

1. CONTRACT (Proc. Inst. Ident.) NO. NRC-03-80-101	2. EFFECTIVE DATE 9/30/80	3. REQUISITION/PURCHASE REQUEST/PROJECT NO. RFPA No. NRR-80-101	4. CERTIFIED FOR NATIONAL DEFENSE UNDER SDSA REG. 2 AND/OR DMS REG. 1. RATING.
5. ISSUED BY U.S. Nuclear Regulatory Commission Division of Contracts Washington, DC 20555		6. ADMINISTERED BY <i>(If other than block 5)</i>	7. DELIVERY FOB DESTINATION <input checked="" type="checkbox"/> NATION <input type="checkbox"/> OTHER (See below)

8. CONTRACTOR NAME AND ADDRESS <i>(Street, city, county, State, and ZIP code)</i> The Regents of the University of California, Los Angeles Office of Contract and Grant Administration 405 Hilgard Avenue Los Angeles, CA 90024	FACILITY CODE	9. DISCOUNT FOR PROMPT PAYMENT N/A
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11. SHIP TO/MARK FOR U.S. Nuclear Regulatory Commission Division of Systems Integration ATTN: J. Meyer Washington, DC 20555	12. PAYMENT WILL BE MADE BY U.S. Nuclear Regulatory Commission Office of the Controller Washington, DC 20555
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13. THIS PROCUREMENT WAS ADVERTISED, NEGOTIATED, PURSUANT TO: 10 U.S.C. 2304 (e)(1) 41 U.S.C. 252 (c)(1)

14. ACCOUNTING AND APPROPRIATION DATA
20-19-04-01 31X0200.200 B-6835 OBLIGATE \$100,000.00

15. ITEM NO.	16. SUPPLIES/SERVICES	17. QUANTITY	18. UNIT	19. UNIT PRICE	20. AMOUNT
	PWR SEVERE-ACCIDENT DELINEATION AND ASSESSMENT (Incrementally Funded Cost-Reimbursement Type Contract)				

21. TOTAL AMOUNT OF CONTRACT **\$ 220,000.00**

CONTRACTING OFFICER WILL COMPLETE BLOCK 22 OR 26 AS APPLICABLE

22. <input checked="" type="checkbox"/> CONTRACTOR'S NEGOTIATED AGREEMENT <i>(Contractor is required to sign this document and return 3 copies to issuing office.)</i> Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. <i>(Attachments are listed herein.)</i>	26. <input type="checkbox"/> AWARD <i>(Contractor is not required to sign this document.)</i> Your offer on Solicitation Number _____, including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.
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23. NAME OF CONTRACTOR The Regents of the University of California BY Peter R Goldschmidt <i>(Signature of person authorized to sign)</i>	27. UNITED STATES OF AMERICA BY D. J. Dougherty <i>(Signature of Contracting Officer)</i>
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24. NAME AND TITLE OF SIGNER <i>(Type or print)</i> PETER R Goldschmidt Special Assistant to The President	25. DATE SIGNED 9/30/80	28. NAME OF CONTRACTING OFFICER <i>(Type or print)</i> D. J. Dougherty	29. DATE SIGNED 9/30/80
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PART I - STATEMENT OF WORK

A. Background

As a result of the TMI-2 accident, the NRR staff has recognized the need to re-examine the emergency preparedness plans and capabilities of all nuclear power plants. Although programs are underway that will evaluate all nuclear plant sites, two sites have been singled out for additional evaluation at this time. The sites are those for the Zion Station, Units 1 and 2, in northern Illinois and the Indian Point Station, Units 2 and 3, in New York. These sites are being evaluated because they represent the four operating reactors which are located in areas of unusually high population density and therefore are believed to present a disproportionately high contribution to the total societal risk from reactor accidents. This evaluation will determine if additional design and procedural preventive or mitigative measures are warranted in order to reduce the probability of occurrence or to reduce the consequences of an accident more severe than the current design bases at these sites.

In the event of such a severe accident, releases of radioactivity to the public may be conveyed through the air, through the ground water supply, or by both paths. Postulated radioactivity releases might occur rapidly due to a rupture of containment, or such postulated releases may occur at a later time due to a slow development of containment overpressure or as a result of a core melt-through which could eventually lead to liquid pathway releases. A rapid release of a given amount of radioactivity could result in high public consequences if there was insufficient time to implement protective measures such as evacuation.

