H009-M-809

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4. Title
Water Supply Systems Preoperational Test Procedure 910, Revision 0

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

Signature	Date

H009-M-809

SAN FORM 70 10/80

DEPARTMENT OF ENERGY
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CONTRACTOR REQUEST FOR PATENT CLEARANCE
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Prime Contract No.	DE-AC03-79SF10499
Subcontract No.	(N/A)
Report No.	(STMPO 590) DOE/SF/10499-T121
Date of Report	July 1981
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
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FROM:
McDonnell Douglas Corporation
3855 Lakewood Blvd.
Long Beach, CA 90846

1. Document Title: Water Supply Systems Preoperational Test Procedure 910, Revision 0

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

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Reviewing/Submitting Official: Name (Print/Type) Donald L. Royer
Title Asst. Chief Patent Counsel, MDC (MS 122-23)
Signature _____ Date 26 Sep 84

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☐ No patent objection to above-identified release.

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DOE/SF/10499-T121
(STMPO-590)

WATER SUPPLY SYSTEMS

PREOPERATIONAL TEST

PROCEDURE 910

REVISION: 0

UNITED STATES DEPARTMENT OF ENERGY/
SOUTHERN CALIFORNIA EDISON COMPANY

10 MWe SOLAR PILOT PLANT

DAGGETT, CALIFORNIA

PROJECT: C-21700

STEARNS-ROGER ENGINEERING CORPORATION

DENVER, COLORADO

AUTHOR: D. L. Williams

REVIEWED BY: J. A. Kochmann

APPROVED BY:

WATER SUPPLY

SYSTEM (910)

TABLE OF CONTENTS

WATER SUPPLY

SYSTEM (910)

TABLE OF CONTENTS

SECTION

1.0 OBJECTIVES

1.1 Demonstrate that Raw Water Storage Tank (TK-701) level is maintained at proper level through the operation of LV-1702.

1.2 Demonstrate Raw Water Storage Tank local level indicator LI-1701, Low Level Alarm Functions LAL 1701A and LAL 1701B and high level alarm function LAH-1703.

1.3 Demonstrate manual operation of Raw/Service Water Pumps P-703 and P704 and related interlock function.

1.4 Demonstrate standby mode operation of Raw/Service Water Pumps P-703 and P-704 and related interlock function.

1.5 Demonstrate minimum flow recirculation through PV-1703 and related interlock function.

1.6 Demonstrate that Raw/Service Water Pump head rises are as designed (P-703 and P-704).

1.7 Demonstrate that PV-1704 will provide the Package Make-up Demineralizer with service water at the design pressure.

1.8 Demonstrate that the Makeup Package Demineralizer (D-701) is capable of producing demineralized water at the specified capacity and at or below the specified water chemistry limits.

1.9 Demonstrate operation of the conductivity monitoring CI-1205 and high conductivity alarm functions CAH-1205.

1.10 Demonstrate the operation of the Demineralized Water Storage Tank (TK-702) level control LV-1203 and interlock functions.

1.11 Demonstrate the Demineralized Water Storage Tank (TK-702) high/low level alarm and local indicator functions.

1.12 Demonstrate manual operation of the Demineralized Water Transfer Pump (P-710) and the related interlock function.

1.13 Demonstrate that the demineralized water transfer pump (P-710) head pressure is as designed.

1.14 Demonstrate that the polishing demineralizers are capable of producing condensate at the specified capacity and at or below the specified water chemistry limits.

1.15 Demonstrate operation of the conductivity monitoring CI-1206 and high conductivity alarm functions CAH-1206.

1.16 Demonstrate that high conductivity effluent from the polishing demineralizer will cause automatic recirculation and the excessive rinse alarm function QAH-1206.

1.17 Demonstrate the condensate storage tank (TK-902) inlet level control function, LC-162.

1.18 Demonstrate the condensate storage tank (TK-902) remote and local level indicating and alarm functions.

1.19 Demonstrate safety shower and eye wash are oprational.

2.0 ACCEPTANCE CRITERIA

		VERIFICATION PARAGRAPH	OBJECTIVE
2.1	LV-1702 opens at 25 ft-6 in. tank level and closes at 27 ft-6 in. ft. tank level. P&ID 40P7005133150.		8.1.5 1.1
2.2	LI-1701 indicates water level in tank TK-701 locally. LAL-1701A Alarms on the EPGS CRT when a low level of 21-0 ft. is reached. LAL-1701B alarms on the EPGS CRT when a low level of 3-0 ft. is reached. LAH-1703 alarms on the EPGS CRT when a high level of 27' 9" is reached. P&ID 40P7005133150.	8.1.4 8.1.5	1.2
2.3	Raw/Service water pumps P-703 and P-704 can be started and stopped manually from local control hand switches HS-1703A and HS-1703B P&ID 40P7005133150. 9033/4 E6-1058 9033/4 E6-1079	8.2.1 8.2.2	1.3
2.4	Raw/Service water pumps P-703 and P-704 will start automatically when respective hand switches are placed in the "Auto" position and the flow is less than 70 GPM. P&ID 40P7005133150.	8.3	1.4
2.5	PV-1703 opens when either P-703 or P-704 is operating and the flow is less than 70 GPM. P&ID 40P7005133150	8.4.1	1.5
2.6	Pumps P-703 and P-704 each develop the design head of 280 ft. at shutoff. P&ID 40P7005133150.	8.5.1 8.5.2	1.6
2.7	PV-1704 is operating when either P-703 or P-704 is operating and the Downstream Header Pressure is 80 PSIG. P&ID 40P7005133150.	8.7.4	1.7

2.0 Acceptance Criteria (Contd)

		Verification Paragraph	Objective
2.8	Makeup package demineralizer D-701 delivers demineralized water at a rate of 30 gpm and total capacity of 20,000 gal subject to the following criteria: Total Solids 200 ppb-max Silica 20 ppb-max conductivity 1.0 micromho/cm-max P&ID 40P7005133145	8.7.4	1.8
2.9	CI-1205 indicates demineralized water conductivity and a high conductivity alarm is initiated at 0.5 micromho/cm on the EPGS CRT. P&ID 40P7005133145	8.7.4 8.7.5	1.9
2.10	LV-1203 closes when the demineralized water conductivity exceeds 0.5 micromho/cm. P&ID 40P7005133145.	8.7.5	1.9
2.11	Demineralized water storage tank level is controlled by LV-1203 and High Level Cut-off. P&ID 40P7005133145.	8.7.4 8.7.5	1.10
2.12	LI-1204 indicates level in tank TK-702 and LAHL-1203 indicates a high level alarm at 14'-4" and a low level alarm at 2 ft. on the EPGS CRT. P&ID 40P7005133145.	8.7.4	1.11
2.13	Demineralized water transfer pump P-710 can be started and stopped manually from remote control hand switch HS-1202A and from local control hand switch HS-1202B and the pump is automatically stopped when the demineralized water storage tank (TK-702) level is below 1'-6" as measured by LS-1203 or the condensate storage tank level is greater than 14'-5" as measured by LIT 160, and is automatically started when the level in TK-902 is less than 15'-8". P&ID 40P3005133301 9033/4 E6-1081	8.8.5 8.8.7 8.8.9	1.12

