

SERI/RP- 0-9371

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Request for
Proposal Number: RP-0-9371

Title: NEW THERMAL ENERGY STORAGE CONCEPTS
FOR SOLAR THERMAL APPLICATIONS

Issue Date: October 10, 1980

Response Due: November 14, 1980



SERI

Solar Energy Research Institute

A Division of Midwest Research Institute

1617 Cole Boulevard
Golden, CO 80401

Solar Energy Research Institute
1617 Cole Boulevard
Golden, Colorado 80401
(303) 231-1000



October 13, 1980

Dr. Michael Gurevich
Division of Thermal and Mechanical
Energy Storage Systems
Department of Energy
600 E Street, N. W.
Washington, D. C. 20585

Dear Mike:

Enclosed is the RFP for "New Thermal Energy Storage Concepts for Solar Thermal Applications". This RFP was assembled from the information that I previously sent you in my letter of August 4, 1980. The RFP was advertised in Commerce Business Daily of October 3, 1980 and copies will be mailed to those responding to that announcement as well as those on a mailing list that I assembled.

Sincerely,

A handwritten signature in cursive script that reads "Charlie".

Charles E. Wyman
Program Coordinator
Solar Energy Storage Program

CEW/jh: 1107

cc: D. Kearney
J. Martin
W. Wilson

Enclosure

TO BE RETURNED

INTENT TO BID Under RFP #RP-0-9371

TO: SOLAR ENERGY RESEARCH INSTITUTE

Attention: Clinton Harrell
Subcontracts Branch
1617 Cole Boulevard
Building 18/2
Golden, CO 80401

We do intend to respond to RFP #RP-0-9371

Name - _____

Address - _____

Attention - _____

NOTE: IF YOU INTEND TO BID, DETACH THIS PAGE AND RETURN TO THE ABOVE ADDRESS BY
October 24, 1980.



Offerors:

Subject : Request for Proposal No. RP-0-9371 for "New Thermal Energy Storage Concepts for Solar Thermal Applications"

Introduction:

The Midwest Research Institute, acting through its Solar Energy Research Institute Division (hereinafter called the SERI) invites your submission of a proposal for New Thermal Energy Storage Concepts for Solar Thermal Applications, in accordance with the requirements and conditions set forth herein.

Statement of Work and Period of Performance

The statement of work is set forth in Enclosure V to this Request for Proposal. The SERI reserves the right to excerpt all or any portion of the successful technical proposal for use as final subcontract language in the event conditions so warrant. The anticipated period of performance of the subcontract is Twelve (12) months.

Reports and Deliverables

The deliverables of this subcontract are as set forth in Enclosure V.

Evaluation Criteria

The detailed evaluation criteria are contained in Enclosure IV. Only these criteria will be used in evaluating your proposal.

Subcontract Award

It is the intent of the SERI to award a subcontract on a cost reimbursable or cost plus fixed fee basis (whichever applicable) and in the manner stated in Enclosure IV. Provisions for this type subcontract are contained in Enclosure VI. Proposals submitted on another basis will not be excluded from consideration.

Proposers are hereby notified that they have the right to request, either in advance of or within thirty (30) days after the date of contracting, a waiver of all or any part of the rights of the United States in subject inventions, in accordance with applicable statutes and ERDA PR 9-9.109-6.

Offerors
RFP #RP-0-9371

Questions or Inquiries

All questions or inquiries concerning this RFP should be addressed to:

Solar Energy Research Institute
Subcontracts Branch
1617 Cole Boulevard
Building 18/2
Golden, CO 80401
Attention: Clinton Harrell
Reference: RFP #RP-0-9371

Written questions regarding the RFP or the requirements to be satisfied under the proposed subcontract will be responded to, provided they are received by the undersigned at the SERI's Subcontract Branch on or before October 24, 1980. Replies to such questions (if considered appropriate) and material along with the questions will be provided to all recipients of record of the RFP as soon as practicable.

Expenses Related to Offeror Submissions

This RFP does not commit the SERI or the Government to pay any costs incurred in the submission of a proposal or in making necessary studies or designed for the preparations thereof.

Unnecessarily Elaborate Proposals

Unnecessarily elaborate brochures or other presentations beyond those sufficient to present a complete and effective proposal are not desired and may be construed as an indication of the Offeror's lack of cost consciousness. Elaborate art work, expensive paper and bindings, and expensive visual and other presentation aids are neither necessary nor desired.

Proposal Content

Proposals should respond to the evaluation criteria in Enclosure IV and be prepared in accordance with the instructions in Enclosure III, "Proposal Preparation Instructions". Submittals should be signed by an employee or official authorized to bind your firm contractually. The original and five (5) copies of the proposals should be mailed or otherwise delivered to the SERI mailroom addressed as follows:

Solar Energy Research Institute
1617 Cole Boulevard
Golden, CO 80401
Attention: Clinton Harrell
Subcontracts Branch
Building 18/2

To facilitate handling, please mark on the outside envelope containing your proposal or other matters related to this solicitation:

"RFP #RP-0-9371 - To Be Opened By Addressee Only"

Offerors
RFP #RP-0-9371

Proposals will be received at the SERI's mailroom until 4:00 p.m. local time on November 14, 1980.

If you do intend to submit a proposal, a response to that effect is requested by detaching the first page of the RFP and returning it to the above address by October 24, 1980.

Late Proposals

Offerors are put on notice that proposals received after the due date will be considered late and will be handled in accordance with the procedures contained in Enclosure II.

Disclaimer

Neither the United States, nor the Department of Energy, nor the SERI, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, expressed or implies, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness for any purpose of any of the technical information or data attached as appendices or otherwise provided herein as reference material.

Contents of the RFP

This RFP consists of this letter and Enclosures I through VI. A list of the Enclosures is attached for reference purposes.

In the event of inconsistency in this RFP, the inconsistency shall be resolved by giving precedence in the following order:

- A. Letter to Offerors;
- B. Enclosure I through VI in that order, including any attachments or exhibits in the order in which they appear within each Enclosure.

Sincerely,

Clinton Harrell

Clinton Harrell
Group Manager
Subcontracts Branch

Enclosures: I Representations and Certifications
 II General Instructions
 III Proposal Preparation Instructions
 Attachment 1 - Proposal Data Summary
 Attachment 2 - Contract Pricing Proposal
 (Optional Form 60)
 IV Evaluation of Proposals
 V Statement of Work
 VI Pro Forma Subcontract(s)

ENCLOSURE I

Representations and Certifications

SOLAR ENERGY RESEARCH INSTITUTE

REPRESENTATIONS AND CERTIFICATIONS

The offeror makes the following Representations and Certifications as part of his offer.
(Check or complete all appropriate boxes or blocks, sign and date on last page.)

1. Type of Business Organization

Are you:

- (a) individual? (b) partnership?
(c) a nonprofit organization?
(d) a corporation, incorporated under the laws under the laws of the State of _____ with principal place of business located at _____?

2. Place of Subcontract Performance

The principal place of subcontract performance will be at:

Street Address: _____
City, State, Zip Code: _____

3. Small and Small Disadvantaged Business Certification

(Required for procurement actions which the Offeror anticipates will exceed \$10,000.)

(a) The offeror () contractor () certifies that it is () is not () a small business concern as defined in accordance with Section 3 of the Small Business Act (15 U.S.C. 632).

(b) The offeror () contractor () certifies that it is a small business (as set forth in (A) above) and is () is not () owned and controlled by socially and economically disadvantaged individuals. Such a firm is defined as one -

- (i) which is at least 51 per centum owned by one or more such individuals or, in the case of publicly owned business, at least 51 per centum of the stock is owned by such individuals.
(ii) whose management and daily business operations are controlled by one or more such individuals, and
(iii) which certifies concerning said ownership and control in accordance with section (c) below.

(c) The offeror () contractor () certifies that it is () is not () a minority individual(s) in accordance with (c) (i) below or that it is () is not () socially and economically disadvantaged in accord with section (c) (ii) or (c) (iii). Socially and economically disadvantaged individuals are defined as:

- (i) United States citizens who are Black Americans, Hispanic Americans, Native Americans, or other specified minorities;
(ii) any other individual found to be disadvantaged pursuant to section 8(a) of the Small Business Act (15 U.S.C. 637); or
(iii) any other individual defined as socially, and economically disadvantaged, for purposes relating to other sections of the Small Business Act.

No solicitation may be properly considered without this certification and no award may be made without it being executed.

4. Labor Surplus Area Representations

- (a) Are you a labor surplus area concern under present Government regulations?
____ Yes, ____ No.
(b) Are you located in a labor surplus area? ____ Yes, ____ No.

NOTE: (For definition of "labor surplus area concern" see Code of Federal Regulations, Title 41, Subpart 1-1.3, section 91. For definition of

labor surplus area, see U.S. Department of Labor Listing of Eligible Labor Surplus Areas under Defense Manpower Policy No. 4a and Executive Order 10582.)

5. Woman-Owned Business

Concern () is, () is not, exempt as set forth below.

Concern () is, () is not, a woman-owned business.

A woman-owned business is a business which is, at least, 51 percent owned, controlled, and operated by a woman or women. Controlled is defined as exercising the power to make policy decisions. Operated is defined as actively involved in the day-to-day management. For the purposes of this definition, businesses which are publicly owned, joint stock associations, and business trusts are exempted. Exempted businesses may voluntarily represent that they are, or are not, woman-owned if this information is available.

6. Contingent Fee Representation

(a) The offeror _____ has, _____ has not, employed or retained any company or person (other than a full-time, bona fide employee working solely for the offeror or bona fide established commercial or selling agencies maintained by the offeror) to solicit or secure this contract, and (b) it _____ has, _____ has not, paid or agreed to pay any company or person (other than a full-time, bona fide employee working solely for the offeror or bona fide established commercial or selling agencies maintained by the offeror) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this subcontract; and agrees to furnish information relating to (a) and (b) above as requested by the Buyer. (For interpretation of the representation, including the term "bona fide employee", see Code of Federal Regulations, Title 41, Subpart 1-1.5.)

7. Certification of Independent Price Determination.
(See note below).

(a) By submission of this offer, the offeror certifies, and in the case of a joint offer each party thereto certifies as to its own organization, that in connection with this procurement:

- (1) The prices in this offer have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other offer or with any competitor;
(2) Unless otherwise required by law, the prices which have been quoted in this offer have not been knowingly disclosed by the offeror and will not knowingly be disclosed by the offeror prior to opening, directly or indirectly to any other offeror or to any competitor; and
(3) No attempt has been made or will be made by the offeror to induce any other person or firm to submit or not to submit an offer for the purpose of restricting competition.

(b) Each person signing this offer certifies that:

- (1) He is the person in the offeror's organization responsible within that organization for the decision as to the prices being offered herein, and that he has not participated, and will not participate, in any action contrary to (a) (1) through (a) (3) above; or
(2) (1) He is not the person in the offeror's organization responsible for the decision as to the prices being offered herein out that he has been authorized to act as agent for the persons responsible for such decisions in certifying that such persons have not participated, and will not

participate in any action contrary to (a) (1) through (a) (3) above, and as their agent does hereby so certify; and

(ii) He has not participated, and will not participate, in any action contrary to (a) (1) through (a) (3) above.

NOTE: (a) This certification on the offer is not applicable to a foreign offeror submitting an offer for a subcontract which requires performance or delivery outside the United States, its possessions, and Puerto Rico.

(b) An offer will not be considered for award where (a) (1), (a) (3), or (b) of the certification has been deleted or modified. Where (a) (2) of the certification has been deleted or modified, the offer will not be considered for award unless the offeror furnishes with the offer a signed statement which sets forth in detail the circumstances of the disclosure and the head of the agency, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

3. Affirmative Action

(Applicable only to offers of \$50,000 or more and offeror has 50 or more employees)

The offeror represents that (1) it has developed and has on file, has not developed and does not have on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or (2) it has not previously had contracts subject to the written affirmative action program requirement of the rules and regulations of the Secretary of Labor.

If such a program has not been developed the offeror will complete the following:

The offeror does does not employ more than 50 employees and has has not been awarded a contract subject to Executive Order 11246 in the amount of \$50,000 or more since July 1, 1968. If such a contract has been awarded since July 1, 1968, give the date of such contract, but do not list contracts awarded within the last 120 days prior to the date of this representation.

7. Equal Opportunity

(Applicable only to offers exceeding \$10,000)

Offeror has. has not. participated in a previous contract or subcontract subject either to the Equal Opportunity Clause herein or the clause originally contained in section 301 of Executive Order No. 10925 or the clause contained in section 301 of Executive Order No. 11174; that it has, has not, filed all required compliance reports, and that representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontract awards. (The above representation need not be submitted in connection with contracts and subcontracts which are exempt from the clause.)

10. Certification of Nonsegregated Facilities

(Applicable to contracts and subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause).

By the submission of this offer, the offeror or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The offeror or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity article in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or

national origin, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certification from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications on his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually). Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

11. Waiver Request

The proposer is hereby notified that it has the opportunity to request, in advance of contracting, or within 30 days thereafter, a waiver of all or any part of the rights of the United States with respect to inventions, in accordance with applicable statutes and the policies and procedures set forth in DGE PR 9-3, 109.5.

12. Identification of Proprietary Technical Data

The section of this solicitation which described the work to be performed also sets forth the SERI's and the DOE's known requirements for technical data. The Additional Technical Data Requirements clause, if included in this solicitation, provides the SERI or the Government with the option to order additional technical data, the requirements for which are not known at the time of contracting. There is, however, a built-in limitation on the kind of technical data which may be required. This limitation is found in paragraph (e) of the Rights in Technical Data clause which provides that the subcontractor may withhold delivery of proprietary data.

Accordingly, it is necessary that you indicate below that the work to be performed and the known requirements for technical data as set forth in the solicitation or subcontract have been reviewed, and either state that to the best of your knowledge, no data will be withheld, or submit a list identifying the proprietary data which to the best of your knowledge will likely be used in the subcontract performance and will be withheld.

Please indicate that you have reviewed the requirements in the technical scope of work and to the best of your knowledge:

- () The technical scope of the work has been reviewed, and
- () None of the data will be withheld; or
- () Data will be withheld as contained on the attached sheet.

13. Rights in Proposal Data

It is DOE policy for a subcontract award based on a proposal that, in consideration of the award, the Government shall obtain unlimited rights in the technical data contained in the proposal unless the subcontractor marks those portions of the technical information which he asserts as "proprietary data" or specifies those portions of such technical data which are not directly related to or will not be utilized in the work to be funded under the subcontract. Accordingly, please indicate:

- () No restriction on Government rights in the proposal technical data; or
- () The identified technical data on the attached sheet is proprietary or is not

directly related to or will not be utilized in the work to be funded under the sub-contract.

14. Clean Air and Water Certification

(Applicable if the bid or offer exceeds \$100,000, or the SERI has determined that orders under an indefinite quantity contract in any year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-3(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or is not otherwise exempt.)

The Offeror certifies as follows:

(a) Any facility to be utilized in the performance of this proposed subcontract has not been listed on the Environmental Protection Agency list of violating facilities.

(b) He will promptly notify the contracting officer, prior to award, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which he proposes to use for the performance of the contract is under consideration to be listed on the EPA list of violating facilities.

(c) He will include substantially this certification, including this paragraph (c), in every nonexempt subcontract.

15. Cost Accounting Standards Certification-Nondefense Applicability

This solicitation notice is not applicable to small business concerns.

Any negotiated subcontract in excess of \$100,000 resulting from this solicitation shall be subject to the requirements of the clauses entitled Cost Accounting Standards-Nondefense Contract (FPR 1-3.1204-2(a)) and Administration of Cost Accounting Standards (FPR 1-3.1204-1(b)) if it is awarded to a contractor's business unit that is performing a national defense contract or subcontract which is subject to cost accounting standards pursuant to 4 CFR 331 at the time of award, except contracts which are otherwise exempt (see FPR 1-3.1203-2(a) and (c)(4)). Otherwise, an award resulting from this solicitation shall be subject to the requirements of the clauses entitled Consistency of Cost Accounting Practices-Nondefense Contract (FPR 1-3.1204-2(b)) and Administration of Cost Accounting Standards (FPR 1-3.1204-1 (b)) if the award is

(i) the first negotiated contract over \$500,000 in the event the award is to a contractor's business unit that is not performing under any CAS covered national defense or non-defense contract or subcontract, or

(ii) a negotiated contract over \$100,000 in the event the award is to a contractor's business unit that is performing under any CAS covered national defense or nondefense contract, or subcontract, or

(iii) a negotiated contract over \$100,000 in the event the award is to a contractor's business unit that is performing under any CAS covered national defense or nondefense contract, or subcontract except contracts which are otherwise exempt (see FPR 1-3.1203(a) and (c)(4)).

16. Certificates of CAS Applicability

The Offeror hereby certifies that:

A It is currently performing a negotiated defense contract or subcontract that contains a Cost Accounting Standards Clause (4 CFR 331), and it is currently required to accept that clause in any new negotiated national defense contracts it receives that are subject to cost accounting standards.

B It is currently performing a negotiated national defense or nondefense contract or subcontract that contains a Cost Accounting Standards Clause required by 4 CFR 331 or 332 or by the FPR Subpart 1-3.12, but it is not required to accept the 4 CFR clause in new negotiated national defense contracts or subcontracts which it receives that are subject to cost accounting standards.

C It is not performing any CAS covered national defense or nondefense contract or subcontract. The Offeror further certifies that it

will immediately notify the contracting officer in writing in the event that it is awarded any negotiated national defense or nondefense contract or subcontract containing any Cost Accounting Standards Clause subsequent to the date of this certificate but prior to the date of the award of a subcontract resulting from this solicitation.

D It is an educational institution receiving contract awards subject to FPR Subpart 1-15.3 (FMC 73-3, OMB Circular A-21).

E It is State or local government receiving contract awards subject to FPR Subpart 1-15.7 (FMC 74-4, OMB Circular A-87).

F It is a hospital.

NOTE: Certain firm fixed price negotiated non-defense contracts awarded on the basis of price competition may be determined by the Contracting Officer (at the time of award) to be exempt from cost accounting standards (FPR 1-3.1203-2 (c)(4)(iv)).

Additional Certification-CAS Applicable Offerors

G The Offeror, subject to cost accounting standards but not certifying under D, E, or F above, further certifies that practices used in estimating costs in pricing this proposal are consistent with the practices disclosed in the Disclosure Statement(s) where they have been submitted pursuant to CASB regulations (4 CFR 351).

Data Required-CAS Covered Offerors

The Offeror certifying under A or B above but not under D, E, F above, is required to furnish the name, address (including agency or department component), and telephone number of the cognizant contracting officer administering the Offeror's CAS covered contracts. If A above is checked, the Offeror will also identify those currently effective cost accounting standards, if any, which upon award of the next negotiated national defense contract or subcontract will become effective upon the offeror.

Name of Contracting Officer: _____

Address: _____

Telephone Number: _____

Standards Not Yet Applicable: _____

17. Certification of Current Cost or Pricing Data

Offerors are put on notice that if a proposal is of an amount over \$100,000 the Offeror may be required to submit a Certificate of Current Cost or Pricing Data, in accordance with FPR 1-3.807 and DOE PR 9-3.807, effective as of the time agreement is reached on subcontract price. An Offeror, by submittal of a proposal, agrees to provide such certification, if requested by the SERI.

18. Certification Regarding Small Business Subcontracting Plan

(Required for procurement actions which the Offeror anticipates will exceed \$500,000.)
Subcontracting Representation

(a) The offeror () represents that the following conditions prevail which determine whether the firm shall be required to submit a subcontracting plan for small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals:

(i) he is () a small business as defined in accordance with 13 CFR, Part 12, of the SBA Regulations;

(ii) subcontracting possibilities are not offered with respect to this contract (); and

(iii) the contract is not expected to exceed \$100,000 (if solely for construction of a public facility) or \$500,000 otherwise ().

(b) The offeror () represents that he is ()
is not () required to submit plans for
subcontracting with small and small disadvantaged
businesses because he has properly executed one or
more of the above representations.

By signing below, the proposer hereby
certifies to all the foregoing representations
and certifications.

(Name of Proposer)

BY: _____
TITLE: _____
DATE: _____

ENCLOSURE II

GENERAL INSTRUCTIONS

Proposal Significance

It is particularly important that you recognize that the initial evaluation of your proposal will be made upon a review of your written proposal only, although some independent investigations may be made with regard to the cost information furnished.

Therefore, you are cautioned to make certain that your written proposal properly reflects your ability to satisfy the requirements of this RFP and is as complete, detailed, and thorough as is possible.

Any inconsistency, whether real or apparent, between promised performance and proposed price should be explained in the proposal. Any significant inconsistency, if unexplained, raises a fundamental issue of the Offeror's understanding of the nature and scope of the work required and his financial ability to perform the subcontract and may be grounds for downgrading the proposal.

The SERI reserves the right to select any proposal as a basis for negotiation or to reject any and all proposals.

Special Instructions

- (1) Each offeror is encouraged to recommend additions or alterations to these projects as part of their proposed Information/Promotion Plan. Offerors should note carefully the Evaluation Criteria outlined elsewhere in this solicitation and structure their proposals accordingly.
- (2) The Solar Energy Research Institute (SERI) recognized that the various categories of tasks identified in this Statement of Work require disparate experience, skills, and resources from proposers. SERI expects that many organizations best qualified and experienced to undertake one portion of this study may not be fully qualified for, or interested in, undertaking all categories of tasks described in this Statement of Work. Nevertheless, SERI wishes to encourage those organizations (or groups of organizations) with relevant skills and experience to respond to this Statement of Work. For this reason, SERI will accept proposals from both individual companies and teams organized according to prime/subcontractor or organization/consultant arrangements. In either or the latter cases, however, the proposal must clearly specify the availability and level of commitment for all proposed subcontractors and/or consultants.

Written and/or Oral Discussion

Written and/or oral discussions will be conducted with those offerors whose proposals are determined to be within a competitive range. Offerors are, however, put upon notice that award may be made without discussion of the initial proposals received. Accordingly, proposals should be submitted initially on the most favorable terms, from a price and technical standpoint, which the Offeror can submit to the SERI.

Late Proposals

- A. Any proposal received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made, and:
- (1) It was sent by registered or certified mail not later than the fifth calendar day prior to the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th day of the month must be mailed by the 15th or earlier);
 - (2) It was sent by mail (or telegram if authorized) and it is determined by the SERI that the later receipt was due solely to mishandling by the SERI after receipt at the SERI;
 - (3) It is the only proposal received; or
 - (4) It offers significant cost or technical advantages to the SERI and it is received before a determination of the competitive range has been made.
- B. Any modification of a proposal is subject to the same conditions as in A. of this provision.
- C. The only acceptable evidence to establish:
- (1) The date of mailing of a late proposal or modification sent either by registered or certified mail in the U.S. Postal Service postmark on both envelope or wrapper and on the original receipt from the U.S. Postal Service. If neither postmark shows a legible date, the proposal or modification of proposal shall be deemed to have been mailed late. (The term "postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postal meter machine impression) that is readily identifiable without further action as having been supplied and affixed on the date of mailing by employees of the U.S. Postal Service. Therefore, offerors should request the postal clerk to place a hand cancellation bulls-eye "postmark" on both the receipt and the envelope or wrapper.)
 - (2) The time of receipt at the SERI is the time-date stamp of such installation on the proposal wrapper or other documentary evidence of receipt maintained by the installation.
- D. Notwithstanding (A) and (B) of this provision, a late modification of an otherwise successful proposal which makes its terms more favorable to the SERI will be considered at any time it is received and may be accepted.
- E. Proposals may be withdrawn by written or telegraphic notice received at any time prior to award. Proposals may be withdrawn in person by an offeror or his authorized representative, provided his identity is made known and he signs a receipt for the proposal prior to award.

NOTE: The term "telegram" includes mailgrams.



ENCLOSURE III

Proposal Preparation Instructions

ENCLOSURE III

PROPOSAL PREPARATION INSTRUCTIONS

Your proposal should be submitted in two separate volumes as follows:

- Volume 1 - Technical Proposal
- Volume 2 - Cost Proposal

No cost data or estimates should appear in the technical volume. To aid in the evaluation of the proposal, it is desired that all technical proposals be keyed to the Statement of Work, where appropriate (technical discussion of approaches, etc.).

A. Technical Proposal Instructions

Since your Technical Proposal will primarily determine the capability of your organization to participate in this procurement, it should be specific and complete in every detail. The proposal should be practical and should be prepared simply and economically, providing straight-forward, concise delineation of capabilities to satisfactorily perform the subcontract being sought.

The proposal should contain an outline of the proposed lines of investigation, method of approach to the problem, the phases or steps into which this project might logically be divided, estimated time required to complete each phase or step, and any other information considered pertinent to the problem. The offeror should not merely offer to perform the work in accordance with the Statement of Work but shall outline the actual work proposed as specifically as possible.

Your technical proposal should, as a minimum, contain the information specified below in accordance with the following general format:

1. Table of Contents
2. List of Tables and Drawings
3. Short Introduction and Summary

This section should contain an outline of the work to be done, difficulties anticipated in doing the work, and the proposed general approach toward solving the identified problems and accomplishing the work.

4. Technical Discussion of Approaches

This section should contain the major portion of the technical proposal. It should be presented in sufficient detail to permit a comprehensive evaluation and should contain as a minimum the following.

- 4.1 Statement of Work. Major difficulties, if any, anticipated by the offeror in performing the Statement of Work.

- 4.2 Principals and techniques which may be applied in performing the work and solving identified difficulties, and an evaluation of the various methods considered with substantiation of those selected. Indicate degree of success expected.
- 4.3 Complete, detailed statement of anticipated solution, including, as applicable, preliminary design layout, sketches, and other information indicating configuration and functions of components.
- 4.4 Specific statement of any interpretations, deviations, and exceptions to the Statement of Work described in Enclosure IV of this RFP. The Offeror, however, should be aware that major deviations, and exceptions to the Statement of Work may impair the evaluation of the Offeror's proposal. Thus, explicit explanation of deviations and exceptions should be part of this technical proposal.

5. Program Plan

This section should contain the Offeror's proposed Program Plan which divides the entire program into work packages of finite tasks or segments of work. Each task should be identified for: personnel accountability, task product identification/application, start/complete schedule, travel, proposed subcontracts, labor hours by labor type, and material description and quantities. Included in the Program Plan should be a summary of (1) labor hours for each labor type, (2) lower tier subcontracts, and (3) material description and quantities, planned for each month during the proposed period of performance of the contract. Cost estimates should not be included in this Plan.

6. Program Schedule

This section should include the period of performance, proposed duration of project in months by phase or task, and a milestone chart. Include time required for preparation and submission of required reports.

7. Project Organization

This section should show the project team or organization proposed for this contract, the relationship of this program to the overall company organization and the function and responsibilities of the major lower tier subcontractors. As a minimum, it should contain the following:

- 7.1 Organization chart and a summary of the labor hours or percentage of time key personnel will devote to each major task of this project.
- 7.2 An estimate of the extent of lower tier subcontracting anticipated together with a list of items or effort to be subcontracted. Cost estimates should not be included in this section.

8. Personnel Qualifications

This section should contain the names of key management and technical or supervisory personnel, down to the third level of proposed project organization structure, to be assigned for direct work on this subcontract along with pertinent background information on each.

9. Site/Facilities/Equipment Data

This section should include a statement of available site, plant, laboratory equipment, and test facilities which are proposed for use on this project, if any.

A specific statement of additional plant, equipment, and test facilities, if any, proposed for this project is required. Indicate their applicability to the project and substantiate their need. Indicate to what extent the project can be accomplished without them. Consider alternate sources, substitutions, etc.

10. Supportive Data

This section should contain the following:

10.1 A listing of current or recent (within the last 2 years) Government contracts or other activity performed by the offeror in this or related fields. Include the name of the sponsoring agency, contract number, amount of contract, subject area of contract, name and phone number of Contracting Officer for any Government contracts cited. If necessary for evaluation, SERI may solicit from available sources, experience data concerning proposer's past performance.

10.2 Any other pertinent technical information which will aid in evaluation of the proposal.

B. Cost Proposal Instructions

The cost portion of your proposal should contain, as a minimum, the information set forth below, as your proposal will be evaluated not only on technical considerations, but also on cost and business considerations.

1. The Proposal Data Summary (Attachment I to this Enclosure III) and submitted as the first part of the Cost Proposal.
2. To be considered for award, offerors must provide cost or pricing data submitted on the enclosed Optional Form 60. (Attachment 2 to this Enclosure III). Your attention is specifically directed to the "Instructions to Offerors" and "Footnotes" set forth on Page 3 of the Optional Form 60. As a minimum, a separate Optional Form 60 is required for each Task and a Summary Optional Form 60 for the complete proposal. Offerors may provide lower levels of cost breakdowns (Optional Form 60) relative to each Task if they believe this level of clarity is desirable.

- a. Direct Labor - Set forth the hours by labor category, the rate per hour, total, and discuss the basis for the rates; i.e., actuals of individuals, category averages, midpoint of effort, etc. Explain any escalation factors used.
 - b. Overhead - This generally encompasses indirect costs which because of their incurrence for common or joint objectives are not readily subject to treatment as direct costs. Advise details of any current Government approval of proposed rates. If Government approval has not been obtained, furnish previous fiscal year burden cost by pool and base for each burden center and cost and base for proposed rates. Offerors should indicate if they operate under the "Negotiated Overhead Rates" system with the Government.
 - c. Direct Materials - Provide unit cost of each item to be used, the basis for the cost, i.e., make, model, size, capacity, vendor quotes, engineering estimates, previous purchase, etc.
 - d. Other Direct Costs - This includes such items as reports and presentations, travel, and computer rental costs. Travel costs must be supported with the detailed information on what the Offeror used in arriving at his estimate, including pertinent contractor travel policies. Computer rental costs should show type of computer, number of hours, and hourly rates if known. Other items of cost in this category must include similar details.
 - e. Lower-Tier Subcontractors - Pursuant to FPR 1-3, 814-3, a separate cost breakdown, in a format consistent with this format, shall be furnished on any subcontract which exceeds \$100,000. The type of subcontract and name and address of the proposed subcontractor shall be furnished, if known.
 - f. General and administrative Expense - Include the same type of information requested in b. above. Composite rates should be broken out separately to explain composition and basis.
 - g. Profit/Fee - Provide rationale for proposed amount.
3. Government Facilities

The SERI does not expect to provide Government Furnished Property (GFP) to any subcontractor. However, Offerors may propose GFP, and requests will be considered and evaluated as a cost to SERI.

If Government-owned facilities will be required for performance of the proposed work, the Offeror shall furnish a list of the required facilities, the contract number under which the facilities are furnished, and the name and address of the cognizant Contracting Officer.

4. Proposing Entity Past Performance (Contracts and Subcontracts over \$500,000)

- a. List all contracts in this field of technology received in the past five years. Include the contract number; the name of the customer; the name, address, and telephone number of the customer official who administered the contract; a description of the product or service; the contract type; the delivery date or the period of performance, if applicable; the basis of the completion (price, delivery, or technical merit); whether it was the initial award or a follow-on; if an initial award was preceded by a Government or customer-financed study or by an offeror-financed study; and the original contract price and final contract price with reason for overruns, if any.
- b. List all Federal government contract(s) terminated (partially or completely) within the past ten years. Include the Department or Agency, contract number, name, address, and telephone number of the terminating officer.

5. Acceptance of Subcontract

A statement as to the acceptableness of the pro forma Subcontract including the Schedule and the Subcontract General Provisions set forth in Enclosure IV. Exceptions should be listed and explained and alternate language provided.

6. Trade Secrets and/or Privileged or Confidential Commercial or Financial Information

Proposals submitted in response to this RFP may contain trade secrets and/or privileged or confidential commercial or financial information which the proposer (or his lower tier subcontractor offeror) does not want used or disclosed for any purpose other than evaluation of the proposal. The use and disclosure of such data may be restricted, provided the proposer marks the cover sheet of the proposal with the following legend, specifying the pages of the proposal which are to be restricted in accordance with the conditions of the legend:

"The data contained on pages _____ of this proposal have been submitted in confidence and contain trade secrets and/or privileged or confidential commercial or financial information and such data shall be used or disclosed only for evaluation purposes, provided that if a subcontract is awarded to this proposer as a result of or in connection with the submission of this proposal, the SERI or the Government shall have the right to use or disclose the data herein to the extent provided in the subcontract. This restriction does not limit the SERI's or the Government's right to use or disclose data obtained from any source, including the proposer, without restriction."

Further, to protect such data, each page containing such data shall be specifically identified and marked, including each line or paragraph containing the data to be protected with a legend similar to the following:

"Use or disclosure of the data set forth on lines _____ above is subject to the restriction on the cover page of this proposal."

It should be noted, however, that data bearing the aforementioned legend may be subject to release under the provisions of the Freedom of Information Act, 5 U.S.C. 552, as amended. The SERI and the Government assume no liability for disclosure or use of unmarked data and may use or disclose such data for any purpose. It should be noted that any resultant subcontract will contain an appropriate "Rights to Proposal Data" article as set forth in Appendix C of the Pro Forma Subcontract.

All such information will be used for evaluation purposes only except to the extent such information is generally available to the public, is already the property of the SERI or Government, or the SERI or Government already has the unrestricted use rights thereto, or, is or has been made available to the SERI or the Government from other sources, including the proposer, without restriction. Proposers are hereby notified that the SERI intends to make all proposals submitted, including any trade secrets and/or privileged or confidential commercial or financial information contained therein, available to DOE personnel, to personnel in DOE's National Laboratories, and to personnel of other Government agencies, as necessary, for the sole purpose of assisting the SERI in its evaluation of the proposal. These individuals will be required to protect the confidentiality of any specifically identified trade secrets and/or privileged or confidential commercial or financial information obtained as a result of their participation in these evaluations.

7. Rights in Technical Data

Enclosure V to this RFP which describes the work to be performed also sets forth SERI's and the Government's known requirements for technical data.

In addition, it is anticipated that any resultant subcontract will contain the "Additional Technical Data Requirements" article set forth in Enclosure VI, Appendix C, in order to provide SERI or the Government with the option to order additional technical data, the requirement for which was not known at the time of contracting. There is, however, a built-in limitation on the kind of technical data which may be required under either of these provisions. The limitation is found in paragraph (e) of the "Rights in Technical Data - Long Form" article, also set forth in Enclosure VI, Appendix C. This paragraph (e) provides that the subcontractor need not furnish proprietary data concerning an item or process which was developed at private expense. In view of this, and to provide visibility, it is necessary that your proposal state that the work

to be performed and the known requirements for technical data set forth in the RFP have been reviewed, and further state either that, to the best of your knowledge, no data will be withheld, or list the data which to the best of your knowledge will likely be used in the subcontract performance and will be withheld.

8. Contract Administration

To assist in our evaluation and during performance of any resultant subcontract it is anticipated that certain functions may be performed by personnel from Government agencies. Accordingly, it is requested that you include within your proposal the names and addresses of Government agencies and specific personnel performing functions such as audits, inspections, property administration, contract administration, small business program reviews, equal employment opportunity reviews and similar services on Governmental contracts which you may have been awarded in the past five years.

9. Place of Performance

All proposals should state the intended place of performance, including the name and street address of facilities other than the Offeror's, such as lower tier subcontractors, if it is reasonably expected that such facilities will be used.

10. Letter of Commitment

Proposals, where teaming arrangements are contemplated, should include letters of commitments for those participants (if any) who are not a part of or affiliated with the proposing organization.

11. Certifications

Each offeror is to submit one signed copy of Enclosure I, Representations and Certifications, with his proposal. All appropriate blocks must be filled in and those not applicable so noted.

PROPOSAL DATA SUMMARY

1. Total Estimated Cost and Fee
2. Proposed Period of Performance
3. Type of Subcontract Proposed
4. Name of Individual(s) Authorized to Negotiate and Commit the Proposer to all of the Provisions of the Proposal.

Name	Title	Telephone No.
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5. The Offeror agrees that the proposal will remain in effect for _____ days (120 days if not otherwise specified) from the date designated for receipt of proposals.
6. Name and Address of Cognizant Government Audit Agency

CONTRACT PRICING PROPOSAL
(RESEARCH AND DEVELOPMENT)

Office of Management and Budget
Approval No. 29-RO184

This form is for use when (i) submission of cost or pricing data (see FPR 1-3.807-3) is required and (ii) substitution for the Optional Form 59 is authorized by the contracting officer.

PAGE NO.

NO. OF PAGES

NAME OF OFFEROR	SUPPLIES AND/OR SERVICES TO BE FURNISHED	
HOME OFFICE ADDRESS		
DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED	TOTAL AMOUNT OF PROPOSAL \$	GOVT SOLICITATION NO.

DETAIL DESCRIPTION OF COST ELEMENTS

1. DIRECT MATERIAL (Itemize on Exhibit A)	EST COST (\$)	TOTAL EST COST ¹	REFER- ENCE ²
a. PURCHASED PARTS			
b. SUBCONTRACTED ITEMS			
c. OTHER—(1) RAW MATERIAL			
(2) YOUR STANDARD COMMERCIAL ITEMS			
(3) INTERDIVISIONAL TRANSFERS (At other than cost)			
TOTAL DIRECT MATERIAL.			
2. MATERIAL OVERHEAD ³ (Rate % X \$ base =)			
3. DIRECT LABOR (Specify)	ESTIMATED HOURS	RATE/HOUR	EST COST (\$)
TOTAL DIRECT LABOR			
4. LABOR OVERHEAD (Specify Department or Cost Center) ⁴	O.H. RATE	X BASE =	EST COST (\$)
TOTAL LABOR OVERHEAD			
5. SPECIAL TESTING (Including field work at Government installations)		EST COST (\$)	
TOTAL SPECIAL TESTING			
6. SPECIAL EQUIPMENT (If direct charge) (Itemize on Exhibit A)		EST COST (\$)	
7. TRAVEL (If direct charge) (Give details on attached Schedule)		EST COST (\$)	
a. TRANSPORTATION			
b. PER DIEM OR SUBSISTENCE			
TOTAL TRAVEL			
8. CONSULTANTS (Identify—purpose—rate)		EST COST (\$)	
TOTAL CONSULTANTS			
9. OTHER DIRECT COSTS (Itemize on Exhibit A)			
TOTAL DIRECT COST AND OVERHEAD			
10.			
11. GENERAL AND ADMINISTRATIVE EXPENSE (Rate % of cost element Nos.) ⁵			
12. ROYALTIES ⁶			
13.			
TOTAL ESTIMATED COST			
14. FEE OR PROFIT			
15.			
TOTAL ESTIMATED COST AND FEE OR PROFIT			

This proposal is submitted for use in connection with and in response to *(Describe RFP, etc.)*
 and reflects our best estimates as of this date, in accordance with the Instructions to Offerors and the Footnotes which follow.

TYPED NAME AND TITLE	SIGNATURE
NAME OF FIRM	DATE OF SUBMISSION

EXHIBIT A—SUPPORTING SCHEDULE *(Specify. If more space is needed, use reverse)*

COST EL NO.	ITEM DESCRIPTION <i>(See footnote 5)</i>	EST COST (\$)

I. HAS ANY EXECUTIVE AGENCY OF THE UNITED STATES GOVERNMENT PERFORMED ANY REVIEW OF YOUR ACCOUNTS OR RECORDS IN CONNECTION WITH ANY OTHER GOVERNMENT PRIME CONTRACT OR SUBCONTRACT WITHIN THE PAST TWELVE MONTHS?
 YES NO *(If yes, identify below.)*

NAME AND ADDRESS OF REVIEWING OFFICE AND INDIVIDUAL	TELEPHONE NUMBER/EXTENSION
---	----------------------------

II. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS PROPOSED CONTRACT?
 YES NO *(If yes, identify on reverse or separate page)*

III. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT?
 YES NO *(If yes, identify.):* ADVANCE PAYMENTS PROGRESS PAYMENTS OR GUARANTEED LOANS

IV. DO YOU NOW HOLD ANY CONTRACT (Or, do you have any independently financed (IR&D) projects) FOR THE SAME OR SIMILAR WORK CALLED FOR BY THIS PROPOSED CONTRACT?
 YES NO *(If yes, identify.):*

V. DOES THIS COST SUMMARY CONFORM WITH THE COST PRINCIPLES SET FORTH IN AGENCY REGULATIONS?
 YES NO *(If no, explain on reverse or separate page)*

INSTRUCTIONS TO OFFERORS

1. The purpose of this form is to provide a standard format by which the offeror submits to the Government a summary of incurred and estimated costs (and attached supporting information) suitable for detailed review and analysis. Prior to the award of a contract resulting from this proposal the offeror shall, under the conditions stated in FPR 1-5.807-5 be required to submit a Certificate of Current Cost or Pricing Data (See FPR 1-5.807-5(h) and 1-5.807-4).

2. In addition to the specific information required by this form, the offeror is expected, in good faith, to incorporate in and submit with this form any additional data, supporting schedules, or substantiation which are reasonably required for the conduct of an appropriate review and analysis in the light of the specific facts of this procurement. For effective negotiations, it is essential that there be a clear understanding of:

- a. The existing, verifiable data.
- b. The judgmental factors applied in projecting from known data to the estimate, and
- c. The contingencies used by the offeror in his proposed price.

In short, the offeror's estimating process itself needs to be disclosed.

3. When attachment of supporting cost or pricing data to this form is impracticable, the data will be described (with schedules as appropriate), and made available to the contracting officer or his representative upon request.

4. The formats for the "Cost Elements" and the "Proposed Contract Estimate" are not intended as rigid requirements. These may be presented in different format with the prior approval of the Contracting Officer if required for more effective and efficient presentation. In all other respects this form will be completed and submitted without change.

5. By submission of this proposal the offeror grants to the Contracting Officer, or his authorized representative, the right to examine, for the purpose of verifying the cost or pricing data submitted, those books, records, documents and other supporting data which will permit adequate evaluation of such cost or pricing data, along with the computations and projections used therein. This right may be exercised in connection with any negotiations prior to contract award.

FOOTNOTES

1. Enter in this column those necessary and reasonable costs which in the judgment of the offeror will properly be incurred in the efficient performance of the contract. When any of the costs in this column have already been incurred (e.g., on a letter contract or change order), describe them on an attached supporting schedule. Identify all sales and transfers between your plants, divisions, or organizations under a common control, which are included at other than the lower of cost to the original transferee or current market price.

