

SAN/0499-61  
MDC G8555

DOE/SF/10499-T9 REV  
(STMPO-214)

10 MWe Solar Thermal  
Central Receiver Pilot Plant

SOLAR FACILITIES DESIGN INTEGRATION

**PURCHASED DEMINERALIZED WATER  
TECHNICAL REQUIREMENTS SPECIFICATION  
(RADL ITEM 7-12A)**

Revised September 1980  
July 1980

REV. 3, OCT., 1980

WORK PERFORMED UNDER CONTRACT  
DE-AC03-79SF10499

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

RECEIVED  
SEP 24 1980

TOWNSEND & BOTTUM INC.



**U.S. Department of Energy**

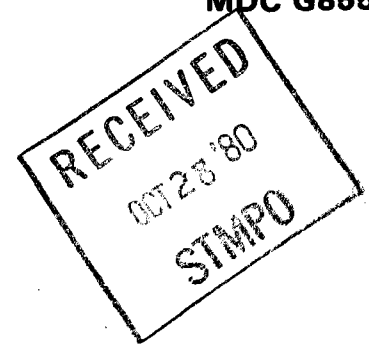


**Solar Energy**

SAN/0499-61  
MDC G8555

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Central Receiver Pilot Plant

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**UPDATE**

**U.S. Department of Energy**



**Solar Energy**

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

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**PURCHASED DEMINERALIZED WATER  
TECHNICAL REQUIREMENTS SPECIFICATION  
(RADL ITEM 7-12A)**

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**July 1980  
Revised September 1980**

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

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

## PREFACE

This technical requirements specification 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 7-12A. This document was prepared by Stearns-Roger Engineering Corporation under MDAC Subcontract Number 78012035.

This document defines the technical requirements for the leasing of a demineralized water system which will provide make-up demineralized water to the EPGS and quality water to be used for washing the mirrors of the heliostats.

RADL 7-12A includes two parts as follows:

- ° Technical Specifications for Purchased Demineralized Water System identified as STMPO Drawing 40M700-33S (Stearns-Roger Project C-21700).
- ° Supplemental construction drawings as identified in Paragraph 2.1 of the Technical Specification.

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

**SPECIFICATION**

**S-R SC-L2**

**D.O.E. NO. 40 M 700 - 33S**

**May 16, 1980**

**Rev. 1 June 27, 1980**

**Rev. 2 September 12, 1980**

**Rev. 3 October 10, 1980**

**for**

## **PURCHASED DEMINERALIZED WATER**

**for**

**10MW<sub>e</sub> SOLAR PILOT PLANT**

**SOLAR - ONE**

**DAGGETT, CA.**

**Prepared by:**

**Stearns-Roger**  
ENGINEERING CORP.

**PROJECT NO. C-21700**

SPECIFICATION  
S-R SC-L2

D.O.E. NO. 40 M 700-33S

PURCHASED DEMINERALIZED WATER

REVISION NO. 3

OCTOBER 10, 1980

Revision No. 3 is issued to delete the flow control valves under trailer mounted equipment, change the number of flow rate meters from two to one on the polisher, change Ponon to Boron for the raw water design analysis, and to include a more complete description of the conductivity monitor for the polisher.

Remove pages TI-1, TI-2, TI-3, and TI-5 and replace with corresponding pages attached hereto. Changes to these pages are denoted by a Rev. 3 in the right-hand margin opposite the items changed.

This Revision 3 includes:

1. Cover sheet
2. The following revised Technical Information Pages

TI-1  
TI-2  
TI-3  
TI-5

SPECIFICATION  
S-R SC-L2

D.O.E. NO. 40 M 700-33S

PURCHASED DEMINERALIZED WATER

REVISION NO. 2

SEPTEMBER 12, 1980

Revision No. 2 issued to revise the influent and effluent analysis and to further describe the demineralizing equipment and addition of polisher effluent conductivity monitor.

Remove pages TI-1, TI-2, TI-3, TI-4, TI-5, TI-6, TI-7, and TI-8 and replace with corresponding pages attached hereto. Changes to these pages are denoted by a Rev. 2 in the right-hand margin opposite the items changed.

This Revision 2 includes:

1. Cover sheet
2. The following revised Technical Information Pages

TI-1  
TI-2  
TI-3  
TI-3a  
TI-4  
TI-5  
TI-5a  
TI-6  
TI-7  
TI-7a  
TI-8

SPECIFICATION  
S-R SC-L2  
D.O.E. NO. 40 M 700-33S  
PURCHASED DEMINERALIZED WATER

REVISION 1  
JUNE 27, 1980

Revision 1 issued to revise the referenced drawings from preliminary status to AFC.

Remove page TI-2 and replace with corresponding page attached hereto. Changes to this page are denoted by Rev. 1 in the right-hand margin opposite the items changed.

This Revision 1 includes:

1. Cover Sheet
2. Technical Information page TI-2.



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INSTRUCTIONS TO BIDDERS

Bidders will submit a written and signed quotation giving the following information:

1. Quote on a unit price basis, i.e., cost per gallon of water processed.
2. Give make and description of item quoted including locations, size and types of all piping and electrical connections.

Include with proposal complete descriptive literature and detailed specifications.

3. Shipping and transportation:

- A. State shipping point and current location of equipment.
- B. Shipment will be on the basis of vendor furnishing or paying all in-bound and out-bound shipping costs.
  - a. If vendor is unable to quote on this basis, he will state the amount of in-bound and out-bound freight cost.
  - b. Vendor will receive a minimum of 5 days notice prior to termination of water supply requirements.

4. Maintenance and Repairs

- A. State condition of proposed equipment (new, used, reconditioned, etc.).
- B. Operational maintenance and service will be the responsibility of the Vendor.
  - a. State location of closest service personnel and parts warehouse.
  - b. State method and facilities vendor will use to maintain equipment.
- E. The user will maintain all equipment in good order, normal operational wear and usage excepted. For any repairs necessary to equipment due to user negligence or damage not repaired prior to return of equipment to owner; user will reimburse owner on the basis of presentation of certified and detailed invoices that are in agreement with user's "Returned Equipment Inspection Report."
- F. The user will reimburse vendor for accessories, tools and spare parts that are received with equipment and not returned with equipment, provided receipt of such accessories, tools and parts agree with user's "Received Equipment Inspection Report."

INSTRUCTIONS TO BIDDERS (CONTD)

- a. State if accessories, tools and parts furnished with equipment will be billed to lessee as a separate charge.
- b. Submit priced inventory of all accessories, tools and parts to be furnished with proposed equipment.

5. Insurance

The user will maintain insurance coverage, at the expense of the user, on all equipment for the period of time such equipment is in the custody of the user. Insurance coverage will be based on the vendor's stated value of equipment.

State value of proposed equipment.

DETAILED SPECIFICATION  
FOR  
PURCHASED DEMINERALIZED WATER

1.0. SCOPE OF WORK

The services to be provided under this Specification shall consist of producing demineralized water of the quality and quantity specified herein for the 10 MWe Solar Pilot Plant located near Daggett, California.

1.1. Description of Work

1.1.1. The work to be performed hereunder shall include but not necessarily be limited to the furnishing, temporarily installing and maintaining of the equipment required to produce demineralized water as specified herein.

1.1.2. Demineralized water of the quality specified shall be provided on an as needed, per gallon basis for makeup to the Demineralized Water Storage Tank (TK-702).

1.1.2.1. This demineralized water shall be produced by on-site treatment of customer supplied raw water of the quality specified herein using trailer mounted equipment.

1.1.2.2. The trailer mounted equipment shall include a demineralizer train containing one (1) primary cation unit, one (1) primary anion unit, two (2) parallel mixed bed units and all interconnecting piping, valves or accessories not specifically identified herein but required to form an operable unit, including flow rate meter.

1.1.2.3. Flexible hose shall be provided to connect water supply to trailer mounted equipment from building connection (interface VF9) as shown on drawing 40P7005133155. Flexible hose shall be provided to connect trailer mounted equipment return line to control valve connection (interface VE10) as shown by drawing 40P7005133164.

1.1.2.4. The trailer mounted equipment shall be provided with freeze protection from the inlet flexible hose connection, as needed, to the outlet flexible hose connection.

1.1.3. Portable demineralizer equipment shall be provided to further treat or polish that portion of demineralized water used as makeup to the Condensate Storage Tank (TK-902) to the quality specified herein.

1.1.3.1. This portable polishing equipment shall be installed inside the Raw/Service Water Pump Building (BL-702) as shown on Drawing 40P7005133155 between 2 inch valve interfaces VE11, VE12 and VE13. All piping required for connecting to the interfaces as shown shall be furnished as part of this equipment.