2.0 Acceptance Criteria (Contd)

		Verification Paragraph	Objective
2.14	Pump P-710 develops the design head of 142 ft. at shut-off. P&ID 40P7005133145.	8.8.6	1.13
2.15	Polishing demineralizers DE-701 and DE-702 deliver demineralized water at a rate of 16 gpm subject to the following effluent criteria: Iron 0-5 ppb as Fe Copper 2-5 ppb as Cu Sodium 2-20 ppb as Na Chloride 2-20 ppb as Cl Total Solids 50 ppb-max. Silica 20 ppb-max. Conductivity (Cation) 0.3 micromho/cm-max P&ID 40P7005133145	8.8.7	1.14
2.16	CI-1206 indicates Demineralized water conductivity and a high conductivity alarm is initiated at 0.3 micromho/CM on the EPGS CRT. P&ID 40P7005133145	8.8.7 8.8.8	1.15
2.17	Polishing Demineralizers will automatically resume rinse recirculation when water conductivity reaches TBD and an excessive rinse alarm is initiated at TBD minutes on the EPGS CRT. P&ID 40P7005133145	8.8.8	1.16
2.18	LC-162 Controls LV-162 to maintain the condensate storage tank (TK-902) level at 15'10". P&ID 40P9005133301	8.8.7	1.17
2.19	LI-161 indicates tank level in TK-902 locally. LI-160 indicates tank level on the EPGS CRT and produces a high level alarm at a level of 18 ft and a low level alarm at a level of 13 ft P&ID 40p9005133301.	8.8.7	1.18
2.20	Safety Showers and eyewash facilities at the acid storage, caustic and ammonia, and the in-line demineralizer area all function properly. P&ID 40P9005133304.	8.9	1.19

3.0 REFERENCES

3.1 Pilot Plant System Description, December, 1980

3.2 Logic Diagrams

N/A

3.3 Line Schedules

Drawing 40P7002133104
a) Demineralized Water (DW), Pg. 1 of 1, Rev. 0
b) Raw Water (RW), Pg. 1 of 1, Rev. 2
c) Service Water (SW), Pgs. 1 & 2 of 2, Rev. 2
Drawing M-33655
a) Line Group SFW, Pg. 28, Rev. 0
b) Line Group CCS, Pgs. 11, 12, 13 & 14, Rev. 0.

3.4 Single Line Diagrams

a) 40E7005133193 (E2-4) One-Line Diagram 480 V MCC-C, Rev. 1

3.5 Piping and Instrumentation Diagrams

a) 40P7005133150, Rev. 4, Plant Support Subsystem (PSS), Service Water, Sheet 1 of 1.

b) 40P7005133145, Rev. 4, Plant Support System (PSS), Water Treatment, Sheet 1 of 1.

c) 40P3005132195, Rev. 1, Thermal Storage Subsystem (TSS), Extraction Steam and Condensate, Sheet 1 of 1.

d) 40P9005133301-2, Feedwater & Condensate System.

e) 40P9005133304-2, Miscellaneous Systems.

f) 40P9005133309-2, Turbine.

g) 40P9005133302-2, Circulating Water System.

3.6 Electrical Elementary Diagrams

a) 40E7002133200 (E6-1058) Raw/Service Water Pump Control, Rev. 0
b) 40E7002133200 (E6-1058A) Raw/Service Water Pump Control, Rev. 0
c) 40E7002133200 (E6-1081) Demineralized Water Transfer Pump Control, Rev. 1
d) 40E7002133200 (E6-1079) Raw/Service Water Pump Control, Rev. 0

3.7 Instrument Index

40I7002181, (11165/8 Sheet 111), Rev. 3

3.0 REFERENCES (Contd)

3.8 Material Requisition and/or Specification

a) Technical Specification, No. 40M700-7S, Plant Support Subsystems Field Erected Tanks, Rev. 2.
b) Technical Specification, No. 40M700-6S, Piping and Mechanical Equipment, Rev. 6.
c) Specification No. 40M700-33S, Purchased Demineralized Water, Rev. 3.

3.9 Vendor Data

a) Raw Water Storage Tank TK-701.
b) Demineralized Water Storage Tank TK-702.
c) Demineralized Water Transfer Pump P-710.
d) Raw/Service Water Pump P-703.
e) Raw/Service Water Pump P-704.
f) Make-up Package Demineralizer D-701.
g) Polishing Demineralizer, DE-701 and DE-702.
h) Condensate Storage Tank TK-902.

3.10 Standards

N/A

3.11 Startup Schedules

a) Procedure Development and Test Schedule, Rev. 2.
b) Solar One Summary Start-up Schedule, Rev. 1.

4.0 PREREQUISITES

4.1 Turnover of the system to SCE is complete and in accordance with Section 5.4 of the SCE Startup Manual.

_____/_____
INITIAL DATE

4.2 Reference Material has been reviewed and later revisions (if any) will not affect this test.

_____/_____
INITIAL DATE

4.3 The Master Tracking System has been reviewed and outstanding items (if any) will not affect this test. A summary list of outstanding items is attached on Appendix 10A.

_____/_____
INITIAL DATE

4.4 The Abnormal Equipment and Circuitry Log has been reviewed, is current, and is satisfactory for this test. A summary list is attached on Appendix 10B.

_____/_____
INITIAL DATE

4.5 The system has been walked through and verified complete to the extent required to conduct this test.

_____/_____
INITIAL DATE

4.6 Prerequisite component tests and calibration have been completed for components listed on Appendix 10C, 10D and 10E.

_____/_____
INITIAL DATE

4.7 All test equipment as per section 6.0, is available, calibrated and in working order.

_____/_____
INITIAL DATE

4.8 A pretest coordination meeting has been held to familiarize test and operations personnel with the requirements of this test.

_____/_____
INITIAL DATE

5.0 LIMITS AND PRECAUTIONS

5.1 Heat tracing should be in service prior to performing tests if ambient temperature requires it.

5.2 Area containing automatically starting pumps posted with "Caution" signs or identified in a conspicuous manner.

5.3 Observe vendor operating and maintenance instructions.

5.4 The Electric Fire Pump System is out of service during a portion of this Test Procedure.

6.0 TEST EQUIPMENT

Test Equipment equivalent to that specified may be used. Equipment serial number will be recorded prior to start of test and calibration will be verified for expected test time period.

6.1 Indicating Instruments

6.1.1 Pressure Indicator

Make:	Marshalltown
Fig. No.:	24
Range:	0-160 PSIG
Size:	4 1/2"
Accuracy:	1%
Number Required:	One

6.1.2 Stop Watch

Make:	Sears
Ranges:	0-60 Sec, 0-15 Minutes
Divisions:	0.2 Sec.
Number Required:	One

6.1.3 Level Indicators

6.1.3.1 Tygon Tubing for Raw/Water Storage Tank, TK-701.

6.1.3.2 Tygon Tubing for Demineralized Water Storage Tank, TK-702.

6.1.3.3 Tygon Tubing for Condensate Storage Tank, TK-902

6.1.4 Portable Conductivity Indicator

Make:	Hach
Model:	2510-01
Range:	0-2, 0-20, 0-200, 0-2000, 0-20000 mmhos/cm
Number Required:	One

6.2 Sample Bottles

Size:	500 Ml
Type:	Glass w/Screw top
Number Required:	Twelve

6.3 Walkie - Talkies

Type:	Per SCE requirements
Number Required:	Two

7.0 INITIAL CONDITIONS

7.1 Environmental Conditions

7.1.1 Buildings should be heated if ambient temperatures require it.

7.2 Temporary Installations

N/A

7.3 Support Systems/Plant Operating Status

7.3.1 Coolwater Station Wells are operating and 8"-RW-6-DQA Header is pressurized.

_____/_____
INITIAL DATE

7.3.2 SDPC System Display and Alarm Functions are operational to support the following sections as applicable:

8.1.5
8.7.4
8.7.5
8.8.5
8.8.7

_____/_____
INITIAL DATE

7.3.3 The Cooling Tower Basin is prepared to receive water.

_____/_____
INITIAL DATE

7.4 Component Lineup

7.4.1 Initial circuit breaker positioning for step 8.1.1 as noted in Appendix 10F completed.

_____/_____
INITIAL DATE

7.4.2 Initial control switch positioning for step 8.1.1 as noted in Appendix 10G completed.

_____/_____
INITIAL DATE

7.4.3 Initial valve lineup for step 8.1.2 as noted in Appendix 10H completed.

_____/_____
INITIAL DATE

7.5 Other Initial Conditions

7.5.1 Ensure the Rental Make-up Package Demineralizer is Ready for Operation.

_____/_____
INITIAL DATE

7.5.2 Insure the Rental Polishing Demineralizer is Ready for Operation.

_____/_____
INITIAL DATE

7.5.3 Establish communications between control room and local test stations as required.

_____/_____
INITIAL DATE

8.0 PROCEDURE AND DATA COLLECTION

8.1 Raw Water Storage Tank TK-701

8.1.1 Verify that initial conditions have been established.

_____/_____
INITIAL DATE

CAUTION:

THE TEST ENGINEER SHOULD BE PREPARED TO ABORT THE TEST AT ANY TIME AND OPEN THE RAW WATER SUPPLY VALVE V-FP-22-34 AND PRIMARY ELECTRIC FIRE PUMP RECIRCULATION VALVE V-FP-26-35 IN CASE OF EMERGENCY.