2. When space in addition to that available in Exhibit A is required, attach separate pages as necessary and identify in this "Reference" column the attachment in which the information supporting the specific cost element may be found. No standard format is prescribed; however, the cost or pricing data must be accurate, complete and current, and the judgment factors used in projecting from the data to the estimates must be stated in sufficient detail to enable the Contracting Officer to evaluate the proposal. For example, provide the basis used for pricing materials such as by vendor quotations, shop estimates, or invoice prices; the reason for use of overhead rates which depart significantly from experienced rates (reduced volume, a planned major re-arrangement, etc.); or justification for an increase in labor rates (anticipated wage and salary increases, etc.). Identify and explain any contingencies which are included in the proposed price, such as anticipated costs of rejects and defective work, or anticipated technical difficulties.

3. Indicate the rates used and provide an appropriate explanation. Where agreement has been reached with Government representatives on the use of forward pricing rates, describe the nature of the agreement. Provide the method of computation and application of your overhead expense, including cost breakdown and showing trends and budgetary data as necessary to provide a basis for evaluation of the reasonableness of proposed rates.

4. If the total cost entered here is in excess of \$250, provide on a separate page the following information on each separate item of royalty or license fee: name and address of licensor; date of license agreement; patent numbers, patent application serial numbers, or other basis on which the royalty is payable; brief description, including any part or model numbers of each contract item or component on which the royalty is payable; percentage or dollar rate of royalty per unit; unit price of contract item; number of units; and total dollar amount of royalties. In addition, if specifically requested by the contracting officer, a copy of the current license agreement and identification of applicable claims of specific patents shall be provided.

5. Provide a list of principal items within each category indicating known or anticipated source, quantity, unit price, competition obtained, and basis of establishing source and reasonableness of cost.

CONTINUATION OF EXHIBIT A—SUPPORTING SCHEDULE AND REPLIES TO QUESTIONS II AND V.

ENCLOSURE IV

Source Evaluation and Selection Process

ENCLOSURE IV

SOURCE EVALUATION AND SELECTION PROCESS

NEW THERMAL ENERGY STORAGE CONCEPTS FOR SOLAR THERMAL APPLICATIONS

A. General

Proposals submitted in response to the RFP will be evaluated in accordance with Federal Procurement Regulations Part 1 - 3.805, Selection of offerors for Negotiations and Award; DOE Procurement Regulations Part -- 3.805.

B. Proposal Evaluation and Selection Procedures

1. Methods

Proposals shall be evaluated and selected in accordance with DOE procurement regulations and the criteria and considerations set forth herein. In conducting this evaluation, SERI will use the technical assistance of qualified scientific personnel and consultants within the government, the national laboratories and SERI. By submission of its proposal, the proposer consents to the disclosure of the proposal contents to such personnel for the purpose of evaluation. There is no commitment on SERI's part to make any particular number of awards, or to make awards which aggregate to any particular sum. Proposals will undergo a Comprehensive Review which shall be conducted from a technical and business standpoint to determine: (1) whether it contains sufficient cost, technical and other information to permit a meaningful, comprehensive evaluation; (2) whether it is responsive to the scope of the RFP; and (3) whether it has been signed by a responsible official of the proposing organization or a person authorized to obligate such organization. If the proposal does not meet these requirements, the proposer will be notified and informed of the reasons why his proposal cannot be considered further under the RFP. Proposals which do meet these requirements shall be evaluated according to the criteria given in Section B.2. Once the proposals have been ranked, Source Sections for negotiation shall be made on the basis of those proposals deemed to have best satisfied the requirements set forth in Section C "Program Policy Factors". Thus, it should be recognized by all offerors that SERI reserves the right to make awards, regardless of ranking, to those proposers who best satisfy the Thermal Storage Program requirements. Final decision and awards will be the sole responsibility of the SERI.

2. Evaluation Criteria

The primary basis for ranking proposals will be the criteria described forthwith:

EVALUATION CRITERIA

SCORING

A weighted-point system will be used to score the proposals and weight the evaluations. Raw scores are assigned by the technical evaluators. Weights, in the form of multipliers, are then applied to these scores.

The totals of the weighted scores will be used to rank the proposals numerically on a technical basis. The criteria for the evaluation are in order of descending importance.

EVALUATION CRITERIA

- I. Scientific/Technical Approach
- II. Qualifications of the Proposer
- III. Past Experience with Proposer
- IV. Cost

Other factors, in addition to technical and price factors, which will be considered, include, but are not limited to such things as:

- o past performance and financial condition;
- o small business and minority business enterprise preference considerations, as well as consideration of the extent of unemployment in the area in which an offeror proposed to accomplish the work;
- o conflicts of interest; and
- o any other factors required by applicable statutes and regulations.

SERI may require proposals to be clarified or supplemented either through additional written submissions or oral presentations. However, offerors should be aware that award may be made without discussion of the initial proposals received. Therefore, proposals should be submitted initially on the most favorable terms, from a financial and technical standpoint, which the offeror can submit to SERI.

C. Program Policy Factors

After the proposals have been evaluated and ranked in order of excellence, SERI will select for negotiation those proposals which provide the maximum opportunity of advancing the overall program with the funds available. In making this selection, SERI will consider the following Program Policy Factors:

- (1) The cost-to-benefit ratio of the proposal in the context of potential combinations of proposals. This consideration will include the probable cost, and business arrangements sought by the proposer;

Page 2, Evaluation Criteria

- (2) That it may be desirable to select projects which represent a diversity of methods, approaches and kinds of work; and/or
- (3) That it may be desirable to select redundant or complementary efforts; and
- (4) That it is desirable to select proposals which assure small and/or minority business the opportunity to participate in this project.

Proposers should recognize that the programmatic considerations of this RFP are beyond the control of the offeror. Therefore, some very good proposals may not receive an award because they do not fit within the mix of projects which maximizes the probability of achieving the goals of this RFP.

STATEMENT OF WORK

NEW THERMAL ENERGY STORAGE CONCEPTS
FOR SOLAR THERMAL APPLICATIONS

OCTOBER 10, 1980

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STATEMENT OF WORK

RP-0-9371

NEW THERMAL ENERGY STORAGE CONCEPTS
FOR SOLAR THERMAL APPLICATIONS

1.0 INTRODUCTION

Major considerations impacting the development of solar thermal power systems for commercial applications are the need to provide continuous operation during periods of variable insolation, to extend operation into nonsolar hours, to buffer potentially harmful transients of abrupt changes in insolation, and to ensure power availability in emergency periods. Two options exist for meeting these requirements: conventional fuel backup systems and energy storage. Backup systems provide a viable near-term solution, but as conventional fuel supplies become more expensive or of limited availability, thermal energy storage will assume an increasingly important role.

The Department of Energy (DOE) has recognized these needs for thermal energy storage and has prepared a draft plan (1) to facilitate the accelerated development of thermal energy storage technologies matched to solar thermal system requirements and scheduled milestones. The Solar Energy Research Institute (SERI) is supporting the implementation of that plan by insuring a technology base is provided to support thermal storage subsystem development for future solar thermal power applications. As described in the joint plan (1), the latter activity includes the definition of new concepts for thermal energy storage; research on new approaches to high temperature thermal energy storage will be supported through this program subelement. Researchers will perform analytical and experimental investigations that will provide information on the cost and performance potential of innovative storage concepts. This request for proposals is seeking subcontractors to support SERI in the latter role.

Subcontracts will be awarded to the subcontractors who propose concepts for which the evidence presented suggests the best cost and/or performance improvements relative to known concepts. In addition, the proposed approach to establishing concept viability and the experience of the subcontractor in demonstrating the potential of new concepts will also be weighed heavily in the selection process.

1.1 THERMAL ENERGY STORAGE DEVELOPMENT PLAN

Currently, first generation thermal energy storage technologies are being developed and will be verified in solar thermal large scale experiments (LSE's) at Barstow, Shenandoah, and other locations. The first generation thermal storage subsystems include dual media oil/rocks and oil thermoclines. The DOE Division of Energy Storage Systems (STOR) and the DOE Division of Central Solar Technologies (CST) have prepared a draft joint multiyear program plan (1) for development of advanced thermal energy storage technologies for solar thermal systems. The development goals of the program are to provide:

- o Second generation storage subsystems offering cost/performance improvements over the first-generation storage subsystems currently being developed for solar thermal power applications.
- o First generation subsystems for those solar thermal applications that presently have no storage subsystems.
- o A technology base to support thermal storage subsystem development for future solar thermal power applications.

The joint program activities were originally organized by storage duration. Three program elements were defined: buffer storage, diurnal storage, and advanced technologies. However, after the release of the original draft plan (1), the program elements were reorganized according to the solar thermal receiver type being employed. Currently, the following seven elements are included in the joint program plan:

- (1) Storage for water/steam cooled collector/receiver
- (2) Storage for molten salt cooled sensible heat collector/receiver
- (3) Storage for liquid metal cooled sensible heat collector/receiver
- (4) Storage for gas cooled sensible heat collector/receiver
- (5) Storage for organic fluid cooled sensible heat collector/receiver
- (6) Storage for liquid metal/salt cooled latent heat collector/receiver
- (7) Advanced storage technologies.

Project applications have been identified for the first six focused elements to provide a focus for storage technology development. The relationship between the first six elements and the project applications is shown in Fig. 1.

The first six focused elements will develop second generation thermal energy storage technologies according to the approach presented in Fig. 2. In the first phase, storage concepts are taken to the point of establishing technical feasibility and assessing the concepts based on general solar thermal system requirements. Small scale laboratory experiments are included in this phase. In the second phase, storage subsystems are defined for the most promising concept(s), and subsystem research experiments (SRE's) are conducted. In the final phase, the thermal storage subsystem will be integrated into an online or new solar thermal power plant or test facility. At the completion of this step, the storage subsystem will be a proven alternative available for retrofit into existing solar thermal systems or ready for incorporation into future solar thermal systems.

The advanced storage technology element, element 7, in the joint plan is concerned with providing a technology base for future focused thermal storage development efforts. As part of this effort, new approaches are supported for reducing the cost and/or improving the performance of thermal energy storage for the six focused development activities. In addition, new thermal energy storage technologies are studied which have potential solar thermal applications beyond the six now contained in the focused development program.

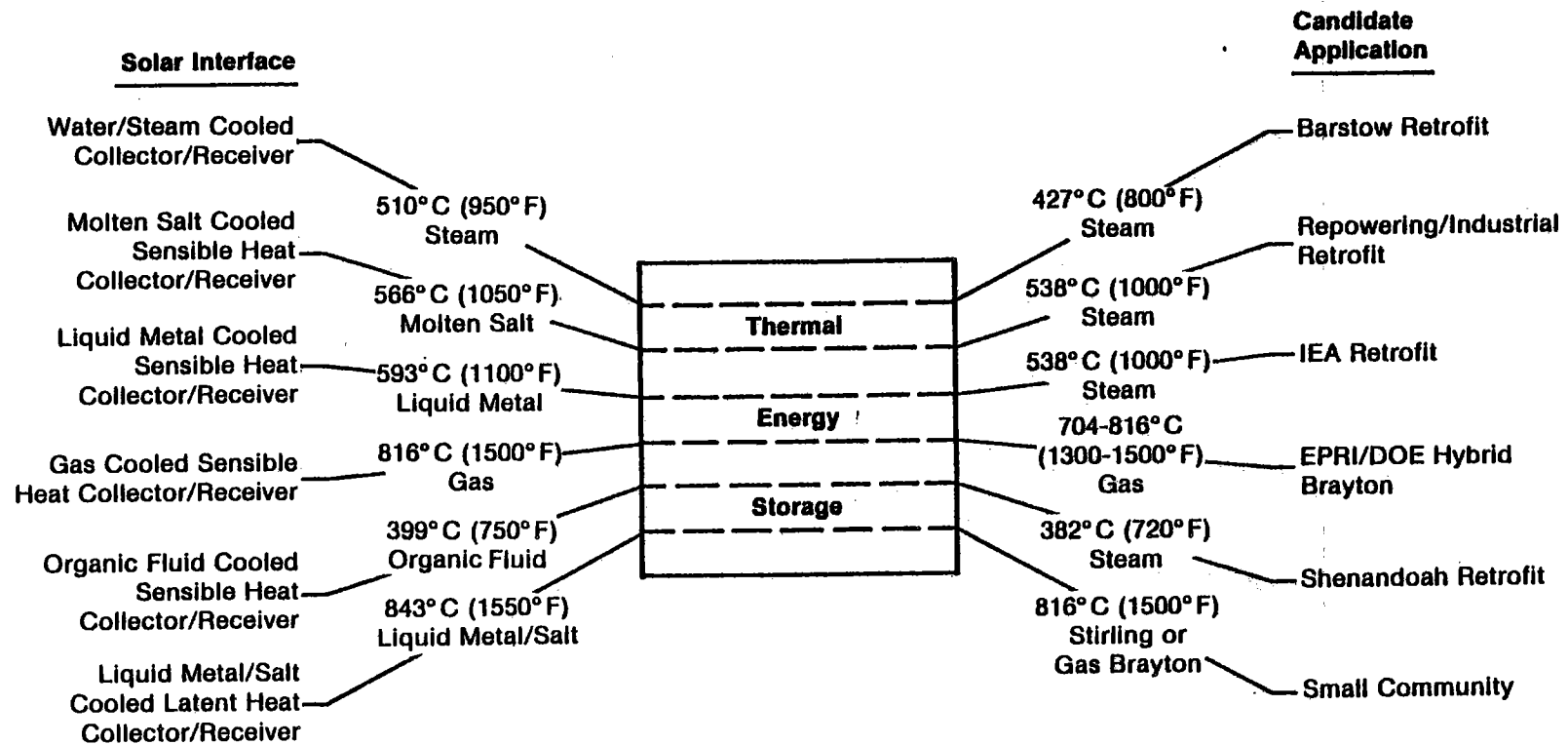


Figure 1. Focused Program Elements and Associated Applications.

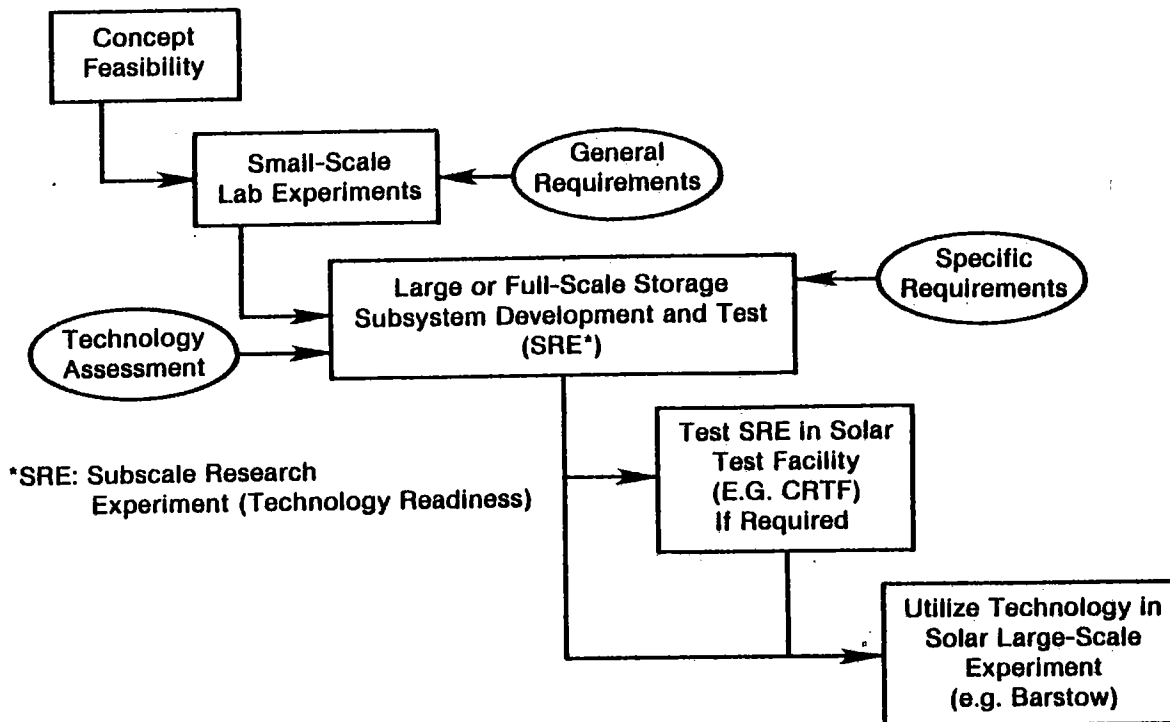


Figure 2. Second Generation Development Approach

1.2 OBJECTIVES OF THIS STUDY

As a result of this procurement, research and/or analyses on innovative thermal energy storage concepts will be funded that accomplishes either or both of the following objectives:

- o offers to provide significant cost and/or performance improvements (~25% or more) over second generation thermal energy storage technologies currently being developed for the six focused program elements.
- o identifies new solar thermal-thermal storage systems with cost and performance improvements over current solar thermal system options in the focused development plan.

1.3 SUBCONTRACT PHASES

The subcontracts awarded as a result of this procurement will be funded in phases. In the first phase of the subcontract (which is the subject of this procurement), it is the intent to fund two or more organizations for one year. During this phase, the subcontractors will perform experimental and/or analytical research to show the technical and economic feasibility of their approach. In the second one year phase, sole source modifications will be employed to continue funding R&D on the concept(s), if any, with the most promise. Finally, if necessary, a third one year phase will be funded to complete thermal storage subsystem definition to the point where judgement can be made as to whether to incorporate the most promising thermal storage concept(s) into the focused development effort of the joint program. SERI reserves the right to competitively bid phase two and three if appropriate.

2.0 SCOPE

The scope of this subcontract is limited to research and/or analyses on innovative thermal storage concepts for which evidence exists that the anticipated

cost and performance surpasses those for current first and second generation thermal storage subsystems for solar thermal applications. To be funded under this procurement, research and/or analyses must be shown to be necessary to resolve the thermal storage cost and performance potential before judgement can be made on whether the concepts should be part of the focused development program. Concepts will not be funded if significant research and analyses have been performed to demonstrate system potential and large scale testing is required to establish feasibility. Such concepts can only be funded as part of the focused development effort, which is not the subject of this procurement.

The first phase of the subcontracts funded through this procurement will consist of a one year study. During that period, the subcontractor(s) will perform the experimental and/or analytical research required to improve the cost and performance estimates for the proposed concept to the maximum extent possible within the resources available. This phase may include any or all of the following activities as well as others not listed: detailed performance analysis, measurement of material properties, experimental system tests, detailed system designs, and economic analyses.

During the first phase of the subcontract, the contractor shall provide SERI with:

- o Monthly progress letters
- o A mid phase progress report
- o A final report on the first phase

The contractor shall also participate in a contractor's review in the Washington, D.C. area as well as a mid-year review at SERI.

3.0 PROGRAM BACKGROUND

3.1 COST AND PERFORMANCE OF THERMAL STORAGE

3.1.1 Cost and Performance Effects

The total cost of a thermal energy storage subsystem can be determined from the cost of the total storage capacity (energy related costs) and the cost of energy removal or addition (power related cost). The energy related cost, C_s , includes the costs of the storage medium, container, insulation, and any other items associated with the actual storage of thermal energy. The power related cost, C_p , takes into account the price of heat exchangers, pumps, plumbing, heat transfer fluids, and any other items required to transfer heat to and from storage. For a storage capacity of h hours, the total storage subsystem cost, C_t , is calculated as:

$$C_t = C_p + C_s h$$

In order to quantitatively assess the applicability of a storage concept, accurate knowledge of C_p and C_s is needed.

The cost of thermal storage is usually a small fraction of the total cost of a solar thermal plant (~10%). Therefore, significant reductions in thermal storage cost are required to have a substantial impact on the delivered energy cost from the system. Cost reductions of about 25% or more are generally required for thermal energy storage to justify committing substantial resources to developing a thermal energy storage concept.

The characteristics of the energy delivered from thermal storage can have a more significant impact on the price of the energy from the solar thermal-thermal storage system than the cost of storage. If the quantity of thermal energy from storage is less than that charged to storage, an extra price must be placed on the delivered energy from the system to pay for the energy lost

in passing through storage. This charge for "lost" energy is beyond that needed to pay for the thermal storage system itself. Obviously, the greater the losses of energy from storage, the greater the delivered energy cost penalty with the result that systems with low efficiencies ($\sim < 50\%$) will probably not be acceptable while high efficiency storage systems ($> 90\%$) will be desirable.

Another important aspect of thermal energy storage for solar thermal applications is the temperature of the thermal energy delivered from storage. Solar thermal receivers are designed to produce output temperatures matched to the application requirements. However, when storage is placed between the receiver and the load, temperature drops must be provided between the receiver and storage and between storage and the load in order to transfer heat. Therefore, the receiver must be either operated at a higher temperatures when charging storage than when operating direct to the load or a lower temperature must be produced at the load from storage than when operating directly from the receiver. To complicate matters further, some thermal storage systems may require a continual drop in storage temperature with time, e.g., sensible heat storage, or the discharge cycle may occur at significantly lower temperatures than the charge cycle, e.g., thermochemical storage. Storage systems also have temperature limits imposed by material properties such as degradation temperatures for the fluids or solidification of the media which limit temperature swings for storage.

Limitations in temperatures from storage adversely affect the economics of the solar thermal system. If the temperature from storage is less than when operating directly, heat engines will run less efficiently; and less work will be produced per unit energy from storage than when operating directly. Alternatively, the temperature of the fluid from storage may not be adequate for applications which utilize process heat. If the receiver temperature is raised to make higher outlet temperatures from storage possible, the receiver efficiency will drop; and less energy will be available from storage per unit input of energy in the collector fluid.

The implications of these considerations are obvious: a thermal storage device is needed which is efficient, has low cost, and provides a high quality of thermal energy. Of course, due to practical constraints, tradeoffs must be made between these factors to arrive at the lowest possible delivered energy cost from the integrated solar thermal-thermal storage system. Quantitative tradeoffs between thermal storage characteristics are beyond the scope of this discussion, but a methodology has been developed for identifying thermal storage systems which have potential to lower delivered energy costs (2,3).

3.1.2 Cost and Performance Goals

Cost and performance goals have been defined for the six focused development elements of the joint Thermal Energy Storage for Solar Thermal Applications Program as shown in Table 1. These goals assume fully developed storage technologies incorporated into large commercial systems and represent the lowest achievable total capital cost consistent with system performance requirements. The goals are based on the results of studies of commercial solar and conventional power systems that incorporate thermal energy storage. The cost goals are based on 1979 dollars. The application heading in the left column refers to the demonstration experiments that will be used to prove the technology.

Cost goals have also been determined for thermal energy storage in solar thermal electric plants based on value (2). In this approach, value is a measure of the worth of the thermal storage technologies; i.e., what the user is willing to pay for thermal energy storage as measured by the cost of conventional fuel systems. Preliminary data on thermal storage value for buffer, diurnal, and long-term storage for solar thermal bulk electric power applications are presented in Table 2 in 1976 dollars.

The value of buffer storage (less than one hour storage capacity) in the table is sufficiently high that the lowest obtainable costs are more useful cost goals. The value of buffer storage is high because harmful transients are prevented which could damage the generating equipment. The value of diurnal

storage (about 3 to 12 hours of storage capacity) depends on the solar insolation data for the site. In Table 2, the high insolation site is Inyokern, California; the medium insolation site is Midland, Texas; while the low insolation site is Seattle, Washington.

Barstow technology was used to generate the data of Table 2, and the storage system efficiency was 70%. Higher storage efficiencies would result in a higher value for storage while lower efficiencies produce lower storage values, as expected from the previous discussion in this Section. The value data in \$/kWe of Table 2 must be divided by the storage duration and increased to 1979 dollars to produce the same cost goal units as in Table 1; the storage duration as defined is the number of hours for which the plant can be operated at full capacity from storage.

Cost goals are also presented in Table 2 for long duration storage. As shown in the table, long duration storage cost goals are not a significant function of location but are strongly dependent on the storage efficiency. Since storage durations on the order of 100 to 1000 hours are needed for long duration storage, very inexpensive storage concepts are required for long duration storage. This requirement exists because the competition for a solar thermal electric plant with long duration thermal energy storage are baseload coal and nuclear fueled plants while short storage durations compete with the high fuel costs of peaking plants. It should be noted that the cost goals for long duration storage were calculated on a basis that tends to overestimate the value of storage; and the goals of Table 2 therefore, tend to represent an upper limit on allowable costs.

3.2 FIRST AND SECOND GENERATION THERMAL STORAGE CONCEPTS

Table 3 provides a list of the first and second generation thermal storage systems being currently considered for the six focused development activities. The following narrative briefly describes each. In this discussion, first generation storage refers to storage systems already under development while

second generation denotes storage systems receiving R&D to replace the first generation concepts.

3.2.1 Thermal Storage for Water/Steam Receivers

The goal for the first element is to develop a second generation storage subsystem for a Barstow retrofit application. This development will also find application in other sectors such as repowering/industrial retrofit and total energy projects. The first generation storage subsystem for the 10 MW_e Barstow pilot plant is a sensible heat oil/rock thermocline storage concept. A major constraint of this technology is the reduction in the temperature and pressure of steam generated from storage compared to that which is available directly from the receiver. This constraint reduces the plant thermal efficiency and electrical output when operating from storage. An additional concern is high fluid maintenance costs (replacement of fluid lost by thermal decomposition) dictated by the need to operate the storage media at or near its maximum operating temperature.

Subsystem development tests for the first generation Barstow storage technology are virtually complete. They have included long-term stability, compatibility, and fouling tests on various oil storage media candidates and a 4 MWH_t subscale research experiment (SRE). Work to be completed early in FY80 includes investigations of fluid maintenance (sidestream processor) techniques and a small effort to study the effect of temperature cycling on rock strength.

Second-generation storage development will emphasize the study of higher temperature storage media with low initial and replacement costs. The plan also provides for the study of storage techniques to reduce the required quantities of components which may have desirable high-temperature properties but are costly. The key milestones are:

- o Recommendations on candidate technologies, February 1981
- o Complete SRE; technology readiness, November 1983

- o Complete Barstow retrofit, May 1986

3.2.2 Thermal Storage for Molten Salt Receivers

The second element will provide support for and advanced alternatives to the molten salt storage subsystems under development for a repowering/industrial retrofit application. Other potential applications include IEA and Barstow retrofit projects.

The first generation storage subsystem for an advanced central receiver system used molten draw salt storage media with externally insulated hot and cold tanks. A number of technical issues have been raised in the development of the first generation systems. Containment materials lifetime issues are currently being addressed by the advanced central receiver system development team; storage media lifetime/maintenance issues are being studied to a much smaller extent. Additional efforts directed at the resolution of the remaining technical issues will be performed within the framework of this element.

The high storage media operating temperature of this application [566°C (1050°F)] requires expensive containment materials. Second-generation storage development will therefore be directed toward low-cost containment techniques, in particular, internally insulated containment vessels. Compatibility tests of draw salt and insulation materials are already underway as part of the advanced central receiver development program. Additional studies of candidate materials will be performed, if required; pending identification of a suitable material, an SRE will be designed, fabricated, and tested.

Identification of a technically feasible low cost containment technique by early FY80 is required if it is to be considered for this application; otherwise the first-generation storage subsystem technology will be used. Storage for an industrial process heat application may require additional development as previous work emphasized electrical power applications with steam Rankine conversion cycles that operate at about 540°C (1000°F). Key milestones are:

- o Recommendations on candidate technologies, January 1980
- o Complete SRE; technology readiness, September 1981
- o Complete repowering/industrial retrofit, July 1985

3.2.3 Thermal Storage for Liquid Metal Receivers

The goal of the third element is to develop a second-generation storage subsystem for an IEA¹ retrofit application. Another potential application is the repowering/industrial retrofit project. The first-generation storage subsystem for advanced central receiver systems as studied uses liquid sodium as the storage media with externally insulated hot and cold tanks. Subsystem development for the first generation system has emphasized electrical power applications with steam Rankine conversion cycles that operate at about 540°C (1000°F). This development is complete with no additional work required.

The first generation storage subsystem, because of the low density and heat capacity and high media cost of sodium, has a high energy-related cost. As was the case with the molten salt system, a high operating temperature [593°C (1100°F)] requires expensive containment materials to minimize thermal fatigue due to temperature cycling. Development of second-generation systems will therefore emphasize low-cost containment techniques, such as internal insulation. In addition, this study will include the technical and economic feasibility of interfacing storage subsystems of lower capacity cost, such as molten salt or air/rock, with a liquid metal collector/receiver via an intermediate heat exchanger.

The storage development plan leads to an IEA retrofit application by mid FY87. Second-generation storage technology may also be available for the first repowering/industrial retrofit application if a large scale SRE is not required. Key milestones are:

¹IEA is the International Energy Agency.

- o Recommendations on candidate technologies, February 1982
- o Complete SRE, technology readiness, November 1985
- o Complete IEA retrofit, May 1987

3.2.4 Thermal Storage for Gas Cooled Receivers

Element four addresses the development of a storage subsystem for a EPRI²/DOE hybrid Brayton system retrofit. Other applications include a repowering/industrial retrofit project and a small community system project.

The first-generation EPRI/DOE system concept uses a fossil energy source but has no energy storage. The primary goal of this element is to develop an energy storage subsystem capable of operating at temperatures up to 816°C (1500°F) and compatible with the existing subsystems. A conceptual design of a refractory brick thermocline storage subsystem has been completed as part of the advanced central receiver program. This concept is a candidate for the retrofit project but may require experimental verification. The concept uses welded steel containment vessels, which due to the high temperature [816°C (1500°F)] and high pressure [3.4 MPa (500 psi)] operation, are very costly. Development will emphasize verification of thermocline performance, low cost storage media (e.g., rocks), and low cost containment techniques, in particular internally insulated, prestressed cast iron containment vessels.

A small scale storage system for a dish mounted collector is also under development. A conceptual design of a refractory brick thermocline system has been completed as part of the small community systems program. Fabrication of a test module is scheduled for completion by the end of FY79 with testing completed by mid FY80.

The storage development plan leads to an EPRI/DOE hybrid Brayton retrofit by the middle of FY86. Key milestones are:

²EPRI is the Electric Power Research Institute.

- o Recommendations on candidate technologies, February 1981
- o Complete SRE; technology readiness, November 1983
- o Complete EPRI/DOE retrofit, May 1986

3.2.5 Thermal Storage for Organic Fluid Receivers

The fifth element will provide support for and advanced alternatives to storage subsystems under development for midtemperature solar thermal applications, such as irrigation, Shenandoah, repowering/industrial retrofit, and Fort Hood. In addition, the dual media (oil, rock) thermocline system development for Barstow, (element 1) is applicable to this element. First generation organic fluid thermocline systems have been designed and built for irrigation applications (Willard, NM and Coolidge, AR). Operational testing indicates the need for further development before an acceptably efficient system can be considered ready for commercial deployment. The analyses and laboratory and field scale testing will therefore include thermocline stability in large tanks, fluid inlet and outlet diffuser designs, feasibility of a driven piston separating hot and cold regions, storage subsystem control, and the effect of system off-design performance on the thermocline storage subsystem and its subsequent effect on the performance of other components and subsystems with which it interfaces. This activity will be completed by the end of FY81, at which time concept characterization of the dual media (oil/rock) thermocline systems will be initiated. Concept characterizations similar to those for the oil thermocline system will be performed with completion scheduled for mid FY83. Storage subsystem application handbooks for use by system designers as implementation tools for each concept judged feasible is a principal output of each activity. This work will be performed at the Sandia Midtemperature Solar Systems Test Facility (MSSTF).

The first generation storage subsystem for the Shenandoah project employs a silicone oil/taconite thermocline storage concept with operating temperatures up to 399°C (750°F). Because the silicones are expensive fluids, a trickle storage concept is under consideration. This is a modification of the dual-media concept in which, by modularizing small rock or taconite and oil units

within a single container and following a sequential mode of operation with these modules during charge and discharge cycles, the quantity, and therefore the cost, of the required organic fluid is a small fraction of that required in a nonmodified configuration.

Development tests for these applications have emphasized stability and compatibility of heat transfer fluids and solid storage media, such as taconite or rocks. A laboratory test of the trickle storage concept has been performed. Testing to assess the effects of operating the storage media at elevated temperatures for long periods of time are ongoing and will continue into the first quarter of FY80. Consideration is being given to providing Shenandoah with a storage subsystem capable of operating in either the trickle or dual-media mode. This capability precludes the need for a SRE test of the trickle storage concept.

The aim of second-generation storage development will be to provide an improved storage subsystem for a Shenandoah retrofit application. Emphasis will be placed on an evaluation of alternative, less costly, organic fluid candidates and alternate storage concepts, in particular, latent heat storage.

The storage development plan will lead to a completed Shenandoah retrofit by early FY86. Key milestones are:

- o Recommendations on candidate technologies, February 1981
- o Complete SRE; technology readiness, April 1983
- o Complete Shenandoah retrofit, November 1985

3.2.6 Thermal Storage for Liquid Metal/Salt Latent Heat Receivers

Element six addresses the development of a storage subsystem for a small community system using a dish-mounted power conversion cycle. A storage subsystem under consideration for the small community system project uses a storage module mounted directly on a collector dish or in the counterweight position. A liquid metal or salt heat pipe receiver transfers thermal energy to the

storage module. This concept requires that the modules be small, lightweight, and configured to cast minimum shadow. Storage durations are necessarily limited to a few hours even with a high density latent heat technology, such as NaF-MgF₂.

Activities in the development of the concept will focus on an evaluation of latent heat storage media. Media stability and containment materials compatibility will be studied in the temperature range, 649 to 816°C (1200 to 1500°F) to match present Stirling and Brayton system requirements. The storage development plan leads to applications for a small community system. Key milestones are:

- o Recommendations on candidate technologies, February 1980
- o Complete SRE; technology readiness, November 1981
- o Complete small community system, May 1984

3.3 SCREENING OF THERMAL STORAGE OPTIONS FOR WATER/STEAM AND ORGANIC FLUID RECEIVERS

A preliminary analysis has been recently completed of thermal energy storage options for use in elements one and five of the joint plan (3). In this analysis, the cost and performance of a number of known thermal energy storage options were estimated; and the effect of the thermal storage cost and performance on solar thermal delivered energy costs were estimated based on a ranking methodology developed previously (2).

A baseline solar thermal system design was selected for both focused development elements. The McDonnell Douglas design of a 100-MW_e plant (Barstow scale-up) was selected as representative of water/steam receiver systems. The General Electric designed Solar Total Energy Large-Scale Experiment at Shenandoah, Georgia, was selected as representative of organic fluid receivers. Detailed design information is available for both of these systems. Both designs included a storage system: a dual-media oil/rock

thermocline system for the water/steam plant and a trickle charge oil/taconite system for the organic fluid receiver system.

Several alternate storage systems were designed for each of the baseline systems. The alternate systems were required to accept the charging and discharging fluid at the same rate as the baseline storage systems. The alternate storage system designs included molten salt, dual-media molten salt, two-stage salt, and phase change salt concepts. A total of seven alternate storage systems were designed for the water/steam receiver system and five for the organic fluid receiver system. If an alternate storage system provided steam at a higher (or lower) temperature and/or pressure, the increased (or decreased) plant electrical output was calculated.

Costs for the baseline and alternate thermal storage systems were calculated with a consistent set of cost algorithms; e.g., all of the storage tank costs were calculated with the same equation. Performance was similarly analyzed e.g., the same pinch point temperature differences.

The alternate thermal storage systems were compared to the baseline thermal storage system based on changes in the cost of energy delivered from the solar plant. The change in the cost of the energy produced by the baseline plant with a baseline storage system was calculated for each alternate storage system. The analysis accounts for the differences in thermal storage system costs and first and second law efficiencies due to the alternate storage system.

For the water/steam receiver application, a dual-media molten salt storage system (molten salt with inexpensive solid) produced the lowest energy cost for buffer storage. For diurnal storage, a two-stage system (dual media oil/rock low-temperature stage and a dual-media molten salt/ low-cost media high-temperature stage) produced the lowest energy cost. Both of the above, however, were only marginally lower than the baseline dual-media oil/rock. Phase change concepts require technical breakthroughs beyond the identified approach before they will be economically attractive.

For the organic fluid receiver application, a lower energy cost was obtained by replacing the taconite in the baseline system with a low-cost medium. Such a medium could be waste glass. Salt concepts were found to be competitive with the oil/taconite trickle charge concept only if the application requires a very large quantity of storage. As with the water/steam receiver application, the phase change concept studied was not competitive economically with the sensible heat concepts.

Several general conclusions and recommendations are drawn from the study. The baseline dual-media oil/rock and tricle charge oil/taconite systems are very good, and their further development is recommended. The alternate systems that are economically competitive require the use of a low-cost medium compatible with the working fluid (molten salt or Syltherm). Research to find such media is recommended. The phase change concepts, although not economically competitive in the systems studied, offer significant potential increases in efficiency for water/steam systems. Research on phase change systems is recommended to solve the identified problems in heat transfer and material costs.

3.4 RESEARCH NEEDS OF THE PROGRAM

Although analyses have not been performed yet for the other four focused program elements, similar conclusions are likely. Sensible heat storage has immediate promise; the need is for low cost media such as rock which can be used in direct contact with the minimum possible amount of a low cost heat transfer fluid. The fluid-rock combination should be capable of reaching the maximum receiver temperature without significant degradation.

For sensible heat storage, "direct" storage systems are generally most economical. In such a case, the fluid employed in the receiver is stored in a large tank until heat is required. Heat exchangers, which are required when a secondary fluid is used for storage, are thereby eliminated for direct storage. The problem then becomes one of finding suitable low cost fluids for both storage and collection of solar thermal energy. Such fluids may well be other

than considered in the six focused development elements. In addition, inexpensive vessels for containing the fluid are needed as are low cost options for providing high temperature energy from storage to maximize the work production capability. If direct storage is not cost effective, low cost heat exchange with the storage media is required to achieve low costs.

Significant thermal storage improvements are particularly needed at very high temperatures (~1500°F or above). Thermal storage in this temperature range can be used to supply heat to high efficiency Brayton and Stirling cycle engines. Costly storage vessels and heat exchangers are required to withstand such high temperatures. If direct contact heat exchange is utilized between the heat carrier fluid and the storage media (e.g., refractory brick), the containment vessel must also be capable of operating at the generally high pressures associated with the hot gases. Innovative system configurations, low cost containment approaches, or new storage concepts might be devised to lower the cost of very high temperature storage.

Latent heat energy storage suffers two major cost penalties. First, the costs of pure materials is high relative to competing sensible heat media such as rocks. Secondly, heat exchange from the media requires extensive surface area (at high cost) to provide adequate heat transfer through the solidifying material by conventional shell-and-tube devices. New approaches to latent heat storage are required to overcome these limitations.

An area of interest in the long term is for long duration thermal energy storage subsystems. At this time, only two known options are of potentially low enough cost to be reasonable candidates for baseload storage: air-rock storage and thermochemical storage. For the air-rock system, the heat transfer limitations of air raise serious doubts about the ability to obtain low power related costs and the containment costs may also be too high. For thermochemical storage, only a few compounds are known to have low enough materials costs to be considered. However, gases are involved during known high temperature reactions. If the gases can be easily condensed for storage at ambient conditions, the heat of condensation, a substantial fraction of the stored energy, is released at a temperature which is too low for use in the solar

thermal system. Therefore, when the liquid(s) are used to regenerate heat by the exothermic reaction, the quantity of thermal energy produced is far less than that used to drive the endothermic reaction (4). If the gases do not condense, the price of gas containment, with or without compression, is probably too high for thermochemical storage to be cost effective. New alternatives which offer to meet the low cost requirements of long duration storage but promise to overcome the difficulties of the known concepts are of interest to this procurement.

Thermal transport of energy is of significant concern. As the temperature of receiver operation rises, movement of the thermal energy from the collector to storage and/or to the load becomes increasingly difficult. Some research and analyses have been done in using reversible reactions with only gaseous reactants and products for ambient or near-ambient temperature transport, but only a few reasonably promising reactions have been identified. For such reactions, cost and efficiency problems have cast doubt on this approach. A need exists to devise new transport approaches for high temperature users. Such ideas might include better fluids, cheaper pipelines, low cost insulations, or entire new concepts.

4.0 PROPOSAL REQUIREMENTS

4.1 COST AND PERFORMANCE ESTIMATES

To be funded, the proposer must show the cost advantages of the concept proposed. Since the objective of this procurement is to develop innovative approaches to thermal energy storage and transport, many of the concepts proposed will not be satisfactorily understood to calculate the power related cost C_p and the energy related cost C_s meaningfully. The concepts proposed are also anticipated to be at considerably different stages of subsystem definition and the time for response to this solicitation is limited. Therefore, substantially different levels of detail are expected in the cost analyses presented. To treat such systems on a common basis, primary emphasis will

be placed on the proposer's ability to explain why the cost of the proposed concept is expected to be significantly better than the concepts now under development. In the following narrative, the minimum requirements to be included in the proposed are enumerated. Of course, the more accurately the proposer can demonstrate such a cost advantage, the better the proposal reviewers can judge the subsystem potential.

In the energy related cost, the impact of many items is readily determined. The cost of the storage media proposed shall be documented with reference to the source of the pricing information. Wherever possible, the proposers shall use the Chemical Marketing Reporter of June 16, 1980 for this information. If the proposer feels a lower price is possible than quoted in this source, the alternate price shall be quoted and justification given for its use. However, the cost quoted in the specified Chemical Marketing Reporter must still be included. All costs shall be in 1980 dollars.

In addition to providing an estimate of the storage media cost, the proposer shall indicate what containment materials are expected to be needed and the probable impact on system cost. For instance, the storage media proposed might be storable in high temperature ceramic vessels with significant cost reductions over a stainless steel container needed for the competing current technology. Documentation and references shall be included to support such claims to the extent possible and the cost of the containment vessel material proposed shall be quoted with appropriate references. Any other advantage expected in the energy related costs such as reduced insulation costs or smaller vessel sizes shall be stated along with satisfactory supporting evidence. If such differences are not explained and supported, the proposal reviewers will be free to use their best judgement.

Power related costs are generally more difficult to estimate since a more detailed system design is required. At the development stage of the concepts requested, such a detailed design is expected to be subject to considerable uncertainties. Therefore, the proposer shall state his judgement of power related costs relative to the reference systems now under development. Such

statements, however, shall be substantiated by supporting evidence. For example, better heat transfer coefficients may be possible with the proposed concepts or a larger temperature change may be possible across the heat exchanger thereby reducing power related costs. In such examples, the basis for the claim shall be clearly shown together with appropriate references or other supporting data. The estimated significance of the change shall also be shown.

Once again, it is recognized that the respondees to this procurement will be somewhat handicapped in their ability to specify the proposed storage subsystem efficiency. However, the proposer shall state the material limitations for the concept presented along with evidence to support the points presented. The proposer shall also state any advantages that are possible in performance for the proposed concepts such as higher temperature capability, constant high temperatures from storage, low thermal losses from storage, etc. Alternately, the proposer shall explain why storage costs are so low that lower efficiencies are tolerable.

4.2 PROPOSED RESEARCH

The proposer shall state why research is necessary on the proposed concept. An explanation shall be given of the technical uncertainties which hinder accurate assessment of the concept for inclusion in the focused development activities. No proposed research shall be funded if sufficient data exists to identify its potential now.

The proposer shall state the proposed research program and why it is necessary to resolve the concept uncertainties. The proposed research may consist of any or all of the following activities as well as others not listed: detailed performance analyses, measurements of material properties, experimental tests, detailed system designs, and economic analyses. The proposer shall state why accomplishment of the research will better define the concept potential in the near future. The proposer shall also state when the research will be

sufficiently completed to allow a better assessment of the practical value of the concept.

The proposer shall outline the research program in sufficient detail for reviewers to assess the scientific merits of the proposed approach and to evaluate the proposed procedures. For instance, if the proposed program includes measurements of material thermal conductivities, the proposer must not simply state that "the thermal conductivity will be measured". Instead, the procedure shall be outlined together with identification of the instrument to be used and how the data shall be interpreted. Similarly, if analyses are proposed, the reviewer shall state what the basis is for the analyses. This statement shall include identification of such items as storage charge and discharge rates, storage capacity, etc. The proposer shall specify key decision points in the proposed program.

The proposed research need not be performed at high temperatures. For a variety of reasons, low temperature experiments may be more economically performed and provide better data. However, in such cases, the proposer must clearly explain the value of the research and how it can be utilized for high temperature storage.

The length of the proposal shall be less than thirty (30) pages, double spaced, typewritten. The proposal shall not restate the background information on the joint program plan presented herein or explain the needs for low cost or high efficiency storage. The proposal shall address the requirements identified in Section 4.0 as well as any other information the proposer believes is necessary to support the proposed activity. The proposer shall also include information necessary to judge the proposal according to the attached criteria.

4.3 PROPOSED PERSONNEL, EXPERIENCE, AND COST

Approximately one person year of professional effort is requested for phase one of this project. Professional persons include managers, engineers,

scientists, cost analysts, technicians etc. who will directly work on the proposed studies. In the case of a college or university, graduate students and post doctoral researchers are also considered as professional personnel for this procurement. Nonprofessional personnel are defined as secretaries, administrative support personnel, graphic artists, undergraduate students, etc. Nonprofessional personnel may be be charged directly or indirectly to the proposed study, but their time will not be considered as part of the professional effort.

The proposers shall identify by name a Principal Investigator (PI) for the proposed study. The PI shall be responsible for the implementation and technical quality of the research. The PI shall serve as the single point contact for the SERI technical monitor for all technical matters and the financial status. If the PI must be replaced during subcontract performance or prior to subcontract go-ahead, the subcontractor shall state the reason for the replacement, shall identify the replacement PI, and shall provide SERI with the new PI's resume. No replacement of the PI shall be made without written approval by SERI subject to subcontract termination.

The proposers shall include person hours by task and by labor category in the proposal. A chart shall be included showing personnel loading with time. The proposers shall include data for the evaluation of the proposer's experience in all areas important to the proposed research.

4.4 EVALUATION PROCEDURE

The proposal shall include a detailed breakdown of the budget. In selecting a subcontractor, the proposals will be ranked in order of excellence according to the attached criteria found in Section IV taking into account the program policy factors. Although SERI will establish the technical scores before the cost proposals are opened, SERI reserves the right to revise the technical scores and groupings based on any additional information received during proposal evaluation and/or negotiation.

5.0 DOCUMENTATION

The subcontractor shall deliver the documentation specified in Table 4.

5.1 DOE CONTRACTOR'S REVIEW

In about October, 1981, the subcontractor shall summarize his results in the DOE Annual Thermal Storage Contractor's Review which is held in the Washington, D.C. area. Before the review, copies of all preprints, viewgraphs, handouts, and other appropriate back-up material required for the meeting shall be delivered to SERI or the appropriate organization specified by SERI for the use of all attendees at the review. This information shall be provided as required to meet the review schedule. The SERI technical monitor will provide written acknowledgement of receipt of these data upon their delivery. The copies will be distributed to attendees at the meeting including representatives from DOE, SERI, national laboratories, subcontractors, and others invited by DOE.

5.2 MONTHLY PROGRESS LETTERS

Status letters shall be prepared and submitted monthly. Both financial status and study status shall be reported. The study status shall describe significant accomplishments, problems, and schedule. The study status letter shall not exceed three single spaced typewritten pages in length. Financial status information shall be in a form approved by the SERI's Contracts Branch.

5.3 MID PHASE PROGRESS REPORT

The mid phase progress report shall report significant data, accomplishments, problems, and schedule status. The report shall be not less than 3 single spaced typewritten pages nor more than 15 such pages in length. The report shall be delivered two weeks prior to the end of appropriate government fiscal year quarters appropriate for the subcontract start date (i.e., 31 December, 31 March, 30 June or 30 September).

5.4 FINAL REPORT

The subcontractor shall prepare a final report documenting all aspects of the first phase of the study. The report shall clearly present all results of the first study phase. The report shall also document the latest data on cost and performance and include system schematics for the thermal storage concept studied. A conceptual description of the thermal storage concept considered shall be included. A draft of the final report shall be prepared and submitted to SERI for review within four weeks of the contract completion date. Within three weeks, SERI will provide comments and recommended changes in the report. The subcontractor shall make appropriate changes and deliver the final report within three weeks.

5.5 OTHER REVIEWS

The subcontractor shall attend a review at SERI or another site specified by SERI in about the third quarter of FY81. Informal meetings will also be held at the subcontractor's facility as deemed necessary to monitor progress and assess performance.

6.0 REFERENCES

1. U.S. Department of Energy, Division of Energy Storage Systems and Division of Central Solar Technology, "Thermal Energy Storage Technology Development for Solar Thermal Power Systems: Multiyear Program Plan", Draft. Washington, D.C., March 13, 1979.
2. Copeland, R. J., "Preliminary Requirements for Thermal Storage Subsystems in Solar Thermal Applications", SERI/RR-731-364, Solar Energy Research Institute, Golden, CO. April 1980.
3. Copeland, R. J., M. E. Karpuk, and J. Ullman, "A Preliminary Screening of Thermal Storage Concepts for Water/Steam and Organic Fluid Solar Thermal Receiver Systems", SERI/TR-631-647, Solar Energy Research Institute, Golden, CO. April 1980.
4. Wyman, C. E., "Thermal Energy Storage for Solar Applications: An Overview," SERI/TR-34-089, Solar Energy Research Institute, Golden, CO. March 1979.

TECHNICAL EVALUATION CRITERIA
July 21, 1980

Factor	Score ^a	
	Maximum	Minimum
I. Scientific/Technical Approach	45	30
A. Technical and Economic Merits of Proposed Concept		
B. Degree of Innovation Proposed ^b		
C. Applicability to Solar Thermal Power Sys. ^c		
D. Soundness of Technical Approach		
II. Qualifications of the Proposer	25	14
A. Related Technical Expertise		
B. Technical Organization		
C. Appropriate Facilities/Equipment		
D. Support Services		
III. Past Experience with Proposer	10	6
A. Technical Ability		
B. Quality of Performance		
C. Compliance with Schedule		
D. Cost History		
E. Correction of Faults		
IV. Cost	20	

^aThe proposer must achieve the minimum score in all categories to be acceptable.

^bUp to 5 negative points will be assigned in this category if the proposed concept is judged to be well understood currently.

^cUp to 5 negative points will be assigned to this category if the concept is judged to have little, if any, application to solar thermal systems.

Table 1. THERMAL ENERGY STORAGE PERFORMANCE AND COST GOAL SUMMARY (FY79 DOLLARS)

Application ^a	Solar Interface	Round Trip Efficiency		Capital Cost		Improvement (%)
		First Generation (%)	Second Generation (%)	First Generation (\$/KWh)	Second Generation (\$/KWh)	
Barstow	Water/Steam Collector/Receiver	70	80	46	35	24
Repowering	Molten Salt Collector/Receiver	98	98	28	14	50
IEA	Liquid Metal Collector/Receiver	98	98	100	43	57
EPRI/DOE Hybrid	Gas Collector/Receiver	80	80	88	61	31
Shenandoah	Organic Fluid Collector/Receiver	96	96	51 ^b	25 ^b	51
Small Community	Liquid Metal/Salt Collector/Receiver	TBD	TBD	TBD	TBD	TBD

^aApplications shown are all electrical power generating systems except for the total energy Shenandoah system. Performance and cost goals will be established for process heat applications pending completion of conceptual design studies in FY80.

^bBased on KWh_t; costs for other applications are based on KWh_e.

Table 2. PRELIMINARY COST GOALS FOR THERMAL STORAGE IN SOLAR
THERMAL ELECTRIC PLANTS

(1976 \$/KW_e)

Quantity of Storage	High Insolation	Medium Insolation	Low Insolation
Buffer	Established by Obtainable Cost		
Diurnal			
3 Hours	255	120	60
6 Hours	300	180	90
9 Hours	-	225	110
Long Duration			
62% Efficiency	230	210	180
100% Efficiency	695	620	515

Table 3. DESCRIPTION OF FIRST AND SECOND GENERATION THERMAL ENERGY STORAGE TECHNOLOGIES

Application ^a	Solar Interface	Storage Technology	
		First Generation	Second Generation
Barstow	Water/Steam Collector/Receiver	Oil/Rock Thermocline	Salt, Trickle Oil
Repowering	Molten Salt Collector/Receiver	Molten Salt with External Insulation	Molten Salt with Internal Insulation
IEA	Liquid Metal Collector/Receiver	Liquid Metal with External Insulation	Molten Salt or Liquid Metal with Internal Insulation, Air/Rock
EPRI/DOE Hybrid	Gas Collector/Receiver	Refractory Brick with Welded Steel Tank	Refractory Brick with PCIV
Shenandoah	Organic Fluid Collector/Receiver	Oil/Rock Thermocline	Salt, Trickle Oil
Small Community	Liquid Metal/Salt Collector/Receiver	Refractory with Welded Steel Tank-Ground Based	Latent Heat Salt-Dish Mounted

^aStorage development for these representative applications is emphasizing second generation technology development. First generation technology development will be initiated during FY80 on additional applications, such as industrial retrofit process heat.

Table 4. DOCUMENTATION REQUIREMENTS

Document	Due Data at SERI	Number of Copies	Number of Submittals
1) DOE Contractors Review	Before review	3	1
2) Monthly Status Letters			
a) study status	At monthly intervals beginning	10	12
b) financial status	the first month after go-ahead		
3) Mid-phase Progress Report	Two weeks prior to the end of the Appropriate Government Fiscal Year Quarter	10	1
4) Final Report			
a) Draft	13 months after go-ahead	10	1
b) Final	14 months after go-ahead	100	1

ENCLOSURE VI

PRO FORMA SUBCONTRACTS

- A. Cost Reimbursable**
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INSTITUTIONS

APPENDIX E - CLAUSES FOR SUBCONTRACTS IN
EXCESS OF \$500,000

SUBCONTRACT NO.
BETWEEN
MIDWEST RESEARCH INSTITUTE
MANAGER-OPERATOR OF
THE SOLAR ENERGY RESEARCH INSTITUTE
AND

SCHEDULE

INTRODUCTION

THIS SUBCONTRACT, is effective upon execution between The Midwest Research Institute acting through its Solar Energy Research Institute Division (hereinafter called the "SERI"), and (hereinafter called the Subcontractor") whose principal offices are located in

MIDWEST RESEARCH INSTITUTE entered into Contract No. EG-77-C-01-4042 with the Department of Energy (hereinafter called the "DOE") an agency of the U. S. Government (hereinafter called the "Government") for the operation and management of the National Solar Energy Research Institute.

This subcontract is entered into in furtherance of the performance of the work provided for in the Prime Contract.

AGREEMENT

Now therefore the parties agree to the following terms and conditions:

ARTICLE 1 - DEFINITIONS

As used throughout this subcontract the following terms shall have the meanings set forth below:

A. The term "Government" means the United States of America and includes the DOE.

B. The term "DOE" means the United States Department of Energy (or its successor agency) or any duly authorized representative thereof, including the Contracting Officer.

C. The term "SERI" means the Solar Energy Research Institute, a division of Midwest Research Institute, acting under Contract No. EG-77-C-01-4042 with the DOE, and includes any duly authorized representative thereof or successor thereto.

D. The term "Subcontractor" as used herein includes subcontractors, independent contractors, and all other classes of persons performing any type of work under this subcontract.

ARTICLE 2 - THE WORK TO BE PERFORMED

A. The Subcontractor shall furnish all personnel, facilities, equipment, materials, supplies, and services (except such as are furnished by the SERI and stated elsewhere in this subcontract) necessary for the performance of the work generally described as

and specifically provided for in Appendix "A" attached hereto and made a part hereof and shall perform the work and report thereon pursuant to the provisions of this subcontract.

B. Specific deliverables, quantities, due dates and addresses are set forth in Appendix A hereto.

ARTICLE 3 - THE PERIOD OF PERFORMANCE

The period for performance under this subcontract shall commence on _____, 19____, and expire on _____: Provided, however, that this period may be extended for additional periods by written agreement of the parties.

ARTICLE 4 - ESTIMATED COST

A. The estimated cost for the work conducted under this subcontract is

B. The Subcontractor shall be paid for the work conducted under this subcontract in accordance with the clause entitled "Allowable Cost and Payment." The Subcontractor is cautioned that, subject to the provisions of the clause entitled "Limitation of Cost," the SERI is not obligated to reimburse the Subcontractor for costs incurred in excess of the amount set forth in Paragraph A above.

ARTICLE 5 - APPLICABLE DOCUMENTATION

In addition to the terms and conditions contained in this schedule, the following documents are attached hereto and made a part of this subcontract:

- A. Appendix A, entitled "Statement of Work No. _____ dated _____."
- B. Appendix B-1, entitled "Standard Terms and Conditions."
- C. Appendix C-2, entitled "Intellectual Property Provisions."
- D. Appendix D-3, entitled "Clauses for Subcontracts in Excess of \$100,000 with Educational Institutions."
- E. Appendix E, entitled "Clauses for Subcontracts in Excess of \$500,000."

ARTICLE 6 - ORDER OF PRECEDENCE

In the event of an inconsistency between provisions of this subcontract, the inconsistency shall be resolved by giving precedence as follows:

- A. this Schedule;
- B. Standard Terms and Conditions (Appendix B-1);
- C. Intellectual Property Provisions (Appendix C-2);
- D. Statement of Work (Appendix A);
- E. Clauses for Subcontracts in Excess of \$100,000 with Educational Institutions (Appendix D-3);
- F. Clauses for Subcontracts in Excess of \$500,000 (Appendix E);
- G. other provisions of the subcontract whether incorporated by reference or otherwise; and
- H. the Subcontractor's technical proposal, if incorporated in the subcontract by reference or otherwise.

ARTICLE 7 - RIGHTS TO PROPOSAL DATA

Except for technical data contained on pages _____ of the subcontractor's proposal number _____ dated _____ which are asserted by the subcontract as being proprietary data, it is agreed that as a condition of the award of this subcontract, and notwithstanding the provisions of any notice appearing on the proposal, the SERI and the Government shall have the right to use, duplicate, and disclose and have others do so for any purpose whatsoever, the technical data contained in the proposal upon which this subcontract is based.

ARTICLE 8 - KEY PERSONNEL

The subcontractor's key personnel referred to in Appendix B-1 is/are:

ARTICLE 9 - CONTRACT ADMINISTRATION RESPONSIBILITIES

- A. The Subcontract Administrator for the SERI for this subcontract is
- B. The Technical Monitor for the SERI for this subcontract is

C. The Property Manager for the SERI for this subcontract is

Pursuant to the Government Property Clause applicable to this subcontract, found in Appendix B, the Subcontractor shall contact the named Property Manager within ten (10) days after receipt of the subcontract award for purposes of receiving guidance and instructions relative to the handling and treatment of property governed by the provisions of the subcontract, including said Government Property Clause.

ARTICLE 10 - INVOICES

Invoices for work accomplished under this subcontract shall be submitted to:

Solar Energy Research Institute
Attn: Subcontracts Branch
1617 Cole Boulevard
Golden, CO 80401

To facilitate processing and payment each invoice must reference the subcontract number which appears on the cover of this subcontract.

ARTICLE 11 - INDIRECT RATES

In accordance with the clause entitled "Negotiated Overhead Rates Predetermined" the following rates shall apply to this subcontract:

<u>Category</u>	<u>Rate</u>
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ARTICLE 12 - ANTICIPATORY COSTS

Any costs incurred directly after the effective date of this subcontract, in anticipation of the subcontract, in order to meet the proposed subcontract delivery requirements, shall be treated as allowable costs, to the extent they would have been allowable if incurred after the execution date of this subcontract. and prior to

ARTICLE 13 - ALTERATIONS TO TERMS AND CONDITIONS

IN WITNESS WHEREOF, the parties hereto have executed this subcontract as of the date stated below.

ACCEPTED: SUBCONTRACTOR

BY _____

TITLE _____

DATE _____

AUTHORIZED: THE MIDWEST RESEARCH INSTITUTE
SOLAR ENERGY RESEARCH INSTITUTE DIVISION

BY _____

TITLE _____

DATE _____

APPENDIX B-1

STANDARD TERMS AND CONDITIONS
FOR A
COST REIMBURSABLE SUBCONTRACT
WITH
EDUCATIONAL AND WITH OTHER NON-PROFIT INSTITUTIONS

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APPENDIX B-1

STANDARD TERMS AND CONDITIONS
FOR A
COST REIMBURSABLE SUBCONTRACT
WITH
EDUCATIONAL AND WITH OTHER NON-PROFIT INSTITUTIONS

CLAUSE 1 - STANDARDS OF WORK

The Subcontractor agrees that the performance of work and services pursuant to the requirements of this subcontract shall conform to high professional standards.

CLAUSE 2 - INSPECTION

The SERI or the Government, through any authorized representatives, has the right at all reasonable times, to inspect, or otherwise evaluate the work performed or being performed hereunder and the premises in which it is being performed. If any inspection, or evaluation is made by the SERI or the Government on the premises of the Subcontractor or a lower tier subcontractor, the Subcontractor shall provide and shall require his lower tier subcontractors to provide all reasonable facilities and assistance for the safety and convenience of the SERI or the Government representatives in the performance of their duties. All inspections and evaluations shall be performed in such a manner as will not unduly delay the work.

CLAUSE 3 - ASSIGNMENT

Neither this subcontract nor any interest therein nor claim thereunder shall be assigned or transferred by the subcontractor, except as expressly authorized in writing by the SERI.

CLAUSE 4 - EXAMINATION OF RECORDS BY COMPTROLLER GENERAL

A. This clause is applicable if the amount of this subcontract exceeds \$10,000 and was entered into by means of negotiation, including small business restricted advertising, but is not applicable if this subcontract was entered into by means of formal advertising.

B. The Subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of 3 years after final payment under this subcontract unless the SERI authorizes their prior disposition have access to and the right to examine any directly pertinent books, documents, papers, and records of the subcontractor involving transactions related to this subcontract.

C. The subcontractor further agrees to include in all his lower tier subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of 3 years after final payment under the subcontract unless the SERI authorizes their prior disposition

have access to and the right to examine any directly pertinent books, documents, papers, and records of such lower tier subcontractor, involving transactions related to the subcontract. The term "lower tier subcontract" as used in this clause excludes (1) purchase orders not exceeding \$10,000 and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

D. The periods of access and examination described in (B) and (C), above, for records which relate to (1) appeals under the "Disputes" clause of this subcontract, (2) litigation or the settlement of claims arising out of the performance of this subcontract, or (3) costs and expenses of this subcontract as to which exception has been taken by the Comptroller General or any of his duly authorized representatives, shall continue until such appeals, litigation, claims, or exceptions have been disposed of.

CLAUSE 5 - UTILIZATION OF SMALL BUSINESS CONCERNS AND SMALL BUSINESS CONCERNS OWNED AND CONTROLLED BY SOCIALLY AND ECONOMICALLY DISADVANTAGED INDIVIDUALS

A. It is the policy of the United States, and the SERI that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals shall have the maximum practicable opportunity to participate in the performance of subcontracts let by the SERI.

B. The Subcontractor hereby agrees to carry out this policy in the awarding of lower tier subcontracts to the fullest extent consistent with the efficient performance of this subcontract. The Subcontractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration, the Department of Energy or the SERI as may be necessary to determine the extent of the Subcontractor's compliance with this clause.

C. As used in this subcontract, the term "small business concern" shall mean a small business as defined pursuant to section 3 of the Small Business Act (15 U.S.C. 632) and relevant regulations promulgated pursuant thereto including 1-1.701 of the Federal Regulations. The term "small business concern owned and controlled by socially and economically disadvantaged individuals" shall mean a small business concern:

1. which is at least 51 per centum owned by one or more socially and economically disadvantaged individuals; or in the case of any publicly-owned business, at least 51 per centum of the stock of which is owned by one or more socially and economically disadvantaged individuals; and

2. whose management and daily business operations are controlled by one or more of such individuals.

The Subcontractor shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans and other specified minorities, or any other individual found to be disadvantaged by the Small Business Administration pursuant to section 8(a) of the Small Business Act.

D. Subcontractors acting in good faith may rely on written representations by their lower tier subcontractors regarding their status as either a small business concern or a small business concern owned and controlled by a socially and economically disadvantaged individuals.

CLAUSE 6 - DISPUTES

A. Except as otherwise provided in this subcontract, any dispute concerning a question of fact or law arising under this subcontract which is not disposed of by agreement shall be submitted in writing to SERI for a review and determination. SERI may grant or deny the whole, or a portion of, a claim in this dispute within ninety (90) days, or such longer time period as may be mutually agreed upon.

If the whole or a portion of a claim is denied, the subcontractor may pursue his legal remedies in a court of competent jurisdiction. Federal contract law including decisions of the various boards of contract appeals will apply in any such suit. Pending a decision of a dispute by SERI or by the court in which the subcontractor seeks a remedy, the subcontractor shall proceed diligently with performance of the subcontract in accordance with SERI's subcontracting officer's decision.

B. Nothing in the subcontract shall be construed as making final the decision of any SERI representative on a question of fact or law.

C. This clause is not applicable to any Appendix C-2 provisions.

CLAUSE 7 - BUY AMERICAN ACT

A. In acquiring end products, the Buy American Act (41 U.S. Code 10a-d) provides that the Government give preference to domestic source end products. For purposes of this clause:

1. "Components" mean those clauses, materials, and supplies which are directly incorporated in the end products;

2. "End Products" mean those clauses, materials, and supplies which are to be acquired under this subcontract for public use; and

3. "Domestic source end product" means (a) an unmanufactured end product which has been mined or produced in the United States; and (b) an end product manufactured in the United States if the cost of the components thereof which are mined, produced, or manufactured in the United States exceeds 50 percent of the costs of all its components. For purposes of this A.3 (b), components of foreign origin of the same type or kind as the products referred to in B.2 or B.3 or this clause shall be treated as components mined, produced, or manufactured in the United States.

B. The Subcontractor agrees that there will be used under this subcontract (by the subcontractor, lower tier subcontractors, materialmen and suppliers) only domestic source and products, except end products:

1. which are for use outside the United States;

2. which the Government determines are not mined, produced or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality;

3. as to which the DOE determines the domestic preference to be inconsistent with public interest; or

4. as to which the DOE determines the cost to the Government to be unreasonable.

(The foregoing requirements are administered in accordance with Executive Order No. 10582 dated December 17, 1954.)

CLAUSE 8 - CONVICT LABOR

In connection with the performance of work under this subcontract, the Subcontractor agrees not to employ any person undergoing sentence of imprisonment except as provided by Public Law 89-176, September 10, 1965 18 U.S.C. 4082(c)(2) and Executive Order 11755, December 29, 1973.

CLAUSE 9 - CONTRACT WORK HOURS AND SAFETY STANDARDS ACT OVERTIME COMPENSATION

This subcontract, to the extent that it is of a character specified in the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333), is subject to the following provisions and to all other applicable provisions and exceptions of such Act and the regulations of the Secretary of Labor thereunder.

A. Overtime Requirements - No subcontractor or lower tier subcontractor contracting for any part of the subcontract work which may require or involve the employment of laborers, mechanics, apprentices, trainees, watchmen, and guards shall require or permit any laborer, mechanic, apprentice, trainee, watchman, or guard in any workweek in which he is employed on such work to work in excess of eight (8) hours in any calendar day or in excess of forty (40) hours in such workweek on work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer, mechanic, apprentice, trainee, watchman, or guard receives compensation at a rate not less than one and one-half times his basic rate of pay for all such hours worked in excess of eight (8) hours in any calendar day or in excess of forty (4) hours in such workweek, whichever is the greater number of overtime hours.

B. Violation; Liability for Unpaid Wages; Liquidated Damages - In the event of any violation of the provision of paragraph A., the Subcontractor and any lower tier subcontractor responsible therefor shall be liable to any affected employee for his unpaid wages. In addition, such subcontractor and lower tier subcontractor shall be liable to the Government for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, apprentice, trainee, watchman, or guard employed in violation of the provisions of paragraph A in the sum of \$10.00 for each calendar day on which such employee was required or permitted to be employed on such work in excess of eight (8) hours or in excess of his standard workweek of forty (40) hours without payment of the overtime wages required by paragraph A.

C. Withholding for Unpaid Wages and Liquidated Damages - The SERI may withhold from the Subcontractor, from any moneys payable on account of work performed by the Subcontractor or lower tier subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of such subcontractor or lower tier subcontractor for unpaid wages and liquidated damages as provided in the provisions of paragraph B.

D. Lower Tier Subcontracts - The Subcontractor shall insert paragraphs A thru D of this clause in all lower tier subcontracts, and shall require their inclusion in all subcontracts of any tier.

E. Records - The Subcontractor shall maintain payroll records containing the information specified in 29 CFR 516.2(a). Such records shall be preserved for three (3) years from the completion of the subcontract.

CLAUSE 10 - EQUAL OPPORTUNITY

The following clause is applicable unless this subcontract is exempt under the rules, regulations, and relevant orders of the Secretary of Labor (41 CFR. CH. 60).

During the Performance of this subcontract, the Subcontractor agrees as follows:

A. The Subcontractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Subcontractor will take affirmative action to ensure that applicants are employed, and that employees are treated during the employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; lay-off or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Subcontractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the SERI or the Government setting forth the provisions of this Equal Opportunity clause.

B. The Subcontractor will, in all solicitations or advertisements for employee placed by or on behalf of the Subcontractor, state that all qualified applicants will receive consideration for employment without regard to race, color, sex, or national origin.

C. The Subcontractor will send to each labor union or representative or workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the SERI advising the labor union or workers' representative of the Subcontractor's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. The Subcontractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended by EO11375 of October 13, 1967 and of the rules, regulations, and relevant orders of the Secretary of Labor.

E. The Subcontractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended by EO11375 of October 13, 1967 and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the DOE and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

F. In the event of the Subcontractor's noncompliance with the Equal Employment clause of this subcontract or with any of the said rules, regulations, or orders, this subcontract may be cancelled, terminated, or suspended in whole or in part and the Subcontractor may be declared ineligible for further Government contracts in accordance with the procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended by EO11375 of October 13, 1967 and such other sanctions may be imposed and remedies invoked, as provided in Executive Order No. 11246 of September 24, 1965, as amended by EO11375 of October 13, 1967 or by rule, regulation, or order of the Secretary of Labor or as otherwise provided by law.

G. The Subcontractor will include the provisions of paragraphs A through G in every sub-subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended by EO11375 of October 13, 1967 so that such provisions will be binding upon each sub-subcontractor or vendor. The Subcontractor will take such action with respect

to any sub-subcontract or purchase order as the Government may direct as a means of enforcing such provisions including sanctions for noncompliance: provided, however, that in the event that the Subcontractor becomes involved in or is threatened with litigation with a lower tier subcontractor or vendor as a result of such direction by the Government, the Subcontractor may request the United States to enter into such litigation to protect the interests of the United States.

CLAUSE 11 - OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this subcontract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this subcontract if made with a corporation for its general benefit.

CLAUSE 12 - COVENANT AGAINST CONTINGENT FEES

A. Warranty - Termination, or Deduction for Breach.

The Subcontractor warrants that no person or selling agency has been employed or retained to solicit or secure this subcontract upon an agreement or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Subcontractor for the purpose of securing business. For breach or violation of this warranty the SERI with the approval of the DOE has the right to annul this subcontract without liability or in its discretion to deduct from the price or consideration, or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

B. Lower Tier Subcontracts and Purchase Orders.

Unless otherwise authorized in writing, the subcontractor shall cause provisions similar to the foregoing to be inserted in all lower tier subcontracts and purchase orders entered into under this subcontract.

CLAUSE 13 - GOVERNMENT PROPERTY

A. The SERI shall deliver to the Subcontractor, for use in connection with and under the terms of this subcontract, the property described as Government-furnished property in the Schedule or specifications, together with such related data and information as the Subcontractor may request and as may reasonably be required (hereinafter referred to as "Government-furnished Property"). The delivery or performance dates for the supplies or services to be furnished by the Subcontractor under this subcontract are based upon the expectation that Government-furnished property suitable for use will be delivered to the Subcontractor at the times stated in the Schedule, or if not so stated, in sufficient time to enable the Subcontractor to meet such delivery or performance dates. In the event that Government-furnished property is not delivered to the Subcontractor by such time or times, the SERI shall, upon timely written request made by the Subcontractor make a determination of the delay, if any, occasioned the Subcontractor and shall equitably adjust the estimated cost, fixed fee, or delivery or performance dates, or all of them, and any other contractual provisions affected by any such delay, in accordance with the procedures provided for in the clause of this subcontract

entitled "Changes." In the event that Government-furnished property is received by the Subcontractor in a condition not suitable for the intended use, the Subcontractor shall, upon receipt thereof notify the SERI of such fact and, as directed by the SERI, either (1) return such property at the SERI's expense or otherwise dispose of the property, or (2) effect repairs or modifications. Upon completion of (1) or (2), above, the SERI upon written request of the Subcontractor shall equitably adjust the estimated cost, fixed fee, if any, or delivery or performance dates, or all of them, and any other contractual provision affected by the return or disposition, or the repair or modification in accordance with the procedures provided for in the clause of this contract entitled "Changes." The foregoing provisions for adjustment are exclusive and the SERI or Government shall not be liable to suit for breach of subcontract by reason of any delay in delivery of Government-furnished property or delivery of such property in a condition not suitable for its intended use.

B. 1. By notice in writing, the SERI may (i) decrease the property furnished or to be furnished by the SERI under this subcontract, or (ii) substitute other Government-owned property for property to be furnished by the SERI or to be acquired by the Subcontractor for the Government, under this subcontract. The Subcontractor shall promptly take such action as the SERI may direct with respect to the removal and shipping of property covered by such notice.

2. In the event of any decrease in or substitution of property pursuant to paragraph 1, above, or any withdrawal of authority to use property provided under any other contract or lease, which property the SERI had agreed in the Schedule to make available for the performance of this subcontract, the SERI, upon the written request of the Subcontractor (or, if the substitution of property causes a decrease in the cost of performance, on his own initiative), shall equitably adjust such contractual provisions as may be affected by the decrease, substitution, or withdrawal, in accordance with the procedures provided for in the "Changes" clause of this subcontract.

C. Title to all property furnished by the SERI shall remain in the Government. Title to all property purchased by the Subcontractor, for the cost of which the Subcontractor is entitled to be reimbursed as a direct item of cost under this subcontract, shall pass to and vest in the Government upon delivery of such property by the vendor. Title to other property, the cost of which is reimbursable to the Subcontractor under the subcontract, shall pass to and vest in the Government upon (1) issuance for use of such property in the performance of this subcontract, or (2) commencement of processing or use of such property in the performance of this subcontract, or (3) reimbursement of the cost thereof by the SERI in whole or in part, whichever first occurs. All Government-furnished property, together with all property acquired by the Subcontractor, title to which vests in the Government under this paragraph, are subject to the provisions of this clause and are hereinafter collectively referred to as "Government property." Title to the Government property shall not be affected by the incorporation or attachment thereof to any property not owned by the Government, nor shall such Government property, or any part thereof, be or become a fixture or lose its identity as personalty by reason of affixation to any realty.

D. The Subcontractor shall be directly responsible for and accountable for all Government property provided under this subcontract. The Subcontractor shall establish and maintain a system to control, protect, preserve, and maintain all Government property. This system shall, upon request by the SERI, be submitted for review and, if satisfactory, approved in writing by the

SERI. The Subcontractor shall maintain and make available such records as are required by the approved system and must account for all Government property until relieved of responsibility therefor in accordance with the written instructions of the SERI. To the extent directed by the SERI, the Subcontractor shall identify Government property by marking, tagging, or segregating in such manner as to clearly indicate its ownership by the Government.

E. The Government property shall, unless otherwise provided herein or approved by the SERI, be used only for the performance of this subcontract.

F. The Subcontractor shall maintain and administer, in accordance with sound industrial practice, a program for the utilization, maintenance, repair, protection, and preservation of Government property so as to assure its full availability and usefulness for the performance of this subcontract. The Subcontractor shall take all reasonable steps to comply with all appropriate directions or instructions which the SERI may prescribe as reasonably necessary for the protection of Government property.

G. 1. The Subcontractor shall not be liable for any loss of or damage to the Government property, or for expenses incidental to such loss or damage, except that the Subcontractor shall be responsible for any such loss or damage (including expenses incidental thereto):

(i) Which results from willful misconduct or lack of good faith on the part of any one of the Subcontractor's directors or officers, or on the part of any of his managers, superintendents, or other equivalent representatives, who has supervision or direction of:

(a) All or substantially all of the Subcontractor's operations at any one plant or separate location in which this Subcontractor's business; or

(b) All or substantially all of the Subcontractor's operations at any one plant or separate location in which this subcontract is being performed; or

(c) A separate and complete major industrial operation in connection with the performance of this subcontract.

(ii) Which results from a failure on the part of the Subcontractor, due to the willful misconduct or lack of good faith on the part of any of his directors, officers, or other representatives mentioned in subparagraph (i), above:

(a) To maintain and administer, in accordance with sound industrial practice, the program for utilization, maintenance, repair, protection, and preservation of Government property as required by paragraph F hereof, or to take all reasonable steps to comply with any appropriate written direction of the SERI under paragraph F hereof, or

(b) To establish, maintain, and administer in accordance with paragraph D hereof a system for control of Government property.

(iii) For which the Subcontractor is otherwise responsible under the express terms of the clause or clauses designated in the Schedule;

(iv) Which results from a risk expressly required to be insured under this subcontract, but only to the extent of the insurance so required to be procured and maintained, or to the extent of insurance actually procured and maintained, whichever is greater; or

(v) Which results from a risk which is in fact covered by insurance or for which the Subcontractor is otherwise reimbursed, but only to the extent of such insurance or reimbursement.

Any failure of the Subcontractor to act, as provided in subparagraph (ii), above, shall be conclusively presumed to be a failure resulting from willful misconduct or lack of good faith on the part of such directors, officers, or other representatives mentioned in subparagraph (i), above, if the Subcontractor is notified by the SERI by registered or certified mail addressed to one of such directors, officers, or other representatives, of the SERI's disapproval, withdrawal of approval, or nonacceptance of the Subcontractor's program or system. In such event it shall be presumed that any loss or damage to Government property resulted from such failure. The Subcontractor shall be liable for such loss or damage unless he can establish that such loss or damage did not result from his failure. The Subcontractor shall be liable for such loss or damage unless he can establish by clear and convincing evidence that such loss or damage did not result from his failure to maintain an approved program or system, or occurred during such time as an approved program or system for control of Government property was maintained.

If more than one of the approved exceptions shall be applicable in any case, the Subcontractor's liability under any one exception shall not be limited by any other exception. If the Subcontractor transfers Government property to the possession and control of a lower tier Subcontractor, the transfer shall not affect the liability of the Subcontractor for loss of destruction of or damage to the property as set forth above. However, the Subcontractor shall require the lower tier subcontractor to assume the risk of, and be responsible for, any loss or destruction of or damage to the property while in the latter's possession or control, except to the extent that the lower tier subcontract, with the prior approval of the SERI, provides for the relief of the lower tier subcontractor from such liability. In the absence of such approval, the SERI subcontract shall contain appropriate provisions requiring the return of all Government property in as good condition as when received, except for reasonable wear and tear or for the utilization of the property in accordance with the provisions of the subcontract.

2. The Subcontractor shall not be reimbursed for, and shall not include as an item of overhead, the cost of insurance, or any provisions for a reserve, covering the risk of loss of or damage to the Government property, except to the extent that the SERI may have required the Subcontractor to carry such insurance under any other provisions of this subcontract.

3. Upon the happening of loss or destruction of or damage to the Government property, the Subcontractor shall notify the SERI thereof, and shall communicate with the loss and salvage organization, if any, now or hereafter designated by the SERI, and with the assistance of the loss and salvage organizations so designated (unless the SERI has designated that no such organization be employed), shall take all reasonable steps to protect the Government property from further damage, separate the damaged and undamaged Government property, put all the Government property in the best possible order, and furnish to the SERI a statement of:

- (i) The lost, destroyed, and damaged Government property;
- (ii) The time and origin of the loss, destruction, or damage;
- (iii) All known interests in commingled property of which the Government property is a part; and
- (iv) The insurance, if any, covering any part of interest in such commingled property.

The Subcontractor shall make repairs and renovations of the damaged Government property or take such other action as the SERI directs.

4. In the event the Subcontractor is indemnified, reimbursed, or otherwise compensated for any loss or destruction of or damage to the Government property, he shall use the proceeds to repair, renovate, or replace the Government property involved, or shall credit such proceeds against the cost of the work covered by the subcontract, or shall otherwise reimburse the Government, as directed by the SERI. The Subcontractor shall do nothing to prejudice the SERI's or Government's right to recover against third parties for any such loss, destruction, or damage and, upon the request of the SERI, shall, at the Government's expense, furnish to the SERI all reasonable assistance and cooperation (including the prosecution of suit and the execution of instruments of assignment in favor of the Government) in obtaining recovery. In addition, where the lower tier subcontractor has not been relieved from liability for any loss or destruction of or damage to Government property, the Subcontractor shall enforce the liability of the lower tier subcontractor for such loss or destruction of or damage to the Government property for the benefit of the Government.

H. The Government, and any persons designated by it, shall at all reasonable times have access to the premises where any of the Government property is located, for the purpose of inspecting the Government property.

I. Upon the completion of this subcontract, or at such earlier dates as may be fixed by the SERI, the Subcontractor shall submit to the SERI in a form acceptable to it, inventory schedules covering all items of the Government property not consumed in the performance of this subcontract, or not theretofore delivered to the SERI, and shall deliver or make such other disposal of such Government property as may be directed or authorized by the SERI. The net proceeds of any such disposal shall be credited to the cost of the work covered by the subcontract or shall be paid in such manner as the SERI may direct. The foregoing provisions shall apply to scrap from Government property: provided, however, that the SERI may authorize or direct the Subcontractor to omit from such inventory schedules any scrap consisting of faulty castings or forgings, or cutting and processing waste, such as chips, cuttings, borings, turnings, short ends, circles, trimmings, clippings, and remnants, and to dispose of such scrap in accordance with the Subcontractor's normal practice and account therefor as a part of general overhead or other reimbursable cost in accordance with the Subcontractor's established accounting procedures.

J. Unless otherwise provided herein, the SERI or Government:

(i) May abandon any Government property in place, and thereupon all obligations of the Government regarding such abandoned property shall cease; and

(ii) Has no obligation to the Subcontractor with regard to restoration or rehabilitation of the Subcontractor's premises, neither in case of abandonment (paragraph J (i), above), disposition on completion of need or of the subcontract (paragraph (i), above), nor otherwise, except for restoration or rehabilitation costs caused by removal of Government property pursuant to paragraph B, above.

K. All communications issued pursuant to this clause shall be in writing.

CLAUSE 14 - UTILIZATION OF LABOR SURPLUS AREA CONCERNS

(This clause is applicable if this subcontract exceeds \$10,000.)

A. It is the policy of the SERI and the Government to award subcontracts to labor surplus concerns that agree to perform substantially in labor surplus areas, where this can be done consistent with the efficient performance of the subcontract and at prices no higher than are obtainable elsewhere. The Subcontractor agrees to use his best efforts to place his lower tier subcontracts in accordance with this policy.

B. In complying with paragraph (A) of this clause and with paragraph (b) of the clause of this subcontract entitled "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled By Socially and Economically Disadvantaged Individuals", the Subcontractor in placing his lower tier subcontracts shall observe the following order of preference: (1) Small business concerns that are labor surplus area concerns, (2) other small business concerns, and (3) other labor surplus area concerns.

C. 1. The term "labor surplus area" means a geographical area identified by the Department of Labor as an area of concentrated unemployment or underemployment or an area of labor surplus.

2. The term "labor surplus area concern" means a concern that together with its first-tier subcontractors will perform substantially in labor surplus areas.

3. The term "perform substantially in a labor surplus area" means that the costs incurred on account of manufacturing, production, or appropriate services in labor surplus areas exceed 50 percent of the contract price.

CLAUSE 15 - COMPETITION IN LOWER TIER SUBCONTRACTING

The Subcontractor shall select lower-tier subcontractors (including suppliers) on a competitive basis to the maximum practicable extent consistent with the objectives and requirements of the subcontract.

CLAUSE 16 - AUDIT AND RECORDS

A. General - The SERI, DOE, or their authorized representatives shall have the audit and inspection right described in the applicable paragraphs B, C and D below.

B. Examination of Costs - If this is a cost-reimbursement type, incentive, time and materials, labor hour, or price redeterminable subcontract, or any combination thereof, the Subcontractor shall maintain, and the SERI, DOE, or their authorized representatives shall have the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of this subcontract.

C. Cost or Pricing Data - If the Subcontractor submitted cost or pricing data in connection with the pricing of this subcontract or any change or modification thereto, unless such pricing was based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation, the SERI or the Government or its representatives who are employees of the United

States Government shall have the right to examine all books, records, documents and other data of the Subcontractor related to the negotiation, pricing or performance of such subcontract, change or modification, for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data submitted. Additionally, in the case of pricing any change or modification exceeding \$100,000 to formally advertising contracts, the Comptroller General of the United States or his representatives who are employees of the United States Government shall have such rights. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

D. Availability - The materials described in B and C above, shall be made available at the office of the Subcontractor, at all reasonable times, for inspection, audit or reproduction, until the expiration of 3 years from the date of final payment under this subcontract or such lesser time specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20) and for such longer period, if any, as is required by applicable statute, or by other clauses of this subcontract, or by 1 and 2 below:

1. If this subcontract is completely or partially terminated, the records relating to the work terminated shall be made available for a period of 3 years from the date of any resulting final settlement.

2. Records which relate to appeals under the "Disputes" clause of this subcontract, or litigation or the settlement of claims arising out of the performance of this subcontract, shall be made available until such appeals, litigation, or claims have been disposed of.

E. The Subcontractor shall insert a clause containing all the provisions of this clause, including this paragraph E, in all lower tier subcontracts hereunder except altered as necessary for proper identification of the contracting parties and the SERI.

CLAUSE 17 - NOTICE OF LABOR DISPUTES

A. Whenever the subcontractor has the knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this Subcontract, the Subcontractor shall immediately give notice thereof, including all relevant information with respect thereto, to the SERI.

B. The Subcontractor agrees to insert the substance of this article, including this paragraph B, in any lower tier Subcontract hereunder as to which a labor dispute may delay the timely performance of this Subcontract; except that each such lower tier Subcontract shall provide that in the event its timely performance is delayed or threatened by delay, any actual or potential labor dispute, the lower tier Subcontractor shall immediately notify his next higher tier Subcontractor, or the Subcontractor, as the case may be, of all relevant information with respect to such disputes.

CLAUSE 18 - DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA

(This clause is applicable if this subcontract exceeds \$10,000.)

A. The Subcontractor will not discriminate against any employee or veteran of the Vietnam era in regard to any position for which the employee or applicant for employment is qualified. The Subcontractor agrees to take

affirmative action to employ, advance in employment, and otherwise treat qualified disabled veterans and veterans of the Vietnam era without discrimination based upon their disability or veterans status in all employment practices such as the following: employment upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

B. The Subcontractor agrees that all suitable employment openings of the Subcontractor which exist at the time of the execution of this subcontract and those which occur during the performance of this subcontract, including those not generated by this subcontract and including those occurring at an establishment of the Subcontractor other than the one wherein the subcontract is being performed but excluding those of independently operated corporate affiliates, shall be listed at an appropriate local office of the state employment service system wherein the opening occurs. The Subcontractor further agrees to provide such reports to such local office regarding employment openings and hires as may be required.

State and local government agencies holding Federal subcontracts of \$10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service, but are not required to provide those reports set forth in paragraph D and E.

C. Listing of employment openings with the employment service system pursuant of this clause shall be made at least concurrently with the use on any other recruitment source or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and nonveterans. The listings of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and nothing herein is intended to relieve the Subcontractor from any requirements in Executive orders or regulations regarding nondiscrimination in employment.

D. The reports required by paragraph B of this clause shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the Subcontractor has more than one hiring location in a State, with the central office of the State employment service. Such reports shall indicate for each hiring location (1) the number of individuals hired during the reporting period; (2) the number of non-disabled veterans of the Vietnam era hired; (3) the number of disabled veterans of the Vietnam era hired; and (4) the total number of disabled veterans hired. The reports should include covered veterans hired for on-the-job training under 38 U.S.C. 1787. The Subcontractor shall submit a report within 30 days after the end of each reporting period wherein any performance is made on this subcontract identifying date for each hiring location. The Subcontractor shall maintain at each hiring location copies of the reports submitted until the expiration of one year after final payment under the subcontract, during which time these reports and related documentation shall be made available, upon request, for examination by any authorized representatives of the SERI or of the Secretary of Labor. Documentation would include personnel records respecting job openings, recruitment, and placement.

E. Whenever the Subcontractor becomes contractually bound to the listing provisions of this clause, it shall advise the employment service system in each State where it has establishments of the name and location of each hiring location in the State. As long as the Subcontractor is contractually bound to these provisions and has so advised the State system, there is not need to advise the State system when it is no longer bound by this subcontract clause.

F. This clause does not apply to the listing of employment openings which occur and are filled outside the 50 states, the District of Columbia, Puerto Rico, Guam and the Virgin Islands.

G. The provisions of paragraph B, C, D and E of this clause do not apply to openings which the Subcontractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of his own organization or employer-union arrangement for that opening.

H. As used in this clause:

1. "all suitable employment openings" include, but are not limited to, openings which occur in the following job categories: production and non-production; plant and office, laborers and mechanics; supervisory and non-supervisory; technical; and executive, administrative, and professional openings that are compensated on a salary basis of less than \$25,000 per year. This term includes full-time employment, temporary employment of more than three (3) days duration, and part-time employment. It does not include openings which the Subcontractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer's union hiring arrangements nor openings in an educational institution which are restricted to students of that institution. Under the most compelling circumstances, an employment opening may not be suitable for listing, including such situations where the needs of the Government cannot reasonably be otherwise supplied, where listings would be contrary to national security, or where the requirements of listing would otherwise not be for the best interest of the Government.

2. "Appropriate office of the State employment service system" means the local office of the Federal/State national system of public employment offices with assigned responsibility for serving the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

3. "Openings which the Subcontractor proposes to fill from within his own organization" means employment openings for which no consideration will be given to persons outside the Subcontractor's organization (including any affiliates, subsidiaries, and the parent companies) and includes any openings which the Subcontractor proposes to fill from regularly established "recall" lists.

4. "Openings which the Subcontractor proposes to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings which the Subcontractor proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the Subcontractor and representatives of his employees.

I. The Subcontractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

J. In the event of the Subcontractor's noncompliance with requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

K. The Subcontractor agrees to post in conspicuous places available to employees and applicants for employment notices in a form to be prescribed by the Director, provided by or through the SERI. Such notice shall state Subcontractor's obligation under the law to take affirmative action to employ and advance in employment qualified veterans and veterans of the Vietnam era for employment and the rights of applicants and employees.

L. The Subcontractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or their contract understanding that the Subcontractor is bound by terms of the Vietnam Era Veteran's Readjustment Assistance Act and is committed to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era.

M. The Subcontractor will include the provisions of this clause in every sub-subcontract or purchase order of \$10,000 or more unless exempted by rules, regulations or orders of the Secretary issued pursuant to the Act, so that such provisions will be binding upon each sub-subcontractor or vendor. The Subcontractor will take such action with respect to any sub-subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

CLAUSE 19 - EMPLOYMENT OF THE HANDICAPPED

A. The Subcontractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. The Subcontractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

B. The Subcontractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Rehabilitation Act of 1973, as amended.

C. In the event of the Subcontractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

D. The Subcontractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, Office of Federal Contract Compliance Program, Department of Labor, provided by or through the SERI. Such notices shall state the Subcontractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

E. The Subcontractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Subcontractor is bound by the terms of Section 503 of the Act, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

F. The Subcontractor will include the provisions of this clause in every lower tier subcontract or purchase order of \$2,500 or more unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 503 of the Act, so that such provisions will be binding upon each lower tier subcontractor or vendor. The Subcontractor will take such action with respect to any lower tier subcontract or purchase order as the Director, Office of Federal Contract Compliance Programs, may direct to enforce such provisions, including action for noncompliance.

CLAUSE 20 - PREFERENCE FOR U.S. FLAG AIR CARRIERS

A. Pub. L. 93-623 requires that all Federal agencies and Government contractors and subcontractors will use U. S. flag air carriers for international air transportation of personnel (and their personal effects) or property to the extent service by such carriers is available. It further provides that the Comptroller General of the United States shall disallow any expenditure from appropriate funds for international air transportation on other than a U. S. flag air carrier in the absence of satisfactory proof of the necessity therefor.

B. The Subcontractor agrees to utilize U. S. flag air carriers for international air transportation of personnel (and their personal effects) or property to the extent service by such carriers is available.

C. In the event that the Subcontractor selects a carrier other than a U. S. flag air carrier for international air transportation, it will include a certification on vouchers involving such transportation which is essentially as follows:

**CERTIFICATION OF UNAVAILABILITY OF U. S. FLAG
AIR CARRIERS**

I hereby certify that transportation service for personnel (and their personal effects) or property by certificated air carrier was unavailable for the following reasons (see Federal Procurement Regulations (41 CFR 1-1.323-3)): (state reasons).

D. The terms used in this article have the following meanings:

1. "International air transportation" means transportation of persons (and their personal effects) or property by air between a place in the United States and a place outside thereof or between two places both of which are outside the United States.

2. "U. S. flag air carrier" means one of a class of air carriers holding a certificate of public convenience and necessity issued by the Civil Aeronautics Board, approved by the President, authorizing operations between the United States and/or its territories and one or more foreign countries.

3. The term "United States" includes the fifty states, Commonwealth of Puerto Rico, possessions of the United States, and the District of Columbia.

E. The Subcontractor shall include the substance of this clause including this paragraph e., in each subcontract or purchase hereunder which may involve international air transportation.

CLAUSE 21 - USE OF U. S. FLAG COMMERCIAL VESSELS

A. The Cargo Preference Act of 1954 (P. L. 664, August 26, 1954, 63 Stat. 832, 46 U.S.C. 1241(b)), requires that Federal departments or agencies shall transport at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) of equipment, materials, or commodities which may be transported on ocean vessels on privately owned United States flag commercial vessels. Such transportation shall be accomplished whenever:

1. Any equipment, materials, or commodities, within or outside the United States, which may be transported by ocean vessel, are:

(i) Procurements, contracted for, or otherwise obtained for the agency's account; or

(ii) Furnished to or for the account of any foreign nation without provision for reimbursement.

2. Funds or credits are advanced or the convertibility of foreign currencies is guaranteed in connection with furnishing such equipment, materials, or commodities which may be transported by ocean vessel.

Note: This requirement does not apply to small purchases as defined in 41 CFR 1-3.6 or to cargoes carried in the vessels of the Panama Canal Company.

B. The Subcontractor agrees as follows:

1. To utilize privately owned United States flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved whenever shipping any equipment, material, or commodities under the conditions set forth in a. above pursuant to this subcontract to the extent such vessels are available at fair and reasonable rates for United States flag commercial vessels.

Note: Guidance regarding fair and reasonable rates for United States flag vessels may be obtained from the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, D. C. 20230: Area Code 202, phone 377-3449.

2. To furnish, within 15 working days following the date of loading for shipments originating within the United States or within 25 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill of lading in English for each shipment of cargo covered by the provisions in a. above to both the Contracting Officer (through the SERI) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, D. C. 20230.

3. To insert the substance of the provisions of this article in all subcontracts issued pursuant to this contract except for small purchases as defined in 41 CFR 1-3.6.

(Sec. 205(c), 63 Stat. 390; 40 U.S.C. 486(c))

CLAUSE 22 - SAFETY AND HEALTH

(This clause shall apply to Subcontractor's work under this subcontract at SERI or Government-owned sites or facilities.)

The Subcontractor shall take all reasonable precautions in the performance of the work under this subcontract to protect the safety and health of employees and of members of the public and shall comply with all applicable safety and health regulations and requirements (including reporting requirements) of the DOE. In the event that the Subcontractor fails to comply with said regulations or requirements of the DOE, the SERI may, without prejudice to any other legal or contractual rights of the SERI, issue an order stopping all or any part of the work; thereafter a start order for resumption of the work may be issued at the discretion of the SERI. The Subcontractor shall make no claim for an extension of time or for compensation or damages by reason of or in connection with such work stoppage.

CLAUSE 23 - PERMITS

Except as the parties hereto may otherwise mutually agree, the Subcontractor shall procure all necessary permits or licenses and abide by all applicable laws, regulations, and ordinances of the United States, and of the State, territory, and political subdivision in which the work under this subcontract is performed.

CLAUSE 24 - KEY PERSONNEL

The personnel specified in the schedule to this subcontract are considered to be essential to the work being performed hereunder. Prior to diverting any of the specified individuals to other programs, the Subcontractor shall notify the SERI reasonably in advance and shall submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on the program. No diversion shall be made by the Subcontractor without the written consent of the SERI: Provided, That the SERI may ratify in writing such diversion and such ratification shall constitute the consent of the SERI required by this clause. The schedule to this subcontract may be amended from time to time during the course of the subcontract to either add or delete personnel, as appropriate.

CLAUSE 25 - COST ACCOUNTING STANDARD WITHDRAWAL

A. Cost Accounting Standard 414 - Cost of money as an element of the cost of facilities capital - is withdrawn from application to the provisions of the clauses in this contract entitled "Cost Accounting Standards" and "Administration of Cost Accounting Standards."

B. This clause shall be included in all subcontracts, at any tier, containing the clause entitled "Cost Accounting Standards."

CLAUSE 26 - PRINTING

Unless otherwise specified in this subcontract, the subcontractor shall not engage in, nor subcontract for, any printing (as that term is defined in title I of the Government Printing and Binding Regulations in effect on the effective date of this subcontract) in connection with the performance of work under this subcontract: Provided, however, that performance of a requirement under this subcontract involving the reproduction of less than 5,000 production units of any one page, or less than 25,000 production units in the aggregate of multiple pages, will not be deemed to be printing. A production unit is defined as one sheet, size 8 by 10 and 1/2 inches, one side only, one color.

CLAUSE 27 - INTEREST

Notwithstanding any other provision of this subcontract, unless paid within 30 days, all amounts that become payable by the Subcontractor to the SERI under this subcontract (net of any applicable tax credit under the Internal Revenue Code) shall bear interest at the rate determined by the

Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat. 97. Amounts shall be due upon the earliest of (a) the date fixed pursuant to this subcontract; (b) the date of the first written demand for payment, consistent with this subcontract, including demand consequent upon default termination; (c) the date of transmittal by the SERI to the Subcontractor of a proposed supplemental agreement to confirm completed negotiations fixing the amount; or (d) if this subcontract provides for revision of prices, the date of written notice to the Subcontractor stating the amount of refund payable in connection with a pricing proposal or in connection with a negotiated pricing agreement not confirmed by subcontract supplement.

CLAUSE 28 - ORAL OR WRITTEN MODIFICATIONS

No oral or written statement of any person other than the Subcontract Administrator (acting as the representative and on the behalf of the Assistant Director, Contracts and Procurement) whomsoever shall, in any manner or degree, modify or otherwise affect the terms of this Subcontract. The Subcontract Administrator is the only person authorized to approve changes in any of the requirements under this Subcontract and notwithstanding any provision contained elsewhere in this Subcontract, the said authority remains solely with the Subcontract Administrator acting in the capacity stated above. In the event the Subcontractor effects any such change at the direction of any person other than the Subcontract Administrator, the change will be considered to have been made without authority and no adjustment will be made in the Subcontract price or estimated cost to cover any increase in costs incurred as a result thereof.

CLAUSE 29 - TECHNICAL DIRECTION AND SURVEILLANCE

A. 1. The work to be performed by the subcontractor under this subcontract is subject to the surveillance and written Technical Direction of the Technical Monitor who is designated elsewhere in this subcontract. The term "Technical Direction" is defined to include the following:

a. Direction to the Subcontractor which shifts work emphasis between work areas or tasks, suggests certain lines of inquiry, fills in details or otherwise provides technical guidance to the subcontractor in order to accomplish the Scope of Work.

b. Provision of information to the Subcontractor which assists in the interpretation of drawings, specifications or technical portions of the Scope of Work.

c. Review and, where required by the subcontract, approval thru the Subcontract Administrator of technical reports, drawings, specifications or technical information to be delivered by the subcontractor to SERI under the subcontract.

The Technical Monitor shall monitor the Subcontractor's performance with respect to compliance with the technical requirements of this subcontract.

2. The only person authorized to give Technical Direction to the subcontractor under this subcontract are the Subcontract Administrator and the Technical Monitor as contemplated by paragraph (A.1) above. Any action taken by the Subcontractor in response to any direction given by any person other than the Subcontract Administrator or Technical Monitor whom he may appoint shall be at the subcontractor's own risk.

B. Technical direction and management surveillance shall not impose tasks or requirements upon the Subcontractor additional to or different from the general tasks and requirements stated in Article 2 of the Schedule of this subcontract. The Technical Direction to be valid:

1. Must be issued in writing consistent with the general scope of the work set forth in this subcontract; and

2. May not:

(i) constitute an assignment of additional work outside the general scope of the Statement of Work attached to this subcontract;

(ii) constitute a change as defined in the subcontract clause entitled "Changes";

(iii) in any manner cause an increase or decrease in the total estimated subcontract cost or the time required for subcontract performance; or

(iv) change any of the expressed terms, conditions or specifications of the subcontract.

C. The Subcontractor shall proceed promptly with the performance of Technical Directions duly issued by the Technical Monitor in the manner prescribed by paragraph (B) and which are within his authority under the provisions of paragraph (A); provided, however, that the Subcontractor shall immediately cease the performance of any Technical Direction upon receipt of a written instruction to that effect from the Subcontract Administrator and, provided, further, that any costs incurred prior to the receipt of said instruction shall be deemed to be incurred in the performance of the work hereunder and shall be treated as allowable costs hereunder if they are otherwise allowable in accordance with the clause entitled "Allowable Cost, Fixed Fee and Payment or Allowable Cost and Payment," as applicable.

D. If in the opinion of the Subcontractor, any Technical Direction issued by the Technical Monitor is within one of the categories as defined in (B) (2) (i) through (iv) above, the subcontractor shall not proceed but shall notify the Subcontract Administrator in writing within two (2) working days after the receipt of any such Technical Direction and shall request the Subcontract Administrator to modify the subcontract accordingly. Such notice shall (i) include the reasons upon which the subcontractor bases its belief that the Technical Direction falls outside the purview of paragraph (A) above and (ii) include the subcontractor's best estimate as to any necessary revisions in the estimated cost, fixed fee, performance time, delivery schedules and any other contractual provisions that would result from implementing the Technical Direction. If after reviewing the information presented pursuant to (d) (i), the Subcontract Administrator is of the opinion that such Technical Direction authorized by this clause, the Subcontract Administrator will direct the subcontractor to proceed with the implementation of such Technical Direction and the subcontractor shall comply therewith. In the event the Subcontract Administrator determines that it is necessary to avoid a delay in performance of the subcontract he may, in writing, direct the subcontractor to proceed with the implementation of the Technical Direction pending receipt of the information to be submitted pursuant to (D) (i) and (ii) above. Should the Subcontract Administrator later determine that change direction is appropriate, the written decision issued hereunder shall constitute the required Change direction.

E. Failure of the subcontractor and the Subcontract Administrator to agree on whether the Direction as issued in Technical Direction or a change within the purview of the "Changes" clause and/or otherwise falls within the limitations set forth in (B) above shall be a subcontract dispute concerning a

question of fact within the meaning of the clause entitled "Disputes", of this subcontract.

CLAUSE 30 - CHANGES (Cost)

A. The SERI's Assistant Director, Contracts and Procurement may at any time, by a written order, and without notice to the sureties, if any, make changes, within the general scope of this subcontract, in any one or more of the following:

- (i) Drawings, designs, specifications, or statement of work;
- (ii) Method of shipment or packing; and
- (iii) Place of inspection, delivery, or acceptance.

B. If any such change causes an increase or decrease in the estimated cost of, or the time required for the performance of any part of the work under this subcontract, whether changed or not changed by any such order, or otherwise affects any other provision of this subcontract, an equitable adjustment shall be made:

- (i) In the estimated cost or delivery schedule, or both;
- (ii) In the amount of any fixed fee if any, to be paid to the Subcontractor; and
- (iii) In such other provisions of the subcontract as may be affected, and the subcontract shall be modified in writing accordingly.

Any claim by the Subcontractor for adjustment under this clause must be asserted within thirty (30) days from the date of receipt by the Subcontractor of the notification of change; Provided, however, that the SERI's Assistant Director, Contracts and Procurement, if he decides that the facts justify such action, may receive an act upon any such claim asserted at any time prior to final payment under this subcontract. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this subcontract entitled "Disputes". However, except as provided in paragraph (C) below, nothing in this clause shall excuse the Subcontractor from proceeding with the subcontract as changed.

C. Notwithstanding the provisions of paragraphs (A) and (B) above, the estimated cost of this subcontract and, if this subcontract is incrementally funded, the funds allotted for the performance thereof, shall not be increased or deemed to be increased except by specific written modification of the subcontract indicating the new subcontract estimated cost and, if this subcontract is incrementally funded, the new amount allotted to the subcontract. Until such modification is made, the Subcontractor shall not be obligated to continue performance or incur costs beyond the point established in the clause of this subcontract entitled "Limitation of Cost" or "Limitation of Funds".

CLAUSE 31 - STOP WORK ORDER

A. The SERI may at any time, by written order to the subcontractor require the subcontractor to stop all, or any part, of the work called for by this subcontract for a period of 90 days after the order is delivered to the subcontractor, and for any further period to which the parties may agree. Any such order shall be specifically identified as a stop work order issued pursuant to this Clause. Upon receipt of such an order, the subcontractor

question of fact within the meaning of the clause entitled "Disputes", of this subcontract.

CLAUSE 30 - CHANGES (Cost)

A. The SERI's Assistant Director, Contracts and Procurement may at any time, by a written order, and without notice to the sureties, if any, make changes, within the general scope of this subcontract, in any one or more of the following:

- (i) Drawings, designs, specifications, or statement of work;
- (ii) Method of shipment or packing; and
- (iii) Place of inspection, delivery, or acceptance.

B. If any such change causes an increase or decrease in the estimated cost of, or the time required for the performance of any part of the work under this subcontract, whether changed or not changed by any such order, or otherwise affects any other provision of this subcontract, an equitable adjustment shall be made:

- (i) In the estimated cost or delivery schedule, or both;
- (ii) In the amount of any fixed fee if any, to be paid to the Subcontractor; and
- (iii) In such other provisions of the subcontract as may be affected, and the subcontract shall be modified in writing accordingly.

Any claim by the Subcontractor for adjustment under this clause must be asserted within thirty (30) days from the date of receipt by the Subcontractor of the notification of change; Provided, however, that the SERI's Assistant Director, Contracts and Procurement, if he decides that the facts justify such action, may receive an act upon any such claim asserted at any time prior to final payment under this subcontract. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this subcontract entitled "Disputes". However, except as provided in paragraph (C) below, nothing in this clause shall excuse the Subcontractor from proceeding with the subcontract as changed.

C. Notwithstanding the provisions of paragraphs (A) and (B) above, the estimated cost of this subcontract and, if this subcontract is incrementally funded, the funds allotted for the performance thereof, shall not be increased or deemed to be increased except by specific written modification of the subcontract indicating the new subcontract estimated cost and, if this subcontract is incrementally funded, the new amount allotted to the subcontract. Until such modification is made, the Subcontractor shall not be obligated to continue performance or incur costs beyond the point established in the clause of this subcontract entitled "Limitation of Cost" or "Limitation of Funds".

CLAUSE 31 - STOP WORK ORDER

A. The SERI may at any time, by written order to the subcontractor require the subcontractor to stop all, or any part, of the work called for by this subcontract for a period of 90 days after the order is delivered to the subcontractor, and for any further period to which the parties may agree. Any such order shall be specifically identified as a stop work order issued pursuant to this Clause. Upon receipt of such an order, the subcontractor

shall forthwith comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Within a period of 90 days after a stop work order is delivered to the subcontractor, or within any extension of that period to which the parties shall have agreed, the SERI shall either:

(i) cancel the stop work order, or

(ii) terminate the work covered by such order as provided in the

"Termination Clause of this Subcontract."

B. If a stop work order issued under this clause is cancelled or the period of the order or any extension thereof expires, the subcontractor shall resume work. An equitable adjustment shall be made in the delivery schedule, the estimated cost, the fee, (if any), or a combination thereof, and in any other provisions of the subcontract that may be affected, and the subcontract shall be modified in writing accordingly, if:

(i) the stop work order results in an increase in the time required for, or in the Subcontractor's cost properly allocable to, the performance of any part of this subcontract, and

(ii) the subcontractor asserts a claim for such adjustments within 30 days after the end of the period of work stoppage; provided that, if the SERI decides the facts justify such action, it may receive and act upon any such claim asserted at any time prior to final payment under this subcontract.

C. If a stop work order is not cancelled and the work covered by such order is terminated for default, the reasonable costs resulting from the stop work order shall be allowed by equitable adjustments or otherwise.

CLAUSE 32 - FOREIGN TRAVEL

A. Foreign travel shall be subject to the prior approval of the SERI for each separate trip regardless of whether funds for such travel are contained in an approved budget. Foreign travel is defined as any travel outside of Canada and the United States and its territories and possessions.

B. Requests for approval shall be submitted at least 45 days prior to the planned departure date, on Form ERDA 445 (Request for Approval of Foreign Travel), and when applicable include Form ERDA 290 (Notification of Proposed Soviet-Bloc Travel).

CLAUSE 33 - PAYMENT FOR OVERTIME PREMIUMS

A. Allowable cost shall not include any amount on account of overtime premiums except when (1) specified in D, below, or (2) paid for work;

(i) Necessary to cope with emergencies such as those resulting from accidents, natural disasters, breakdowns of production equipment, or occasional production bottlenecks of a sporadic nature;

(ii) By indirect labor employees such as those performing duties in connection with administration, protection, transportation, maintenance, standby plant protection, operation of utilities, or accounting;

(iii) In the performance of tests, industrial processes, laboratory procedures, loading or unloading of transportation media, and operations in flight or afloat, which are continuous in nature and cannot reasonably be interrupted or otherwise completed; or

(iv) Which will result in lower cost to the SERI.

B. The cost of overtime premiums otherwise allowable under A, above, shall be allowed only to the extent the amount thereof is reasonable and properly allocable to the work under the subcontract.

C. Any request for overtime, in addition to any amount specified in D, below, will be for all overtime which can be estimated with reasonable certainty shall be used for the remainder of the subcontract, and shall contain the following: (1) Identification of the work unit, such as the department or section in which the requested overtime will be used, together with present workload, manning and other data of the affected unit, sufficient to permit an evaluation by the SERI of the necessity for the overtime; (2) the effect that the denial of the request will have on the delivery or performance schedule of the subcontract; (3) reasons why the required work cannot be performed on the basis of utilizing multishift operations or by the employment of additional personnel; and (4) the extent to which approval of overtime would affect the performance or payments in connection with any other SERI or Government subcontracts, together with any identification of such affected contracts.

D. The Subcontractor is authorized to perform overtime, in addition to that performed under A (2), only to the extent, if any, specified elsewhere in this subcontract.

CLAUSE 34 - INSURANCE LIABILITY TO THIRD PERSONS

A. The Subcontractor shall procure and thereafter maintain workmen's compensation, employee's liability, comprehensive general liability (bodily injury), and comprehensive automobile liability (bodily injury and property damage) insurance with respect to performance under this subcontract, and such other insurance as the SERI may from time to time require with respect to performance under this subcontract: provided, that the subcontractor may with the approval of the SERI maintain a self-insurance program; and Provided Further, that with respect to workmen's compensation the Subcontractor is qualified pursuant to a statutory authority. All insurance required pursuant to the provisions of this paragraph shall be in such form, in such amounts, and for such periods of time as the SERI may from time to time require or approve, and with insurers approved by the SERI.

B. The Subcontractor agrees, to the extent and in the manner required by the SERI to submit for the approval of the SERI any other insurance maintained by the Subcontractor in connection with the performance of this subcontract and for which the subcontractor seeks reimbursement hereunder.

C. The Subcontractor shall be reimbursed (1) for the portion allocable to this subcontract of the reasonable cost of insurance as required or approved pursuant to the provisions of this clause, and (2) without regard to and as an exception to the "Limitation of Cost" or the "Limitation of Funds" clause of this subcontract, for liabilities to third persons for loss of or for damage to property (other than property (i) owned, occupied, or used by the Subcontractor, or rented to the subcontractor or (ii) in the care custody or control of the Subcontractor), or for death or bodily injury, not compensated by insurance or otherwise, arising out of the performance of this subcontract, whether or not caused by the negligence of the Subcontractor, his agents, servants, or employees: Provided, such liabilities are represented by final judgments or by settlements approved in writing by the SERI and expenses

incidental to such liabilities, except liabilities (a) for which the Subcontractor is otherwise responsible under the express terms of the clause or clauses, if any, specified in the Schedule, or (b) with respect to which the Subcontractor has failed to insure as required or maintain insurance as approved by the SERI, or (c) which results from willful misconduct or lack of good faith on the part of any of the Subcontractor's directors, officers, or on part of any of his managers, superintendents, or other equivalent representatives, who has supervision or direction of (aa) all or substantially all of the Subcontractor's business, or (bb) all or substantially all of the Subcontractor's operations at any one plant or separate location in which this Subcontract is being performed or (cc), a separate and complete major industrial operation in connection with the performance of this Subcontract. The foregoing shall not restrict the right of the Subcontractor to be reimbursed for the cost of insurance maintained by the Subcontractor in connection with the performance of this Subcontract, other than insurance required to be submitted for approval or required to be procured and maintained pursuant to the provisions of this clause: Provided, such cost would constitute allowable cost under the clause of this Subcontract entitled "Allowable Cost, Fixed-Fee, and Payment" or the clause entitled "Allowable Cost and Payment", whichever is applicable for this subcontract.

D. The Subcontractor shall give SERI or its representatives immediate notice of any suit or action filed, or prompt notice of any claim made against the Subcontractor arising out of the performance of this subcontract, the cost and expense of which may be reimbursable to the Subcontractor under the provisions of this subcontract, and the risk of which is then uninsured or in which the amount claimed exceeds the amount of coverage. The Subcontractor shall furnish immediately to the SERI copies of all pertinent papers received by the Subcontractor. If the amount of the liability claimed exceeds the amount of the liability of coverage, the Subcontractor shall authorize representatives of the SERI to collaborate with counsel for the insurance carrier, if any, in settling or defending such claim. If the liability is not insured or covered by bond, the Subcontractor shall, if required by the SERI, authorize representatives of the SERI to settle or defend any such claim and to represent the Subcontractor in or take charge of any litigation in connection therewith: Provided, however, that the Subcontractor may, at its own expense, be associated with the representatives of the SERI in the settlement or defense or any such claim or litigation.

CLAUSE 35 - ALLOWABLE COSTS AND PAYMENT (EI)

A. For the performance of this Subcontract, the SERI shall pay to the Subcontractor the cost thereof (hereinafter referred to as "allowable cost") determined by the SERI to be allowable in accordance with:

(i) If this subcontract is with a non profit educational institution, the principles and procedures set forth in OMB Circular A-21 in effect on the effective date of this subcontract or:

If this subcontract is with a non profit organization other than an educational institution, Subpart 1-15.2 of the Federal Procurement Regulations (41 CFR 1-15.2) as supplemented or modified by DOE PR 9-15 (41 CFR 9-15), as in effect on the date of this Subcontract; and

(ii) The terms of this Subcontract.

B. Payments shall be made to the Subcontractor when requested as work progresses, but not more frequently than bi-weekly, in amounts approved by the SERI. The Subcontractor may submit to an authorized representative of the SERI, in such form and reasonable detail as such representative may require, an invoice or public voucher supported by a statement of cost for the performance of this Subcontract and claimed to constitute allowable cost. For this purpose, except as provided herein with respect to pension contributions, the term "costs" shall include only those recorded costs which result, at the time of the request for reimbursement, from payment by cash, check, or other form of actual payment for items or services purchased directly for the Subcontract, together with (when the Subcontractor is not delinquent in payment of costs of Subcontract performance in the ordinary course of business) costs incurred, but not necessarily paid, for materials which have been issued from the Subcontractor's stores inventory and placed in the production process for use on the Subcontract, for direct labor, for direct travel, for other direct inhouse costs, and for properly allocable and allowable indirect costs, as is shown by records maintained by the Subcontractor for purposes of obtaining reimbursement under Government contracts plus the amount of progress payments which have been paid to the Subcontractor's lower tier subcontractors under similar cost standards. In addition, when pension contributions are paid by the Subcontractor to the retirement fund less frequently than quarterly, accrued costs therefor shall be excluded from indirect costs for payment purposes until such costs are paid. If pension contributions are paid on a quarterly or more frequent basis, accruals therefor may be included in indirect costs for payment purposes provided that they are paid to the fund within 30 days after the close of the period covered. If payments are not made to the fund within such 30-day period, pension contribution costs shall be excluded from indirect costs for payment purposes until payment has been made. The restriction on payment more frequently than bi-weekly and the requirement of prior payment for items or services purchased directly for the contract shall not apply when the Subcontractor is a small business concern.

C. Promptly after receipt of each invoice or voucher and statement of cost, the SERI shall, except as otherwise provided in this Subcontract subject to the provisions of D, below, make payment thereon as approved by the SERI.

After payment of an amount equal to 80 percent of the total estimated cost of performance of this Subcontract set forth in the Schedule, the SERI may withhold further payment on account of allowable cost until a reserve shall have been set aside in an amount which it considers necessary to protect the interests of the SERI, but such reserve shall not exceed 1 percent of such total estimated cost or \$10,000, whichever is less.

D. At any time or times prior to final payment under this Subcontract the SERI may have the invoices or vouchers and statements of cost audited. Each payment theretofore made shall be subject to reduction for amounts included in the related invoice or voucher which are found by the SERI on the basis of such audit, not to constitute allowable cost. Any payment may be reduced for overpayments, or increased for underpayments, on preceding invoices or vouchers.

E. On receipt and approval of the invoice or voucher designated by the Subcontractor as the "completion invoice" or "completion voucher" and upon compliance by the Subcontractor with all the provisions of this Subcontract (including, without limitation, the provisions relating to patents and the provisions of F, below), the SERI shall promptly pay to the Subcontractor any balance of allowable cost, which has been withheld pursuant to C, above, or otherwise not paid to the Subcontractor. The completion invoice or voucher

shall be submitted by the Subcontractor promptly following completion of the work under this Subcontract but in no event later than 1 year (or such longer period as the SERI may in its discretion approve in writing) from the date of such completion.

F. The Subcontractor agrees that any refunds, rebates, credits, or other amounts (including any interest thereon) accruing to or received by the Subcontractor or any assignee under this Subcontract shall be paid by the Subcontractor to the SERI to the extent that they are properly allocable to costs for which the Subcontractor has been reimbursed by the SERI under this subcontract. Reasonable expenses incurred by Subcontractor for the purpose of securing such refunds, rebates, credits, or other amounts shall be allowable costs hereunder when approved by the SERI. Prior to final payment under this Subcontract, the Subcontractor and each assignee under this Subcontract whose assignment is in effect at the time of final payment under this Subcontract shall execute and deliver:

1. An assignment to the Government, in form and substance satisfactory to the SERI of refunds, rebates, credits or other amounts (including any interest thereon) properly allocable to costs for which the Contractor has been reimbursed by the SERI under this Subcontract; and

2. A release discharging the SERI, its officers, agents, and employees from all liabilities, obligations, and claims arising out of or under this Subcontract, subject only to the following exceptions:

(i) Special claims in stated amounts or in estimated amounts where the amounts are not susceptible of exact statement by the Subcontractor;

(ii) Claims together with reasonable expenses incidental thereto, based upon liabilities of the Subcontractor to third parties arising out of the performance of this Subcontract: Provided, however, that such claims are not known to the Subcontractor on the date of the execution of the release; and provided further, that the Subcontractor gives notice of such claims in writing to the SERI not more than 6 years after the date of the release or the date of any notice to the Subcontractor that the SERI is prepared to make final payment, whichever is earlier; and

(iii) Claims for reimbursement of costs (other than expenses of the Subcontractor by reason of its indemnification of the SERI and the Government against patent liability), including reasonable expenses incidental thereto, incurred by the Subcontractor under the provisions of this Subcontract relating to patents.

G. Any cost incurred by the Subcontractor under the terms of this Subcontract which would constitute allowable cost under the provisions of this clause shall be included in determining the amount payable under this Subcontract, notwithstanding any provisions contained in the specifications or other documents incorporated in this Subcontract by reference, designating services to be performed or materials to be furnished by the Subcontractor at his expense or without cost to the SERI.

CLAUSE 36 - LIMITATION OF COST

A. It is estimated that the total cost to the SERI for the performance of this subcontract, exclusive of fee (if any), will not exceed the estimated cost set forth in the Schedule, and the Subcontractor agrees to use his best efforts to perform the work specified in the Schedule and all obligations

under this subcontract within such estimated cost. If, at any time, the Subcontractor has reason to believe that the costs which he expects to incur in the performance of this subcontract in the next succeeding 60 days, when added to all costs previously incurred, will exceed 75 percent of the estimated cost then set forth in the Schedule, or if, at any time, the Subcontractor has reason to believe that the total cost to the SERI for the performance of this subcontract, exclusive of fee (if any), will be greater or substantially less than the then estimated cost hereof, the Subcontractor shall notify the SERI in writing to that effect, giving the revised estimate of such total cost for the performance of this subcontract.

B. Except as required by other provisions of this subcontract specifically citing and stated to be an exception from this clause, the SERI shall not be obligated to reimburse the Subcontractor for costs incurred in excess of the estimated cost set forth in the Schedule, and the Subcontractor shall not be obligated to continue performance under the subcontract (including actions under the "Termination" Clause) or otherwise to incur costs in excess of the estimated cost set forth in the Schedule, unless and until the SERI shall have notified the Subcontractor in writing that such estimated cost has been increased and shall have specified in such notice a revised estimated cost which shall thereupon constitute the estimated cost of performance of the subcontract. No notice, communication, or representation in any other form or from any person other than the SERI's Subcontract Administrator shall affect the estimated cost of this subcontract. In the absence of the specified notice, the SERI shall not be obligated to reimburse the Subcontractor for any costs in excess of the estimated cost set forth in the Schedule, whether those excess costs were incurred during the course of the subcontract or as a result of termination. When and to the extent that the estimated cost set forth in the Schedule has been increased, any costs incurred by the Subcontractor in excess of the estimated cost prior to such increase shall be allowable to the same extent as if such costs had been incurred after the increase; unless the SERI issues a termination or other notice and directs that the increase is solely for the purpose of covering termination or other specified expense.

C. Change orders issued pursuant to the Changes clause of this subcontract shall not be considered an authorization to the subcontractor to exceed the estimated cost set forth in paragraph A of Article 4 of the Schedule in the absence of a statement in the change order, or other subcontract modification, increasing the estimated cost.

D. In the event that this subcontract is terminated or the estimated cost not increased, the SERI and the subcontractor shall negotiate an equitable distribution of all property produced or purchased under the subcontract based upon the share of costs incurred by each.

CLAUSE 37 - TERMINATION FOR CONVENIENCE OF THE SERI

A. The performance of work under this subcontract may be terminated, in whole or from time to time in part, by the SERI whenever for any reason the SERI shall determine that such termination is in the best interest of the SERI. Termination of work hereunder shall be effected by delivery to the Subcontractor of a Notice of Termination specifying the extent to which performance of work under the subcontract is terminated and the date upon which such termination becomes effective.

B. After receipt of the Notice of Termination the Subcontractor shall cancel his outstanding commitments hereunder covering the procurement of

materials, supplies, equipment, and miscellaneous items. In addition, the Subcontractor shall exercise all reasonable diligence to accomplish the cancellation or diversion of his outstanding commitments covering personal services and extending beyond the date of such termination to the extent that they relate to the performance of any work terminated by the notice. With respect to such canceled commitments the Subcontractor agrees to (1) settle all outstanding liabilities and all claims arising out of such cancellation of commitments, with the approval or ratification of the SERI, to the extent he may require, which approval or ratification shall be final for all purposes of this clause, and (2) assign to the SERI in the manner, at the time, and to the extent directed by the SERI, all of the right, title, and interest of the Subcontractor under the orders and lower tier subcontracts so terminated, in which case SERI shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and lower tier subcontracts.

C. The Subcontractor shall submit his termination claim to the SERI promptly after receipt of a Notice of Termination, but in no event later than one year from the effective date thereof, unless one or more extensions in writing are granted by the SERI upon written request of the Subcontractor within such one-year period or authorized extension thereof. Upon failure of the Subcontractor to submit his termination claim within the time allowed, the SERI may, subject to any review required by its procedures in effect as of the date of execution of this subcontract, determine, on the basis of information available to him, the amount, if any, due to the Subcontractor by reason of the termination and shall thereupon pay to the Subcontractor the amount so determined.

D. Any determination of costs under paragraph C shall be governed by the contract cost principles and procedures in OMB Circular A-21 in effect on the date of this subcontract, except that if the subcontractor is not an educational institution any costs claimed, agreed to, determined pursuant to paragraph C or E hereof shall be in accordance with subpart 1-15.2 of the Federal Procurement regulations, as supplemented or modified by DOE-PR Part 9-15 (41 CFR 9-15) in effect on the date of this subcontract.

E. Subject to the provisions of paragraph C above, and subject to any review required by SERI's procedures in effect as of the date of execution of this Subcontract, the Subcontractor and the SERI may agree upon the whole or any part of the amount or amounts to be paid to the Subcontractor by reason of the termination under this clause, which amount or amounts may include any reasonable cancellation charges thereby incurred by the Subcontractor and any reasonable loss upon outstanding commitments for personal services which it is unable to cancel: provided, however, that in connection with any outstanding commitments for personal services which the Subcontractor is unable to cancel, the Subcontractor shall have exercised reasonable diligence to divert such commitments to his other activities and operations. Any such agreement shall be embodied in an amendment to this Subcontract and the Subcontractor shall be paid the agreed amount.

F. The SERI may from time to time, under such terms and conditions as it may prescribe, make partial payments against costs incurred by the Subcontractor in connection with the terminated portion of this Subcontract whenever, in the opinion of the SERI, the aggregate of such payments is within the amount to which the Subcontractor will be entitled hereunder. If the total of such payments is in excess of the amount finally agreed or determined to be due under this clause, such excess shall be payable by the Subcontractor to the SERI upon demand: provided, that if such excess is not so paid upon demand

interest thereon shall be payable by the Subcontractor to the SERI at the rate established by the Secretary of the Treasury pursuant to Pub. L. 92-41 (50 U.S.C. App. 1215 (b) (2)) for the Renegotiation Board, beginning 30 days from the date of such demand.

G. The Subcontractor agrees to transfer title to the SERI and deliver in the manner, at the time, and to the extent, if any, directed by the SERI, such information and items which, if the contract had been completed, would have been required to be furnished to the SERI, including:

1. Completed or partially completed plans, drawings, and information; and

2. Materials or equipment produced or in progress or acquired in connection with the performance of the work terminated by the notice.

Other than the above, any termination inventory resulting from the termination of the contract may, with the written approval of the SERI, be sold or acquired by the Subcontractor under the conditions prescribed by and at a price or prices approved by the SERI. The proceeds of any such disposition shall be applied in reduction of any payments to be made by the SERI to the Subcontractor under this Subcontract or shall otherwise be credited to the price or cost of work covered by this Subcontract or paid in such other manner as the SERI may direct. Pending final disposition of property arising from the termination, the Subcontractor agrees to take such action as may be necessary, or as the SERI may direct, for the protection and preservation of the property related to this Subcontract which is in the possession of the Subcontractor and in which the SERI has or may acquire an interest.

H. Any disputes as to questions of fact which may arise hereunder shall be subject to the "Disputes" clause of this subcontract.

CLAUSE 38 - NEGOTIATED OVERHEAD RATES--PREDETERMINED (EI)

(Applicable if this subcontract is with an Educational Institution)

A. Notwithstanding the provisions of the clause of this subcontract entitled "Allowable Cost and Payment," the allowable indirect costs under this subcontract shall be obtained by applying predetermined overhead rates to bases agreed upon by the parties, as specified in the schedule.

B. The Subcontractor, as soon as possible but not later than three (3) months after the close of his fiscal year, or such other period as may be specified in the subcontract, shall submit to the Subcontract Administrator, with a copy to the cognizant audit activity, a proposed predetermined overhead rate or rates based on the Subcontractor's actual cost experience during that period, together with supporting cost data. Negotiation of predetermined overhead rates by the Subcontractor and the Subcontract Administrator shall be undertaken as promptly as practicable after receipt of the Subcontractor's proposal.

C. Allowability of costs and acceptability of cost allocation methods shall be determined in accordance with OMB Circular A-21 as in effect on the effective date of this subcontract.

D. The results of each negotiation shall be set forth in a modification to this subcontract, which shall specify (1) the agreed predetermined overhead rates, (2) the bases to which rates apply, (3) the fiscal year unless the parties agree to a different period for which the rates apply, and (4) the specific items treated as direct costs or any changes in the items previously agreed to be direct costs.

E. Pending establishment of predetermined overhead rates for the initial period of subcontract performance, or for any fiscal year or different period agreed to by the parties, the Subcontractor shall be reimbursed either at: (1) the rates fixed for the previous fiscal year or other period, or (2) billing rates acceptable to the Subcontract Administrator, subject to appropriate adjustment when the final rates for that fiscal year or other period are established.

F. Any failure by the parties to agree on any predetermined overhead rate or rates under this clause shall not be considered a dispute concerning a question of fact for decision by the SERI within the meaning of the "Disputes" clause of this subcontract. If for any fiscal year or other period of subcontract performance the parties fail to agree to a predetermined overhead rate or rates, it is agreed that the allowable indirect costs under this subcontract shall be obtained by applying negotiated final overhead rates in accordance with the terms of the "Negotiated Overhead Rates--Postdetermined" clause set forth in 1-3.704-2(a) (41 CFR 1-3.-704-2(a)), as in effect on the date of this subcontract.

CLAUSE 39 - NEGOTIATED OVERHEAD RATES (Postdetermined)

This clause is applicable if this subcontract is with a non-profit concern other than an Educational Institution)

A. Notwithstanding the provisions of the clause of the subcontract entitled: "Allowable Cost, Fixed Fee, and Payment" the allowable indirect costs under this subcontract shall be obtained by applying negotiated overhead rates to bases agreed upon by the parties, as specified below.

B. The Subcontractor, as soon as possible but not later than ninety (90) days after the expiration of his fiscal year, or such other period as may be specified in the subcontract, shall submit to the SERI, with a copy to the cognizant audit activity, a proposed final overhead rate or rates for that period based on the Subcontractor's actual cost experience during that period, together with supporting cost data. Negotiation of overhead rates by the Subcontractor and the SERI shall be undertaken as promptly as practicable after receipt of the Subcontractor's proposal.

C. Allowability of costs and acceptability of cost allocation methods shall be determined in accordance with the clause entitled "Allowable Cost Fixed Fee and Payment" as in effect on the date of this subcontract.

D. The results of each negotiation shall be set forth in a modification to this subcontract, which shall specify (1) the agreed final rates, (2) the bases to which the rates apply, and (3) the periods for which the rates apply.

E. Pending establishment of final overhead rates for any period, the Subcontractor shall be reimbursed either at negotiated provisional rates as provided in the subcontract, or at billing rates acceptable to the SERI, subject to appropriate adjustment when the final rates for that period are established. To prevent substantial over or under payment, and to apply either retroactively or prospectively: (1) Provisional rates may, at the request of either party, be revised by mutual agreement, and (2) billing rates may be adjusted at any time by the SERI. Any such revision of negotiated provisional rates provided in the subcontract shall be set forth in a modification to this subcontract.

F. Any failure by the parties to agree on any final rates under this clause shall be considered a dispute concerning a question of fact for decision by the SERI within the meaning of the "Disputes" clause of this subcontract.

CLAUSE 40 - LOWER TIER SUBCONTRACTS

A. The Subcontractor shall notify the SERI reasonably in advance of entering into a lower tier subcontract which (1) is cost-reimbursement type, time and materials, or labor-hour or (2) is fixed-price type and exceeds in dollar amount either \$25,000 or 5 percent of the total estimated cost of this subcontract, or (3) provides for the fabrication, purchase, rental, installation, or other acquisition of special test equipment having a value in excess of \$1,000 or any items of industrial facilities, or (4) has experimental, developmental, or research work as one of its purposes.

B. In the case of a proposed lower tier subcontract which is (1) cost-reimbursement type, time and materials, or labor-hour which would involve an estimated amount in excess of \$10,000, including any fee, (2) is proposed to exceed \$100,000, or (3) is one of a number of lower tier subcontracts under this subcontract with a single subcontractor for the same or related supplies or services which, in the aggregate are expected to exceed \$100,000, the advance notification required by A above, shall include:

1. A description of the supplies or services to be called for by the subcontract;
2. Identification of the proposed lower tier subcontractor and an explanation of why and how the proposed lower tier subcontractor was selected, including the degree of competition obtained;
3. The proposed lower tier subcontract price, together with the Subcontractor's cost or price analysis thereof;
4. The lower tier subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data when such data and certificate are required by other provisions of this subcontract to be obtained from the lower tier subcontractor;
5. Identification of the type of lower tier subcontract to be used;
6. A memorandum of negotiation which sets forth the principal elements of the lower tier subcontract price negotiations. A copy of this memorandum shall be retained in the subcontractor's file for the use of the SERI or the Government reviewing authorities. The memorandum shall be in sufficient detail to reflect the most significant considerations controlling the establishment of initial or revised price. The memorandum should include an explanation of why cost or pricing data was, or was not required, and, if it was not required in the case of any price negotiation in excess of \$100,000, a statement of the basis for determining that the price resulted from or was based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation. If cost or pricing data was submitted and a certificate of cost or pricing data was required, the memorandum shall reflect the extent to which reliance as not placed upon the factual cost or pricing data was not used by the Subcontractor in determining the total price objective and in negotiating the final price. The memorandum shall also reflect the extent to

which it was recognized in the negotiation that any cost or pricing data submitted by the subcontractor was not accurate, complete, or current; the action taken by the Subcontractor and the lower tier subcontractor as a result; and the effect, if any, of such defective data on the total price negotiated. Where the total price negotiated differs significantly from the Subcontractor's total price objective, the memorandum shall explain this difference;

7. When incentives are used, the memorandum of negotiation shall contain an explanation of the incentive fee/profit plan identifying each critical performance element, reasons for incentives on particular performance characteristics, and a brief summary of trade-off possibilities considered as to cost, performance, and time;

8. The lower tier subcontractor's Disclosure Statement or Certificate to Cost Accounting Standards when such data are required by other provisions of this subcontract to be obtained from the lower tier subcontractor; and

9. A copy of the proposed lower tier subcontract if it either (a) exceeds \$100,000 or (b) is otherwise required by the SERI.

C. The Subcontractor shall obtain the written consent of the SERI prior to placing any lower tier subcontract for which advance notification is required under A above. The SERI may, in its discretion, ratify in writing any such lower tier subcontracts; such action shall constitute the consent of the SERI as required by this paragraph C.

D. The Subcontractor agrees that no lower tier subcontract placed under this subcontract shall provide for payment on a cots-plus-a-percentage-of-cost-basis.

E. The SERI may, in its discretion, specifically approve in writing any of the provisions of a lower tier subcontract. However, such approval or the consent of the SERI obtained as required by this article shall not be construed to constitute a determination of the allowability of any cost under this subcontract, unless such approval specifically provides that it constitutes a determination of the allowability of such cost.

F. The Subcontractor shall give the SERI immediate notice in writing of any action or suit filed, and prompt notice of any claim made against the Subcontractor by any lower tier subcontractor or vendor which in the opinion of the Subcontractor, may result in litigation, related in any way to this subcontract, with respect to which the Subcontractor may be entitled to reimbursement from the SERI.

G. Notwithstanding C above, the Subcontractor may enter into lower tier subcontracts within 1 or 2 of A above, without the consent of the SERI, if the SERI has approved in writing the Subcontractor's procurement system and the lower tier subcontract is within the scope of such approval. (This paragraph G however, shall not be applicable to those lower tier subcontracts subject to sub-paragraph J below, if any.)

H. To facilitate small business participation in lower tier subcontracting under this subcontract, the Subcontractor agrees to provide progress payments on the fixed-price types of lower tier subcontracts of those lower tier subcontractors which are small business concerns, in conformity with the standards for customary progress payments stated in the Federal Procurement Regulations, Subpart 1-30.5, as in effect on the date of this subcontract. The Subcontractor further agrees that the need for such progress payments will not be considered as a handicap or adverse factor in the award of lower tier subcontracts.

I. The Subcontractor agrees to insert the substance of this ^{CLAUSE} article including this paragraph I, in any lower tier subcontract hereunder which is a cost-reimbursement, time and materials, or labor-hour type which would involve an estimated amount in excess of \$10,000, including any fee; except that any such lower tier subcontract shall provide that required requests and notifications by the lower tier subcontractor shall be to the next higher tier subcontractor, or as the case may be, Subcontractor.

APPENDIX C-2

INTELLECTUAL PROPERTY PROVISIONS
FOR SUBCONTRACTS WITH
EDUCATIONAL AND NON-PROFIT INSTITUTIONS

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APPENDIX C-2

INTELLECTUAL PROPERTY PROVISIONS

CLAUSE 1 - AUTHORIZATION AND CONSENT

The Government has given its authorization and consent for all use and manufacture of any invention described in and covered by a patent of the United States in the performance of this subcontract or any part hereof or any amendment hereto or any lower tier subcontract hereunder (including all lower tier subcontracts).

CLAUSE 2 - NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT

(This article shall be applicable only if the amount of this subcontract exceeds \$10,000.)

A. The Subcontractor shall report to the Government through the SERI promptly and in reasonable written detail each notice or claim of patent or copyright infringement based on the performance of this subcontract of which the Subcontractor has knowledge.

B. In the event of any claim or suit against the SERI or the Government on account of any alleged patent or copyright infringement arising out of the performance of this subcontract or out of the use of any supplies furnished or work or services performed hereunder, the Subcontractor shall furnish to the SERI or Government when requested by the Government or the SERI all evidence and information in possession of Subcontractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Subcontractor has agreed to indemnify the Government or the SERI.

C. This article shall be included in all lower tier subcontracts.

CLAUSE 3 - REPORTING OF ROYALTIES

If this subcontract is in an amount which exceeds \$10,000 and if any royalty payments are directly involved in the subcontract or are reflected in the subcontract price to the SERI, the Subcontractor agrees to report in writing to the Government through the SERI during the performance of this subcontract and prior to its completion or final settlement the amount of any royalties or other payments paid or to be paid by it directly to others in connection with the performance of this subcontract together with the names and addresses of licensors to whom such payments are made and either the patent numbers involved or such other basis on which the royalties are to be paid. The approval of the DOE or the SERI of any individual payments or royalties shall not stop the SERI or the Government at any time from contesting the enforceability, validity or scope of, or title to, any patent under which a royalty or payment are made.

CLAUSE 4 - PATENT RIGHTS (SHORT FORM)

A. Definitions

1. "Subject Invention" means any invention or discovery of the Subcontractor conceived or first actually reduced to practice in the

course of or under this subcontract, and includes any art, method, process, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of plants, whether patented or unpatented, under the Patent Laws of the United States of America or any foreign country.

2. "Patent Counsel" means the DOE Patent Counsel assisting the procuring activity.

B. Invention disclosures and reports

1. The Subcontractor shall furnish the Patent Counsel (with notification by Patent Counsel to the Contracting Officer):

(i) A written report containing full and complete technical information concerning each Subject Invention within 6 months after conception or first actual reduction to practice whichever occurs first in the course of or under this subcontract, but in any event prior to any on sale, public use, or public disclosure of such invention known to the Subcontractor. The report shall identify the subcontract and the inventor and shall be sufficiently complete in technical detail and appropriately illustrated by sketch or diagram to convey to one skilled in the art to which the invention pertains a clear understanding of the nature, purpose, operation, and to the extent known, the physical, chemical, biological, or electrical characteristics of the invention.

(ii) Upon request, but not more than annually, interim reports on DOE-approved form listing Subject Inventions for that period and certifying that all Subject Inventions have been disclosed or that there were no such inventions; and

(iii) A final report on a DOE-approved form within 3 months after completion of the subcontract work listing all Subject Inventions and certifying that all Subject Inventions have been disclosed or that there were no such inventions.

2. The Subcontractor agrees that the Government may duplicate and disclose Subject Invention disclosures and all other reports and papers furnished or required to be furnished pursuant to the subcontract.

C. Allocation of principal rights

1. Assignment to the Government. The Subcontractor agrees to assign to the Government the entire right, title, and interest throughout the world in and to each Subject Invention, except to the extent that rights are retained by the Subcontractor under paragraphs C(2), and D of this clause.

2. Greater rights determinations. The Subcontractor, or the employee-inventor with authorization of the Subcontractor, may request greater rights than the nonexclusive license and the foreign patent rights provided in paragraph D of this clause on identified inventions in accordance with the procedure and criteria of 41 CFR 9-9-109-6. A request for a determination of whether the Subcontractor or the employee-inventor is entitled to retain such greater rights must be submitted to the Patent Counsel at the time of the first disclosure of the Invention pursuant to paragraph B(1) of this clause or not later than 9 months after conception or first actual reduction to practice, whichever occurs first, or such longer period as may be authorized by the Patent Counsel for good cause shown in writing by the Subcontractor. The information to be submitted for a greater rights determination is specified in 41 CFR 9-9-109-6(e).

D. Minimum rights to the Subcontractor

The Subcontractor reserves a revocable, nonexclusive, paid-up license in each patent application filed in any country on a Subject Invention and any resulting patent in which the Government acquires title. Revocation shall be in accordance with the procedure of paragraph C(2) and (3) of the clause in 41 CFR 9-9.107-5(a). The Subcontractor also has the right to request foreign rights in accordance with the procedures of paragraph (c)(4) of the clause in 41 CFR 9-9.107-5(a).

E. Employee and lower tier subcontractor agreements

Unless otherwise authorized in writing by DOE via SERI, the Subcontractor shall:

1. Obtain patent agreements to effectuate the provisions of the Patent Rights clause from all persons in its employ who perform any part of the work under this subcontract except nontechnical personnel, such as clerical employees and manual laborers.

2. Unless otherwise authorized or directed by the DOE via SERI, the Subcontractor shall include the Patent Rights clause of 41 CFR 9-9.107-5(a) or 41 CFR 9-9.107-6, as appropriate, modified to identify the parties in any lower tier subcontract hereunder having as a purpose the conduct of research, development or demonstration work; and

3. Promptly notify the DOE through the SERI in writing upon the award of any lower tier subcontract containing a Patent Rights clause by identifying the Subcontractor, the work to be performed under the lower tier subcontract, and the dates of award, and estimated completion. Upon request of the DOE or the SERI the Subcontractor shall furnish a copy of the lower tier subcontract to such requestor.

F. Publication

In order that information concerning scientific or technical developments conceived or first actually reduced to practice in the course of or under the subcontract is not prematurely published so as to adversely affect patent interest of DOE, the Subcontractor agrees to submit to the Patent Counsel for patent review a copy of each paper 60 days prior to its intended publication date. The Subcontractor may publish such information after expiration of a 60-day period following such submission or prior thereto if specifically approved by Patent Counsel, unless the Subcontractor is informed in writing that in order to protect patentable subject matter, publication must be further delayed. In this event, publication shall be delayed up to 100 days beyond the 60 day period or such longer period as mutually agreed to.

CLAUSE 5 - RIGHTS IN TECHNICAL DATA (SHORT FORM)

A. Definitions

1. "Technical Data" means recorded information, regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental, or demonstration, or engineering work or be usable or used to define a design or process or to procure, produce, support, maintain, or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specification or related performance or design type documents or computer software (including computer programs, computer software data bases, and computer software documentation). Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification and related information. Technical data as used herein does not include financial reports, cost analyses and other information incidental to contract administration.

2. "Proprietary Data" means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data:

- (i) Are not generally known or available from other sources without obligation concerning their confidentiality,
- (ii) Have not been made available by the owner to others without obligation concerning their confidentiality, and
- (iii) Are not already available to the Government without obligation concerning their confidentiality.

3. "Contract Data" means technical data first produced in the performance of the subcontract, technical data which are specified to be delivered in the subcontract, technical data that may be called for under the "Additional Technical Data Requirements" article of the subcontract, if any, or technical data actually delivered in connection with the subcontract.

4. "Unlimited Rights" means rights to use, duplicate, or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to permit others to do so.

B. Allocation of rights

1. The Government shall have:

(i) Unlimited rights in technical data first produced or specifically used in the performance of this subcontract;

(ii) The right of the SERI or the Government or their representatives to inspect at all reasonable times up to three (3) years after final payment under this subcontract all technical data first produced or specifically used in the subcontract. (for which inspection the Subcontractor or its lower tier subcontractor shall afford proper facilities to DOE or the SERI).

(iii) The right to have any technical data first produced or specifically used in the performance of this subcontract delivered to the Government as the SERI or the Government may from time to time direct during the progress of the work or in any event as the SERI or the Government shall direct upon completion or termination of this subcontract.

2. The Subcontractor shall have:

The right to use for its private purposes, subject to patent, security or other provisions of this subcontract, technical data it first produces in the performance of this subcontract provided the data requirements of this subcontract have been met as of the date of the private use of such data. The Subcontractor agrees that to the extent it receives or is given access to proprietary data or other technical, business or financial data in the form of recorded information from DOE or a DOE Contractor or Subcontractor, the Subcontractor shall treat such data in accordance with any restrictive legend contained thereon, unless use is specifically authorized by prior written approval of DOE via SERI.

C. Copyrighted Material

1. The Subcontractor agrees to, and does hereby grant to the Government, and SERI, and to its officers, agents, servants and employees acting within the scope of their duties:

- (i) A royalty-free, nonexclusive, irrevocable license to reproduce, translate, publish, use and dispose of and to authorize others

to do so, all copyrightable material first produced or composed in the performance of this subcontract by the Subcontractor, its employees or any individual or concern specifically employed or assigned to originate and prepare such material; and

(ii) A license as aforesaid under any and all copyrighted or copyrightable works not first produced or composed by the Subcontractor in the performance of this subcontract but which are incorporated in the material furnished under the subcontract, provided that such license shall be only to the extent the Subcontractor now has, or prior to completion or final settlement of the subcontract may acquire, the right to grant such license without becoming liable to pay compensation to others solely because of such grant.

2. The Subcontractor agrees that it will not knowingly include any material copyrighted by others in any written or copyrightable material furnished or delivered under this subcontract without a license as provided for in subparagraph (1)(ii) hereof, or without the consent of the copyright owner, unless it obtains specific written approval of the Government via the SERI for the inclusion of such copyrighted material.

APPENDIX D-3

CLAUSES FOR SUBCONTRACTS IN EXCESS OF \$100,000
WITH EDUCATIONAL INSTITUTIONS

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APPENDIX D-3

CLAUSES FOR SUBCONTRACTS IN EXCESS OF \$100,000
WITH EDUCATIONAL INSTITUTIONS

CLAUSE 1 - PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA

(Applicable only if this subcontract exceeds \$100,000).

If any price, including profit or fee, negotiated in connection with this subcontract or any cost reimbursable under this subcontract was increased by any significant sums because:

A. The Subcontractor furnished cost or pricing data which was not accurate, complete and current as certified in the Subcontractor's Certificate of Current Cost or Pricing Data;

B. A sub-subcontractor, pursuant to the clause of this subcontract entitled "Sub-Subcontractor Cost or Pricing Data" or "Sub-Subcontractor Cost or Pricing Data - Price Adjustment" or any subcontract clause therein required, furnished cost or pricing data which was not accurate, complete and current as certified in the Sub-Subcontractor's Certificate of Current Cost or Pricing Data;

C. A sub-subcontractor or prospective sub-subcontractor furnishing cost or pricing data which was required to be accurate, complete and current and to be submitted to support a sub-subcontract cost estimate furnished by the Subcontractor but which was not accurate, complete and current as of the date certified in the Subcontractor's Certificate of Current Cost or Pricing Data;
or

D. The Subcontractor or a sub-subcontractor or prospective sub-subcontractor furnished any data, not within A., B., or C. above, which was not accurate as submitted; the price or cost shall be reduced accordingly and the subcontract shall be modified in writing as may be necessary to reflect such reduction. However, any reduction in the subcontract price due to defective sub-subcontract data or a prospective sub-subcontractor when the sub-subcontract was not subsequently awarded to such sub-subcontractor, will be limited to the amount (plus applicable overhead and profit markup) by which the actual sub-subcontract or actual cost to the Subcontractor if there was no sub-subcontract, was less than the prospective sub-subcontract cost estimate submitted by the Subcontractor; provided, the actual sub-subcontract price was not affected by defective cost or pricing data.

Note: Since the subcontract is subject to reduction under this clause by reason of defective cost or pricing data submitted in connection with certain sub-subcontracts, it is expected that the Subcontractor may wish to include a clause in each such sub-subcontract requiring the sub-subcontractor to appropriately indemnify the Subcontractor. It is also expected that any sub-subcontractor subject to such indemnification will generally require substantially similar indemnification for defective cost or pricing data required to be submitted by his lower tier subcontractors.

CLAUSE 2 - LOWER TIER SUBCONTRACTOR COST OR PRICING DATA

(This clause is applicable if this subcontract exceeds \$100,000)

A. The Subcontractor shall require lower tier subcontractors hereunder to submit, actually or by specific identification in writing, cost or pricing

data under the following circumstances;

1. prior to award of any lower tier subcontract the amount of which is expected to exceed \$100,000 when entered into;

2. prior to the pricing of any lower tier subcontract modification which involves aggregate increases and/or decreases in cost plus applicable profits expected to exceed \$100,000; except where the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

B. The Subcontractor shall require lower tier subcontractors to certify, in substantially the same form as that used in the certificate by the Subcontractor to the SERI that to the best of their knowledge and belief, the cost and pricing data submitted under A. above is accurate, complete, and current as of the date of agreement of the negotiated price of the lower tier subcontract or lower tier subcontract change or modification.

C. The Subcontractor shall insert the substance of this clause, including this paragraph in each lower tier subcontract hereunder which exceeds \$100,000 when entered into except where the price thereof is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation. In each such excepted lower tier subcontract hereunder in excess of \$100,000 the Subcontractor shall insert the substance of the following clause:

Lower Tier Sub-Subcontractor Cost or Pricing Data-Price Adjustments

1. Paragraphs 2 and 3 of this clause shall become operative only with respect to any modification made pursuant to one or more provisions of this subcontract which involves aggregate increases and/or decreases in cost plus applicable profits expected to exceed \$100,000. The requirements of this clause shall be limited to such subcontract modifications.

2. The Subcontractor shall require lower tier subcontractors hereunder to submit, actually or by specific identification in writing, cost or pricing data under the following circumstances:

(a) prior to award of any lower tier subcontract, the amount of which is expected to exceed \$100,000 when entered into;

(b) prior to the pricing of any lower tier subcontract modification which involves aggregate increases and/or decreases except where the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

3. The Subcontractor shall require lower tier subcontractors to certify in substantially the same form as that used in the certificate by the Subcontractor to the SERI that to the best of their knowledge and belief the cost or pricing data submitted under 2., above is accurate, complete and current as of the date of agreement on the negotiated price of the subcontract or lower tier subcontract change or modification.

4. The Subcontractor shall insert the substance of this clause including this paragraph 4 in each lower tier subcontract hereunder which exceeds \$100,000 when entered into.

CLAUSE 3 - CLEAN AIR AND WATER

(Applicable only if the subcontract exceeds \$100,000, or the SERI has determined that the subcontracts under an indefinite quantity subcontract in any one year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA or the subcontract is not otherwise exempt.

A. The Subcontractor agrees as follows:

1. To comply with all requirements of Section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by Public Law 91-604) and Section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251, as amended by Public Law 92-500), respectively, relating to inspection, monitoring, entry reports, and information, as well as other requirements specified in Section 114 and Section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this subcontract.

2. That no portion of the work required by this subcontract will be performed in a facility listed on the Environmental Protection Agency list of violating facilities on the date when this subcontract was awarded unless and until the EPA eliminates the name of such facility or facilities from such listing.

3. To use his best efforts to comply with clean air standards and clean water standards at the facilities in which the subcontract is being performed.

4. To insert the substance of the provisions of this clause in any non exempt sub-subcontract, including this paragraph 4.

B. The terms used in this clause have the following meanings:

1. The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Public Law 91-604).

2. The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Public Law 92-500).

3. The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in Section 110(d) of the Clean Air Act (42 U.S.C. 1857c-5(d)1, an approved implementation procedures or plan under Section 111(c) or Section 111(d), respectively, of the Air Act (42 U.S.C. 1857c-6(c) or (d)1, or an approved implementation procedure under Section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)1).

4. The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standard or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program authorized by Section 402 of the Water Act (33 U.S.C. 1342), or by local Government to ensure compliance with pretreatment regulations as required by Section 307 of the Water Act (33 U.S.C. 1317).

5. The term "compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency or an air or water pollution control agency in accordance with the requirement of the Air Act or Water Act and regulations issued pursuant thereof.

The term "facility" means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations owned, leased, or supervised by a Subcontractor or lower tier subcontractor to be utilized in the performance of a subcontract or lower tier subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure where the Director, Office of Federal Activities, Environmental Protection Agency, determines the independent facilities are collocated in one geographical area.

APPENDIX E

CLAUSES FOR SUBCONTRACTS IN EXCESS OF \$500,000

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APPENDIX E

CLAUSES FOR SUBCONTRACTS IN EXCESS OF \$500,000

CLAUSE 1 - LABOR SURPLUS AREA LOWER TIER SUBCONTRACTING

(Applicable if this subcontract exceeds \$500,000.)

A. The Subcontractor agrees to establish and conduct a program which will encourage labor surplus area concerns to compete for lower tier subcontracts within their capabilities. In this connection, the Subcontractor shall:

1. Designate a liaison officer who will (i) maintain liaison with duly authorized representatives of the Government on labor surplus area matters, (ii) supervise compliance with the utilization of concerns in labor surplus areas clause and (iii) administer the Subcontractor's "Labor Surplus Area Subcontracting Program";

2. Provide adequate and timely consideration of the potentialities of labor surplus area concerns in all "make-or-buy" decisions;

3. Assure that labor surplus area concerns will have an equitable opportunity to compete for lower tier subcontracts, particularly by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation of labor surplus area concerns;

4. Maintain records showing procedures which have been adopted to comply with the policies set forth in this clause; and

5. Include the Utilization of Concerns in Labor Surplus clause in subcontracts which offer substantial labor surplus area subcontracting opportunities.

B. A "Labor Surplus Area Concern" is a concern which will perform, or cause to be performed, a substantial proportion of any contract awarded to it in "Areas of Substantial Labor Surplus" (also called "Areas of Substantial Unemployment"), as designated by the Department of Labor. A concern shall be deemed to perform a substantial proportion of a contract in a labor surplus area if the costs that the concern will incur on account of manufacturing or production performed in persistent or substantial labor surplus areas (by itself or its first-tier subcontractors) amount to more than 50 percent of the price of such contract.

C. The Subcontractor further agrees to insert, in any lower tier subcontracts hereunder which may exceed five hundred thousand dollar (\$500,000) and which contains the utilization of concerns in labor surplus areas clause provisions, which shall conform substantially to the language of this clause, including this Paragraph C., and to notify the SERI of the name of such lower tier subcontractors.

CLAUSE 2 - SMALL BUSINESS SUBCONTRACTING PLAN

(Subcontracting plan for small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals.)

A. The Subcontractor agrees to comply in good faith with the small and small disadvantaged business concerns subcontracting plan approved by the Subcontract Administrator which is hereby incorporated in and made a part of this Subcontract. In this connection, the Subcontractor shall:

1. Use his best effort to attain such percentage goals as may be set forth in the plan;
2. Designate an individual who will (i) maintain liaison with the SERI on matters relating to small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals; (ii) supervise compliance with the clause entitled "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals;" and (iii) administer the contractor's plan.
3. Provide adequate and timely consideration of the potentialities of small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals in all "make-or-buy" decisions.
4. Assure that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals will have an equitable opportunity to compete for subcontracts, particularly by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation of such concerns. Where the Subcontractor's lists of potential lower tier subcontractors which are small business and small business concerns owned and controlled by socially and economically disadvantaged individuals are excessively long, reasonable effort shall be made to give all such concerns an opportunity to compete over a period of time.
5. Maintain records showing: (i) whether each prospective lower tier subcontractor is a small business concern or a small business concern owned and controlled by socially and economically disadvantaged individuals; (ii) procedures which have been adopted to comply with the plan and the policies set forth in this clause; and (iii) with respect to the letting of any lower tier subcontract (including purchase orders) exceeding \$10,000, information substantially as follows:

A. Whether the award went to large business, small business, or small business owned and controlled by socially and economically disadvantaged individuals.

B. Whether small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals were solicited.

C. The reason for nonsolicitation of small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals if such was the case.

D. The reason for failure of small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals to receive the award if such was the case when such firms were solicited.

The records maintained in accordance with (5) (iii) above may be in such form as the subcontractor may determine, and the information shall be summarized quarterly and submitted by the purchasing department of each individual plant or division to the subcontractor's cognizant liaison officer for small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals. Such quarterly summaries will be considered to be management records only and need not be submitted routinely

to SERI; however, records maintained pursuant to this clause will be kept available for review by SERI until the expiration of one year after the expiration of this contract, or for such longer period as may be required by any other clause of this contract or by applicable law or regulation.

6. Notify the Subcontract Administrator before soliciting bids or quotations on any subcontract (including purchase orders) in excess of \$10,000 if (i) no small business concern or small business concern owned and controlled by socially and economically disadvantaged individuals is to be solicited, and (ii) the Subcontract Administrator consent to the subcontract (or ratification) is required by a "Lower-Tier Subcontracts" clause in this subcontract. Such notice will state the subcontractor's reasons for non-solicitation of small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals and will be given as early in the procurement cycle as possible so that the Subcontract Administrator may give Small Business Administration (SBA) timely notice to permit SBA a reasonable period to suggest potentially qualified small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals through the Subcontract Administrator. In no case will the procurement action be held up when to do so would, in the Subcontractor's judgement, delay performance under the subcontract.

7. Include the "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals" clause in all lower tier subcontracts which offer further subcontracting opportunities.

8. Cooperate in any studies or surveys of the Subcontractor's subcontracting procedures and practices as may be required by the Department of Energy, the Small Business Administration, or SERI.

9. Submit quarterly reports of subcontracting to small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals on such forms as may be specified elsewhere in this subcontract.

B. The Subcontractor agrees that, in the event he fails to comply in good faith with his contractual obligations concerning the plan or the clause entitled "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals" this subcontract may be terminated, in whole or in part, for default.

C. The Subcontractor further agrees to insert in all lower tier subcontracts hereunder (except those with small business concerns) which contain the clause entitled "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals" and which may exceed \$1,000,000 in the case of a lower tier subcontract for the construction of any public facility or in excess of \$500,000 in the case of all other lower tier subcontracts provisions which shall conform substantially to the language of this clause, including this paragraph (C), and to notify the Subcontract Administrator of the names of such subcontractors.

D. The provisions of this clause shall not apply to small business concerns.

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EXCESS OF \$500,000

SUBCONTRACT NO.
BETWEEN
MIDWEST RESEARCH INSTITUTE
MANAGER-OPERATOR OF
THE SOLAR ENERGY RESEARCH INSTITUTE
. AND

SCHEDULE

INTRODUCTION

THIS SUBCONTRACT, is effective upon execution between The Midwest Research Institute acting through its Solar Energy Research Institute Division (hereinafter called the "SERI"), and (hereinafter called the Subcontractor") whose principal offices are located in

Midwest Research Institute has entered into Contract No. EG-77-C-01-4042 with the Department of Energy (hereinafter called the "DOE") an agency of the U.S. Government (hereinafter called the "Government") for the operation and management of the National Solar Energy Research Institute.

This subcontract is entered into in furtherance of the performance of the work provided for in the Prime Contract.

AGREEMENT

Now therefore the parties agree to the following terms and conditions:

ARTICLE 1 - DEFINITIONS

As used throughout this subcontract the following terms shall have the meanings set forth below:

- A. The term "Government" means the United States of America and includes the DOE.
- B. The term "DOE" means the United States Department of Energy (or its successor agency) or any duly authorized representative thereof, including the Contracting Officer.
- C. The term "SERI" means the Solar Energy Research Institute, a division of Midwest Research Institute, acting under Contract No. EG-77-C-01-4042 with the DOE, and includes any duly authorized representative thereof or successor thereto.

D. The term "Subcontractor" as used herein includes subcontractors, independent contractors, and all other classes of persons performing any type of work under this subcontract.

ARTICLE 2 - THE WORK TO BE PERFORMED

A. The Subcontractor shall furnish all personnel, facilities, equipment, materials, supplies, and services (except such as are furnished by the SERI and stated elsewhere in this subcontract) necessary for the performance of the work general described as

and specifically provided for in Appendix "A" attached hereto and made a part hereof and shall perform the work and report thereon pursuant to the provisions of this subcontract.

B. Specific deliverables, quantities, due dates and addresses are set forth in Appendix A hereto.

ARTICLE 3 - THE PERIOD OF PERFORMANCE

The period for performance under this subcontract shall commence on _____, 19____, and expire on _____: Provided, however, that this period may be extended for additional periods by written agreement of the parties.

ARTICLE 4 - ESTIMATED COST AND FIXED FEE

A. Estimates of Cost - The estimated cost for the work to be conducted under this subcontract is _____.

B. Fixed Fee - The fixed fee for the work conducted under this subcontract is _____. There shall be no adjustment in the amount of the Subcontractor's fixed fee by reason of differences between any estimate of cost for performance of the work under this subcontract and the actual cost for performance of that work. Subject to the SERI's right to withhold the payment of fixed fee pursuant to paragraph C of the clause entitled "Allowable Cost, Fixed Fee and Payment", the fixed fee specified herein shall become due and payable in periodic installments (but not more frequently than bi-weekly) in amounts based on the proportion of the work then completed as determined by the SERI.

C. Cost Plus Fixed Fee - The total estimated cost plus fixed fee for the work conducted under this subcontract is _____.

D. The Subcontractor shall be paid for the work conducted under this subcontract in accordance with the clause entitled "Allowable Cost Fixed Fee and Payment." The Subcontractor is cautioned that, subject to the provisions of the clause entitled "Limitation of Cost," the SERI is not obligated to reimburse the Subcontractor for costs incurred in excess of the amount set forth in paragraph C of this clause.

ARTICLE 5 - APPLICABLE DOCUMENTATION

In addition to the terms and conditions contained in this schedule, the following documents are attached hereto and made a part of this subcontract:

- A. Appendix A, entitled "Statement of Work"
- B. Appendix B-2, entitled "Standard Terms and Conditions."
- C. Appendix C-1, entitled "Intellectual Property Provisions."
- D. Appendix D- entitled "Clauses for Subcontracts in Excess of \$100,000."
- E. Appendix E, entitled "Clauses for Subcontracts in Excess of \$500,000."
- F. Subcontractor proposal number _____ dated _____ is hereby incorporated herein by reference in so far as it is consistent with Appendix A "Statement of Work."

ARTICLE 6 - ORDER OF PRECEDENCE

In the event of an inconsistency between provisions of this subcontract, the inconsistency shall be resolved by giving precedence as follows:

- A. this Schedule;
- B. Standard Terms and Conditions (Appendix B-2);
- C. Intellectual Property Provisions (Appendix C-1);
- D. Statement of Work (Appendix A);
- E. Clauses for Subcontracts in Excess of \$100,000 (Appendix D-);
- F. Clauses for Subcontracts in Excess of \$500,000 (Appendix E);
- G. other provisions of the subcontract whether incorporated by reference or otherwise; and
- H. the subcontractor's technical proposal, if incorporated in the subcontract by reference or otherwise.

ARTICLE 7 - RIGHTS TO PROPOSAL DATA

Except for technical data contained on pages _____ of the subcontractor's proposal number _____ dated _____ which are asserted by the subcontract as being proprietary data, it is agreed that as a condition of the award of this subcontract, and notwithstanding the provisions of any notice appearing on the proposal, the SERI and the Government shall have the right to use, duplicate, and disclose and have others do so for any purpose whatsoever, the technical data contained in the proposal upon which this subcontract is based.

ARTICLE 8 - KEY PERSONNEL

The subcontractor's key personnel referred to in Appendix B-2 are:

ARTICLE 9 - CONTRACT ADMINISTRATION RESPONSIBILITIES

- A. The Subcontract Administrator for SERI for this subcontract is
- B. The Technical Monitor for the SERI for this subcontract is
- C. The Property Monitor for the SERI for this subcontract is

Pursuant to the Government Property Clause applicable to this subcontract, found in Appendix B, the Subcontractor shall contact the named Property Manager within ten (10) days after receipt of the subcontract award for purposes of receiving guidance and instructions relative to the handling and treatment of property governed by the provisions of the subcontract, including said Government Property Clause.

ARTICLE 10 - INVOICES

Invoices for work accomplished under this subcontract shall be submitted to:

Solar Energy Research Institute
Attn: Subcontracts Branch
1617 Cole Boulevard
Golden, CO 80401

To facilitate processing and payment each invoice must reference the subcontract number which appears on the cover of this subcontract.

ARTICLE 11 - INDIRECT RATES

The following are the provisional rates contemplated by paragraph E of the clause entitled "Negotiated Overhead Rates":

<u>Category</u>	<u>Rate</u>
-----------------	-------------

ARTICLE 12 - ANTICIPATORY COSTS

Any costs incurred directly after _____ and prior to the effective date of this subcontract, in anticipation of the subcontract, in order to meet the proposed subcontract delivery requirements, shall be treated as allowable costs, to the extent they would have been allowable if incurred after the execution date of this subcontract.

ARTICLE 13 - ALTERATIONS TO TERMS AND CONDITIONS

IN WITNESS WHEREOF, the parties hereto have executed this subcontract as of the date first above written.

ACCEPTED: SUBCONTRACTOR

BY _____

TITLE _____

DATE _____

AUTHORIZED: THE MIDWEST RESEARCH INSTITUTE
SOLAR ENERGY RESEARCH INSTITUTE DIVISION

BY _____

TITLE _____

DATE _____

APPENDIX B-2

STANDARD TERMS AND CONDITIONS
FOR A
COST PLUS FIXED FEE SUBCONTRACT
WITH
COMMERCIAL CONCERNS

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APPENDIX B-2

STANDARD TERMS AND CONDITIONS
FOR A
COST PLUS FIXED FEE SUBCONTRACT
WITH
COMMERCIAL CONCERNS

CLAUSE 1 - STANDARDS OF WORK

The Subcontractor agrees that the performance of work and services pursuant to the requirements of this subcontract shall conform to high professional standards.

CLAUSE 2 - INSPECTION

The SERI or the Government, through any authorized representatives, has the right at all reasonable times, to inspect, or otherwise evaluate the work performed or being performed hereunder and the premises in which it is being performed. If any inspection, or evaluation is made by the SERI or the Government on the premises of the Subcontractor or a lower tier subcontractor, the Subcontractor shall provide and shall require his lower tier subcontractors to provide all reasonable facilities and assistance for the safety and convenience of the SERI or the Government representatives in the performance of their duties. All inspections and evaluations shall be performed in such a manner as will not unduly delay the work.

CLAUSE 3 - ASSIGNMENT

Neither this subcontract nor any interest therein nor claim thereunder shall be assigned or transferred by the subcontractor, except as expressly authorized in writing by the SERI.

CLAUSE 4 - EXAMINATION OF RECORDS BY COMPTROLLER GENERAL

A. This clause is applicable if the amount of this subcontract exceeds \$10,000 and was entered into by means of negotiation, including small business restricted advertising, but is not applicable if this subcontract was entered into by means of formal advertising.

B. The Subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of 3 years after final payment under this subcontract unless the SERI authorizes their prior disposition have access to and the right to examine any directly pertinent books, documents, papers, and records of the subcontractor involving transactions related to this subcontract.

C. The subcontractor further agrees to include in all his lower tier subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of 3 years after final payment under the subcontract unless the SERI authorizes their prior disposition

have access to and the right to examine any directly pertinent books, documents, papers, and records of such lower tier subcontractor, involving transactions related to the subcontract. The term "lower tier subcontract" as used in this clause excludes (1) purchase orders not exceeding \$10,000 and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

D. The periods of access and examination described in (B) and (C), above, for records which relate to (1) appeals under the "Disputes" clause of this subcontract, (2) litigation or the settlement of claims arising out of the performance of this subcontract, or (3) costs and expenses of this subcontract as to which exception has been taken by the Comptroller General or any of his duly authorized representatives, shall continue until such appeals, litigation, claims, or exceptions have been disposed of.

CLAUSE 5 - UTILIZATION OF SMALL BUSINESS CONCERNS AND SMALL BUSINESS CONCERNS OWNED AND CONTROLLED BY SOCIALLY AND ECONOMICALLY DISADVANTAGED INDIVIDUALS

A. It is the policy of the United States, and the SERI that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals shall have the maximum practicable opportunity to participate in the performance of subcontracts let by the SERI.

B. The Subcontractor hereby agrees to carry out this policy in the awarding of lower tier subcontracts to the fullest extent consistent with the efficient performance of this subcontract. The Subcontractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration, the Department of Energy or the SERI as may be necessary to determine the extent of the Subcontractor's compliance with this clause.

C. As used in this subcontract, the term "small business concern" shall mean a small business as defined pursuant to section 3 of the Small Business Act (15 U.S.C. 632) and relevant regulations promulgated pursuant thereto including 41-1.701 of the Federal Regulations. The term "small business concern owned and controlled by socially and economically disadvantaged individuals" shall mean a small business concern:

1. which is at least 51 per centum owned by one or more socially and economically disadvantaged individuals; or in the case of any publicly-owned business, at least 51 per centum of the stock of which is owned by one or more socially and economically disadvantaged individuals; and

2. whose management and daily business operations are controlled by one or more of such individuals.

The Subcontractor shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans and other specified minorities, or any other individual found to be disadvantaged by the Small Business Administration pursuant to section 8(a) of the Small Business Act.

D. Subcontractors acting in good faith may rely on written representations by their lower tier subcontractors regarding their status as either a small business concern or a small business concern owned and controlled by a socially and economically disadvantaged individuals.

CLAUSE 6 - DISPUTES

A. Except as otherwise provided in this subcontract, any dispute concerning a question of fact or law arising under this subcontract which is not disposed of by agreement shall be submitted in writing to SERI for a review and determination. SERI may grant or deny the whole, or a portion of, a claim in this dispute within ninety (90) days, or such longer time period as may be mutually agreed upon.

1 If the whole or a portion of a claim is denied, the subcontractor may pursue his legal remedies in a court of competent jurisdiction. Federal contract law including decisions of the various boards of contract appeals will apply in any such suit. Pending a decision of a dispute by SERI or by the court in which the subcontractor seeks a remedy, the subcontractor shall proceed diligently with performance of the subcontract in accordance with SERI's subcontracting officer's decision.

B. Nothing in the subcontract shall be construed as making final the decision of any SERI representative on a question of fact or law.

C. This clause is not applicable to any Appendix C-1 provisions.

CLAUSE 7 - BUY AMERICAN ACT

A. In acquiring end products, the Buy American Act (41 U.S. Code 10a-d) provides that the Government give preference to domestic source end products. For purposes of this clause:

1. "Components" mean those clauses, materials, and supplies which are directly incorporated in the end products;

2. "End Products" mean those clauses, materials, and supplies which are to be acquired under this subcontract for public use; and

3. "Domestic source end product" means (a) an unmanufactured end product which has been mined or produced in the United States; and (b) an end product manufactured in the United States if the cost of the components thereof which are mined, produced, or manufactured in the United States exceeds 50 percent of the costs of all its components. For purposes of this A.3 (b), components of foreign origin of the same type or kind as the products referred to in B.2 or B.3 or this clause shall be treated as components mined, produced, or manufactured in the United States.

B. The Subcontractor agrees that there will be used under this subcontract (by the subcontractor, lower tier subcontractors, materialmen and suppliers) only domestic source and products, except end products:

1. which are for use outside the United States;

2. which the Government determines are not mined, produced or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality;

3. as to which the DOE determines the domestic preference to be inconsistent with public interest; or

4. as to which the DOE determines the cost to the Government to be unreasonable.

(The foregoing requirements are administered in accordance with Executive Order No. 10582 dated December 17, 1954.)

CLAUSE 8 - CONVICT LABOR

In connection with the performance of work under this subcontract, the Subcontractor agrees not to employ any person undergoing sentence of imprisonment except as provided by Public Law 89-176, September 10, 1965 118 U.S.C. 4082(c)(2)1 and Executive Order 11755, December 29, 1973.

CLAUSE 9 - CONTRACT WORK HOURS AND SAFETY STANDARDS ACT OVERTIME COMPENSATION

This subcontract, to the extent that it is of a character specified in the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333), is subject to the following provisions and to all other applicable provisions and exceptions of such Act and the regulations of the Secretary of Labor thereunder.

A. Overtime Requirements - No subcontractor or lower tier subcontractor contracting for any part of the subcontract work which may require or involve the employment of laborers, mechanics, apprentices, trainee, watchmen, and guards shall require or permit any laborer, mechanic, apprentice, trainee, watchman, or guard in any workweek in which he is employed on such work to work in excess of eight (8) hours in any calendar day or in excess of forty (40) hours in such workweek on work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer, mechanic, apprentice, trainee, watchman, or guard receives compensation at a rate not less than one and one-half times his basic rate of pay for all such hours worked in excess of eight (8) hours in any calendar day or in excess of forty (4) hours in such workweek, whichever is the greater number of overtime hours.

B. Violation; Liability for Unpaid Wages; Liquidated Damages - In the event of any violation of the provision of paragraph A., the Subcontractor and any lower tier subcontractor responsible therefor shall be liable to any affected employee for his unpaid wages. In addition, such subcontractor and lower tier subcontractor shall be liable to the Government for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, apprentice, trainee, watchman, or guard employed in violation of the provisions of paragraph A in the sum of \$10.00 for each calendar day on which such employee was required or permitted to be employed on such work in excess of eight (8) hours or in excess of his standard workweek of forty (40) hours without payment of the overtime wages required by paragraph A.

C. Withholding for Unpaid Wages and Liquidated Damages - The SERI may withhold from the Subcontractor, from any moneys payable on account of work performed by the Subcontractor or lower tier subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of such subcontractor or lower tier subcontractor for unpaid wages and liquidated damages as provided in the provisions of paragraph B.

D. Lower Tier Subcontracts - The Subcontractor shall insert paragraphs A thru D of this clause in all lower tier subcontracts, and shall require their inclusion in all subcontracts of any tier.

E. Records - The Subcontractor shall maintain payroll records containing the information specified in 29 CFR 516.2(a). Such records shall be preserved for three (3) years from the completion of the subcontract.

CLAUSE 10 - EQUAL OPPORTUNITY

The following clause is applicable unless this subcontract is exempt under the rules, regulations, and relevant orders of the Secretary of Labor (41 CFR. CH. 60).

During the Performance of this subcontract, the Subcontractor agrees as follows:

A. The Subcontractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Subcontractor will take affirmative action to ensure that applicants are employed, and that employees are treated during the employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; lay-off or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Subcontractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the SERI or the Government setting forth the provisions of this Equal Opportunity clause.

B. The Subcontractor will, in all solicitations or advertisements for employee placed by or on behalf of the Subcontractor, state that all qualified applicants will receive consideration for employment without regard to race, color, sex, or national origin.

C. The Subcontractor will send to each labor union or representative or workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the SERI advising the labor union or workers' representative of the Subcontractor's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. The Subcontractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended by E011375 of October 13, 1967 and of the rules, regulations, and relevant orders of the Secretary of Labor.

E. The Subcontractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended by E011375 of October 13, 1967 and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the DOE and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

F. In the event of the Subcontractor's noncompliance with the Equal Employment clause of this subcontract or with any of the said rules, regulations, or orders, this subcontract may be cancelled, terminated, or suspended in whole or in part and the Subcontractor may be declared ineligible for further Government contracts in accordance with the procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended by E011375 of October 13, 1967 and such other sanctions may be imposed and remedies invoked, as provided in Executive Order No. 11246 of September 24, 1965, as amended by E011375 of October 13, 1967 or by rule, regulation, or order of the Secretary of Labor or as otherwise provided by law.

G. The Subcontractor will include the provisions of paragraphs A through G in every sub-subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended by E011375 of October 13, 1967 so that such provisions will be binding upon each sub-subcontractor or vendor. The Subcontractor will take such action with respect

to any sub-subcontract or purchase order as the Government may direct as a means of enforcing such provisions including sanctions for noncompliance: provided, however, that in the event that the Subcontractor becomes involved in or is threatened with litigation with a lower tier subcontractor or vendor as a result of such direction by the Government, the Subcontractor may request the United States to enter into such litigation to protect the interests of the United States.

CLAUSE 11 - OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this subcontract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this subcontract if made with a corporation for its general benefit.

CLAUSE 12 - COVENANT AGAINST CONTINGENT FEES

A. Warranty - Termination, or Deduction for Breach.

The Subcontractor warrants that no person or selling agency has been employed or retained to solicit or secure this subcontract upon an agreement or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Subcontractor for the purpose of securing business. For breach or violation of this warranty the SERI with the approval of the DOE has the right to annul this subcontract without liability or in its discretion to deduct from the price or consideration, or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

B. Lower Tier Subcontracts and Purchase Orders.

Unless otherwise authorized in writing, the subcontractor shall cause provisions similar to the foregoing to be inserted in all lower tier subcontracts and purchase orders entered into under this subcontract.

CLAUSE 13 - GOVERNMENT PROPERTY

A. The SERI shall deliver to the Subcontractor, for use in connection with and under the terms of this subcontract, the property described as Government-furnished property in the Schedule or specifications, together with such related data and information as the Subcontractor may request and as may reasonably be required (hereinafter referred to as "Government-furnished Property"). The delivery or performance dates for the supplies or services to be furnished by the Subcontractor under this subcontract are based upon the expectation that Government-furnished property suitable for use will be delivered to the Subcontractor at the times stated in the Schedule, or if not so stated, in sufficient time to enable the Subcontractor to meet such delivery or performance dates. In the event that Government-furnished property is not delivered to the Subcontractor by such time or times, the SERI shall, upon timely written request made by the Subcontractor make a determination of the delay, if any, occasioned the Subcontractor and shall equitably adjust the estimated cost, fixed fee, or delivery or performance dates, or all of them, and any other contractual provisions affected by any such delay, in accordance with the procedures provided for in the clause of this subcontract

entitled "Changes." In the event that Government-furnished property is received by the Subcontractor in a condition not suitable for the intended use, the Subcontractor shall, upon receipt thereof notify the SERI of such fact and, as directed by the SERI, either (1) return such property at the SERI's expense or otherwise dispose of the property, or (2) effect repairs or modifications. Upon completion of (1) or (2), above, the SERI upon written request of the Subcontractor shall equitably adjust the estimated cost, fixed fee, if any, or delivery or performance dates, or all of them, and any other contractual provision affected by the return or disposition, or the repair or modification in accordance with the procedures provided for in the clause of this contract entitled "Changes." The foregoing provisions for adjustment are exclusive and the SERI or Government shall not be liable to suit for breach of subcontract by reason of any delay in delivery of Government-furnished property or delivery of such property in a condition not suitable for its intended use.

B. 1. By notice in writing, the SERI may (i) decrease the property furnished or to be furnished by the SERI under this subcontract, or (ii) substitute other Government-owned property for property to be furnished by the SERI or to be acquired by the Subcontractor for the Government, under this subcontract. The Subcontractor shall promptly take such action as the SERI may direct with respect to the removal and shipping of property covered by such notice.

2. In the event of any decrease in or substitution of property pursuant to paragraph 1, above, or any withdrawal of authority to use property provided under any other contract or lease, which property the SERI had agreed in the Schedule to make available for the performance of this subcontract, the SERI, upon the written request of the Subcontractor (or, if the substitution of property causes a decrease in the cost of performance, on his own initiative), shall equitably adjust such contractual provisions as may be affected by the decrease, substitution, or withdrawal, in accordance with the procedures provided for in the "Changes" clause of this subcontract.

C. Title to all property furnished by the SERI shall remain in the Government. Title to all property purchased by the Subcontractor, for the cost of which the Subcontractor is entitled to be reimbursed as a direct item of cost under this subcontract, shall pass to and vest in the Government upon delivery of such property by the vendor. Title to other property, the cost of which is reimbursable to the Subcontractor under the subcontract, shall pass to and vest in the Government upon (1) issuance for use of such property in the performance of this subcontract, or (2) commencement of processing or use of such property in the performance of this subcontract, or (3) reimbursement of the cost thereof by the SERI in whole or in part, whichever first occurs. All Government-furnished property, together with all property acquired by the Subcontractor, title to which vests in the Government under this paragraph, are subject to the provisions of this clause and are hereinafter collectively referred to as "Government property." Title to the Government property shall not be affected by the incorporation or attachment thereof to any property not owned by the Government, nor shall such Government property, or any part thereof, be or become a fixture or lose its identity as personalty by reason of affixation to any realty.

D. The Subcontractor shall be directly responsible for and accountable for all Government property provided under this subcontract. The Subcontractor shall establish and maintain a system to control, protect, preserve, and maintain all Government property. This system shall, upon request by the SERI, be submitted for review and, if satisfactory, approved in writing by the

SERI. The Subcontractor shall maintain and make available such records as are required by the approved system and must account for all Government property until relieved of responsibility therefor in accordance with the written instructions of the SERI. To the extent directed by the SERI, the Subcontractor shall identify Government property by marking, tagging, or segregating in such manner as to clearly indicate its ownership by the Government.

E. The Government property shall, unless otherwise provided herein or approved by the SERI, be used only for the performance of this subcontract.

F. The Subcontractor shall maintain and administer, in accordance with sound industrial practice, a program for the utilization, maintenance, repair, protection, and preservation of Government property so as to assure its full availability and usefulness for the performance of this subcontract. The Subcontractor shall take all reasonable steps to comply with all appropriate directions or instructions which the SERI may prescribe as reasonably necessary for the protection of Government property.

G. 1. The Subcontractor shall not be liable for any loss of or damage to the Government property, or for expenses incidental to such loss or damage, except that the Subcontractor shall be responsible for any such loss or damage (including expenses incidental thereto):

(i) Which results from willful misconduct or lack of good faith on the part of any one of the Subcontractor's directors or officers, or on the part of any of his managers, superintendents, or other equivalent representatives, who has supervision or direction of:

(a) All or substantially all of the Subcontractor's operations at any one plant or separate location in which this Subcontractor's business; or

(b) All or substantially all of the Subcontractor's operations at any one plant or separate location in which this subcontract is being performed; or

(c) A separate and complete major industrial operation in connection with the performance of this subcontract.

(ii) Which results from a failure on the part of the Subcontractor, due to the willful misconduct or lack of good faith on the part of any of his directors, officers, or other representatives mentioned in subparagraph (i), above:

(a) To maintain and administer, in accordance with sound industrial practice, the program for utilization, maintenance, repair, protection, and preservation of Government property as required by paragraph F hereof, or to take all reasonable steps to comply with any ge (including expenses incidental thereto):

(i) Which results from willful misconduct or lack of good faith on the part of any one of the Subcontractor's directors or officers, or on the part of any of his managers, superintendents, or other equivalent representatives, who has supervision or direction of:

(a) All or substantially all of the Subcontractor's operations at any one plant or separate location in which this Subcontractor's business; or

(b) All or substantially all of the Subcontractor's operations at any one plant or separate location in which this subcontract is being performed; or

(c) A separate and complete major industrial operation in connection with the performance of this subcontract.

(ii) Which results from a failure on the part of the Subcontractor, due to the willful misconduct or lack of good faith on the part

of any of his directors, officers, or other representatives mentioned in subparagraph (i), above:

(a) To maintain and administer, in accordance with sound industrial practice, the program for utilization, maintenance, repair, protection, and preservation of Government property as required by paragraph F hereof, or to take all reasonable steps to comply with any appropriate written direction of the SERI under paragraph F hereof, or

(b) To establish, maintain, and administer in accordance with paragraph D hereof a system for control of Government property.

(iii) For which the Subcontractor is otherwise responsible under the express terms of the clause or clauses designated in the Schedule;

(iv) Which results from a risk expressly required to be insured under this subcontract, but only to the extent of the insurance so required to be procured and maintained, or to the extent of insurance actually procured and maintained, whichever is greater; or

(v) Which results from a risk which is in fact covered by insurance or for which the Subcontractor is otherwise reimbursed, but only to the extent of such insurance or reimbursement.

Any failure of the Subcontractor to act, as provided in subparagraph (ii), above, shall be conclusively presumed to be a failure resulting from willful misconduct or lack of good faith on the part of such directors, officers, or other representatives mentioned in subparagraph (i), above, if the Subcontractor is notified by the SERI by registered or certified mail addressed to one of such directors, officers, or other representatives, of the SERI's disapproval, withdrawal of approval, or nonacceptance of the Subcontractor's program or system. In such event it shall be presumed that any loss or damage to Government property resulted from such failure. The Subcontractor shall be liable for such loss or damage unless he can establish by clear and convincing evidence that such loss or damage did not result from his failure to maintain an approved program or system, or occurred during such time as an approved program or system for control of Government property was maintained.

If more than one of the approved exceptions shall be applicable in any case, the Subcontractor's liability under any one exception shall not be limited by any other exception. If the Subcontractor transfers Government property to the possession and control of a lower tier Subcontractor, the transfer shall not affect the liability of the Subcontractor for loss of destruction of or damage to the property as set forth above. However, the Subcontractor shall require the lower tier subcontractor to assume the risk of, and be responsible for, any loss or destruction of or damage to the property while in the latter's possession or control, except to the extent that the lower tier subcontract, with the prior approval of the SERI, provides for the relief of the lower tier subcontractor from such liability. In the absence of such approval, the SERI subcontract shall contain appropriate provisions requiring the return of all Government property in as good condition as when received, except for reasonable wear and tear or for the utilization of the property in accordance with the provisions of the subcontract.

2. The Subcontractor shall not be reimbursed for, and shall not include as an item of overhead, the cost of insurance, or any provisions for a reserve, covering the risk of loss of or damage to the Government

property, except to the extent that the SERI may have required the Subcontractor to carry such insurance under any other provisions of this subcontract.

3. Upon the happening of loss or destruction of or damage to the Government property, the Subcontractor shall notify the SERI thereof, and shall communicate with the loss and salvage organization, if any, now or hereafter designated by the SERI, and with the assistance of the loss and salvage organizations so designated (unless the SERI has designated that no such organization be employed), shall take all reasonable steps to protect the Government property from further damage, separate the damaged and undamaged Government property, put all the Government property in the best possible order, and furnish to the SERI a statement of:

- (i) The lost, destroyed, and damaged Government property;
- (ii) The time and origin of the loss, destruction, or damage;
- (iii) All known interests in commingled property of which the Government property is a part; and
- (iv) The insurance, if any, covering any part of interest in such commingled property.

The Subcontractor shall make repairs and renovations of the damaged Government property or take such other action as the SERI directs.

4. In the event the Subcontractor is indemnified, reimbursed, or otherwise compensated for any loss or destruction of or damage to the Government property, he shall use the proceeds to repair, renovate, or replace the Government property involved, or shall credit such proceeds against the cost of the work covered by the subcontract, or shall otherwise reimburse the Government, as directed by the SERI. The Subcontractor shall do nothing to prejudice the SERI's or Government's right to recover against third parties for any such loss, destruction, or damage and, upon the request of the SERI, shall, at the Government's expense, furnish to the SERI all reasonable assistance and cooperation (including the prosecution of suit and the execution of instruments of assignment in favor of the Government) in obtaining recovery. In addition, where the lower tier subcontractor has not been relieved from liability for any loss or destruction of or damage to Government property, the Subcontractor shall enforce the liability of the lower tier subcontractor for such loss or destruction of or damage to the Government property for the benefit of the Government.

H. The Government, and any persons designated by it, shall at all reasonable times have access to the premises where any of the Government property is located, for the purpose of inspecting the Government property.

I. Upon the completion of this subcontract, or at such earlier dates as may be fixed by the SERI, the Subcontractor shall submit to the SERI in a form acceptable to it, inventory schedules covering all items of the Government property not consumed in the performance of this subcontract, or not theretofore delivered to the SERI, and shall deliver or make such other disposal of such Government property as may be directed or authorized by the SERI. The net proceeds of any such disposal shall be credited to the cost of the work covered by the subcontract or shall be paid in such manner as the SERI may direct. The foregoing provisions shall apply to scrap from Government property: provided, however, that the SERI may authorize or direct the Subcontractor to omit from such inventory schedules any scrap consisting of faulty castings or forgings, or cutting and processing waste, such as chips, cuttings, borings, turnings, short ends, circles, trimmings, clippings, and

remnants, and to dispose of such scrap in accordance with the Subcontractor's normal practice and account therefor as a part of general overhead or other reimbursable cost in accordance with the Subcontractor's established accounting procedures.

J. Unless otherwise provided herein, the SERI or Government:

(i) May abandon any Government property in place, and thereupon all obligations of the Government regarding such abandoned property shall cease; and

(ii) Has no obligation to the Subcontractor with regard to restoration or rehabilitation of the Subcontractor's premises, neither in case of abandonment (paragraph J (i), above), disposition on completion of need or of the subcontract (paragraph (i), above), nor otherwise, except for restoration or rehabilitation costs caused by removal of Government property pursuant to paragraph B, above.

K. All communications issued pursuant to this clause shall be in writing.

CLAUSE 14 - UTILIZATION OF LABOR SURPLUS AREA CONCERNS

(This clause is applicable if this subcontract exceeds \$10,000.)

A. It is the policy of the SERI and the Government to award subcontracts to labor surplus concerns that agree to perform substantially in labor surplus areas, where this can be done consistent with the efficient performance of the subcontract and at prices no higher than are obtainable elsewhere. The Subcontractor agrees to use his best efforts to place his lower tier subcontracts in accordance with this policy.

B. In complying with paragraph (A) of this clause and with paragraph (b) of the clause of this subcontract entitled "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled By Socially and Economically Disadvantaged Individuals", the Subcontractor in placing his lower tier subcontracts shall observe the following order of preference: (1) Small business concerns that are labor surplus area concerns, (2) other small business concerns, and (3) other labor surplus area concerns.

C. 1. The term "labor surplus area" means a geographical area identified by the Department of Labor as an area of concentrated unemployment or underemployment or an area of labor surplus.

2. The term "labor surplus area concern" means a concern that together with its first-tier subcontractors will perform substantially in labor surplus areas.

3. The term "perform substantially in a labor surplus area" means that the costs incurred on account of manufacturing, production, or appropriate services in labor surplus areas exceed 50 percent of the contract price.

CLAUSE 15 - COMPETITION IN LOWER TIER SUBCONTRACTING

The Subcontractor shall select lower-tier subcontractors (including suppliers) on a competitive basis to the maximum practicable extent consistent with the objectives and requirements of the subcontract.

CLAUSE 16 - AUDIT AND RECORDS

A. General - The SERI, DOE, or their authorized representatives shall have the audit and inspection right described in the applicable paragraphs B, C and D below.

B. Examination of Costs - If this is a cost-reimbursement type, incentive, time and materials, labor hour, or price redeterminable subcontract, or any combination thereof, the Subcontractor shall maintain, and the SERI, DOE, or their authorized representatives shall have the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of this subcontract.

C. Cost or Pricing Data - If the Subcontractor submitted cost or pricing data in connection with the pricing of this subcontract or any change or modification thereto, unless such pricing was based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation, the SERI or the Government or its representatives who are employees of the United States Government shall have the right to examine all books, records, documents and other data of the Subcontractor related to the negotiation, pricing or performance of such subcontract, change or modification, for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data submitted. Additionally, in the case of pricing any change or modification exceeding \$100,000 to formally advertising contracts, the Comptroller General of the United States or his representatives who are employees of the United States Government shall have such rights. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

D. Availability - The materials described in B and C above, shall be made available at the office of the Subcontractor, at all reasonable times, for inspection, audit or reproduction, until the expiration of 3 years from the date of final payment under this subcontract or such lesser time specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20) and for such longer period, if any, as is required by applicable statute, or by other clauses of this subcontract, or by 1 and 2 below:

1. If this subcontract is completely or partially terminated, the records relating to the work terminated shall be made available for a period of 3 years from the date of any resulting final settlement.

2. Records which relate to appeals under the "Disputes" clause of this subcontract, or litigation or the settlement of claims arising out of the performance of this subcontract, shall be made available until such appeals, litigation, or claims have been disposed of.

E. The Subcontractor shall insert a clause containing all the provisions of this clause, including this paragraph E, in all lower tier subcontracts hereunder except altered as necessary for proper identification of the contracting parties and the SERI.

CLAUSE 17 - NOTICE OF LABOR DISPUTES

A. Whenever the subcontractor has the knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this Subcontract, the Subcontractor shall immediately give notice thereof, including all relevant information with respect thereto, to the SERI.

B. The Subcontractor agrees to insert the substance of this article, including this paragraph B, in any lower tier Subcontract hereunder as to which a labor dispute may delay the timely performance of this Subcontract; except that each such lower tier Subcontract shall provide that in the event its timely performance is delayed or threatened by delay, any actual or potential labor dispute, the lower tier Subcontractor shall immediately notify his next higher tier Subcontractor, or the Subcontractor, as the case may be, of all relevant information with respect to such disputes.

CLAUSE 18 - DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA

(This clause is applicable if this subcontract exceeds \$10,000.)

A. The Subcontractor will not discriminate against any employee or veteran of the Vietnam era in regard to any position for which the employee or applicant for employment is qualified. The Subcontractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified disabled veterans and veterans of the Vietnam era without discrimination based upon their disability or veterans status in all employment practices such as the following: employment upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

B. The Subcontractor agrees that all suitable employment openings of the Subcontractor which exist at the time of the execution of this subcontract and those which occur during the performance of this subcontract, including those not generated by this subcontract and including those occurring at an establishment of the Subcontractor other than the one wherein the subcontract is being performed but excluding those of independently operated corporate affiliates, shall be listed at an appropriate local office of the state employment service system wherein the opening occurs. The Subcontractor further agrees to provide such reports to such local office regarding employment openings and hires as may be required.

State and local government agencies holding Federal subcontracts of \$10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service, but are not required to provide those reports set forth in paragraph D and E.

C. Listing of employment openings with the employment service system pursuant of this clause shall be made at least concurrently with the use on any other recruitment source or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and nonveterans. The listings of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and nothing herein is intended to relieve the Subcontractor from any requirements in Executive orders or regulations regarding nondiscrimination in employment.

D. The reports required by paragraph B of this clause shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the Subcontractor has more than

one hiring location in a State, with the central office of the State employment service. Such reports shall indicate for each hiring location (1) the number of individuals hired during the reporting period; (2) the number of non-disabled veterans of the Vietnam era hired; (3) the number of disabled veterans of the Vietnam era hired; and (4) the total number of disabled veterans hired. The reports should include covered veterans hired for on-the-job training under 38 U.S.C. 1787. The Subcontractor shall submit a report within 30 days after the end of each reporting period wherein any performance is made on this subcontract identifying date for each hiring location. The Subcontractor shall maintain at each hiring location copies of the reports submitted until the expiration of one year after final payment under the subcontract, during which time these reports and related documentation shall be made available, upon request, for examination by any authorized representatives of the SERI or of the Secretary of Labor. Documentation would include personnel records respecting job openings, recruitment, and placement.

E. Whenever the Subcontractor becomes contractually bound to the listing provisions of this clause, it shall advise the employment service system in each State where it has establishments of the name and location of each hiring location in the State. As long as the Subcontractor is contractually bound to these provisions and has so advised the State system, there is not need to advise the State system when it is no longer bound by this subcontract clause.

F. This clause does not apply to the listing of employment openings which occur and are filled outside the 50 states, the District of Columbia, Puerto Rico, Guam and the Virgin Islands.

G. The provisions of paragraph B, C, D and E of this clause do not apply to openings which the Subcontractor proposes to fill from within his own organization or to fill pursuant of a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of his own organization or employer-union arrangement for that opening.

H. As used in this clause:

1. "all suitable employment openings" include, but are not limited to, openings which occur in the following job categories: production and non-production; plant and office, laborers and mechanics; supervisory and non-supervisory; technical; and executive, administrative, and professional openings that are compensated on a salary basis of less than \$25,000 per year. This term includes full-time employment, temporary employment of more than three (3) days duration, and part-time employment. It does not include openings which the Subcontractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer's union hiring arrangements nor openings in an educational institution which are restricted to students of that institution. Under the most compelling circumstances, an employment opening may not be suitable for listing, including such situations where the needs of the Government cannot reasonably be otherwise supplied, where listings would be contrary to national security, or where the requirements of listing would otherwise not be for the best interest of the Government.

2. "Appropriate office of the State employment service system" means the local office of the Federal/State national system of public employment offices with assigned responsibility for serving the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

3. "Openings which the Subcontractor proposes to fill from within his own organization" means employment openings for which no consideration

will be given to persons outside the Subcontractor's organization (including any affiliates, subsidiaries, and the parent companies) and includes any openings which the Subcontractor proposes to fill from regularly established "recall" lists.

4. "Openings which the Subcontractor proposes to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings which the Subcontractor proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the Subcontractor and representatives of his employees.

I. The Subcontractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

J. In the event of the Subcontractor's noncompliance with requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

K. The Subcontractor agrees to post in conspicuous places available to employees and applicants for employment notices in a form to be prescribed by the Director, provided by or through the SERI. Such notice shall state Subcontractor's obligation under the law to take affirmative action to employ and advance in employment qualified veterans and veterans of the Vietnam era for employment and the rights of applicants and employees.

L. The Subcontractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or their contract understanding that the Subcontractor is bound by terms of the Vietnam Era Veteran's Readjustment Assistance Act and is committed to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era.

M. The Subcontractor will include the provisions of this clause in every sub-subcontract or purchase order of \$10,000 or more unless exempted by rules, regulations or orders of the Secretary issued pursuant to the Act, so that such provisions will be binding upon each sub-subcontractor or vendor. The Subcontractor will take such action with respect to any sub-subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

CLAUSE 19 - EMPLOYMENT OF THE HANDICAPPED

A. The Subcontractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. The Subcontractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

B. The Subcontractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Rehabilitation Act of 1973, as amended.

C. In the event of the Subcontractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

D. The Subcontractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, Office of Federal Contract Compliance Program, Department of Labor, provided by or through the SERI. Such notices shall state the Subcontractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

E. The Subcontractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Subcontractor is bound by the terms of Section 503 of the Act, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

F. The Subcontractor will include the provisions of this clause in every lower tier subcontract or purchase order of \$2,500 or more unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 503 of the Act, so that such provisions will be binding upon each lower tier subcontractor or vendor. The Subcontractor will take such action with respect to any lower tier subcontract or purchase order as the Director, Office of Federal Contract Compliance Programs, may direct to enforce such provisions, including action for noncompliance.

CLAUSE 20 - PREFERENCE FOR U.S. FLAG AIR CARRIERS

A. Pub. L. 93-623 requires that all Federal agencies and Government contractors and subcontractors will use U. S. flag air carriers for international air transportation of personnel (and their personal effects) or property to the extent service by such carriers is available. It further provides that the Comptroller General of the United States shall disallow any expenditure from appropriate funds for international air transportation on other than a U. S. flag air carrier in the absence of satisfactory proof of the necessity therefor.

B. The Subcontractor agrees to utilize U.S. flag air carriers for international air transportation of personnel (and their personal effects) or property to the extent service by such carriers is available.

C. In the event that the Subcontractor selects a carrier other than a U.S. flag air carrier for international air transportation, it will include a certification on vouchers involving such transportation which is essentially as follows:

CERTIFICATION OF UNAVAILABILITY OF U. S. FLAG AIR CARRIERS

I hereby certify that transportation service for personnel (and their personal effects) or property by certificated air carrier was unavailable for the following reasons (see Federal Procurement Regulations (41 CFR 1-1.323-3)): (state reasons).

D. The terms used in this article have the following meanings:

1. "International air transportation" means transportation of persons (and their personal effects) or property by air between a

place in the United States and a place outside thereof or between two places both of which are outside the United States.

2. "U. S. flag air carrier" means one of a class of air carriers holding a certificate of public convenience and necessity issued by the Civil Aeronautics Board, approved by the President, authorizing operations between the United States and/or its territories and one or more foreign countries.

3. The term "United States" includes the fifty states, Commonwealth of Puerto Rico, possessions of the United States, and the District of Columbia.

E. The Subcontractor shall include the substance of this clause including this paragraph e., in each subcontract or purchase hereunder which may involve international air transportation.

CLAUSE 21 - USE OF U. S. FLAG COMMERCIAL VESSELS

A. The Cargo Preference Act of 1954 (P. L. 664, August 26, 1954, 63 Stat. 832, 46 U.S.C. 1241(b)), requires that Federal departments or agencies shall transport at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) of equipment, materials, or commodities which may be transported on ocean vessels on privately owned United States flag commercial vessels. Such transportation shall be accomplished whenever:

1. Any equipment, materials, or commodities, within or outside the United States, which may be transported by ocean vessel, are:

(i) Procurements, contracted for, or otherwise obtained for the agency's account; or

(ii) Furnished to or for the account of any foreign nation without provision for reimbursement.

2. Funds or credits are advanced or the convertibility of foreign currencies is guaranteed in connection with furnishing such equipment, materials, or commodities which may be transported by ocean vessel.

Note: This requirement does not apply to small purchases as defined in 41 CFR 1-3.6 or to cargoes carried in the vessels of the Panama Canal Company.

B. The Subcontractor agrees as follows:

1. To utilize privately owned United States flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved whenever shipping any equipment, material, or commodities under the conditions set forth in a. above pursuant to this subcontract to the extent such vessels are available at fair and reasonable rates for United States flag commercial vessels.

Note: Guidance regarding fair and reasonable rates for United States flag vessels may be obtained from the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, D. C. 20230: Area Code 202, phone 377-3449.

2. To furnish, within 15 working days following the date of loading for shipments originating within the United States or within 25 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill of lading in English for each shipment of cargo covered by the provisions in a. above to both the Contracting Officer (through the SERI) and to the

Division of National Cargo, Office of Market Development, Maritime Administration, Washington, D. C. 20230.

3. To insert the substance of the provisions of this article in all subcontracts issued pursuant to this contract except for small purchases as defined in 41 CFR 1-3.6.

(Sec. 205(c), 63 Stat. 390; 40 U.S.C. 486(c))

CLAUSE 22 - SAFETY AND HEALTH

(This clause shall apply to Subcontractor's work under this subcontract at SERI or Government-owned sites or facilities.)

The Subcontractor shall take all reasonable precautions in the performance of the work under this subcontract to protect the safety and health of employees and of members of the public and shall comply with all applicable safety and health regulations and requirements (including reporting requirements) of the DOE. In the event that the Subcontractor fails to comply with said regulations or requirements of the DOE, the SERI may, without prejudice to any other legal or contractual rights of the SERI, issue an order stopping all or any part of the work; thereafter a start order for resumption of the work may be issued at the discretion of the SERI. The Subcontractor shall make no claim for an extension of time or for compensation or damages by reason of or in connection with such work stoppage.

CLAUSE 23 - PERMITS

Except as the parties hereto may otherwise mutually agree, the Subcontractor shall procure all necessary permits or licenses and abide by all applicable laws, regulations, and ordinances of the United States, and of the State, territory, and political subdivision in which the work under this subcontract is performed.

CLAUSE 24 - KEY PERSONNEL

The personnel specified in the schedule to this subcontract are considered to be essential to the work being performed hereunder. Prior to diverting any of the specified individuals to other programs, the Subcontractor shall notify the SERI reasonably in advance and shall submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on the program. No diversion shall be made by the Subcontractor without the written consent of the SERI: Provided, That the SERI may ratify in writing such diversion and such ratification shall constitute the consent of the SERI required by this clause. The schedule to this subcontract may be amended from time to time during the course of the subcontract to either add or delete personnel, as appropriate.

CLAUSE 25 - COST ACCOUNTING STANDARD WITHDRAWAL

A. Cost Accounting Standard 414 - Cost of money as an element of the cost of facilities capital - is withdrawn from application to the provisions of the clauses in this contract entitled "Cost Accounting Standards" and "Administration of Cost Accounting Standards."

B. This clause shall be included in all subcontracts, at any tier, containing the clause entitled "Cost Accounting Standards."

CLAUSE 26 - PRINTING

Unless otherwise specified in this subcontract, the subcontractor shall not engage in, nor subcontract for, any printing (as that term is defined in title I of the Government Printing and Binding Regulations in effect on the effective date of this subcontract) in connection with the performance of work under this subcontract: Provided, however, that performance of a requirement under this subcontract involving the reproduction of less than 5,000 production units of any one page, or less than 25,000 production units in the aggregate of multiple pages, will not be deemed to be printing. A production unit is defined as one sheet, size 8 by 10 and 1/2 inches, one side only, one color.

CLAUSE 27 - INTEREST

Notwithstanding any other provision of this subcontract, unless paid within 30 days, all amounts that become payable by the Subcontractor to the SERI under this subcontract (net of any applicable tax credit under the Internal Revenue Code) shall bear interest at the rate determined by the Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat. 97. Amounts shall be due upon the earliest of (a) the date fixed pursuant to this subcontract; (b) the date of the first written demand for payment, consistent with this subcontract, including demand consequent upon default termination; (c) the date of transmittal by the SERI to the Subcontractor of a proposed supplemental agreement to confirm completed negotiations fixing the amount; or (d) if this subcontract provides for revision of prices, the date of written notice to the Subcontractor stating the amount of refund payable in connection with a pricing proposal or in connection with a negotiated pricing agreement not confirmed by subcontract supplement.

CLAUSE 28 - ORAL OR WRITTEN MODIFICATIONS

No oral or written statement of any person other than the Subcontract Administrator (acting as the representative and on the behalf of the Assistant Director, Contracts and Procurement) whomsoever shall, in any manner or degree, modify or otherwise affect the terms of this Subcontract. The Subcontract Administrator is the only person authorized to approve changes in any of the requirements under this Subcontract and notwithstanding any provision contained elsewhere in this Subcontract, the said authority remains solely with the Subcontract Administrator acting in the capacity stated above. In the event the Subcontractor effects any such change at the direction of any person other than the Subcontract Administrator, the change will be considered to have been made without authority and no adjustment will be made in the Subcontract price or estimated cost to cover any increase in costs incurred as a result thereof.

CLAUSE 29 - TECHNICAL DIRECTION AND SURVEILLANCE

A. 1. The work to be performed by the subcontractor under this subcontract is subject to the surveillance and written Technical Direction of the Technical Monitor who is designated elsewhere in this subcontract. The term "Technical Direction" is defined to include the following:

a. Direction to the Subcontractor which shifts work emphasis between work areas or tasks, suggests certain lines of inquiry, fills in details or otherwise provides technical guidance to the subcontractor in order to accomplish the Scope of Work.

b. Provision of information to the Subcontractor which assists in the interpretation of drawings, specifications or technical portions of the Scope of Work.

c. Review and, where required by the subcontract, approval thru the Subcontract Administrator of technical reports, drawings, specifications or technical information to be delivered by the subcontractor to SERI under the subcontract.

The Technical Monitor shall monitor the Subcontractor's performance with respect to compliance with the technical requirements of this subcontract.

2. The only person authorized to give Technical Direction to the subcontractor under this subcontract are the Subcontract Administrator and the Technical Monitor as contemplated by paragraph (A.1) above. Any action taken by the Subcontractor in response to any direction given by any person other than the Subcontract Administrator or Technical Monitor whom he may appoint shall be at the subcontractor's own risk.

B. Technical direction and management surveillance shall not impose tasks or requirements upon the Subcontractor additional to or different from the general tasks and requirements stated in Article 2 of the Schedule of this subcontract. The Technical Direction to be valid:

1. Must be issued in writing consistent with the general scope of the work set forth in this subcontract; and

2. May not:

(i) constitute an assignment of additional work outside the general scope of the Statement of Work attached to this subcontract;

(ii) constitute a change as defined in the subcontract clause entitled "Changes";

(iii) in any manner cause an increase or decrease in the total estimated subcontract cost or the time required for subcontract performance; or

(iv) change any of the expressed terms, conditions or specifications of the subcontract.

C. The Subcontractor shall proceed promptly with the performance of Technical Directions duly issued by the Technical Monitor in the manner prescribed by paragraph (B) and which are within his authority under the provisions of paragraph (A); provided, however, that the Subcontractor shall immediately cease the performance of any Technical Direction upon receipt of a written instruction to that effect from the Subcontract Administrator and, provided, further, that any costs incurred prior to the receipt of said instruction shall be deemed to be incurred in the performance of the work hereunder and shall be treated as allowable costs hereunder if they are otherwise allowable in accordance with the clause entitled "Allowable Cost, Fixed Fee and Payment or Allowable Cost and Payment," as applicable.

D. If in the opinion of the Subcontractor, any Technical Direction issued by the Technical Monitor is within one of the categories as defined in

(B) (2) (i) through (iv) above, the subcontractor shall not proceed but shall notify the Subcontract Administrator in writing within two (2) working days after the receipt of any such Technical Direction and shall request the Subcontract Administrator to modify the subcontract accordingly. Such notice shall (i) include the reasons upon which the subcontractor bases its belief that the Technical Direction falls outside the purview of paragraph (A) above and (ii) include the subcontractor's best estimate as to any necessary revisions in the estimated cost, fixed fee, performance time, delivery schedules and any other contractual provisions that would result from implementing the Technical Direction. If after reviewing the information presented pursuant to (d) (i), the Subcontract Administrator is of the opinion that such Technical Direction authorized by this clause, the Subcontract Administrator will direct the subcontractor to proceed with the implementation of such Technical Direction and the subcontractor shall comply therewith. In the event the Subcontract Administrator determines that it is necessary to avoid a delay in performance of the subcontract he may, in writing, direct the subcontractor to proceed with the implementation of the Technical Direction pending receipt of the information to be submitted pursuant to (D) (i) and (ii) above. Should the Subcontract Administrator later determine that change direction is appropriate, the written decision issued hereunder shall constitute the required Change direction.

E. Failure of the subcontractor and the Subcontract Administrator to agree on whether the Direction as issued in Technical Direction or a change within the purview of the "Changes" clause and/or otherwise falls within the limitations set forth in (B) above shall be a subcontract dispute concerning a question of fact within the meaning of the clause entitled "Disputes", of this subcontract.

CLAUSE 30 - CHANGES (Cost)

A. The SERI's Assistant Director, Contracts and Procurement may at any time, by a written order, and without notice to the sureties, if any, make changes, within the general scope of this subcontract, in any one or more of the following:

- (i) Drawings, designs, specifications, or statement of work;
- (ii) Method of shipment or packing; and
- (iii) Place of inspection, delivery, or acceptance.

B. If any such change causes an increase or decrease in the estimated cost of, or the time required for the performance of any part of the work under this subcontract, whether changed or not changed by any such order, or otherwise affects any other provision of this subcontract, an equitable adjustment shall be made:

- (i) In the estimated cost or delivery schedule, or both;
- (ii) In the amount of any fixed fee if any, to be paid to the Subcontractor; and
- (iii) In such other provisions of the subcontract as may be affected, and the subcontract shall be modified in writing accordingly.

Any claim by the Subcontractor for adjustment under this clause must be asserted within thirty (30) days from the date of receipt by the Subcontractor of the notification of change; Provided, however, that the SERI's Assistant Director, Contracts and Procurement, if he decides that the facts justify such action, may receive an act upon any such claim asserted at any time prior to

final payment under this subcontract. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this subcontract entitled "Disputes". However, except as provided in paragraph (C) below, nothing in this clause shall excuse the Subcontractor from proceeding with the subcontract as changed.

C. Notwithstanding the provisions of paragraphs (A) and (B) above, the estimated cost of this subcontract and, if this subcontract is incrementally funded, the funds allotted for the performance thereof, shall not be increased or deemed to be increased except by specific written modification of the subcontract indicating the new subcontract estimated cost and, if this subcontract is incrementally funded, the new amount allotted to the subcontract. Until such modification is made, the Subcontractor shall not be obligated to continue performance or incur costs beyond the point established in the clause of this subcontract entitled "Limitation of Cost" or "Limitation of Funds".

CLAUSE 31 - STOP WORK ORDER

A. The SERI may at any time, by written order to the subcontractor require the subcontractor to stop all, or any part, of the work called for by this subcontract for a period of 90 days after the order is delivered to the subcontractor, and for any further period to which the parties may agree. Any such order shall be specifically identified as a stop work order issued pursuant to this Clause. Upon receipt of such an order, the subcontractor shall forthwith comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Within a period of 90 days after a stop work order is delivered to the subcontractor, or within any extension of that period to which the parties shall have agreed, the SERI shall either:

(i) cancel the stop work order, or

(ii) terminate the work covered by such order as provided in the

"Termination Clause of this Subcontract."

B. If a stop work order issued under this clause is cancelled or the period of the order or any extension thereof expires, the subcontractor shall resume work. An equitable adjustment shall be made in the delivery schedule, the estimated cost, the fee, (if any), or a combination thereof, and in any other provisions of the subcontract that may be affected, and the subcontract shall be modified in writing accordingly, if:

(i) the stop work order results in an increase in the time required for, or in the Subcontractor's cost properly allocable to, the performance of any part of this subcontract, and

(ii) the subcontractor asserts a claim for such adjustments within 30 days after the end of the period of work stoppage; provided that, if the SERI decides the facts justify such action, it may receive and act upon any such claim asserted at any time prior to final payment under this subcontract.

C. If a stop work order is not cancelled and the work covered by such order is terminated for default, the reasonable costs resulting from the stop work order shall be allowed by equitable adjustments or otherwise.

CLAUSE 32 - FOREIGN TRAVEL

A. Foreign travel shall be subject to the prior approval of the SERI for each separate trip regardless of whether funds for such travel are contained in an approved budget. Foreign travel is defined as any travel outside of Canada and the United States and its territories and possessions.

B. Requests for approval shall be submitted at least 45 days prior to the planned departure date, on Form ERDA 445 (Request for Approval of Foreign Travel), and when applicable include Form ERDA 290 (Notification of Proposed Soviet-Bloc Travel).

CLAUSE 33 - PAYMENT FOR OVERTIME PREMIUMS

A. Allowable cost shall not include any amount on account of overtime premiums except when (1) specified in D, below, or (2) paid for work;

(i) Necessary to cope with emergencies such as those resulting from accidents, natural disasters, breakdowns of production equipment, or occasional production bottlenecks of a sporadic nature;

(ii) By indirect labor employees such as those performing duties in connection with administration, protection, transportation, maintenance, standby plant protection, operation of utilities, or accounting;

(iii) In the performance of tests, industrial processes, laboratory procedures, loading or unloading of transportation media, and operations in flight or afloat, which are continuous in nature and cannot reasonably be interrupted or otherwise completed; or

(iv) Which will result in lower cost to the SERI.

B. The cost of overtime premiums otherwise allowable under A, above, shall be allowed only to the extent the amount thereof is reasonable and properly allocable to the work under the subcontract.

C. Any request for overtime, in addition to any amount specified in D, below, will be for all overtime which can be estimated with reasonable certainty shall be used for the remainder of the subcontract, and shall contain the following: (1) Identification of the work unit, such as the department or section in which the requested overtime will be used, together with present workload, manning and other data of the affected unit, sufficient to permit an evaluation by the SERI of the necessity for the overtime; (2) the effect that the denial of the request will have on the delivery or performance schedule of the subcontract; (3) reasons why the required work cannot be performed on the basis of utilizing multishift operations or by the employment of additional personnel; and (4) the extent to which approval of overtime would affect the performance or payments in connection with any other SERI or Government subcontracts, together with any identification of such affected contracts.

D. The Subcontractor is authorized to perform overtime, in addition to that performed under A (2), only to the extent, if any, specified elsewhere in this subcontract.

CLAUSE 34 - INSURANCE LIABILITY TO THIRD PERSONS

A. The Subcontractor shall procure and thereafter maintain workmen's compensation, employee's liability, comprehensive general liability (bodily

injury), and comprehensive automobile liability (bodily injury and property damage) insurance with respect to performance under this subcontract, and such other insurance as the SERI may from time to time require with respect to performance under this subcontract: provided, that the subcontractor may with the approval of the SERI maintain a self-insurance program; and Provided Further, that with respect to workmen's compensation the Subcontractor is qualified pursuant to a statutory authority. All insurance required pursuant to the provisions of this paragraph shall be in such form, in such amounts, and for such periods of time as the SERI may from time to time require or approve, and with insurers approved by the SERI.

B. The Subcontractor agrees, to the extent and in the manner required by the SERI to submit for the approval of the SERI any other insurance maintained by the Subcontractor in connection with the performance of this subcontract and for which the subcontractor seeks reimbursement hereunder.

C. The Subcontractor shall be reimbursed (1) for the portion allocable to this subcontract of the reasonable cost of insurance as required or approved pursuant to the provisions of this clause, and (2) without regard to and as an exception to the "Limitation of Cost" or the "Limitation of Funds" clause of this subcontract, for liabilities to third persons for loss of or for damage to property (other than property (i) owned, occupied, or used by the Subcontractor, or rented to the subcontractor or (ii) in the care custody or control of the Subcontractor), or for death or bodily injury, not compensated by insurance or otherwise, arising out of the performance of this subcontract, whether or not caused by the negligence of the Subcontractor, his agents, servants, or employees: Provided, such liabilities are represented by final judgments or by settlements approved in writing by the SERI and expenses incidental to such liabilities, except liabilities (a) for which the Subcontractor is otherwise responsible under the express terms of the clause or clauses, if any, specified in the Schedule, or (b) with respect to which the Subcontractor has failed to insure as required or maintain insurance as approved by the SERI, or (c) which results from willful misconduct or lack of good faith on the part of any of the Subcontractor's directors, officers, or on part of any of his managers, superintendents, or other equivalent representatives, who has supervision or direction of (aa) all or substantially all of the Subcontractor's business, or (bb) all or substantially all of the Subcontractor's operations at any one plant or separate location in which this Subcontract is being performed or (cc), a separate and complete major industrial operation in connection with the performance of this Subcontract. The foregoing shall not restrict the right of the Subcontractor to be reimbursed for the cost of insurance maintained by the Subcontractor in connection with the performance of this Subcontract, other than insurance required to be submitted for approval or required to be procured and maintained pursuant to the provisions of this clause: Provided, such cost would constitute allowable cost under the clause of this Subcontract entitled "Allowable Cost, Fixed-Fee, and Payment" or the clause entitled "Allowable Cost and Payment", whichever is applicable for this subcontract.

D. The Subcontractor shall give SERI or its representatives immediate notice of any suit or action filed, or prompt notice of any claim made against the Subcontractor arising out of the performance of this subcontract, the cost and expense of which may be reimbursable to the Subcontractor under the provisions of this subcontract, and the risk of which is then uninsured or in which the amount claimed exceeds the amount of coverage. The Subcontractor shall furnish immediately to the SERI copies of all pertinent papers received by the Subcontractor. If the amount of the liability claimed exceeds the amount of

the liability of coverage, the Subcontractor shall authorize representatives of the SERI to collaborate with counsel for the insurance carrier, if any, in settling or defending such claim. If the liability is not insured or covered by bond, the Subcontractor shall, if required by the SERI, authorize representatives of the SERI to settle or defend any such claim and to represent the Subcontractor in or take charge of any litigation in connection therewith: Provided, however, that the Subcontractor may, at its own expense, be associated with the representatives of the SERI in the settlement or defense or any such claim or litigation.

CLAUSE 35 - LIMITATION OF COST

A. It is estimated that the total cost to the SERI for the performance of this subcontract, exclusive of fee (if any), will not exceed the estimated cost set forth in the Schedule, and the Subcontractor agrees to use his best efforts to perform the work specified in the Schedule and all obligations under this subcontract within such estimated cost. If, at any time, the Subcontractor has reason to believe that the costs which he expects to incur in the performance of this subcontract in the next succeeding 60 days, when added to all costs previously incurred, will exceed 75 percent of the estimated cost then set forth in the Schedule, or if, at any time, the Subcontractor has reason to believe that the total cost to the SERI for the performance of this subcontract, exclusive of fee (if any), will be greater or substantially less than the then estimated cost hereof, the Subcontractor shall notify the SERI in writing to that effect, giving the revised estimate of such total cost for the performance of this subcontract.

B. Except as required by other provisions of this subcontract specifically citing and stated to be an exception from this clause, the SERI shall not be obligated to reimburse the Subcontractor for costs incurred in excess of the estimated cost set forth in the Schedule, and the Subcontractor shall not be obligated to continue performance under the subcontract (including actions under the "Termination" Clause) or otherwise to incur costs in excess of the estimated cost set forth in the Schedule, unless and until the SERI shall have notified the Subcontractor in writing that such estimated cost has been increased and shall have specified in such notice a revised estimated cost which shall thereupon constitute the estimated cost of performance of the subcontract. No notice, communication, or representation in any other form or from any person other than the SERI's Subcontract Administrator shall affect the estimated cost of this subcontract. In the absence of the specified notice, the SERI shall not be obligated to reimburse the Subcontractor for any costs in excess of the estimated cost set forth in the Schedule, whether those excess costs were incurred during the course of the subcontract or as a result of termination. When and to the extent that the estimated cost set forth in the Schedule has been increased, any costs incurred by the Subcontractor in excess of the estimated cost prior to such increase shall be allowable to the same extent as if such costs had been incurred after the increase; unless the SERI issues a termination or other notice and directs that the increase is solely for the purpose of covering termination or other specified expense.

C. Change orders issued pursuant to the Changes clause of this subcontract shall not be considered an authorization to the subcontractor to exceed the estimated cost set forth in paragraph A of Article 4 of the Schedule in the absence of a statement in the change order, or other subcontract modification, increasing the estimated cost.

D. In the event that this subcontract is terminated or the estimated cost not increased, the SERI and the subcontractor shall negotiate an equitable distribution of all property produced or purchased under the subcontract based upon the share of costs incurred by each.

CLAUSE 36 - ALLOWABLE COST, FIXED FEE, AND PAYMENT

A. For the performance of this Subcontract, the SERI shall pay to the Subcontractor;

1. The cost thereof (hereinafter referred to as "allowable cost") determined by the SERI to be allowable in accordance with:

(i) Subpart 1-15.2 of the Federal Procurement Regulations (41 CFR 1-15.2) as supplemented or modified by DOE-PR 9-15 (41 CFR 9-15), as in effect on the date of this Subcontract; and

(ii) The terms of this Subcontract; and

2. Such fixed-fee, if any, as may be provided for in this Schedule.

B. Payments shall be made to the Subcontractor when requested as work progresses, but not more frequently than bi-weekly, in amounts approved by the SERI. The Subcontractor may submit to an authorized representative of the SERI, in such form and reasonable detail as such representative may require, an invoice or public voucher supported by a statement of cost for the performance of this Subcontract and claimed to constitute allowable cost. For this purpose, except as provided herein with respect to pension contributions, the term "costs" shall include only those recorded costs which result, at the time of the request for reimbursement, from payment by cash, check, or other form of actual payment for items or services purchased directly for the Subcontract, together with (when the Subcontractor is not delinquent in payment of costs of Subcontract performance in the ordinary course of business) costs incurred, but not necessarily paid, for materials which have been issued from the Subcontractor's stores inventory and placed in the production process for use on the Subcontract, for direct labor, for direct travel, for other direct inhouse costs, and for properly allocable and allowable indirect costs, as is shown by records maintained by the Subcontractor for purposes of obtaining reimbursement under Government contracts plus the amount of progress payments which have been paid to the Subcontractor's lower tier subcontractors under similar cost standards. In addition, when pension contributions are paid by the Subcontractor to the retirement fund less frequently than quarterly, accrued costs therefor shall be excluded from indirect costs for payment purposes until such costs are paid. If pension contributions are paid on a quarterly or more frequent basis, accruals therefor may be included in indirect costs for payment purposes provided that they are paid to the fund within 30 days after the close of the period covered. If payments are not made to the fund within such 30-day period, pension contribution costs shall be excluded from indirect costs for payment purposes until payment has been made. The restriction on payment more frequently than bi-weekly and the requirement of prior payment for items or services purchased directly for the contract shall not apply when the Subcontractor is a small business concern.

C. Promptly after receipt of each invoice or voucher and statement of cost, the SERI shall, except as otherwise provided in this Subcontract subject to the provisions of D, below, make payment thereon as approved by the SERI. Payment of the fixed-fee, if any, shall be made to the Subcontractor as specified in the Schedule: Provided, however, That after payment of 85 percent of the fixed-fee set forth in the Schedule, the SERI may withhold further payment

of fee until a reserve shall have been set aside in an amount which he considers necessary to protect the interests of the SERI, but such reserve shall not exceed 15 percent of the total fixed fee, or \$100,000, whichever is less.

D. At any time or times prior to final payment under this Subcontract the SERI may have the invoices or vouchers and statements of cost audited. Each payment theretofore made shall be subject to reduction for amounts included in the related invoice or voucher which are found by the SERI on the basis of such audit, not to constitute allowable cost. Any payment may be reduced for overpayments, or increased for underpayments, on preceding invoices or vouchers.

E. On receipt and approval of the invoice or voucher designated by the Subcontractor as the "completion invoice" or "completion voucher" and upon compliance by the Subcontractor with all the provisions of this Subcontract (including, without limitation, the provisions relating to patents and the provisions of F, below), the SERI shall promptly pay to the Subcontractor any balance of allowable cost, which has been withheld pursuant to C, above, or otherwise not paid to the Subcontractor. The completion invoice or voucher shall be submitted by the Subcontractor promptly following completion of the work under this Subcontract but in no event later than 1 year (or such longer period as the SERI may in its discretion approve in writing) from the date of such completion.

F. The Subcontractor agrees that any refunds, rebates, credits, or other amounts (including any interest thereon) accruing to or received by the Subcontractor or any assignee under this Subcontract shall be paid by the Subcontractor to the SERI to the extent that they are properly allocable to costs for which the Subcontractor has been reimbursed by the SERI under this subcontract. Reasonable expenses incurred by Subcontractor for the purpose of securing such refunds, rebates, credits, or other amounts shall be allowable costs hereunder when approved by the SERI. Prior to final payment under this Subcontract, the Subcontractor and each assignee under this Subcontract whose assignment is in effect at the time of final payment under this Subcontract shall execute and deliver:

1. An assignment to the Government, in form and substance satisfactory to the SERI of refunds, rebates, credits or other amounts (including any interest thereon) properly allocable to costs for which the Subcontractor has been reimbursed by the SERI under this Subcontract; and

2. A release discharging the SERI its officers, agents, and employees from all liabilities, obligations, and claims arising out of or under this Subcontract, subject only to the following exceptions:

- (i) Special claims in stated amounts or in estimated amounts where the amounts are not susceptible of exact statement by the Subcontractor;

- (ii) Claims, together with reasonable expenses incidental thereto, based upon liabilities of the Subcontractor to third parties arising out of the performance of this Subcontract: Provided, however, that such claims are not known to the Subcontractor on the date of the execution of the release; and provided further, that the Subcontractor gives notice of such claims in writing to the SERI not more than 6 years after the date of the release or the date of any notice to the Subcontractor that the SERI is prepared to make final payment, whichever is earlier; and

- (iii) Claims for reimbursement of costs (other than expenses of the Subcontractor by reason of its indemnification of the SERI and

the Government against patent liability), including reasonable expenses incidental thereto, incurred by the Subcontractor under the provisions of this Subcontract relating to patents.

G. Any cost incurred by the Subcontractor under the terms of this Subcontract which would constitute allowable cost under the provisions of this clause shall be included in determining the amount payable under this Subcontract, notwithstanding any provisions contained in the specifications or other documents incorporated in this Subcontract by reference, designating services to be performed or materials to be furnished by the Subcontractor at his expense or without cost to the SERI.

CLAUSE 37 - TERMINATION

A. The performance of work under this subcontract may be terminated by the SERI in accordance with this clause in whole or from time to time in part:

1. whenever the Subcontractor shall default in performance of this subcontract in accordance with its terms (including in the term "default" any such failure by the Subcontractor to make progress in the prosecution of the work hereunder as endangers such performance) and shall fail to cure such default within a period of ten days (or such longer period as the SERI may allow) after receipt from the SERI of a notice of specifying the default; or

2. whenever for any reason the SERI shall determine that such termination is in the best interest of the SERI or the Government.

Any such termination shall be effected by delivery to the Subcontractor of a Notice of Termination specifying whether termination is for the default of the Subcontractor or for the convenience of the SERI the extent to which performance of the work under the subcontract is terminated and the date upon which such termination becomes effective. If after notice of termination of this subcontract for default under 1. above it is determined, for any reason, that the Subcontractor was not in default pursuant to 1. or that the Subcontractor's failure to perform or to make progress in performance is due to causes beyond the control and without the fault or negligence of the Subcontractor pursuant to the provisions of Paragraph L. below, the Notice of Termination shall be deemed to have been issued under 2., above, and the rights and obligations of the parties hereto shall in such event be governed accordingly.

B. After receipt of a Notice of Termination and except as otherwise directed by the SERI, the Subcontractor shall:

1. stop work under the subcontract on the date and to the extent specified in the Notice of Termination;

2. place no further orders or sub-subcontracts for materials, service, or facilities, except as may be necessary for completion of such portion of the work under the subcontract as is not terminated;

3. terminate all orders and sub-subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;

4. assign to the SERI or the Government, in the manner and to the extent directed by the SERI, all of the right, title and interest of the Subcontractor under the orders or sub-subcontracts so terminated, in which case the SERI or the Government shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and sub-subcontracts;

5. with the approval or ratification of the SERI, to the extent it may require, which approval or ratification shall be final and conclusive for all purposes of this clause, settle all outstanding liabilities and all claims arising out of such termination of orders and sub-subcontracts, the cost of which would be reimbursable in whole or in part in accordance with the provisions of this subcontract;

6. transfer title to the Government (to the extent that title has not already been transferred) and deliver in the manner, at the times, and to the extent directed by the SERI, (a) the fabricated or unfabricated parts, work in process, completed work, supplies and other material produced as a part of, or acquired in respect of the performance of, the work terminated by Notice of Termination; (b) the completed or partially completed plans, drawings, information and other property which, if the subcontract had been completed, would be required to be furnished to the SERI; and (c) the jigs, dies, and fixtures and other special tools and tooling acquired or manufactured for the performance of this subcontract for the cost of which the Subcontractor has been or will be reimbursed under this subcontract;

7. use its best efforts to sell, in the manner, at the times to the extent, and at the price or prices directed or authorized by the SERI, any property of the types referred to in 6. above; provided, however, that the Subcontractor (a) shall not be required to extend credit to any purchaser; and (b) may acquire any such property under the conditions prescribed by and at a price or prices approved by the SERI and, provided further, that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the SERI to the Subcontractor under this subcontract or shall otherwise be credited to the price or cost of the work covered by the subcontract or paid in such manner as the SERI may direct;

8. complete performance of such part of the work as shall not have been terminated by the Notice of Termination; and

9. take such action as may be necessary or as the SERI may direct, for the protection and preservation of the property related to this subcontract which is in the possession of the Subcontractor and in which the Government has or may acquire an interest.

The subcontractor shall proceed immediately with the performance of the above obligations notwithstanding any delay in determining or adjusting the amount of the fee or any item of reimbursable cost under this clause. At any time after expiration of the plant clearance period as defined in the definitions may be amended from time to time, the Subcontractor may submit to the SERI a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed of, exclusive of items, the disposition of which has been directed or authorized by the SERI, and may request the SERI to remove such items or enter into a storage agreement covering them. Not later than fifteen (15) days thereafter, the SERI will accept such items and remove them or enter into a storage agreement covering the same; Provided, that the list submitted shall be subject to verification by the SERI upon removal of the items or, if the items are stored, within forty-five (45) days from the date of submission of the list, and any necessary adjustment to correct the list as submitted shall be made prior to final settlement.

C. After receipt of a Notice of Termination, the Subcontractor shall submit to the SERI its termination claim in the form and with the certification prescribed by the SERI. Such claim shall be submitted promptly but in no

event later than one (1) year from the effective date of termination, unless one or more extensions in writing are granted by the SERI upon request of the Subcontractor made in writing within such one-year period or authorized extension thereof. However, if the SERI determines that the facts justify such action, it may receive and act upon any such termination claim at any time after such one-year period or any extension thereof. Upon failure of the Subcontractor to submit its termination claim within the time allowed, the SERI may, subject to any review required by the DOE's procedures in effect as of the date of execution of this subcontract, determine, on the basis of information available to it, the amount, if any, due the Subcontractor by reason of termination and shall thereupon pay to the Subcontractor the amount so determined.

D. Subject to the provisions of Paragraph C., and subject to any review required by the DOE's procedures in effect as of the date of execution of this subcontract, the Subcontractor and the SERI may agree upon the whole or any part of the amount or amounts to be paid (including an allowance for the fee) to the Subcontractor by reason of the total or partial termination of work pursuant to this clause. The subcontract shall be amended accordingly and the Subcontractor shall be paid the agreed amount.

E. In the event of the failure of the Subcontractor and the SERI to agree in whole or in part, as provided in Paragraph D., above, as to the amounts with respect to cost and fee, or as to the amount of the fee, to be paid to the Subcontractor in connection with the termination of work pursuant to this clause, the SERI shall, subject to any review required by the DOE's procedures in effect as of the date of execution of this subcontract, determine on the basis of information available to it, the amount, if any, due the Subcontractor by reason of the termination and shall pay to the Subcontractor the amount determined as follows:

1. If the settlement includes cost and fee:

a. there shall be included therein all costs and expenses reimbursable in accordance with this subcontract, not previously paid to the Subcontractor for the performance of this subcontract prior to the effective date of the Notice of Termination and such of these costs as may continue for a reasonable time thereafter with the approval of or as directed by the SERI: provided, however, that the Subcontractor shall proceed as rapidly as practicable to discontinue such costs.

b. there shall be included therein so far as not included under (a) above, the cost of settling and paying claims arising out of the termination of the work under sub-subcontracts or orders, as provided in Paragraph B.5, above, which are properly chargeable to the terminated portion of this subcontract.

c. there shall be included therein the reasonable costs of settlement, including accounting, legal, clerical, and other expenses necessary for the preparation of settlement claims and supporting technical data with respect to the terminated portion of the subcontract and for the termination and settlement of sub-subcontracts thereunder, together with the reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of termination inventory: provided, however, that if the termination is for default of the Subcontractor, there shall not be included any amounts for the preparation of the Subcontractor's settlement proposal; and

d. there shall be included therein a portion of the fee, if any, payable under the subcontract determined as follows:

(i) In the event of termination of this subcontract for the convenience of the SERI and not for the default of the Subcontractor, there shall be paid a percentage of the fee equivalent to the percentage of the completion of work contemplated by the subcontract, but exclusive of lower tier subcontract effort included in lower tier subcontractor's termination claims, less fee payments previously made hereunder; or

(ii) In the event of termination of this subcontract for the default of the Subcontractor, the total fee payable shall be such proportionate part of the fee (or, if this subcontract calls for articles of different types, of such part of the fee as is reasonably allocable to the type of article under consideration) as the total number of articles delivered to and accepted by the SERI bears to the total number of articles of like kind called for by this subcontract.

If the amount determined under this subparagraph 1, is less than the total payment theretofore made to the Subcontractor, the Subcontractor shall repay to the SERI the excess amount.

2. If the settlement includes only the fee, the amount thereof will be determined in accordance with subparagraph 1.(d). above.

F. Costs claimed, agreed to, or determined pursuant to Paragraphs C, D, and E of this clause shall be in accordance with the subcontract cost principles and procedures in Part 1-15 of the Federal Procurement Regulations (41 CFR 1-15) as supplemented or modified by DOE-PR part 9-15 (41 CFP 9-15) as supplemented or modified by DOE-PR part 9-15 (41 CFR 9-15) in effect on the date of this subcontract.

G. In arriving at the amount due the Subcontractor under this clause, there shall be deducted (1) all unliquidated advance or other payments theretofore made to the Subcontractor, applicable to the terminated portion of this subcontract; (2) any claim which the SERI or the Government may have against the Subcontractor in connection with this subcontract; and (3) the agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the Subcontractor or sold pursuant to the provisions of this clause and not otherwise recovered by or credited to the SERI.

H. In the event of a partial termination, the portion of the fee which is payable with respect to the work under the continued portion of the subcontract shall be equitably adjusted by agreement between the Subcontractor and the SERI, and such adjustment shall be evidenced by an amendment to this subcontract.

I. The SERI may from time to time under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Subcontractor in connection with the terminated portion of the subcontract whenever in the opinion of the SERI the aggregate of such payments shall be within the amount to which the Subcontractor will be entitled hereunder. If the total of such payments is in excess of the amount finally determined to be due under this clause, such excess shall be payable by the Subcontractor to the SERI upon demand, together with interest computed at the rate established by the Secretary of the Treasury pursuant to Pub. L. 92-41 (50 U.S.C App. 1215(b)(2) for the Renegotiation Board, for the period from the date such excess payment is received by the Subcontractor to the date on which such excess is repaid to the SERI, provided, however, that no interest shall be charged with respect to any such excess payment attributable to a reduction

in the Subcontractor's claim by reason of retention or other disposition or termination inventory until ten (10) days after the date of such retention or disposition or such later date as determined by the SERI by reason of the circumstances.

J. The provisions of this clause relating to the fee shall be inapplicable if this subcontract does not provide for payment of a fee.

CLAUSE 38 - EXCUSABLE DELAYS

Except with respect to defaults of lower tier subcontractors, the Subcontractor shall not be in default by reason of any failure in performance of this subcontract in accordance with its terms (including any failure by the Subcontractor to make progress in the prosecution of the work hereunder which endangers such performance) if such failure arises out of causes beyond the control and without the fault or negligence of the Subcontractor. Such causes may include, but are not restricted to, acts of God or of the public enemy, acts of the Government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather, but in every case the failure to perform must be beyond the control and without the fault or negligence of the Subcontractor. If the failure to perform is caused by the failure of a lower tier subcontractor to perform or make progress, and if such failure arises out of causes beyond the control of both the Subcontractor and lower tier subcontractor, and without the fault or negligence of either of them, the Subcontractor shall not be deemed to be in default, unless (1) the supplies or services to be furnished by the lower tier subcontractor were obtainable from other sources, (2) the SERI shall have ordered the Subcontractor in writing to procure such supplies or services from such other sources, and (3) the Subcontractor shall have failed to comply reasonably with such order. Upon request of the Subcontractor, the SERI shall ascertain the facts and extent of such failure and, if he shall determine that any failure to perform was occasioned by one or more of the said causes, the delivery schedule shall be revised accordingly, subject to the rights of the Government under the clause hereof entitled "Termination." (As used in this clause, the term "lower tier subcontractor" and "lower tier subcontractors" means subcontractor(s) at any tier.)

CLAUSE 39 - NEGOTIATED OVERHEAD RATES (Commercial)

A. Notwithstanding the provisions of the clause of the subcontract entitled: "Allowable Cost, Fixed Fee, and Payment" the allowable indirect costs under this subcontract shall be obtained by applying negotiated overhead rates to bases agreed upon by the parties, as specified in the schedule.

B. The Subcontractor, as soon as possible but not later than ninety (90) days after the expiration of his fiscal year, or such other period as may be specified in the subcontract, shall submit to the SERI, with a copy to the cognizant audit activity, a proposed final overhead rate or rates for that period based on the Subcontractor's actual cost experience during that period, together with supporting cost data. Negotiation of overhead rates by the Subcontractor and the SERI shall be undertaken as promptly as practicable after receipt of the Subcontractor's proposal.

C. Allowability of costs and acceptability of cost allocation methods

shall be determined in accordance with the clause entitled "Allowable Cost Fixed Fee and Payment" as in effect on the date of this subcontract.

D. The results of each negotiation shall be set forth in a modification to this subcontract, which shall specify (1) the agreed final rates, (2) the bases to which the rates apply, and (3) the periods for which the rates apply.

E. Pending establishment of final overhead rates for any period, the Subcontract shall be reimbursed either at negotiated provisional rates as provided in the Subcontract, or at billing rates acceptable to the SERI, subject to appropriate adjustment when the final rates for that period are established. To prevent substantial over or under payment, and to apply either retroactively or prospectively: (1) Provisional rates may, at the request of either party, be revised by mutual agreement, and (2) billing rates may be adjusted at any time by the SERI. Any such revision of negotiated provisional rates provided in the subcontract shall be set forth in a modification to this subcontract.

F. Any failure by the parties to agree on any final rates under this clause shall be considered a dispute concerning a question of fact for decision by the SERI within the meaning of the "Disputes" clause of this subcontract.

CLAUSE 40 - LOWER TIER SUBCONTRACTS

A. The Subcontractor shall notify the SERI reasonably in advance of entering into a lower tier subcontract which (1) is cost-reimbursement type, time and materials, or labor-hour or (2) is fixed-price type and exceeds in dollar amount either \$25,000 or 5 percent of the total estimated cost of this subcontract, or (3) provides for the fabrication, purchase, rental, installation, or other acquisition of special test equipment having a value in excess of \$1,000 or any items of industrial facilities, or (4) has experimental, developmental, or research work as one of its purposes.

B. In the case of a proposed lower tier subcontract which is (1) cost-reimbursement type, time and materials, or labor-hour which would involve an estimated amount in excess of \$10,000, including any fee, (2) is proposed to exceed \$100,000, or (3) is one of a number of lower tier subcontracts under this subcontract with a single subcontractor for the same or related supplies or services which, in the aggregate are expected to exceed \$100,000, the advance notification required by A above, shall include:

1. A description of the supplies or services to be called for by the subcontract;

2. Identification of the proposed lower tier subcontractor and an explanation of why and how the proposed lower tier subcontractor was selected, including the degree of competition obtained;

3. The proposed lower tier subcontract price, together with the Subcontractor's cost or price analysis thereof;

4. The lower tier subcontractor's current, complete, and accurate cost or pricing data and certificate of Current Cost or Pricing Data when such data and certificate are required by other provisions of this subcontract to be obtained from the lower tier subcontractor;

5. Identification of the type of lower tier subcontract to be used;

6. A memorandum of negotiation which sets forth the principal elements of the lower tier subcontract price negotiations. A copy of this memorandum shall be retained in the Subcontractor's file for the use of the SERI or the Government reviewing authorities. The memorandum shall be in

sufficient detail to reflect the most significant considerations controlling the establishment of initial or revised price. The memorandum should include an explanation of why cost or pricing data was, or was not required, and, if it was not required in the case of any price negotiation in excess of \$100,000, a statement of the basis for determining that the price resulted from or was based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation. If cost or pricing data was submitted and a certificate of cost or pricing data was required, the memorandum shall reflect the extent to which reliance was not placed upon the factual cost or pricing data was not used by the Subcontractor in determining the total price objective and in negotiating the final price. The memorandum shall also reflect the extent to which it was recognized in the negotiation that any cost or pricing data submitted by the subcontractor was not accurate, complete, or current; the action taken by the Subcontractor and the lower tier subcontractor as a result; and the effect, if any, of such defective data on the total price negotiated. Where the total price negotiated differs significantly from the Subcontractor's total price objective, the memorandum shall explain this difference;

7. When incentives are used, the memorandum of negotiation shall contain an explanation of the incentive fee/profit plan identifying each critical performance element, management decisions used to quantify each incentive element, reasons for incentives on particular performance characteristics, and a brief summary of trade-off possibilities considered as to cost, performance, and time;

8. The lower tier subcontractor's Disclosure Statement or Certificate to Cost Accounting standards when such data are required by other provisions of this subcontract to be obtained from the lower tier subcontractor; and

9. A copy of the proposed lower tier subcontract if it either (a) exceeds \$100,000 or (b) is otherwise required by the SERI.

C. The Subcontractor shall obtain the written consent of the SERI prior to placing any lower tier subcontract for which advance notification is required under A above. The SERI may, in its discretion, ratify in writing any such lower tier subcontracts; such action shall constitute the consent of the SERI as required by this paragraph C.

D. The Subcontractor agrees that no lower tier subcontract placed under this subcontract shall provide for payment on a cost-plus-a-percentage-of-cost-basis.

E. The SERI may, in its discretion, specifically approve in writing any of the provisions of a lower tier subcontract. However, such approval or the consent of the SERI obtained as required by this article shall not be construed to constitute a determination of the allowability of any cost under this subcontract, unless such approval specifically provides that it constitutes a determination of the allowability of such cost.

F. The Subcontractor shall give the SERI immediate notice in writing of any action or suit filed, and prompt notice of any claim made against the Subcontractor by any lower tier subcontractor or vendor which in the opinion of the Subcontractor, may result in litigation, related in any way to this subcontract, with respect to which the Subcontractor may be entitled to reimbursement from the SERI.

G. Notwithstanding C above, the Subcontractor may enter into lower tier subcontracts within 1 or 2 of A above, without the consent of the SERI, if the

SERI has approved in writing the Subcontractor's procurement system and the lower tier subcontract is within the scope of such approval. (This paragraph G however, shall not be applicable to those lower tier subcontracts subject to sub-paragraph J below, if any.)

H. To facilitate small business participation in lower tier subcontracting under this subcontract, the Subcontractor agrees to provide progress payments on the fixed-price types of lower tier subcontracts of those lower tier subcontractors of those lower tier subcontractors which are small business concerns, in conformity with the standards for customary progress payments on the fixed-price types of lower tier subcontracts of those lower tier subcontractors which are small business concerns, in conformity with the standards for customary progress payments stated in the Federal Procurement Regulations, Subpart 1-30.5, as in effect on the date of this subcontract. The Subcontractor further agrees that the need for such progress payments will not be considered as a handicap or adverse factor in the award of lower tier subcontracts.

I. The Subcontractor agrees to insert the substance of this clause, including this paragraph I, in any lower tier subcontract hereunder which is a cost-reimbursement, time and materials, or labor-hour type which would involve an estimated amount in excess of \$10,000, including any fee; except that any such lower tier subcontract shall provide that required requests and notifications by the lower tier subcontractor shall be to the next higher subcontractor, or as the case may be, Subcontractor.

APPENDIX C-1

INTELLECTUAL PROPERTY PROVISIONS
FOR SUBCONTRACTS WITH
COMMERCIAL CONCERNS

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APPENDIX C-1

INTELLECTUAL PROPERTY PROVISIONS

CLAUSE 1 - PATENT RIGHTS (LONG FORM)

A. Definitions

1. "Subject Invention" means any invention or discovery of the subcontractor conceived or first actually reduced to practice in the course of or under this subcontract, and includes any art, method, process, machine, manufacture, or from composition of matter, or any new and useful improvement thereof, or any variety of plants, whether patented or unpatented under the Patent Laws of the United States of America or any foreign country.

2. "Subcontract" means any subcontract, grant, agreement, understanding or other arrangement, which includes research, development, or demonstration work and includes any assignment, or substitution of parties.

3. "States and domestic municipal governments" means the States of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, and Trust Territory of the Pacific Islands, and any political subdivision and agencies thereof.

4. "Government agency" includes an executive department, independent commission, board, office, agency, administration, authority, Government corporation, or other Government establishment of the Executive Branch of the Government of the United States of America.

5. "To the point of practical application" means to manufacture in the case of a composition or product, to practice in the case of a process, or to operate in the case of a machine and under such conditions as to establish that the invention is being worked and that its benefits are reasonably accessible to the public.

6. "Patent Counsel" means the DOE Patent Counsel assisting the procuring activity.

B. Allocation of Principal Rights

1. Assignment to the Government. The Subcontractor agrees to assign to the Government the entire right, title and interest throughout the world in and to each Subject Invention, except to the extent that rights are retained by the Subcontractor under paragraphs B(2) and C of this article.

2. Greater Rights Determinations. The Subcontractor or the employee-inventor with authorization of the subcontractor may request greater rights than the nonexclusive license and the foreign patent rights provided in paragraph C of this article on identified inventions in accordance with 41 CFR 9-9.109-6. Such requests must be submitted to Patent Counsel at the time of the first disclosure pursuant to paragraph E(2) of this article, or not later than 9 months after conception, or first actual reduction to practice, whichever occurs first, or such longer periods as may be authorized by Patent Counsel for good cause shown in writing by the Subcontractor.

C. Minimum Rights to the Subcontractor

1. Subcontractor License. The Subcontractor reserves a revocable, non-exclusive, paid-up license in each patent application filed in any country on a Subject Invention and any resulting patent in which the

Government acquires title. The license shall extend to the Subcontractor's domestic subsidiaries and affiliates, if any, within the corporate structure of which the Subcontractor is a part and shall include the right to grant sublicenses of the same scope to the extent the Subcontractor was legally obligated to do so at the time the subcontract was awarded. The license shall be transferable only with approval of DOE except when transferred to the successor of that part of the Subcontractor's business to which the invention pertains.

2. Revocation Limitations. The Subcontractor's nonexclusive license retained pursuant to paragraph C(1) of this article and sublicenses granted thereunder may be revoked or modified by DOE, either in whole or in part, only to the extent necessary to achieve expeditious practical application of the Subject Invention under DOE's published licensing regulations (10 CFR 781), and only to the extent an exclusive license is actually granted. This license shall not be revoked in that field of use and/or the geographical areas in which the Subcontractor, or its sublicensee, has brought the invention to the point of practical application and continues to make the benefits of the invention reasonably accessible to the public, or is expected to do so within a reasonable time.

3. Revocation Procedures. Before modification or revocation of the license or sublicense, pursuant to paragraph C(2) of this article, DOE shall furnish the Subcontractor a written notice of its intention to modify or revoke the license and any sublicense thereunder, and the Subcontractor shall be allowed 30 days or such longer period as may be authorized by the Patent Counsel for good cause shown in writing by the Subcontractor after such notice to show cause why the license or any sublicense should not be modified or revoked. The Subcontractor shall have the right to appeal, in accordance with 10 CFR 781, any decision concerning the modification or revocation of his license or any sublicense.

4. Foreign Patent Rights. Upon written request to Patent Counsel and subject to DOE security regulations and requirements, there shall be reserved to the Subcontractor, or the employee-inventor with authorization of the Subcontractor, the patent rights to a Subject Invention in any foreign country where the Government has elected not to secure such rights, provided:

(i) The recipient of such rights, when specifically requested by DOE and three years after issuance of a foreign patent disclosing said Subject Invention, shall furnish DOE a report setting forth:

(a) The commercial use that is being made, or is intended to be made, of said invention, and

(b) The steps taken to bring the invention to the point of practical application or to make the invention available for licensing.

(ii) The Government shall retain at least an irrevocable, non-exclusive, paid-up, license to make, use, and sell the invention through the work by or on behalf of the Government (including any Government agency) and States and domestic municipal governments, unless the Secretary or his designee determines that it would not be in the public interest to acquire the license for the State and domestic municipal governments.

(iii) Subject to the rights granted in C(1), (2) and (3) of this article, the Secretary or his designee shall have the right to terminate the foreign patent rights granted in this paragraph C(4) in whole or in part unless the recipient of such rights demonstrates to the satisfaction of the Secretary or his designee that effective steps necessary to accomplish substantial utilization of the invention have been taken or within a reasonable time will be taken.

(iv) Subject to the rights granted in C(1), (2) and (3) of this article the Administrator or his designee shall have the right, commencing four years after foreign patent rights are accorded under this paragraph C(4) to require the granting of a nonexclusive or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances and in appropriate circumstances to terminate said foreign patent rights in whole or in part, following a hearing upon notice thereof to the public, upon a petition by an interested person justifying such hearing:

(a) If the Secretary or his designee determines, upon review of such material as he deems relevant, and after the recipient of such rights, or other interested person, has had the opportunity to provide such relevant and material information as the Secretary or his designee may require, that such foreign patent rights have tended substantially to lessen competition or to result in undue market concentration in any section of the United States in any line of commerce to which the technology relates; or

(b) Unless the recipient of such rights demonstrates to the satisfaction of the Secretary or his designee at such hearing that the recipient has taken effective steps, or within a reasonable time thereafter is expected to take such steps, necessary to accomplish substantial utilization of the invention.

D. Filing of Patent Applications.

1. With respect to each Subject Invention in which the Subcontractor or the inventor requests foreign patent rights in accordance with paragraph C(4) of this article, a request may also be made for the right to file and prosecute the U.S. application on behalf of the U.S. Government. If such request is granted, the Subcontractor or inventor shall file a domestic patent application on the invention within 6 months after the request for foreign patent rights is granted, or such longer period of time as may be approved by the Patent Counsel for good cause shown in writing by the requester. With respect to the invention, the requester shall promptly notify the Patent Counsel of any decision not to file an application.

2. For each Subject Invention on which a domestic patent application is filed by the Subcontractor or inventor, the Subcontractor or inventor shall:

(i) Within 2 months after the filing or within 2 months after submission of the invention disclosure if the patent application previously has been filed, deliver to the Patent Counsel a copy of the application as filed, including the filing date and serial number.

(ii) Within 6 months after filing the application or within 6 months after submitting the invention disclosure if the application has been filed previously, deliver to the Patent Counsel a duly

executed and approved assignment to the Government, on a form specified by the Government;

(iii) Provide the Patent Counsel with the original patent grant promptly after a patent is issued on the application; and

(iv) Not less than 30 days before the expiration of the response period for any action required by the Patent and Trademark Office, notify the patent counsel of any decision not to continue prosecution of the application.

3. With respect to each Subject Invention in which the Subcontractor or inventor has requested foreign patent rights, the Subcontractor or inventor shall file a patent application on the invention in each foreign country in which such request is granted in accordance with applicable statutes and regulations and within one of the following periods:

(i) Eight months from the date of filing a corresponding United States application, or if such an application is not filed, six months from the date the request was granted;

(ii) Six months from the date a license is granted by the Commissioner of Patents and Trademarks to file the foreign patent application where such filing has been prohibited by security reasons; or

(iii) Such longer periods as may be approved by the Patent Counsel for good cause shown in writing by the Subcontractor or inventor.

4. Subject to the license specified in paragraphs C(1), (2) and (3) of this article the Subcontractor or inventor agrees to convey to the Government, upon request, the entire right, title, and interest in any foreign country in which the Subcontractor or inventor fails to have a patent application filed in accordance with paragraph D(3) of this article or decides not to continue prosecution or to pay any maintenance fees covering the invention. To avoid forfeiture of the patent application or patent the Subcontractor or inventor shall, not less than 60 days before the expiration period for any action required by any patent office, notify the Patent Counsel of such failure or decision, and deliver to the Patent Counsel the executed instruments necessary for the conveyance specified in this paragraph.

E. Invention Identification, Disclosures, and Reports

1. The Subcontractor shall establish and maintain active and effective procedures to ensure that Subject Inventions are promptly identified and timely disclosed. These procedures shall include the maintenance of laboratory notebooks or equivalent records and any other records that are reasonably necessary to document the conception and/or the first actual reduction to practice of Subject Inventions, and records which show that the procedures for identifying and disclosing the inventions are followed. Upon request, the Subcontractor shall furnish DOE with a description of these procedures so that it may evaluate and determine their effectiveness.

2. The Subcontractor shall furnish the Patent Counsel, on a DOE approved form:

(i) A written report containing full and complete technical information concerning each Subject Invention within 6 months after conception or first actual reduction to practice whichever occurs first in the course of or which this subcontract, but in any event prior to any on sale, public use or public disclosure of such invention known to the Subcontractor. The report shall identify the

subcontract and inventor and shall be sufficiently complete in technical detail and appropriately illustrated by sketch or diagram to convey to one skilled in the art to which the invention pertains a clear understanding of the nature, purpose, operation, and to the extent known, the physical, chemical, biological, or electrical characteristics of the invention. The report should also include any request for foreign patent rights under paragraph C(4) of this article and any request to file a domestic patent application made within the period set forth in paragraph B(2) of this article. When an invention is reported under this paragraph E(2)(i), it shall be presumed to have been conceived or first actually reduced to practice in the course of or under the subcontract unless the Subcontractor contends it was not so made in accordance with paragraph G(2)(ii) of this article.

(ii) Upon request, but not more than annually, interim reports on a DOE approved form listing Subject Inventions and lower tier subcontracts awarded containing a Patent Rights article for that period and certifying that:

(a) The Subcontractor's procedures for identifying and disclosing Subject Inventions as required by this paragraph E have been followed throughout the reporting period;

(b) All Subject Inventions have been disclosed or that there are no such inventions;

(c) All lower tier subcontracts containing a Patent Rights article have been reported or that no such lower tier subcontracts have been awarded; and

(iii) A final report on a DOE approved form within 3 months after completion of the subcontract work listing all Subject Inventions and all lower tier subcontracts awarded containing a Patent Rights article and certifying that:

(a) All Subject Inventions have been disclosed or that there were no such inventions; and

(b) All lower tier subcontracts containing a Patent Rights article have been reported or that no such lower tier subcontracts have been awarded.

3. The Subcontractor shall obtain patent agreements to effectuate the provisions of this article from all persons in its employ who perform any part of the work under this subcontract except nontechnical personnel, such as clerical employees and manual laborers.

4. The Subcontractor agrees that the Government may duplicate and disclose Subject Invention disclosures and all other reports and papers furnished or required to be furnished pursuant to this article. If the Subcontractor is to file a foreign patent application on a Subject Invention, the Government agrees, upon written request, to use its best efforts to withhold publication of such invention disclosures until the expiration of the time period specified in paragraph D(1) of this article, but in no event shall the Government or its employees be liable for any publication thereof.

F. Publication - It is recognized that during the course of the work under this subcontract, the Subcontractor or its employees may from time to time desire to release or publish information regarding scientific or technical developments conceived or first actually reduced to practice in the course of or under this subcontract. In order that public disclosure of such information will not adversely affect the patent interests of DOE or the

Subcontractor, patent approval for release or publication shall be secured from Patent Counsel prior to any such release or publication.

G. Forfeiture of Rights in Unreported Subject Inventions

1. The Subcontractor shall forfeit to the Government, at the request of the Secretary or his designee, all rights in any Subject Invention which the Subcontractor fails to report to Patent Counsel within six months after the time the Subcontractor:

(i) Files or causes to be filed a United States or foreign patent application thereon; or

(ii) Submits the final report required by paragraph E(2)(ii) of this article, whichever is later.

2. However, the Subcontractor shall not forfeit rights in a Subject Invention if, within the time specified in 1(i) or 1(iii) of this paragraph G, the Subcontractor:

(i) Prepared a written decision based upon a review of the record that the invention was neither conceived nor first actually reduced to practice in the course of or under the subcontract and delivers the same to Patent Counsel; or

(ii) Contending that the invention is not a Subject Invention the subcontractor nevertheless discloses the invention and all facts pertinent to this contention to the Patent Counsel or

(iii) Establishes that the failure to disclose did not result from the Subcontractor's fault or negligence.

3. Pending written assignment of the patent applications and patents on a Subject Invention determined by the Secretary or his designee to be forfeited (such determination to be a final decision under the "Disputes" article of this subcontract), the Subcontractor shall be deemed to hold the invention and the patent applications and patents pertaining thereto in trust for the Government. The forfeiture provision of this paragraph G shall be in addition to and shall not supersede other rights and remedies which the Government may have with respect to Subject Inventions.

H. Examination of Records Relating to Inventions.

1. The DOE or its authorized representative, until the expiration of 3 years after final payment under this subcontract, shall have the right to examine any books (including laboratory notebooks), records, documents, and other supporting data of the Subcontractor which the DOE or its authorized representative reasonably deem pertinent to the discovery or identification of Subject Inventions or to determine compliance with the requirements of this article.

2. The DOE or its authorized representative shall have the right to examine all books (including laboratory notebooks), records and documents of the Subcontractor relating to the conception or first actual reduction to practice of inventions in the same field of technology as the work under this subcontract to determine whether any such inventions are Subject Inventions, if the Subcontractor refuses or fails to:

(i) Establish the procedures of paragraph E(1) of this article;

or
(ii) Maintain and follow such procedures; or

(iii) Correct or eliminate any material deficiency in the procedures within thirty (30) days after the SERI or DOE notifies the Subcontractor of such a deficiency.

I. Withholding of Payment (not applicable to lower tier subcontracts).

1. Any time before final payment of the amount of this subcontract, DOE may, if it deems such action warranted, direct the SERI to withhold payment until a reserve not exceeding \$50,000 or 5 percent of the amount of this subcontract, whichever is less, shall have been set aside if in DOE's opinion the Subcontractor fails to:

(i) Establish, maintain, and follow effective procedures for identifying and disclosing Subject Inventions pursuant to paragraph (e)(1) of this article; or

(ii) Disclose any Subject Invention pursuant to paragraph (e)(2)(i) of this article; or

(iii) Deliver the interim reports pursuant to paragraph (e)(2)-(ii) of this article; or

(iv) Provide the information regarding lower tier subcontracts pursuant to paragraph (j)(5) of this article; or

(v) Convey to the Government in a DOE approved form the title and/or rights of the Government in each Subject Invention as required by this article.

2. The reserve or balance shall be withheld until DOE has determined that the Subcontractor has rectified whatever deficiencies exist and has delivered all reports, disclosures, and other information required by this article.

3. Final payment under this subcontract shall not be made by the SERI before the Subcontractor delivers to the Patent Counsel all disclosures of Subject Inventions and other information required by (e)(2)(i) of this article, the final report required by (e)(2)(iii) of this article, and the Patent Counsel has issued a patent clearance certification to the SERI.

4. DOE may, in its discretion, decrease or increase the sums withheld up to the maximum authorized above. If the Subcontractor is a non-profit organization the maximum amount that may be withheld under this paragraph shall not exceed \$50,000 or 1 percent of the amount of this subcontract, whichever is less. No amount shall be withheld under this paragraph while the amount specified by this paragraph is being withheld under other provisions of the subcontract. The withholding of any amount or subsequent payment thereof shall not be construed as a waiver of any rights accruing to the Government under this subcontract.

J. Subcontracts.

1. For the purpose of this paragraph the term "Contractor" means the party awarding a subcontract and the term "Subcontractor" means the party being awarded a subcontract, regardless of tier.

2. Unless otherwise authorized or directed by DOE via SERI the Contractor shall include the Patent Rights clause of 41 CFR 9-9.107(a) or 41 CFR 9-9.107-6 as appropriate, modified to identify the parties in any subcontract hereunder having as a purpose the conduct of research, development or demonstration work. In the event of refusal by a Subcontractor to accept this article, or if in the opinion of the Contractor this article is inconsistent with DOE's patent policies, the Contractor:

(i) Shall promptly submit written notice to DOE through the SERI setting forth reasons for the Subcontractor's refusal and other pertinent information which may expedite disposition of the matter; and

(ii) Shall not proceed with the subcontract without the written authorization of the DOE via SERI.

3. Except as may be otherwise provided in this article, the Contractor shall not, in any subcontract or by using a subcontract as consideration therefore, acquire any rights in its Subcontractor's Subject Invention for the Contractor's own use (as distinguished from such rights as may be required solely to fulfill the Subcontractor's contract obligations to the Government in the performance of this contract).

4. All invention disclosures, reports, instruments, and other information required to be furnished by the Subcontractor to DOE, under the provisions of a Patent Rights article in any subcontract hereunder may, in the discretion of the DOE, be furnished to the Contractor for transmission to DOE.

5. The Contractor shall promptly notify the DOE through the SERI in writing upon the award of any subcontract containing a Patent Rights article by identifying the Subcontractor, the work to be performed under the subcontract, and the dates of award, and estimated completion. Upon the request of the DOE or the SERI the Contractor shall furnish a copy of the subcontract.

6. The Contractor shall identify all Subject Inventions of the Subcontractor of which it acquires knowledge in the performance of this contract and shall notify the Patent Counsel promptly upon the identification of the inventions.

7. It is understood that the Government is a third party beneficiary of any subcontract clause granting rights to the Government in Subject Inventions, and the Contractor hereby assigns to the Government all rights that the Contractor would have to enforce the Subcontractor's obligations for the benefit of the Government with respect to Subject Inventions. The Contractor shall not be obligated to enforce the agreements of any Subcontractor hereunder relating to the obligations of the Subcontractor to the Government regarding Subject Inventions.

K. Background Patents.

1. "Background Patent" means a domestic patent covering a invention or discovery which is not a Subject Invention and which is owned or controlled by the Subcontractor at any time through the completion of this subcontract:

(i) Which the Subcontractor, but not the Government, has the right to license to others without obligation to pay royalties thereon, and

(ii) Infringement of which cannot reasonably be avoided upon the practice of any specific process, method, machine, manufacture or composition of matter (including relatively minor modifications thereof) which is a subject of the research, development, or demonstration work performed under this subcontract.

2. The Subcontractor agrees to and does hereby grant to the Government a royalty free, nonexclusive, license under any Background Patent for practicing a subject of this subcontract by and for the Government in research, development, and demonstration work only.

3. The Subcontractor also agrees that upon written application by DOE, it will grant to responsible parties for purposes of practicing a subject of this subcontract, nonexclusive licenses under any Background Patent on terms that are reasonable under the circumstances. If, however, the Subcontractor believes that exclusive or partially exclusive rights are necessary to achieve expeditious commercial development or utilization, then a request may be made to DOE for DOE approval of such licensing by the Subcontractor.

4. Notwithstanding the foregoing paragraph K(3), the Subcontractor shall not be obligated to license any Background Patent if the Subcontractor demonstrates to the satisfaction of the Secretary or his designee that:

(i) A competitive alternative to the subject matter covered by said Background Patent is commercially available or readily introduci-
ble from one or more sources, or

(ii) the Subcontractor or its licensees are supplying the subject matter covered by said Background Patent in sufficient quantity and at reasonable prices to satisfy market needs, or have taken effective steps or within a reasonable time are expected to take effective steps to so supply the subject matter.

L. Atomic Energy.

1. No claim for pecuniary award or compensation under the provisions of the Atomic Energy Act of 1954, as amended, shall be asserted by the Subcontractor or its employees with respect to any invention or discovery made or conceived in the course of or under this subcontract.

2. Except as otherwise authorized in writing by the DOE, the Subcontractor will obtain patent agreements to effectuate the provisions of paragraph L(1) of this article from all persons who perform any part of this work under this subcontract, except nontechnical personnel, such as clerical employees and manual laborers.

M. Limitation of Rights - Nothing contained in this Patent Rights article shall be deemed to give the Government any rights with respect to any invention other than a Subject Invention except as set forth in the Patent Rights article of this subcontract with respect to Background Patents and the Facilities License.

CLAUSE 2 - AUTHORIZATION AND CONSENT

The Government has given its authorization and consent for all use and manufacture of any invention described in and covered by a patent of the United States in the performance of this subcontract or any part hereof or any amendment hereto or any lower tier subcontract hereunder (including all lower tier subcontracts).

CLAUSE 3 - NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT

(This article shall be applicable only if the amount of this subcontract exceeds \$10,000.)

A. The Subcontractor shall report to the Government through the SERI promptly and in reasonable written detail each notice or claim of patent or copyright infringement based on the performance of this subcontract of which the Subcontractor has knowledge.

B. In the event of any claim or suit against the SERI or the Government on account of any alleged patent or copyright infringement arising out of the performance of this subcontract or out of the use of any supplies furnished or work or services performed hereunder, the Subcontractor shall furnish to the SERI or Government when requested by the Government or the SERI all evidence and information in possession of Subcontractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Subcontractor has agreed to indemnify the Government or the SERI.

C. This article shall be included in all lower tier subcontracts.

CLAUSE 4 - ADDITIONAL TECHNICAL DATA REQUIREMENTS

A. In addition to the technical data specified elsewhere in this subcontract to be delivered, the SERI or the Government may at any time during the subcontract performance or within one year after final payment call for the Subcontractor to deliver any technical data first produced or specifically used in the performance of this subcontract except technical data pertaining to items of standard commercial design.

B. The provisions of the "Rights in Technical Data" article included in this subcontract are applicable to all technical data called for under this "Additional Technical Data Requirements" article. Accordingly, nothing contained in this article shall require the Subcontractor to actually deliver any technical data, the delivery of which is excused by paragraph E of the "Rights in Technical Data" article.

C. When technical data are to be delivered under this article the Subcontractor will be compensated for appropriate costs for converting such data into the prescribed form, for reproduction, and for delivery.

CLAUSE 5 - RIGHTS IN TECHNICAL DATA (LONG FORM)

A. Definitions

1. "Technical Data" means recorded information regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental, or demonstration, or engineering work, or be useable or used to define a design or process, or to procure, produce, support, maintain or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specifications or related performance or design type documents or computer software (including computer programs, computer software data bases, and computer software documentation). Examples of technical data include research and engineering data, engineering drawings, and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification, and related information. Technical data as used herein does not include financial reports, cost analyses, and other information incidental to subcontract administration.

2. "Proprietary Data" means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data:

(i) Are not generally known or available from other sources without obligation concerning their confidentiality.

(ii) Have not been made available by the owner to others without obligation concerning their confidentiality, and

(iii) Are not already available to the Government or SERI without obligation concerning their confidentiality.

3. "Contract Data" means technical data first produced in the performance of the subcontract, technical data which are specified to be delivered under the subcontract, technical data that may be called for under the "Additional Technical Data Requirements" article of the subcontract, if any, or technical data actually delivered in connection with the subcontract.

4. "Unlimited Rights" means rights to use, duplicate, or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to permit others to do so.

B. Allocation of Rights

1. The Government shall have:

(i) Unlimited rights in contract data except as otherwise provided below with respect to proprietary data.

(ii) The right to remove, cancel, correct, or ignore any marking not authorized by the terms of this subcontract on any technical data furnished hereunder if in response to a written inquiry by the SERI or DOE concerning the propriety of the markings, the Subcontractor fails to respond thereto within sixty (60) days or fails to substantiate the propriety of the markings. In either case, the SERI or DOE will notify the Subcontractor of the action taken.

(iii) No rights under this subcontract in any technical data which are not contract data.

2. The Subcontractor shall have:

(i) The right to withhold proprietary data in accordance with the provisions of this article.

(ii) The right to use for its private purposes, subject to patent, security or other provisions of this subcontract, contract data it first produces in the performance of this subcontract provided the data requirements of this subcontract have been met as of the date of the private use of such data. The Subcontractor agrees that to the extent it receives or is given access to proprietary data or other technical, business or financial data in the form of recorded information from DOE or a DOE contractor or subcontractor, the Subcontractor shall treat such data in accordance with any restrictive legend contained thereon, unless use is specifically authorized by prior written approval of the DOE via SERI.

3. Nothing contained in this "Rights in Technical Data" article shall imply a license to the Government under any patent or be construed as affecting the scope of any licenses or other rights otherwise granted to the Government under any patent.

C. Copyrighted Material

1. The Subcontractor shall not without prior written authorization of the Government via SERI establish a claim to statutory copyright in any contract data first produced in the performance of the subcontract. To the extent such authorization is granted, the Government reserves for itself and others acting on its behalf a royalty-free, non-exclusive, irrevocable, worldwide license for Governmental purposes to publish, distribute, translate, duplicate, exhibit and perform any such data copyrighted by the Subcontractor.

2. The Subcontractor agrees not to include in the technical data delivered under the subcontract any material copyrighted by the Subcontractor and not to knowingly include any material copyrighted by others without first granting or obtaining at no cost a license therein for the benefit of the Government of the same scope as set forth in paragraph C(1) above. If such royalty-free license is unavailable and the Subcontractor nevertheless determines that such copyrighted material must be included in the technical data to be delivered, rather than merely incorporated therein by reference, the Subcontractor shall request the written authorization of the DOE via SERI to include such copyrighted material in the technical data without a license.

D. Subcontracting. It is the responsibility of the Subcontractor to obtain from its lower tier subcontractors technical data and rights therein, on behalf of the Government, necessary to fulfill the Subcontractor's obligations to the Government with respect to such data. In the event of refusal by a lower tier subcontractor to accept a clause affording the Government such rights, the Subcontractor shall:

1. Promptly submit written notice to the Government via SERI setting forth reasons for the lower tier subcontractor refusal and other pertinent information which may expedite disposition of the matter; and
2. Not proceed with the lower tier subcontract without the written authorization of DOE.

E. Withholding of Proprietary Data. Notwithstanding the inclusion of the "Additional Technical Data Requirements" article in this subcontract or any provision of this subcontract specifying the delivery of technical data, the Subcontractor may withhold proprietary data from delivery, provided that the Subcontractor furnishes in lieu of any such proprietary data so withheld technical data disclosing the source, size, configuration, mating and attachment characteristics, functional characteristics and performance requirements ("Form, Fit and Function" data, e.g., specification control drawings, catalog sheets, envelope drawings, etc.) or a general description of such proprietary data where "Form, Fit and Function" data are not applicable. The Government shall acquire no rights to any proprietary data so withheld except that such data shall be subject to the "inspection rights" provisions of paragraph F and, if included, the "Limited rights in proprietary data" provisions of paragraph G and the "Subcontractor licensing" provisions of paragraph H.

F. Inspection Rights. Except as may be otherwise specified in this subcontract for specific items of proprietary data which are not subject to this paragraph, the SERI's and the Government's representatives, at all reasonable times up to three (3) years after final payment under this subcontract, may inspect at the Subcontractor's facility any proprietary data withheld under paragraph E and not furnished under paragraph G for the purposes of verifying that such data properly fell within the withholding provision of paragraph E, or for evaluating work performance.

CLAUSE 6 - REPORTING OF ROYALTIES

If this subcontract is in an amount which exceeds \$10,000 and if any royalty payments are directly involved in the subcontract or are reflected in the subcontract price to the SERI, the Subcontractor agrees to report in writing to the Government through the SERI during the performance of this subcontract and prior to its completion or final settlement the amount of any royalties or other payments paid or to be paid by it directly to others in connection with the performance of this subcontract together with the names and addresses of licensors to whom such payments are made and either the patent numbers involved or such other basis on which the royalties are to be paid. The approval of the DOE or the SERI of any individual payments or royalties shall not stop the SERI or the Government at any time from contesting the enforceability, validity or scope of, or title to, any patent under which a royalty or payment are made.

APPENDIX D-1

CLAUSES FOR SUBCONTRACTS IN EXCESS OF \$100,000

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APPENDIX D-1

CLAUSES FOR SUBCONTRACTS IN EXCESS OF \$100,000

CLAUSE 1 - PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA

(Applicable only if this subcontract exceeds \$100,000).

If any price, including profit or fee, negotiated in connection with this subcontract or any cost reimbursable under this subcontract was increased by any significant sums because:

A. The Subcontractor furnished cost or pricing data which was not accurate, complete and current as certified in the Subcontractor's Certificate of Current Cost or Pricing Data;

B. A sub-subcontractor, pursuant to the clause of this subcontract entitled "Sub-Subcontractor Cost or Pricing Data" or "Sub-Subcontractor Cost or Pricing Data - Price Adjustment" or any subcontract clause therein required, furnished cost or pricing data which was not accurate, complete and current as certified in the Sub-Subcontractor's Certificate of Current Cost or Pricing Data;

C. A sub-subcontractor or prospective sub-subcontractor furnishing cost or pricing data which was required to be accurate, complete and current and to be submitted to support a sub-subcontract cost estimate furnished by the Subcontractor but which was not accurate, complete and current as of the date certified in the Subcontractor's Certificate of Current Cost or Pricing Data; or

D. The Subcontractor or a sub-subcontractor or prospective sub-subcontractor furnished any data, not within A., B., or C. above, which was not accurate as submitted; the price or cost shall be reduced accordingly and the subcontract shall be modified in writing as may be necessary to reflect such reduction. However, any reduction in the subcontract price due to defective sub-subcontract data or a prospective sub-subcontractor when the sub-subcontract was not subsequently awarded to such sub-subcontractor, will be limited to the amount (plus applicable overhead and profit markup) by which the actual sub-subcontract or actual cost to the Subcontractor if there was no sub-subcontract, was less than the prospective sub-subcontract cost estimate submitted by the Subcontractor; provided, the actual sub-subcontract price was not affected by defective cost or pricing data.

Note: Since the subcontract is subject to reduction under this clause by reason of defective cost or pricing data submitted in connection with certain sub-subcontracts, it is expected that the Subcontractor may wish to include a clause in each such sub-subcontract requiring the sub-subcontractor to appropriately indemnify the Subcontractor. It is also expected that any sub-subcontractor subject to such indemnification will generally require substantially similar indemnification for defective cost or pricing data required to be submitted by his lower tier subcontractors.

CLAUSE 2 - LOWER TIER SUBCONTRACTOR COST OR PRICING DATA

(This clause is applicable if this subcontract exceeds \$100,000)

A. The Subcontractor shall require lower tier subcontractors hereunder to submit, actually or by specific identification in writing, cost or pricing data under the following circumstances;

1. prior to award of any lower tier subcontract the amount of which is expected to exceed \$100,000 when entered into;

2. prior to the pricing of any lower tier subcontract modification which involves aggregate increases and/or decreases in cost plus applicable profits expected to exceed \$100,000; except where the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

B. The Subcontractor shall require lower tier subcontractors to certify, in substantially the same form as that used in the certificate by the Subcontractor to the SERI that to the best of their knowledge and belief, the cost and pricing data submitted under A. above is accurate, complete, and current as of the date of agreement of the negotiated price of the lower tier subcontract or lower tier subcontract change or modification.

C. The Subcontractor shall insert the substance of this clause, including this paragraph in each lower tier subcontract hereunder which exceeds \$100,000 when entered into except where the price thereof is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation. In each such excepted lower tier subcontract hereunder in excess of \$100,000 the Subcontractor shall insert the substance of the following clause:

Lower Tier Sub-Subcontractor Cost or Pricing Data-Price Adjustments

1. Paragraphs 2 and 3 of this clause shall become operative only with respect to any modification made pursuant to one or more provisions of this subcontract which involves aggregate increases and/or decreases in cost plus applicable profits expected to exceed \$100,000. The requirements of this clause shall be limited to such subcontract modifications.

2. The Subcontractor shall require lower tier subcontractors hereunder to submit, actually or by specific identification in writing, cost or pricing data under the following circumstances:

(a) prior to award of any lower tier subcontract, the amount of which is expected to exceed \$100,000 when entered into;

(b) prior to the pricing of any lower tier subcontract modification which involves aggregate increases and/or decreases except where the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

3. The Subcontractor shall require lower tier subcontractors to certify in substantially the same form as that used in the certificate by the Subcontractor to the SERI that to the best of their knowledge and belief the cost or pricing data submitted under 2., above is accurate, complete and current as of the date of agreement on the negotiated price of the subcontract or lower tier subcontract change or modification.

4. The Subcontractor shall insert the substance of this clause including this paragraph 4 in each lower tier subcontract hereunder which exceeds \$100,000 when entered into.

CLAUSE 3 - CLEAN AIR AND WATER

(Applicable only if the subcontract exceeds \$100,000, or the SERI has determined that the subcontracts under an indefinite quantity subcontract in any one year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA or the subcontract is not otherwise exempt.

A. The Subcontractor agrees as follows:

1. To comply with all requirements of Section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et.seq., as amended by Public Law 91-604) and Section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251, as amended by Public Law 92-500), respectively, relating to inspection, monitoring, entry reports, and information, as well as other requirements specified in Section 114 and Section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this subcontract.

2. That no portion of the work required by this subcontract will be performed in a facility listed on the Environmental Protection Agency list of violating facilities on the date when this subcontract was awarded unless and until the EPA eliminates the name of such facility or facilities from such listing.

3. To use his best efforts to comply with clean air standards and clean water standards at the facilities in which the subcontract is being performed.

4. To insert the substance of the provisions of this clause in any non exempt sub-subcontract, including this paragraph 4.

B. The terms used in this clause have the following meanings:

1. The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 1857 et.seq., as amended by Public Law 91-604).

2. The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et.seq., as amended by Public Law 92-500).

3. The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in Section 110(d) of the Clean Air Act (42 U.S.C. 1857c-5(d)1, an approved implementation procedures or plan under Section 111(c) or Section 111(d), respectively, of the Air Act (42 U.S.C. 1857c-6(c) or (d)1, or an approved implementation procedure under Section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)1.

4. The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standard or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program authorized by Section 402 of the Water Act (33 U.S.C. 1342), or by local Government to ensure compliance with pretreatment regulations as required by Section 307 of the Water Act (33 U.S.C. 1317).

5. The term "compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency or an air or water pollution control agency in accordance with the requirement of the Air Act or Water Act and regulations issued pursuant thereof.

The term "facility" means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations owned, leased, or supervised by a Subcontractor or lower tier subcontractor to be utilized in the performance of a subcontract or lower tier subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure where the Director, Office of Federal Activities, Environmental Protection Agency, determines the independent facilities are collocated in one geographical area.

CLAUSE 4 - COST ACCOUNTING STANDARDS - NONDEFENSE CONTRACT

(Applicable if this subcontract exceeds \$100,000 and is not otherwise exempt under the provisions of FPR 1-3.1203(a)(1), (2), or (h)(1).)

A. Unless the Administrator of General Services has prescribed rules or regulations exempting the Subcontractor or this subcontract from standards, rules, and regulations promulgated by the Cost Accounting Standards Board, the Subcontractor, in connection with this subcontract shall:

1. Follow consistently the cost accounting practices established or disclosed as required by regulations of the Cost Accounting Standards Board and administered under the Administration of Cost Accounting Standards clause. If any change in disclosed practices is made for purposes of any subcontract or lower tier subcontract subject to those disclosure requirements, the change must be applied in a consistent manner to this subcontract.

2. Comply with all cost accounting standards which the Subcontractor is required to comply with by reason of concurrent performance of any contract or subcontract subject to the Cost Accounting Standards clause (4 CFR 331) and administered under the Administration of Cost Accounting Standards clause. The Subcontractor also shall comply with any cost accounting standard which hereafter becomes applicable to such a contract or subcontract. Such compliance shall be required prospectively from the date of applicability to such contract or subcontract. Compliance shall continue until the Subcontractor completes performance of work under this subcontract.

3. Agree to an equitable adjustment (as provided in the Changes clause of this subcontract, if any) if the subcontract cost is affected by a change which, pursuant to 2. above, the Subcontractor is required to make to his established cost accounting practices whether such practices are covered by a Disclosure Statement or not.

4. Negotiate with the SERI or as otherwise directed to determine the terms and conditions under which a change to either a disclosed cost accounting practice or an established cost accounting practice, other than a change under A. 3. above or A. 6. below, may be made. A change to a practice may be proposed by either the Government, SERI or the Subcontractor, provided, however, that no agreement may be made under this provision that will increase costs paid by the United States.

5. Agree to an adjustment of the subcontract price or cost allowance, as appropriate, if it or a lower tier subcontractor fails to comply with the applicable Cost Accounting Standards or to follow any practice disclosed or established pursuant to subparagraph A. 1. or A. 2. above and such failure results in any increased costs paid by the United States. Such adjustment shall provide for recovery of the increased costs to the

United States together with interest thereon computed at the rate determined by the Secretary of the Treasury pursuant to Pub. L. 92-41, (50 U.S.C. App. 1215 (b)(2)), or 7 percent per annum, whichever is less, from time the payment by the United States or the SERI was made to the time the adjustment is effected.

6. Negotiate an equitable adjustment (as provided in the changes clause of this subcontract) when the parties agree to a change to either a disclosed cost accounting practice or an established cost accounting practice.

B. The Subcontractor shall permit any authorized representative of the Department of Energy, the SERI, of the Cost Accounting Standards Board, or of the Comptroller General of the United States to examine and make copies of any documents, papers, or records relating to compliance with the requirements of this article until the expiration of 3 years after final payment under this subcontract or such lesser time specified in the Federal Procurement Regulations (FPR) Part 1-20.

C. Unless a lower tier subcontract or lower tier subcontractor is exempt under rules or regulations prescribed by the Administrator of General Services, the Subcontractor, (1) shall include the substance of this clause including this paragraph C. in all negotiated lower tier subcontracts under this subcontract with subcontractors that are currently performing a national defense contract or subcontract that contains the clause entitled "Cost Accounting Standards" and that are currently required to accept the clause in applicable national defense awards, and (2) shall include the substance of the Consistency of Cost Accounting Practices - Nondefense Contract clause set forth in §1-3.1204-2(b) of the FPR in negotiated lower tier subcontracts under this subcontract with all other subcontractors. The Subcontractor may elect to use the substance of the solicitation notice set forth in §1-3.1203-3(b) of the FPR in his determination of applicability of cost accounting standards to lower tier subcontracts.

D. The terms defined in §331.20 of Part 331 of Title 4, Code of Federal Regulations, shall have the same meaning herein. As there defined, "negotiated subcontract" means "any subcontract except a firm fixed price subcontract made by a contractor or subcontractor, providing (1) the solicitation to all competing firms is identical, (2) price is the only consideration in selecting the subcontractor from among the competing firms solicited, and (3) the lowest offer received to compliance with the solicitation from among those solicited is accepted."

E. The administration of this clause by the Government shall be accomplished in conjunction with the administration of the Subcontractor's national defense contracts and subcontracts subject to rules and regulations of the Cost Accounting Standards Board, pursuant to the Administration of Cost Accounting Standards clause. For the purposes of the Administration of Cost Accounting Standards clause contained in this subcontract, references to the Cost Accounting Standards clause shall be deemed to include this Cost Accounting Standards - Nondefense Contract clause and reference to the Disclosure and Consistency of Cost Accounting Practices clause shall be deemed to include the Consistency of Cost Accounting Practices - Nondefense Contract clause.

CLAUSE 5 - ADMINISTRATION OF COST ACCOUNTING STANDARDS

(Applicable only if this subcontract exceeds \$100,000 and is not otherwise exempt under the provisions of FPR 1-3.1203(a)(1), (2), or (h)(1).)

For the purpose of administering Cost Accounting Standards requirements under this subcontract, Subcontractor shall:

A. Submit to the SERI, or as otherwise directed, a description of the accounting change and the general dollar magnitude of the change to reflect the sum of all increases and the sum of all decreases for all contracts containing the Cost Accounting Standards clause or the Disclosure and Consistency of Cost Accounting Practices clause:

1. For any change in cost accounting practices required to comply with a new cost accounting standard in accordance with paragraph A. 3. and A. 4. (a) of the Cost Accounting Standards clause within 60 days (or such other date as may be mutually agreed to) after award of a contract requiring such change;

2. For any change to cost accounting practices proposed in accordance with paragraph A. 4. (b) or A. 4. (c) of the Cost Accounting Standards clause or with paragraph A. 3. or A. 5. of the Disclosure and Consistency of Cost Accounting Practices clause not less than 60 days (or such other date as may be mutually agreed to) prior to the effective date of the Proposed change; or

3. For any failure to comply with an applicable Cost Accounting Standard or to follow a disclosed practice as contemplated by paragraph A. 5. of the Cost Accounting Standards clause or with paragraph A. 4. of the Disclosure and Consistency of Cost Accounting Practices clause within 60 days (or such other date as may be mutually agreed to) after the date of agreement of such noncompliance by Subcontractor.

B. Submit a cost impact proposal in the form and manner specified by the SERI within sixty (60) days (or such other date as may be mutually agreed to) after the date of determination of the adequacy and compliance of a change submitted pursuant to A. 1., 2., or 3. above.

C. Agree to appropriate subcontract and lower tier subcontract amendments to reflect adjustments established in accordance with paragraphs A. 4. and A. 5. of the Cost Accounting Standards clause or with paragraphs A. 3., A. 4. or A. 5. of the Disclosure and Consistency of Cost Accounting Practices clause.

D. When the lower tier subcontract is subject to either the Cost Accounting Standards clause or the Disclosure and Consistency of Cost Accounting Practices clause so state in the body of the subcontract and/or in the letter of award. Self-deleting clauses shall not be used.

E. Include the substance of this clause in all negotiated lower-tier subcontracts containing either the Cost Accounting Standards clause or the Disclosure and Consistency of Cost Accounting Practices clause. In addition, include a provision in those subcontracts which will require such subcontractors, within 30 days after receipt of award (or such other date as may be mutually agreed to) to submit the following information to the Contract Administration Office cognizant of the subcontractor's facility or as otherwise directed by the SERI.

1. Lower-tier Subcontractor's name and subcontract number.
2. Dollar amount and date of award.
3. Name of Subcontractor making the award.

4. A statement as to whether the lower-tier subcontractor has made or proposes to make any changes to accounting practices that affect prime contracts or subcontracts containing the Cost Accounting Standards clause, or the Disclosure and Consistency of Cost Accounting Practices clause

unless such changes have already been reported. If award of the subcontract results in making a cost accounting standard(s) effective for the first time, this shall also be reported.

F. For negotiated lower tier subcontracts containing the Cost Accounting Standards clause, require the subcontractor to comply with all Standards in effect on the date of final agreement on price as shown on the Subcontractor's signed Certificate of Current Cost or Pricing Data or date of award, whichever is earlier.

G. In the event an adjustment is required to be made to any lower-tier subcontract hereunder, notify the SERI in writing of such adjustment and agree to an adjustment in the price or estimated cost and fee of this subcontract, as appropriate, based upon the adjustment established under the lower-tier subcontract. Such notice shall be given within 30 days after receipt of the proposed lower-tier subcontract adjustment, and shall include a proposal for adjustment to such higher tier subcontract(s) or prime contract(s) as appropriate.

H. When either the Cost Accounting Standards clause or the Disclosure and Consistency of Cost Accounting Practices clause and this clause are included in lower-tier subcontracts, the term "the SERI" shall be suitably altered to identify the purchaser.

APPENDIX E

CLAUSES FOR SUBCONTRACTS IN EXCESS OF \$500,000

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APPENDIX E

CLAUSES FOR SUBCONTRACTS IN EXCESS OF \$500,000

CLAUSE 1 - LABOR SURPLUS AREA LOWER TIER SUBCONTRACTING

(Applicable if this subcontract exceeds \$500,000.)

A. The Subcontractor agrees to establish and conduct a program which will encourage labor surplus area concerns to compete for lower tier subcontracts within their capabilities. In this connection, the Subcontractor shall:

1. Designate a liaison officer who will (i) maintain liaison with duly authorized representatives of the Government on labor surplus area matters, (ii) supervise compliance with the utilization of concerns in labor surplus areas clause and (iii) administer the Subcontractor's "Labor Surplus Area Subcontracting Program";
2. Provide adequate and timely consideration of the potentialities of labor surplus area concerns in all "make-or-buy" decisions;
3. Assure that labor surplus area concerns will have an equitable opportunity to compete for lower tier subcontracts, particularly by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation of labor surplus area concerns;
4. Maintain records showing procedures which have been adopted to comply with the policies set forth in this clause; and
5. Include the Utilization of Concerns in Labor Surplus clause in subcontracts which offer substantial labor surplus area subcontracting opportunities.

B. A "Labor Surplus Area Concern" is a concern which will perform, or cause to be performed, a substantial proportion of any contract awarded to it in "Areas of Substantial Labor Surplus" (also called "Areas of Substantial Unemployment"), as designated by the Department of Labor. A concern shall be deemed to perform a substantial proportion of a contract in a labor surplus area if the costs that the concern will incur on account of manufacturing or production performed in persistent or substantial labor surplus areas (by itself or its first-tier subcontractors) amount to more than 50 percent of the price of such contract.

C. The Subcontractor further agrees to insert, in any lower tier subcontracts hereunder which may exceed five hundred thousand dollar (\$500,000) and which contains the utilization of concerns in labor surplus areas clause provisions, which shall conform substantially to the language of this clause, including this Paragraph C., and to notify the SERI of the name of such lower tier subcontractors.

CLAUSE 2 - SMALL BUSINESS SUBCONTRACTING PLAN

(Subcontracting plan for small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals.)

A. The Subcontractor agrees to comply in good faith with the small and small disadvantaged business concerns subcontracting plan approved by the Subcontract Administrator which is hereby incorporated in and made a part of this Subcontract. In this connection, the Subcontractor shall:

1. Use his best effort to attain such percentage goals as may be set forth in the plan;
2. Designate an individual who will (i) maintain liaison with the SERI on matters relating to small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals; (ii) supervise compliance with the clause entitled "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals;" and (iii) administer the contractor's plan.
3. Provide adequate and timely consideration of the potentialities of small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals in all "make-or-buy" decisions.
4. Assure that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals will have an equitable opportunity to compete for subcontracts, particularly by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation of such concerns. Where the Subcontractor's lists of potential lower tier subcontractors which are small business and small business concerns owned and controlled by socially and economically disadvantaged individuals are excessively long, reasonable effort shall be made to give all such concerns an opportunity to compete over a period of time.
5. Maintain records showing: (i) whether each prospective lower tier subcontractor is a small business concern or a small business concern owned and controlled by socially and economically disadvantaged individuals; (ii) procedures which have been adopted to comply with the plan and the policies set forth in this clause; and (iii) with respect to the letting of any lower tier subcontract (including purchase orders) exceeding \$10,000, information substantially as follows:

A. Whether the award went to large business, small business, or small business owned and controlled by socially and economically disadvantaged individuals.

B. Whether small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals were solicited.

C. The reason for nonsolicitation of small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals if such was the case.

D. The reason for failure of small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals to receive the award if such was the case when such firms were solicited.

The records maintained in accordance with (5) (iii) above may be in such form as the subcontractor may determine, and the information shall be summarized quarterly and submitted by the purchasing department of each individual plant or division to the subcontractor's cognizant liaison officer for small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals. Such quarterly summaries will be considered to be management records only and need not be submitted routinely

to SERI; however, records maintained pursuant to this clause will be kept available for review by SERI until the expiration of one year after the expiration of this contract, or for such longer period as may be required by any other clause of this contract or by applicable law or regulation.

6. Notify the Subcontract Administrator before soliciting bids or quotations on any subcontract (including purchase orders) in excess of \$10,000 if (i) no small business concern or small business concern owned and controlled by socially and economically disadvantaged individuals is to be solicited, and (ii) the Subcontract Administrator consent to the subcontract (or ratification) is required by a "Lower-Tier Subcontracts" clause in this subcontract. Such notice will state the subcontractor's reasons for non-solicitation of small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals and will be given as early in the procurement cycle as possible so that the Subcontract Administrator may give Small Business Administration (SBA) timely notice to permit SBA a reasonable period to suggest potentially qualified small business concerns or small business concerns owned and controlled by socially and economically disadvantaged individuals through the Subcontract Administrator. In no case will the procurement action be held up when to do so would, in the Subcontractor's judgement, delay performance under the subcontract.

7. Include the "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals" clause in all lower tier subcontracts which offer further subcontracting opportunities.

8. Cooperate in any studies or surveys of the Subcontractor's subcontracting procedures and practices as may be required by the Department of Energy, the Small Business Administration, or SERI.

9. Submit quarterly reports of subcontracting to small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals on such forms as may be specified elsewhere in this subcontract.

B. The Subcontractor agrees that, in the event he fails to comply in good faith with his contractual obligations concerning the plan or the clause entitled "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals" this subcontract may be terminated, in whole or in part, for default.

C. The Subcontractor further agrees to insert in all lower tier subcontracts hereunder (except those with small business concerns) which contain the clause entitled "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals" and which may exceed \$1,000,000 in the case of a lower tier subcontract for the construction of any public facility or in excess of \$500,000 in the case of all other lower tier subcontracts provisions which shall conform substantially to the language of this clause, including this paragraph (C), and to notify the Subcontract Administrator of the names of such subcontractors.

D. The provisions of this clause shall not apply to small business concerns.