

1. SCOPE

This document defines the interface and survey requirements for the foundation, bolt circle and conduit routing for the 10 MWe Solar Pilot Plant Collector System.

2. APPLICABLE DOCUMENTS

The following documents of latest issue form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement, provided the requirements are equal to or exceed those in the referenced codes and standards.

2.1 Standards

- Standards of the American Institute of Steel Construction.
- American Concrete Institute Standards.
- Uniform Building Code.

3. REQUIREMENTS

3.1 Heliostat Foundation Design

The heliostat foundations shall be designed to accommodate the Martin Marietta-configured heliostat assembly.

The physical design of the foundation interface with the heliostat shall be in accordance with Figure 3-1.

Each individual heliostat of the Collector System will require a 17' horizontal swing radius.

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3.1.1 Base Interface Loads

The base interface loads summarized in Table 3-1 are the design-limit values and establish the basic criteria governing the foundation design and heliostat structural interface. For design purposes, dead weight of the heliostat is 4200 lb. This weight is included in the loads summary.

3.1.2 Foundation Design Requirements

Utilizing the loads of Table 3-1, the maximum allowable foundation settlement or plastic displacement shall be .05 mrad standard deviation. The maximum allowable elastic displacement is .5 mrad standard deviation when subjected to the 27 mph wind loads.

Foundation settlement which would require heliostat realignment after earthquake is acceptable.

3.2 HELIOSTAT LOCATION

3.2.1 Survey Requirements

The location of all heliostat foundations shall be determined relative to a master benchmark. The location of the center of the bolt pattern relative to the facility master benchmark shall be determined and recorded (three-dimensional coordinate system) within 0.25 in.

3.2.2 Bolt Pattern Orientation

Orientation (clocking) of the interface studs relative to true North to be per Figure 3-1. The orientation shall be held consistent on all foundations to within TBD.

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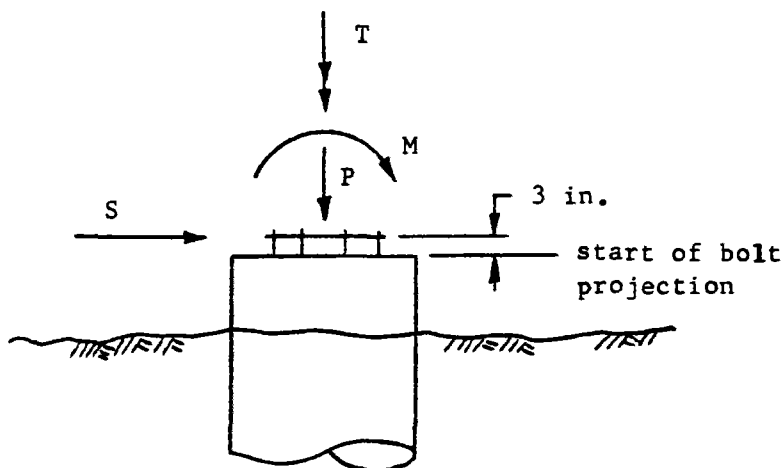
3.2.3 Power and Control Cable Conduit Routing

The collector system power and control cable conduit(s) shall be routed into the center of the heliostat pedestal and project upward 40 to 46 inches as shown on Figure 3-1. The conduit may be routed over the foundation and between the mounting studs provided that the conduit dia does not exceed the height of the lower 1½ - 7UNC mounting nut and washer.

Accuracy of positioning the conduit in the center of the pedestal envelope is not important. Approximately 3 feet of cable shall protrude from the conduit to facilitate connections.

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Foundation Interface Loads



Note: Loads and moments are to be applied to the top of the Pedestal Foundation Interface as shown.

Limit Design Loads on Foundation

Limit Design Loads	Loading Condition	Load		90 Mph Wind	
		27 Mph Wind	50 Mph Wind	Loading Condition	Load
Max. P (lbs)	2	4,950	6,700	1	12,500
Max. T (ft-lbs)	3	2,360	8,100	1	0
Max. S (lbs)	3	830	2,850	1	830
Max. M (ft-lbs)	4	11,600	38,700	1	23,900

It is recommended that the foundation be designed to the maximum values of all P,T,S and M acting simultaneously.