2  
3  
2  
2,3

DETAILED SPECIFICATION (CONTD)

1.1.3.2. This portable polishing equipment shall be skid-mounted and consist of two (2) portable mixed bed units, and all valves, pipe or accessories not specifically identified herein but required to form a complete operating system, including flow rate meter and flow control valves. 2,3

1.2. Work Not Included. The following equipment or services, relating to the services specified, will be provided by others and do not constitute a part of this Specification:

1.2.1. All equipment shown outside of 2 inch valve interfaces VE9 to VE10 and VE11 to VE12 to VE13 on Drawing 40P7005133145.

1.2.2. Supply of dry, oil-free, filtered, compressed air at 125 + 25 psig.

1.2.3. Supply of 120 volt, single phase, 60 hertz electrical power.

2.0. SUPPLEMENTS

The following supplements are included with and form a part of this Specification.

2.1. Estimated Monthly Demineralized Water Storage, Usage and Make-Up Requirements, Figure 1.0 dated 5/8/80.

2.2 Drawings

<u>Dwg. No.</u>	<u>S-R Dwg. No.</u>	<u>Rev.</u>	<u>Title</u>	
40C1005133900	G1-1	6	General Arrangement Site Plan	2
40C1005133901	G1-2	2	General Arrangement Core Plan	2
40C1005133911	Y1-1	1	Plot Plan	2
40P7005133145	P3-6	2	Piping & Instrument Diagram Water Treatment	2,3
40P7005133155	P6-1	1	Plan & Sections Raw/Service Water Pump Building	2
40P7005133164	P9-16	0	Yard Piping - Water Treating Area Plan	

3.0. CONDITIONS OF SERVICE

3.1. Environmental. The equipment furnished shall incorporate all features necessary for satisfactory operation under the following environmental conditions:

3.1.1. The plant elevation is 1940 feet above sea level.

3.1.2. The normal ambient temperature range is 16°F to 113°F.

3.1.3. The survival temperature range is 9°F to 117°F.

DETAILED SPECIFICATION (CONTD)

3.1.4. The plant is located in a Uniform Building Code Seismic Zone 3.

3.2. Operational. The equipment furnished shall incorporate all features necessary for satisfactory operation under the following conditions:

3.2.1. Water to the trailer mounted equipment will be supplied from the Service Water Storage Tank at an influent pressure of 60 to 80 psig. System design pressure is 150 psig. 2  
2

3.2.2. The raw water will have the following design analysis.

Calcium	400 mg/l as CaCO <sub>3</sub>
Magnesium	94 mg/l as CaCO <sub>3</sub>
Sodium	286 mg/l as CaCO <sub>3</sub>
Total Cations	<u>780</u> mg/l as CaCO <sub>3</sub>

Alkalinity	339 mg/l as CaCO <sub>3</sub>	2
Sulfate	208 mg/l as CaCO <sub>3</sub>	
Chloride	185 mg/l as CaCO <sub>3</sub>	
Nitrate	48 mg/l as CaCO <sub>3</sub>	
Total Anions	<u>780</u> mg/l as CaCO <sub>3</sub>	

Silica	35 mg/l as SiO <sub>3</sub>
Fluoride	0.8 mg/l as F
Boron	0.6 mg/l as B
Iron	0.43 mg/l as Fe
Total Dissolved Residue	870 mg/l
pH	7.4

2,3

3.2.3. The portable polishing equipment will be supplied with demineralized water produced by the trailer mounted equipment at an influent pressure of 43 psig. System design pressure is 75 psig. 2  
2

4.0. DESIGN REQUIREMENTS

4.1. General

4.1.1. The demineralizer vessels and interconnecting piping and valves shall be constructed of materials compatible with the intended service to prevent any corrosion products from contaminating the demineralized water.

4.1.2. The demineralizer vessels and interconnecting piping shall be protected from overpressurization in the event that influent pressures increase to the system design pressure specified in Article 3.0, CONDITIONS OF SERVICE. 2

4.1.3. Each demineralizer vessel shall be equipped with a valved effluent sampler connection. 2

4.2. Demineralized Water - Trailer Mounted Equipment. Demineralized water shall be produced by on-site treatment of customer supplied raw water using trailer mounted equipment in accordance with the following requirements.

DETAILED SPECIFICATION (CONTD)

4.2.1. The trailer mounted equipment shall be designed to produce demineralized water at a flow rate of 30 gpm when the two mixed beds units are in service simultaneously. | 2

4.2.2 The demineralized water produced by the trailer mounted equipment shall meet the following criteria: | 2

Total Solids	200 ppb-max	
Silica	20 ppb-max	2
Conductivity (Cation)	1.0 micromho/cm-max	

4.2.3. The trailer mounted equipment shall comply with the following design parameters: |

Minimum bed depth - all units	36 inches	2
Minimum diameter - cation and anion units	36 inches	
Minimum diameter - mixed bed unit	13 inches	

DETAILED SPECIFICATION (CONTD)

- 4.2.4. The trailer mounted equipment shall have the capacity to produce a minimum of 20,000 gallons of demineralized water of the quality specified between each regeneration. 2
- 4.2.5. The estimated water usage is shown in Figure 1.0, Estimated Monthly Demineralized Water Storage, Usage and Make-Up Requirements. 2
- 4.2.6. The trailer mounted equipment will be connected to the permanent plant equipment and left to process water on an "as needed" basis as regulated by the Demineralized Water Storage Tank level control valve. 2
- 4.2.7. Upon exhaustion of the resin, the trailer mounted equipment shall be removed and another trailer mounted system with freshly regenerated resin installed. 2
- 4.2.8. The pressure drop through the trailer mounted equipment at maximum flow shall not exceed 35 psi. 2
- 4.2.9. Conductivity Monitor 2
- 4.2.9.1. One conductivity monitor with sensing element shall be provided for indication of the demineralizer output. 2
- 4.2.9.2. The monitor shall provide local indication of conductivity. The indicating dial shall be selectable to read 0-1 micromho/cm and 0-10 micromho/cm full scale. 2
- 4.2.9.3. The monitor shall have a 4-20 ma output proportional to conductivity for user remote monitoring of conductivity. 2
- 4.2.9.4. The monitor shall provide one normally open and one normally closed SPST relay contact output for user remote high conductivity alarm and control. Setpoint for the relay operation shall be adjustable over the entire indicating dial range. A deadband adjustable from 1 to 5 percent of full scale shall be provided. Relay output contacts shall be rated for 10 amperes continuous, 2.2 amperes make and break at 120 volt dc or 10 amperes continuous, 60 amperes make and 6 amperes break at 120 volts ac as defined by NEMA ICS 2-125. 2
- 4.2.10. During start-up, the demineralized water demand will be higher than estimated in Figure 1.0. More frequent replacements or equipment with larger capacities may be required. 2
- 4.2.11. Vendor shall furnish and install a positive displacement type flow totalizing indicator similar to a Brooks-Meinecke Model 3300 or SFDI approved equal to record the amount of demineralized water produced. The instrument shall be furnished with a permanently attached metal identification tag stamped FQI-1205. 2
- 4.2.12. Freeze protection is to be designed for a minimum ambient temperature of 90°F, rated at 120 VAC, and shall be complete with all required control equipment. 2



DETAILED SPECIFICATION (CONTD)

4.3. Polishing Equipment. Equipment shall be provided to further polish that portion of the demineralized water produced by the trailer mounted equipment needed as makeup to the Condensate Storage Tank. This equipment shall be in accordance with the following requirements. 2

4.3.1. The polishing equipment shall be designed to produce demineralized water at a flow rate of 16 gpm when the two mixed bed units are in service simultaneously. 2

4.3.2. The effluent of the polishing equipment shall meet the following criteria:

Iron	0-5 ppb as Fe	
Copper	2-5 ppb as Cu	
Sodium Chloride	2-20 ppb as Na	2
	2-20 bbp as Cl	
Total Solids	50 ppb-max	
Silica	20 ppb-max	
Conductivity (Cation)	0.3 micromho/cm-max	

4.3.3. Each of the mixed bed units shall comply with the following design parameters:

Minimum Diameter	10 inches	
Minimum capacity - cation and anions	16000 grains	2
Minimum Resin Inventory	2 cubic feet	
Minimum Bed Depth	42 inches.	