Several rapid atmospheric release paths being evaluated include: steam explosions in the reactor vessel or the containment building which rupture the containment; hydrogen explosions; open vents in the containment at the time of an event; and Event V considerations. Releases at various other time frames are also being evaluated and include: loss of power events; loss of heat removal events; and slow overpressurization. In addition, slow liquid pathway releases will be evaluated.

Recent studies (see for example, NUREG-0440 "Liquid Pathway Generic Study") indicate that the probability of a steam explosion rupturing containment during such a postulated accident is relatively small in comparison to other release mechanisms and therefore, in this evaluation, priority will be given to the study of the other release mechanisms. The potential hydrogen explosion release path, open containment release path, and Event V check valve failure path will be examined further, and, if found necessary, design and procedural preventive and mitigative measures will be required in order to reduce the probability of occurrence of these release paths.

The sustained loss of all AC power leading to core melt may initiate release paths of various time scales. The probability of occurrence of these release paths will be further evaluated, and preventive measures such as more reliable decay heat removal systems, or mitigative measures such as a filtered vented containment system to prevent the resultant rupturing of the containment building will be required as necessary.

Delayed air pathway releases due to a slow overpressurization of containment may be generated as a result of loss of containment heat removal, hydrogen burning, or due to a buildup of gases from a molten fuel - containment basemat interaction. These slower release paths will be examined further, and mitigative or preventive design and procedural measures will be required as necessary.

The slow liquid pathway release results from fuel melting through the reactor vessel and through the containment basemat or the containment walls. This release path will be examined further, and mitigative or preventive design and procedural measures such as core retention devices will be required as necessary.

Recognizing the length of time that may be required to implement some or all of the severe accident mitigation features (probably one to two years), the staff has evaluated a number of interim operational actions that should be implemented at these high population density sites for this period of time. Additionally, the staff is undertaking a concerted effort to accelerate current outstanding generic and plant specific licensing actions at these plants.

The general objective then is to define design or procedural measures that significantly reduce the likelihood and/or mitigate the consequences of an accident more severe than the current design bases at the Indian Point and Zion nuclear plant sites. Measures are to be identified that significantly reduce the probability of an event or the source term magnitude of such an accident, or that result in significant additional time to respond to an accident at these sites.

Risk analysis may be helpful in establishing general concepts of appropriate action, but will not be used quantitatively to rule out positive plant improvements. The general approach will be to pursue actively those design features that contribute favorably toward the prevention as well as the mitigation of the consequences of a severe accident. Where reliance is placed on the response of the external population, the time required should be commensurate with the evacuation times estimated by the Federal Emergency Management Agency (FEMA), as available.

Objective

The objective of this project is to perform analyses and assessments in three specific areas directly related to the above program in order to aid in the licensing decision making which is to take place during the next 18 months.

B. Work Required

The Contractor shall provide all necessary personnel, equipment, and facilities to provide technical assistance to the NRC in the area of licensing associated with the Zion and Indian Point activity. Specific tasks in this program and associated effort are:

The activities described below shall be limited in scope to activities directly supporting specific licensing actions in the area of degraded core/core melt accidents in particular for the Zion/Indian Point program.

Task I - Core Melt Accident Analysis

The Contractor shall perform state-of-the-art analyses and assessments for Light Water Reactors (LWRs), particularly for the Indian Point Nuclear Units 2 and 3 and for the Zion Nuclear Units 1 and 2 in the core-melt related areas indicated in the following four subtasks:

Subtask A: Molten Pool and Debris Bed Heat Transfer

Prepare analyses related to the thermal-hydraulics of core debris penetration (molten or solid) into either containment materials (steel, concrete) or core retention system materials (e.g., magnesium oxide, graphite). Special emphasis in the area of molten pool heat transfer shall be devoted to phenomena associated with freezing/re-melting, penetration of hot solid mass of core debris, concentration/density gradients, and gas generation effects from concrete interactions. The coolability of debris beds for the aforementioned water reactors detailed study of the scenarios and conditions necessary to form a coolable debris bed.