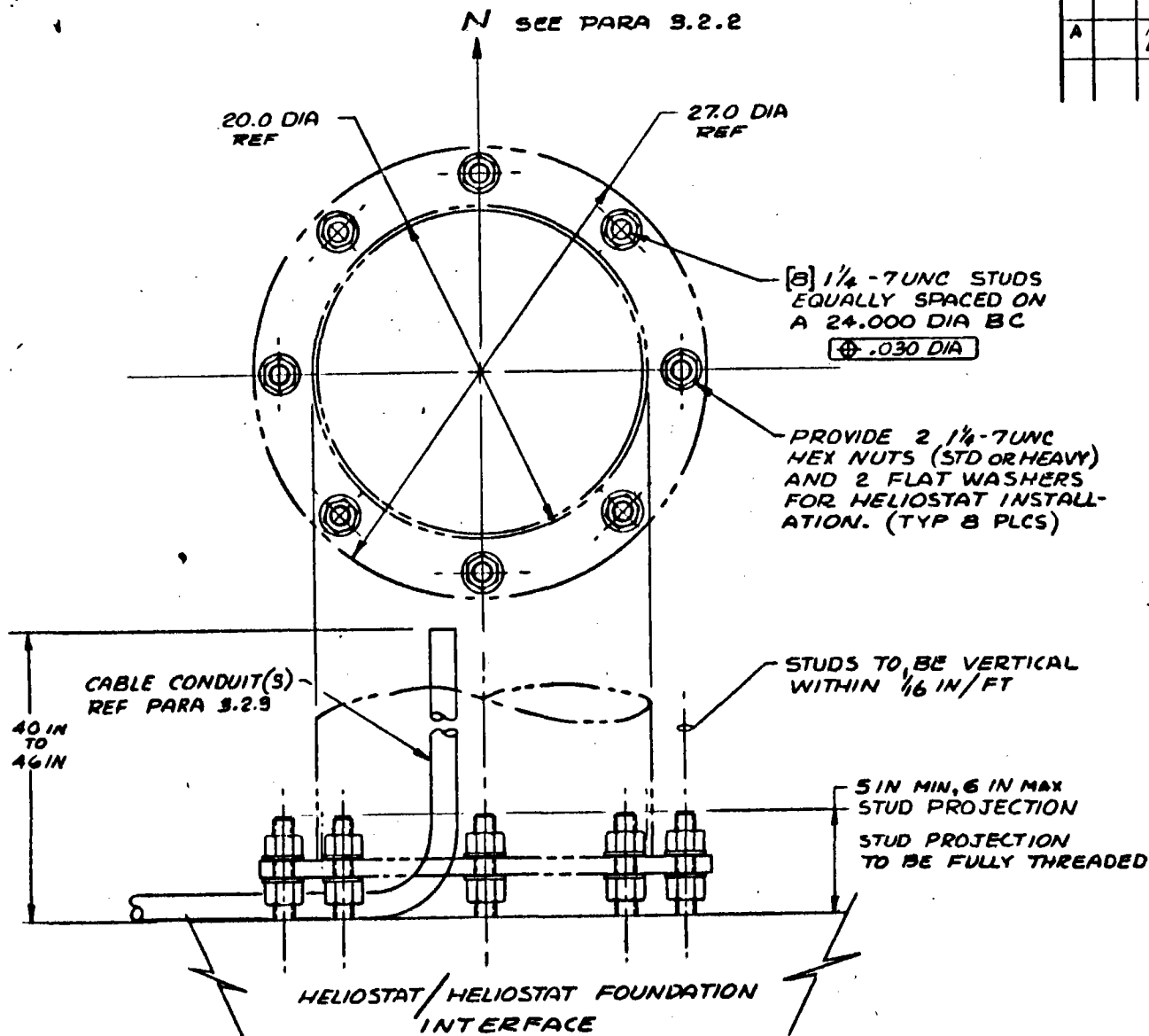
Loading conditions:

TABLE 3-1

1. Heliostat in stowage with 2 in ice.
2. Heliostat is 70° from vertical with no ice.
3. Heliostat is vertical with no ice.
4. Heliostat is 10° from vertical with no ice.