8.1.2 Position all Outlet Valves from the Raw Water Storage Tank TK-701 as noted in Appendix 10H for this test step.

_____/_____
INITIAL DATE

8.1.3 Install temporary Tygon Tubing level indicator on Raw Water Storage Tank TK-701 next to LI-1701.

_____/_____
INITIAL DATE

8.1.4 Using LV-1702 by-Pass, fill Raw Water Storage Tank TK-701 and record LI-1701 readings and the temporary level indicator readings. (Number of readings necessary to be determined by Test Engineer). (See Valve Lineup List for this Section)

LI-1701 Read/Ft.	Tubing Read/Ft.

_____/_____
INITIAL DATE

8.0 Procedure and Data Collection (Contd)

8.1.5 During filling of Step 8.1.4, observe at what Level LV-1701B clears on the EPGS CRT; what level LAL 1701A clears on the EPGS CRT and at what level LV-1702 closes. Then, shutdown the well water supply and, with LV-1702 by-pass open and V-FP-38-38 open, allow the Raw Water Storage Tank TK-701 level to slowly drop while draining into the cooling tower basin. Observe at what level LV-1702 opens. Close V-FP-38-38 and resume filling with the well water supply and note at what high Level Alarm LAH-1703 alarms on the EPGS-CRT (See Section 7.3.2). (See Valve Lineup List for this Section).

	Design		Actual
LV-1702 Closes	27-6	Ft-In	_____ Ft-In
LV-1702 Opens	25-6	Ft-In	_____ Ft-In
LAH-1703 Alarms	27-9	Ft-In	_____ Ft-In
LAL-1701A Clears	22-0	Ft-In	_____ Ft-In
LAL-1701B Clears	3-0	Ft-In	_____ Ft-In

_____/_____
INITIAL DATE

8.2 Raw/Service Water Pumps Manual Start/Stop

8.2.1 At Local Control Station, place HS-1703A in "HAND" position. Verify Starting of Pump P-703 and illumination of Red Light. Place HS-1703A in "OFF" position. Verify stopping of Pump P-703 and illumination of Green Light.

_____/_____
INITIAL DATE

8.2.2 At Local Control Station, place HS-1703B in "HAND" position. Verify Starting of Pump P-704 and illumination of Red Light. Place HS-1703B in "OFF" position. Verify stopping of Pump P-704 and illumination of Green Light.

_____/_____
INITIAL DATE

8.3 Raw/Service Water Pump "AUTO" Start

8.3.1 Set Valves for recirculation of both Pumps P-703 and P-704. Observe that FIT-1703A and FIT-1703B indicate less than 70 GPM. (See Valve Lineup List for this Section)

_____/_____
INITIAL DATE

8.0 Procedure and Data Collection (Contd)

8.3.2 At the local control station, place HS-1703A in "HAND" position. Observe Pump P-703 Start.

_____/_____
INITIAL DATE

8.3.3 At the local control station, place HS-1703B in "AUTO" position. Observe Pump P-704 Does Not Start.

_____/_____
INITIAL DATE

8.3.4 At the local control station, place HS-1703A in "OFF" position. Observe Pump P-704 Start. Observe Pump P-703 Stop.

_____/_____
INITIAL DATE

8.3.5 At the local control station, place HS-1703A in "HAND". Observe pump P703 Start and observe Pump P-704 Stop. Place both HS-1703A and HS-1703B in "OFF". Verify stopping of both pumps.

_____/_____
INITIAL DATE

8.3.6 At the local control station, place HS-1703B in "HAND" position. Observe Pump P-704 start.

_____/_____
INITIAL DATE

8.3.7 At the local control station, place HS-1703A in "AUTO" position. Observe Pump P-703 does not start.

_____/_____
INITIAL DATE

8.3.8 At the local control station, place HS-1703B in "OFF" position. Observe Pump P-703 start. Observe Pump P-704 stop.

_____/_____
INITIAL DATE

8.3.9 At the local control station, place HS-1703B in "HAND". Observe Pump P-704 start and observe Pump P-703 stop.

_____/_____
INITIAL DATE

8.0 Procedure and Data Collection (Contd)

CAUTION

BOTH RAW/SERVICE WATER PUMPS SHOULD ONLY BE RUN TOGETHER ON RECIRCULATION MOMENTARILY IN ORDER TO CHECK ALARM FUNCTION.

8.3.10 At the local control station, place HS-1703A in "HAND". Observe that both pumps are running and an alarm is received on the EPGS CRT stating "Raw/Service Water Pumps Recirculation Trouble". Place both HS-1703A and HS-1703B in "OFF". (See Section 7.3.2)

_____/_____
INITIAL DATE

8.4 Raw/Service Water Recirculation Control

8.4.1 With both pumps P-703 and P-704 set up for recirculation, and all uses of Raw/Service Water isolated, observe that PV-1703 is open during operation of either pump P-703 or P-704, and note either pump P-703 or P-704 discharge pressure on either PI-1703A or PI-1703B. (See Valve Lineup List for this section.)

	DESIGN	ACTUAL
Pump Discharge Pressure (Full Tank) PI-1703A or PI-1703B.	120 PSIG	_____ PSIG

_____/_____
INITIAL DATE

8.5 Raw/Service Water Pump Head

8.5.1 While Pump P-703 operates on recirculation with V-SW-5-6 closed, close its recirculation Shutoff Valve V-SW-8-10 and record the reading of PI-1703A and LI-1701. (See Valve Lineup List for this Section)

PI-1703A _____PSIG
LI-1701 _____FT.

Calculate the operating shutoff head value as follows:

[2.3][PI-1703A Reading]-[LI-1701 Reading-1.5 Ft.]

	Design	Actual
Shutoff Head (Full Tank)	280 ft	_____ft

_____/_____
INITIAL DATE

8.0 Procedure and Data Collection (Contd)

8.5.2. While Pump P-704 operates on recirculation with V-SW-5-4 closed, close its Recirculation Shutoff Valve V-SW-8-8 and record the reading of PI-1703B and LI-1701. (See Valve Lineup List for this section)

PI-1703B _____ PSIG
LI-1701 _____ FT.

Calculate the Operating Shutoff Head Value as follows:

[2.31][PI-1703B Reading] - [LI-1701 Reading - 1.5 Ft.]