4.3.4. The polishing equipment will be installed in the Raw/Service Water Pump Building as shown on Drawing 40P7005133155 and left to process water on an "as needed" basis as regulated by the Condensate Storage Tank level control valve. 2

4.3.5. The polishing equipment shall include a conductivity monitor, controls, and valves to recirculate the polisher effluent to the demineralized water storage tank upon initial demand for water by the Condensate Storage Tank Level Control Valve, and automatically divert the effluent to service when conductivity becomes acceptable. Should conductivity become unacceptably high during service flow, recirculation shall automatically resume. An adjustable timer shall be provided to activate contacts for user remote excessive rinse alarm in the event that recirculation exceeds a preset time interval. The monitor shall be as described in paragraphs 4.2.9.1, 4.2.9.3, and 4.2.9.4, and shall have a range of 0-1 micromho/cm full scale for local indication of conductivity. 2

4.3.6. Upon exhaustion of the resins, the depleted equipment shall be replaced with mixed bed units containing freshly regenerated resins. 2

4.3.7. During start-up, the demineralized water demand will be higher than in normal operation. As a result, more frequent replacements or equipment with larger capacities may be required. 2

DETAILED SPECIFICATION (CONTD)

4.3.8. The pressure drop through the polishing equipment at maximum flow shall not exceed 20 psi. 2

5.0. GUARANTEES

5.1. The Seller shall guarantee that trailer mounted equipment shall be provided as required by site water usage and shall produce demineralized water of the quality and quantity specified in Article 4.0 DESIGN REQUIREMENTS when supplied with raw water of the quality specified in Article 3.0 CONDITIONS OF SERVICE. 2

5.2. The Seller shall guarantee that the portable polishing equipment shall be provided as required by site water usage and shall produce demineralized water of the quality specified in Article 4.0 DESIGN REQUIREMENTS when supplied with demineralized water produced by the Seller supplied trailer mounted equipment. 2

5.3. The Seller shall guarantee that the required equipment will be available as needed at all times during the service life specified in Article 6.0 SCHEDULE. 2

5.4. The Seller shall guarantee that the cost of the produced demineralized water (\$/gallon) shall be firm for the service life specified in Article 6.0 SCHEDULE. 2

DETAILED SPECIFICATION (CONTD)

6.0. SCHEDULE

6.1. The Seller shall begin providing the services required under this Specification on August, 1981.

6.2. The Seller shall provide uninterrupted service for the period beginning with the initial start-up testing (12 months) and extending through the five (5) year operating life of the pilot plant.

2

EQUIPMENT APPLICATION DATA

NAME OF SELLER \_\_\_\_\_

1. SPECIFIC DATA

A. Demineralizers

	<u>Primary Cation Unit</u>	<u>Primary Anion Unit</u>	<u>Mixed Beds (Trailer Mounted)</u>	<u>Mixed Beds Portable</u>	
(1) Size, Diameter x Height, ft	_____	_____	_____	_____	
(2) Resin Quantity, ft <sup>3</sup>					
a. Cation	_____		_____	_____	2
b. Anion		_____	_____	_____	2
(3) Resin Capacity, kgr/ft <sup>3</sup>					
a. Cation	_____		_____	_____	2
b. Anion		_____	_____	_____	2
(4) Resin Manufacturer					
a. Cation	_____		_____	_____	2
b. Anion		_____	_____	_____	2
(5) Resin Type					
a. Cation	_____	_____	_____	_____	
b. Anion	_____	_____	_____	_____	

EQUIPMENT APPLICATION DATA (CONTD)

NAME OF SELLER \_\_\_\_\_

B. Effluent Water Quality

	<u>Mixed Beds (Trailer Mounted)</u>	<u>Mixed Beds (Portable)</u>
(1) Silica, ppb	_____	_____
(2) Total Solids, ppb	_____	_____
(3) Cation Conductivity, micromhos/cm	_____	_____
(4) Iron, ppb Fe		_____
(5) Copper, ppb Cu		_____
(6) Sodium, ppb Na		_____
(7) Chloride, ppb Cl		_____

EQUIPMENT APPLICATION DATA (CONTD)

NAME OF SELLER \_\_\_\_\_

C. INTERFACE & DESIGN DATA

(1) Trailer Mounted Equipment

- a. Inlet (size/type) \_\_\_\_\_
- b. Outlet (size/type) \_\_\_\_\_
- c. Max flow rate (GPM) \_\_\_\_\_
- d. Operating voltage/amps \_\_\_\_\_
- e. Control air (press/flow) \_\_\_\_\_
- f. Pressure drop (psi at max flow rate) \_\_\_\_\_

2  
2

(2) Portable Polishing Equipment

- a. Inlet (size/type) \_\_\_\_\_
- b. Outlet (size/type) \_\_\_\_\_
- c. Recirculation to Storage (size/type) \_\_\_\_\_
- d. Max flow rate (GPM) \_\_\_\_\_
- e. Operating voltage/amps \_\_\_\_\_
- f. Control air (press/flow) \_\_\_\_\_
- g. Pressure drop (psi at max flow rate) \_\_\_\_\_

2

(3) Overall Dimensions

- |           | <u>Trailer Unit</u> | <u>Polisher Unit</u> |
|-----------|---------------------|----------------------|
| a. Height | _____               | _____                |
| b. Width  | _____               | _____                |
| c. Length | _____               | _____                |

2

2. EXPERIENCE OF BIDDER

A. How many years has the Bidder been regularly engaged in supplying demineralized water?

No of Years \_\_\_\_\_

B. Identify other clients for whom demineralized water was supplied in comparable quantities

2

EQUIPMENT APPLICATION DATA (CONTD)