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REVISIONS			
BY	DATE	DESCRIPTION	APPROVED
		INITIAL RELEASE RR9001-001	
A	8-1-79	ADDED CONDUIT REQMTS - REVISED STUD REQUIREMENTS RW9005-001	BULLINGTON 8-8-79



NOTE

1. THIS DWG DEFINES INTERFACE REQUIREMENTS ONLY. IT RELEASES NO PARTS.

FIGURE 3-1

REV	CODE IDENT NO	40 M 500 25	
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DRAWING 46-141 2007-A 1-77

4.0 QUALITY ASSURANCE

Any heliostat foundation design and location survey results that will require approval by Martin Marietta Corporation will be accepted on the basis that the requirements of paragraph 3 of this document are satisfied and that the drawings and documentation to be delivered are consistent with accepted architectural and engineering practice and procedures.

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	A	04236	40 M 500 2S
	SCALE	PAGE	SHEET
		6	



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

Reply to:
DOE Site Office
Post Office Box 366
Daggett, CA 92327

Mr. Melvin T. Frohardt
Martin Marietta Aerospace
Post Office Box 179
Denver, CO 80201

DEC 06 1983

Subj.: Closeout Actions on Martin Marietta Contracts with DOE San Francisco Operations Office

Dear Mel:

Nearly six months ago, I requested your assistance in finalizing patent clearance on a number of the documents from the Collector Phase I and Phase II contracts which we wish to enter into the DOE Technical Information Center system. Thus far, I have not had any response to this request. We are about to issue the bibliography developed by Burns & McDonnell under the EPRI-funded "Lessons Learned and Project Documentation" study (I assume you have received a copy of Vol. 1, "Lessons Learned" - if not, let me know and I will send you one), and we and TIC anticipate a substantial number of requests for key documents, including yours.

In addition, SAN Contracts Closeout (Sonia Jackson) advises me that several of the final documents needed to complete closeout (and release final payment of withheld funds), ~~is~~ as yet lacking, not only on the above two contracts, but also on the old Preliminary Design contract. I would greatly appreciate your assistance (or your guidance as to who can assist us) in getting this wrapped up and off both of our desks. To recapitulate (adding the items needed by SAN) for the three contracts:

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DE-AC03-80SF10539, Collector System Phase II

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 - MCR-80-1376*, "Heliostat Stimulator Operators' Manual";
 - MCR-81-1708, "Operation Instructions, Heliostat Field Subsystem...";
 - MCR-81-1709A, "Maintenance Instructions, Heliostat Field Subsystem...";
 - MTR-81-1769, "...Collector Subsystem Functional Test Report";
 - MCR-81-1770, "Supplemental Spares Plan, Heliostat Field...";
 - MCR-80-1377A, "Software/Firmware Design Specifications...";
 - MCR-82-1701, "Control System Theory of Operation";
 - Drawing Set, as Identified in "Drawing Tree 400500 5132701";
 - Source Listing of Code for Heliostat Controller ROM or EPROM*
 - Source Listing of Code for Heliostat Field Controller ROM/EPROM*

Our files do not have current copies of the following other items identified in the Drawing Tree (400500 5132701):

Documents: ~~40M500-2S~~, "Foundation Req'ts.", 40M500-1I, "Installation Instructions", 40M500-2M, "Canting Procedures", 40M500-5P, "Acceptance Plan", MCR-80-1361, "Collector System Functional Test Plan", and MCR-81-1715, "Collector System Integrated Acceptance Test Plan."