Subtask B: Thermophysical Properties

Prepare a data file on all relevant thermophysical properties. The properties which shall be compiled are those which are especially relevant to performing consequence evaluations of core meltdown events. This subtask shall complement, but not be duplicative of the DOE Safety Analysis Coordinated Reactor Data (SACRD) program.

Subtask C: Core Melt Computer Code Applications

Implement and apply computer codes (e.g., GROWS, CORCON, WESCHL) being developed, particularly as part of RES programs, for analyzing core melt front penetration by either molten material or a hot

solid mass of material. These codes shall be applied to Zion and Indian Point for performing core meltdown consequence evaluations. Modifications to existing computer codes shall also be included where this is deemed to be appropriate.

Subtask D: Post-Accident Core Retention and Containment Systems

Review and conduct an independent evaluation of heat transfer analytical methods used by reactor designers in developing proposed core retention/containment system approaches. Special emphasis shall be devoted to performing sensitivity analyses for determining the relative importance of various thermal/hydraulic parameters, and examining the effectiveness of various proposed core retention/containment system approaches in accommodating low probability accidents.

In performance of Subtasks A through D above, the Contractor shall maintain close interaction with the BNL effort on post-accident containment analyses.

State-of-the-art technical information relevant to the above, in particular, data and analyses generated by Contractors sponsored by NRC's Office of Nuclear Regulatory Research (RES), shall be used by the Contractor as appropriate.

Task II - Advanced Decay-Heat Removal Systems (ADHR)

The Contractor shall evaluate the advanced decay-heat removal systems for PWRs that have the potential to improve the overall reliability of decay heat removal under operational and accident conditions. The evaluation shall consider such items as potential improvement to existing systems (such as increasing the PORV relieving capacity, improvements to existing Auxiliary Feedwater Systems (AFW), and upgrading HPI and recirculation pumps), as well as the addition of a completely diverse system. This could be a dedicated high pressure RHR system or a comparable feedwater system, either of which could be "hardened" to protect against aircraft impacts, toxic fires and sabotage. A system such as the last one is now part of the German Standard PWR plant. The German System is located in a separate building partially below grade. This effort shall be focused on the Indian Point Nuclear Plants Units 2 and 3, and the Zion Plants Units 1 and 2 and shall include the following subtasks:

Subtask A: Survey and Evaluation

Evaluate existing designs (e.g., the German bunkered system) and/or other conceptual designs and options that can improve the reliability of the decay-heat removal in the Z/IP plants. Consider changes/additions, as well as totally diverse paths from the presently existing ones. Establish design criteria and requirements and evaluate the usefulness and/or the potential improvements to reliability of proposed ADHR systems.

Subtask B: Application to Z/IP

Based on the results of Subtask A, determine appropriate approaches for backfitting ADHR systems to Z/IP plants. Based on safety goals and design bases (to be determined by NRC) propose design criteria and requirements, and conceptual designs which are appropriate for the Z/IP plant/site.

Subtask C: Impact of ADHR Systems on Overall Safety

Using deterministic as well as quantitative-probabilistic (at least in a relative sense) assessments, determine contribution to safety of the potential candidate ADHR systems backfitted to the Z/IP plants, including an estimation of the uncertainties involved in such assessments.

State-of-the-art technical information relevant to the above, in particular, data and analyses generated by Contractors sponsored by NRC's Office of Nuclear Regulatory Research (RES), shall be used by the Contractor as appropriate.

Task III - Risk Reduction Criteria for a Filtered-Vented Containment

There have been several concepts suggested for use as engineered safety features aimed at mitigating the consequences/effects of degraded core/core melt accidents. Of primary interest is the use of a filtered-vented containment system (FVCS) in conjunction with methods to cope with hydrogen generation/accumulation for maintaining containment integrity following these potential accidents. The ultimate decision to require these features depends upon their potential for risk reduction.

In this task, potential acceptance criteria for employment of a FVCS in the Z/IP plants, including the effects of hydrogen generation/accumulation shall be derived. These criteria shall be formulated in terms of improved safety potential. From the criteria, the requirements for designing these engineered features shall be obtained. The various proposed concepts and designs shall be examined to determine whether or not such requirements can be met and/or what design changes could be made to meet them.