	Design	Actual
Shutoff Head (Full Tank)	280 ft	_____ft

_____/_____
INITIAL DATE

8.6 Make-up Package Demineralizer Supply Pressure

Delete

8.7 Make-up Package Demineralizer

8.7.1 Close all outlet valves from Demineralized Water Storage Tank TK-702. (See Valve Lineup List for this Section)

_____/_____
INITIAL DATE

8.7.2 Install temporary tygon tubing level indicator on Demineralized Water Storage Tank TK-702 next to LI-1204.

_____/_____
INITIAL DATE

8.7.3 Isolate all uses of Raw/Service Water except supply to the Make-up Package Demineralizer. (See Valve Lineup List for this Section)

_____/_____
INITIAL DATE

8.7.4 Note starting level in Raw Water Storage Tank and start a 30 GPM flow through the Make-up Package Demineralizer using FQI-1205 to check the rate. Observe water pressure at Makeup Package Demineralizer inlet on test pressure indicator. Continue until a total of 20,000 gallons is demineralized. At 426.0 gal/inch, a total of 46.9" of level change is required. During tank filling, note at what level low alarm LAHL-1203 is cleared from the EPGS CRT, LV-1203 is closed and

8.0 Procedure and Data Collection (Contd)

what level high alarm LAHL-1203 is indicated on the EPGS CRT. Compare LI-1204 with the temporary level gauge during filling. Toward the end of the test, use the LV-1203 by-pass and allow the tank to overfill. It will be necessary to start procedure step 8.8 before this step is complete since the demineralized water storage capacity is 17,280 gallons and overflowing to drain is only permissible when the separator waste water pumps are operational. Take hourly samples of product water and have the laboratory analyze for 1) Total solids, 2) Silica, and 3) Conductivity and compare with CI-1205 readings. (See Section 7.3.2) (See valve Lineup List for this Section)

	Design	Actual
Low Alarm LAHL-1203 Cleared	2 ft	_____ft
LV-1203 Closed	14'-2"	_____ft
High Alarm LAHL-1203 Indicated	14'-4"	_____ft

(Number of Readings Necessary to be determined by Test Engineer.)

LI-1204 Read/Ft.	Tubing Read/Ft.

Hour	CI-1205 Reading, mmhos/cm	Total Solids ppb	Silica ppb	Conductivity Mmhos/cm
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

	Design	Actual
Supply Pressure @ 30 GPM	80 PSIG	_____PSIG

_____/_____
INITIAL DATE

8.0 Procedure and Data Collection (Contd)

8.7.5 Remove CE-1205 and immerse in a water solution of conductivity 0.5 mmhos/cm. Observe CAH-1205 alarm on the EPGS CRT and LV-1203 close. (See Section 7.3.2)

_____/_____
INITIAL DATE

8.8 Demineralized Water Transfer Pump P-710

8.8.1 Close all outlet valves from Condensate Storage Tank TK-902. (See Valve Lineup List for this Section)

_____/_____
INITIAL DATE

8.8.2 Install temporary tygon tubing level indicator on Condensate Storage Tank TK-902 next to LI-161.

_____/_____
INITIAL DATE

8.8.3 Verify that Condensate Storage Tank TK-902 is empty and that Demineralized Water Storage Tank, TK-702 is full.

_____/_____
INITIAL DATE

8.8.4 Shut off make-up supply to Demineralized Water Storage Tank TK-702. (See Valve Lineup List for this Section)

_____/_____
INITIAL DATE

8.8.5 At Local Control Station, Place HS-1202B in "HAND" Position. Verify starting of Demineralized Water Transer Pump P-710 and illumination of Red Light. Place HS-1202 in "OFF" position. Verify stopping of pump P-710 and illumination of Green light. At the SPDC, place HS-1202A in "HAND" position. Verify starting of Demineralized Water Transfer Pump P-710. Place HS-1202A in "OFF" position. Verify stopping of Pump P-710. (See Section 7.3.2)

_____/_____
INITIAL DATE

8.0 Procedure and Data Collection (Contd)

8.8.6 While Pump P-710 operates on recirculation with its discharge valves all closed, close its recirculation shutoff valve and record the reading of PI-1201 and LI-1204. (See Valve Lineup List for this Section)

PI-1201A	_____	PSIG
LI-1204	_____	FT.

Calculate the operating shutoff head value as follows:

[2.31][PI-1201A Reading]-[LI-1204 Reading-1.25 ft.]

	Design	Actual
Shutoff Head (Full Tank)	142 ft	_____ ft

_____ / _____
INITIAL DATE

8.8.7 At Local Control Station, place HS-1202 in "AUTO" postion. Verify starting of Demineralized Water Transfer Pump P-710. Direct all water through Polishing Demineralizers to Condensate Storage Tank TK-902. Control Pump Discharge to 16 GPM by noting the flow rate meter supplied with the Polishing Demineralizer. During the filling, note the starting level of both the Demineralized Water Storage Tank TK-702 and the Condensate Storage Tank TK-902, at what low level on LI-1204 the Demineralized Water Transfer Pump P-710 is stopped, and at what high level on LI-161 the pump is stopped. Compare LI-161 with the temporary level gauge and LI-160, as displayed on the EPGS CRT. Note at what point low level alarm LAHL-160 is cleared and at what point high level alarm LAHL-160 is indicated on the EPGS CRT. Note at what Level LV-162 starts to close, receives 9 PSIG Air Signal from LC-162 and is fully closed. Take Bi-hourly samples of product water and have the laboratory analyze for 1) Iron, 2) Copper, 3) Sodium, 4) Chloride, 5) Total Solids, 6) Silica, 7) Cation Conductivity and 8) Total conductivity and compare with CI-1206 readings. (See Section 7.3.2). (See Valve Lineup List for this Section)

LI-161 Levels

	Design	Actual
Low Alarm LAHL 160 Cleared	13'	_____ Ft.
LV-162 Starts to Close	15'-4"	_____ Ft.
LV-162 Fully Closed	16'4"	_____ Ft.
P-710 is Stopped	16'	_____ Ft.

8.0 Procedure and Data Collection (Contd)

LI-1204 Levels

P-710 is stopped

	Design	Actual
	2'-0"	_____ Ft.

LI-161 Reading,Ft.	LI-160 Reading, Ft.	Tubing Reading, Ft.

Hour	Iron ppb Fe	Copper ppb Cu	Sodium ppb Na.	Chloride ppb Cl.	Total Solids ppb	Silica ppb	Cond, mmho./cm	Cation Cond,	Total	CI-210 Reading
2										
4										
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

_____/_____
INITIAL DATE

8.8.8 Remove CE-1206 and immerse in a water solution of conductivity 0.3 mmhos/cm. Observe CAH-1206 alarm on the EPGS CRT and the Polishing Demineralizer automatically resume rinse recirculation. Allow the rinse to continue until the excessive rinse alarm QAH-1206 is initiated on the EPGS CRT. Note the rinse time required for this alarm. Clean and reinstall CE-1206. (See Section 7.3.2)

	Design	Actual
QAH-1206 Alarm Time	TBD Ft.	_____ Ft.

_____/_____
INITIAL DATE

8.0 Procedure and Data Collection (Contd)

8.8.9 During an emptying cycle, note at what level on LI-161 the Demineralized Water Transfer Pump P-710 is started.

	Design	Actual
P-710 is Started	15'-8"	_____ Ft.

_____/_____
INITIAL DATE

8.9 Safety Showers

8.9.1 Operate the Inline Demineralizer Area Safety Shower and Eyewash and note whether they function properly.

_____/_____
INITIAL DATE

8.9.2 Operate the Caustic and Ammonia Area Safety Shower and Eyewash and note whether they function properly.

_____/_____
INITIAL DATE

8.9.3 Operate the Acid Storage Area Safety Shower and Eyewash and note whether they function properly.

_____/_____
INITIAL DATE

9.0 SYSTEM RESTORATION

9.1 Set up Valves on Raw/Service Water System for normal distribution, and observe filling of Raw Water Storage Tank TK-701.

_____/_____
INITIAL DATE

9.2 Remove all temporary test equipment, level indicator tubes, temporary strainers, etc., or note in the Abnormal Equipment and Circuits Log, Appendix 10B.

_____/_____
INITIAL DATE

9.3 Set up valves on Demineralized Water System for normal distribution, and observe filling of Demineralized Water Storage Tank TK-702.

_____/_____
INITIAL DATE

9.4 Set up valves on Demineralized Water Transfer System and Polishing Demineralizers for Normal Distribution, and observe filling of Condensate Storage Tank TK-902.

_____/_____
INITIAL DATE

9.5 Isolate Condensate Storage Tank outlets at Boundary Valves to adjoining systems.

_____/_____
INITIAL DATE

9.6 Inform the SCE Shift Operating Foreman that the test is completed and the system may be lined up and placed in service in accordance with station operating procedures.

_____/_____
INITIAL DATE

10.0 ATTACHMENTS

Appendix 10A	Master Tracking System
Appendix 10B	Abnormal Equipment and Circuits
Appendix 10C	Electrical Prerequisite Tests
Appendix 10D	Instrumentation and Control Prerequisite Tests and Calibrations
Appendix 10E	Mechanical Prerequisite Tests
Appendix 10F	Initial Status of Breakers for Test Procedure Step 8.1.1
Appendix 10G	Initial Status of Switches for Test Procedure Step 8.1.1
Appendix 10H	Initial Status - Valve Lineup for Test Procedure Steps
Data Sheet EO 142	Raw/Service Water Pump Motor & Breaker P-703
Data Sheet EO 142	Raw/Service Water Pump Motor & Breaker P-704
Data Sheet EO 142	Demineralized Water Transfer Pump Motor & Breaker P-710
Data Sheet E5-386	Raw/Service Water Pump P-703
Data Sheet E5-386	Raw/Service Water Pump P-704
Data Sheet E5-386	Demineralized Water Transfer Pump P-710

APPENDIX 10A

MASTER TRACKING SYSTEM

ITEM NO.	DESCRIPTION	SECTION AFFECTED	INITIAL/DATE

APPENDIX 10B

ABNORMAL EQUIPMENT AND CIRCUITS

ITEM NO.	DESCRIPTION	SECTION AFFECTED	INITIAL/DATE

APPENDIX 10C

ELECTRICAL PREREQUISITE TESTS

Component		Generic Test Procedure No.	Test Complete Initial/Date
Number	Description		
1	Raw/Service Water Pump Motor P-703	Form EO-142 a) Insulation b) Resistance c) Ground Strap d) Coupling e) Lubrication f) Vibration g) Rotation h) Inrush Amps i) No Load Amps	
2	Raw/Service Water Pump Motor P-704	Form EO-142 a) Insulation b) Resistance c) Ground Strap d) Coupling e) Lubrication f) Vibration g) Rotation h) Inrush Amps i) No Load Amps	
3	Demineralized Water Transfer Pump Motor P-710	Form EO-142 a) Insulation b) Resistance c) Ground Strap d) Coupling e) Lubrication f) Vibration g) Rotation h) Inrush Amps i) No Load Amps	
4	Raw/Service Water Pump Motor P-703 Breaker	Form EO-142 a) Calibration Check b) Set Trip Points c) Minimum Trip Current Check d) Operating Time	

APPENDIX 10C

ELECTRICAL PREREQUISITE TESTS

Component		Generic Test Procedure No.	Test Complete Initial/Date
Number	Description		
5	Raw/Service Water Pump Motor P-704 Breaker	Form EO-142 a) Calibration Check b) Set Trip Points c) Minimum Trip Current Check d) Operating Time	
6	Demineralized Water Transfer Pump Motor P-710 Breaker	Form EO-142 a) Calibration Check b) Set Trip Points c) Minimum Trip Current Check d) Operating Time	

APPENDIX 10D

INSTRUMENTATION & CONTROLS
PREREQUISITE TESTS AND CALIBRATIONS

Component				Generic Test Procedure	Test Complete Initial/Date
Number	Description	Set Point	Field Setting		
1	LIT-160	N/A		Calibrate	
2	LAHL-160 High Low	 18' 17'-6"			
3	LI-160	N/A		Calibrate	
4	LI-161	N/A		Calibrate	
5	LV-162	N/A		Stroke	
6	LC-162	N/A		Calibrate	
7	PI-1201	N/A		Calibrate	
8	LV-1203	N/A		Stroke	
9	SOV-1203	N/A		Stroke	
10	LS-1203	14'-2"			
11	LAHL-1203 High Low	 14'-4" 2'-0"			
12	LI-1204	N/A		Calibrate	
13	CE-1205	N/A		Clean	
14	CIT-1205	N/A		Calibrate	
15	CY-1205	N/A		N/A	
16	CI-1205	N/A		Calibrate	
17	CAH-1205	0,5 mm/o cm			
18	FQI-1205	N/A		N/A	
19	LI-1701	N/A		Calibrate	
20	SOV-1702	N/A		Stroke	
21	LV-1702	N/A		Stroke	

APPENDIX 10D

INSTRUMENTATION & CONTROLS
PREREQUISITE TESTS AND CALIBRATIONS

Component				Generic Test Procedure	Test Complete Initial/Date
Number	Description	Set Point	Field Setting		
22	LS-1702 Falling Rising	 25'-6" 27'-6"			
23	LS-1703	27'-9"			
24	~~LAH~~-1703	27'-9"			
25	PI-1703A	N/A		Calibrate	
26	PI-1703B	N/A		Calibrate	
27	PV-1703	N/A		Stroke	
28	SOV-1703	N/A		Stroke	
29	FIT-1703A	N/A		Calibrate	
30	FIT-1703B	N/A		Calibrate	
31	PV-1704	80 PSIG			
32	QAH-1206	TBD			
33	FI-1206	N/A		N/A	
34	CE-1206	N/A		Clean	
35	CIT-1206	N/A		Calibrate	
36	CY-1206	N/A		N/A	
37	CI-1206	N/A		Calibrate	
38	CAH-1206	0.3 $\frac{mmho}{cm}$			

APPENDIX 10E

MECHANICAL PREREQUISITE TESTS

Component		Generic Test Procedure No.	Test Complete Initial/Date
Number	Description		
1	Raw/Service Water Pump P-703	Form E5-386 a) Pump Lubrication b) RPM c) Suction Pressure & Temperature d) Discharge Pressure e) Alignment f) Vibration	
2	Raw/ Service Water Pump P-704	Form E5-386 a) Pump Lubrication b) RPM c) Suction Pressure & Temperature d) Discharge Pressure e) Alignment f) Vibration	
3	Demineralized Water Transfer Pump P-710	Form E5-386 a) Pump Lubrication b) RPM c) Suction Pressure & Temperature d) Discharge Pressure e) Alignment f) Vibration	

APPENDIX 10E

MECHANICAL PREREQUISITE TESTS (Contd)

Component		Generic Test Procedure No.	Test Complete Initial/Date
Number	Description		
4	Raw Water Storage Tank TK-701 has been cleaned, inspected and closed.	N/A	
5	Demineralized Water Storage Tank TK-702 has been cleaned, inspected and closed.	N/A	
6	Condensate Storage Tank TK-902 has been cleaned, inspected and closed.	N/A	
7	Demineralized Water Transfer Pump P-710 Temporary Suction Strainer TF-DW-2-1 has been removed, cleaned, inspected and reinstalled.	N/A	
8.	All instrumentation isolation valves have been opened.	N/A	

APPENDIX 10F

INITIAL STATUS OF BREAKERS FOR TEST PROCEDURE STEP 8.1.1

BREAKERS		POSITION	STATUS	INITIAL/DATE
NUMBER	DESCRIPTION			
1	Raw/Service Water Pump P-703	Connect	Closed	
2	Raw/Service Water Pump P-704	Connect	Closed	
3	Demineralized Water Transfer Pump P-710	Connect	Closed	

APPENDIX 10G

INITIAL STATUS OF SWITCHES FOR TEST PROCEDURE STEP 8.1.1

SWITCH		STATUS	INITIAL/DATE
NUMBER	DESCRIPTION		
HS-1703A	Raw/Service Water Pump P-703	OFF	
HS-1703B	Raw/Service Water Pump P-704	OFF	
HS-1202	Demineralized Water Transfer Pump P-710	OFF	