* Current copies of these four items are lacking from the Project files; your assistance in obtaining at least one copy of each will be most appreciated.

Drawings: 40M500 5132788, "Adapter Plate/Control Arm Heat Tool", 40M500 5132771, "Field Cantino Tool", and 40E500 5132776, "Drive Unit Checkout Console".

While these items are not carried in the current version of the Bibliography (none of the Plant as-built drawings have been entered as yet), many, if not all, of them may be expected to be of interest to the solar community. I would appreciate at least one copy of each, again with your release. To save you considerable effort in preparing the Patent Clearance Request forms (I am enclosing several copies of the form), you may combine many of the above by simply clearing the "Drawing Tree", with its contents.

If you need the other closeout forms cited above (your Contract Administration staff should have them in stock), please call Sonia Jackson at FTS 536-4179, or write her at:

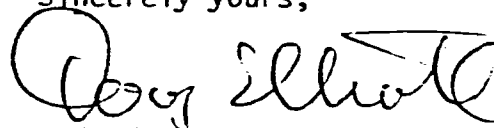
Ms. Sonia Jackson (CM)
Department of Energy
1333 Broadway
Oakland, CA 94612

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Mel, I know (believe me!) that this is all a significant amount of work, and I wish I didn't have to ask you (or your staff) to go through it, but it will be to our mutual benefit in the end to get these three contracts all cleaned up, and a comprehensive package of Project documentation (currently, over 550 documents, plus drawings) into the archives. If there is anything further I can do to assist you in this effort, please call on me.

Encl.: DOE Proj. Ofc. ltr. 6/25/83
Patent Clearance Req. Forms

Sincerely yours,



S. D. Elliott, Jr., Director,
DOE Project Office, Barstow

cc: H. C. Wroton, MMC
Sonia Jackson, DOE/SAN (CM)

PS: I keep running across references to a document I can't identify: MCR-78-1325; what was it?

TIN MARIETTA AEROSPACE

DENVER DIVISION
POST OFFICE BOX 179
DENVER, COLORADO 80201
TELEPHONE (303) 977-3000

January 30, 1984

Mr. Doug Elliott
DOE Site Office
Post Office Box 366
Daggett, CA 92327

Subject: Closeout Actions on Martin Marietta Contracts with DOE San Francisco Operations Office

Reference: Letter of December 06, 1983, S.D. Elliott, Jr. to M. Frohardt, Closeout of Contracts

In regard to the referenced letter, following is the status and actions in process to close out these items:

1. Contract Closeout Status

In regard to the closeout of cost type contracts DE-AC03-76ET20422, Central Receiver Test Facility, and DE-AC03-78ET21007, Collector System Phase I, we include the "Contractors Assignment of Refunds and Rebates" and "Contractors Release" with our final invoice package. The final invoices for these two contracts will be submitted upon completion of final settlement negotiations for our 1979 overhead and G&A rates which is currently in progress. In reference to the closeout of contract DE-AC03-80SF10539, Collector System Phase II, please see Attachment 1, the letter to Ms. Joann Littlehales dated January 23, 1984, for the current status.

2. Patent Clearance

The following documents are in the process of being cleared by our Patent office. When this transmittal is available, I will send a copy to you.

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40-0-500-6P, "10-MWe Solar Thermal Pilot Plant Phase II Planning"

Mr. Doug. Elliott
January 27, 1984
Page 2

The remainder of the documents have been previously cleared by the following letters, copies of which are included in Attachment 2.

Letters from Phillip DeArment to Roger Gaither:

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DAC-82-389, dated May 3, 1982
Letter dated March 11, 1982
Letter dated November 10, 1982

3. Documents

You requested copies of some documents and drawings in the referenced letter. Copies of the following drawings and documents are being submitted under Attachment 3.