Consideration shall be given for both generic (such as steam explosions) and site specific (such as earthquakes) effects. In the latter context, various seismic design bases such as the Operational Basis Earthquake, the Safe Shutdown Earthquake (SSE) or some earthquakes more intense than SSE shall be explored for filtered-vented containment system concepts, as well as the costs associated with designing to these various earthquake levels. In addition, the Contractor shall consider earthquakes as possible initiators of core meltdown and the implications of these events on the overall risk reduction potential of filtered-vented containment systems.

State-of-the-art technical information relevant to the above, in particular, data and analyses generated by Contractors sponsored by NRC's Office of Nuclear Regulatory Research (RES), shall be used by the Contractor as appropriate.

C. Reporting Requirements

The Contractor shall prepare and deliver the following reports:

1. Monthly Progress Letters shall be submitted within fifteen (15) days following the month reported on (one copy each) to the Contracting Officer (CO), the NRC Project Officer (PO), the Cognizant Assistant Director, and the Technical Support Branch. This letter report will include, but not be limited to, the following:
 1. Funds committed during the previous month and cumulative to date.*
 2. Brief description of the work accomplished in the month, and projected activity for the next month.
 3. Preliminary or interim results, conclusions or trends or other items thought to be of interest to the NRC.
 4. Any problems or delays which may have been experienced or can be foreseen and specific recommendations for action to facilitate the execution of the contract work.

* The first such report of each contract year will include a monthly projection of expenditures for the next twelve (12) contract months.

2. Topical Reports: A draft version of each topical report shall be submitted to the CO for review and comment with five (5) copies to the NRC PO sixty (60) days prior to the due date specified below. The NRC will furnish its comments on each draft report no later than thirty (30) days prior to the due date. The Contractor shall submit one (1) camera-ready copy of each topical report to the CO with one (1) copy each to the NRC PO and Assistant Director, Advanced Reactor Safety Research, RFS, no later than the due date specified. Each topical report shall be prepared in accordance with the NRC Manual Chapter 3202, entitled, "Publications of Regulatory and Technical Documents Prepared by NRC Contractors." Each report shall contain an executive summary of not more than ten (10) pages

in length. Each report shall include, but not be limited to, inclusion of the following:

- a. A self-contained description of the analysis, assessment, and evaluation performed for the topic covered by the report.
- b. Conclusions, trends, or other items thought to be of interest to the NRC.

The subjects and the due dates of the final topical reports shall be as follows:

- Report 1. (Task I) "Interim Report on Core Melt Accident Analysis: Application to Zion and Indian Point," due 4/30/81.
- Report 2. (Task I) "Final Report ... (etc.)....," due 3/30/82.
- Report 3. (Task II) "Advanced Decay-Heat Removal Systems: Survey and Evaluation applied to Zion and Indian Point," due 12/30/80.
- Report 4. (Task II) "Advanced Decay-Heat Removal Systems: Conceptual Designs for Zion and Indian Point," due 6/30/81.
- Report 5. (Task II) "Impact of ADHR Systems on Over-All Safety," due 3/80/82.
- Report 6. (Task III) "Risk Reduction Criteria for a Filtered-Vented Containment System: Interim Report," due 2/27/81.
- Report 7. (Task III) "Risk Reduction Criteria for a Filtered-Vented Containment System: Interim Report," due 3/30/82.

3. The Contractor shall submit to the NRC PO one (1) copy with an additional copy to the CO, a plan of work and methodology within three (3) weeks after the first briefing. This plan shall establish and identify a set of project milestones and shall be accompanied by a brief narrative description.

D. Meetings and Travel

Key Contractor personnel will meet with the PO at the NRC office in Bethesda, Maryland to brief the PO on contract progress with the following schedule; two (2) weeks after the effective date of the contract; five (5) months after and twelve (12) months after. Each meeting shall be one (1) day in duration. The key Contractor personnel will be required to attend about two (2) topical meetings per year (total of three (3)) each of approximately three (3) days duration.

E. Representations and Certifications and Contractors Proposal

The Contractors proposals dated August 4 and September 11, 1980, and the Contractors representations and certifications dated August 4, 1980 are hereby incorporated into the contract by reference. See Article XI for provisions regarding the order of precedence.