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.1.2

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
V-FP-22-34	40P7005133150	E-4	Fire Pumps Supply	C		
V-ED-2-1	40P7005133150	E-4	Raw Water Storage Tank Drain	C		
V-FP-26-35	40P7005133150	D-4	Fire Pump Minimum Flow	C		
V-RW-4-1	40P7005133150	E-6	Raw/Service Water Pumps Suction	O		
V-RW-4-2	40P7005133150	E-8	Raw/Service Water Pump P-704 Suction	O		
V-RW-4-3	40P7005133150	F-8	Raw/Service Water Pump P-703 Suction	O		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.1.4 AND 8.1.5

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
N/A	40P7005133150	C-4	LV-1702 By-Pass	O		
V-FP-38-38	40P7005133150	H-2	Cooling Tower Basin Fill Block	O/C**		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

** See Procedure

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.3.1, 8.4.1, 8.5.1, 8.5.2

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
V-RW-4-1	40P7005133150	E-6	Raw/Service Water Pumps Suction	O		
V-RW-4-2	40P7005133150	E-8	Raw/Service Water Pump P-704 Suction	O		
V-RW-4-3	40P7005133150	F-8	Raw/Service Water Pump P-703 Suction	O		
V-SW-5-4	40P7005133150	E-10	Raw/Service Water Pump P-704 Discharge	O/C**		
V-SW-5-6	40P7005133150	F-10	Raw/Service Water Pump P-703 Discharge	O/C**		
V-SW-8-8	40P7005133150	C-9	Raw/Service Water Pump P-704 Recirc.	O/C**		
V-SW-8-10	40P7005133150	C-9	Raw/Service Water Pump P-703 Recirc.	O/C**		
N/A	40P7005133150	C-10	PV-1704 Upstream Block	C		
V-SW-17-7	40P7005133150	F-11	Warehouse, Rest Room & Cooling Tower Supply	C		
N/A	40P7005133150	D-11	SWS Supply	C		
N/A	40P7005133150	A-11	Humidifier Supply	C		
N/A	40P7005133149	I-4	Separator Pumps Bearing Lube Supply	C		
N/A	40P7005133150	D-14	EPGS SWS	C		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

**See Procedure Step 8.5.

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.3.1, 8.4.1, 8.5.1 (Contd.)

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
V-SW-29-13	40P3005132195	L-9	TV-1420 Upstream Block	C		
N/A	40P3005132195	L-9	TV-1420 By-Pass	C		
N/A	40P7005133150	D-13	SWS and Humidifier Supply	C		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.7.1

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
V-ED-17-2	40P7005133145	H-13	Demineralized Water Storage Tank Drain	C		
N/A	40P7005133145	H-11	Tank TK-702 Sample	C		
V-DW-2-1	40P7005133145	H-11	Demineralized Water Transfer Pump Suction	C		
N/A	40P7005133145	H-11	Demineralized Water Transfer Pump Recirc.	C		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.7.3

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
V-SW-17-7	40P7005133150	F-11	Warehouse, Rest Room & Cooling Tower Supply	C		
N/A	40P7005133150	D-11	SWS Supply	C		
N/A	40P7005133150	A-11	Humidifier Supply	C		
N/A	40P7005133149	I-4	Separator Pumps Bearing Lube Supply	C		
N/A	40P7005133150	D-14	EPGS SWS	C		
V-SW-29-13	40P3005132195	L-9	TV-1420 Upstream Block	C		
N/A	40P3005132195	L-9	TV-1420 By-Pass	C		
N/A	40P7005133150	D-13	SWS and Humidifier Supply	C		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.7.4

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
N/A	40P7005133145	D-9	LV-1203 Upstream Block	O		
N/A	40P7005133145	D-9	LV-1203 Downstream Block	O		
N/A	40P7005133145	D-9	LV-1203 By-pass	C/O**		
N/A	40P7005133145	G-11	Demineralized Water Storage Tank Inlet	O		
N/A	40P7005133150	C-10	PV-1704 Upstream Block	O		
N/A	40p7005133150	C-10	PV-1704 Downstream Block	O		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

**See Procedure

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.8.1

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
N/A	40P900513330l	D-11	Condensate Storage Tank Drain	C		
N/A	40P900513330l	D-11	Condensate Storage Tank Outlet	C		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.8.4

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
N/A	40P7005133145	G-11	Demineralized Water Storage Tank Inlet	C		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.8.6

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
V-DW-2-1	40P7005133145	H-11	Demineralized Water Transfer Pump Suction	O		
N/A	40P7005133145	H-11	Demineralized Water Transfer Pump Recirc.	O/C**		
N/A	40P7005133145	K-7	Demineralized Water Transfer Pump Discharge	C		
N/A	40P7005133145	H-5	Polishing Demineralizers Return to TK-702	C		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

**See Procedure

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.8.7

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
N/A	40P7005133145	K-7	Demineralized Water Transfer Pump Discharge	O		
N/A	40P7005133145	K-6	Mirror Washing SWS	C		
N/A	40P7005133145	K-6	Polishing Demineralizers By-Pass	C		
N/A	40P7005133145	K-6	Polishing Demineralizers Inlet	O		
N/A	40P7005133145	K-5	Polishing Demineralizers Outlet	O		
N/A	40P7005133145	H-5	Polishing Demineralizer Return to 1K-702	O		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

APPENDIX 10H

INITIAL STATUS - VALVE LINEUP LIST FOR TEST PROCEDURE STEP 8.8.10

VALVE TAG NO.	INFO ONLY DRAWING NUMBER	INFO ONLY COORD	DESCRIPTION	POSITION	INITIAL	DATE
N/A	40P7005133150	D-14	EPGS SWS	0		
N/A	40P9005133304	B-11	PCV-443 Upstream Block	0		
N/A	40P9005133304	G-11	Demineralizer Area S.S. Block	0		
N/A	40P9005133304	E-11	Caustic & Ammonia Area S.S. Block	0		
N/A	40P9005133304	C-11	Acid Storage Area S.S. Block	0		

O = Open C - Closed T - Throttled LO - Locked Open LC - Locked Closed

EQUIPMENT DATA SHEET
-MECHANICAL-

GENERATING STATION: Solar One DATE: _____

UNIT NUMBER: _____ S.C.E. J.O. NO.: _____

EQUIPMENT: Raw/Service Water Pump P-703

MANUFACTURER: _____ SERIAL NO.: _____

RATING: _____ CAPACITY: _____

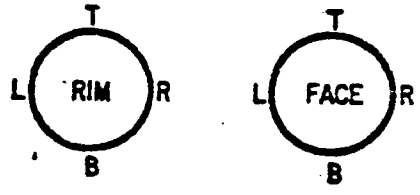
START-UP AND TEST DATA

DATE OF LUBRICATION: _____ RPM: _____

SUCTION PRESSURE AND TEMPERATURE: _____ PSIG: _____ °F.

DISCHARGE PRESSURE: _____ PSIG

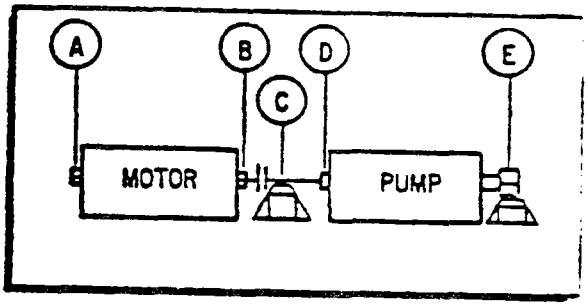
ALIGNMENT DATA:



DIAL INDICATOR MOUNTED ON: _____

VIBRATION DATA:

POINT	VIBRATION, MILS		
	HORIZ.	VERT.	AXIAL
A			
B			------
C			------
D			------
E			



COMMENTS: _____

SIGNED: _____
S.C.E. START-UP ENG.

DATE: _____

SIGNED: _____
S.C.E. CONST. ENG.

DATE: _____

SIGNED: _____
CONTRACT REP.