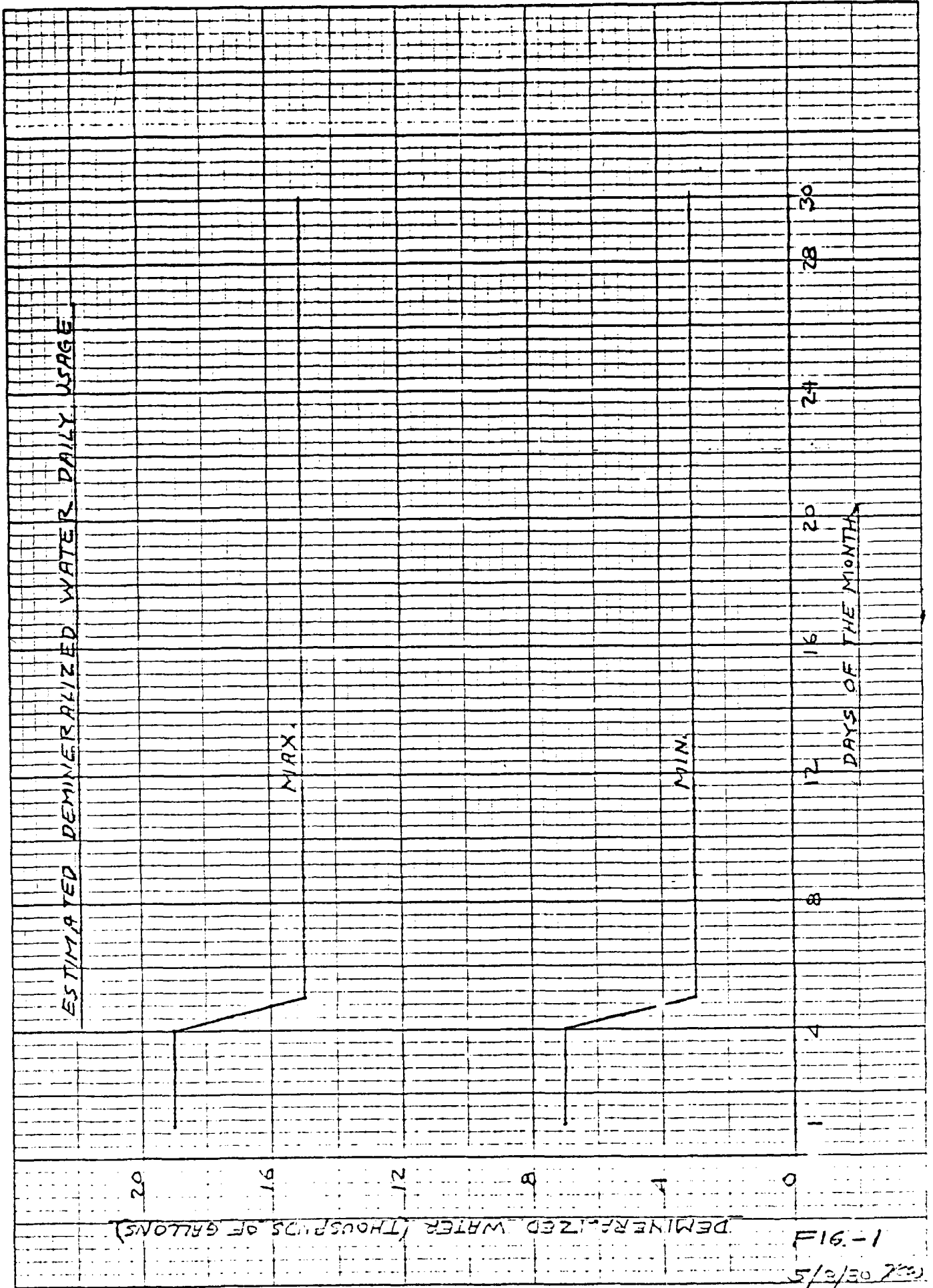
NAME OF SELLER \_\_\_\_\_

Client

Location

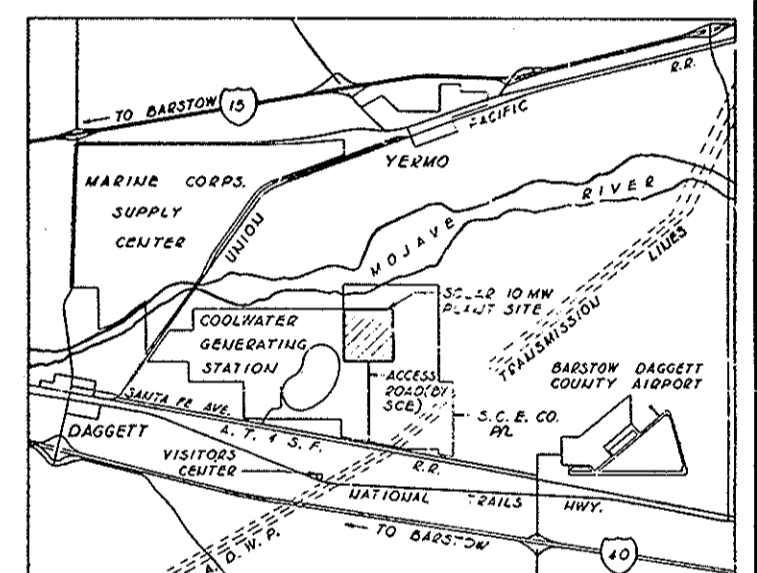
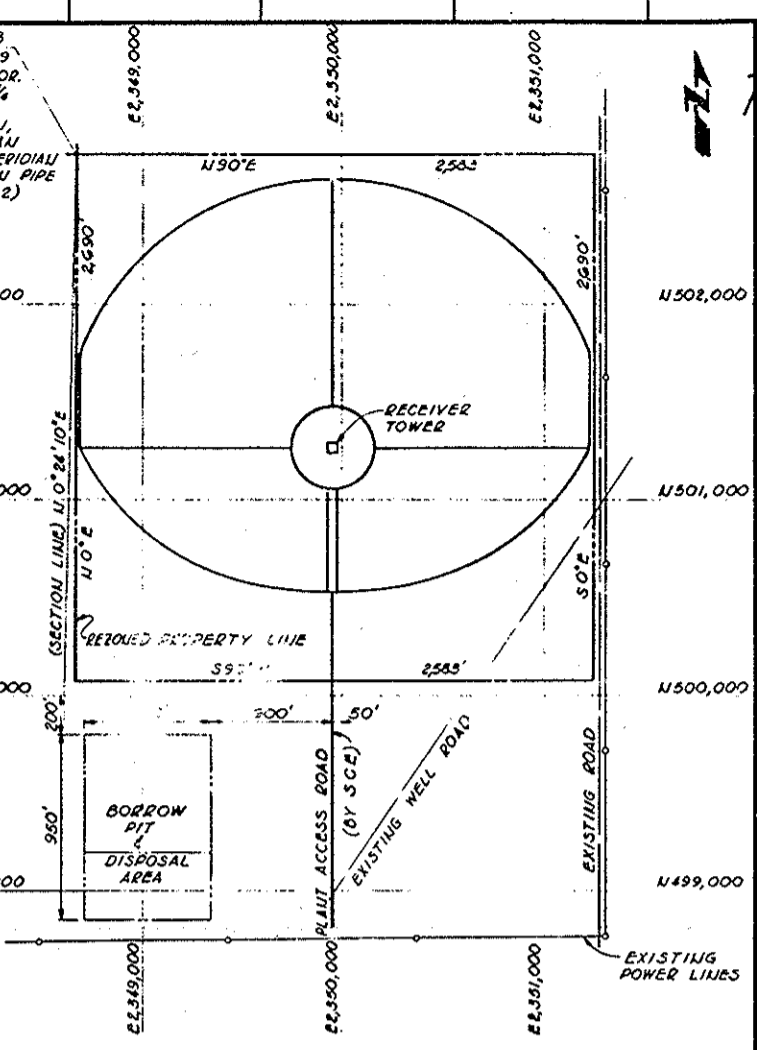
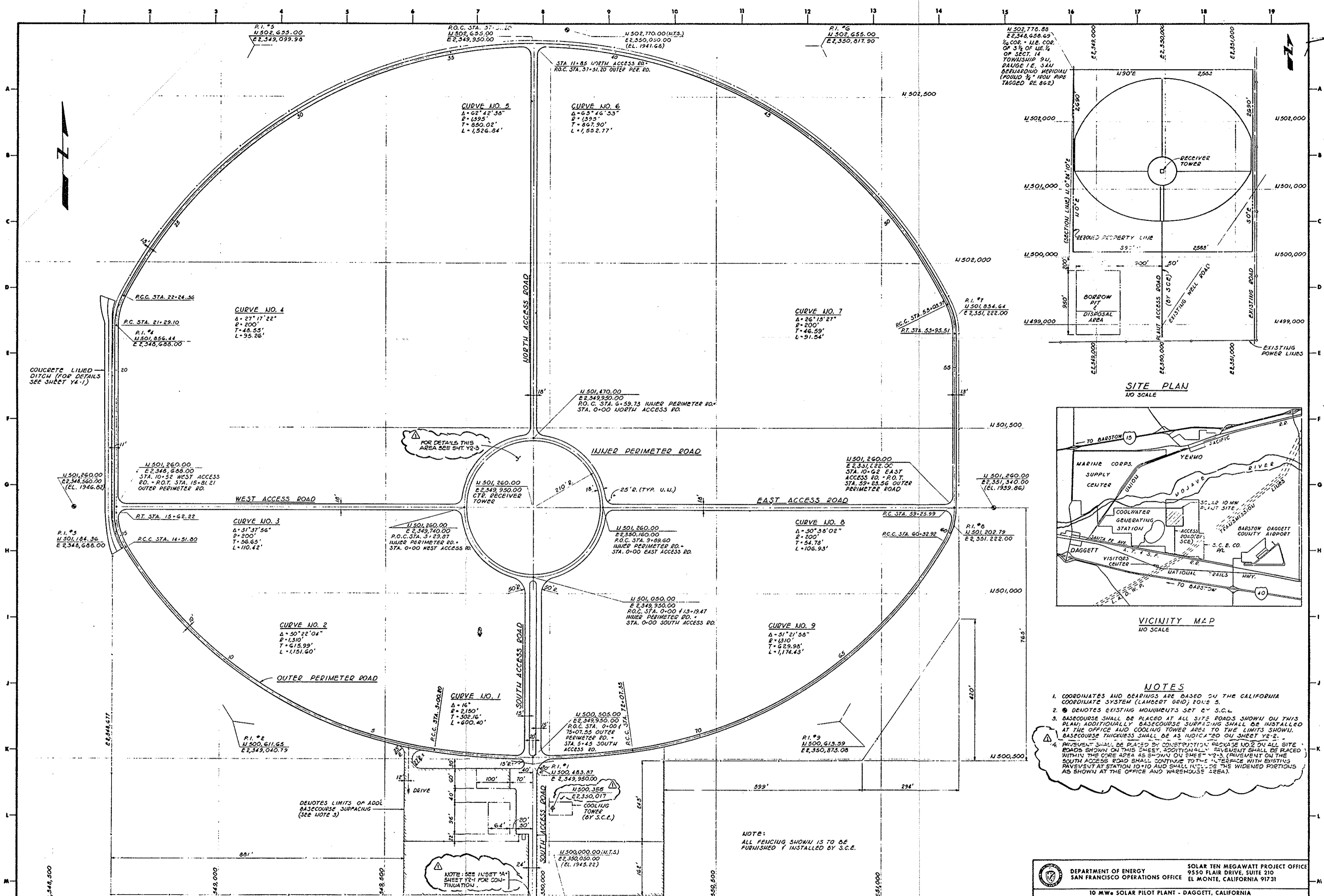
- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_

INSERT --- PURCH. DEMIN. WTR. SPEC. --- SUPPLEMENT



1-91F  
5/2/5





- NOTES**
- COORDINATES AND BEARINGS ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM (LAMBERT GRID); ZONE 5.
  - DENOTES EXISTING MONUMENTS SET BY S.C.E.
  - BASECOURSE SHALL BE PLACED AT ALL SITE ROADS SHOWN ON THIS PLAN; ADDITIONALLY BASECOURSE SURFACING SHALL BE INSTALLED AT THE OFFICE AND COOLING TOWER AREA TO THE LIMITS SHOWN. BASECOURSE THICKNESS SHALL BE AS INDICATED ON SHEET Y2-2.
  - PAVEMENT SHALL BE PLACED BY CONSTRUCTION PACKAGE NO. 2 ON ALL SITE ROADS SHOWN ON THIS SHEET. ADDITIONALLY, PAVEMENT SHALL BE PLACED WITHIN THE CORE AREA AS SHOWN ON SHEET Y2-3 (PREVENT ON THE SOUTH ACCESS ROAD SHALL CONTINUE TO THE INTERFACE WITH EXISTING PAVEMENT AT STATION 10+10 AND SHALL INCLUDE THE WIDENED PORTIONS AS SHOWN AT THE OFFICE AND WAREHOUSE AREA).

NOTE:  
ALL FENCING SHOWN IS TO BE FURNISHED & INSTALLED BY S.C.E.

DEPARTMENT OF ENERGY SOLAR TEN MEGAWATT PROJECT OFFICE  
9550 FLAIR DRIVE, SUITE 210  
SAN FRANCISCO OPERATIONS OFFICE EL MONTE, CALIFORNIA 91731  
10 MW SOLAR PILOT PLANT - DAGGETT, CALIFORNIA

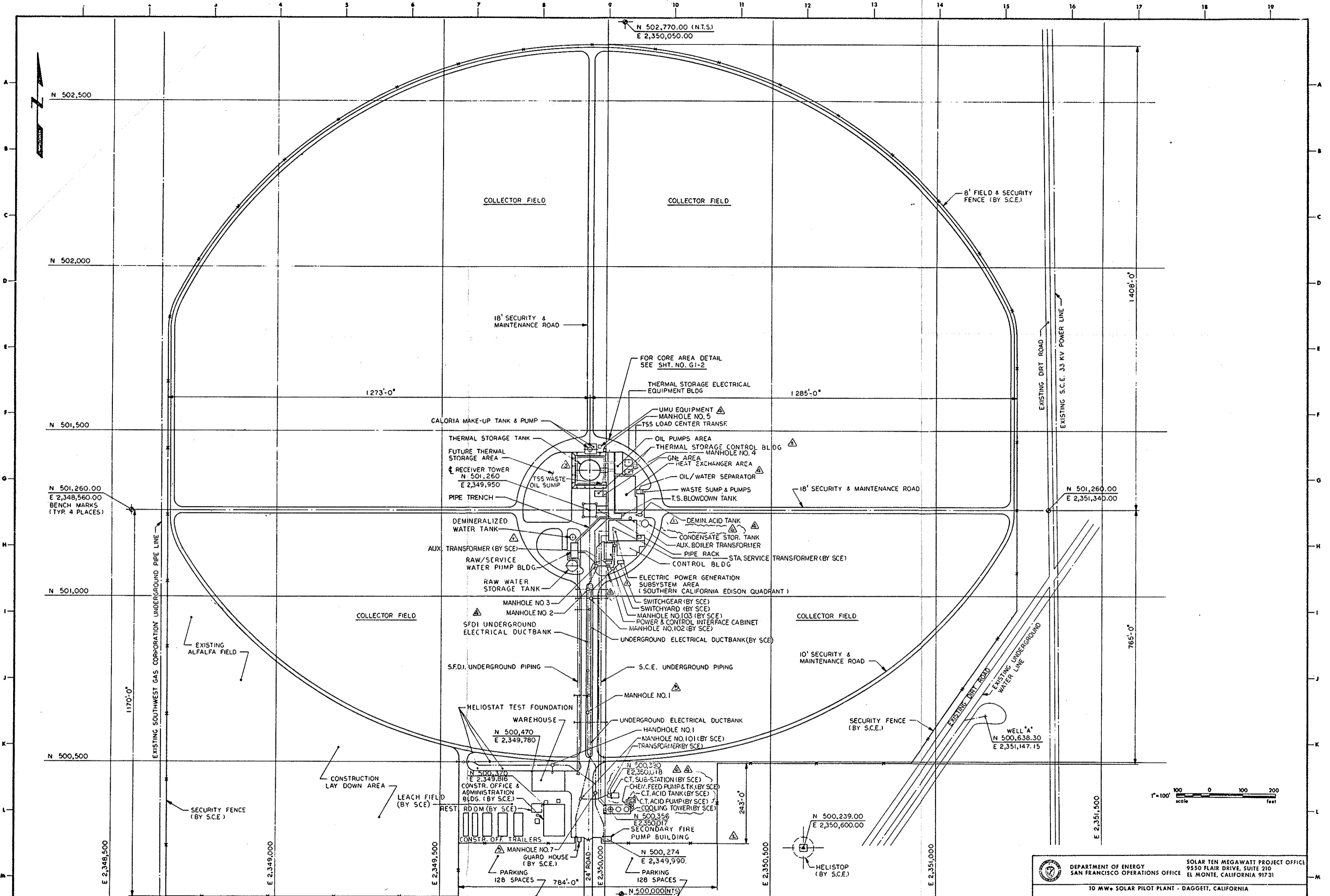
REVISIONS		REFERENCE DRAWINGS		PRINT RECORD		SOLAR FACILITIES DESIGN INTEGRATOR	
NO.	DATE	BY	CHKD.	NO.	DATE	NO.	DATE
1	6-11-79	WJ	WJ	1	6-11-79	1	6-11-79
2	6-11-79	WJ	WJ	2	6-11-79	2	6-11-79
3	6-11-79	WJ	WJ	3	6-11-79	3	6-11-79
4	6-11-79	WJ	WJ	4	6-11-79	4	6-11-79
5	6-11-79	WJ	WJ	5	6-11-79	5	6-11-79

DRAWN: WJ 4-3-79  
 CHECKED: WJ 5-11-79  
 ELECT. CK: WJ 6-11-79  
 STAFF CK: WJ 6-11-79  
 APPROVED: WJ 6-11-79  
 PROJECT NO: 21700  
 SHEET NO: 2934  
 SHEET NO: 11-1  
 REV: 1

**SOLAR FACILITIES DESIGN INTEGRATOR**  
 ROCKWELL INTERNATIONAL  
 STEARNS ROGER  
 ROCKEFORNE  
 SPO

**TITLE**  
 SITE PLAN P'IN LAYOUT  
**SCALE**  
 1"=100'  
**DATE**  
 7-8-80  
**SHEET NO.**  
 1 OF 1  
**REV.**  
 1

**CIVIL (Y1-1)**  
 43C100513391J



NO.	REVISIONS	DATE	BY	CHECKED	APP. FOR CONST.
0	APPROVED FOR CONST. FOR REF. CONET. PWS #1	6-17-79	BSM		
1		6-17-79	BA		
2					
3					
4					
5					
6					

NO.	REFERENCE DRAWINGS	DATE	BY	CHECKED	APP. FOR CONST.
1	Y-1 SITE PLOT PLAN LAYOUT				
2					
3					
4					
5					
6					

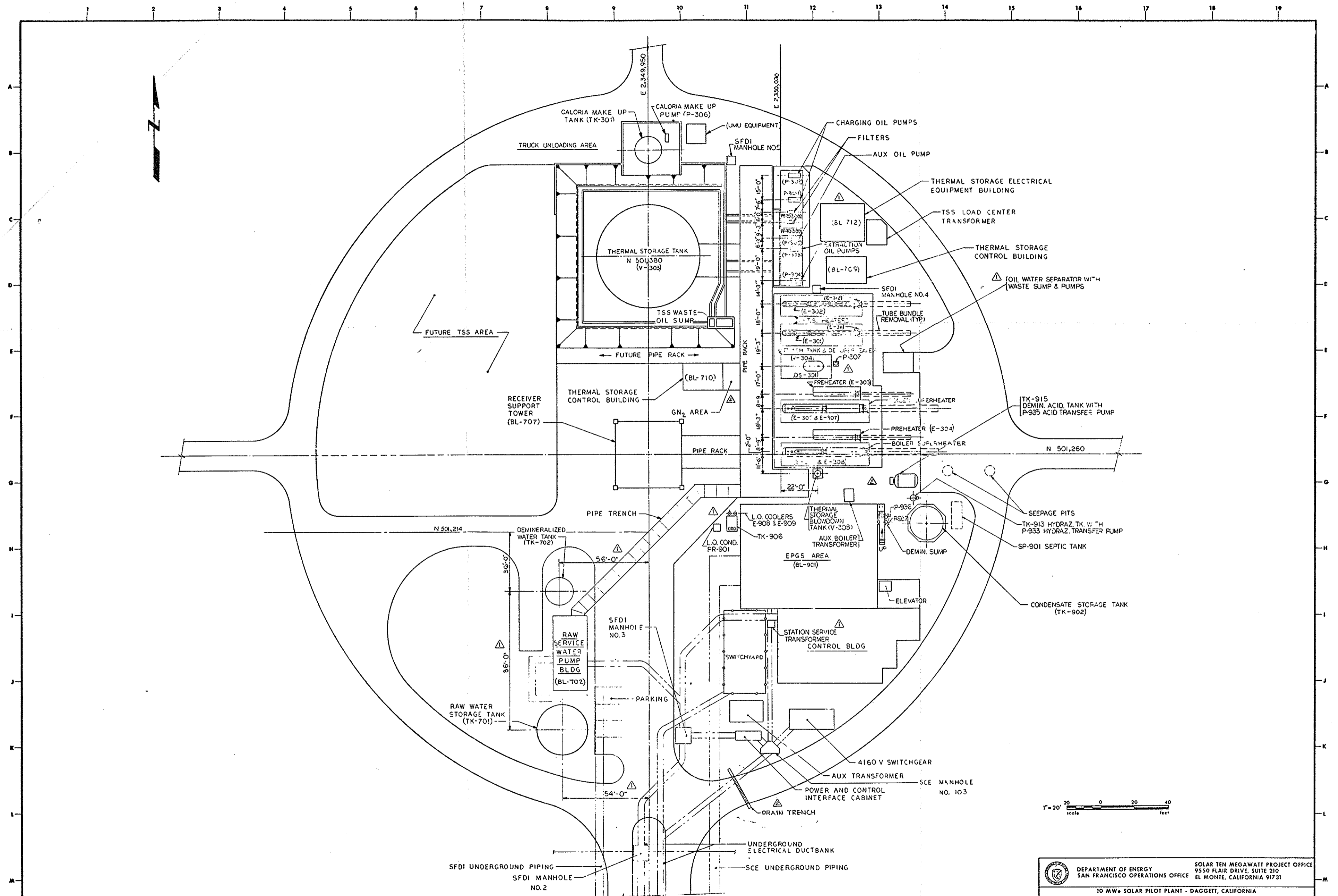
  

NO.	PRINT RECORD	DATE	BY	CHECKED	APP. FOR CONST.
0					
1					
2					
3					
4					
5					
6					

DEPARTMENT OF ENERGY SOLAR TEN MEGAWATT PROJECT OFFICE  
SAN FRANCISCO OPERATIONS OFFICE 9550 FLAIR DRIVE, SUITE 210  
EL MONTE, CALIFORNIA 91731  
10 MW SOLAR PILOT PLANT - DAGGETT, CALIFORNIA

TITLE	SCALE	DATE	DRAWING NO.	SHEET NO.
GENERAL ARRANGEMENT PLOT PLAN	1"=100'	9-12-80	40C100513390	1 OF 1

Form 22079



DEPARTMENT OF ENERGY  
 SOLAR TEN MEGAWATT PROJECT OFFICE  
 9550 FLAIR DRIVE, SUITE 210  
 EL MONTE, CALIFORNIA 91731

10 MW SOLAR PILOT PLANT - DAGGETT, CALIFORNIA

NO.	REVISIONS	DATE	BY	APP'D	DESC.
0	APPROVED FOR CONSTRUCTION PERMITS	11/11/88	DP	MS	
1	GENERAL REVISIONS	11/11/88	DP	MS	
2	DELETED MANHOLE FROM PROPERTY RELEASE LOCATIONS	11/11/88	DP	MS	

NO.	DATE	BY	APP'D	DESC.
0	11/11/88	DP	MS	
1	11/11/88	DP	MS	
2	11/11/88	DP	MS	

NO.	DATE	BY	APP'D	DESC.
0	11/11/88	DP	MS	
1	11/11/88	DP	MS	
2	11/11/88	DP	MS	

NO.	DATE	BY	APP'D	DESC.
0	11/11/88	DP	MS	
1	11/11/88	DP	MS	
2	11/11/88	DP	MS	

NO.	DATE	BY	APP'D	DESC.
0	11/11/88	DP	MS	
1	11/11/88	DP	MS	
2	11/11/88	DP	MS	

**SOLAR FACILITIES DESIGN INTEGRATOR**

McDonnell Douglas  
 Rockwell International  
 Rockwell Collins

STEVENSON, ILLINOIS  
 ROCKWELL INTERNATIONAL  
 10000 WILSON AVENUE  
 ROCKWELL, ILLINOIS 60087  
 TEL: (312) 229-3000  
 FAX: (312) 229-3001

DATE: 11/11/88  
 SHEET NO: 1 OF 1  
 REV: 2

TITLE  
 GENERAL ARRANGEMENT  
 CORE AREA

SCALE: 1" = 20'

DATE: 9-12-88

GENERAL ARRANGEMENT (G1-2)

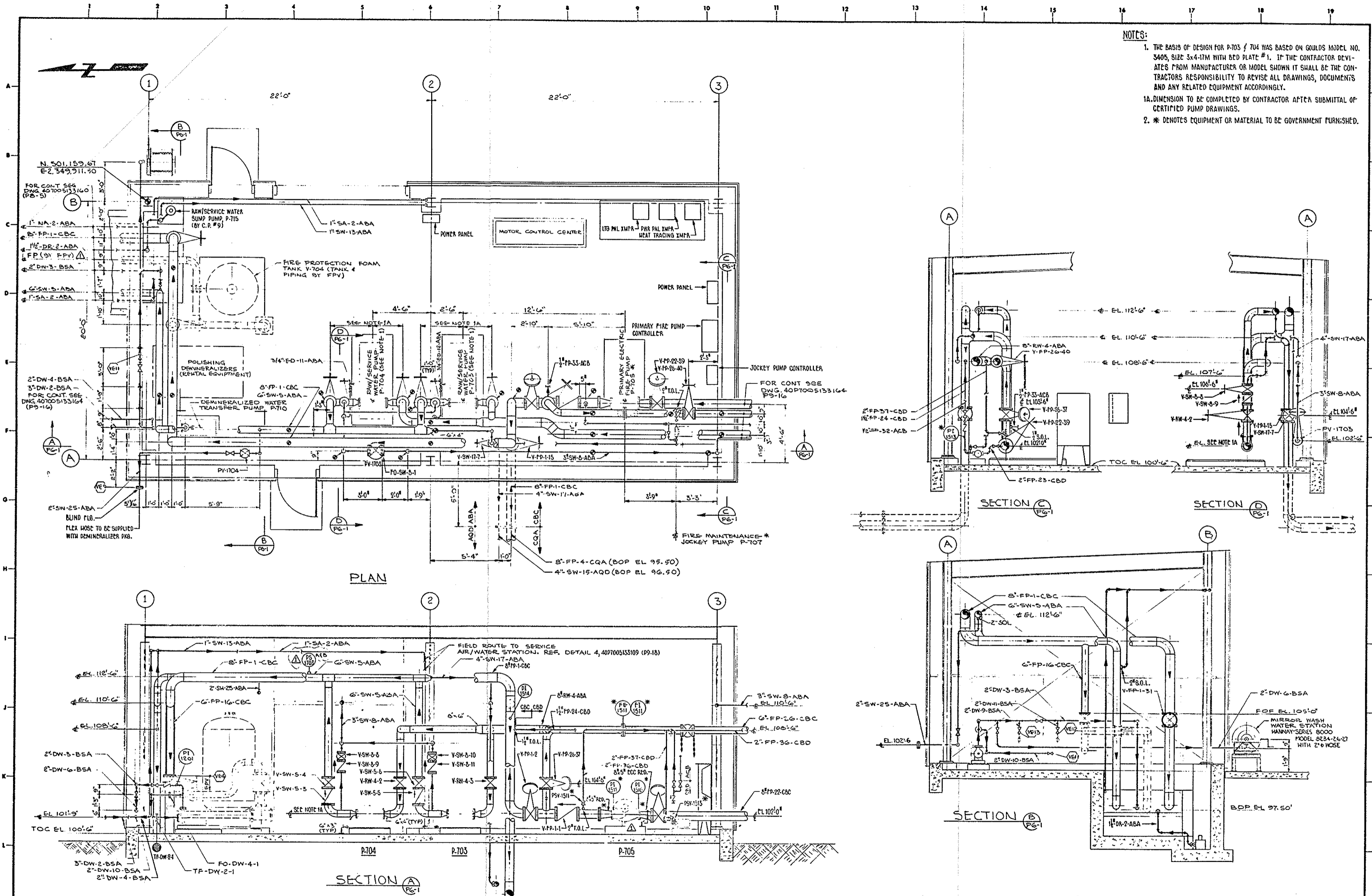
DRAWING NO.: 4-C-1005133901

SHEET NO.: 1 OF 1

REV: 2

Form 2079

- NOTES:**
1. THE BASIS OF DESIGN FOR P-703 & 704 WAS BASED ON GOULDS MODEL NO. 3405, SIZE 3x4-17M WITH BED PLATE #1. IF THE CONTRACTOR DEVIATES FROM MANUFACTURER OR MODEL SHOWN IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REVISE ALL DRAWINGS, DOCUMENTS AND ANY RELATED EQUIPMENT ACCORDINGLY.
  - 1A. DIMENSION TO BE COMPLETED BY CONTRACTOR AFTER SUBMITTAL OF CERTIFIED PUMP DRAWINGS.
  2. \* DENOTES EQUIPMENT OR MATERIAL TO BE GOVERNMENT FURNISHED.



REVISIONS				REFERENCE DRAWINGS				PRINT RECORD			
NO.	DATE	BY	CHKD	APPD	DOC NO.	REVISION NO.	DATE	DRWN	CLS	DATE	FOR APPROVAL
0											
1											

DEPARTMENT OF ENERGY SOLAR TEN MEGAWATT PROJECT OFFICE  
 9550 FLAIR DRIVE, SUITE 210  
 SAN FRANCISCO OPERATIONS OFFICE EL MONTE, CALIFORNIA 91731

10 MW SOLAR PILOT PLANT - DAGGETT, CALIFORNIA

**SOLAR FACILITIES DESIGN INTEGRATOR**

MOOREHEAD DOUBLAS Rockwell International

STEVEN MOORE  
 ROCKY THRE  
 MOC  
 SPO

DATE 6-20-80

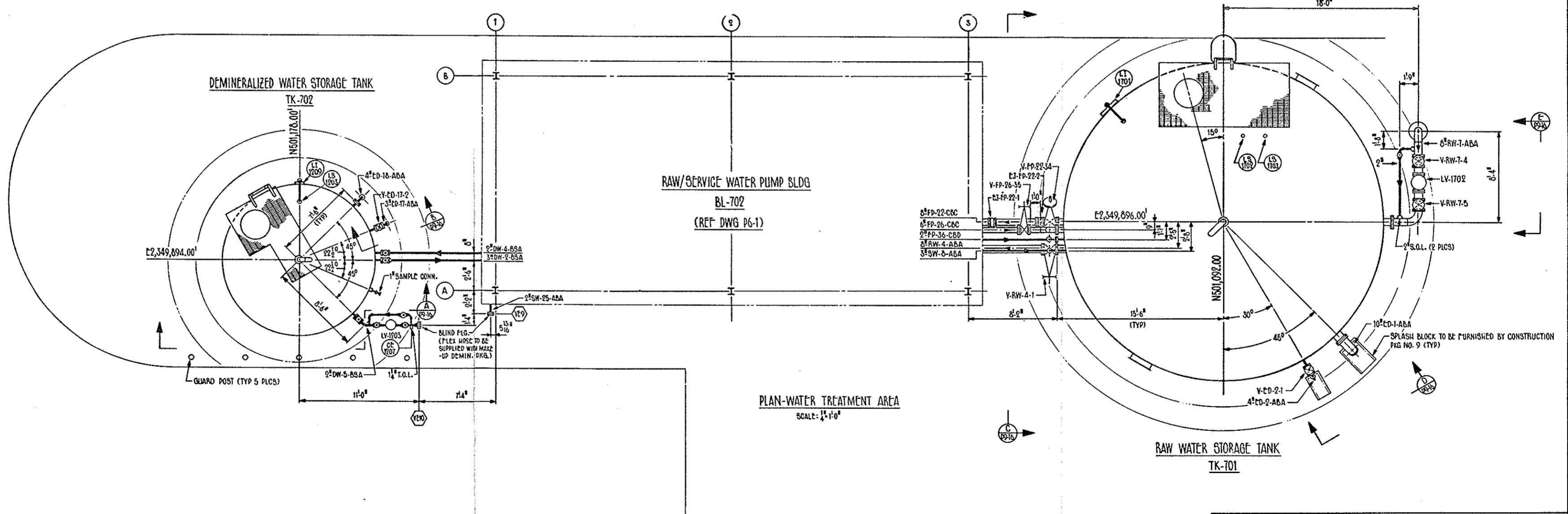
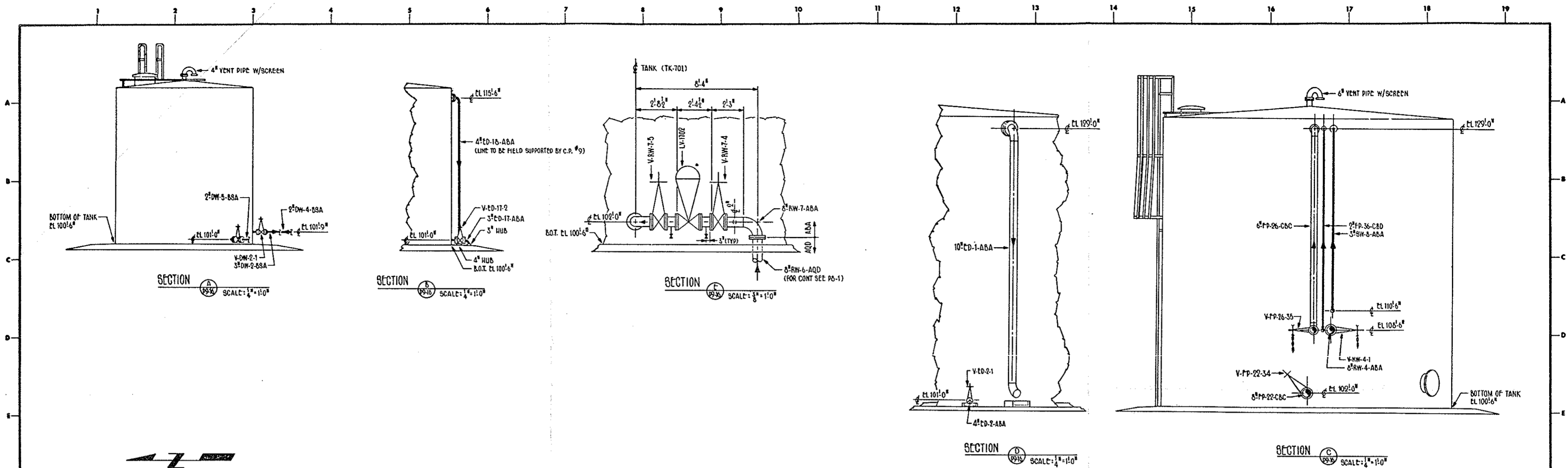
PROJECT NO. C-21700  
 SHEET NO. XL-22934  
 SHEET NO. 26-1

DATE 9-12-80

1 OF 1

PIPING ARRANGEMENTS AUX BLDG (P6-1) 40P005133155





REVISIONS		DATE	BY	CHKD	APPD	DOC NO	REFERENCE DRAWINGS	PRINT RECORD		DRAWN		FOR APPROVAL		SOLAR FACILITIES DESIGN INTEGRATOR		TITLE		SCALE	NOTED		
0	APPROVED FOR CONSTRUCTION C.P.#9	5/23/80	SDR	TM	HL	JAN	GENERAL ARRANGEMENT CORE AREA RAW/SERVICE WATER PUMP BLDG PLAN & SECTIONS UNDERGROUND YARD PIPING PLAN CORE AREA LAYOUT & GRADING PLAN CORE AREA DEMINERALIZED WATER TANK (TK-702) RAW WATER STORAGE TANK (TK-701)	REVISION NO.	0	0	0	10M	2/19/80	FOR APPROVAL	BY	2/19/80	FOR APPROVAL	BY	2/19/80	DATE	6-20-80
APPROVED FOR CONSTRUCTION C.P.#9		5/23/80	SDR	TM	HL	JAN	GENERAL ARRANGEMENT CORE AREA	REVISION NO.	0	0	0	10M	2/19/80	FOR APPROVAL	BY	2/19/80	FOR APPROVAL	BY	2/19/80	DATE	6-20-80
							RAW/SERVICE WATER PUMP BLDG PLAN & SECTIONS	REVISION NO.	1	2	3	4	5	6	7	8	9	10	11	12	13
							UNDERGROUND YARD PIPING PLAN CORE AREA	REVISION NO.	14	15	16	17	18	19	20	21	22	23	24	25	26
							LAYOUT & GRADING PLAN CORE AREA	REVISION NO.	27	28	29	30	31	32	33	34	35	36	37	38	39
							DEMINERALIZED WATER TANK (TK-702)	REVISION NO.	40	41	42	43	44	45	46	47	48	49	50	51	52
							RAW WATER STORAGE TANK (TK-701)	REVISION NO.	53	54	55	56	57	58	59	60	61	62	63	64	65

**DEPARTMENT OF ENERGY**  
 SOLAR TEN MEGAWATT PROJECT OFFICE  
 9550 FLAIR DRIVE, SUITE 210  
 SAN FRANCISCO OPERATIONS OFFICE  
 EL MONTE, CALIFORNIA 91731

**10 MW SOLAR PILOT PLANT - DAGGETT, CALIFORNIA**

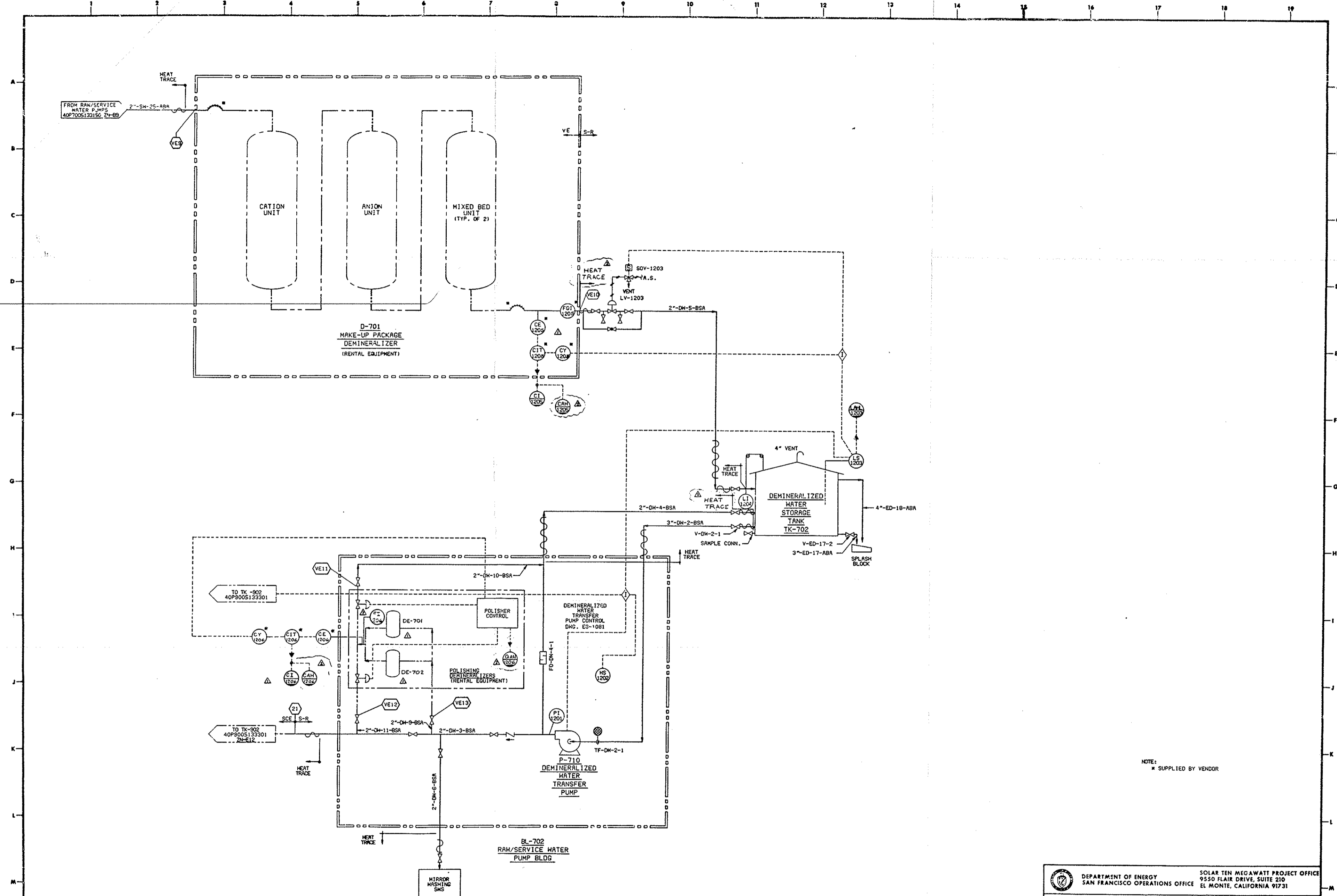
**TITLE**  
 ABOVE GROUND YARD PIPING  
 WATER TREATMENT AREA PLAN

**SCALE**  
 AS NOTED

**DATE**  
 6-20-80

**DRAWING NO.**  
 40P7005133164

**SHEET NO.**  
 1 OF 1



NOTES:  
 \* SUPPLIED BY VENDOR

IGS NO. 8F9179		REVISIONS		DATE		BY		CHK'D		APP'D		DOC NO.		REFERENCE DRAWINGS		PRINT RECORD		DRAWN		IGS		FOR APPROVALS		SOLAR FACILITIES DESIGN INTEGRATOR	
0	APPROVED FOR CONSTRUCTION C.R.#5	1/20/80	IGS	708	220																				
1	FOR CE CITY WAS 1207, CHANGED DE-701 & 702	7/20/80	RRS	7/20																					
2	ADDED INSTR. 1204	7/20/80	RRS	7/20																					
3	ADDED HEAT TRACING TO DW. 2, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21	7/20/80	RRS	7/20																					
4	SD: C SYS. TO CAN-1205 & 1206, DELETED & CI & CAH 1207 & 1208	7/20/80	RRS	7/20																					

DEPARTMENT OF ENERGY  
 SAN FRANCISCO OPERATIONS OFFICE  
 9550 FLAIR DRIVE, SUITE 210  
 EL MONTE, CALIFORNIA 91731

SOLAR TEN MEGAWATT PROJECT OFFICE

10 MW SOLAR PILOT PLANT - DAGGETT, CALIFORNIA

TITLE  
 PIPING AND INSTRUMENT DIAGRAM  
 PLANT SUPPORT SYSTEM (PSS)  
 WATER TREATMENT

SCALE: NONE

DATE: 10-10-80

DRAWING NO.  
 P & ID (P3-6)

40P7005123145

SHEET NO.  
 1 OF 1

REV.

STMPO 214 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	STMPO 212	Plant Support Subsystem Procurement
DOE/SF/10499-T9 REV	STMPO 214	Purchased Demineralized Water
DOE/SF/10499-T45 REV	STMPO 122	Receiver Feedwater Pump and Drive
DOE/SF/10499-T13 REV	STMPO 222	Plant Support Subsystem Procurement
DOE/SF/10499-T27 REV	STMPO 127	Master Control Subsystem Hardware
DOE/SF/10499-T25 REV 2	STMPO 206	System Integration Lab Test Plan
MDC-G-8591 REV	STMPO 220	Plant Support Subsystem Procurement
MDC-G-8575 REV	STMPO 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-SF10499
Subcontract No.
(N/A)
Report No.
(STMPO 214)
DOE/SF/10499-T9 Rev
Date of Report
October 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: Purchased Demineralized Water Technical Requirements Specification Update (RADL 7-12A)
- 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.

4. 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 clearance copy to: Solar One Project Office  
P.O. Box 366, Daggett, CA 92327

6. Remarks:  
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 \_\_\_\_\_

U.S. DEPARTMENT OF ENERGY

DOE AND MAJOR CONTRACTOR RECOMMENDATIONS FOR  
ANNOUNCEMENT AND DISTRIBUTION OF DOCUMENTS

See Instructions on Reverse Side

1. DOE Report No. (STMPO 214) DOE/SF/10499-T9 Rev	2. Contract No. DE-AC03-79SF10499	3. Subject Category No. UC-62, 62c, 62d
--	--------------------------------------	--

4. Title

Purchased Demineralized Water Technical Requirements Specification 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 Office

Organization

P.O. Box 366, Daggett, CA 92327 (619) 254-2672

Signature

Date

H009-M-838

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-SF10499
Subcontract No.
(N/A)
Report No.
(STMPO 214)
DOE/SF/10499-T9 Rev
Date of Report
October 1980
Name & Phone No. of DOE Technical Representative
S.D. Elliott, Jr. (619) 254-2672

- Document Title: Purchased Demineralized Water Technical Requirements Specification Update (RADL 7-12A)
- 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.

4. 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 clearance copy 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 (MS122-23)  
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 214) DOE/SF/10499-T9 Rev	2. Contract No. DE-AC03-79SF10499	3. Subject Category No. UC-62, 62c, 62d
--	--------------------------------------	--

4. Title  
Purchased Demineralized Water Technical Requirements Specification 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 25 Number of copies distributed outside originating organization 15

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 Office

Organization  
P.O. Box 366, Daggett, CA 92327 (619) 254-2672

Signature \_\_\_\_\_ Date \_\_\_\_\_