Article II - Period of Performance

The period of performance shall be from September 30, 1980, through March 30, 1982, at which time all work shall have been completed and all reports shall have been delivered.

Article III - Consideration

A. Estimated Cost and Obligation

1. It is estimated that the total cost to the Government for full performance of this contract will be \$220,000.00. This contract is a cost reimbursement type contract containing no fee.
2. Total funds currently available for payment and allotted to this contract are \$100,000.00. For further provisions of funding, see the General Provisions, Clause three entitled, "Limitation of Funds."
3. It is estimated that the amount currently allotted will cover performance from September 30, 1980 until May 29, 1981.

B. Payment

The Government shall render payment to the contractor in approximately thirty (30) days after submission of proper and correct invoices or vouchers.

Additional provisions relating to payment are contained in clause five of the General Provisions hereto.

Article IV - Overhead/General and Administrative Rates

The contractor shall be reimbursed for general and administrative expenses at the provisional rate of 31%.

Article V - Provisions Applicable to Direct Costs

A. Items Unallowable Unless Otherwise Provided

Notwithstanding Clause No. 5 -- ALLOWABLE PAYMENT, and Clause No. 10 -- SUBCONTRACT, of the General Provisions of this contract, unless authorized in writing by the Contracting Officer, the costs of the following items or activities shall be unallowable as direct costs:

1. Fees for Consultants.
2. Overtime; shift or incentive payments.
3. All Travel outside the United States.
4. Rental agreements, service contracts, or maintenance of Government equipment.

Article VI- Authorized Representative

The following authorized representative will represent the Government for the purpose of this contract:

J. Meyer

The authorized representative is responsible for: (1) Monitoring the contractor's technical progress, including the surveillance and assessment of performance and recommending to the CO changes in requirements; (2) interpreting scope of work; (3) performing technical evaluation as required; (4) performing technical inspections and acceptances required by this contract; and (5) assisting the Contractor in the resolution of technical problems encountered during performance. Within the purview of this authority, the representative is authorized to approve payment vouchers for supplies/services required under the contract. The Contracting Officer is responsible for directing or negotiating any changes in terms, conditions, or amounts cited in the contract.

For guidance from the authorized representative to the Contractor to be valid, it must: (1) be consistent with the description of work set forth in this contract; (2) not constitute new assignment of work or change to the expressed terms, conditions, or specifications incorporated into this contract; (3) not constitute a basis for an extension to the period of performance or contract delivery schedule; (4) not constitute a basis for any increase in the contract fee.

Article VII - Technical Direction

- A. The NRC Project Officer or other authorized individual named in Article V of this contract is responsible for guiding the technical aspects of the project and for general surveillance of the work performed. The Project Officer or named individual is not authorized to make any commitments or any changes which constitute work not within the general scope of this contract, change the expressed terms and conditions incorporated into this contract, or constitute a basis for any increase in contract price or extension of the contract Period of Performance.
- B. Technical direction must be within the general scope of work stated in the contract. The Project Officer does not have the authority to and may not issue any technical direction which:
- (1) Constitutes an assignment of additional work outside the general scope of the contract.
 - (2) Constitutes a change as defined in the clause of the General Provisions, entitled "Changes."

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- (3) In any way causes an increase or decrease in the total estimated contract cost, the fixed fee, if any, or the time required for contract performance.
- (4) Changes any of the expressed terms, conditions or specifications of the contract.
- C. ALL TECHNICAL DIRECTIONS SHALL BE ISSUED IN WRITING BY THE PROJECT OFFICER OR SHALL BE CONFIRMED BY HIM IN WRITING WITHIN TEN (10) WORKING DAYS AFTER VERBAL ISSUANCE. A copy of said written direction shall be submitted to the Contracting Officer.
- D. In the event the Project Officer desires a change to the contract within one or more of the categories as defined in (1) through (4) of paragraph B above, he must direct such request to the Contracting Officer. The Contracting Officer will handle the request in accordance with applicable laws and regulations.
- E. Any unauthorized commitment or direction issued by the Project Officer may result in an unnecessary delay in the Contractor's performance and may even result in the Contractor expending his funds for unallowable costs under the contract.

Article VIII - Key Personnel

Pursuant to Clause No. 41 - KEY PERSONNEL, the following individual(s) are considered to be essential to the work being performed hereunder.

W.E. Kastenberg
I. Catton

L. Cave
N. Ostrander

A Wazzan

Article IX - Government Furnished Material

Within two (2) weeks after the effective date of the contract, the NRC PO shall furnish to the Contractor the Action Plan for Indian Point and Zion.

Within one (1) month after the effective date of the contract, the NRC PO shall furnish to the Contractor a listing of the relevant technical reports generated by research laboratories and their availability.

If the above material, suitable for its intended use, is not so delivered to the Contractor, the CO shall, upon timely written request made by the Contractor, and if the facts warrant such action, equitably adjust any affected provision of the contract pursuant to the procedures of the "changes" clause of the contract.

Article X - Order of Precedence

In the event of an inconsistency between the terms and conditions of this contract, the inconsistency shall be resolved by giving precedence in the following order:

1. The SCHEDULE: (Note: Nothing contained in the contractor's proposal, whether or not incorporated by reference, shall constitute a waiver of any terms or conditions provided in the SCHEDULE.)
2. The General Provisions
3. Other terms and conditions of the contract, whether incorporated by reference or otherwise.

ARTICLE XI CONFLICT OF INTEREST

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(a) Purpose. The primary purpose of this article is to aid in ensuring that the contractor: (1) Is not placed in a conflicting role because of current or planned interest (financial, contractual, organizational, or otherwise) which relate to the work under this contract, and (2) does not obtain an unfair competitive advantage over other parties by virtue of its performance of this contract.

(b) Scope. The restrictions described herein shall apply to performance or participation by the contractor as defined in 41 CFR § 20-1.5402(f) in the activities covered by this clause.

(c) Work for others. Notwithstanding any other provision of this contract, during the term of this contract, the contractor agrees to forego entering into consulting or other contractual arrangements with any firm or organization, the result of which may give rise to a conflict of interest with respect to the work being performed under this contract. The contractor shall ensure that all employees who are employed full time under this contract and employees designated as key personnel, if any, under this contract abide by the provision of this clause. If the contractor believes with respect to itself or any such employee that any proposed consultant or other contractual arrangement with any firm or organization may involve a potential conflict of interest, the contractor shall obtain the written approval of the contracting officer prior to execution of such contractual arrangement.

(d) Disclosure after award. (1) The contractor warrants that to the best of its knowledge and belief and except as otherwise set forth in this contract, it does not have any organizational conflicts of interest, as defined in 41 CFR § 20-1.5402(a).

(2) The contractor agrees that if after award it discovers organizational conflicts of interest with respect to this contract, it shall make an immediate and full disclosure in writing to the contracting officer. This statement shall include a description of the action which the contractor has taken or proposes to take to avoid or mitigate such conflicts. The NRC may, however, terminate the contract for convenience if it deems such termination to be in the best interests of the government..

(e) Access to and use of information. (1) If the contractor in the performance of this contract obtains access to information, such as NRC plans, policies, reports, studies, financial plans, internal data protected by the Privacy Act of 1974 (Pub. L. 93-579), or data which has not been released to the public, the contractor agrees not to: (i) Use such information for any private purpose until the information has been released to the public; (ii) compete for work for the Commission based

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on such information for a period of six (6) months after either the completion of this contract or the release of such information to the public, whichever is first, (iii) submit an unsolicited proposal to the government based on such information until one year after the release of such information to the public, or (iv) release the information without prior written approval by the contracting officer unless such information has previously been released to the public by the NRC.

(2) In addition, the contractor agrees that to the extent it receives or is given access to proprietary data, data protected by the Privacy Act of 1974 (Pub. L. 93-579), or other confidential or privileged technical, business, or financial information under this contract, the contractor shall treat such information in accordance with restrictions placed on use of the information.

(3) The contractor shall have, subject to patent and security provisions of this contract, the right to use technical data it produces under this contract for private purposes provided that all requirements of this contract have been met.

(f) Subcontracts. Except as provided in 41 CFR 520-1.5402(h), the contractor shall include this clause, including this paragraph, in subcontracts of any tier. The terms "contract," "contractor," and "contracting officer," shall be appropriately modified to preserve the government's rights.

(g) Remedies. For breach of any of the above proscriptions or for intentional nondisclosure or misrepresentation of any relevant interest required to be disclosed concerning this contract or for such erroneous representations as necessarily imply bad faith, the government may terminate the contract for default, disqualify the contractor from subsequent contractual efforts, and pursue other remedies as may be permitted by law or this contract.

(h) Waiver. A request for waiver under this clause shall be directed in writing through the contracting officer to the Executive Director for Operations (EDO) in accordance with the procedures outlined in 520-1.5411.

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ARTICLE XII TRAVEL REIMBURSEMENT

The contractor will be reimbursed for the following reasonable domestic travel costs incurred directly and specifically in the performance of this contract and accepted by the Contracting Officer:

1. Per diem shall be reimbursed at a daily rate not to exceed \$70.00. The per diem amount is comprised of lodging expense plus \$16.00 for meals and miscellaneous expense.
2. The cost of travel by privately owned automobile shall be reimbursed at the rate of 20¢ per mile.
3. The cost of travel by rented automobile shall be reimbursed on a reasonable actual expense basis.
4. All common carrier travel reimbursable hereunder shall be via economy class rates when available. If not available, reimbursement vouchers will be annotated that economy class accommodations were not available. First-class air travel is not authorized.
5. Receipts are required for common carrier transportation, lodging and miscellaneous items in excess of \$15.00

ARTICLE XIII - BILLING INSTRUCTIONS FOR NRC COST-TYPE CONTRACTS

General. The contractor shall submit vouchers for cost-reimbursement in the manner and format described herein and as illustrated in the sample voucher.

Form. Claims shall be submitted on the payee's letterhead, invoice or on the Government Standard Form 1034, "Public Voucher for Purchases and Services Other than Personal," and Standard Form 1035, "Public Voucher for Purchases Other than Personal--Continuation Sheet." These forms are available from the Government Printing Office, 710 North Capitol Street, Washington, DC 20801.

Number of Copies. An original and four copies shall be mailed to the NRC office identified below.

Frequency. The contractor shall submit claims for reimbursement once each month unless otherwise authorized in writing by the Contracting Officer.

Billing of Costs After Expiration of Contract: If cost-reimbursements are incurred during the contract period and claimed after the contract has expired, the period during which these costs were incurred must be cited.

Currency. Billings may be expressed in the currency normally used by the contractor in maintaining his accounting records; payments will be made in that currency. However, the U.S. dollar equivalent for all invoices paid under the contract may not exceed the total U.S. dollars authorized in the contract.

Supersession. These instructions supersede all previous billing instructions.

Preparation and Itemization of the Voucher. The contractor shall furnish the information set forth in the explanatory notes below. These notes are keyed to the entries on the sample voucher.

- (a) Payor's Name and Address. (i) Address the original voucher (with copies to: U.S. Nuclear Regulatory Commission, Division of Accounting, Office of the Controller, ATTN: GOV/COM Accounts Section, Washington, DC 20555.
- (b) Voucher Number. Insert the appropriate serial number of the voucher. This must be in sequential order beginning with 001 as the number to be used for the first voucher submitted under this contract.
- (c) Date of Voucher. Insert the date the voucher is prepared.
- (d) Contract Number and Date. Insert the contract number and the effective date of the contract.
- (e) Payee's Name and Address. Show the name of the contractor as it appears in the contract and its correct address; except when an approved assignment has been made by the contractor, or a different payee has been designated, then insert the name and address of the payee. Include name of voucher preparer and telephone number.
- (f) Contract Amount. Insert the total estimated cost of the contract, exclusive of fixed fee. For incrementally funded contracts enter the amount currently obligated and available for payment.
- (g) Fixed Fee. Where applicable, insert total fixed fee.

(h) Billing Period. Insert the beginning and ending dates (day, month, and year) of the period in which costs were incurred and for which reimbursement is claimed.

(i) Direct Costs. Insert the major cost elements as follows:

(i)(1) Direct Labor. This consists of salaries and wages paid (or accrued) for direct performance of the contract. Itemize by name/labor category, hours, and rate per hour.

(i)(2) Fringe Benefits. This represents fringe benefits applicable to direct labor and billed as a direct cost. Fringe benefits included in direct costs should not be identified here.

(i)(3) Capitalized Nonexpendable Equipment. For educational institutions list each item costing \$1,000 or more; for contractors other than educational institutions, list each item costing \$200 or more and having a life expectancy of more than one year. List only those items of equipment for which reimbursement is requested. A reference shall be made to the following (as applicable): (1) the item number for the specific piece of equipment listed in the Property Schedule; (2) the Contracting Officer's Approval Letter, if the equipment covered by the Property Schedule; or (3) be preceded by an asterisk (*) if the equipment is below the approval level. Further itemization of vouchers shall only be required for items having specific limitations set forth in the contract.

(i)(4) Materials, Supplies, and Noncapitalized Equipment. This is consumable materials and supplies and equipment other than that described in (i)(3) above. Specify separately all items over \$1,000.

- (i)(5) Premium Pay. This is remuneration in excess of the basic hourly rate.
- (i)(6) Consultant's Fee. These are fees paid to consultants. List name, hours, rate per hour, and total cost.
- (i)(7) Travel. Domestic travel is travel within the United States, its territories, possessions, and Canada; it should be billed separately from foreign travel. List cost elements and locations of travel: Airfare, car rental, lodging, food, parking, misc.
- (i)(8) Other. List all other direct costs in total unless in excess of \$500. If over \$500, list cost elements and dollar amount separately, e.g., subcontracts. For computer costs, specify computer type, total hours, and cost per hour of computer time.
- (j) Indirect Costs--Overhead. Cite the provisional rate specified in the contract.
- (k) G&A Expenses. Cite the provisional rate specified in the contract.
- (l) Fixed Fee. If the contract provides for a fixed fee, it must be claimed as provided for by the contract. Cite the formula or method of computation. (See (p)).
- (m) Amount Billed for Current Period. Insert the amount billed for the major cost elements, adjustment, and adjusted amounts for the period.
- (n) Cumulative Amount from Inception to Date of this Billing. Insert the cumulative amounts billed for the major cost elements and adjusted amounts claimed during this contract.

- (o) Total Amounts Claimed. Insert the total amounts claimed for the current and cumulative periods.
- (p) Adjustments. This includes amounts conceded by the contractor, outstanding suspensions, disapprovals subject to appeal, and 15% withholding of earned fixed fee.
- (q) Grand Totals.

POOR ORIGINAL

SAMPLE VOUCHER

(a) Payor's Name and Address
 The U.S. Nuclear Regulatory
 Commission
 Division of Accounting, CON
 Attention: Gov/Com Accts Section
 Washington, DC 20555

(b) Voucher No.

(c) Date Voucher Prepared

(d) Contract No. and Date

(e) Contract Period of Performance

(f) Payee's Name and Address
 ABC CORPORATION
 100 Main Street
 Anywhere, U.S.A.
 ATTN: Jane Count(555)987-6543"OR"
 The National Bank, Anywhere, U.S.A.
 Assignee for ABC Corporation
 Anywhere, U.S.A.
 (When Payments are Assigned)

(g) Total Estimated Cost of Contract

(h) Total Fixed-Fee

(i) This voucher represents reimburseable costs from July 1, 1978 through July 31, 1978

	(m) Amount Billed for Current Period	(n) Cumulative Amount From Inception to Date of this Billing
(i) Direct Costs		
(i)(1) Direct Labor(itemize)	\$ 3,400	\$ 6,800
(i)(2) Fringe Benefits(rate)	600	1,200
(i)(3) Capitalized Nonexpendable Equipment	5,000	8,000
(i)(4) Materials, Supplies and Noncapitalized Equipment	2,000	4,000
(i)(5) Premium Pay	100	150
(i)(6) Consultant's Fee(s)	100	100
(i)(7) Travel -- Domestic	200	200
(i)(7) Travel -- Foreign	200	200
(i)(8) Other	-0-	-0-
Total Direct Costs	\$11,600	\$20,650
(j) INDIRECT COSTS		
% of Direct Labor or Other Base(Formula)	4,000	6,000
(k) G&A Expenses	700	1,400
(l) FIXED FEE EARNED(Formula) %	\$16,300	\$28,050
(o) