

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

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**PSS FINAL DESIGN CALCULATIONS  
BOOK 23 OF 26--PSS FIELD ERECTED TANKS  
CONSTRUCTION PACKAGE 10A (RADL ITEM 7-8)**

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**September 1980**

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**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 7-8). The report was prepared by Stearns-Roger Engineering Corporation under MDAC Subcontract Number 78012035.

The Plant Support Subsystem Final Design Calculations (RADL Item 7-8) are arranged in a twenty-six book volume as shown on the master Table of Contents.

Book 23 of this document is provided in support of the PSS Field Erected Tanks, Construction Package No. 10A and includes sizing and drawings of the demineralized and Raw/water tank design.

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

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<b>BOOK 2 - WAREHOUSE, CONSTRUCTION PACKAGE 3</b>		
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2	<b>Lighting Calculation Sheet</b>	1 of 1
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BOOK 4 - RECEIVER TOWER  
STRUCTURAL, CONSTRUCTION  
PACKAGE 5A (RADL ITEM 7-21)

Note: This document includes design calculation for the receiver tower steel (Construction Package 5A) which was previously submitted by MDAC letter A3-228-EP-RJP-46, dated 16 January 1980, and therefore, is not included in this submittal. Please transfer your copy to your RADL ITEM 7-8 file, marking it as BOOK 4 of 25.

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MASTER TABLE OF CONTENTS FOR PSS FINAL  
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ITEM

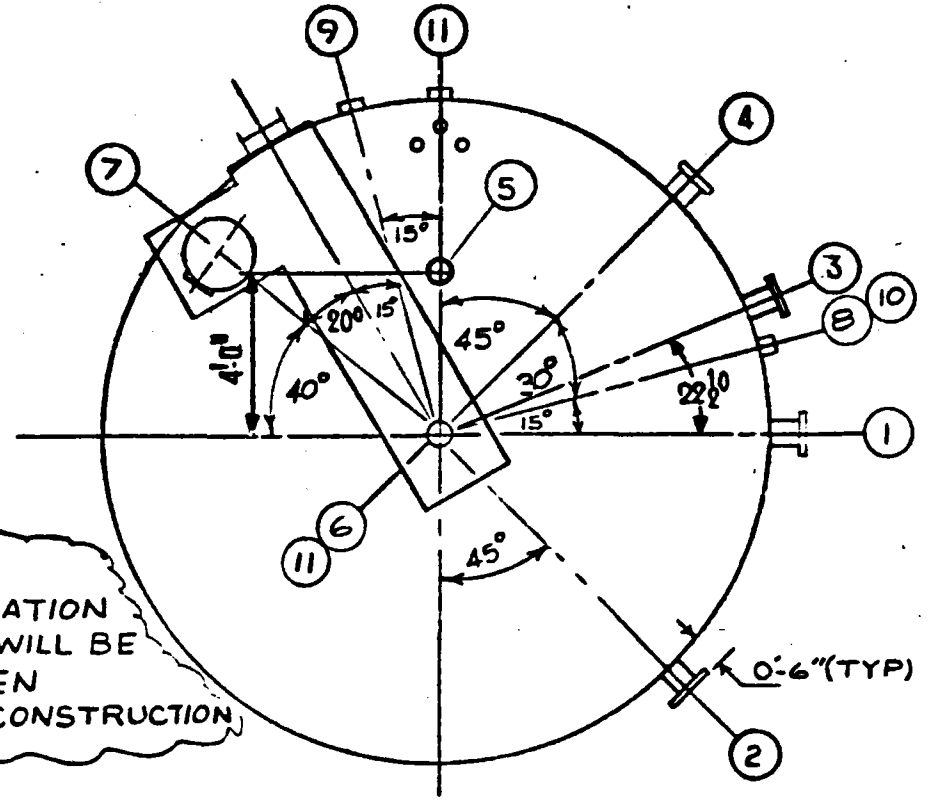
PAGE

BOOK 25 - COLLECTOR FIELD  
ELECTRICAL, CONSTRUCTION  
PACKAGE 11A

Note: This document was previously submitted by MDAC Letter A3-228-EP-RJP-262, dated 7 March 1980 and therefore is not included in this submittal. Please transfer your copy to your RADL ITEM 7-8 file, marking it as BOOK 25 of 25.

BOOK-26-MDAC GENERAL ANALYSIS AND  
BACKGROUND DATA

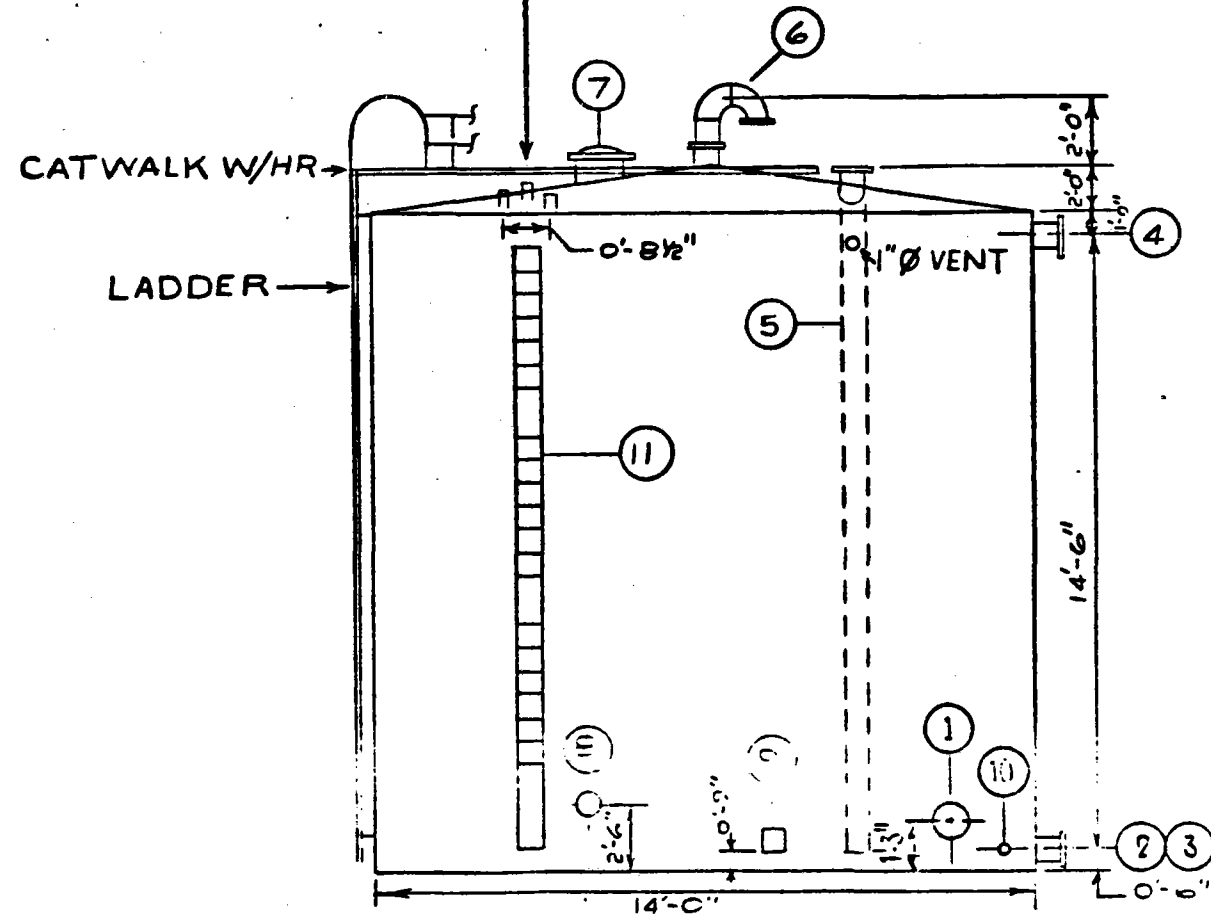
- 1 Plant Process and Preliminary Component Requirements
- 2 Receiver Subsystem Calculations
- 3 Thermal Storage Subsystems Calculations
- 4 Analysis of Plant Cost Reduction Options
- 5 Collector Field Design and Plant Power Calculations
- 6 Miscellaneous Plant Calculations



PLAN

NOTE:  
NOZZLE ORIENTATION  
IS PRELIMINARY, WILL BE  
FINALIZED WHEN  
APPROVED FOR CONSTRUCTION

1/2" CPLG BY CUSTOMER  
1/4" HOLES



ELEVATION

VESSEL (HORZ.-VERT.) 14'-0"				NOZZLES & CONNECTIONS	NO. REQD	SIZE-RATING-FACE SLIP-ON FLANGES
SHELL DIA. (I.D.-O.D.) 14'-0"						
HEADS (S.E.-C.D.) CONICAL ROOF FLAT BOTTOM				1	1	3"-150# FLG. RF
VESSEL CONTENTS DEMINERALIZED WATER				2	1	3"-150# FLG. RF
SHELL LENGTH (SEAM TO SEAM) 14'-0"				3	1	3"-150# FLG. RF
SUPPORT COMPACTED SAND BY OTHERS				4	1	4"-150# FLG. RF
DESIGN CONDITIONS CODE ANSI B96.1 STAMP N/A				5	1	4"-150# FLG. RF
				6	1	4"-150# FLG. RF
PRESS. (PSIG)	OPER.	DESIGN	ALLOW.	7	1	24" SEE SPEC. PARA. 6.2.3.2
	ATMOS.	ATMOS	---	8	1	1"-3000# HALF CPLG
TEMP. (°F)	N/A	9°F TO 117°F	N/A	9	1	SEE SPEC. PARA. 6.2.3.6
				10	1	1"-3000# HALF CPLG
CORR. ALLOW. SHELL NONE HEADS NONE				11	1	SEE SPEC. PARA. 6.2.3.4
X-RAY AS PER SPEC. STRESS RELIEF NOT REQ'D				12		
WIND LOAD UBC 25 PSF WIND PRESSURE AREA				13		
SEISMIC LOAD SEE SPEC. PARA. 6.2.1.B				14		
ICE & SNOW LOAD 5 PSF				15		
HYDROSTATIC TEST PRESS. NOT REQUIRED				16		
JOINT EFFICIENCY NO LEAK				17		
MATERIALS				ACCESSORIES		FURN. BY
						VESSEL FAB.
HEADS ROOF AL ASTM B209 TYPE 3003				LADDERS		X
SHELL AL ASTM B209 TYPE 3003				PLATFORMS (CATWALK)		X
NOZZLES & FLANGES AL ASTM B209 TYPE 3003				LADDER & PLATF. CLIPS		X
COVERS AL ASTM B209 TYPE 3003				DAVITS		X
GASKETS 1/8" NEOPRENE FOR MANWAYS				INSUL. RINGS		NONE
SKIRT N/A				SANDBLAST		NONE
SADDLE N/A				PRIMER REQ'D.		NONE
BASE PLATE N/A				LINING		NONE
LIFTING LUGS N/A				WEIGHT: VESSEL		-
BOLTS ---				LADDERS & PLATF.		-
FLANGES PER ANSI B16.5				TOTAL		-
EXTERNAL LADDERS & PLATF. ALUMINUM ASTM B209				VESSEL- DEMINERALIZED WATER TANK TK-702		
WEAR PLATES N/A				FOR DEPARTMENT OF ENERGY		
INTERNAL LADDERS ALUMINUM ASTM B209				PLANT 10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
INTERNAL N/A				ORDER NO. C-21700		
INTERNAL BARS & PLATES N/A				MANUFACTURER		
LINING NONE				DATE 6-23-79 BY RRC		
NO.	DATE	BY	REVISION			
A	10-1-78	FOR APPROVAL				
E	7-26-77	FOR EID				
C	3-25-80	TIA	① EL WAS 6" ② ORIENTATION WAS 45°			
DRAWING NO. 10P7002-53178 S-R.D.W. 9-2-79 P25-1				Stearns-Roger INCORPORATED 1		

# Stearns-Roger

FORM 32-114  
REV. 3-75

JOB NO. C-21700 DATE 6/6/79 BY J/CW CHK \_\_\_\_\_  
 CUSTOMER MDAC PROJECT 10MW SOLAR PILOT PLANT  
 SUBJECT MIRROR WASH WATER TANK

PAGE 1

PROBLEM: TO SIZE THE SUBJECT TANK FOR INCORPORATION INTO CONSTRUCTION PACKAGE 10a.

REFERENCES:

- (1) TELECOM FROM KEN KNOX, MDAC TO J. HORSON S-R 4/26/79.  
4000 GALS/DAY MIRROR WASHING USAGE
- (2) MEMO FROM R. LONG TO H. WELZ 4/27/79 AND TELECOM FROM K. KNOX TO R. LONG 4/17/79.  
FLOW TO DEMINERALIZER 12.5 GPM FOR 18 HRS/DAY
- (3) TELECOM K. KNOX MDAC TO R. LONG S-R 4/17/79  
1 1/2 gal/HELIOSTAT FOR WASHING + 6 GAL/HELIOSTAT FOR RINSING,  
WASH MIRRORS 12 TIMES/YR, 1-HELIOSTAT/MIN., 480 HELIOSTATS/  
NIGHT OR 3600 GALS/DAY
- (4) TELECOM FROM K. KNOX TO J. BUTKOVICH 6/5+6/79.

CALCULATIONS:

$$\text{GALS/DAY} = \left( 7 \frac{1}{2} \frac{\text{gals}}{\text{heliostat}} \right) \left( 480 \frac{\text{heliostats}}{\text{night}} \right) = \underline{3600} \text{ gals/DAY}$$

$$\begin{aligned} \text{THE DEMINERALIZER CAPACITY} &= \left( 12.5 \frac{\text{GAL}}{\text{MIN}} \right) \left( 18 \frac{\text{HRS}}{\text{DAY}} \right) \left( 60 \frac{\text{MIN}}{\text{HR}} \right) \\ &= \underline{13500} \frac{\text{GALS}}{\text{DAY}} \text{ CAPACITY} \end{aligned}$$

(REF 4) APPROXIMATE 5 DAY STORAGE SUPPLY = 5 x 3600 = 18000 gals.

LET TANK CAPACITY BE 12000 GALS

PAGE 2

JOB NO. \_\_\_\_\_ DATE 6/7/79 BY J/CW CHK \_\_\_\_\_

CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_

SUBJECT \_\_\_\_\_

$$\frac{\text{HEIGHT}}{\text{DIAMETER}} = \frac{36'}{25'} = 1.44 \quad \leftarrow \text{REF NEBRASKA UNIT-1 CONDENSATE STORAGE TANK.}$$

$$= \frac{26'}{24'} = 1.08 \quad \leftarrow \text{REF. TAMPA PROJECT.}$$

ACCESSORIES & CONNECTIONS (REF. NEBRASKA COND. TANK)

- 1- LADDERS
- 2- INLET
- 3- OUTLET
- 4- LEVEL INSTRUMENTATION
- 5- VENT
- 6- OVERFLOW
- 7- DRAIN

ASSUME DIA. TO BE 16 FT.

VOLUME = 18000 GALS = 2407 FT<sup>3</sup>

$$2407 = \frac{\pi 16^2}{4} \times H$$

H = 12 FT.

ASSUME DIA TO BE 14 FT

$$2407 = \frac{\pi 14^2}{4} \times H$$

H = 15.6 FT. USE 15 FT. ← USE

$$\text{VOL.} = \frac{\pi 14^2}{4} \times 16 = 2463 \text{ FT}^3$$

$$= 18426 \frac{2}{3} \text{ GALS.}$$

# Stearns-Roger

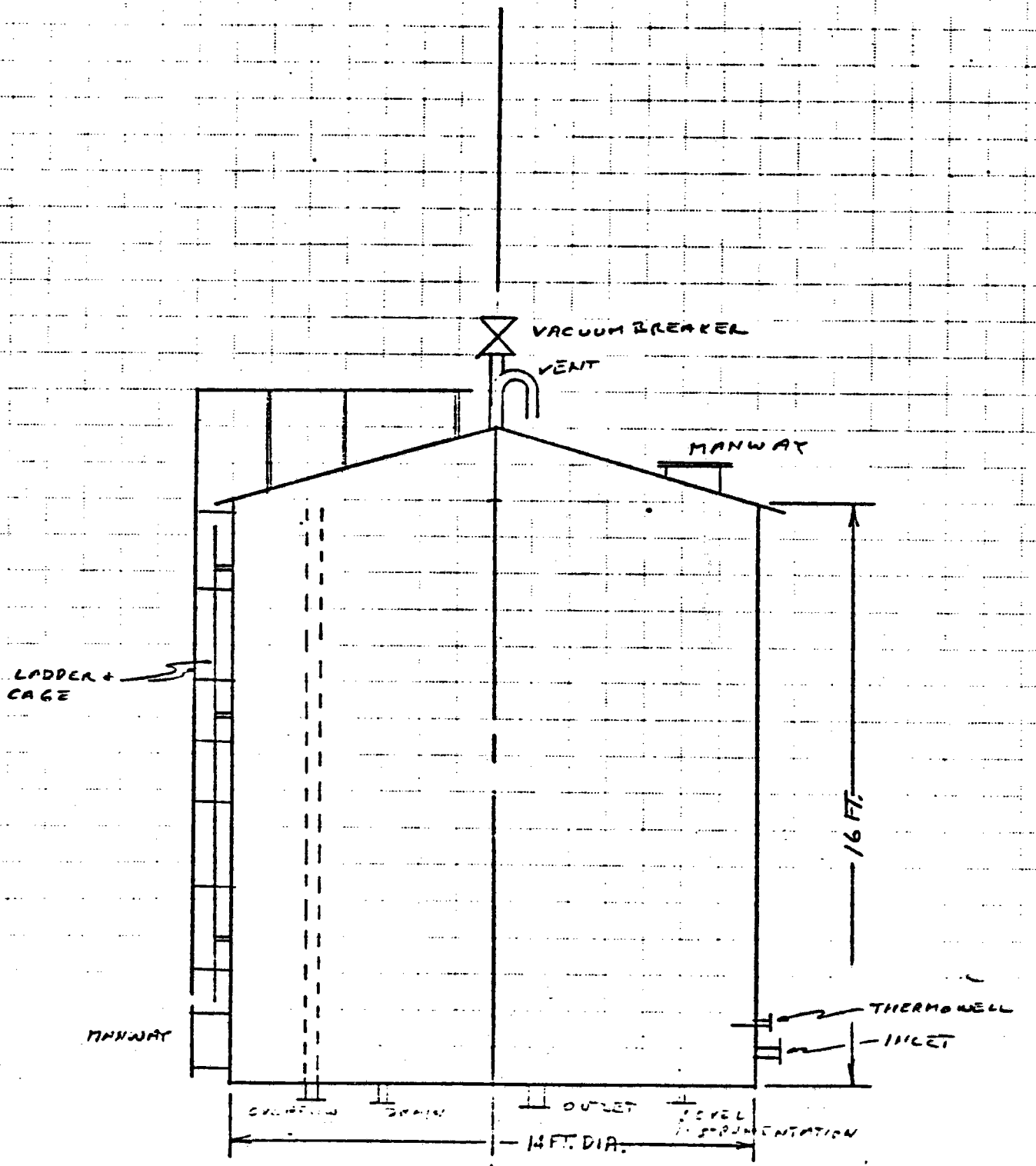
FORM 42-114  
REV. 4-75

PAGE 3

JOB NO. \_\_\_\_\_ DATE 6/8/79 BY JCW CH'K. \_\_\_\_\_

CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_

SUBJECT MIRROR WASH WATER TANK



SK-M-83

JOB NO. C-21700 DATE 8/31/79 BY J/CW CHK. \_\_\_\_\_  
 CUSTOMER MDAC PROJECT 10 MW SOLAR PILOT PLANT  
 SUBJECT RESIZING OF RAW WATER STORAGE TANK

PAGE 1

PROBLEM: TO RESIZE THE RAW WATER STORAGE TANK BASED ON THE LATEST INFORMATION FROM STMPD & SCE

REFS:

- (1) MEMO FROM HWELE TO J. HOPSON 8/10/79, "PRELIM. DESIGN OF RAW/SERVICE WATER SYSTEM."
- (2) TELEPHONE NOTES FROM C. WINIARSKI SCE TO BOB WIESE STMPD 8/24/79 "WELL WATER SUPPLY"
- (3) TELECOM BOB WIESE TO J. HOPSON 8/24/79, "WATER"

CALCULATIONS:

FROM REFS 2+3, SMALL 200 TO 250 GPM HEADER PRESSURE PUMP TO BE INSTALLED @ WELL, FOR LOW FLOW DEMANDS

NOMINAL DEMAND RATE (REF 1) =  $\overset{600 \text{ GPM}}{\cancel{709 \text{ GPM}}}$  ← WILL USE THIS TO SIZE TANK.

NET TANK OUTFLOW =  $\overset{600}{\cancel{709}} - 200 = \underline{\underline{400 \text{ GPM}}}$

VOL. OF SERVICE WATER REQUIRED

<u>TANK RESERVE, HRS</u>	<u>WATER VOLUME, GALS</u>
2	61080 ← USE
4	122160
6	183240
8	244320
12	366480

CONCLUSION: 61080 GALS. TANK CAP. WOULD ALLOW  $\approx 2.5$  HRS. NOTICE TO START WELL WATER PUMP. THIS IS AMPLE TIME TO CALL THE COOL WATER STATION EVEN THOUGH THE PREVIOUS 2HR CALL TIME CRITERIA IS ELIMINATED.



PAGE 2

JOB NO. \_\_\_\_\_ DATE 2/31/79 BY J/Car CHK \_\_\_\_\_

CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_

SUBJECT \_\_\_\_\_

FIRE PROTECTION RESERVE = 90000 GALS

TOTAL CAPACITY = 90000 + 61080 = 151080 GALS

= 20,200 FT<sup>3</sup>

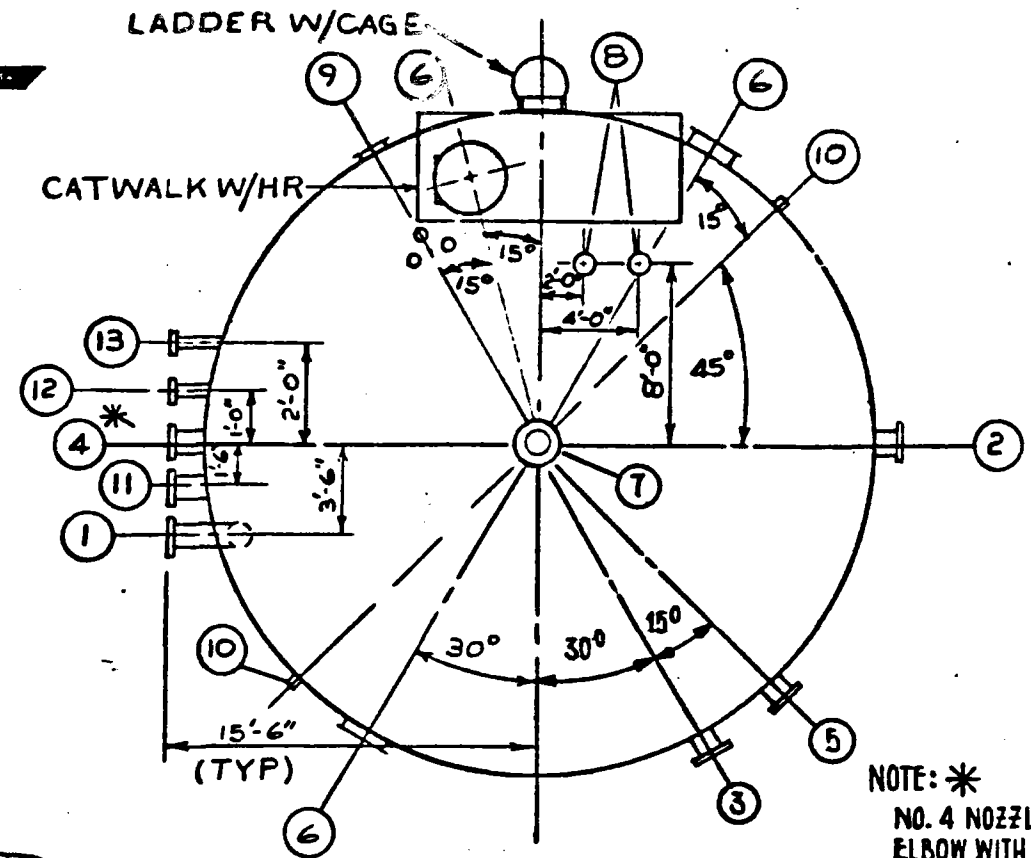
LET  $H/D = 1.0$  FOR MIN. SURFACE AREA

$$VOL. = \frac{\pi D^2}{4} \times H = \frac{\pi D^2}{4} \times D$$

$$D^3 = \frac{4 \times VOL.}{\pi} = \frac{(4)(20200)}{3.1416} =$$

REVISED  
SIZE

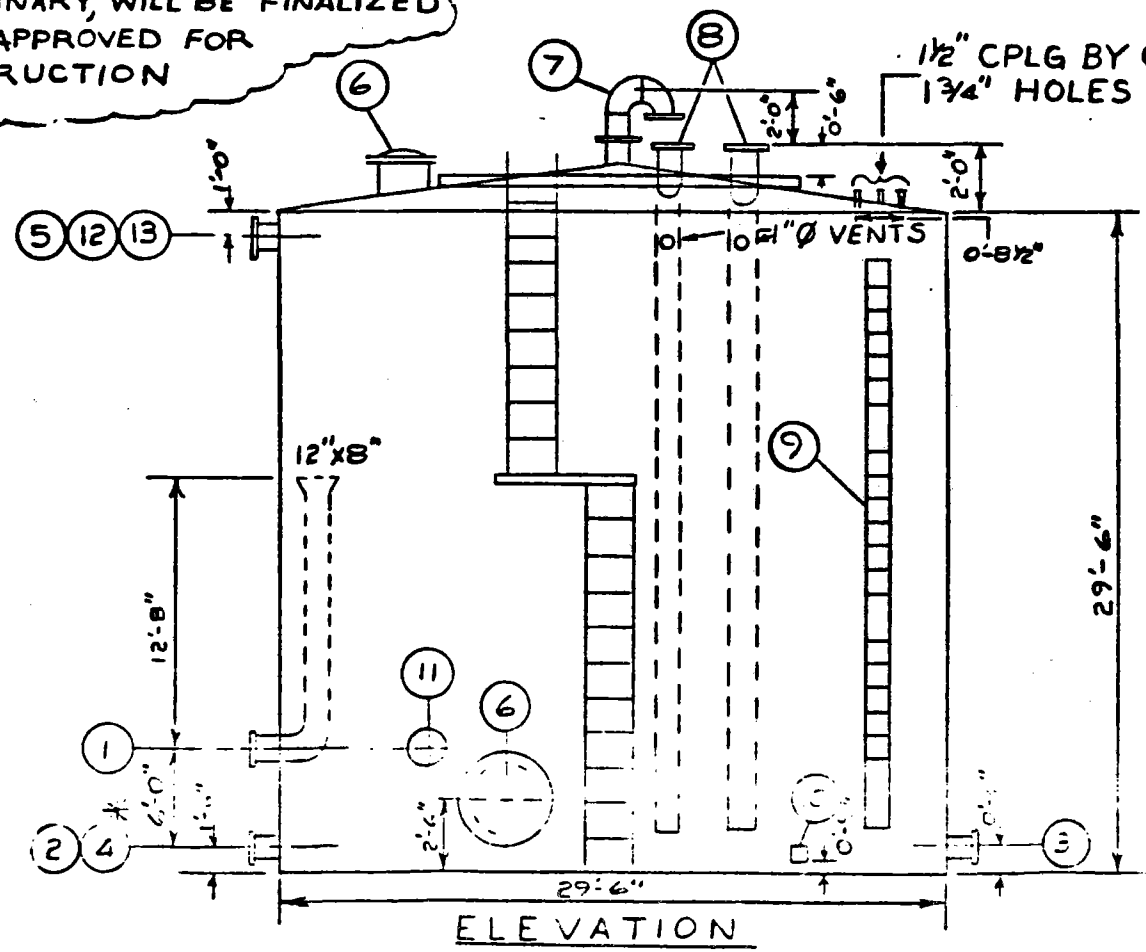
$$\left\{ \begin{array}{l} D = 29.5 \text{ FT.} \\ H = 29.5 \text{ FT.} \end{array} \right.$$



PLAN

NOTE:  
NOZZLE ORIENTATION IS  
PRELIMINARY, WILL BE FINALIZED  
WHEN APPROVED FOR  
CONSTRUCTION

NOTE: \*  
NO. 4 NOZZLE HAS A ENTRANCE  
ELBOW WITH A 4x4' VORTEX PLATE  
6" (MIN) ABOVE BOTTOM OF TANK  
PER NFPA SECTION 20



ELEVATION

VESSEL (HORZ.-VERT.)		29'-6"		NOZZLES & CONNECTIONS	NO. REQD	SIZE-RATING-FACE SLIP-ON FLANGES
SHELL DIA. (I.D.-O.D.)		29'-6"				
HEADS (S.E.-C.D.) CONICAL ROOF-FLAT BOTTOM				1	OUTLET (RW)	1 8"-150* FLG. RF
VESSEL CONTENTS RAW WATER				2	INLET (RW)	1 8"-150* FLG. RF
SHELL LENGTH (SEAM TO SEAM)				3	DRAIN	1 4"-150* FLG. RF
SUPPORT COMPACTED SAND BY OTHERS				4	OUTLET (FP)	1 8"-150* FLG. RF
DESIGN CONDITIONS CODE AWWA D100 STAMP N/A				5	OVERFLOW	1 10"-150* FLG. RF
				6	MANHOLE	3 24"-SEE SPEC PARA. 6.1.3.4
PRESS. (PSIG)				7	VENT	1 6"-150* FLG. RF
				OPER.	DESIGN	ALLOW.
TEMP. (°F)				9	LEVEL IND.	1 SEE SPEC. PARA. 6.1.3.5
				N/A	9°F TO 117°F	N/A
CORR. ALLOW. SHELL NONE HEADS NONE				11	FP FLOW MTR RET	1 6"-150* FLG. RF
X-RAY AS PER. SPEC. STRESS RELIEF NOT REQ'D				12	RW MIN FLOW RET	1 4"-150* FLG. RF
WIND LOAD UBC 25 PSF WIND PRESSURE AREA				13	FP MIN FLOW RET	1 2"-150* FLG. RF
SEISMIC LOAD SEE SPEC. PARA. 6.1.1.B				14		
ICE & SNOW LOAD 5 PSF				15		
HYDROSTATIC TEST PRESS. NOT REQ'D				16		
JOINT EFFICIENCY NO LEAK				17		
MATERIALS				ACCESSORIES		FURN. BY
						VESSEL FAB.
HEADS ROOF - CS ASTM A283 GrC					LADDERS	X
SHELL CS ASTM A283 GrC					PLATFORMS (CATWALK)	X
NOZZLES & FLANGES CS ASTM A283 GrC					LADDER & PLATF. CLIPS	X
COVERS CS ASTM A36					DAVITS	X
GASKETS 1/8" NEOPRENE FOR MANWAYS					INSUL. RINGS	NONE
SKIRT N/A					SANDBLAST	X
SADDLE N/A					PRIMER REQ'D.	X
BASE PLATE N/A					LINING	X
LIFTING LUGS N/A					WEIGHT: VESSEL	-
BOLTS _____					LADDERS & PLATF.	-
FLANGES PER ANSI B16.5					TOTAL	-
EXTERNAL LADDERS & PLATF. CS ASTM A53 GrB					VESSEL- RAW WATER STORAGE TANK TK-701	
WEAR PLATES N/A					FOR DEPARTMENT OF ENERGY	
INTERNAL LADDERS CS ASTM A53 GrB					PLANT 10MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
INTERNAL _____					ORDER NO. C-21700	
INTERNAL BARS & PLATES N/A					MANUFACTURER	
LINING AMERCOAT 71 (OR APPROVED EQUAL)					DATE 2-22-79 BY RRS	
NO.	DATE	BY	REVISION			
A	7-27-77		FOR APPROVAL			
B	7-28-77		FOR EID			
C	3-25-80	TM	(3)(4) ORIENTATION WAS WEST OF TANK			
				Stearns-Leger		DRAWING NO. 40P70021331B4 S-R DWG 7037/4 P25-2
				INCORPORATED		7

TELEPHONE NOTES

AUG 27 1979  
B. Lang

BY C. P. Winarski

OF SCE

WITH Bob Wiese

OF STMPD

DATE August 24, 1979

SUBJECT: Well Water Supply  
Solar One Generating Station

DISTRIBUTION

- H. J. Dellaven
- R. Wiese, STMPD
- ~~G. R. Lang, Steam~~
- R. Perkins, MDC
- R. Williamson
- Project File

P3-11

ACTION REQUIRED

None

DISCUSSION HIGHLIGHTS AND AGREEMENTS REACHED

Bob indicated that present Service Water Tank design capacities are based on a two hour lead time requirement. This lead time is attributed to the time needed to put the Cool Water well system into operation.

I informed Bob that this requirement is unknown to me based on the following premises.

The Cool Water well system is presently being modified to include a small 200 to 250 gpm pump near Well "C". This pump will keep the well system header full and pressurized to serve the low flow demands upon the well system. Once this capacity is exceeded, one or more of the three large existing 2500 gpm pumps will be operated to fulfill service demands. Starting and stopping of the pumps will be achieved at the control room for Units 3&4. As a result, the requirement to initiate large volume water flows to the Solar site is a telephx call to the Units 3&4 control operator.

Water supply to the Solar One project will be via an 8" pipeline interconnecti with the well system at Well "A".

SCE drawings: 5133311, 5133313, 5133314, provide specific information related to the above.

# Stearns-Roger

P3-11

## INTEROFFICE CORRESPONDENCE

August 10, 1979

TO: J. A. Hopson

FROM: H. C. Welz

*Revised see  
8/31/79 CALCS.*

SUBJECT Preliminary Design of  
Raw/Service Water System

This memo defines, on a preliminary basis, the design of the raw/service water system. This design is based on the most recent service water requirements of the EPGs, TSS, Administration Building. This preliminary design defines the criteria used and preliminary sizing of the raw/service water pumps, raw water storage tank, and service water piping.

Figure 1 defines the service water requirements showing peak demand and nominal demand. The sources of these requirements are also shown. A 20% contingency is added which may, at first glance, seem rather high. However, past experience indicates that service water requirements always increases as the project progresses.

Based on the data given in Figure 1, nighttime service water usage is estimated to be 180 GPM.

The Raw Water tank sizing is based on the following criteria:

- 1) The SCE well water pump capacity is 2250 GPM
- 2) No more than a 2-hour lead time to notify SCE to start the well water pump will be required.
- 3) Maximum raw water tank outflow of 947 GPM.
- 4) A fire protection water reserve of 90,000 gallons.

The maximum tank out flow rate, excluding operation of the fire pumps, is well below the available inflow rate. Therefore the 2 hour well pump start notice is used as the criteria for tank sizing together with the 947 GPM out flow.

$$\begin{aligned} \text{Minimum Service Water Volume} &= (2 \text{ hours}) \left( 60 \frac{\text{min}}{\text{hour}} \right) (947 \text{ GPM}) \\ &= 113,640 \text{ gallons} \end{aligned}$$

*REVISED*

Including the 90,000 gallon fire protection reserve, a tank of 203,640 gallons (27,227 Ft.<sup>3</sup>) will be required. For a 28 foot tank diameter, the tank height will be 44.2 feet.

A reduction in the size of the tank could be accomplished by providing well water pump start capability located in the pilot plant control room. This capability would eliminate the 2 hour wait period and the service water tank volume could be reduced to only several minutes of usage. This well pump remote start capability is recommended.

A preliminary estimate of piping pressure losses and pipe sizes was made to determine the discharge pressure of the raw/service water pumps. It is recommended that preliminary service water pipe routing be based on the information contained in this memo. Pipe sizing and pressure losses will then be checked by the Power Division C-127, "Piping Network Flow Analysis" program to finalize pipe sizing, pumping head requirements and flow division.

Figure 2 shows the results of this preliminary piping analysis.

The raw/service water pump design and sizing is based on all of the preceding data and includes the following additional design criteria:

- 1) The design is for 2-pumps at <sup>600</sup>709 GPM/pump nominal demand.
- 2) If the peak demand of 947 GPM occurs, then the second pump will start giving a total pumping capacity of <sup>1200</sup>1,418 GPM.

This arrangement should provide for one pump operation for the majority of the time with sufficient back up capacity to meet peak demands. In the event one pump is down for repairs, the operating pump can operate the plant, assuming judicious use of non-essential service water.

The raw/service water pumps preliminary design is as follows:

2-Pumps  
<sup>600</sup>709 GPM capacity/pump  
<sup>100</sup>130 psig discharge pressure  
 8.4 psig minimum suction pressure  
 Total Developed Head - ~~282~~ Feet <sup>212 FT</sup>  
 Horsepower Delivered to Pump - ~~67~~ @ 60° water  
<sup>45</sup>

It is recommended that the various Project Design Discipline Engineers review this memo and submit their comments to H. Welz for incorporation.

*H. C. Welz*

H. C. Welz

cc: W. Lang  
 A. McKenzie  
 T. Olson  
 R. Bicknell  
 J. Detweiler  
 D. Parker  
 J. Butkovich  
 R. Long  
 J. Gormely  
 C. E. File

FIG-1

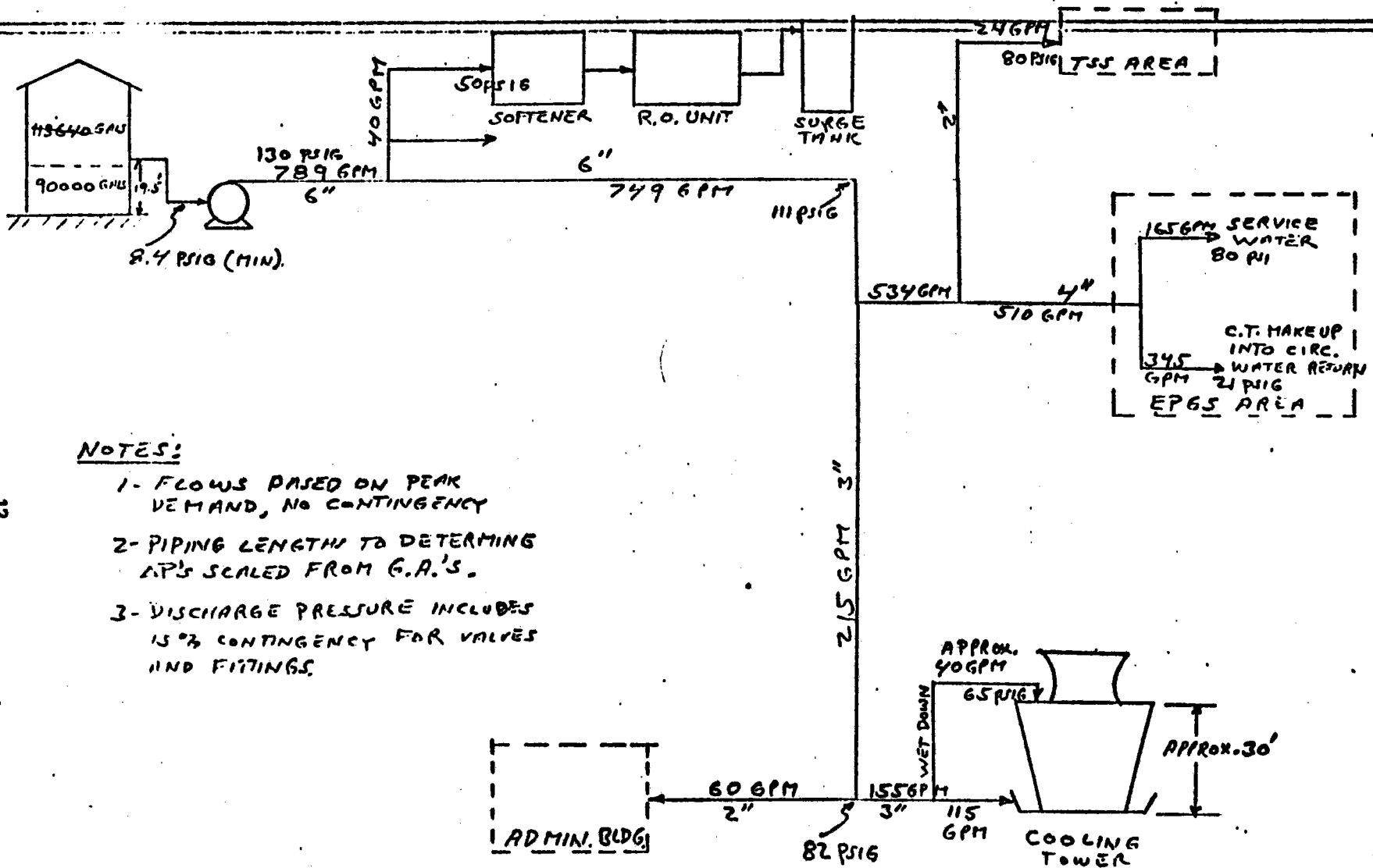
SERVICE WATER REQUIREMENTS, DAYTIME OPERATION

USER	PEAK DEMAND	NOMINAL DEMAND		SOURCE
	RATE GPM	ASSUMED SERVICE FACTOR	RATE GPM	
1-COOLING TOWER MAKE UP	345	1.0	345	SCE, 8/8/79
2-EPGS	165	0.5	60 <del>25</del>	SCE, 8/8/79
3-ADMIN BLDG	60	0.5	30	SCE, 8/8/79
4-WATER TREATMENT BLDG	40	0.3	12	R.V. LONG, 8/8/79
5-TSS AREA	24	0.5	12	R MEMO 3/23/79
6-COOLING TOWER AREA (CHLORINATION, ACID MIXING, WET DOWN, SAFETY SHOWER)	155	0.7	109.75	SCE, 8/8/79
SUBTOTAL	789		534 <del>591</del>	
10 26% CONTINGENCY	158		58 <del>118</del>	
TOTAL	947		209 587	

△ SAT 600 GPM PUMP

△ REV. 1 REF. 9/25/79 TELECOM J. GORMELY TO R. WILLIAMSON SCE.

NOTE: LEAVE LINE SIZES AS IS. VIEW 9/27/79



PRELIMINARY RAW/SERVICE WATER SYSTEM

FIG.-2

**NOTES:**

- 1- FLOWS BASED ON PEAK DEMAND, NO CONTINGENCY
- 2- PIPING LENGTH TO DETERMINE AP'S SCALED FROM G.A.'S.
- 3- DISCHARGE PRESSURE INCLUDES 15% CONTINGENCY FOR VALVES AND FITTINGS.

12

# Stearns-Roger

FORM 62-114  
REV. 4.75

PAGE 1

JOB NO. C-21700 DATE 8/8/79 BY JCW CHK \_\_\_\_\_  
 CUSTOMER MDAC PROJECT 10 MW SOLAR PILOT PLANT  
 SUBJECT RAW/SERVICE WATER SYSTEM

PROBLEM: TO DETERMINE SIZE OF RAW WATER TANK, PUMPS AND PIPING

ASSUMPTIONS & REFERENCES:

- 1- FIRE WATER REQUIREMENT OF 90000 GAL. "FIRE PROTECTION PLAN" 6/29/79, M. DILIBERTO
- 2- EPGS, COOLING TOWER + AD. BLDG REQUIREMENTS, 8/8/79  
TELECOM BETWEEN I. KATTER SEE & H. WELZ
- 3- WATER TRTMT BLDG 40 GPM MAX. DURING 20 GPM NORM. TO SOFTENER? R.V. 6/29/79  
BACKWASH 12 " TO WASH DOWN } 8/8/79
- 4- TSS AREA = 24 GPM 3/23/79 ROCKET DYNE MEMO

REVISED  
 SEE 8/31/79  
 CALCS. JCW

Revised 9/27/79  
 JCW



JOB NO. \_\_\_\_\_ DATE \_\_\_\_\_ BY \_\_\_\_\_ CHK. \_\_\_\_\_

CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_

SUBJECT \_\_\_\_\_

SERVICE WATER REQUIREMENTS  
DAYTIME OPERATION

USER	PEAK DEMAND	NOMINAL DEMAND	
	RATE, GPM	ASSUMED SERVICE FACTOR	RATE, GPM
1- COOLING TOWER MAKEUP (PEAK DEMAND)	345	1.0	345
2- EPGS (PEAK DEMAND)	165	0.5	83
3- ADMIN. BLDG (PEAK DEMAND)	60	0.5	30
4- WATER TREATMENT BLDG	40	0.3	12
5- TSS AREA	24	0.5	12
6- COOLING TOWER AREA, CHLORINATION, ACID MIXING, WET DOWN + SAFETY SHOWER (PEAK DEMAND)	155	0.7	109
SUBTOTAL	789		591
ADD 20% CONTINGENCY	158		118
TOTAL	947		709

REVISED

RAW/SERVICE WATER PUMP DESIGN CRITERIA

DESIGN FOR 2-PUMPS, @ 709 GPM/PUMP.  
LET ONE PUMP OPERATION SATISFY NOMINAL DEMAND OF 709 GPM.  
2-PUMP OPERATION COULD SUPPLY 1418 GPM WELL ABOVE PEAK DEMAND.

NIGHT TIME OPERATION (ASSUMED USAGE)

USER	RATE GPM
1- COOLING TOWER MAKEUP	0
2- EPGS	83
3- AD. BLDG.	15
4- WATER TREATMENT BLDG	12
6- COOLING TOWER AREA, WET DOWN ONLY	40
SUBTOTAL	150
20% CONT.	30
TOTAL	180 GPM

JOB NO. \_\_\_\_\_ DATE 8/8/79 BY J/CW CH'K. \_\_\_\_\_  
CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_  
SUBJECT \_\_\_\_\_

RAW WATER TANK VOLUME CRITERIA

ASSUME 12 HR OPERATION AT PEAK DEMAND ON ONE TANK FILL FROM WELLS

$$\text{SERVICE WATER TANK VOLUME} = (12 \text{ HR}) \left( \frac{60 \text{ MIN}}{\text{HR}} \right) \left( 947 \frac{\text{GALS}}{\text{MIN}} \right)$$

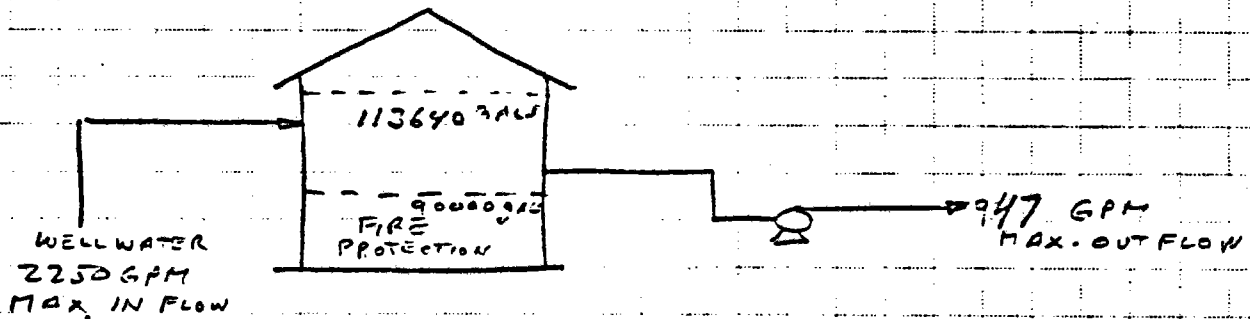
TOO BIG → VOL. = 681840 gals.

REF: TRIP REPORT BY H. WELLS 7/18/79

ITEM-1 2-HOUR LEAD TIME TO START WELL WATER PUMPS.

WELL WATER PUMP FLOW RATE @ 2250 GPM

THEREFORE; MINIMUM REQUIRED SERVICE WATER VOL.



2-HR LEAD TIME (MAX) TO START WELL WATER PUMPS

$$\text{MIN. VOL} = (2 \text{ HR}) \left( \frac{60 \text{ MIN}}{\text{HR}} \right) (947 \text{ GPM}) = \underline{\underline{113640 \text{ GALS.}}}$$

JOB NO. \_\_\_\_\_ DATE 8/8/79 BY JCW PAGE 4  
 CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_ CHK. \_\_\_\_\_  
 SUBJECT \_\_\_\_\_

TANK SIZE

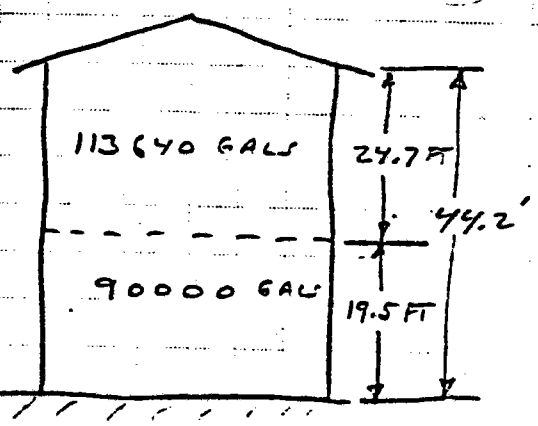
FIRE PROTECTION RESERVE 90000 GALS  
 SERVICE WATER 113640 "  
 TOTAL = 203640 GALS

TOTAL VOLUME = 203640 (.1337) = 27227 FT<sup>3</sup>

TANK DIA. = 28 FT (PER JAH/TEO)

$VOL = \frac{\pi D^2}{4} \times H$

$H = 4 \times \frac{VOL}{\pi D^2} = 4 \left( \frac{27227}{\pi 28^2} \right) = \underline{44.2 FT. HIGH}$



$H = 4 \left( \frac{90000 \text{ gals} \times .1337}{\pi 28^2} \right) = 19.5 FT.$

FOR MIN. SURFACE AREA  $H/D = 1.0$

$\therefore Vol. = 27227 FT^3$

$V = \frac{\pi D^2}{4} \times H$  AREA =  $2 \left( \frac{\pi D^2}{4} \right) + \pi D \times H$

$27227 = \frac{\pi D^2}{4} \times D$

$A = \pi D \left( \frac{D}{2} + H \right)$

$D^3 = 4 \left( \frac{27227}{\pi} \right) = 34117$

USE THESE

$D = 32.6 FT$   
 $H = 32.6 FT.$

REVISED

$VOL = \frac{\pi 32.6^2}{4} \times 32.6 =$

PAGE 5 a

JOB NO. \_\_\_\_\_ DATE \_\_\_\_\_ BY New CHK \_\_\_\_\_

CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_

SUBJECT \_\_\_\_\_

HOWEVER: STEEL PLATE COMES IN 4 FT. WIDTHS

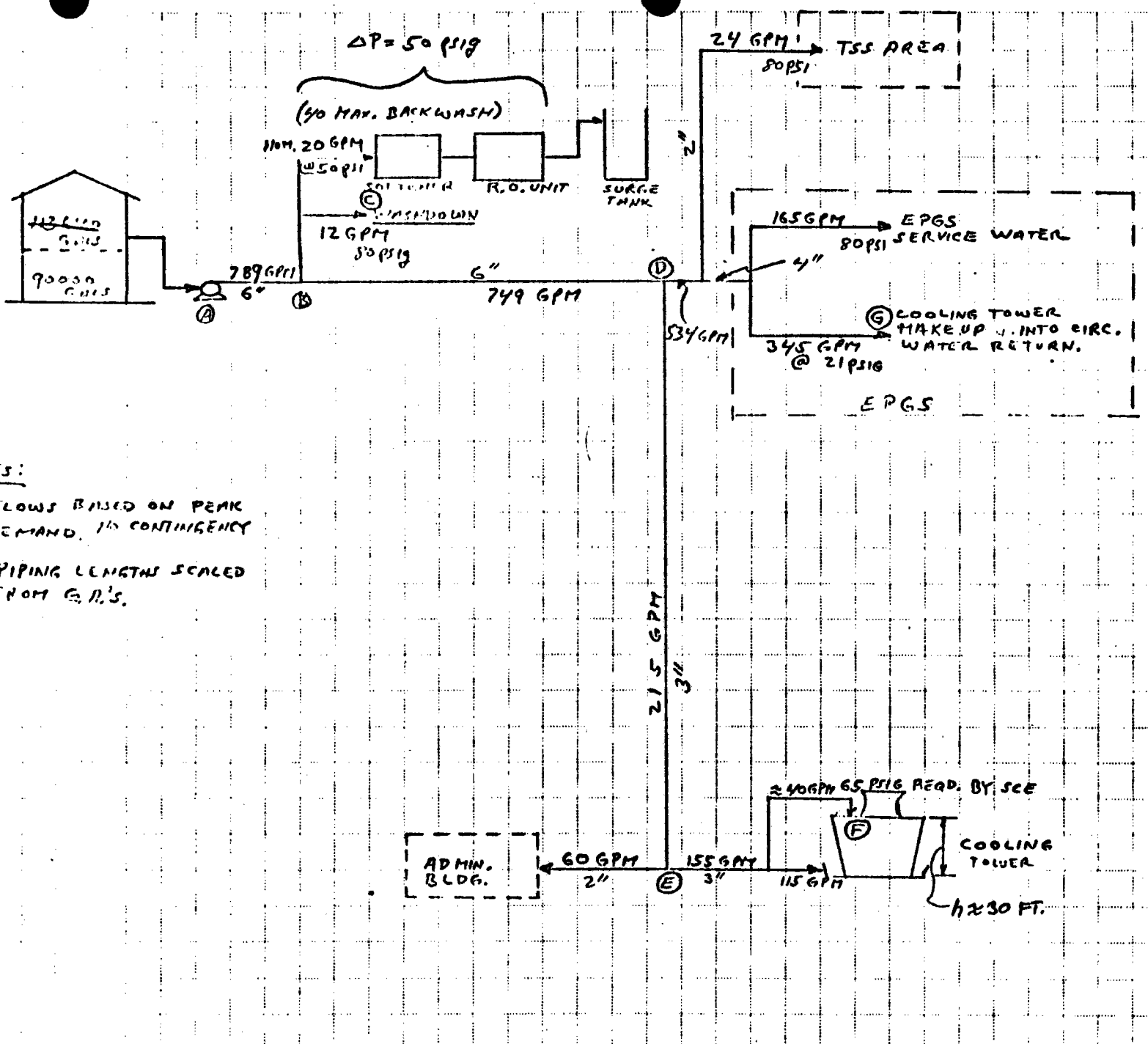
IF WE USE  $\rightarrow$   $D = 34$  FT. AVAILABLE NPSH TO PUMPS WILL  
 $H = 30$  FT. BE REDUCED, PARTICULARLY THE  
FIRE PUMP. IN THE EVENT THAT A FIRE OCCURS  
WHEN THE WATER LEVEL IS AT THE MINIMUM  
SERVICE WATER LEVEL THE FIRE PUMPS MAY  
HAVE TROUBLE GETTING THE LAST BIT OF WATER  
OUT.

$\therefore$   
WILL USE 40 FT. HIGH  
30 FT DIA.

$$V = \frac{\pi 30^2}{4} \times 40 = \underline{28274 \text{ FT.}^3} > 27227 \text{ FT.}^3 \text{ OK. REQD.}$$

**Stearns-Logger**

CUSTOMER \_\_\_\_\_  
 SUBJECT RAW SERVICE WATER PIPE SIZING AND PUMP  
 PROJECT PRECHEMINARY  
 JOB NO. \_\_\_\_\_ DATE 2/2/79 BY NEW CHK \_\_\_\_\_  
 PAGE 5



- NOTES:**
- 1- FLOWS BASED ON PEAK DEMAND, 10% CONTINGENCY
  - 2- PIPING LENGTHS SCALED FROM G.P.'S.

JOB NO. \_\_\_\_\_ DATE 8/8/79 BY J. Wood CH'K. \_\_\_\_\_  
 CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_  
 SUBJECT \_\_\_\_\_

1- PRESSURE REQUIRED FOR C.T. MAKEUP AT CIRC. WATER RETURN IN EP65.

COOLING TOWER HEIGHT  $\approx$  30 FT OR 13 PSI  
 CIR. WATER RETURN LINE  $\approx$  880 FT.,  
 @  $\Delta P/100$  FT  $\approx$  0.7 FT, FOR 1500 GPM.  $\Delta P_f = 8.8(0.7) = 6.2$  FT.  
 IN 24" PIPE.  $\approx$  3.0 PSI

APPROX. PRESS. REQUIRED AT CIRC. WATER RETURN LINE  
 $P = 13 + 3.0 + 5$  (CONTINGENCY) = 21 PSI

2- FROM PG-5 IT APPEARS THAT ROUTING FROM (A) TO (G) OR (A) TO (F) WILL HAVE GREATEST TOTAL  $\Delta P$ . CHECK BOTH ROUTINGS.

PRESSURE @ (D) ROUTE (G) TO (D)

(1) CIRC WATER RETURN LINE PRESS. 21 PSI

(2)  $\Delta P_f$  FROM (G) TO (D)

345 GPM 4" PIPE,  $V \approx 8.8$  FT/SEC,  $8.0$  FT/100  $L \approx 80'$  3 PSI

PRESSURE AT (D) ROUTE (E) TO (D) 24 PSI PRESS @ (D)

(1) PRESSURE AT (F) 65 PSI

(2) PRESSURE AT (E)

160 FT OF 3 INCH. PIPE  $\Delta P_f$   $5.2$  FT/100 4 PSI

ELEVATION HD. OF C.T. 13 PSI

PRESS @ (E) 22 PSI 22 PSI

(3)  $\Delta P_f$  @ 215 GPM, 3 IN PIPE  $\Delta P_f = 9.5$  FT/100  $L \approx 960$  FT. 39 PSI

PRESS. @ (D) 111 PSI

→ SINCE PRESS. @ (D) = 111 PSI IS HIGHEST USE THIS

JOB NO. \_\_\_\_\_ DATE \_\_\_\_\_ BY \_\_\_\_\_ CHK \_\_\_\_\_  
 CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_  
 SUBJECT \_\_\_\_\_

$\Delta P_f$   $\textcircled{D}$  TO  $\textcircled{B}$  FOR 749 GPM 6 INCH PIPE 8.33 FT/SEC.  $\Delta P/100' = 3.57$  FT.

$L \times 140$  FT.

$$\Delta P_f = \frac{\left(\frac{140}{100}\right)(3.57)}{2.33 \text{ FT/PSI}} = 2 \text{ PSI}$$

$\therefore$  REQUIRED PRESSURE  $\textcircled{B}$   
 PRESSURE  $\textcircled{D}$

$\Delta P_f$   $\textcircled{D}$  TO  $\textcircled{B}$

111 PSIG

2

$\rightarrow P_{\textcircled{B}} = 113 \text{ PSIG}$   
 THIS PRESS ALSO SATISFIES WATER  
 TREATMENT EQUIPMENT  $\Delta P$  OF 50 PSI

DISCHARGE PRESSURE OF PUMP  $P_{\textcircled{A}}$

$$P_{\textcircled{B}} = 113 \text{ PSIG}$$

$$\Delta P_{\textcircled{A}-\textcircled{B}} = \text{NEGLECTIBLE}$$

113 PSIG

ALLOW 15% FOR  
 VALVES & FITTINGS 17 PSI

$$P_{\textcircled{A}} = \underline{\underline{130 \text{ PSIG}}}$$

BASED ON REVI MEMO 2/10/79 FROM HALL  
 TO J. HOPSON

$$P_A = (113) \left(\frac{600 \text{ GPM}}{709 \text{ GPM}}\right)^2 = 21 \text{ PSIG}$$

+15% FOR  
 FITTINGS

$$P_A = \underline{\underline{93 \text{ PSIG}}}$$

USE 100 PSIG AS  
 Conservative Number

PAGE 8

JOB NO. \_\_\_\_\_ DATE \_\_\_\_\_ BY \_\_\_\_\_ CH'K. \_\_\_\_\_

CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_

SUBJECT \_\_\_\_\_

## PUMP DESIGN POINT

2 - PUMPS  
 600 ~~209~~ GPM/PUMP      232 FT.  
 100 ~~130~~ PSIG DISCHARGE PRESSURE      301 FT  
 8.4 PSIG SUCTION PRESSURE      19 FT.  
 TDH = ~~282~~ FT 223 FT.

T = 60°F

$\eta_p = 75\%$

$$PUMP \text{ HP} = \frac{(GPM)(TDH)(S.G.)}{3960 \eta_p} = \frac{600 \cdot 223 \cdot (.997)}{(3960)(.75)} = \frac{40}{67} \text{ HP}$$



PAGE \_\_\_\_\_

JOB NO. \_\_\_\_\_ DATE 6/5/79 BY \_\_\_\_\_ CH'K \_\_\_\_\_

CUSTOMER \_\_\_\_\_ PROJECT \_\_\_\_\_

SUBJECT Tank Spec. Data.

Raw Water Storage Tank

- Fire protection requirements 93000 gals. Ref. Telecom 5/11/79 From R. Williamson / I. Katter SCE TO J. Hyson + T. Olson. S-R.

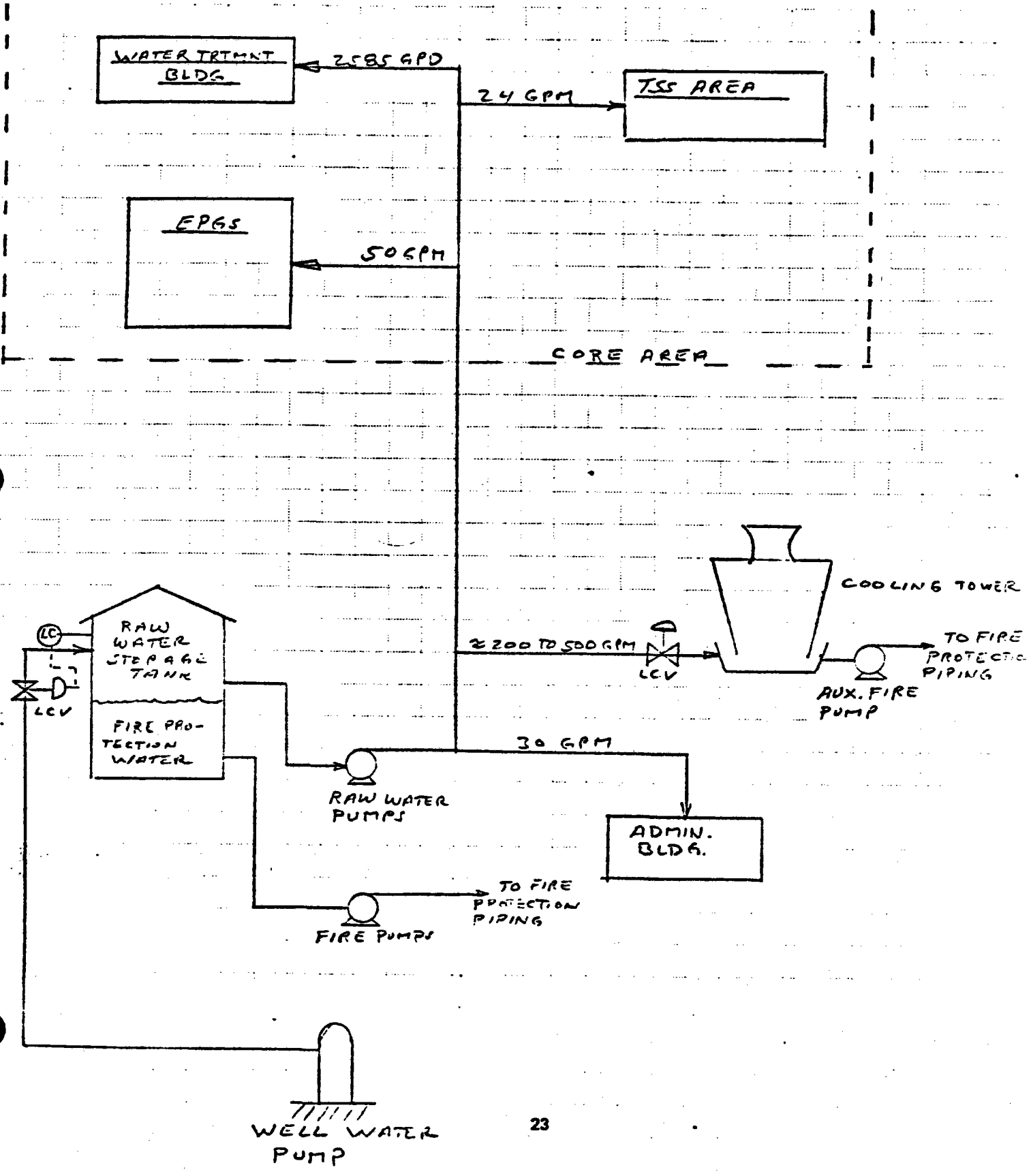
Mirror Wash Water Tank

- Mirror Washing 4000 gals/day. usage Telecom from Ken Kroy. MDAC to J. Hyson S-R 4/26/79.
- Flow to Demin. 12.5 gpm Max to H Well From R. Long 4/27/79 for 18 hrs/day. 4/17/79 Telecom K. Kroy MDAC TO R. Long S-R.
- 1 1/2 gal/helostat for washing + 6 gal/helostat for rinsing, Wash mirror 12 times/year, 1 helostat/minute, 480 helostat/night. based on the requirement 3600 gals/day. Telecom K. Kroy MDAC to R. Long S-R 4/17/79

# Stearns-Roger

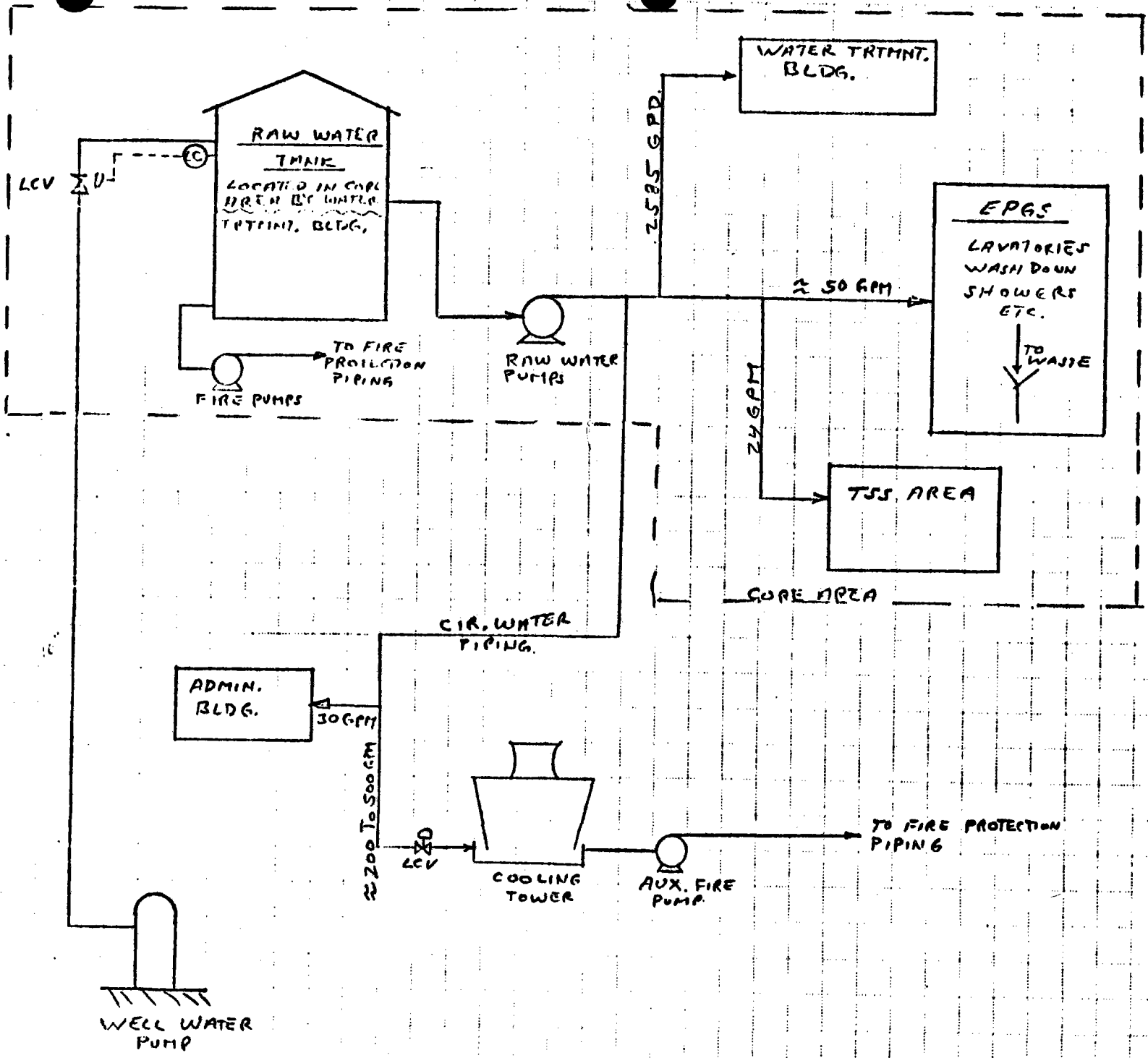
FORM 10-114  
REV. 4-75

JOB NO. 21700      DATE 6/4/79      PAGE \_\_\_\_\_  
 BY J/CW      CH'K \_\_\_\_\_  
 CUSTOMER \_\_\_\_\_      PROJECT \_\_\_\_\_  
 SUBJECT SERVICE WATER SYSTEM      SYSTEM-B



JOB NO. 21700 DATE 6/4/79 BY *llw* CHK

CUSTOMER \_\_\_\_\_ PROJECT SERVICE WATER SYSTEM - SYSTEM - A



Rec'd 5/3/79 WELLS  
@ MDAC P3-11  
JH

PER SCE (BOB WILLIAMSON), VERY  
PRELIMINARY REQUIREMENTS ARE:

- 250 GPM → <sup>also</sup> SPRINKLER SYSTEM + 4 hose reels TURBINE/GENERATOR FIRE PROTECT
- 30 GPM ADMIN. BLDG SERVICE
- 500 GPM COOLING TOWER MAKEUP
- 300 GPM TURBINE/GENERATOR SERVICE

Ken Knox 5/2/79

REGEN WASTE  $\approx$  50 GPM  
COOLING TOWER BLOWDOWN  $\approx$  <sup>1200</sup> 500 GPM  
NO OIL WASTE 5/3

**Stearns-Roger**

LEN C21700 MAY 04 '79  
Acc. 16.3 File No. 34

cc  
TO  
WELLS

Rev: PDE'S JB





STMPO 198

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

OCT 19 1984

Mr. Robert L. Gervais  
Solar One Project Office  
McDonnell Douglas Astronautics Corp.  
P.O. Box 366  
Daggett, CA 92327

Subject: Contractor Clearance of Contract DE-AC03-79SF10499  
Solar One Reports for DOE/TIC Inclusion.

Dear Bob:

Enclosed are copies of covers and title pages of nine 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-T108	STMPO 193	PSS Final Design Calculations (Book 18 of 26)
DOE/SF/10499-T109	STMPO 194	PSS Final Design Calculations (Book 19 of 26)
DOE/SF/10499-T110	STMPO 195	PSS Final Design Calculations (Book 20 of 26)
DOE/SF/10499-T111	STMPO 196	PSS Final Design Calculations (Book 21 of 26)
DOE/SF/10499-T112	STMPO 197	PSS Final Design Calculations (Book 22 of 26)

DOE/SF/10499-T113	STMPO 198	PSS Final Design Calculations (Book 23 of 26)
DOE/SF/10499-T114	STMPO 199	PSS Final Design Calculations (Book 24 of 26)
DOE/SF/10499-T115	STMPO 200	PSS Final Design Calculations (Book 25 of 26)
DOE/SF/10499-T116	STMPO 201	PSS Final Design Calculations (Book 26 of 26)

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: CCC010.RNO(SA3:)

Encl: Nine Document Covers W/forms 70 and RA-426

cc: 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. (STMP0 198) DOE/SF/10499-T113
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 Final Design Calculations  
(Book 23 of 26)
- Type of Document:  Technical Report,  Conference Paper,  Journal Article,  Abstract or Summary,  
 Copy of Oral Presentation,  Other (please specify): \_\_\_\_\_  
(Routine)
- In order to meet a publication schedule or submission deadline, patent clearance by \_\_\_\_\_  
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 copy of clearance 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 \_\_\_\_\_



DOE AND MAJOR CONTRACTOR RECOMMENDATIONS FOR  
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1. DOE Report No. DOE/SF/10499-T113 (SIMPO 198)	2. Contract No. DE-AC03-79SF10499	3. Subject Category No. UC-62, 62c, 62d
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4. Title  
Plant Support Sybssystem Final Design Calculations (Book 23 of 26)

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 \_\_\_\_\_  
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S.D. Elliott, Jr., DOE Solar One Project Office  
Organization  
P.O. Box 366, Daggett, CA 92327 (619) 254-2672

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

10 MWe Solar Thermal  
Central Receiver Pilot Plant

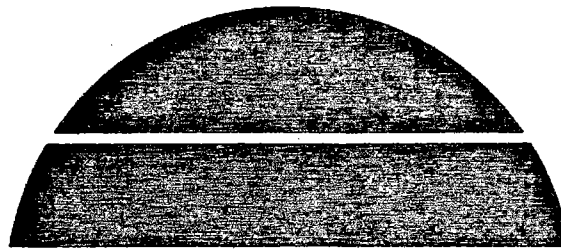
SOLAR FACILITIES DESIGN INTEGRATION

PSS FINAL DESIGN CALCULATIONS  
BOOK 23 OF 26--PSS FIELD ERECTED TANKS  
CONSTRUCTION PACKAGE 10A (RADL ITEM 7-8)

September 1980

WORK PERFORMED UNDER CONTRACT  
DE-AC03-79SF10499

STEARNS-ROGER ENGINEERING CORP  
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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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**PSS FINAL DESIGN CALCULATIONS  
BOOK 23 OF 26—PSS FIELD ERECTED TANKS  
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**September 1980**

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**PREPARED FOR THE  
U.S. DEPARTMENT OF ENERGY  
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DOE AND MAJOR CONTRACTOR RECOMMENDATIONS FOR ANNOUNCEMENT AND DISTRIBUTION OF DOCUMENTS

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1. DOE Report No. DOE/SF/10499-T113 (STMPO 198)	2. Contract No. DE-AC03-79SF10499	3. Subject Category No. UC-62, 62c, 62d
4. Title Plant Support Sybssystem Final Design Calculations (Book 23 of 26)		
5. Type of Document ("x" one) <input checked="" type="checkbox"/> a. Scientific and technical report <input type="checkbox"/> b. Conference paper: Title of conference _____ <div style="text-align: right; margin-top: 5px;">Date of conference _____</div> Exact location of conference _____ Sponsoring organization _____ <input type="checkbox"/> c. Other (specify planning, educational, impact, market, social, economic, thesis, translations, journal article manuscript, etc.)		
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14. Submitted by (Name and Position) (Please print or type) <u>S.D. Elliott, Jr., DOE Solar One Project Office</u> Organization <u>P.O. Box 366, Daggett, CA 92327 (619) 254-2672</u> Signature _____ Date _____		



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 198) DOE/SF/10499-T113
Date of Report September 1980
Name & Phone No. of DOE Technical Representative S.D. Elliott, Jr. (619) 254-2672

1. Document Title: Plant Support Subsystem Final Design Calculations  
(Book 23 of 26)

2. Type of Document:  Technical Report,  Conference Paper,  Journal Article,  Abstract or Summary,  
 Copy of Oral Presentation,  Other (please specify): \_\_\_\_\_  
(Routine)

3. In order to meet a publication schedule or submission deadline, patent clearance by \_\_\_\_\_  
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:

a. Attention should be directed to pages \_\_\_\_\_ of this document.

b. This document describes matter relating to an invention:

- i. Contractor Invention Docket No. \_\_\_\_\_
- ii. A disclosure of the invention was submitted to DOE on \_\_\_\_\_ (date)
- iii. A disclosure of the invention will be submitted shortly \_\_\_\_\_ (approximate date)
- iv. 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  
P.O. Box 366, Daggett, CA 92327

6. Remarks:

Reviewing/Submitting Official: Name (Print/Type) John P. Scholl  
Title Asst. Chief Patent Counsel, MDC (MS 122-23)  
Signature [Signature] Date 6 NOV 84

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.