

SERI/RP-0-8001

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Request for
Proposal Number: RP-0-8001

Title: Cost and Performance of Thermal
Storage Concepts in Solar Thermal
Systems

Issue Date: October 19, 1979

Response Due: November 30, 1979



SERI

Solar Energy Research Institute

A Division of Midwest Research Institute

1536 Cole Boulevard
Golden, Colorado 80401

TO BE RETURNED

INTENT TO BID Under RFP RP-0-8001

To: SOLAR ENERGY RESEARCH INSTITUTE

Attention: C. Harrell, Contracts Branch
1617 Cole Boulevard
Golden, CO 80401

We do intend to respond to RFP #RP-0-8001

Name: _____

Address: _____

Attention: _____

NOTE: IF YOU INTEND TO BID, DETACH THIS PAGE AND RETURN TO THE ABOVE ADDRESS BY NOVEMBER 2, 1979.



Offerors

Subject: REQUEST FOR PROPOSALS NO. RP- 0-8001
FOR "COST AND PERFORMANCE OF THERMAL STORAGE CONCEPTS IN
SOLAR THERMAL SYSTEMS"

Introduction:

The Midwest Research Institute, acting through its Solar Energy Research Institute Division (hereinafter called the SERI) invites your submission of a proposal for Cost and Performance of Thermal Storage Concepts in Solar Thermal Systems, 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 reimbursement basis 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 NO. RP 0-8001

Questions or Inquiries

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

Solar Energy Research Institute
Subcontracts Branch
1617 Cole Boulevard
Golden, Colorado 80401
Attn: Clinton Harrell
Reference RFP No. RP-0-8001

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 Contract Branch on or before November 2, 1979. 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 presentations 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, Colorado 80401
Attention: Clint Harrell, Subcontracts Branch

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

"RFP No. RP -0-8001
To be Opened by Addressee Only"

Proposals will be received at the SERI'- mailroom until 4 p.m. local time on November 30, 1979.

Offerors
RFP No. RP-0-8001

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 November 2, 1979.

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 implied, 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
Senior Subcontract Administrator

Offerors
RFP No. RP-0-800i

Enclosures:

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

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 Business Representation

Are you considered small business under present
Government regulations? yes, no.

NOTE: A small business concern for the purpose of
Government procurement is a concern, including its
affiliates, which is independently owned and oper-
ated, is not dominant in the field of operation in
which it is submitting offers on Government con-
tracts, and can further qualify under the criteria
concerning number of employees, average annual
receipts, or other criteria, as prescribed by the
Small Business Administration. (See Code of
Federal Regulations, Title 13, Part 121, as
amended, which contains detailed industry defini-
tions and related procedures.)

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 con-
cern" see Code of Federal Regulations, Title 41,
subpart 1-1.8, section 01. 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. Minority Business (Affirmative Action Program)

Are you a minority-owned business enterprise under
present Government Regulations?
 yes, no.

NOTE: A minority business enterprise is defined
as a "business, at least 50 percent of which is
owned by minority group members or, in the case of
publicly owned businesses, at least 51 percent of

the stock of which is owned by minority group mem-
bers are Negroes, Spanish-speaking American
persons, American-Orientals, American-Indians,
American-Eskimos, and American-Aleuts.

6. Contingent Fee Representation

(a) He 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) he 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 estab-
lished 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 organiza-
tion, that in connection with this procurement:

(1) The prices in this offer have been arrived
at independently, without consultation, communi-
cation, or agreement, for the purpose of
restricting competition, as to any matter rela-
ting 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 organiza-
tion 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) (i) He is not the person in the offeror's organization responsible for the decision as to the prices being offered herein but 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.

8. Affirmative Action

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

The offeror represents that (1) he ___ 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) he ___ 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.

9. Equal Opportunity

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

He ___ 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 201 of Executive Order No. 11114; that he ___ 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).

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 ERDA PR 9-9.109.6.

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. 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-8(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 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.

14. Cost Accounting Standards Certification-Nondefense

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)). This solicitation notice is not applicable to small business concerns.

15. Certificate 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 73-8, 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 no 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: _____

16. 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 ERDAPR 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.

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) In order to provide SERI with an effective means of controlling costs and the quality of materials produced under this contract, a progress payments schedule should be included in the proposal submittal. A reasonable basis for this schedule would be to permit progress payments based on the successful completion of each of the individual deliverables as listed in the Scope of Work.
- (2) Each offeror is encouraged to recommend additions or alternations 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.
- (3) The Solar Energy Research Institute (SERI) recognizes 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 (for 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 of 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 is the U.S. Postal Service postmark on both the 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 Proforma 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 IV, 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.
------	-------	---------------

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	REFER-ENCE
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 OVERHEAD² (Rate % of \$ base =)

3. DIRECT LABOR (Specify)	ESTIMATED HOURS	RATE/HOUR	EST COST (\$)	
TOTAL DIRECT LABOR				

4. LABOR OVERHEAD (Specify Department or Cost Center)³

	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)

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)

10. **TOTAL DIRECT COST AND OVERHEAD**

11. GENERAL AND ADMINISTRATIVE EXPENSE (Rate % of cost element Nos.)⁴

12. ROYALTIES ⁴

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

OFFEROR 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 (See footnote 5)	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)

See Reverse for Instructions and Footnotes

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 1-3.807-3 be required to submit a Certificate of Current Cost or Pricing Data (See FPR 1-3.807-3(h) and 1-3.807-4).

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 schedule, 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

SOURCE EVALUATION AND SELECTION PROCESS

COST AND PERFORMANCE OF THERMAL STORAGE CONCEPTS
IN SOLAR THERMAL SYSTEMS

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 9 - 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 Selections 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 Energy Storage for Solar Thermal Applications Program requirements. Final decision and awards will be the sole responsibility of SERI.

2. Evaluation Criteria

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

EVALUATION CRITERIA

Factor	Points	Subtotal	Max/(Min) Score
I. Applicable Experience^c			45 (32)^a
A. Principal Investigator		27	
1. Design & costing of commercial-ly sold hardware	12		
2. Solar Thermal Systems	8		
3. Performance Analysis	5		
4. Thermal Storage Systems ^b	2		
B. Proposed Staff		18	
1. Design & costing of commercial-ly sold hardware	8		
2. Solar Thermal Systems	5		
3. Performance Analysis	3		
4. Thermal Storage Systems	2		
II. Approach			35 (24)^a
A. Systems Integration		15	
B. Cost Analysis		15	
C. Thermal Storage Analysis		5	
III. Management			20 (14)^a
A. Proposed Management Personnel		8	
1. Program Manager ^d	4		
2. Principal Investigator	4		
B. Management Structure		4	
C. Past Contract Experience		8	
1. Quality of Performance	2		
2. Compliance with Schedule	2		
3. Cost History	2		
4. Correction of Faults	2		

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

^bNegative points (up to 5) will be assigned in this category if the proposer has active contract(s) which, in SERI's opinion, may bias the results of the proposed study.

^cCorporation experience will be considered in this area but no points will be awarded or discounted.

While price is important and will be considered in the final selection of contractor(s), it will not be numerically scored. Cost or pricing data will be evaluated to determine the probable cost and the reasonableness of the proposed costs.

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 each proposal in the context of potential combinations of proposals. This consideration will include the probable cost, and business arrangements sought by the proposer;
- (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

**Cost and Performance
of
Thermal Storage Concepts
in
Solar Thermal Systems**

15 August 1979

1

OUTLINE

	<u>Page</u>
List of Tables.....	iii
List of Figures.....	iii
1.0 INTRODUCTION.....	1
1.1 Thermal Storage Technology Development Plan.....	1
1.2 Objectives of This Study.....	2
1.3 Multi-phased Subcontract.....	2
1.4 Ranking Methodology.....	4
2.0 SCOPE.....	5
3.0 REQUIREMENTS.....	6
3.1 General.....	6
3.2 Cost Data.....	6
3.2.1 Cost Reporting.....	6
3.2.2 Thermal Storage Cost Base.....	6
3.2.3 Reporting of Parametric Data.....	7
3.3 Performance Data.....	7
3.3.1 1st Law Thermal Efficiency.....	7
3.3.2 Cycle Operating Conditions.....	7
3.3.3 Receiver Temperatures.....	8
3.3.4 Pressure Drop.....	8
3.4 Reference Systems.....	8
3.4.1 Allowable Changes in Reference Systems.....	8
3.4.2 Non-Allowable Changes in Reference Systems.....	12
3.4.3 SERI Revisions to Reference Systems.....	12
3.5 Proposal Requirements.....	12
4.0 PROGRAM PLAN.....	13
4.1 Concept Screening.....	16
4.2 Conceptual Designs.....	16
4.3 Cost Analysis.....	16
4.4 Documentation.....	16
4.4.1 Review Presentation Data.....	16
4.4.2 Quarterly Progress Reports.....	18
4.4.3 Final Report.....	18
4.4.4 Monthly Status Reports.....	18
4.4.5 Task Approval Data.....	18

OUTLINE (Continued)

	<u>Page</u>
5.0 REFERENCES	18
APPENDICES	
A. Standard Cost Reporting Structure	A-1
B. Conceptual Description and Conceptual Design Data Requirements	B-1

LIST OF TABLES

	<u>Page</u>
4-1 Data Requirements	15
4-2 Documentation Requirements	17

LIST OF FIGURES

	<u>Page</u>
1-1 Detailed Approach	3
3-1 Barstow Technology Reference System	9
3-2 Shenandoah LSE System Schematic	10
3-3 Closed Cycle Brayton Reference System	11
4-1 Program Schedule	14

1.0 INTRODUCTION

The commercial applications of solar thermal power systems will require thermal storage. Thermal storage will satisfy the needs to supply near continuous operation, to extend operation of the solar thermal system into non-daylight hours, and to buffer potentially harmful transients induced by rapid insulation changes. The Department of Energy (DOE) has recognized these needs and has prepared a draft plan (1) to develop appropriate thermal storage technology. SERI is supporting the implementation of that plan with a systems analysis of storage coupled solar thermal systems. SERI's role includes identification of requirements and promising thermal storage concepts. This request for proposal is seeking an experienced subcontractor to support SERI in the latter role. Specifically, the subcontractor shall provide cost and performance data on thermal storage concepts in solar thermal applications. These data shall be provided for thermal storage concepts now under development and for new concepts which will be identified in part by the subcontractor.

what type
of exper. conc
[as set
forth below

The subcontract will be awarded to an experienced subcontractor who proposes the best approach and management. Experience is the most important factor and will be evaluated as the sum of the subcontractor's proposed Principal Investigator and proposed staff. The proposed approach is the second most important factor in the evaluation. This factor will be evaluated as sum of the approaches to system integration, cost analysis and thermal storage analysis. The proposed management (personnel, past contracting performance and structure) is the third most important factor.

?
?

The subcontractor shall be experienced in the following areas in order of priority:

- 1) The design and costing of commercially sold hardware
- 2) Solar thermal systems
- 3) Performance Analysis
- 4) Thermal storage subsystems

at least!

SERI will select one subcontractor whose proposed personnel have the appropriate experience for this study.

1.1 THERMAL STORAGE TECHNOLOGY DEVELOPMENT PLAN

The DOE Divisions of Energy Storage Systems (STOR) and Central Solar Technologies (CST) have prepared a draft multi-year program plan (1). Currently, first generation technologies are being developed and will be verified in Solar Thermal Large Scale Experiments (LSE's). These experiments include Barstow, Shenandoah, and others; and each LSE will include a thermal storage subsystem (dual media, oil thermoclines, etc.). The plan will develop second and third generation thermal storage technologies for solar thermal systems. The second and third generations are thermal storage concepts which offer the potential for lower cost and/or improved system performance.

Program activities were originally organized by storage applications. Three program elements were defined: buffer storage, diurnal storage and advanced technologies. Since the release of the original draft plan, the planning has evolved and the program elements are organized by solar thermal system. The current program elements are presented below:

- 1) Water/steam collector/receiver
- 2) Molten salt collector/receiver
- 3) Liquid metal collector/receiver
- 4) Gas collector/receiver
- 5) Organic fluid collector/receiver
- 6) Liquid metal/salt collector/receiver
- 7) Advanced technologies

The program will develop appropriate buffer and diurnal storage for the first six elements. The advanced technologies element includes the third generation. That element (#7) includes any concept in the very early stages of development regardless of solar thermal system.

The first six elements will develop second generation thermal storage technologies. Each follows the same general approach. Figure 1-1 presents that approach. In the first phase concept, feasibility is established by small scale laboratory experiments. In the second phase, large scale storage subsystems are designed and Subsystem Research Experiments (SRE) are conducted. These SRE's are first tested under laboratory conditions and then in a solar thermal test facility. In the third phase, the technology is verified by utilizing a full scale subsystem in a solar thermal LSE, primarily by retrofitting a LSE. At the completion of this last phase, the storage sub-system will be a proven alternative available for technology commercialization. During the first phase, several thermal storage concepts will be under simultaneous development. As the program proceeds, decision points will be reached and the number of concepts being developed will be reduced. At the last phase of each element, only one concept is expected to be tested in a LSE. SERI's role is to support the decision points providing cost and performance data on developing thermal storage concepts. Each element is proceeding on a different schedule, which is appropriate for the state of the art, available program funding, and solar thermal program schedules. Consequently, the decision points will be occurring over a multi-year period.

1.2 OBJECTIVES OF THIS STUDY

The objectives of this study are as follows:

- 1) To provide consistently calculated cost data for several thermal storage concepts in several solar thermal systems.
- 2) To provide consistent and realistic performance data for thermal storage concepts integrated into solar thermal systems.
- 3) To provide the above data as projected for a mature technology based upon the state-of-the-art and anticipated improvements in the storage technologies.

During the course of the subcontract, only the six second generation technology elements will be studied.

1.3 MULTI-PHASED SUBCONTRACT

The subcontract is anticipated to be in effect during three fiscal years (FY), FY 80, FY 81, and FY 82. Only the first phase (FY 80) is the subject of this procurement. Sole source modifications to the first sub-contract are expected. Each phase will have a specific statement of work and will address program elements appropriate for that point

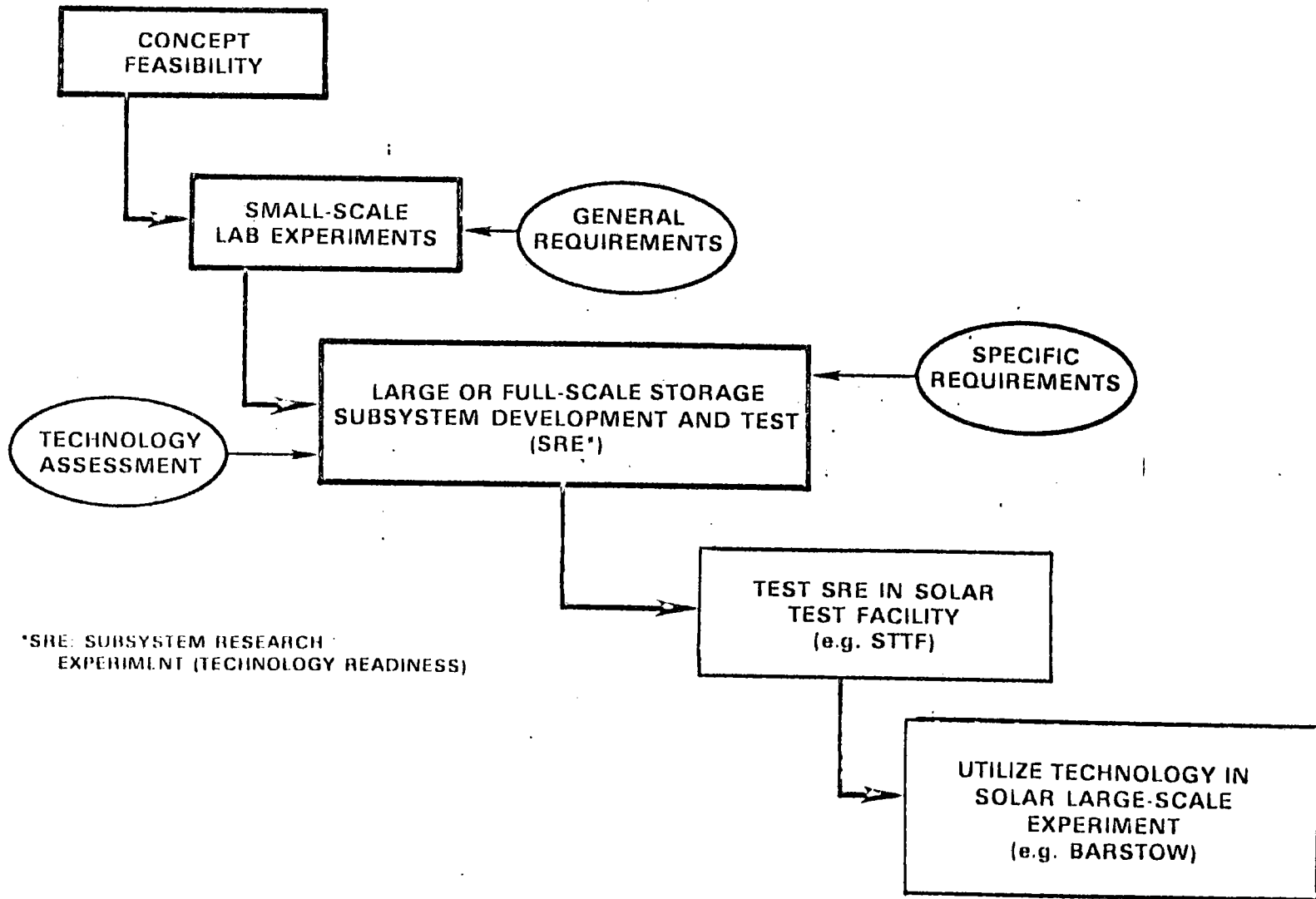


Figure 1-1 Detailed Approach

not cheap
5-7 man years

in time. The total subcontract value for all three years is not expected to exceed \$450,000. The scope of effort (person hours) is expected to be approximately equal in each phase.

1.4 RANKING METHODOLOGY

The subcontractor will provide cost and performance data on thermal storage concepts. However, the trade-offs of concepts will be performed by SERI. A methodology for ranking thermal storage concepts in solar thermal systems has been developed by SERI. That methodology is currently being documented and is described below.

The methodology employs a ranking index to quantitatively evaluate the effects of thermal storage cost and performance. The Ranking Index (RI) is based upon delivered unit energy costs (bus bar energy cost, BBEC in mills per kilowatt hour or thermal energy unit cost in \$/MBTU). The ranking index is literally the ratio of the storage coupled solar thermal unit energy cost with an alternative storage concept (A) to the system cost with a reference thermal storage concept (R). For electric power applications, RI is calculated as follows: *what about indost. process heat, Shranadach, etc?*

How about
numbers in
equations?

$$RI = \frac{BBEC(A)}{BBEC(R)}$$

It can be shown that this reduces to the following equation:

$$RI = \frac{(CC)_A}{(CC)_R} \cdot \left(\frac{ESR}{EDR} + 1 \right)$$

$$RI = \left[\frac{A}{R}_{rt} \cdot \frac{A}{R}_{cycle} \cdot \frac{A}{R}_{collector} \cdot \frac{ESR}{EDR} \right] + \left[\frac{AD}{RD}_{cycle} \cdot \frac{AD}{RD}_{collector} \right]$$

where

- $(CC)_A$: The capitalized cost of the storage coupled solar thermal system with storage concept, A.
- $(CC)_R$: The capitalized cost of the storage coupled solar thermal system with the reference storage concept, R.
- $\frac{ESR}{EDR}$ *→ if unknown you can't calculate RI. where does it come from?* : A function only of the reference system (those data are not needed by the subcontractor)
- $\frac{A}{R}_{rt}$: 1st law thermal efficiency on storage for concept A divided by the 1st law thermal efficiency of concept R.
- $\frac{A}{R}_{cycle}$: The conversion cycle efficiency when operating through storage with concept A divided by the conversion cycle efficiency when operating through storage with the reference storage concept, R, a function of the working fluid temperature and pressure.

$\frac{A}{R}$ collector

: The solar collector field efficiency (i.e. receiver efficiency) when charging storage concept A divided by the solar collector field efficiency when charging storage concept R; a function of the receiver temperature

$\frac{AD}{RD}$ cycle

: The conversion cycle efficiency when operating cycle direct (not through storage) with concept A in the system divided by the conversion cycle efficiency when operating direct with concept R in the system; a function of the working fluid temperature and pressure.

$\frac{AD}{RD}$ collector

: The solar collector field efficiency when operating direct with concept A in the system divided by the solar collector efficiency with concept R in the system, a function of the receiver temperature.

SERI has developed the necessary supporting data for the evaluation of those factors based upon the cost and performance data to be supplied by the subcontract winner of this procurement. The following sections describe the required form of the data.

2.0 SCOPE

The scope of this subcontract is limited to the evaluation thermal storage concepts for solar thermal systems applications. The four shall be finalized during the subcontract negotiations, where the four are from the first six specified in Paragraph 1.1 of this statement of work. The proposer shall base his response on the following:

- A) Water/steam central receiver for a 100 MWe electric power plant
(Diurnal storage for stand alone solar thermal plants)
- B) Organic fluid receiver for a 400 KWe dish receiver total energy application (a la' Shenandoah) *← what's this a la' crap. Try e.g.*
- C) 816°C (1500°F) Thermal storage* for 100 MWe closed cycle Brayton
- D) Process heat
 - 1) Water/steam receiver
 - 2) Organic fluid receiver *where's molten salt??*

At the time of this writing the above are anticipated to the final four, but a substitution (e.g., liquid metal for the 816°C gas-cooled collector/receiver) may occur to be consistent with the latest program plans.

The cost and performance data shall be provided for a mature technology in commercial use. Only conceptual data will be available and the subcontractor shall estimate the costs data for the 80th commercial unit of any concept.

*This element includes any thermal storage technology which can deliver thermal energy in the range of 704°C (1300°F) to 982°C (1800°F).

3.0 REQUIREMENTS

3.1 GENERAL

Thermal storage costs and performances shall be evaluated for several thermal storage concepts for each of the solar thermal systems described in Section 2.0. The supplier shall integrate each candidate thermal storage in a reference system for each solar thermal system, eliminating the reference storage concept. A system schematic for each case* shall be prepared; and equipment and operating conditions changes shall be identified.

3.2 COST DATA

Costs shall be estimated for each combination of thermal storage and solar thermal reference system. Costs for each reference system (excluding thermal storage) will be supplied by SERI within two weeks following subcontract go-ahead.

3.2.1 Cost Reporting

Cost shall be reported for the entire storage coupled solar thermal system. The format shall be that defined in Appendix A. All data shall be generated and documented for six hours of thermal storage (note: when the thermal storage does not affect a cost code, the data supplied by SERI shall be reported). When a cost code is affected, the subcontractor shall revise the reference system cost and report the new total for each case.

3.2.2 Thermal Storage Cost Base

Thermal storage costs are those defined as Code 5700, Energy Storage Subsystem, in Appendix A. The costs in this category and the performance data shall be determined with the following conditions:

- (1) The rates of charging thermal storage are the same as the reference system.
- (2) The rates of discharging thermal storage are the same as the reference system.
- (3) The capacity to store thermal energy is the same as the reference system. Note: because the efficiency may be different, the electrical storage ratings may be different.
- (4) One hour of thermal energy storage is defined as the ability to store the thermal energy from the receiver which would have operated the plant for one hour at its name-plate rating (electrical for power generation) if the thermal energy had not been stored.

*something
storage here -
ability + capacity
two different things
ditto store + deliver*

*A case is defined therein to be one storage concept in one solar thermal system.

- (5) The name-plate rating in each case shall be the same as the reference system.
- (6) The collector area shall be the same as the reference system.
- (7) All items not affected by thermal storage shall be the same as the reference system. *Heliosat number changes, too? How about the receiver?*

3.2.3 Reporting of Parametric Data

Costs in Code 5700 shall be reported parametrically in the range of 1 to 15 hours of thermal energy storage. Thermal storage costs shall be reported as the power related cost (C_p) and capacity related cost (C_s). The total storage subsystem cost (C_t) for a quantity of storage, h , is calculated as follows:

$$C_t = C_p + C_s \cdot h$$

When the total cost has a non-linear relationship with quantity of storage, the total cost shall be reported as a function of storage quantity, either graphically or as an appropriate algorithm. If costs in other codes are also affected by changing the storage, those costs shall also be included in the above parametric data.

3.3 PERFORMANCE DATA

Performance data include both the thermal storage and items which are affected by the presence of thermal storage in the system. The following items shall be reported for annual average conditions. Performance data will be affected by storage capacity (particularly 1st Law Thermal Efficiency). When data is so affected, the subcontractor shall report the data parametrically.

*why not spell 1st
as first all the time?*

3.3.1 1ST LAW THERMAL EFFICIENCY

First law thermal efficiency is the ratio of the usable thermal energy delivered from storage to the thermal energy used to charge storage. Many concepts require work to either charge or discharge storage. The thermal equivalent of that work shall be included in the calculation of first law efficiency. The thermal equivalent is primary thermal energy required to generate that work and therefore includes the conversion cycle inefficiency.

3.3.2 CYCLE OPERATING CONDITIONS

The operating conditions of the power conversion cycle should be reported for each case. These data shall be separately reported for both when energy is being delivered from storage only, and when energy is being delivered directly from the solar collector (not through storage). The data required are

- o Conversion cycle working fluid temperatures, as a minimum both the temperatures into and out of the heat exchanger(s), adding heat to the conversion cycle sub-system and the heat exchanger(s) removing heat from the subsystem.
- o Conversion cycle working fluid pressures at the heat addition and heat removal locations of the conversion cycle subsystem.

3.3.3 RECEIVER TEMPERATURES

The operating temperatures of the solar collector receiver shall be reported for each case. These data shall be separately reported for both when the thermal energy is used to charge storage and when the thermal energy is used to directly supply heat to a conversion cycle. Three temperatures for both operating modes shall be reported; the three are presented below:

- o Temperature of the transport fluid into the receiver.
- o Temperature of the transport fluid out of the receiver.
- o The average temperature of the transport fluid equal to the average enthalpy of the fluid while in the receiver.

3.3.4 PRESSURE DROP

Pressure drop shall be considered in the analysis of performance. Pressure drops occur in heat exchanges, thermal storage devices and lines. Each reference system has a pressure drop, the impact on system performance has been included. For alternative systems, the pressure drops are anticipated to be different than the reference system. The difference in the power required for an alternative shall be calculated. The thermal equivalent for the extra (or smaller) power required shall be determined and the effect included in the 1st law efficiency calculation.

3.4 REFERENCE SYSTEMS

How well they do
Alternative thermal storage concepts shall be identified for each of four reference systems. The cost and performance shall be determined with the alternative storage replacing the reference thermal storage in the reference system. The following reference systems shall be used in this study:

- 1) 100 MWe Barstow Technology central receiver, see Figure 3-1 and Reference 2.
- 2) Organic fluid receiver for 400 KWe total energy system, Shennandoah Technology, see Figure 3-2 and Reference 3.
- 3) 100 MWe closed cycle Brayton, see Figure 3-3 and Reference 4.

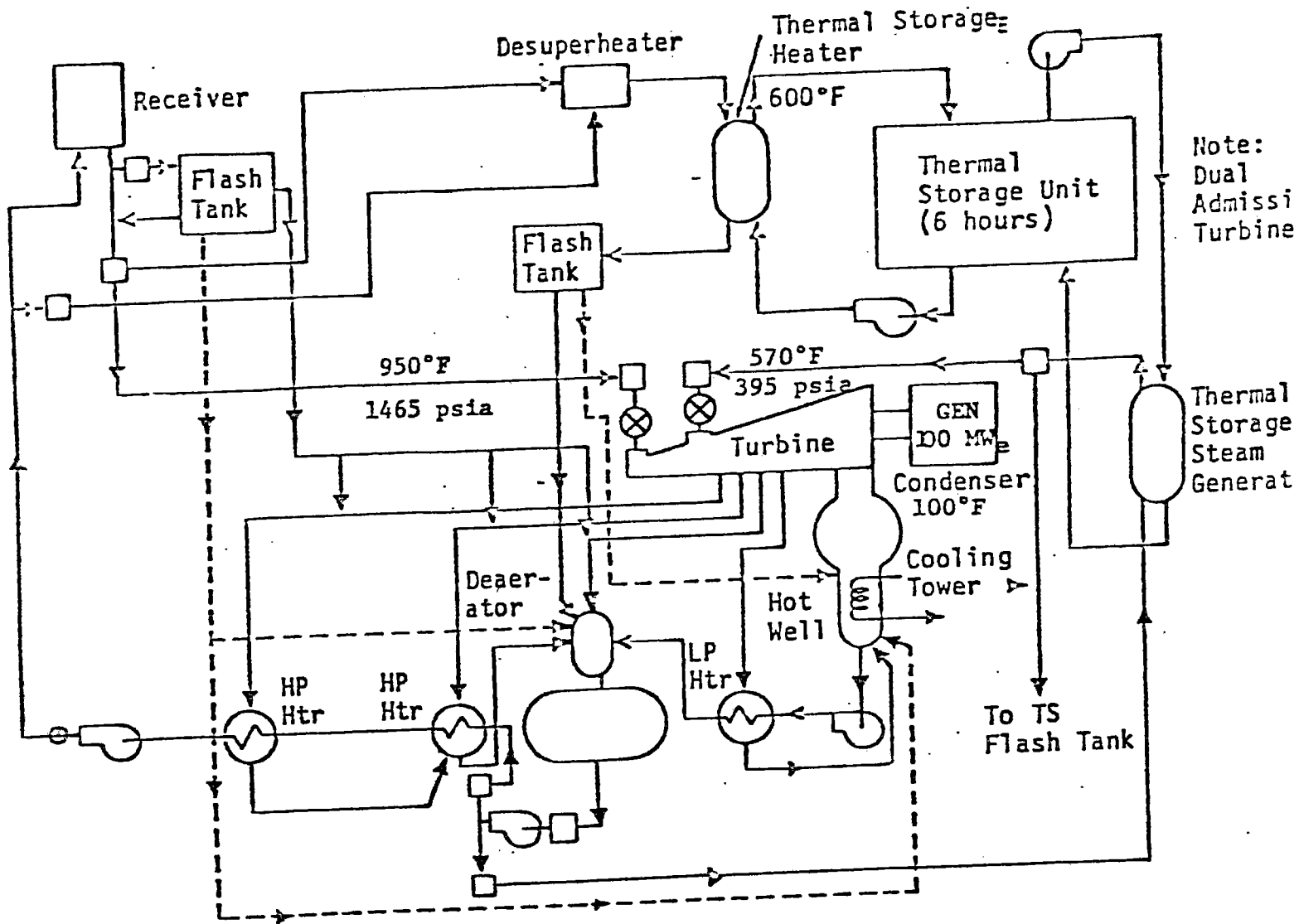
For process heat the reference systems are 1) and 2) above less the power conversion and related equipment. Both process heat solar thermal systems shall deliver dry saturated steam in all operating modes. For the Barstow technology the steam shall be at 232°C (450°F); for the organic fluid receiver the steam shall be at 168°C (335°F).

is this process steam, too?
Furthermore, both shall deliver only process heat. →

3.4.1 ALLOWABLE CHANGES IN REFERENCE SYSTEMS

The integration of alternative storage systems will require changes to the reference systems. Any change which does not affect the primary non-storage equipment is allowable. The following is a partial list of allowable changes:

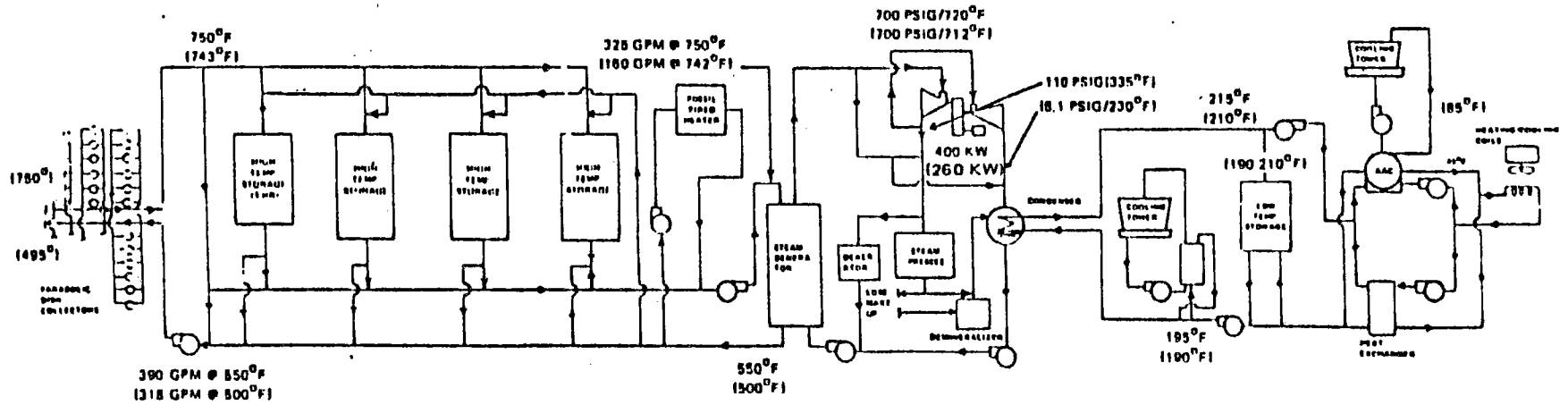
- 1) Conversion cycle temperatures and pressures



Note:
Dual
Admissi
Turbine

Thermal
Storage
Generat

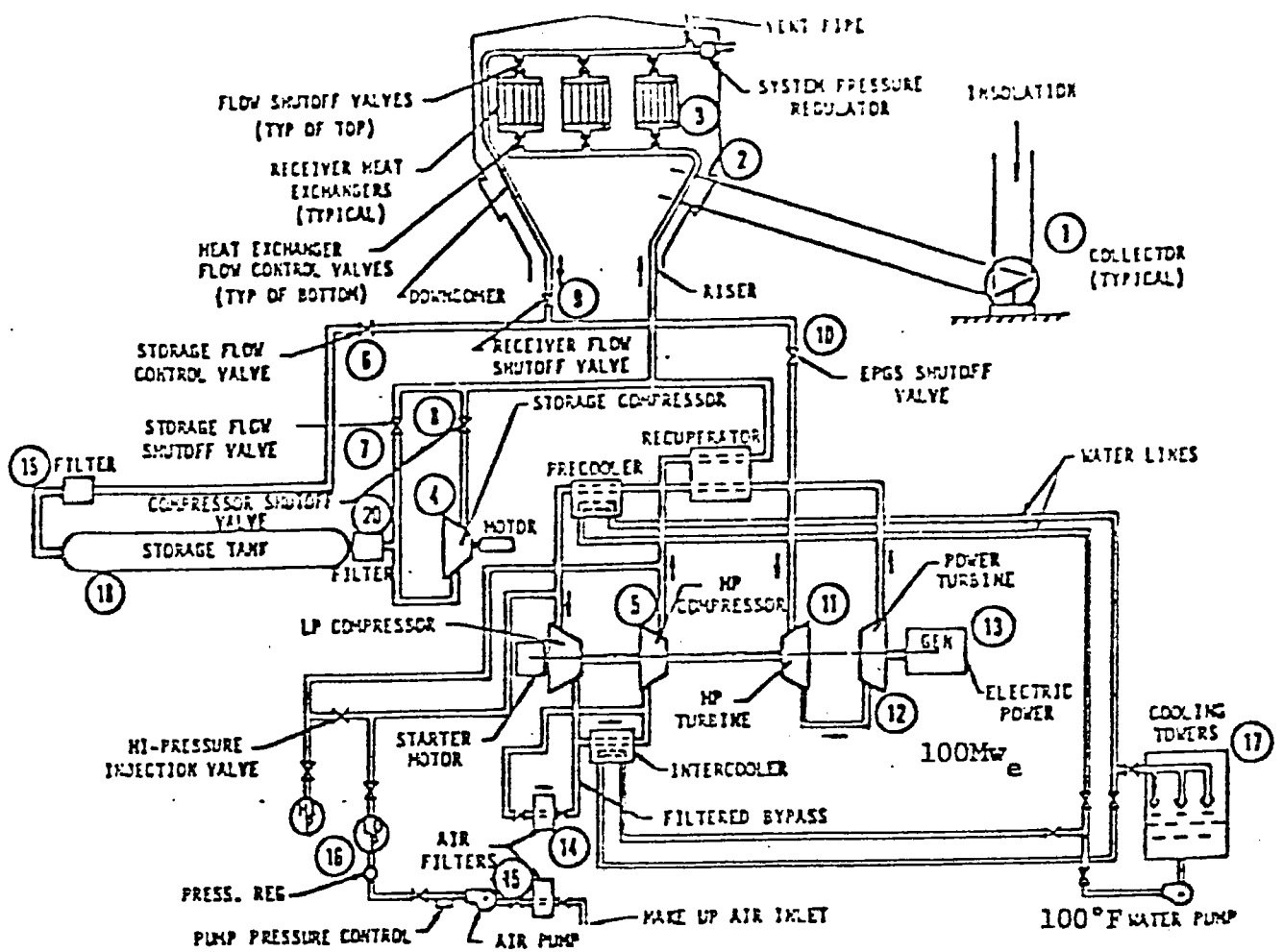
Figure 3-1 Barstow Technology Reference System



NOTE:

DESIGN MAXIMUM	- I _{DN}	= 300 BTU/HR.FT ²
	- Q _{ELEC}	= 400 KW
NOMINAL	- I _{DN}	= 270 BTU/HR.FT ²
	- Q _{ELEC}	= 260 KW

Figure 3-2 Shenandoah LSE System Schematic



**PREFERRED EPGS DESIGN POINT REQUIREMENTS
(Closed Cycle Air)**

Turbine inlet temperature	815.6°C (1500°F)
Turbine inlet pressure	34.5 bar (500 psia)
Compressor pressure ratio	4.75
Compressor inlet temperature	37.8°C (100°F)
Recuperator effectiveness	0.902
Component pressure losses, $\Delta P/P$	
Precooler	1.0%
Intercooler	1.0%
Recuperator	4.0%
Receiver	3.5%
EPGS ducting, $\Delta P/P$	2.2%
Cooling water inlet temperature	29.4°C (85°F)
Cooling water temperature rise	
Precooler	$\Delta 12^\circ\text{C}$ ($\Delta 26^\circ\text{F}$)
Intercooler	$\Delta 17^\circ\text{C}$ ($\Delta 30^\circ\text{F}$)

Figure 3-3 Closed Cycle Brayton Reference System

- 2) Receiver temperature and pressure
- 3) Dual admission turbine changed to single admission or a change in design point admission conditions
- 4) Any item associated with the thermal storage subsystem

why not heliostats
and receiver?

3.4.2 NON-ALLOWABLE CHANGES IN REFERENCE SYSTEM

Any change which modifies the receiver or power conversion cycle is not allowed. The following is a partial list of non-allowable changes.

- 1) Change of power conversion cycle (e.g., from non-reheat steam cycle to a reheat cycle)
- 2) Receiver transport fluid with the exception of organic fluid receiver where at least two organic transport fluids shall be investigated
- 3) Receiver design (e.g., from an external surface to a cavity)
- 4) Plant name plate rating including process heat delivery rate and quality

3.4.3 SERI REVISIONS OF REFERENCE SYSTEMS

The reference systems defined above may be revised by SERI. If such a change occurs, the subcontractor will be informed by SERI within two weeks of subcontract go-ahead. The change shall be considered within the subcontract scope.

Any change will be only in the reference system. Examples of possible changes are illustrated below:

- 1) Water/Steam Receiver - From Barstow technology to an advanced water/steam receiver system.
- 2) Organic Fluid Receiver - From Syltherm transport fluid to caloria.
- 3) Process Heat - A different temperature and pressure of the form of delivered heat (e.g., dry saturated steam at 300°C, 572°F).

capitalize
caloria
Trademark?

3.5 PROPOSAL REQUIREMENTS

3200 professional person hours is the minimum acceptable quantity; any offer which contains a lesser number will be evaluated as unacceptable. Professional persons are managers, engineers, scientists, cost analysts, etc. who will directly work on the proposed study. Non-professional persons are secretaries, administrative support personnel, draftsmen, graphic artists, etc. Non-professional personnel may be charged direct or indirect in the proposed study. In either case, non-professional person hours will be specifically excluded in the evaluation of the 3200 professional person hour requirement.

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 study. The PI shall serve as the single point contact for the SERI technical monitor on all technical matters. The PI shall be proposed for a minimum of 800 person hours in the

study. During the subcontract performance or prior to subcontract go-ahead, replacement of the Principal Investigator may be necessary. If PI replacement occurs, the subcontractor shall state the reason for the replacement, shall identify an individual and shall provide SERI with his resume. No replacement of the Principal Investigator shall be made without written SERI approval subject to termination of the subcontract.

The proposers shall include person hours by task and by labor category in his proposal. A chart showing manpower loading with time shall also be included. The proposers shall also include resumes of all professional personnel proposed for this subcontract.

The proposers shall include data for the evaluation of his experience in all areas important to the proposed study. Caution: SERI will evaluate experience solely upon the data provided by the proposers and the data SERI will obtain in verifying the proposer's statements.

4.0 PROGRAM PLAN

The subcontractor shall deliver cost and performance data on thermal storage concepts as specified in Section 3 of the statement of work. The subcontractor shall deliver these data in accordance with the schedule specified in Figure 4-1. Four tasks are required; the scope of each task is described below:

SERI shall have the right to approve the quality of the work performed. This right shall be applied on a task-by-task basis. No task shall be considered completed until it has been approved by SERI. Only a letter, signed by an authorized agent of SERI and containing the following statement constitutes approval: "Task __, * _____, ** is approved by SERI."

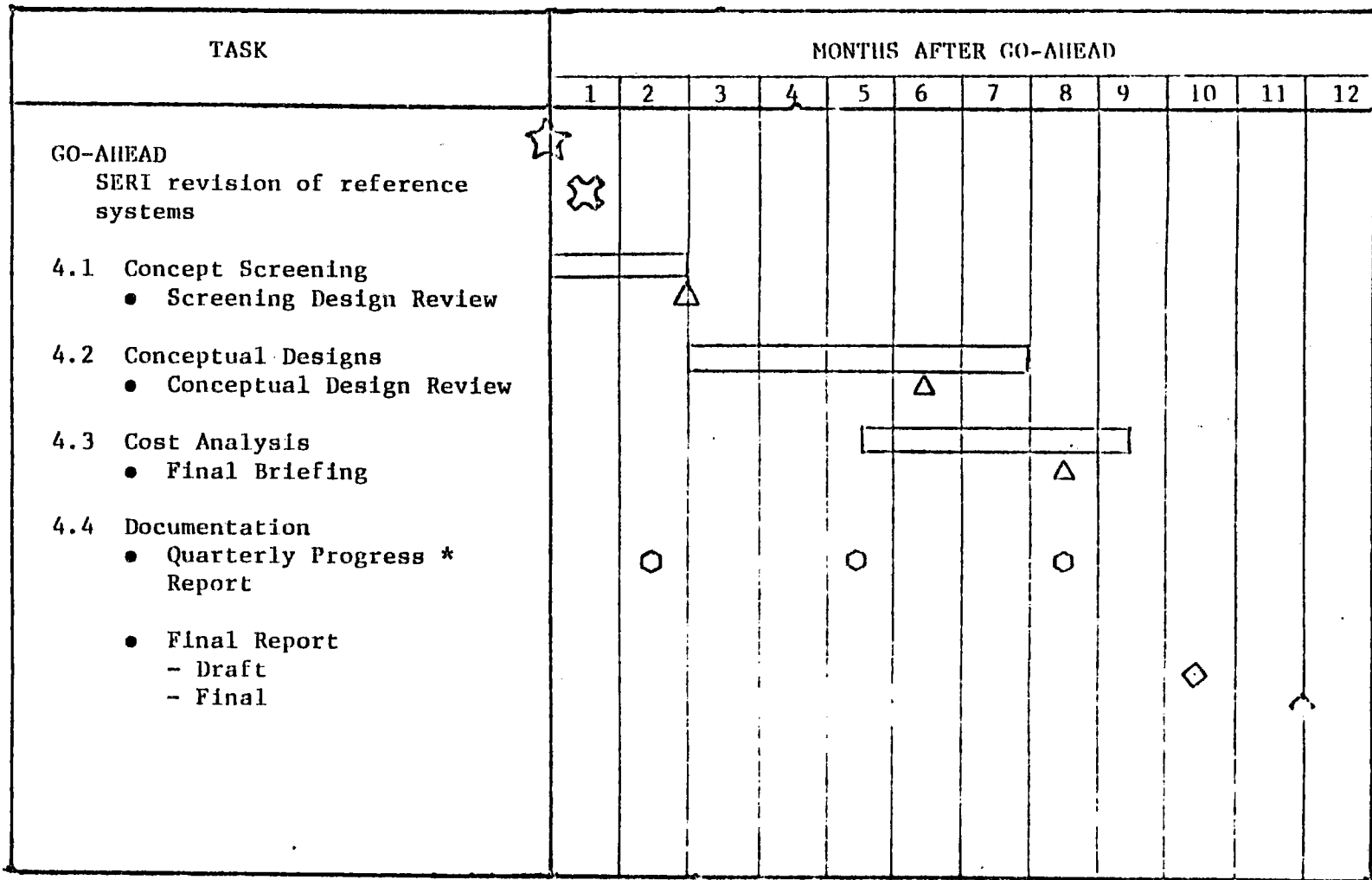
When the subcontractor determines that he has completed the work required in a task, he shall deliver to SERI five copies of the documentation on that task and request task approval. SERI has the right to request and to receive the requested additional data generated by that task. If the task is judged to be incomplete or the quality of the work deficient, the subcontractor shall perform the work necessary to complete the task; that work shall be considered as with the scope of the subcontract. At the completion of work, the subcontractor shall submit five copies of all revised or new data and request approval of task completion. If, after two such revisions (three data submittals), SERI still judges the work to be unsatisfactory, the subcontract may be terminated.

Cost and performance data for alternative storage concept shall be generated for several alternative thermal storage concepts for each reference system. Table 4-1 presents the type of data required for performance, cost, and the number of thermal storage concepts. These data shall be generated parametrically as a function of the storage capacity. The data shall be supplied for storage capacities in the range of 1.0 hour to 15.0 hours. The data shall be supplied both for the reference thermal storage concept and each alternative thermal storage concept. Appendix B presents data requirements for the conceptual descriptions and conceptual designs.

within
concepts
You have two Appendix B's which confusing and tacky.

*Task number.

**Task title.



* Dates are approximate, see Table 4-2

FIGURE 4-1

PROGRAM SCHEDULE

Table 4-1. DATA REQUIREMENTS

	Screening Design Review (at Subcontractor's Facility)	Conceptual Design Review (at SERI)	Final Briefing (at SERI)	Report
<u>PERFORMANCE DATA:</u>				
1. System Schematic	I	R	R	F
2. Concept Description	I	R	F	F
3. Conceptual Design		I	R	F
4. 1st Law Efficiency		I	R	F
5. Cycle Operating Conditions		I	R	F
6. Receiver Temperatures		I	R	F
7. Pressure Drops		I	R	F
<u>COST DATA:</u>				
1. Preliminary Cost Data For 6 Hours of Storage	I	R		
2. Detail Cost Data				
a) Power related			I	F
b) Capacity related			I	F
c) Changes to Reference System			I	F
<u>NUMBER OF ALTERNATIVE CONCEPTS:</u>				
Total number* (includes reference storage concept)	40	25	20	20

*The number of concepts will not necessarily be equally distributed among the reference systems.

NOTES: Data Type:

- I: Initial
- R: Revised
- F: Final

4.1 CONCEPT SCREENING

The subcontractor shall review the available data on thermal storage concepts. These data shall be accumulated from the existing published literature and from contacts with SERI, national laboratories and contractors developing thermal storage. SERI will assist in the accumulation of data to the extent deemed appropriate by the SERI technical monitor. The best available data on each identified thermal storage concept shall be used to generate a system schematic, concept description and preliminary cost. These data shall be reported for each thermal storage in each reference system for which the thermal storage has been proposed. A preliminary screening shall be conducted by the subcontractor and thermal storage concepts recommended for additional study. A design review shall be conducted and the data presented. Within two working days following the review, the SERI technical monitor will provide a preliminary list of thermal storage concepts for additional study. Within two weeks following the review, SERI will provide a final list.

Has SERI checked to see if 40 concepts are presently available in the literature?

4.2 CONCEPTUAL DESIGNS

The subcontractor shall prepare conceptual designs for each thermal storage concept. Initial performance estimates and revised cost data shall be generated on each and reported at a conceptual design review. Within two weeks following the conceptual design review SERI will identify recommended changes in the conceptual designs and the thermal storage concepts that shall be studied in more detail. The subcontractor shall modify the conceptual designs in light of the comments made during and after the review to the extent deemed appropriate by the subcontractor. Performance data shall be generated and reported for the final conceptual designs.

4.3 COST ANALYSIS

For each thermal storage concept selected following the conceptual design review, detailed cost data shall be prepared. The cost data shall include both costs associated with the thermal storage subsystem and equipment changes in the reference system. The cost data shall include both power related cost and energy related costs for the range of 1.0 hours to 15.0 hours of thermal storage for each case. The subcontractor shall conduct a final briefing on the study results. Within one week following the briefing the SERI technical monitor will identify the recommended changes. The subcontract shall modify the cost and performance data to the extent deemed appropriate by the subcontractor.

4.4 DOCUMENTATION

The subcontractor shall deliver the documentation specified in Table 4-2.

4.4.1 REVIEW PRESENTATION DATA

Before or during each review copies of all viewgraphs, handouts, and appropriate back-up data shall be delivered to all attendees at the review. The SERI technical monitor will provide written acknowledgement of receipt of these data upon their delivery. No additional submittal of the presentation data are required. The copies will be distributed to non-subcontractor attendees at the meetings including representatives from SERI, national laboratories, and others invited by SERI.

Table 4-2. DOCUMENTATION REQUIREMENTS

Document	Due Data At SERI	Numbers of Copies	Number of Submittals
1) Review Presentation Data	During review	25	3
2) Monthly Status Reports	At monthly intervals	15	10
a) study status	beginning one month after		
b) financial status	go-ahead		
3) Quarterly Progress Reports	Two weeks prior to the Government Fiscal Year Quarters	50	3
4) Final Report			
a) Draft	9 1/2 months after go-ahead	10	1
b) Final	11 months after go-ahead	100	1
5) Task Approval Data	After completion of task	5	3

this adds up to a lot of trees. printing costs will be excessive.

4.4.2 QUARTERLY PROGRESS REPORTS

Quarterly progress reports shall report significant data accomplishments, problems, and schedule status. The reports shall be not less than 3 pages nor more than 15 pages in length. The quarterly progress reports shall be delivered two weeks prior to the government fiscal year quarters (i.e., 31 December, 31 March, 30 June and 30 September). The first progress report is not due until after at least one month following go-ahead.

4.4.3 FINAL REPORT

The subcontractor shall prepare a final report documenting all aspects of the study. The report shall document the final data on cost and performance and include system schematics and conceptual for all thermal storage concepts studied in detail. Conceptual descriptions of all thermal storage concepts considered shall also be documented. A draft of the final report shall be prepared and submitted to SERI for review. Within three weeks, SERI will provide comments and recommended changes in the report. The subcontractor shall make appropriate changes and deliver the final report.

4.4.4 MONTHLY STATUS REPORTS

Status reports shall be prepared and submitted monthly. Both financial status and study status shall be reported. The study status report shall describe significant accomplishments, problems, and schedule. The study status report shall not exceed three pages in length. Financial status reports shall be in a form approved by SERI's contracts branch.

4.4.5 TASK APPROVAL DATA

The subcontractor shall deliver sufficient data for SERI to review each task. These data include, but are not limited to, revised design review data, documentation on specific analyses, schematics, and other data as deemed appropriate by the subcontractor. Approval of the documentation task and subcontract completion shall be based on the final report. The final report shall be submitted both as a draft for SERI review and comment and in final form for SERI approval.

5.0 REFERENCES

1. "Thermal Energy Storage Technology Development for Solar Thermal Power Systems; Multi-year program plan. The United States Department of Energy, Division of Energy Storage Systems, Division of Central Solar Technology, Washington, D.C. Draft dated March 13, 1979.
2. "Central Receiver Solar Thermal Power System Phase I, Preliminary Design Report", MDC G 6776, May, 1977.
3. "Solar Total Energy - Large Scale Experiment at Shenandoah, Georgia", General Electric Space Division, 78 SDS 4234, July 10, 1978.
4. "Department of Energy - Large Solar Central Power Systems Semi-Annual Review", Sandia Livermore report. SAND 78-8511. 'Closed Cycle Brayton Advanced Central Receiver Solar Thermal Electric Power Plant'. Nov. 1978.

Can you deliver this to your contractor? He may request it

Is this the most recent edition available?

What about computer programs to help in evaluating storage systems. Many exist.

APPENDIX A

STANDARD COST REPORTING STRUCTURE

This Appendix presents a standard cost breakdown structure to be used in this subcontract. The structure was originally defined for a hybrid central receiver system and there may be some ambiguities as a result. The subcontractor is reminded that the scope of this effort is limited to the thermal storage subsystem and areas affected by storage.

Enclosure A-1 presents the standard cost breakdown structure. This format shall be used for data presented at the final briefing and final report. For cost data presented at the screening design review and the conceptual design review, the subcontract shall define factors that are being considered in his proposal.

why don't you edit
this to remove the ambiguities
you're probably in a better
position to do this and it
will save the contractor time
and your money.

ENCLOSURE A-1

Plant Cost Data - Comparison of hybrid plant cost and performance estimates requires that the estimates be based on comparable assumptions. The cost breakdown structure, discussion, and examples included in this section are intended to provide the basis for comparability of the cost and performance estimates. The basis for the hybrid plant construction cost and operations and maintenance cost estimates are shown in Figures 1 - 4. Cost estimates are to be provided in 1979 dollars for the 80th plants. For each cost code a cost account summary sheet is needed (see Figure 5 for construction costs and Figures 6 and 7 for operations and maintenance costs). Construction cost accounts should be summarized on backup sheets (Figure 8). The backup sheets shall include all the inputs and assumptions along with sufficient justification to assess the merits of the costs shown. The backup sheets shall take the form and provide at least the detail in the examples in Figures 9 - 14. All applicable cost accounts shown in Figure 5 shall be included in the backup sheets in addition to those specifically listed in Figures 9 - 14.

Sometimes it is not obvious under which cost code the cost of an item should be included. Therefore, include a drawing of schematic that shows the subsystem geographic boundaries. These boundaries may be of arbitrary shape; the entire area of the plant should be mapped so that all items get included in the costing. Also define the nomenclature used for components and parts and show under which functional element it is to be included. An example of one such illustration is shown in Figure 15.

The operations and maintenance costs are to be for the first year of operation with an estimate of how the costs may change over the plant life.

FIGURE 1 - BASIS FOR CONSTRUCTION COST ESTIMATE

1. The structure of construction costs estimate will be:
 - a. Construction cost codes (Figure 2)
 - b. Construction cost accounts, A thru W (Figure 5)
 - c. Construction cost backup sheets (Figure 8)
2. The structure of operations and maintenance costs estimate will be:
 - a. Operations and maintenance cost codes (Figure 3)
 - b. Operations and maintenance material cost accounts (Figure 6)
 - c. Operations and maintenance labor cost accounts (Figure 7)
3. A/E performs as an engineer and constructor and is the Prime Contractor responsible for:
 - Plant Design
 - Construction and Plant Start Up
 - Subcontracting Construction
 - Procuring Major Equipment
 - Construction Management
4. Labor wages rates = base wage rate at Barstow, California, 1979.
5. Labor manhours per U.S. Gulf Coast (Houston).
6. Adjustments for labor productivity from U.S. Gulf Coast to Barstow, California, to be included in labor productivity (Acct U).
7. Material priced to Barstow, California, 1979.
8. Field Indirects and Engineering will be per Figure 4.
9. The following two items are not to be included in construction costs.
 - a. Sales Tax
 - b. Cost of Money
10. Do not include Design Contingency in Total for Construction Cost.
11. Include backup information on major subcontract equipment items where available.

FIGURE 2 - CONSTRUCTION COST CODES

Solar Hybrid Central Receiver Plant Capital Investment Cost

5000 Plant Cost

- 5100 Land, General Site Preparation
- 5200 Administrative Areas
 - 5210 Operations
 - 5211 Security
 - 5212 Storage and Maintenance
- 5300 Collector Subsystem
- 5400 Receiver Subsystem
- 5500 Master Control Subsystem
- 5600 Non-Solar Energy Subsystem
- 5700 Energy Storage Subsystem
- 5800 Electric Power Generating Subsystem

FIGURE 3 - OPERATIONS AND MAINTENANCE COST CODES

Solar Hybrid Central Receiver Plant Operations and Maintenance Costs

- OM100 Operations
 - OM110 Operating Personnel
 - OM120 Operating Consumables
- OM200 Maintenance Materials
 - OM210 Spare Parts
 - OM211 Turbine and Electrical Plant
 - OM212 Collector Equipment
 - OM213 Receiver Equipment
 - OM214 Thermal Storage Equipment
 - OM215 Non-Solar Energy Subsystem Equipment
 - OM220 Materials for Reports
 - OM230 Other
- OM300 Maintenance Labor
 - OM310 Scheduled Maintenance
 - OM320 Corrective Maintenance

FIGURE 4 - INDIRECT COSTS DESCRIPTION

Account

L Temporary Construction Facilities

Includes: Temporary buildings, sheds, trailers, work areas, bays, roads, walks, parking, signs, railroads, unloading docks, utilities, personnel protection, camps, cleaning services, maintenance services, utility bills, and site maintenance.

M Construction Services, Supplies and Expenses

Services:

Includes: Cleanup, nonproductive time, medical examinations, doctor's fees, move on and off, and construction equipment maintenance and servicing.

Supplies:

Includes: Welding rod, oxygen, acetylene, rags and other consumables.

Field Office Supplies:

Includes: Office machines, telephone, telegraph, postage, computer rental, stationery and furniture.

N Field Staff, Subsistence and Expense

Field Staff:

Includes: Superintendents, field engineers, cost engineers, field administration, warehouseman, purchaser, nurse, safety engineer, timekeeper, accountant, clerks, Q/A control, watchmen, and security service.

Field Staff Subsistence

Includes travel, subsistence, transportation, and relocation for field staff.

Field Staff Burdens:

Includes: Vacation, sick leave, and holiday allowance.

Figure 4 - continued

Account

P Field Craft Benefits, Payroll Burdens and Insurance

Field Craft Benefits:

Includes: Required contributions to funds for vacation, welfare, education, apprentice, retirement, holidays, etc.

Field Craft Travel, Transportation or Subsistence

Payroll Burdens for Field Craft and Field Staff:

Includes: Social security, workman's compensation, comprehensive PL & PD, state unemployment insurance, federal unemployment insurance.

Insurance:

Included: Builder's risk, performance bonds, and marine insurance.

Q Equipment Rental

Construction Equipment Rental

Special Equipment Rental

Small Tools

NOTE: Special rigging equipment included in the Direct Field Accounts

R Engineering

Plant Engineering - prime contractor to design plant, subcontract construction, and startup plant.

S Equipment Procurement by Prime Contractor

T Construction Management by Prime Contractor

U Labor Productivity

Adjusts direct field labor from Houston to Barstow.

V Contingency

Construction Cost Contingency:

These represent normal construction uncertainties in an estimate which is based on a given design.

Figure 4 - continued

Design Contingency (not to be included in this cost estimate):

This is an allowance for possible design alternates and is used for project budgetary input.

W Prime Contractors Fee

Material Markups

Fee on Labor and Indirects

Fee on Subcontracted Work

CONSTRUCTION COST ESTIMATE

CLIENT: **SAMPLE**

DESCRIPTION: Account 5910
Cooling Tower Blowdown

LOCATION: _____

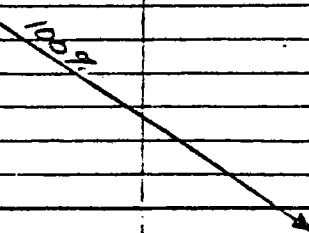
CONT. NO. _____

MADE BY _____

APPROVED _____

PROJECT: _____

A/C NO.	ITEM & DESCRIPTION	MANHOURS	ESTIMATED COST			
			LABOR	SUBCONTRACTS	MATERIALS	TOTALS
5910 SUMMARY						
A	Excavation & Civil	70	910	26	-	93
B	Concrete	85	1190	-	465	165
C	Structural Steel	43	602	-	860	146
D	Buildings	-	-	-	-	-
E	Machinery & Equipment	28	420	-	2200	262
F	Piping	118	1770	-	3374	514
G	Electrical	46	685	-	729	141
H	Instruments	24	360	-	200	56
J	Painting	-	-	160	-	16
K	Insulation	-	-	-	-	-
	DIRECT FIELD COSTS	414	5937	186	7828	1395
L	Temporary Construction Facilities					
M	Construction Services, Supplies & Expense					
N	Field Staff, Subsistence & Expense					
P	Craft Benefits, Payroll Burdens & Insurances					
Q	Equipment Rental					
	INDIRECT FIELD COSTS					593
	TOTAL FIELD COSTS					1988
R	Engineering <i>Plant Design 10% of TFC</i>					198
	<i>R&D</i>					-
S	Major Equipment Procurement <i>10% of Pump</i>					22
T	Construction Management <i>3% of (TFC + R + S)</i>					66
	TOTAL FIELD & ENGR. COSTS					2276
U	<i>Labor Productivity see pg. 5/5</i>					403
V	<i>Contingency Construction see pg. 5/5</i>					181
	<i>Design " " "</i>					-
W	<i>Fee 10% of (A thru V)</i>					284
	TOTAL CONSTRUCTION COST					3147



SAMPLE

Figure 6: Operations and Maintenance Material Cost Estimate

OM212 Collector Equipment

<u>Part Description</u>	<u>Expected Failures per Year per Plant</u>	<u>1st Unit Cost per Unit</u>	<u>Subtotal</u>	<u>Learning Curve Factor Years 1-10</u>	<u>G&A</u>	<u>Overhead</u>	<u>Total</u>
Reflective Unit	1	\$310	\$310	.90	1.10		\$ 307
Drive	2	450	900	.90	1.10		891
Drive	1	500	500	.90	1.10		495
Motors	1.5	400	600	.88	1.10		581
TOTAL FOR OM212							\$2,274

NOTES:

- Failure rates are based on manufacturer specifications.
- The learning curve factor expresses the average cost of the units being costed as a fraction of the first unit cost (i.e., unit one). The units in this estimate start with unit 3000 for first three items and unit 6000 for the motors. The learning curve rate in all cases is 0.95. The learning curve factor is estimated to change as follows for spare parts purchased over the plant life:

<u>Years of Plant Life</u>	<u>Factor for all but Motors</u>	<u>Factor for Motors</u>
1-10	.90	.88
10-20	.89	.87
20-30	.88	.87

These factors are estimated based on the manufacturing facility production rate of 1000 units per year for all but motors and 2000 units per year for motors.

- Percentages, costs, items, and other numbers used in this estimate do not represent suggested values.

SALAH

Figure 7: Operations and Maintenance Labor Cost Estimate

OM310 Scheduled Maintenance

<u>Description</u>	<u>Hours per Year</u>	<u>Unit Cost</u>	<u>Subtotal</u>	<u>G&A</u>	<u>Overhead</u>	<u>Total</u>
Mirror Washing	84	\$15	1,260	1.1	1.5	\$ 2,079
Heliostat Lubrication	500	20	10,000	1.1	1.5	16,500
Receiver Preventive Maintenance	20	20	400	1.1	1.5	660
Thermal Storage Preventive Maintenance	10	20	200	1.1	1.5	330
						<hr/>
						TOTAL FOR OM310
						\$19,569

NOTES:

- Hours per year estimates are based on time and motion studies.
- G&A and overhead rates are based on rates at comparable size power plants located near Barstow.
- Percentages, costs, items, and other numbers used in this estimate do not represent suggested values.

CONSTRUCTION COSTS

Fig. 8

CLIENT _____
 LOCATION SAMPLE
 PROJECT _____

BY DU APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			MATERIAL	TOTAL
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MATERIAL		
5910	Cooling Tower Blowdown										
H	EXCAVATION & CIVIL										
A1	Land 35' x 40'	1400	SF								incl. 57
A2	Site Grading & Clearing	156	SY	.05	8	13 ⁰⁰			104		104
A3	<u>Excavate</u>										
	* 116 Sump	65	CY	.4	26				338		338
	* 116 Pipe Trench	26	CY	.4	11				143		143
	Pipe Sleeper allowance	.5	CY	.5	0				0		0
	Elec. Conduit trench allow	5	CY	.4	2				26		26
	Walkway	.5	CY	.3	0				0		0
A4	<u>Compacted Backfill</u>										
	* 116 Sump	22	CY	.5	11				143		143
	* 116 Pipe Trench	24	CY	.5	12				156		156
A5	Asphalt Walkway 2" thk	8.5	SY					3 ⁰⁰		26	26
	A. CIVIL TOTAL				70				910	26	936
B	CONCRETE										
B1	* 116 Sump	5	CY	15.8	79	14 ⁰⁰			87 ⁰⁰		435
	Pipe Sleeper Allowance	.5	CY	11	6				60 ⁰⁰		30
	Includes: Concrete, rebar, embedments, forms, & stripping.										
	B. CONCRETE TOTAL				85				1190		465
C	STRUCTURAL STEEL										
C1	Med Stl. Sump 116	.36	T	25	9	14 ⁰⁰			500		180
C2	1/2" φ Handrail 36 LF	.13	T	60	8				1000		130
C3	1/4" Chkrd. Plate 8'x10'	.45	T	40	18				1000		450
C4	Misc. Steel	Allow			6						100
C5	Unload & Store	Allow			2						
	C. STRUCT. STL. TOTAL				43				602		860

NOTE: Percentages, manhours, wage rates, and material costs used in this estimate do not represent suggested values.

A-12

CONSTRUCTION COSTS

Fig. 8 CONTINUED.....

CLIENT _____
 LOCATION SAMPLE
 PROJECT _____

BY DU CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
5910	Cooling Tower Blowdown												
G	ELECTRICAL												
G 1	* 116 Sump												
	Motor Feed w/local P.B. 15hp	1	ea	16.5	17	15 ⁰⁰	-	-	73 ⁰⁰	255	-	73	328
	3/4" RSG Conduit	25	LF	.11	3	1	-	-	0 ⁰⁵	45	-	1	46
	Wire 3- #10 THW	75	LF	.026	2		-	-	0 ⁰⁷	30	-	5	35
	Grounding	Allow		-	10		-	-	-	150	-	-	150
	Starters - Size 2, Nema Type 4	1	ea	7	7		-	-	600	105	-	600	705
	Lighting	Allow		-	7		-	-	-	100	-	50	150
	G. ELECTRICAL TOTAL				46					685		729	1414
H	INSTRUMENTS												
H 1	* 116 SUMP												
	Level Control Probes	1	set		24	15 ⁰⁰	-	-	200	360	-	200	560
	H. INSTRUMENTS TOTAL				24					360		200	560
J	PAINTING												
J 1	8"φ Pipe - Line 402	23LF	Allow				-	-	-	-	100	-	100
J 2	1 1/2"φ Handrail - Sump 116	36LF	Allow				-	-	-	-	60	-	60
	J. PAINTING TOTAL										160		160

NOTE:
 Percentages, manhours, wage rates,
 and material costs used in this
 estimate do not represent suggested
 values.

A-13

CLIENT SAMPLE
 LOCATION _____
 PROJECT _____

CONSTRUCTION COSTS

Fig. 8

BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
5910	Cooling Tower Blowdown												
U	<u>LABOR PRODUCTIVITY ALLOWANCE</u>												
	Jobsite/Houston = 130/100 → +30%												
U1	A thru K +30% of DFL	5937											1781
U2	L thru Q 100% of U1	1781											1781
U3	R 10% of (U1+U2)	3562											356
U4	T 3% of (U1+U2+U3)	3918											118
	U. LABOR PROD. TOTAL												4036
V	<u>CONTINGENCY</u>												
VI	<u>Construction Contingency</u>												
	5% of A	936											47
	5% of B	1655											83
	5% of C	1462											73
	15% of E	2620											37
	10% of F	5144											51
	5% of G	1414											7
	5% of H	560											2
	5% of J	160											1
	SUBTOTAL												121
	R @ 10%	1217											121
	15% of S	220											3
	T @ 3%	1372											4
	10% of U	4036											40
	VI CONSTR. CONTINGENCY TOTAL												181
VZ	VZ DESIGN CONTINGENCY TOTAL												-

NOTE:
 Percentages, manhours, wage rates,
 and material costs used in this
 estimate do not represent suggested
 values.

A-14

CONSTRUCTION COSTS

Fig. 9

CLIENT _____

LOCATION SAMPLE

PROJECT _____

BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
S300	Collector Subsystem:												
A	EXCAVATION												
A1	Heliostat Foundations												
B	CONCRETE												
B1	Heliostat Foundations												
E	EQUIPMENT												
E1	Heliostat Reflective Surface												
E2	Heliostat Drives & Motors												
E2.1	Horiz. (Az.) Drive(s)												
E2.2	Horiz. Motors												
E2.3	Vert. (El.) Drives												
E2.4	Vert. Motors												
E3	Heliostat Protective System												
G	ELECTRICAL												
G1	Heliostat Power Distribution												
G2	Emergency Power Supply												
G3	Lightning Protection												
H	INSTRUMENTS												
H1	Sensors												
H2	Controller												
H3	Calibration Instruments												

Note:
 Sample is not complete.
 Also include a specific
 description of components.
 (Type, model, rating, etc.)

A-15

CLIENT _____
 LOCATION SAMPLE
 PROJECT _____

CONSTRUCTION COSTS

Fig. 10

BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
5400	Receiver Subsystem												
A	<u>EXCAVATION & CIVIL</u>												
A1	Tower Foundation												
S	<u>CONCRETE</u>												
B1	Tower Foundation												
B2	Tower (if applicable)												
C	<u>STRUCTURAL STEEL</u>												
C1	Tower Structure												
C2	Receiver Support												
C3	Absorber Attachments												
C4	Platforms, catwalks, ladders, etc.												
E	<u>EQUIPMENT</u>												
E1	Absorber Unit												
E2	Surge Tank(s) - specify sep.												
E3	Pumps - specify separately												
E4	Receiver Coolant												
E5	Steam Generator or Heat Transfer Equipment												
E6	Lifting Devices - elevator, crane												
F	<u>PIPING</u>												
F1	Pipe												
F2	Fittings												
F3	Valves												
F3.1	Manual Valves												
F3.2	Control Valves												
F3.3	Anti Siphon												
F4	Hangers & Supports												

Note:
 Sample is not complete.
 Also include a specific description of components (Type, model, rating, etc.)

A-16

CONSTRUCTION COSTS

Fig 10 CONTINUED...

CLIENT _____

LOCATION SAMPLE

PROJECT _____

BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
5400	Receiver Subsystem (continued)												
H	INSTRUMENTS												
H1	Sensors												
H2	Controls												

A 17

CLIENT _____

CONSTRUCTION COSTS

LOCATION SAMPLE

Fig. 11

PROJECT _____

BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
5500	Master Control Subsystem												
D	<u>BUILDINGS</u>												
D1	Control Room												
D1.1	Lighting												
D1.2	HVAC												
D1.3	Enclosure												
D2	Computer Room												
D2.1	Lighting												
D2.2	HVAC												
D2.3	Enclosure												
H	<u>INSTRUMENTS</u>												
H1	Controls												
H2	Computers												
H3	Software												
H4	Displays												

Note:
 Sample is not complete.
 Also include a specific description of components.
 (Type, model, rating, etc.)

A-18

CONSTRUCTION COSTS

Fig 12

CLIENT _____

LOCATION SAMPLE

PROJECT _____

BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
5600	<i>Non-Solar Energy Subsystem</i>												
E	EQUIPMENT												
E1	<i>Fuel Storage</i>												
E2	<i>Fuel Preparation Equip.</i>												
E3	<i>Fuel Feed Equip.</i>												
E4	<i>Fuel Handling Equip.</i>												
F	PIPING												
F1	<i>Pipe</i>												
F2	<i>Fittings</i>												
F3	<i>Valves</i>												
F4	<i>Hangers & Supports</i>												

*Note:
Sample is not complete.
Also include a specific
description of components.
(Type, model, rating, etc.)*

A-19

CLIENT _____
 LOCATION SAMPLE
 PROJECT _____

CONSTRUCTION COSTS

Fig. 13

BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
5700	Energy Storage Subsystem												
A	<u>EXCAVATION</u>												
A1	Storage Containment Structure												
A2	Equipment Foundations												
B	<u>CONCRETE</u>												
B1	Storage Containment Structure												
B2	Equipment Foundations												
C	<u>STRUCTURAL STEEL</u>												
C1	Storage Containment Support												
C2	Equipment												
C3	Other												
E	<u>EQUIPMENT</u>												
E1	Storage Media												
E2	Media Containment Vessel(s)												
E3	Media Circulation Equip.												
E4	Discharge Heat Exchangers												
E5	Charge Heat Exchangers												
F	<u>PIPING</u>												
F1	Pipe												
F2	Fittings												
F3	Valves												
F3.1	Manual Valves												
F3.2	Control Valves												
F3.3	Anti Siphon												
F4	Hangers & Supports												

Notr:
 Sample is not complete.
 Also include a specific
 description of components
 (Type, model, rating, etc.)

A-20

CLIENT _____

LOCATION SAMPLE

PROJECT _____

CONSTRUCTION COSTS

Fig 18 CONTINUED...

BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)				
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL	
700 700	Subsystem ENERGY STORAGE													
H	INSTRUMENTS													
H1	Sensors													
H2	Controls													
J	PAINTING													
K	INSULATION													

A-21

CONSTRUCTION COSTS

CLIENT _____

LOCATION SAMPLE

PROJECT _____

Fig. 14

BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
5800	EPGS												
A	EXCAVATION & CIVIL												
A1	Land												
A2	Site grading & clearing												
A3	Excavation												
A4	Compacted Backfill												
B	CONCRETE												
B1	Buildings												
B1.1	Foundations												
B1.2	Slabs, floors, decks, walls												
B2	Equipment foundations												
B2.1	Turbine												
B2.2	Cooling Tower												
B2.3	Heat Exchangers												
C	STRUCTURAL STEEL												
C1	Overhead crane & support												
C2	Building Frame												
C3	Equipment support												
C3.1	Cooling Tower												
C3.2	Exchangers												
C3.3	Turbine												
D	BUILDINGS												
D1	Turbine Building												
D2	Water Treatment												

Note:
Sample is not complete.
Also include a specific
description of components.
(Type, model, rating, etc.)

CONSTRUCTION COSTS

Fig 14.. continued

CLIENT _____
 LOCATION SAMPLE
 PROJECT _____

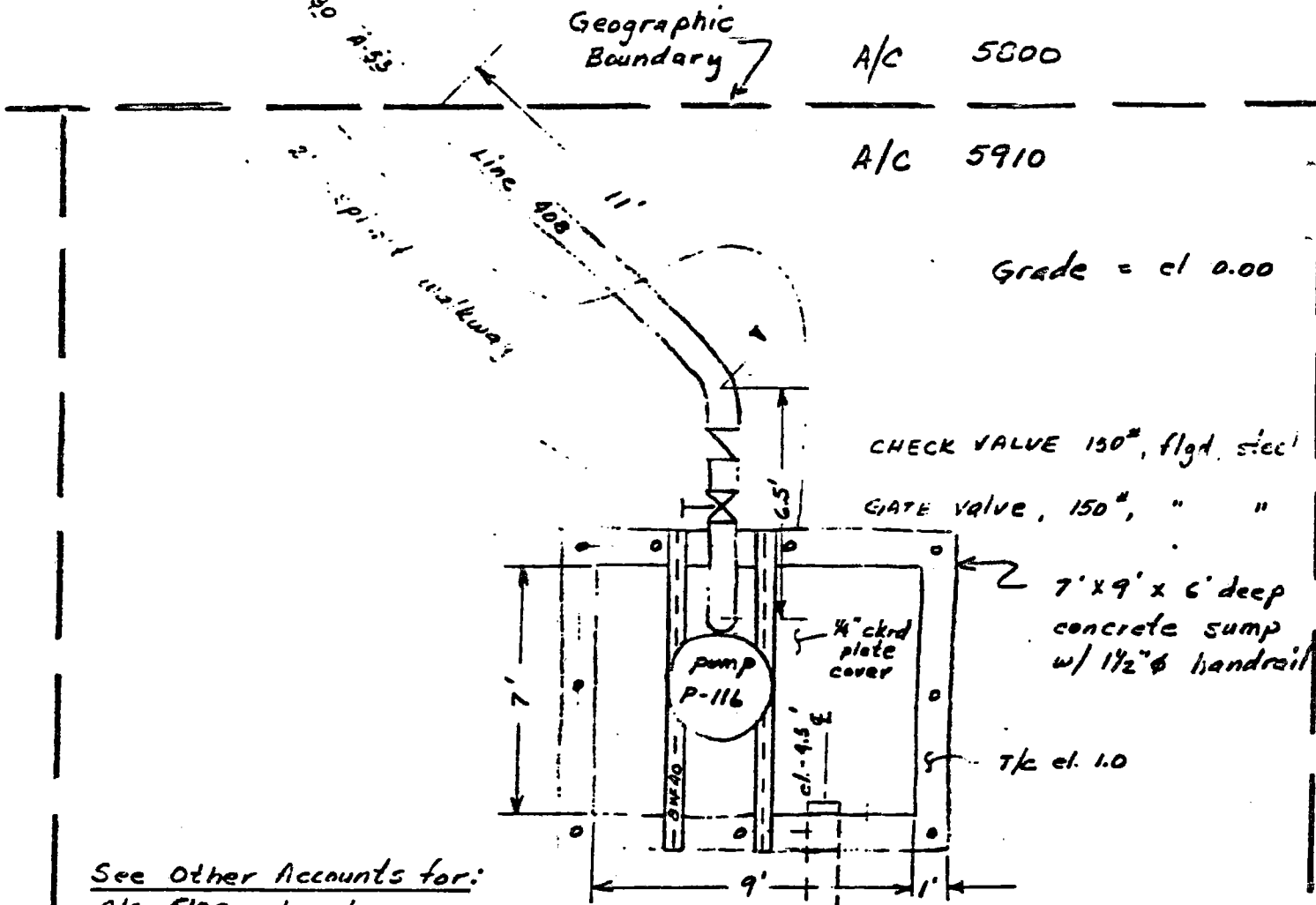
BY _____ CHKD. _____ APVD. _____

A/C NO.	ITEM & DESCRIPTION	QUAN.	UNIT	MANHOURS			COST/UNIT			COSTS (_____)			
				PER UNIT	TOTAL	RATE	LABOR	SUB CONTR.	MAT'L.	LABOR	SUB CONTRACT	MATERIAL	TOTAL
5800	EPGS (continued)												
E	EQUIPMENT												
E1	Turbine / Generator												
E2	Pumps												
E3	Heat Exchangers, feedwater												
E4	Water Treatment												
E5	Combustor												
E6	Boiler												
E7	Heater												
E8	Air Quality Equipment												
F	PIPING												
F1	Pipe												
F2	Fittings												
F3	Valves												
F4	Hangers & Supports												
G	ELECTRICAL												
G1	Major Electrical Equipment												
G1.1	Transformers												
G1.2	Switchgear												
G2	Wire, Cable, Bus & Conduit												
H	INSTRUMENTS												
H1	Sensors												
H2	Controls												

*Note:
 Sample is not complete.
 Also include a specific
 description of components.
 Type, model, rating, etc*

A-23

FIGURE 15



See Other Accounts for:
A/c 5100 Land

SAMPLE

SUMP 116
Cooling Tower
Blowdown
Scale 1" = 5'

APPENDIX B

CONCEPTUAL DESCRIPTION AND CONCEPTUAL DESIGN DATA REQUIREMENTS

Enclosure B-1 presents the minimum information required for the storage subsystem description. The subcontract shall perform appropriate analyses to verify the realism of each conceptual design. In depth optimization trade offs on each item is specifically not required. The subcontractor shall report these data at the final briefing and his final report.

Enclosure B-2 presents the minimum design characteristics which shall be reported for as a minimum 1, 6, and 15 hours of storage for each of alternative concepts. These data are required at the final briefing and in the final report.

The subcontractor shall define in his proposal the data that will be supplied in the screening design review and the conceptual design review. His proposal shall specify this data for both the storage subsystem description and design characteristics.

ENCLOSURE B-1

STORAGE SUBSYSTEM DESCRIPTION

Storage concept (including a schematic of the subsystem)

Storage size

Storage media and containment materials selection

Storage thermal performance analysis (including losses)

Containment vessel structural analysis

Ullage maintenance analysis

Fluid maintenance analysis

Pumps, piping, and valve analysis

Heat exchanger analysis

Storage subsystem control

Leak detection and fire protection

ENCLOSURE B-2

STORAGE SUBSYSTEM DESIGN CHARACTERISTICS

Storage media (include specific heat, viscosity, and density over the operating temperature range)

Storage Media Mass, kg (lb)

Tank characteristics (provide for each tank type)

Number of storage tanks

Tank geometry and dimensions, m (ft)

Tank volume, m³ (ft³) (total and value per tank)

Tank material

Tank design temperature, °C (°F)

Tank mass, kg (lb) (total and value per tank)

Tank surface area (total and value per tank)

top, m² (ft²)

side, m² (ft²)

total (single tank), m² (ft²)

Tank insulation material (specify internal and/or external)

Insulation thickness, m (in)

Insulation mass, kg (lb) (total and value per tank)

Piping, material, OD/ID/wall, mm (in)

Mass of piping insulation, kg (lb)

Pump material, number and mass of storage pumps (ground level only), kg (lb)

Pump characteristics for all storage subsystem pumps

type (centrifugal, etc.)

speed and operating range (single, etc.)

head, m (ft)

NPSH, m (ft)

operating temperature, °C (°F)

power, kW_e (HP)

capacity, m³/s (GPM)

OPERATING CHARACTERISTICS

Extractable capacity, MWH_t (Btu)

Charging rate

maximum, MW_t

design, MW_t

minimum, MW_t

Discharging rate

maximum, TW_t

design, MW_t

minimum, MW_t

Duration

maximum discharge rate, hrs

design discharge rate, hrs

minimum discharge rate, hrs

Storage media operating temperatures (hot/cold) °C (°F)

Storage tank operating pressures (provide for both hot and cold tanks if applicable)

for fully charged storage

top, MPa (PSI)

bottom, MPa (PSI)

for fully discharged storage

top, MPa (PSI)

bottom, MPa (PSI)

Heat loss rate

for fully charged storage, MW_t

for fully discharged storage, MW_t

Storage ramp rate, % of maximum discharge power per minute

ENCLOSURE VI

Pro Forma Subcontract's

↳ This must be legalized.

ENCLOSURE VI

(For Commercial Organizations)

INDEX

<u>ARTICLE</u>	<u>TITLE</u>	<u>PAGE</u>
	INTRODUCTION	1
	AGREEMENTS	1
1	DEFINITIONS	1
2	THE WORK TO BE PERFORMED	2
3	THE PERIOD OF PERFORMANCE	2
4	ESTIMATED COST AND FIXED FEE	2
5	DELIVERY	3
6	APPLICABLE DOCUMENTATION	3
7	ORDER OF PRECEDENCE	3
8	KEY PERSONNEL	3
9	CONTRACT ADMINISTRATION RESPONSIBILITIES	3
10	RIGHTS TO PROPOSAL DATA	3
11	ALTERATIONS TO TERMS AND CONDITIONS	4
	APPENDIX A—STATEMENT OF WORK	
	APPENDIX B—STANDARD TERMS AND CONDITIONS	
	APPENDIX C—INTELLECTUAL PROPERTY PROVISIONS	

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

INTRODUCTION

THIS SUBCONTRACT, is effective between 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 U. S. Government (hereinafter called the "Government") represented by the Department of Energy (hereinafter called the "DoE") for the performance of certain operation, management, research and development, and support services. 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:

SCHEDULE

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.

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

The subcontractor shall to the best of its ability furnish all personnel, facilities, equipment, materials, supplies, and services (except such as are furnished by the SERI) 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.

ARTICLE 3 - 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 presently 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 Article V, 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 - DELIVERY

A. All worked required under the terms of this subcontract shall be delivered to the SERI, FOB Golden, Colorado.

- B. Ship to: Solar Energy Research Institute
Reference: (Subcontract Number)
1536 Cole Boulevard
Golden, Colorado 80401
- C. Ship Via:
- D. Marking Instructions:

ARTICLE 6 - 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, entitled "Standard Terms and Conditions."
- C. Appendix C, entitled "Intellectual Property Provisions."

ARTICLE 7 - 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); (c) Intellectual Property Provisions (Appendix C); (d) Statement of Work (Appendix A); (e) other provisions of the subcontract whether incorporated by reference or otherwise; and (f) the subcontractor's technical proposal, if incorporated in the subcontract by reference or otherwise.

ARTICLE 8 - KEY PERSONNEL

The subcontractor's key personnel referred to in Appendix B 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

ARTICLE 10 - RIGHTS TO PROPOSAL DATA

Except for technical data contained on pages _____ of the subcontractor's proposal number _____ dated _____ which are asserted by the subcontractor 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 11 - ALTERATIONS TO TERMS AND CONDITIONS

A. The following clauses are hereby deleted in their entirety from Appendix B.

1. Clause 1. "Allowable Costs and Payment (EI)"
2. Clause 13. "Termination for the Convenience of the SERI"
3. Clause 22. "Government Property (Cost Reimbursement, Non Profit)"
4. Clause 55. "Pricing of Adjustments"
5. Clause 56. "Disposition of Materials"
6. Clause 57. "Government Property (Fixed Price)"
7. Clause 58. "Government Property (Short Form)"
8. Clause 59. "Government Property (Fixed Price, Non Profit)"
9. Clause 60. "Default (Fixed Price)"
10. Clause 61. "Termination (Fixed Price)"
11. Clause 62. "Federal, State and Local Taxes (Fixed Price)"
12. Clause 63. "Changes (Fixed Price)"
13. Clause 66. "Allowable Cost and Payment (Cost Sharing)"
14. Clause 67. "Limitations of Cost (Cost Sharing)"

B. The following clause are hereby deleted in their entirety from Appendix C:

1. Clause 8 "Patent Rights (Short Form)"
2. Clause 9 "Rights in Technical Data (Short Form)"

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

AUTHORIZED: THE SOLAR ENERGY RESEARCH INSTITUTE

BY _____

TITLE _____

DATE _____

ACCEPTED SUBCONTRACTOR

BY _____

TITLE _____

DATE _____

ENCLOSURE VI

(For Non-Profit Organizations)

INDEX

<u>ARTICLE</u>	<u>TITLE</u>	<u>PAGE</u>
	INTRODUCTION	1
	AGREEMENTS	1
1	DEFINITIONS	1
2	THE WORK TO BE PERFORMED	2
3	THE PERIOD OF PERFORMANCE	2
4	ESTIMATED COST	2
5	DELIVERY	2
6	APPLICABLE DOCUMENTATION	3
7	ORDER OF PRECEDENCE	3
8	KEY PERSONNEL	3
9	CONTRACT ADMINISTRATION RESPONSIBILITIES	3
10	RIGHTS TO PROPOSAL DATA	3
11	ALTERATIONS TO TERMS AND CONDITIONS	3
	APPENDIX A--STATEMENT OF WORK	
	APPENDIX B--STANDARD TERMS AND CONDITIONS	
	APPENDIX C--INTELLECTUAL PROPERTY PROVISIONS	

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

INTRODUCTION

THIS SUBCONTRACT, is effective 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 U. S. Government (hereinafter called the "Government") represented by the Department of Energy (hereinafter called the "DoE") for the performance of certain operation, management, research and development, and support services. 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:

SCHEDULE

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.

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

The subcontractor shall to the best of its ability furnish all personnel, facilities, equipment, materials, supplies, and services (except such as are furnished by the SERI) 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.

ARTICLE 3 - 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 presently 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 - DELIVERY

A. All worked required under the terms of this subcontract shall be delivered to the Institute, FOB Golden, Colorado, no later than _____

B. Ship to: Solar Energy Research Institute
Reference: (Subcontract Number)
1536 Cole Boulevard
Golden, Colorado 80401

C. Ship Via:

D. Marking Instructions:

ARTICLE 6 - 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, entitled "Standard Terms and Conditions."
- C. Appendix C, entitled "Intellectual Property Provisions."

ARTICLE 7 - 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); (c) Intellectual Property Provisions (Appendix C); (d) Statement of Work; (e) other provisions of the subcontract whether incorporated by reference or otherwise; and (f) the contractor's technical proposal, if incorporated in the subcontract by reference or otherwise.

ARTICLE 8 - KEY PERSONNEL

The subcontractor's key personnel referred to in Appendix B 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

ARTICLE 10 - RIGHTS TO PROPOSAL DATA

Except for technical data contained on pages _____ of the subcontractor's proposal number _____ dated _____ which are asserted by the subcontractor 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 purposed whatsoever, the technical data contained in the proposal upon which this subcontract is based.

ARTICLE 11 - ALTERATIONS TO TERMS AND CONDITIONS

A. The following clauses are hereby deleted in their entirety from Appendix B.

1. Clause 2. "Allowable Costs, Fixed fee, and Payment"
2. Clause 11. "Termination"
3. Clause 12. "Excusable Delays"
4. Clause 21. "Government Property"
5. Clause 55. "Pricing of Adjustments"
6. Clause 56. "Disposition of Materials"
7. Clause 57. "Government Property (Fixed Price)"
8. Clause 58. "Government Property (Short Form)"
9. Clause 59. "Government Property (Fixed Price, Non-Profit)"
10. Clause 60. "Default (Fixed Price, R&D)"
11. Clause 61. "Termination (Fixed Price)"
12. Clause 62. "Federal, State and Local Taxes (Fixed Price)"
13. Clause 63. "Changes (Fixed Price)"
14. Clause 66. Allowable Costs and Payment (Cost Sharing)
15. Clause 67. Limitation of Cost (Cost Sharing)

B. The following clauses are hereby deleted in their entirety from Appendix C:

1. Clause 1 "Patent Rights (Long Form)"
2. Clause 5 "Additional Technical Data Requirements"
3. Clause 6 "Rights in Technical Data (Long Form)"

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

AUTHORIZED: THE SOLAR ENERGY RESEARCH INSTITUTE

BY _____

TITLE _____

DATE _____

ACCEPTED SUBCONTRACTOR

BY _____

TITLE _____

DATE _____

APPENDIX B

INDEX

<u>CLAUSE</u>	<u>TITLE</u>	<u>PAGE</u>
1	ALLOWABLE COSTS AND PAYMENT (EI)	1
2	ALLOWABLE COSTS, FIXED FEE, AND PAYMENT	3
3	LIMITATION OF COST	5
4	ACCOUNTS, RECORDS AND INSPECTION	6
5	STANDARDS OF WORK	7
6	INSPECTION	8
7	ASSIGNMENT	8
8	EXAMINATION OF RECORDS BY COMPTROLLER GENERAL	8
9	LOWER TIER SUBCONTRACTS	8
10	UTILITIZATION OF SMALL BUSINESS CONCERNS	11
11	TERMINATION	11
12	EXCUSABLE DELAYS	16
13	TERMINATION FOR CONVIENCE OF THE SERI	16
14	DISPUTES	18
15	BUY AMERICAN ACT	19
16	CONVICT LABOR	19
17	CONTRACT WORK HOURS AND SAFETY STANDARDS ACT OVERTIME COMPENSATION	19
18	EQUAL OPPORTUNITY	20
19	OFFICIALS NOT TO BENEFIT	22
20	COVENANTS AGAINST CONTINGENT FEES	22

<u>CLAUSE</u>	<u>TITLE</u>	<u>PAGE</u>
21	GOVERNMENT PROPERTY	22
22	GOVERNMENT PROPERTY (COST REIMBURSEMENT, NON PROFIT)	27
23	UTILIZATION OF LABOR SURPLUS AREA CONCERNS	31
24	COMPETITION IN LOWER TIER SUBCONTRACTORS	32
25	AUDIT AND RECORDS	32
26	PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA	33
27	LOWER TIER SUBCONTRACTOR COST OR PRICING DATA	34
28	UTILIZATION OF MINORITY BUSINESS ENTERPRISES	35
29	DISABLED VETERANS AND VETERANS OF THE VIET NAM ERA	36
30	EMPLOYMENT OF THE HANDICAPPED	38
31	PAYMENTS OF INTEREST ON SUBCONTRACTOR'S CLAIMS	39
32	CLEAN AIR AND WATER	39
33	RENEGOTIATION	41
34	STOP WORK ORDER	41
35	CHANGES	42
36	FEDERAL REPORTS ACT	42
37	FOREIGN TRAVEL	43
38	SAFETY AND HEALTH	43
39	PERMITS	43
40	LITIGATION AND CLAIMS	43
41	REQUIRED BONDS AND INSURANCE - EXCLUSIVE OF GOVERNMENT PROPERTY	44
42	KEY PERSONNEL	45
43	STATE AND LOCAL TAXES	45

<u>CLAUSE</u>	<u>TITLE</u>	<u>PAGE</u>
44	COST ACCOUNTING STANDARD WITHDRAWAL	45a
45	COST ACCOUNTING STANDARDS	45a
46	ADMINISTRATION OF COST ACCOUNTING STANDARDS . . .	47
47	LABOR SURPLUS AREA LOWER TIER SUBCONTRACTING . . .	49
48	SMALL BUSINESS LOWER TIER SUBCONTRACTING PROGRAM	49
49	MINORITY BUSINESS ENTERPRISES LOWER TIER SUBCONTRACTING PROGRAM	51
50	PAYMENT FOR OVERTIME PREMIUMS	52
51	PREFERENCE FOR U.S. FLAG AIR CARRIERS	52
52	USE OF U.S. FLAG COMMERCIAL VESSELS	53
53	ORAL OR WRITTEN MODIFICATIONS	54
54	NOTICE OF LABOR DISPUTES	54
55	PRICING OF ADJUSTMENT	55
56	DISPOSITION OF MATERIAL (FIXED PRICE)	55
57	GOVERNMENT PROPERTY (FIXED PRICE)	55
58	GOVERNMENT FURNISHED PROPERTY (SHORT FORM)	60
59	GOVERNMENT PROPERTY (FIXED PRICE, NON-PROFIT) . . .	61
60	DEFAULT (FIXED PRICE)	66
61	TERMINATION (FIXED PRICE)	68
62	FEDERAL, STATE, AND LOCAL TAXES (FIXED PRICE) . . .	71
63	CHANGES (FIXED PRICE)	72
64	PRINTING	72
65	INSURANCE-LIABILITY TO THIRD PERSONS	73
66	ALLOWABLE COSTS AND PAYMENT (COST SHARING)	74
67	LIMITATIONS OF COST (COST SHARING)	76

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APPENDIX B
STANDARD TERMS AND CONDITIONS

CLAUSE 1 - ALLOWABLE COSTS AND PAYMENT (EI)

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 1-15.3 of the Federal Procurement Regulations (41 CFR 1-15.3) as supplemented or modified by ERDA-PR 9-15 (41 CFR 9-15), as in effect on the date of this Subcontract; and

(ii) The terms of this Subcontract; and

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 he 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 2 - 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 ERDA-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 3 - LIMITATION OF COST

A. It is estimated that the total cost to the Institute 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 Institute 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 Institute 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 article, the Institute 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 Article) or otherwise to incur costs in excess of the estimated cost set forth in the Schedule, unless and until the Institute 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 Institute's Subcontract Administrator shall affect the estimated cost of this subcontract. In the absence of the specified notice, the Institute 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 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 article of this subcontract shall not be considered an authorization to the subcontractor to exceed the estimated cost set forth in paragraph A of Article III 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, 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 4 - ACCOUNTS, RECORDS AND INSPECTION

A. Accounts - The Subcontractor shall maintain a separate and distinct set of accounts, records, documents, and other evidence showing and supporting all allowable costs incurred, or anticipated to be incurred, revenues or other applicable credits, fixed-fee accruals, if any, and the receipt, use, and disposition of all Government property coming into the possession of the Subcontractor under this subcontract. The system of accounts employed by the Subcontractor shall be satisfactory to the SERI and in accordance with generally accepted accounting principles consistently applied.

B. Inspection and Audit of Accounts and Records - All books of account and records relating to this subcontract shall be subject to

inspection and audit by the SERI or DoE at all reasonable time, before and during the period of retention provided for in D below, and the Subcontractor shall afford the SERI or DoE proper facilities for such inspection and audit.

C. Audit of Sub-Subcontractor's Records - The Subcontractor also agrees, with respect to any sub-subcontracts (including lump-sum or unit price sub-subcontracts or purchase orders) where, under the terms of the sub-subcontract, costs incurred are a factor in determining the amount payable to the subcontractor of any tier, to conduct an audit of the costs of the sub-subcontractor in a manner satisfactory to the SERI or to have the audit conducted by the next higher tier subcontractor in a manner satisfactory to the SERI, except when the SERI elects to waive such audit or approves other arrangements for the conduct of the audit.

D. Disposition of Records - Except as agreed upon by the SERI and the Subcontractor, all financial and cost reports, books of account and supporting documents and other data evidencing costs allowable and revenues received, and other applicable credits under this subcontract, and all other records, including medical and personnel records generated under this subcontract, not covered by the article hereof entitled "Rights in Technical Data", shall be the property of the SERI, and shall be delivered to the SERI or otherwise disposed of by the Subcontractor either as the SERI may from time to time direct during the progress of the work or in any event as the SERI shall direct upon completion or termination of this subcontract and final audit of all accounts hereunder. Except as provided in this subcontract, all other records in the possession of the Subcontractor relating to this subcontract shall be preserved by the Subcontractor for a period of three (3) years after final payment under this subcontract or otherwise disposed of in such manner as may be agreed upon by the SERI and the Subcontractor.

E. Reports - The Subcontractor shall furnish such progress reports and schedules, financial and cost reports and other reports concerning the work under this subcontract as the SERI may from time to time require.

F. Inspections - The SERI and the DoE shall have the right to inspect the work and activities of the Subcontractor under this subcontract at such time and in such manner as it shall deem appropriate.

G. Sub-Subcontracts - The Subcontractor further agrees to require the inclusion of provisions similar to those in paragraphs A through this paragraph G of this article in all sub-subcontracts (including lump-sum or unit price sub-subcontracts or purchase orders) of any tier entered into hereunder where, under the terms of the sub-subcontract, costs incurred are a factor in determining the amount payable to the sub-subcontractor, except when and to such extent as the SERI may waive such requirements.

The subcontractor further agrees to include an audit article, the substance of which is the "audit" clause in FPR 1-3. 814-2 in each subcontract which does not include provisions similar to those in paragraphs A through paragraph G of this article, but which contains a "defective cost or pricing data" article.

CLAUSE 5 - 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 6 - 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 7 - 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 8 - EXAMINATION OF RECORDS BY COMPTROLLER GENERAL

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

A. The Subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three (3) years after final payment under this subcontract, unless the DoE 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.

B. The periods of access and examination described in A above, for records which relate to (1) appeals under the "Disputes" article 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 its duly authorized representatives shall continue until such appeals, litigation, claims, or exceptions have been disposed of.

C. Nothing in this subcontract shall be deemed to preclude an audit by the General Accounting Office of any transaction under this subcontract.

CLAUSE 9 - 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 estimat-

ed 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, 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 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 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.

CLAUSE 10 - UTILIZATION OF SMALL BUSINESS CONCERNS

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

A. It is the policy of the Government, as declared by the Congress, that a fair proportion of the purchases and contracts for supplies and services for the Government be placed with small business concerns.

B. The Subcontractor agrees to accomplish the maximum amount of subcontracting to small business concerns that the Subcontractor finds to be consistent with the efficient performance of this subcontract.

CLAUSE 11 - TERMINATION

A. The performance of work under this subcontract may be terminated by the SERI in accordance with this article 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 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 article, 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 article. At any time after expiration of the plant clearance period as defined in Subpart 1-8.1 of the Federal Procurement Regulations (41 CFR 1-8.1), as 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 article. The subcontract shall be amended accordingly and the Subcontractor shall 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 costs 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 article, 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 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 cost 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 article 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 ERDA-PR part 9-15 (41 CFR 9-15) in effect on the date of this subcontract.

G. The Subcontractor shall have the right to appeal to the DoE contracting officer under the article entitled "Disputes" from any determination made by the SERI under Paragraph C or E, above, except that, if the Subcontractor has failed to submit its claim within the time provided in Paragraph C above and has failed to request extension of such time, it shall have no such right of appeal. In any case where the SERI has made a determination of the amount due under C or E above, the SERI shall pay to the Subcontractor the following: (1) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the SERI, or (2) if the appeal has been taken, the amount finally determined on such appeal.

H. In arriving at the amount due the Subcontractor under this article, 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 article and not otherwise recovered by or credited to the SERI.

I. 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 equitable adjusted by agreement between the Subcontractor and the SERI, and such adjustment shall be evidenced by an amendment to this subcontract.

J. The SERI may from time to time 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 article, such excess shall be payable by the Subcontractor to the SERI upon demand, together with interest computed at the rate of 6% per annum, 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.

K. The provisions of this article relating to the fee shall be inapplicable if this subcontract does not provide for payment of a fee.

L. Except with respect to defaults of 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 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 SERI, acts of the Government in 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 the subcontractor to perform or make progress, and if such failure arises out of causes beyond the control of both the Subcontractor and its 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 its 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 it shall

determine that any failure to perform was occasioned by any one or more of the said causes, the delivery schedule shall be revised accordingly, subject to the rights of the SERI under this article. (As used in this paragraph, the terms "subcontractor" and "subcontractors" mean subcontractor(s) of any tier.)

CLAUSE 12 - EXCUSABLE DELAYS

Except with respect to defaults of subcontractors, the Contractor shall not be in default by reason of any failure in performance of this contract in accordance with its terms (including any failure by the Contractor 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 Contractor. 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 Contractor. If the failure to perform is caused by the failure of a subcontractor to perform or make progress, and if such failure arises out of causes beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either of them, the Contractor shall not be deemed to be in default, unless (1) the supplies or services to be furnished by the subcontractor were obtainable from other sources, (2) the Contracting Officer shall have ordered the Contractor in writing to procure such supplies or services from such other sources, and (3) the Contractor shall have failed to comply reasonably with such order. Upon request of the Contractor, the Contracting Officer 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 article hereof entitled "Termination for Default or for Convenience of the Government". (As used in this article, the term "subcontractor" and "subcontractors" means subcontractor(s) at any tier.)

CLAUSE 13 - 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 Subpart 1-15.3 of the Federal procurement regulations as supplemented or modified by ERDA-PR Part 9-15 (41 CFR 9-15) 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 here of shall be in accordance with subpart 1-15.2 of the Federal Procurement regulations, as supplemented or modified by ERDA-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 he 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 Contractor 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 times, 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 14 - DISPUTES

A. Except as otherwise provided in this subcontract, any dispute concerning a question of fact arising under this subcontract which is not disposed of by agreement shall be decided by DoE's Contracting Officer for the SERI's Contract EG-77-C-01-4042, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the SERI and the Subcontractor. The decision of the Contracting Officer shall be final and conclusive unless within 30 days from the date of receipt of such copy, the Subcontractor mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the DoE. The decision of the DoE or its duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent or capricious or arbitrary or so grossly erroneous as necessarily to imply bad faith or not supported by substantial evidence. In connection with any appeal proceeding under this Article, the Subcontractor shall be afforded an opportunity to be heard and to offer evidence in support of this appeal. Pending final decision of a dispute hereunder, the Subcontractor shall proceed diligently with the performance of the subcontract and in accordance with the Contracting Officer's decision.

B. This Disputes article does not preclude consideration of law

questions in connection with decisions provided for in paragraph A above: Provided, that nothing in this subcontract shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

CLAUSE 15 - 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 article:

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

2. "End Products" mean those articles, 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 article 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 end 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 16 - 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 17 - 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 (40) 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 article 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 18 - EQUAL OPPORTUNITY

The following article 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 article.

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

C. The Subcontractor will send to each labor union or representative of 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 article, 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 non-compliance with the Equal Employment article 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 in 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 19 - 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 20 - 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 have 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 21 - 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 for the intended use of such property (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 article 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 article 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" article 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 article 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 article or articles 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.

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:

- (1) 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 22 - GOVERNMENT PROPERTY (COST-REIMBURSEMENT, NON-PROFIT)

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 this subcontract, together with such related data and information as the Subcontractor may request and as may reasonably be required for the intended use of such property (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 of this subcontract 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, or delivery or performance dates, or both, and any other contractual provisions affected by any such delay. In the event that the 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 Institute, either (i) return such property, or (ii) effect repairs or modifications. Upon completion of (i) or (ii) above, the SERI upon timely written request of the Subcontractor shall equitably adjust the estimated cost, or delivery or performance dates, or both, and any other contractual provision affected by the return, disposition, repair or modification. The foregoing provision affected by the return, disposition, repair or modification. The foregoing provisions for adjustment are exclusive and the SERI shall not be liable for suit for breach of contract 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 SERI, under this subcontract. The Subcontractor shall promptly take such action as the SERI may direct with respect to the removal, shipping, and disposal of property covered by such notice.

2. In the event of any decrease in or substitution of property pursuant to subparagraph 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. 1. Title to all property furnished by the SERI shall remain in the Government.

2. Notwithstanding subparagraph 1 above, title to equipment purchased with funds available for research having an acquisition cost of less than \$1,000 shall vest in the Subcontractor upon acquisition or as soon thereafter as feasible provided that the Subcontractor shall have obtained approval of the SERI prior to acquisition of such property.

3. Title to equipment having an acquisition cost of \$1,000 or more, purchased with funds available for the conduct of research, shall vest as set forth in the subcontract.

4. If title to equipment is vested pursuant to (2) or (3) above, the Subcontractor agrees that no charge will be made to the Government for any depreciation, amortization, or use charge with respect to such equipment under any existing or future Government contract or subcontract thereunder.

5. The Subcontractor shall furnish the SERI a list of all equipment acquired under subparagraph (2) above within ten (10) days following the end of the calendar quarter during which such equipment was received.

6. All Government-furnished property, together with all property acquired by the Subcontractor, title to which vests in the Government under this article is hereinafter collectively referred to as "Government property."

7. Title to 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.

8. Title to all property purchased by the Subcontractor, for the cost of which the Subcontractor is to be reimbursed as a direct item of cost under this subcontract and which under the provisions of the subcontract is to vest in the Government, 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 to be reimbursed to the Subcontractor under this subcontract and which under the provisions of this subcontract is to vest in the Government, shall pass to and vest in the Government upon (i) issuance for use of such property in the performance of this subcontract, or (ii) commencement of processing or use of such property in the performance of the subcontract, or (iii) reimbursement of the cost thereof by the SERI, whichever first occurs.

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, 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 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 all or substantially all of the Subcontractor's business, or all or substantially all of the Subcontractor's operations at any one plant, laboratory, or separate location in which this subcontract is being performed;

(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 (i) above, (A) to maintain and administer, in accordance with sound business practice, the program for utilization, maintenance, repair, protection and preservation of Government property as required by F above, or to take all reasonable steps to comply with any appropriate written directions of the SERI under F above, or (B) to establish, maintain and administer, in accordance with D above, 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 some other provisions of the 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 Contractor's program or system. In such event, it shall be presumed that any loss of 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 above exceptions shall be applicable in any case, the Subcontractor's liability under any one exception shall not be limited by any other exception.

2. The Subcontractor shall not be reimbursed for, and shall not include as an item of overhead, the cost of insurance, or any provision for a reserve, covering the risk of loss of or damage to the Government property, except to the extent that the Government may have required the Subcontractor to carry such insurance under any other provision 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 designed by the SERI, and with the assistance of the loss and salvage organization 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 or 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 or Government all reasonable assistance and cooperation (including assistance in the prosecution of suit and the execution of instruments of assignment in favor of the Government) in obtaining recovery.

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

I. Upon completion or expiration of this subcontract, or at such earlier dates as may be fixed by the SERI, any Government property which has not been consumed in the performance of this subcontract, or which has not been disposed of as provided for elsewhere in this article, or for which the Subcontractor has not otherwise been relieved of responsibility, shall be disposed of in the same manner, and subject to the same procedures, as is provided in paragraph G of the article of this subcontract entitled "Termination for the Convenience of the Government" with respect to termination inventory.

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 cost of the work covered by the subcontract, or shall be paid in such other manner as the SERI may direct. Pending final disposition of such property, the Subcontractor agrees to take such action as may be necessary, or as the SERI may direct, for the protection and preservation thereof.

J. If the Subcontractor determines any Government property to be in excess of his needs under this subcontract, such Government property shall be disposed of in the same manner as provided by paragraph I above, except that the SERI may abandon any Government property in place and thereupon all obligations of the SERI or Government regarding such abandoned property shall cease. Unless otherwise provided herein, the SERI or Government has no obligation to the Subcontractor with regard to restoration or rehabilitation of the Subcontractor's premises, neither in case of abandonment, disposition pursuant to the 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 23 - UTILIZATION OF LABOR SURPLUS AREA CONCERNS

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

A. It is the policy of the Government to award contract to labor surplus concerns that:

1. have been certified by the Secretary of Labor (hereinafter referred to as certified-eligible concerns with first or second preferences) regarding the employment of a proportionate number of disadvantaged individuals and have agreed to perform substantially (a) in or near sections of concentrated unemployment or underemployment or in persistent or substantial labor surplus areas, or (b) in other areas of the United States, respectively; or

2. are noncertified concerns which have agreed to perform substantially in persistent or substantial 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 subcontracts in accordance with this policy.

B. In complying with Paragraph A of this article and with Paragraph B of the article entitled "Utilization of Small-Business Concerns," the Subcontractor in placing his subcontracts shall observe the following order of preference:

1. certified-eligible concerns with a first preference which are also small business concerns;
 2. other certified-eligible concerns with a first preference;
 3. certified-eligible concerns with a second preference which are also small business concerns.
 4. other certified-eligible concerns with a second preference;
 5. persistent or substantial labor surplus area concerns which are also small business concerns;
 6. other persistent or substantial labor surplus area concerns;
- and
7. small business concerns which are not labor surplus area concerns.

CLAUSE 24 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 25 - 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. Such right of examination shall include inspection at all reasonable times of the Subcontractor's plants, or such parts thereof, as may be engaged in the performance of this subcontract.

C. Cost or Pricing Data - If the Subcontract or 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" article 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 article, 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 26 - 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 article of this subcontract entitled "Sub-Subcontractor Cost or Pricing Data" or "Sub-Subcontractor Cost or Pricing Data - Price Adjustment" or any subcontract article 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 article 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 27 - LOWER TIER SUBCONTRACTOR COST OR PRICING DATA

(This article 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 article, including this paragraph in each low 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 subcon-

tract 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 costs 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 in costs 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.

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 28 - UTILIZATION OF MINORITY BUSINESS ENTERPRISES

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

A. It is the policy of the Government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance of Government contracts and orders or subcontracts issued thereunder.

B. The Subcontractor agrees to use his best efforts to carry out this policy in the award of its subcontracts to the fullest extent consistent with the efficient performance of this subcontract. As used in this subcontract, the term "minority business enterprise" means a business at least 50 percent of which is owned by minority group members or, in the case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members. For the purposes of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and

American Aleuts. The Subcontractor may rely on written representations by its lower tier subcontractors regarding their status as minority business enterprises in lieu of an independent investigation.

CLAUSE 29 - DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA

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

A. The Subcontractor will not discriminate against any employee or applicant for employment because he or she is a disabled veteran 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 paragraphs D and E.

C. Listing of employment openings with the employment service system pursuant of this article 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 article 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 that 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 dat 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 article, 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 no need to advise the State system of subsequent contracts. The Subcontractor may advise the State system when it is no longer bound by this subcontract article.

F. This article 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 paragraphs B, C, D and E of this article 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 article:

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. "Opening which the Subcontract 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 article, 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 article 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 30 - 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

C. In the event of the Subcontractor's noncompliance with the requirements of this article, 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 article 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 provision, including action for noncompliance.

CLAUSE 31 - PAYMENTS OF INTEREST ON SUBCONTRACTOR'S CLAIMS

A. If an appeal is filed by the subcontractor from a final decision of DoE's Contracting Officer for the SERI's Contract EG-77-C-01-4042 under the "Disputes" article, denying a claim arising under this subcontract, simple interest on the amount of the claim finally determined owed by the SERI shall be payable to the Subcontractor. Such interest shall be at the rate determined by the Secretary of Treasury pursuant to Public Law 92-41, 85 Stat. 97 from the date the Subcontractor furnishes the Contracting Officer his written appeal under the "Disputes" article to the date of (a) a final judgement by the court of competent jurisdiction, or (b) mailing to the Subcontractor of a supplemental agreement for execution either confirming completed negotiations between the parties or carrying out a decision of the DoE's Board of Contract Appeals.

B. Notwithstanding A. above, (a) interest shall be applied only from the date payment was due, if such date is later than the filing of appeal, and (b) interest shall not be paid for any period of time that the DoE determines Subcontractor has unduly delayed in pursuing his remedies before the DoE Board of Contract Appeals or a court of competent jurisdiction.

CLAUSE 32 - 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 issues 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 article in any non exempt sub-subcontract, including this paragraph 4.

B. The terms used in this article 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)], 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)], or an approved implementation procedure under Section 112(d) of the Air Act [42 U.S.C. 1857c-7(d)].

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 33 - RENEGOTIATION

If this subcontract is subject to the Renegotiation Act of 1951, as amended, the following provisions shall apply:

A. This subcontract is subject to the Renegotiation Act of 1951 (50 U.S.C. App. 1211, et., seq.), as amended, and to any subsequent act of Congress providing for the renegotiation of contracts. Nothing contained in this article shall impose any renegotiation obligation with respect to this subcontract or any lower tier subcontract hereunder which is not imposed by an act of Congress heretofore or hereafter enacted. Subject to the foregoing, the subcontract shall be deemed to contain all the provisions required by section 104 of the Renegotiation Act of 1951, and by any such other act, without subsequent subcontract amendment specifically incorporating such provisions.

B. The subcontractor agrees to insert the provisions of this article, including this paragraph B, in all lower tier subcontracts, as that term is defined in section 103 g. of the Renegotiation Act of 1951, as amended.

CLAUSE 34 - 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 Article. 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 Article of this Subcontract."

B. If a stop work order issued under this article 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 35 - CHANGES

A. Changes - The SERI's Subcontract Administrator may at any time and without notice to the sureties, if any, issue written directions within the general scope of this subcontract requiring additional work or directing the omission of or variation in work covered by this subcontract. If any such direction results in a material change in the amount or character of the work described in Appendix A entitled "Statement of Work," an equitable adjustment of the fixed fee shall be made in accordance with the agreement of the parties and the subcontract shall be modified in writing accordingly. Any claim by the subcontractor for an adjustment under this Article must be asserted in writing within 30 days from the date of receipt by the subcontractor of the notification of change; provided, however, that the SERI, if it decides that the facts justify such action, may receive and act upon any such claim asserted at any time prior to final payment under this subcontract. A failure to agree on an equitable adjustment under this article shall be deemed to be a dispute within the meaning of the article entitled "Disputes."

B. Work to Continue - Nothing contained in this article shall excuse the subcontractor from proceeding with the prosecution of the work in accordance with the requirements of any direction hereunder.

CLAUSE 36 - FEDERAL REPORTS ACT

A. In the event that it subsequently becomes a contractual requirement to collect or record information calling either for answers to identical questions from 10 or more persons other than Federal employees, or information from Federal employees which is to be used for statistical compilations of general public interest, the Federal Reports Act shall apply to this subcontract. No plan, questionnaire, interview guide, or other similar device for collecting information (whether repetitive or single-time) may be used without first obtaining clearance from the Office of Management and Budget (OMB).

B. The Subcontractor shall request the required OMB clearance from the SERI before expending any funds or making public contracts for the collection of data. The authority to expend funds and to proceed with the

collection of data shall be in writing by the SERI. The subcontractor must plan at least 90 days for OMB clearance. Excessive delay caused by the Government which arises out of causes beyond the control and without the fault or negligence of the subcontractor will be considered in accordance with the Article entitled "Termination" (Paragraph L), if such Article is applicable. If not, the period of performance may be extended pursuant to this Article if approved by the SERI.

CLAUSE 37 - 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 last 45 days prior to the planned departure date, be on Form ERDA 445 (Request for Approval of Foreign Travel), and when applicable include Form ERDA 290 (Notification of Proposed Soviet-Bloc Travel).

CLAUSE 38 - SAFETY AND HEALTH

(This article 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 39 - 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 40 - LITIGATION AND CLAIMS

A. Initiation of Litigation - If the SERI requires the Subcontractor to initiate litigation, including proceedings before administrative agencies, in connection with this subcontract, the Subcontractor shall proceed with the litigation in good faith as directed from time to time by the SERI: Provided, however, that in those instances in which such an

assignment would be legally effective and enable the litigation or proceeding to be instituted and carried on for the Government's purposes the Subcontractor shall have the right to assign the cause to the Government for the latter's initiation or prosecution. In the latter case, the Subcontractor shall cooperate fully with the Government and provide such assistance as the Government shall request in the prosecution of the litigation.

B. Defense and Settlement of Claims - The Subcontractor shall give the SERI immediate notice in writing (1) of any action, including any proceeding before an administrative agency, filed against the Subcontractor, arising out of the performance of this subcontract and which would, if successful, constitute a directly allowable cost and (2) of any claim against the Subcontractor the cost and expense of which is an allowable cost under the article entitled "Allowable Costs." Except as otherwise directed by the SERI, in writing, the Subcontractor shall furnish immediately to the SERI copies of all pertinent papers received by the Subcontractor with respect to such action or claims. To the extent not in conflict with any applicable policy of insurance, the Subcontractor may, with the SERI's approval, settle any such action or claim, shall effect at the SERI's request an assignment and subrogation in favor of the SERI or Government of all the Subcontractor's rights and claims (except those against the Government) arising out of any such action or claims against the Subcontractor, and, if required by the SERI, shall authorize representatives of the SERI or Government to settle or defend any such action or claim and to represent the Subcontractor in, or to take charge of, any action: Provided, however, to the extent not inconsistent with the SERI's or the Government's interests, the Subcontractor may, at his own expense, be associated with the representatives of the SERI or the Government in settlement or defense of any such claim or action. If the settlement or defense of an action or claim against the Subcontractor is undertaken by the SERI or the Government, the Subcontractor shall furnish all reasonable assistance in effecting a settlement or asserting a defense. Where an action against the Subcontractor is not covered by a policy of insurance, the Subcontractor shall, with the approval of the SERI, proceed with the defense of the action in good faith; and in such event the defense of the action shall be at the expense of the Government: Provided, however, that the Government shall not be liable for such expense to the extent that it would have been compensated for by insurance which was required by law or by the written direction of the SERI, but which the Subcontractor failed to secure through its own fault or negligence. The Subcontractor's "charitable defense" (i.e., such defense as is available to the Subcontractor as a matter of law because of the Subcontractor's eleemosynary character) shall not be asserted if the assertion of such a defense contravenes the Subcontractor's established policy.

CLAUSE 41 - REQUIRED BONDS AND INSURANCE-EXCLUSIVE OF GOVERNMENT PROPERTY

The Subcontractor shall procure and maintain such bonds and insurance as are required by law or by the written direction of the SERI. The terms of any such bond or insurance policy shall be submitted to the SERI for approval upon request. In view of the provisions of the article entitled "Property," the Subcontractor shall not procure or maintain for its own

protection any insurance covering loss or destruction of or damage to Government-owned property. Nothing herein shall preclude the Subcontractor from obtaining or maintaining insurance at its own cost and expense to cover any insurable interest it may have in such "Government-owned property".

CLAUSE 42 - KEY PERSONNEL

It having been determined that the individuals, if any, whose names appear elsewhere in this subcontract as "key personnel," or other persons mutually acceptable as persons of substantially equal abilities and qualifications are necessary for the successful performance of this subcontract, the Subcontractor agrees, insofar as it is able, to make available such employees or persons for the performance of the work under the subcontract. Whenever for any reason, one or more of the aforementioned employees is unavailable for performance of work under the subcontract, the Subcontractor shall use its best efforts to replace such employee with an employee of substantially equal abilities and qualifications who is satisfactory to the SERI.

CLAUSE 43 - STATE AND LOCAL TAXES

A. The Subcontractor agrees to notify the SERI of any State or local tax, fee, or charge levied or purported to be levied on or collected from the Subcontractor with respect to the subcontract work, any transaction thereunder, and constituting an allowable item of cost if due and payable, but which in the opinion of the Subcontractor or under the position of the SERI as communicated to the Subcontractor, is inapplicable or invalid; and the Subcontractor further agrees to refrain from paying any such tax, fee, or charge unless authorized in writing by the SERI. Any State or local tax, fee, or charge paid with the approval of the SERI or on the basis of advice from the SERI that such tax, fee, or charge is applicable and valid, and which would otherwise be an allowable item of cost, shall not be disallowed as an item of cost by reason of any subsequent ruling or determination that such tax, fee, or charge was, in fact, inapplicable or invalid.

B. The Subcontractor agrees to take such action as may be required or approved by the SERI to cause any such tax, fee, or charge referred to above to be paid under protest and to take such actions as may be required or approved by the SERI to seek recovery of any payment made, including assignment to the Government or its designee of all rights to an abatement or refund thereof, and granting permission for the Government to join with the Subcontractor in any proceedings for the recovery thereof or to sue for recovery in the name of the Subcontractor. If the SERI directs Subcontractor to institute litigation to enjoin the collection of or to recover payment of any such tax, fee, or charge referred to above, or if a claim or suit is filed against the Subcontractor for a tax, fee, or charge, he has refrained from paying in accordance with this article, the procedures and requirements of the article entitled "Litigation and Claims" shall apply, and the costs and expenses incurred by the Subcontractor shall be allowable items of cost, as provided in this subcontract, together with the amount of any judgement rendered against the Subcontractor.

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C. The SERI shall save the Subcontractor harmless from penalties and interest incurred through compliance with this article. All recoveries or credits in respect of the foregoing taxes, fees, and charges (including interest) shall insure to and be the sole benefit of the SERI.

CLAUSE 44 - 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 article shall be included in all subcontracts, at any tier, containing the article entitled "Cost Accounting Standards."

CLAUSE 45 - COST ACCOUNTING STANDARDS

(Applicable if this subcontract exceeds \$100,000 and is not otherwise exempt under the provisions of FPR 1-3.1703(a)(1), (2), or (h)(1).)

A. Unless the Cost Accounting Standards Board, or the General Services Administration in the case of nondefense contracts, has prescribed rules and regulations exempting Subcontractor or this subcontract from standards, rules and regulations promulgated pursuant to 50 U.S.C. App. 2168 (Public Law 91-379, August 15, 1970), or other statutory authority, Subcontractor, in connection with this subcontract shall:

1. By submission of a Disclosure Statement, disclose in writing his cost accounting practices as required by regulations of the Cost Accounting Standards Board. The required disclosures must be made prior to subcontract award unless the SERI provides a written notice to the Subcontractor authorizing post award submission in accordance with regulations of the Cost Accounting Standards Board. The practices disclosed for this subcontract shall be the same as the practices currently disclosed and applied on all other contracts and subcontracts being performed by the Subcontractor and which contain this Cost Accounting Standards article. If the Subcontractor has notified the SERI and DOE that the Disclosure Statement contains trade secrets and commercial or financial information which is privileged and confidential, the Disclosure Statement shall be submitted directed to the DOE and the Disclosure Statement will not be released outside of the Government.

2. Follow consistently the cost accounting practices disclosed pursuant to 1., above, in accumulating and reporting contract performance cost data concerning this subcontract. If any change in disclosed practices is made for the purposes of any contract or subcontract subject to Cost Accounting Standards Board requirements, the change must be applied prospectively to this subcontract, and the Disclosure Statement must be amended accordingly. If the subcontract price or cost allowance of this subcontract is affected by such changes, adjustment shall be made in accordance with subparagraphs A.4. or A.5., below, as appropriate.

3. Comply with all Cost Accounting Standards in effect on the date of award of this subcontract or if the Subcontractor has submitted cost or pricing data, on the date of final agreement on price as shown on the Subcontractor's signed certificate of current cost or pricing data. The Subcontractor shall also comply with any Cost Accounting Standard which hereafter becomes applicable to a contract or subcontract of the Subcontractor. Such compliance shall be required prospectively from the date of applicability to such contract or subcontract.

4. (a) Agree to an equitable adjustment of this subcontract (as provided in the Changes Article of this subcontract, if any) if the subcontract cost is affected by a change which, pursuant to A.3., above, the Subcontractor is required to make to its established cost accounting practices whether such practices are covered by a Disclosure Statement or not.

(b) Negotiate with the SERI to determine the terms and conditions under which a change either to a disclosed cost accounting practice or an established cost accounting practice, other than a change under 4.a., above, may be made. A change to a practice may be proposed by either the SERI, cognizant Government Agencies or the Subcontractor, provided, however, no agreement may be made under this provision that will increase costs paid by the SERI or the United States.

5. Agree to an adjustment of the subcontract price or cost allowance, as appropriate, if he or a lower-tier subcontractor fails to comply with an applicable Cost Accounting Standard or to follow any practice disclosed pursuant to subparagraphs A.1., and A.2., above, and such failure results in any increased costs paid by the SERI. Such adjustment shall provide for recovery of the increased costs to the SERI together with interest thereon computed at the rate determined by the Secretary of the Treasury pursuant to P. L. 92-41, 85 Stat. 97, or 7 percent per annum, whichever is less, from the time the payment by the SERI was made to the time the adjustment is effected.

6. Indemnify the SERI for all losses and liability which might arise under this article.

B. The Subcontractor shall permit any authorized representatives of the SERI, DoE, the Cost Accounting Standards Board, or the Comptroller General of the United States to examine and make copies of any documents, paper, or records relating to compliance with the requirements of this article.

C. The Subcontractor shall include in all negotiated subcontracts which he enters into the substance of this article, and shall require such inclusion in all lower-tier subcontracts, except that this requirement shall apply only to negotiated subcontracts in excess of \$100,000 where the price negotiated is not based on:

(i) Established catalog or market prices of commercial items sold in substantial quantities to the general public; or

(ii) Prices set by law or regulation, and except that the requirement shall not apply to negotiated subcontracts otherwise exempt from the requirement to accept the Cost Accounting Standards clause by reason of 331.30(b) of Title 4, Code of Federal Regulations

[CFR 331.30(b) or 1-3.1203(a)(2) or Title 41, Code of Federal Regulations (41 CFR 1-3.1203(a)(2)].

Note:

1. Lower-tier subcontractors shall be required to submit their Disclosure Statements to the Subcontractor. However, if a lower-tier subcontractor has previously submitted his Disclosure Statement to the SERI or to the cognizant Government Contracting Officer, he may satisfy that requirement by certifying to the Subcontractor the date of such Statement and the address of the SERI or of the Contracting Officer.

2. In any case where a lower-tier subcontractor determines that the Disclosure Statement Information is privileged and confidential and declines to provide it to the Subcontractor or a higher-tier subcontractor, the Subcontractor may authorize the direct submission of that lower-tier subcontractor's Disclosure Statement to the same offices to which the Subcontractor was required to make submission of his Disclosure Statement, or directly to the DoE. Such authorization shall in no way relieve the Subcontractor of liability as provided in paragraphs A.5, and 6. of this article. In view of the foregoing and since this subcontract may be subject to adjustment under this article by reason of any failure to comply with rules, regulations, and standards of the Cost Accounting Standards Board in connection with covered lower-tier subcontracts, it is expected that the Subcontractor may wish to include an article in each such lower-tier subcontract requiring the lower-tier subcontractor to appropriately indemnify the Subcontractor. However, the inclusion of such an article and the terms thereof are matters for negotiation and agreement between the Subcontractor and the lower-tier subcontractor, provided that they do not conflict with the duties of the Subcontractor under its subcontract with the SERI. It is also expected that any lower-tier subcontractor subject to such indemnification will generally require substantially similar indemnification to be submitted by its subcontractors.

D. The terms defined in Sec. 331.20 of Part 331 of Title 4. Code of Federal Regulations (4 CFR 331.20) shall have the same meanings herein. As there defined, "negotiated subcontract" means "any subcontract except a firm fixed-price subcontract made by a Contractor or Subcontractor after receiving offers from at least two firms not associated with each or such 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 in compliance with the solicitation from among those solicited is accepted".

CLAUSE 46 - 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 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 Subcontracts containing the Cost

Accounting Standards article:

1. For any change in cost accounting practices required to comply with a new Cost Accounting Standard in accordance with paragraphs A 3 and A 4 (a) of the article of this subcontract entitled "Cost Accounting Standards" within 60 days (or such other date as may be mutually agreed to) after award of an order requiring such change;

2. For any change to cost accounting practices proposed in accordance with paragraph A 4 (b) of the article of this subcontract entitled "Cost Accounting Standards" 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 article of this subcontract entitled "Cost Accounting Standards" 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 SERI within 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 and 3 above.

C. Agree to appropriate subcontract lower tier subcontract amendments to reflect adjustments established in accordance with paragraphs A 4 and A 5 of the article of this subcontract entitled "Cost Accounting Standards".

D. Include the substance of this article in all negotiated lower-tier subcontracts containing the article entitled "Cost Accounting Standards". In addition, include a provision in these lower-tier subcontracts which will require such lower-tier subcontractors, within thirty (30) days after receipt of award, to submit the following information to the Contracting Officer cognizant of the lower-tier subcontractor's facility:

1. Lower-tier Subcontractor's name and subcontract number;

2. Dollar amount and date of award;

3. Name of Subcontractor making the award; and

4. A statement as to whether the lower-tier subcontractor has made or proposes to make any changes to accounting practices that affect orders or subcontracts containing the Cost Accounting Standards article, 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.

E. In the event an adjustment is required to be made to any lower-tier subcontract hereunder, notify SERI in writing of such adjustment and agree to an adjustment in the price or estimated cost 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.

F. When the Cost Accounting Standards article and this article are included in lower-tier subcontract, the term "SERI" shall be suitably altered to identify the purchaser.

CLAUSE 47 - 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 labor surplus area concerns;

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

5. Include the Utilization of Concerns in Labor Surplus article 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 dollars (\$500,000) and which contains the utilization of concerns in labor surplus areas article provisions, which shall conform substantially to the language of this article, including this Paragraph C., and to notify the SERI of the name of such lower tier subcontractors.

CLAUSE 48 - SMALL BUSINESS LOWER TIER SUBCONTRACTING PROGRAM

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

A. The Subcontractor agrees to establish and conduct a Small Business Lower Tier Subcontracting Program which will enable small business concerns to be considered fairly as lower tier subcontractors and suppliers under this subcontract. In this connection, the Subcontractor shall:

1. Designate a liaison officer who will (i) maintain liaison with the Government on small business matters, (ii) supervise compliance with the utilization of small business concerns article, and (iii) administer the Subcontractor's "Small Business Lower Tier Subcontracting Program".

2. Provide adequate and timely consideration of the potentialities of small business concerns in all "make-or-buy" decisions.

3. Assure that small business 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 small business concerns. Where the Subcontractor's lists of potential small business lower tier subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to complete over a long period of time.

4. Maintain the records showing (i) whether each prospective lower tier subcontractor is a small business concern, (ii) procedures which have been adopted to comply with the policies set forth in this article, and (iii) with respect to the letting of any subcontract (including purchase orders) exceeding ten thousand dollars (\$10,000), information substantially as follows:

(a) Whether the award went to large or small business.

(b) Whether less than three or more than two small business concerns were solicited.

(c) The reason for nonsolicitation of small business if such was the case.

(d) The reason for small business failure to receive the award if such was the case when small business was solicited.

The records maintained in accordance with (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 small business liaison officer. Such quarterly summaries will be considered to be management records only and need not be submitted routinely to the Government; however, records maintained pursuant to this article will be kept available for review.

5. Notify the SERI before soliciting bids or quotations on any sub-subcontract (including purchase orders) in excess of ten thousand dollars (\$10,000) if (i) no small business concern is to be solicited; and (ii) SERI's consent to the lower tier subcontract (or ratification) is required by a procurement article in this subcontract. Such notice will state the Subcontractor's reasons for nonsolicitation of small business concerns, and will be given as early in procurement cycle as possible so that the SERI may give SBA timely notice to permit SBA a reasonable period to suggest potentially qualified small business concerns through the SERI. In no case will the procurement action be held up when to do so would, in the Subcontractor's judgment, delay performance under the subcontract.

6. Include the utilization of small business concerns clause in lower tier subcontracts which offer substantial small business subcontracting opportunities.

7. Cooperate with the SERI in any studies and surveys of the Subcontractor's lower tier subcontracting procedures and practices that the SERI may from time to time conduct.

8. Submit such information on lower tier subcontracting to small business concerns as is called for by the SERI.

B. A "Small Business Concern" is a concern that meets the pertinent criteria established by the Small Business Administration and set forth in 1-1.701 of the Federal Procurement Regulations.

C. The Subcontractor agrees that, in the event it fails to comply with its contractual obligations concerning the Small Business Lower Tier Subcontracting Program, this subcontracting may be terminated, in whole or in part, for default.

D. The Subcontractor further agrees to insert, in any lower tier subcontract hereunder which may exceed five hundred thousand dollars (\$500,000) and which contains the Utilization of Small Business Concerns article, provisions which shall conform substantially to the language of this article, including this Paragraph D., and to notify the SERI of the names of such lower tier subcontractors.

CLAUSE 49 - MINORITY BUSINESS ENTERPRISES LOWER TIER SUBCONTRACTING PROGRAM

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

A. The Subcontractor agrees to establish and conduct a program which will enable minority business enterprises (as defined in the article entitled "Utilization of Minority Business Enterprises") to be considered fairly as lower tier subcontractors and suppliers under this subcontract. In this connection, Subcontractor shall:

1. Designate a liaison officer who will administer Subcontractor's minority business enterprises program.

2. Provide adequate and timely consideration of the potentialities of known minority business enterprises in all "make-or-buy" decisions.

3. Assure that known minority business enterprises will have an equitable opportunity to compete for lower tier subcontracts, particularly by arranging solicitations, time for preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation of minority business enterprises.

4. Maintain records showing (a) procedures which have been adopted to comply with the policies set forth in this article, including the establishment of a source list of minority business enterprises, (b) awards to minority business enterprises on the source list, and (c) specific efforts to identify and award lower tier subcontracts to minority business enterprises.

5. Include the Utilization of Minority Business Enterprises article in lower tier subcontracts which offer substantial minority business enterprises subcontracting opportunities.

6. Cooperate with the SERI and the DoE in any studies and surveys of Subcontractor's minority business enterprises procedures and practices that the SERI or the DoE may from time to time conduct.

7. Submit periodic reports of lower tier subcontracting to known minority business enterprises with respect to the records referred to in subparagraph 4., above, in such form and manner and at such time (not more often than quarterly as the SERI or the DoE may prescribe).

B. Subcontractor further agrees to insert, in any lower tier subcontract hereunder which may exceed \$500,000. provisions which shall conform substantially to the language of this article, including this paragraph B., and to notify SERI of the names of such lower tier subcontractors.

CLAUSE 50 - 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 51 - 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 52 - 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) Procured, contracted for, or otherwise obtained for the agency's account; or

(ii) Furnished to or for the account of any foreign nation with out 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 requirements 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 53 - ORAL OR WRITTEN MODIFICATIONS

No oral or written statement of any person other than the Contract Administrator whomsoever shall, in any manner or degree, modify or otherwise affect the terms of this Subcontract. The Contract 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 Contract Administrator. In the event the Subcontractor effects any such change at the direction of any person other than the Contract Administrator, the change will be considered to have been made without authority and no adjustment will be made in the Subcontract price to cover any increase in costs incurred as a result thereof.

CLAUSE 54 - 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 be 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 55 - PRICING OF ADJUSTMENT

When costs are a factor in any determination of a contract price adjustment pursuant to the "Changes" cause or any other provision of this Subcontract, such costs shall be in accordance with the contract cost principles and procedures in Part of 1-15 of the Federal Procurement Regulations (41 CFR 1-15) as supplemental or modified by ERDA-PR Part 9-15 (41 CFR 9-15) in effect on the date of this Subcontract.

CLAUSE 56 - DISPOSITION OF MATERIAL (FIXED PRICE)

Upon termination or completion of all work under this Subcontract, the Subcontractor shall prepare for shipment, deliver f.o.b. destination, or dispose of all materials received from the SERI and all residual materials produced in connection with the performance of this Subcontract as may be directed by the SERI or as specified in other provisions of this Subcontract. All materials produced or required to be delivered under this Subcontract become and remain the property of the Government or SERI.

CLAUSE 57 - GOVERNMENT PROPERTY (FIXED PRICE)

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 for the intended use of such property (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 (except for such property furnished "as is") 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 thereby, and shall equitably adjust the delivery or performance dates or the Subcontract price, or both, and any other contractual provision affected by any such delay, in

accordance with the procedures provided for in the clause of this Subcontract entitled "Changes." Except for Government-furnished property furnished "as is", in the event the 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 expense or otherwise dispose of the property, or (2) effect repair or modification, in accordance with the procedures provided for in the clause of this Subcontract entitled "Changes." The foregoing provisions for adjustment are exclusive and the SERI or Government shall not be liable to suit for breach of contract 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 provided or to be provided by the SERI under this Subcontract, or (ii) substitute other Government-owned property for property to be provided by the SERI, or to be acquired by the Subcontractor for the SERI 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 subparagraph 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. In order to define the obligations of the parties under this clause, title to each item of facilities, special test equipment, and special tooling (other than that subject to a "Special Tooling" clause) acquired by the Subcontractor for the SERI pursuant to this Subcontract shall pass to and vest in the government when its use in the performance of this Subcontract commences, or upon payment therefor by the SERI, whichever is earlier, whether or not title previously vested. All Government-furnished property, together with all property acquired by the Subcontractor title to which vests in the Government under this paragraph, is subject to the provisions of this clause and is hereinafter collectively referred to as "Government property." Title to 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 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 property until relieved of responsibility therefor in accordance with written instructions of the SERI.

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 until disposed of by the Subcontractor in accordance with this clause. In the event that any damage occurs to Government property the risk of which has been assumed by the Government under this Subcontract, the SERI shall replace such items or the Subcontractor shall make such repair of the property as the Government directs: Provided, however, that if the Subcontractor cannot effect such repair within the time required, the Subcontractor shall dispose of such property in the manner directed by the SERI. The Subcontract price includes no compensation to the Subcontractor for the performance of any repair or replacement for which the SERI is responsible, and an equitable adjustment will be made in any contractual provisions affected by such repair or replacement of Government property made at the direction of the SERI, in accordance with the procedures provided for in the "Changes" clause of this Subcontract. Any repair or replacement for which the Subcontractor is responsible under the provisions of this Subcontract shall be accomplished by the Subcontractor at his own expense.

G. 1. Except as provided in 2, below, the Subcontractor shall not be liable for loss or destruction of or damage to the Government property provided under this Subcontract:

(i) Caused by any peril while the property is in transit off the Subcontractor's premises; or

(ii) Caused by any of the following perils while the property is on the Subcontractors or lower tier Subcontractor's premises, or on any other premises where such property may properly be located, or by removal therefrom because of any of the following perils:

(a) Fire, lightning, windstorm, cyclone, tornado, hail; explosion; riot, riot attending a strike, civil commotion; vandalism and malicious mischief; sabotage; aircraft or objects falling therefrom; vehicles running on land or tracks, excluding vehicles owned or operated by the Subcontractor or any agent or employee of the Subcontractor; smoke; sprinkler leakage; earthquake or volcanic eruption; flood, meaning thereby rising of a body of water; nuclear reaction, nuclear radiation or radioactive contamination; hostile or warlike action, including action in hindering, combating, or defending against an actual, impending, or expected attack by any government or sovereign power (de jure or de facto), or by any authority using military, naval, or air forces; or by an agent of any such government, power, authority, or forces; or

(b) Other peril, of a type not listed above, if such

other peril is customarily covered by insurance (or by a reserve for self-insurance) in accordance with the normal practice of the Subcontractor, or the prevailing practice in the industry in which the Subcontractor is engaged with respect to similar property in the same general locale.

The perils as set forth (i) and (ii), above, are hereinafter called "excepted perils."

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 or 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 Subcontractor, 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 lower tier 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. Notwithstanding 1, above, the Subcontractor shall be responsible for any loss or damage (a) to the extent specifically provided in the clause or clauses of this Subcontract designated in the schedule, or (b) which results from:

(i) Willful misconduct or lack of good faith of any of the Subcontractor's managerial personnel; or

(ii) A failure on the part of the Subcontractor, due to willful misconduct or lack of good faith of the Subcontractor's managerial personnel, (aa) to maintain and administer the program for maintenance, repair, protection, and preservation of the Government property as required by paragraph F hereof, or (bb) to establish, maintain, and administer a system for control of Government property as required by paragraph D of this clause.

Any failure of the Subcontractor to act, as provided in this (ii), shall be conclusively presumed to be a failure resulting from willful misconduct, or lack of good faith on the part of one of the Subcontractor's managerial personnel if the Subcontractor is notified by the SERI by registered or certified mail addressed to one of the Subcontractor's managerial personnel, of the Government's or 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 of 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.

The term "Subcontractor's managerial personnel" as used herein means the Subcontractor's directors, officers, and any of his managers, superintendents, or other equivalent representatives who have supervision or direction of:

(a) All or substantially all of the Subcontractor's business;

(b) All or substantially all of the Subcontractor's operation at any one plant or separate location at which the Subcontract is being performed; or

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

3. The Subcontractor represents that he not including in the price hereunder, and agrees that he will not hereafter include any price to the Government or the SERI any charge or reserve for insurance (including self-insurance funds or reserve) covering loss or destruction of or damage to the Government property caused by any excepted peril.

4. Upon the happening of loss or destruction of or damage to any Government property caused by an excepted peril, 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 organization so designated (unless the SERI has directed 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 or interest in such commingled property.

The Subcontractor shall be entitled to an equitable adjustment in the Subcontract price for the expenditures made by him in performing his obligations under this subparagraph 4 (including charges made to the Subcontractor by the loss and salvage organization, except any of such charges the payment of which the Government or the SERI has, at its option, assumed directly), in accordance with the procedures provided for in the "Changes" clause of this Subcontract.

5. With the approval of the SERI after loss or destruction of or damage to Government property, and subject to such conditions and limitations as may be imposed by the SERI, the Subcontractor may, in order to minimize the loss to the Government and the SERI or in order to permit resumption of business or the like, sell for the account of the Government or the SERI any item of Government property which has been damaged beyond practicable repair, or which is so commingled or combined with property of others, including the Subcontractor, that separation is impracticable.

6. Except to the extent of any loss or destruction of or damage to Government property for which the Subcontractor is relieved of liability under the foregoing provisions of this clause, and except for reasonable wear and tear or depreciation, or the utilization of the Government property in accordance with the provisions of this subcontract, the Subcontractor assumes the risk of, and shall be responsible for, any loss or destruction of or damage to the Government property, and such property (other than that which is permitted to be sold) shall be returned to the SERI in as good condition as when received by the Subcontractor in connection with this Subcontract, or as repaired under paragraph F above.

7. In the event the Subcontractor is reimbursed or compensated for any loss or destruction of or damage to the Government property, caused by an excepted peril, he shall equitably reimburse the SERI. The Subcontractor shall do nothing to prejudice the Government's or the SERI's rights to recover against third parties for any such loss, destruction, or damage, and, upon the request of the SERI, shall at the SERI'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 SERI) in obtaining recovery. In addition, where a lower tier subcontractor has not been relieved from liability for any loss or destruction of or damage to the 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 or the SERI.

H. The Government and SERI and any persons designated by them, shall at all reasonable times have access to the premises wherein any 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, in a form acceptable to the SERI, inventory schedules covering all items of Government property not consumed in the performance of this Subcontract (including any resulting scrap) or not theretofore delivered to the SERI, and shall prepare for shipment, delivery f.o.b. origin, or dispose of the Government property, as may be directed or authorized by the SERI. The net proceeds of any such disposal shall be credited to the Subcontract price or shall be paid in such other manner as the SERI may direct.

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

1. May abandon any Government property in place, and thereupon all obligations of the Government and SERI regarding such abandoned property shall cease; and

2. Has no obligation to the Subcontractor with regard to restoration or rehabilitation of the Subcontractor's premises, neither in case of abandonment (paragraph J 1, above), disposition on completion of need or of the Subcontract (paragraph I, above), nor otherwise, except for restoration or rehabilitation costs which are properly included in an equitable adjustment under paragraph B., above.

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

CLAUSE 58 - GOVERNMENT-FURNISHED PROPERTY (SHORT FORM)

A. The SERI shall deliver to the Subcontractor, for use only in connection with this Subcontract, the property described in the schedule or specifications (hereinafter referred to as "Government-furnished property"), at the times and locations stated therein. If the Government-furnished property, suitable for its intended use, is not so delivered to the Subcontractor, the SERI shall upon timely written request made by the Subcontractor, and if the facts warrant such action, equitably adjust any affected provision of this Subcontract pursuant to the procedures of the "Change" clause hereof.

B. Title to Government-furnished property shall remain in the Government. The Subcontractor shall maintain adequate property control records of Government-furnished property in accordance with sound industrial practice.

C. Unless otherwise provided in this Subcontract, the Subcontractor, upon delivery to him of any Government-furnished property, assumes the risk of, and shall be responsible for, any loss thereof or damage thereto except for reasonable wear and tear, and except to the extent that such property is consumed in the performance of this Subcontract.

D. The Subcontractor shall, upon completion of this Subcontract, prepare for shipment, deliver f.o.b. origin, or dispose of all Government-furnished property not consumed in the performance of this Subcontract or not theretofore delivered to the SERI, as may be directed or authorized by the SERI. The net proceeds of any such disposal shall be credited to the contract price or paid in such other manner as the SERI may direct.

CLAUSE 59 - GOVERNMENT PROPERTY (FIXED-PRICE, NONPROFIT)

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 for the intended use of such property (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 (except for such property furnished "as is") 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 by the Subcontractor then by, and shall equitably adjust the delivery or performance dates or the Subcontract price, or both, and any other contractual provision affected by any such delay. Except for Government-furnished property furnished "as is," in the event that Government-furnished property is received by the Subcontractor in a condition not suitable for its 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 such property, or (2) effect repairs or modifications. Upon completion of (1) or (2), above, the SERI upon timely written

request of the Subcontractor shall equitably adjust the delivery or performance dates or the Subcontract price, or both, and any other contractual provision affected by the return, disposition, repair, or modification. The foregoing provisions for adjustment are exclusive and the Government or the SERI shall not be liable to suit for breach of contract 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 (i) may 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 SERI under this Subcontract. The Subcontractor shall promptly take such action as the SERI may direct with respect to the removal, shipping, and disposal 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 Subcontract 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 in the "Changes" clause of this subcontract.

C. 1. Title to all property furnished by the SERI shall remain in the Government.

2. Notwithstanding subparagraph C 1 above, title to equipment purchased with funds available for research, having an acquisition cost of less than \$1,000, shall vest in the Subcontractor upon acquisition or as soon thereafter as feasible, provided that the Subcontractor shall have obtained approval of the SERI prior to acquisition of such property.

3. Title to equipment having an acquisition cost of \$1,000 or more, purchased with funds available for the conduct of research, shall vest as set forth in the Subcontract.

4. If title to equipment is vested pursuant to C 2 or C 3 above, the Subcontractor agrees that no charge will be made to the SERI for any depreciation, amortization, or use charge with respect to such equipment under any existing or future SERI subcontract or lower tier subcontract thereunder.

5. The Subcontractor shall furnish the SERI a list of all equipment acquired under subparagraph C 2 above within ten (10) days following the end of the calendar quarter during which such equipment was received.

6. All Government furnished property, together with all property acquired by the Subcontractor, title to which vests in the Government under this clause, is hereinafter collectively referred to as "Government property."

7. Title to 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 affixa-

tion to any realty.

8. In order to define the obligations of the parties under this clause, where title to each item of facilities, special test equipment, and special tooling (other than that subject to a "Special Tooling" clause) acquired by the Subcontractor is to vest in the Government, title shall pass to and vest in the Government when its use in the performance of this Subcontract commences, or upon payment therefor by the SERI, whichever is earlier, whether or not title previously vested.

D. The Subcontractor shall be 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 property until relieved of responsibility therefor in accordance with written instructions of the SERI.

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 business practice, a program for the utilization, maintenance, repair, protection, and preservation of Government property, until disposed of by the Subcontractor in accordance with this clause. In the event that any damage occurs to Government property the risk of which has been assumed by the SERI under this Subcontract, the SERI shall replace such items or the Subcontractor shall make such repair of the property as the SERI directs: Provided, however, that if the Subcontractor cannot effect such repair within the time required, the Subcontractor may reject such property. The Subcontract price includes no compensation to the Subcontractor for the performance of any repair or replacement for which the SERI is responsible, and an equitable adjustment will be made in any contractual provision affected by the repair or replacement of Government property made at the direction of the SERI. Any repair or replacement for which the Subcontractor is responsible under the provision of this Subcontract shall be accomplished by the Subcontractor at his own expense.

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 liable for any loss or damage to Government property provided under this subcontract upon its delivery to him or passage of title to the Government as provided in paragraph C, above (including expenses incidental thereto):

(i) Which results from willful misconduct or lack of good faith on the part of any of the Subcontractor's directors or officers, or on the part of his managers, superintendents, or other equivalent representatives who have supervision or direction of all or substantially all of the Subcontractor's business, or all or substantially all of the Subcontractor's operations at any one plant, laboratory, or separate location in which this subcontract is being performed;

(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 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, above, 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 risk expressly required to be insured under some other provision of this Subcontract, or of the Schedules or task orders thereunder, 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 above exceptions shall be applicable in any case, the Subcontractor's liability under any one exception shall not be limited by any other exception.