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MCR-79-1352B, "Quality Assurance Plan for 10-MWe Phase II Collector"
MCR-80-1376, "Heliostat Stimulator Operators' Manual"
STMPD-575 40M500-2S, "Foundation Requirements"
40M500-2M, "Canting Procedures"
40M500-1T, "Installation Instructions"
40M500-5P, "Acceptance Plan"
MCR-81-1715, "Collector System Integrated Acceptance Test Plan"
MCR-80-1361, "Collector System Functional Test Plan"
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40M500 5132771, "Field Canting Tool"
Source Listing of Code for Heliostat Controller ROM or EPROM*
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No drawing exists for 40E500 5132776, "Drive Unit Checkout Console" as this checkout console consisted of a stimulator to operate a production Drive Mechanism Assembly. Also MCR-78-1330 is the correct document number for the Preliminary Design Review Package rather than MCR-78-1325. MCR-78-1325 is the document number assigned to all the Monthly Progress Reports written during the Phase I contract.

Doug, I hope this will help in getting the documentation finalized. I will follow-up with the additional information identified. If you have any questions please call on me.

Sincerely yours,

MARTIN MARIETTA CORPORATION


Melvin W. Frohardt
Solar Programs

Enclosures

cc: H. Wroton
Sonia Jackson

U.S. DEPARTMENT OF ENERGY

memorandum

DATE **AUG 06 1984**

RE TO
AT OF **Doug Elliott, Director, DOE Solar One Project Office**

SUBJECT **Submission of Six Reports by Martin Marietta Corporation under Contracts DE-AC03-79ET21007 (Phase I) and DE-AC03-80SF10539 (Phase II) for Solar One Collector System**

TO **Roger S. Gaither, DOE/SAN (OPC)
William D. Matheny, OSTI/Document Control**

Enclosed are copies of six reports prepared by Martin Marietta Corporation (Denver Aerospace Division) under the Phase I and Phase II contracts for the Collector (Heliostat) System for the 10-MWe Solar One Pilot Plant:

<u>Primary No.</u>	<u>Secondary No.</u>	<u>Short Title</u>
DOE/SF/10539-21	STMPO-571	Phase II Acceptance Plan (Revised)
DOE/SF/10539-22	STMPO-572	Collector System Functional Test Plan (Revised)
DOE/SF/10539-23	STMPO-573	Collector System Integrated Acceptance Test Plan
DOE/SF/10539-24	STMPO-574	Assembly Canting Fixture Operations, Phase II (Revision 2)
DOE/ET/21007-6	STMPO-575	Collector System Foundation Requirements (Revision A)
DOE/ET/21007-7	STMPO-576	Heliostat Installation Instructions

One copy of each document, accompanied by a completed SAN Form 70, is provided to DOE/SAN Office of Patent Counsel for patent review and clearance. Project Office release is based upon correspondence requesting (Attch. 1) and forwarding (Attch. 2) the respective documents; in addition, documents STMPO-572 and -573 are cited by MMC in their November, 1982 letter of Patent Certification (extract, Attch. 3). SAN-OPC's copies may be destroyed on completion of the clearance process.

Two copies of each report, accompanied by a completed DOE Form RA-426, is provided to the DOE Office of Scientific and Technical Information, Document Control and Evaluation Division, for abstracting, microfiching, archiving, announcement and forwarding to the National Technical Information Service.

Please call upon me at (619) 254-2672 if any further information is required.

Attchs.: 3, as stated

Encls.: 6 documents, w/forms

cc: M. Lopez, DOE/SAN (FGS)
D. Holz, DOE/SAN (ISEA)
M. Soderstrum, B&McD

S. D. Elliott, Jr., Director,
DOE Solar One Project Office



Department of Energy
 San Francisco Operations Office
 1355 Broadway
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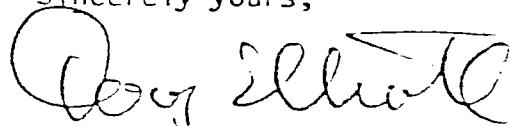
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MARTIN MARIETTA AEROSPACE

DENVER DIVISION
POST OFFICE BOX 175
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TELEPHONE (303) 977-3000

January 30, 1984

Mr. Doug Elliott
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Source Listing of Code for Heliostat Field Controller ROM/EPROM

No drawing exists for 40E500 5132776, "Drive Unit Checkout Console" as this checkout console consisted of a stimulator to operate a production Drive Mechanism Assembly. Also MCR-78-1330 is the correct document number for the Preliminary Design Review Package rather than MCR-78-1325. MCR-78-1325 is the document number assigned to all the Monthly Progress Reports written during the Phase I contract.