DATE: _____

EQUIPMENT DATA SHEET
-MECHANICAL-

GENERATING STATION: Solar One DATE: _____

UNIT NUMBER: _____ S.C.E. J.O. NO.: _____

EQUIPMENT: Raw/Service Water Pump P-704

MANUFACTURER: _____ SERIAL NO.: _____

RATING: _____ CAPACITY: _____

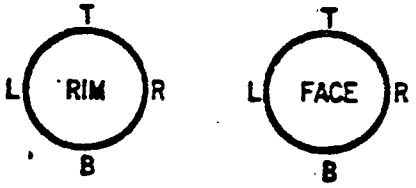
START-UP AND TEST DATA

DATE OF LUBRICATION: _____ RPM: _____

SUCTION PRESSURE AND TEMPERATURE: _____ PSIG: _____ °F.

DISCHARGE PRESSURE: _____ PSIG

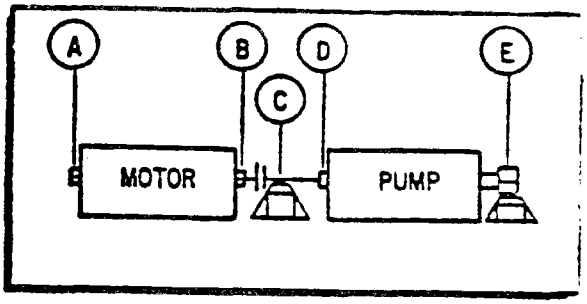
ALIGNMENT DATA:



DIAL INDICATOR MOUNTED ON: _____

VIBRATION DATA:

POINT	VIBRATION, MILS		
	HORIZ.	VERT.	AXIAL
A			
B			------
C			------
D			------
E			



COMMENTS: _____

SIGNED: _____
S.C.E. START-UP ENG.

DATE: _____

SIGNED: _____
S.C.E. CONST. ENG.

DATE: _____

SIGNED: _____
CONTRACT REP.

DATE: _____

EQUIPMENT DATA SHEET

-MECHANICAL-

GENERATING STATION: Solar One DATE: _____

UNIT NUMBER: _____ S.C.E. J.O. NO.: _____

EQUIPMENT: Demineralized Water Transfer Pump P-710

MANUFACTURER: _____ SERIAL NO.: _____

RATING: _____ CAPACITY: _____

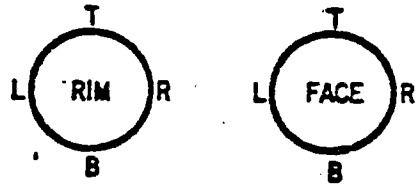
START-UP AND TEST DATA

DATE OF LUBRICATION: _____ RPM: _____

SUCTION PRESSURE AND TEMPERATURE: _____ PSIG: _____ °F.

DISCHARGE PRESSURE: _____ PSIG

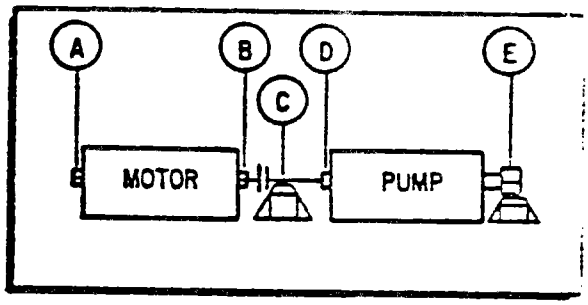
ALIGNMENT DATA:



DIAL INDICATOR MOUNTED ON: _____

VIBRATION DATA:

POINT	VIBRATION, MILS		
	HORIZ.	VERT.	AXIAL
A			
B			------
C			------
D			------
E			



COMMENTS: _____

SIGNED: _____
S.C.E. START-UP ENG.

DATE: _____

SIGNED: _____
S.C.E. CONST. ENG.

DATE: _____

SIGNED: _____
CONTRACT REP.

DATE: _____

EO 142 REV 10-78
S.C.E.CO

ELECTRICAL CIRCUIT TEST RECORD AND EQUIPMENT DATA SHEET

EQUIPMENT IDENTIFICATION

STATION NAME	UNIT NO.	S.C.E. J.O. NO.
Solar One		
CONTRACTOR		CONTRACTOR J.O. NO.
FILE NO.	SCHEDULE NO.	CIRCUIT NO.	DRAWING NO.

EQUIPMENT: Raw/Service Water Pump Motor & Breaker P-703

EQUIPMENT NAME PLATE DATA

NAME OF MANUFACTURER	SERIAL NO.	FRAME

TYPE	CODE	DUTY	MODEL

S.F.	H.P.	R.P.M.	AMPS	VOLTS

START-UP AND TEST DATA

TYPE MEGGER _____ MOTOR INSULATION WITH LEADS: _____ MEGAOHMS

MOTOR RESISTANCE (OHMS): ☐ WITH, ☐ WITHOUT LEADS: _____ A-B. _____ B-C. _____ C-A

GROUND STRAP CONNECTED: ☐ YES ☐ NO | MOTOR COUPLED: ☐ YES ☐ NO | LUBRICATION: ☐ FACTORY, ☐ FIELD | LUBE TAG: ☐ YES, ☐ NO

VIBRATION: _____ MILS | ROTATION VIEWED FROM COUPLING END: ☐ CCW, ☐ CW

INRUSH AMPS _____ | NC LOAD AMPS _____ | TYPE OF CONTROL: ☐ LOCAL, ☐ BOARD

OPERATING TIME IN SECONDS: CLOSE _____ OPEN _____

POWER CABLE SIZE _____ | FUSE SIZE _____ | O/L SIZE _____

COMMENTS. _____

REV. NO.	DATE REVISION	S.C.E. APPROVED	CONTRACTOR OK	DATE ASSIGNED	START DATE	DATE COMPLETED	REMARKS

SIGNED: S C E. START-UP ENGINEER _____ SHEET _____ OF _____

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SO 143 NEW 10-70
S.C.E. CO

ELECTRICAL CIRCUIT TEST RECORD AND EQUIPMENT DATA SHEET

EQUIPMENT IDENTIFICATION

STATION NAME	UNIT NO.	S.C.E. J.O. NO.
Solar One		
CONTRACTOR		CONTRACTOR J.O. NO.
FILE NO.	SCHEDULE NO.	CIRCUIT NO.	DRAWING NO.

EQUIPMENT: Raw/Service Water Pump Motor & Breaker P-704

EQUIPMENT NAME PLATE DATA

NAME OF MANUFACTURER	SERIAL NO.	FRAME

TYPE	CODE	DUTY	MODEL

S.F.	H.P.	R.P.M.	AMPS	VOLTS

START-UP AND TEST DATA

TYPE MEGGER _____ MOTOR INSULATION WITH LEADS: _____ MEGAOHMS

MOTOR RESISTANCE (OHMS): ☐ WITH, ☐ WITHOUT LEADS: _____ A-B, _____ B-C, _____ C-A

GROUND STRAP CONNECTED: ☐ YES ☐ NO | MOTOR COUPLED: ☐ YES ☐ NO | LUBRICATION: ☐ FACTORY, ☐ FIELD | LUBE TAG: ☐ YES, ☐ NO

VIBRATION: _____ MILS | ROTATION VIEWED FROM COUPLING END: ☐ CCW, ☐ CW

INRUSH AMPS _____ | NO LOAD AMPS _____ | TYPE OF CONTROL: ☐ LOCAL, ☐ BOARD

OPERATING TIME IN SECONDS: CLOSE _____ OPEN _____

POWER CABLE SIZE _____ | FUSE SIZE _____ | O/L SIZE _____

COMMENTS. _____

REV. NO.	DATE REVISION	S.C.E. APPROVED	CONTRACTOR OK	DATE ASSIGNED	START DATE	DATE COMPLETED	REMARKS

SIGNED: S.C.E. START-UP ENGINEER _____ SHEET _____ OF _____

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EO 142 REV 10-78
S.C.E. CO.

ELECTRICAL CIRCUIT TEST RECORD AND EQUIPMENT DATA SHEET

EQUIPMENT IDENTIFICATION

STATION NAME	UNIT NO.	S.C.E. J.O. NO.
Solar One		
CONTRACTOR		CONTRACTOR J.O. NO.
FILE NO.	SCHEDULE NO.	CIRCUIT NO.	DRAWING NO.

EQUIPMENT: Demineralized Water Transfer Pump Motor & Breaker P-710

EQUIPMENT NAME PLATE DATA

NAME OF MANUFACTURER	SERIAL NO.	FRAME

TYPE	CODE	DUTY	MODEL

S.F.	H.P.	R.P.M.	AMPS	VOLTS

START-UP AND TEST DATA

TYPE MEGGER _____ MOTOR INSULATION WITH LEADS: _____ MEGAOHMS

MOTOR RESISTANCE (OHMS): ☐ WITH, ☐ WITHOUT LEADS; _____ A-B, _____ B-C, _____ C-A

GROUND STRAP CONNECTED: ☐ YES ☐ NO | MOTOR COUPLED: ☐ YES ☐ NO | LUBRICATION: ☐ FACTORY, ☐ FIELD | LUBE TAG: ☐ YES, ☐ NO

VIBRATION: _____ MILS | ROTATION VIEWED FROM COUPLING END: ☐ CCW, ☐ CW

INRUSH AMPS _____ | NO LOAD AMPS _____ | TYPE OF CONTROL: ☐ LOCAL, ☐ BOARD

OPERATING TIME IN SECONDS: CLOSE _____ OPEN _____

POWER CABLE SIZE _____ | FUSE SIZE _____ | O/L SIZE _____

COMMENTS. _____

REV. NO.	DATE REVISION	S.C.E. APPROVED	CONTRACTOR OK	DATE ASSIGNED	START DATE	DATE COMPLETED	REMARKS

SIGNED: S.C.E. START-UP ENGINEER _____ SHEET _____ OF _____

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TBD LIST - SYSTEM 910

PROCED NO.	PARA. NO.	DESCRIPTION	DUE DATE	SOURCE DATA RESPONSIBILITY
910	2.17	Auto Rinse Set Point	4/1/81	SCE
910	2.17	Excessive Rinse Time	4/1/81	SCE
910	8.8.8	QAH-1206 Design Alarm Time	4/1/81	SCE
910	App. 10D	Page 27, QAH-1206 Set Point	4/1/81	SCE

MCDONNELL DOUGLAS ASTRONAUTICS COMPANY

5301 Bolsa Avenue, Huntington Beach, CA 92647 (714) 896-3311

A3-202-EP-RGR-417
17 July 1981

Department of Energy
San Francisco Operations Office
1333 Broadway
Oakland, CA 94612

Attention: Mr. David J. Tenca, Contracting Officer

Subject: CONTRACT DE-AC03-79SF10499
SOLAR FACILITIES DESIGN INTEGRATION
PARTIAL SUBMITTAL OF SUBSYSTEM STAND ALONE (PREOPERATIONAL)
TEST PROCEDURES (RADL ITEM 2-45)

Reference: MDAC Letter A3-130-EP-DSB-138, dated 3 March 1981,
"Revised Delivery Date for Subsystem Stand Alone Test Procedures
(RADL Item 2-45)"

Dear Mr. Tenca:

One (1) copy each of six of the Preoperational Test Procedures that comprise a portion of the subject RADL item is being submitted in accordance with the requirements of the Phase II Reports and Deliverables List of the subject contract, as modified by the contents of the reference letter. The reference letter proposed to fulfill the reporting requirements for the subject RADL item by submitting informal drafts to the Test Working Group (TWG) for review and comments, with subsequent formal transmittal of the finalized versions (Revision 0) of these procedures which reflect the review comments and represent the actual test procedures to be implemented. DOE concurrence was received from STMPO on this approach on 3 March 1981.

This letter transmits the following preoperational test procedures:

• 210	Thermal Storage System Oil Filling	Revision 1
• 305	Subsystem Distributed Process Controllers (SDPC)	Revision 0
• 820	Collector Power Systems	Revision 0
• 871	Heat Tracing System	Revision 0
• 905	Nitrogen System	Revision 0
• 910	Water Supply Systems	Revision 0

A copy of this letter also transmits the master copy of each of the procedures to Southern California Edison (L. H. Chillcott) at the Solar One site for control and implementation. Any revisions to these procedures which are originated by the SFDI will be coordinated informally with SCE and subsequently transmitted by letter in the same manner as the subject documents.

MCDONNELL DOUGLAS CORPORATION

A3-202-EP-RGR-417
17 July 1981

Additional submittals will be made as other preoperational test procedures become available in Revision 0 versions, and you will be notified when all of the preoperational test procedures that comprise RADL item 2-45 have been submitted.

Technical questions regarding these procedures should be directed to R. G. Riedesel at (714) 896-3357. For contractual questions, please call the undersigned at (714) 896-1340.

Very truly yours,

D. S. Butler
Contractor Administrator
Solar Facilities Design Integration

Enclosure: (as noted)

Cy: L. H. Chillcott, SCE-Daggett (1)
J. M. Slaminski, DOE/STMPO (1)

(w/o enclosure)
R. N. Schweinberg, DOE/STMPO
J. C. Corcoran, DOE/STMPO
D. W. Christian, DOE/Daggett
F. Kovach, T&B-Daggett
R. M. Weeks, MMC-Daggett
C. W. Lopez, SCE-Daggett
A. Maitino, T&B-Daggett
D. L. Williams, Stearns-Roger
H. D. Eden, Aerospace/STMPO
R. O. Rogers, Aerospace/STMPO
R. W. Wiese, ETEC/STMPO
K. L. Adler, ETEC/STMPO
D. N. Tanner, Sandia-Livermore
W. S. Rorke, Sandia-Livermore
J. N. Reeves, SCE
N. J. DeHaven, SCE
C. P. Winarski, SCE
W. R. Lang, Stearns-Roger
J. M. Friefeld, Rocketdyne
L. L. Vant-Hull, Univ. of Houston
T. E. Olson, SFDI Field Office

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

AUG 16 1984

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

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

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:

Primary Document No.	Secondary No.	Brief Title
DOE/SF/10499-T117	STMPO 581	Test Procedure 210, Rev. 1
DOE/SF/10499-T118	STMPO 587	Test Procedure 820, Rev. 0
DOE/SF/10499-T119	STMPO 588	Test Procedure 871, Rev. 0
DOE/SF/10499-T120	STMPO 589	Test Procedure 905, Rev. 0
DOE/SF/10499-T121	STMPO 590	Test Procedure 910, Rev. 0
DOE/SF/10499-T138	STMPO 593	Test Procedure 1010, Rev. 0
DOE/SF/10499-T139	STMPO 594	Test Procedure 1030, Rev. 0, Sec. 1-9
DOE/SF/10499-T140	STMPO 595	Test Procedure 1030, Rev. 0, Sec. 10

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: CCC005.RNO(SA3)

Encl: Eight 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.	(STMPO 590) DOE/SF/10499-T121
Date of Report	July 1981
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

1. Document Title: Water Supply Systems Preoperational Test Procedure 910, Revision 0

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

3. 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:

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.

6. Remarks: 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 _____

FOR CHIEF OF PATENT COUNSEL (CHC)

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.	2. Contract No.	3. Subject Category No.
DOE/SF/10499-T121 (STMPO 590)	DE-AC03-79SF10499	UC 62, 62c, 62d

4. Title
Water Supply Systems Preoperational Test Procedure 910, Revision 0

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.)

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- ☐ 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)
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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)

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("x" one ☐ a. DOE patent clearance has been granted by responsible DOE patent group.
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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