2. The Subcontractor represents that he is not including in the price hereunder, and agrees that he will not hereafter include in any price to the Government, any charge or reserve for insurance (including self-insurance funds or reserves) covering loss or destruction of or damage to the Government property, except to the extent that the risk of loss is imposed on the Subcontractor under 1 (iii), above, or insurance has been required under 1 (iv), above.

3. Upon the happening of loss or destruction of or damage to any 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 organization so designated (unless the SERI has directed that no such organization be employed) shall take all reasonable steps to protect the Government property from further damages, 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 or interest in such commingled property.

The Subcontractor shall be entitled to an equitable adjustment in the Subcontract price for the expenditures made by him in performing his obligations under this subparagraph 3 (including charges made to the Subcontractor by the loss and salvage organization, except any of such charges the payment of which the SERI has, at its option, assumed directly).

4. With the approval of the SERI after loss or destruction of or damage to Government property, and subject to such conditions and limitations as may be imposed by the SERI, the Subcontractor may, in order to minimize the loss to the Government and the SERI or in order to permit resumption of business or the like, sell for the account of the Government any item of Government property which has been damaged beyond practicable repair, or which is so commingled or combined with property of others, including the Subcontractor, that separation is impracticable.

5. Except to the extent of any loss or destruction of or damage to Government property for which the Subcontractor is relieved of liability under the foregoing provisions of this clause, and except for reasonable wear and tear or depreciation, or the utilization of the Government property in accordance with the provisions of this subcontract, the Subcontractor assumes the risk of, and shall be responsible for, any loss or destruction of or damage to the Government property, and such property (other than that which is permitted to be sold) shall be returned to the SERI in as good condition as when received by the Subcontractor in connection with this subcontract, or as repaired under paragraph F, above.

6. In the event the Subcontractor is reimbursed or compensated for any loss or destruction of or damage to the Government property, he shall equitably reimburse the SERI. The Subcontractor shall do nothing to prejudice the Government's or the SERI's rights to recover against third parties for any such loss, destruction, or damage and, upon the request of the SERI, shall at the SERI's expense, furnish to the SERI all reasonable assistance and cooperation (including assistance in the prosecution of suit and the execution of instruments of assignment in favor of the SERI) in obtaining recovery.

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

I. Upon completion or expiration of this subcontract, any Government property which has not been consumed in the performance of this subcontract, or which has not been disposed of as provided for elsewhere in this

clause, or for which the Subcontractor has not otherwise been relieved of responsibility, shall be disposed of in the same manner, and subject to the same procedures, as is provided in the clause of this subcontract entitled "Termination for the Convenience of the SERI" with respect to termination inventory. 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 costs of the work covered by this subcontract, or shall be paid in such other manner as the SERI may direct. Pending final disposition of such property, the Subcontractor agrees to take such action as may be necessary, or as the SERI may direct, for the protection and preservation thereof.

J. If the Subcontractor determines any Government property to be in excess of his needs under this subcontract, such Government property shall be disposed of in the same manner as provided by paragraph I, above, except that the SERI may abandon any Government property in place and thereupon all obligations of the Government and the SERI regarding such abandoned property shall cease. The Government and the SERI has no obligation to the Subcontractor with regard to restoration or rehabilitation of the Subcontractor's premises, neither in case of abandonment, disposition pursuant to paragraph I, above, nor otherwise, except for restoration or rehabilitation costs which are properly included in an equitable adjustment under paragraph B, above.

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

CLAUSE 60 - DEFAULT (FIXED PRICE)

A. The SERI may, subject to the provisions of paragraph C of this clause, by written notice of default to the Subcontractor, terminate the whole or any part of this subcontract in any one of the following circumstances:

1. If the Subcontractor fails to perform the work called for by this Subcontract within the time(s) specified herein or any extension thereof; or

2. If the Subcontractor fails to perform any of the other provisions of this subcontract, or so fails to prosecute the work as to endanger performance of this subcontract in accordance with its terms, and in either of these two circumstances does not cure such failure within a period of 10 days (or such longer period as the SERI may authorize in writing) after receipt of notice from the SERI specifying such failure.

B. In the event the SERI terminates this Subcontract in whole or in part as provided in paragraph A of this clause, the SERI may procure, upon such terms and in such manner as the SERI may deem appropriate, work similar to the work so terminated and the Subcontractor shall be liable to the SERI for any excess costs for such similar work: Provided, That the Subcontractor shall continue the performance of this subcontract to the extent not terminated under the provisions of this clause.

C. Except with respect to defaults of lower tier subcontractors, the Subcontractor shall not be liable for any excess costs if the failure to perform the subcontract 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 default of a lower tier subcontractor, and if such default arises out of causes beyond the control of both the Subcontractor and the lower tier Subcontractor, and without the fault or negligence of either of them, the Subcontractor shall not be liable for any excess costs for failure to perform unless the supplies or services to be furnished by the lower tier subcontractor were obtainable from other sources in sufficient time to permit the Subcontractor to meet the required delivery schedule or other performance requirements.

D. If this subcontract is terminated as provided in paragraph A of this clause, the SERI, in addition to any other rights provided in this clause, may require the Subcontractor to transfer title and deliver to the SERI, in the manner and to the extent directed by the SERI, any of the completed or partially completed work not theretofore delivered to, and accepted by, the SERI and any other property, including contract rights, specifically produced or specifically acquired for the performance of such part of this subcontract as has been terminated; and the Subcontractor shall, upon the direction of the SERI, protect and preserve property in the possession of the Subcontractor in which the SERI has an interest. The SERI shall pay to the Subcontractor the subcontract price, if separately stated, for completed work accepted by the SERI and the amount agreed upon by the Subcontractor and the SERI for (1) completed work for which no separate price is stated, (2) partially completed work, (3) other property described above which is accepted by the SERI, and (4) the protection and preservation of property. Failure to agree shall be a dispute concerning a question of fact within the meaning of the clause of this subcontract entitled "Disputes." The SERI may withhold from the Subcontractor amounts otherwise due to the Subcontractor for such completed supplies or manufacturing materials such sum as the SERI determines to be necessary to protect the SERI against loss because of outstanding liens or claims or claims of former lien holders.

E. If, after notice of termination of this subcontract under the provisions of this clause, it is determined for any reason that the Subcontractor was not in default under the provisions of this clause, or that the default was excusable under the provisions of this clause, the rights and obligations of the parties shall, if the subcontract contains a clause providing for termination for convenience of the SERI, be the same as if the notice of termination had been issued pursuant to such clause. If, after notice of termination of this subcontract under the provisions of this clause, it is determined for any reason that the Subcontractor was not in default under the provisions of this clause, and if this subcontract does not contain a clause providing for termination for convenience of the SERI, the subcontract shall be equitably adjusted to compensate for such termination and the subcontract modified accordingly; failure to agree to any such adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this subcontract entitled "Dis-

putes."

F. The right and remedies of the SERI provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this subcontract.

G. As used in paragraph C of this clause, the terms "lower tier subcontractor" and "lower tier subcontractors" mean subcontractor(s) at any tier.

CLAUSE 61 - TERMINATION (FIXED PRICE)

A. The performance of work under this subcontract may be terminated, in whole or from time to time in part, by the SERI in accordance with this clause. 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 date upon which such termination becomes effective.

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 lower tier subcontracts for materials, services, or facilities except as may be necessary for completion of such portions of the work under the subcontract as may not be terminated;

3. Terminate all orders and lower tier subcontracts to the extent that they relate to the performance of any work terminated by the Notice of Termination;

4. Assign to the SERI, in the manner, and to the extent directed by the SERI, all of the right, title, and interest of his Subcontractor under the orders or lower tier subcontracts so terminated:

5. Settle all outstanding liabilities and all claims arising out of such termination of orders and lower tier subcontracts subject to the approval or ratification of the SERI to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;

6. Transfer title and deliver to the SERI in the manner, to the extent, and at the times directed by the SERI (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and (ii) 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;

7. Use his best efforts to sell, in the manner, to the extent, at the time, 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 (i) shall not be required to extend credit to any purchaser, and (ii) 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 this subcontract or paid in such other 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 protection and preservation of the property related to this subcontract which is in the possession of the Subcontractor and in which the SERI or the Government has or may acquire an interest.

C. After receipt of a Notice of Termination, the Subcontractor shall submit to the SERI his termination claim; in the form and with the certification prescribed by the SERI. Such claim shall be submitted promptly, but not later than six (6) months from the effective date of termination. Upon failure of the subcontractor to submit his termination claim within the time allowed, the SERI may determine on the basis of information available to the SERI, the amount, if any, due to the Subcontractor with respect to the termination and such determination shall be final. After the SERI has made a determination under this paragraph, he shall pay the Subcontractor the amount so determined.

D. Subject to the provisions of paragraph C 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 total or partial termination of work pursuant to this clause, which amount or amounts may include a reasonable allowance for profit on work done and the SERI shall pay the agreed amount or amounts: Provided, that such agreed amount or amounts exclusive of settlement costs, shall not exceed the total subcontract price as reduced by the amount of payments otherwise made and as further reduced by the subcontract price of work not terminated. Nothing in paragraph E below prescribing the amount to be paid to the subcontract in the event of the failure of the Subcontractor and the SERI to agree upon the whole amount to be paid to the subcontractor by reason of the termination of work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts which may be agreed upon to be paid to the Subcontractor pursuant to this paragraph D.

E. In the event of the failure of the Subcontractor and the SERI to agree as provided in paragraph D upon the whole amount to be paid to the Subcontractor by reason of the termination of work pursuant to this clause, the SERI, but without duplication of any amounts agreed upon in accordance with paragraph D, shall pay to the Subcontractor the following amounts;

1. For completed supplies accepted by the SERI (or sold or acquired as provided in paragraph B 7 above) and not theretofore paid for, forthwith a sum equivalent to the aggregate price for such supplies computed in accordance with the price or prices specified in the subcontract, appropriately adjusted for any saving of freight or other charges;

2. In respect of the work terminated as permitted by this clause, the total (without duplication of any items) of-

(i) The cost of such work, including initial costs and preparatory expenses allocable thereto, exclusive of any costs attributable to supplies paid or to be paid for under 1 above; and

(ii) The cost of settling and paying claims arising out of

the termination of work under lower tiers subcontracts or orders as provided in paragraph B 5 above, exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the lower tier subcontractor prior to the effective date of the Notice of Termination of work under this subcontract, which amount shall be included in the cost on account of which payment is made under (i) above; and

(iii) A sum, as profit on (i), above, determined by the SERI pursuant to 1-8.303 of the Federal Procurement Regulations (41 CFR 1-8.303), in effect as of the date of execution of this subcontract, to be fair and reasonable: Provided, however, that if it appears that the Subcontractor would have sustained a loss on the entire subcontract had it been completed, no profit shall be included or allowed under this subdivision (iii) and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss;

3. The reasonable costs of settlement, including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the subcontract and for the termination and settlement of lower tier subcontracts thereunder, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of the property allocable to this subcontract.

The total sum to be paid to the Subcontractor under 1 and 2 above shall not exceed the total subcontract price as reduced by the amount of payments otherwise made and as further reduced by the subcontract price of work not terminated. Except for normal spoilage and except to the extent that the SERI or the Government shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the subcontractor under 1 and 2 (i) above the fair value as determined by the SERI of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the SERI or to a purchaser pursuant to paragraph B (7).

F. The obligation of the SERI to make any payments under this clause shall be subject to deductions with respect to (1) all unliquidated advances or other payments on account theretofore made to the subcontractor applicable to the terminated portion of this subcontract, (2) any claim which the SERI 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 retained by the Subcontractor or sold, and not otherwise recovered by or credited to the SERI.

G. If the termination hereunder be partial, prior to the settlement of the terminated portion of this subcontract, the subcontractor may file with the SERI a request in writing that an equitable adjustment be made in the price or prices specified in the subcontract for the work in connection with the continued portion not terminated by the Notice of Termination, and the appropriate equitable adjustment shall be made in such price or prices.

H. The SERI may, from time to time, under such terms and conditions as he may prescribe, make partial payments and payments on account against costs incurred by the Subcontractor with respect to 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 agreed upon or 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 Public Law 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: 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 of termination inventory until 10 days after the date of such retention or disposition, or such later date as determined by the SERI by reason of the circumstances.

I. For the purpose of paragraphs C and E above, the amounts of the payments to be made by the SERI to the Subcontractor shall be determined in conformity with the policies and principles set forth in Part 1-8 of the Federal Procurement Regulations (41 CFR 1-8), in effect at the date of this subcontract. Unless otherwise provided for in this subcontract, or by applicable statute, the Subcontractor, for a period of three years after final settlement under the subcontract shall make available to the SERI and the Government at all reasonable times at the office of the Subcontractor all his books, records, documents, or other evidence bearing on the costs and expenses of the Subcontractor under the subcontract and in respect of the termination of work hereunder or, to the extent approved by the Government, photographs, microphotographs, or other authentic reproductions thereof.

CLAUSE 62 - FEDERAL, STATE, AND LOCAL TAXES (FIXED PRICE)

A. Except as may be otherwise provided in this subcontract, the subcontract price includes all applicable Federal, State, and local taxes and duties.

B. Nevertheless, with respect to any Federal excise tax or duty on the transactions or property covered by this subcontract, if a statute, court decision, written ruling, or regulation takes effect after the subcontract date, and-

1. Results in the Subcontractor being required to pay or bear the burden of any such Federal excise tax or duty or increase in the rate thereof which would not otherwise have been payable on such transactions or property, the subcontract price shall be increased by the amount of such tax or duty or rate increase: Provided, that the Subcontractor if requested by the SERI warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the subcontract price as a contingency reserve or otherwise; or

2. Results in the Subcontractor not being required to pay or bear the burden of, or in his obtaining a refund or drawback of, any such Federal excise tax or duty which would otherwise have been payable on such transactions or property or which was the basis of an increase in the subcontract price, the contract price shall be

decreased by the amount of the relief, refund, or drawback, or that amount shall be paid to the SERI, as directed by the SERI. The subcontract price shall be similarly decreased if the Subcontractor, through his fault or negligence or his failure to follow instructions of the SERI, is required to pay or bear the burden of, or does not obtain a refund or drawback of, any such Federal excise tax or duty.

C. No adjustment pursuant to paragraph B above will be made under this subcontract unless the aggregate amount thereof is or may reasonably be expected to be over \$100.

D. As used in paragraph B above, the term "subcontract date" means the date set for the bid opening, or if this is a negotiated subcontract, the date of this subcontract. As to additional supplies or services procured by modification to this subcontract, the term "subcontract date" means the date of such modification.

E. Unless there does not exist any reasonable basis to sustain an exemption, the SERI upon request of the Subcontractor, without further liability, agrees, except as otherwise provided in this subcontract, to furnish evidence appropriate to establish exemption from any tax which the Subcontractor warrants in writing was excluded from the subcontract price. In addition, the SERI may furnish evidence to establish exemption from any tax that may, pursuant to this clause, give rise to either an increase or decrease in the subcontract price. Except as otherwise provided in this subcontract, evidence appropriate to establish exemption from duties will be furnished only at the discretion of the SERI.

F. The Subcontractor shall promptly notify the SERI of matters which will result in either an increase or decrease in the subcontract price, and shall take action with respect thereto as directed by the SERI.

CLAUSE 63 - CHANGES (FIXED PRICE)

The SERI 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, or specifications; (ii) method of shipment or packing; and (iii) place of inspection, delivery, or acceptance. If any such change causes an increase or decrease in the cost of, or the time required for performance of, this subcontract, or otherwise affects any other provisions of this subcontract, whether changed or not changed by any such order, an equitable adjustment shall be made (i) in the subcontract price or time of performance, or both, and (ii) in such other provisions 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, if he decides that the facts justify such action, may receive and 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, nothing in this clause shall excuse the Subcontractor from proceeding with the subcontract as changed.

CLAUSE 64 - 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 65 - 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 66 - ALLOWABLE COSTS AND PAYMENT (COST SHARING)

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 1-15.3 of the Federal Procurement Regulations (41 CFR 1-15.3) [Subpart 1-15.2 of the Federal Procurement Regulations 941 CFR 1-15.2), if this subcontract is with a concern other than an educational or nonprofit institution as supplemented or modified by ERDA-PR 9-15 (41 CFR 9-15), as in effect on the date of this Subcontract; and

(ii) The terms of this Subcontract; and

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 store 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 amount equal to 80 percent of the SERI's share 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 he 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 patents and the provisions of F, below), the SERI shall promptly pay 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 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, rebateds, credits, or other amounts (including any interest hereon) accruing to or received 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 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 of 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 67 - LIMITATION OF COST (COST SHARING)

A. It is estimated that the cost to the SERI for the performance of this subcontract (exclusive of any fee) will not exceed the estimated cost to the SERI 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 to the SERI plus the share of the cost of performance agreed to be borne by the subcontractor, as set forth in the Schedule. If, at any time, the Subcontractor has reason to believe that the costs which he expects to be incurred 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 total cost the SERI and to the Subcontractor then set forth in the Schedule, or if, at any time, the Subcontractor has reason to believe that the total cost the performance of this subcontract (exclusive of any fee) will be greater or substantially less than the then estimated total cost thereof, the Subcontractor shall notify the Subcontract Administrator in writing to that effect, giving his 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 to the SERI 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 total cost set forth in the Schedule unless and until the SERI shall have notified the Subcontractor in writing that such estimated total cost has been increased and shall have specified in such notice a revised estimated total cost which shall thereupon constitute the estimated total cost of performance of this subcontract. The increase in such estimated total cost shall be allocated in accordance with the formula set forth in the Schedule governing such increases. No notice, communication, or representation in any other form or from any person other than the SERI shall affect the estimated cost to the SERI 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 to the SERI 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 total cost set forth in the Schedule has been increased, any costs incurred by the Subcontractor in excess of the estimated total cost prior to such increase shall be allowable to the same extent and in the same percentage 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 expenses.

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 to the SERI set forth in the Schedule in the absence of a statement in the change order, or other contract modification, increasing the estimated cost.

D. In the event 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 68 - NEGOTIATED OVERHEAD RATES

A. Notwithstanding the provisions of the clause of this 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 applicable cost principles referenced in the allowable cost, fixed fee, and payment clause 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 Contracting Officer within the meaning of the "Disputes" clause of this subcontract.

APPENDIX C

INDEX

<u>CLAUSE</u>	<u>TITLE</u>	<u>PAGE</u>
1	PATENT RIGHTS (LONG FORM)	1
2	PATENT INDEMNITY	9
3	AUTHORIZATION AND CONSENT	10
4	NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT	10
5	ADDITIONAL TECHNICAL DATA REQUIREMENTS	10
6	RIGHTS IN TECHNICAL DATA (LONG FORM) .	11
7	REPORTING OF ROYALTIES	13
8	PATENT RIGHTS (SHORT FORM)	14
9	RIGHTS IN TECHNICAL DATA (SHORT FORM)	16

APPENDIX C

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 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, the 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 file 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, nonexclusive, 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 of 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 or 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 nonprofit 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 or the 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.

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-able 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 - PATENT INDEMNITY

The Subcontractor shall indemnify the SERI and the Government and their officers, agents, and employees against liability, including costs, for infringement of U.S. Letters Patent (except U.S. Letters Patent issued upon an application which is not or may hereafter be kept secret or otherwise withheld from issue by order of the Government) resulting from the Subcontractor's: (a) Furnishing or supplying standard parts or components which have been sold or offered for sale to the public on the commercial open market; or (b) utilizing its normal practices or methods which normally are or have been used in providing goods and services in

the commercial open market, in the performance of the subcontract; or (c) utilizing any parts, components, practices, or methods to the extent to which the Subcontractor has secured indemnification from liability. The foregoing indemnity shall not apply unless the Subcontractor shall have been informed as soon as practicable by the SERI or the Government or the suite or action alleging such infringement, and shall have been given such opportunity as is afforded by applicable laws, rules, or regulations to participate in the defense thereof; and further, such indemnity shall not apply to a claimed infringement which is settled without the consent of the Subcontractor, unless required by final decree of a court of competent jurisdiction or to an infringement resulting from addition to or change in such supplies or components furnished or construction work performed which addition or change was made subsequent to delivery or performance by the Contractor.

CLAUSE 3 - 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 4 - 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 5 - 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 delivery 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 6 - 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 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 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.

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 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 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 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 or 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 7 - 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 information as will permit the identification of the patents or 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 8 - 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

(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 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 know, 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 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 D. of this article 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 (with notification by Patent Counsel to the SERI) at the time of the first disclosure of the Invention pursuant to paragraph B, 1 of this article 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 (with notification by Patent Counsel to the SERI) 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, the Subcontractor shall:

1. Obtain patent agreements to effectuate the provisions of the Patent Rights 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.

2. Unless otherwise authorized or directed by DoE or the SERI, the Subcontractor shall include the Patent Rights article 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 DoE through the SERI in writing upon the award of any lower tier subcontract containing a Patent rights article 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 DoE or the SERI the Subcontractor shall furnish a copy of the lower tier subcontract to such requestor.

F. 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 DoE, the Subcontractor will obtain patent agreements to effectuate the provisions of paragraph F, 1 of this article from all persons who perform any part of the work under this subcontract except non-technical personnel, such as clerical employees.

G. 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 that in order to protect patentable subject matter, publication must be further delayed.

CLAUSE 9 - 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 contract, 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 do 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 (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.

C. Copyrighted material

1. The Subcontractor agrees to, and does hereby grant to the Government, 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 or the SERI for the inclusion of such copyrighted material.