Doug, I hope this will help in getting the documentation finalized. I will follow-up with the additional information identified. If you have any questions please call on me.

Sincerely yours,

MARTIN MARIETTA CORPORATION


Melvin W. Frohardt
Solar Programs

Enclosures

cc: H. Wroton
Sonia Jackson

MARTIN MARIETTA AEROSPACE

DENVER DIVISION
POST OFFICE BOX 179
DENVER, COLORADO 80201
TELEPHONE (303) 977-3000

10 November 1982

Ms. Mary Jane Holliday
Contract Examiner
Department of Energy
California Patent Group
San Francisco Operations Office
Oakland, California 94612

Re: Final Patent Certification for DOE
Contract DE-ACO3-80SF10539

Dear Ms. Holliday:


Pursuant to your letter of September 7, 1982, addressed to Mr. Cecil W. Duclon, I have made the corrections you requested thereon.

With respect to Invention Disclosures 81YD16, 81YD24 and 81YD25, please see our attached letters dated March 11, 1982 wherein you were notified that these inventions are not reportable. I am also attaching Mr. Carnahan's letter dated March 22, 1982.

If we can be of further assistance, please contact our office. Mr. DeArment may be reached at (303) 977-6109 and I may be reached at (303) 977-6501/6110.

Very truly yours,

MARTIN MARIETTA CORPORATION


(Miss) Josephine E. Salazar
Assistant to Phillip L. DeArment
Assistant Patent Counsel

cc: C. W. Duclon
W. A. Brevor
J. T. Weber

2. Technical data of this contract other than reports (i.e., notebooks, drawings, etc.) are completely listed, as follows:

All correspondence, reports, etc., mailed to Huntington Beach office.

Monthly submittals, Issue 1 through 25 as follows:

- a. Milestone Schedule and Status Report
- b. Cost Management Report
- c. Project Status Report
- d. Documentation Tab Run
- e. List of active changes/modifications
- f. List of drawing revisions/levels
- g. Indentured Parts List

Minority Business Reports

Updated OPDD Documentation

Controls Hardware Drawings

Software Design Specification

Safety Plan

Hazard Analysis

Preliminary Design Review Package

Preliminary Design Review Package Final

Manufacturing Plan

Quality Assurance Plan

STMDO-572 Functional Test Plan

MCR-80-1361

Functional Test Report

STMDO-573 C/S Integrated Acceptance Test Plan

MCR-81-1715



DEPARTMENT OF ENERGY
SAN FRANCISCO OPERATIONS OFFICE

CONTRACTOR REQUEST FOR PATENT CLEARANCE
FOR RELEASE OF UNCLASSIFIED DOCUMENT

Prime Contract No. DE-AC03-79ET2100.7
Subcontract No. (N/A)
Report No. DOE/ET/21007-6 (STMP0-575)
Date of Report December, 1978
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: DOE Solar One Project Office
Post Office Box 366
Daggett, CA 92327
ATTN: S. D. Elliott, Jr.

- Document Title:
10 MWe Solar Power Plant: Collector System Foundation Requirements (Revision A)
- Type of Document: Technical Report, Conference Paper, Journal Article, Abstract or Summary,
 Copy of Oral Presentation, Other (please specify): _____
- In order to meet a publication schedule or submission deadline, patent clearance by _____ (Routine) would be desired.

SENDER IS TO CHECK BOX #4 OR #5 BELOW.

4. I have reviewed (or have had reviewed by technically knowledgeable personnel) this document for possible inventive subject matter (Subject Inventions) and that no inventions or discoveries (Subject Inventions) are deemed to be disclosed in this document except as stated below:

Attention should be directed to pages _____ of this document.

This document describes matter relating to an invention:

- Contractor Invention Docket No. _____
- A disclosure of the invention was submitted to DOE on _____ (date)
- A disclosure of the invention will be submitted shortly _____ (approximate date)
- A waiver of DOE's patent rights to the contractor:
 has been granted, has been applied for; or will be applied for _____ (date)

5. This document is being submitted, but no review has been made ^{by me} of this document for possible inventive subject matter.

6. Remarks: Return copy of clearance to Project Office; document may be destroyed

Reviewing/Submitting Official: Name (Print/Type) S. D. Elliott, Jr., Director
Title DOE Solar One Project Office
Signature [Signature] Date 6 August, 1984

TO: INITIATOR OF REQUEST

FROM: ASSISTANT CHIEF FOR PROSECUTION
Office of Patent Counsel/Livermore Office

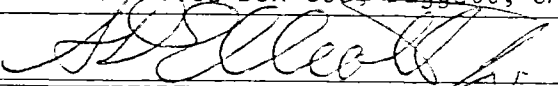
- No patent objection to above-identified release.
 Please defer release until advised by this office.

Signed _____ Date Mailed _____

U.S. DEPARTMENT OF ENERGY

DOE AND MAJOR CONTRACTOR RECOMMENDATIONS FOR
ANNOUNCEMENT AND DISTRIBUTION OF DOCUMENTS

See Instructions on Reverse Side

1. DOE Report No. DOE/ET/21007-6 (STMP0-575)	2. Contract No. DE-AC03-79ET21007	3. Subject Category (iv). UC-62, -62c, -62d
4. Title 10 MWe Solar Power Plant: Collector System Foundation Requirements (Revision A)		
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;">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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8. Recommended Announcement ("x" one) <input checked="" type="checkbox"/> a. Normal procedure may be followed. <input type="checkbox"/> b. Recommend the following announcement limitations:		
9. Reason for Restrictions Recommended in 7 or 8 above. <input type="checkbox"/> a. Preliminary information. <input type="checkbox"/> b. Prepared primarily for internal use. <input type="checkbox"/> c. Other (Explain)		
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13. Additional Information or Remarks (Continue on separate sheet, if necessary)		
14. Submitted by (Name and Position) (Please print or type) S. D. Elliott, Jr., Director, DOE Solar One Project Office Organization _____ Post Office Box 366, Daggett, CA 92327 (619) 254-2672 Signature  Date AUG 06 1984		



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: DOE Solar One Project Office
Post Office Box 366
Daggett, CA 92327
ATTN: S. D. Elliott, Jr.

Prime Contract No. DE-AC03-79ET21007
Subcontract No. (N/A)
Report No. DOE/ET/21007-6 (STMP0-575)
Date of Report December, 1988
Name & Phone No. of DOE Technical Representative S. D. Elliott, Jr. (619) 254-2672

- Document Title:
10 MWe Solar Power Plant: Collector System Foundation Requirements (Revision A)
- Type of Document: Technical Report, Conference Paper, Journal Article, Abstract or Summary,
 Copy of Oral Presentation, Other (please specify): _____
- In order to meet a publication schedule or submission deadline, patent clearance by _____ (Routine) would be desired.

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- 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)

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6. Remarks: Return copy of clearance to Project Office; document may be destroyed

Reviewing/Submitting Official: Name (Print/Type) S. D. Elliott, Jr., Director
Title DOE Solar One Project Office
Signature *S. D. Elliott* Date 6 August, 1984

TO: INITIATOR OF REQUEST

FROM: ASSISTANT CHIEF FOR PROSECUTION
Office of Patent Counsel/Livermore Office

- No patent objection to above-identified release.
 Please defer release until advised by this office.

Signed *L. E. Carnahan*

L. E. Carnahan
Date Mailed 8/10/84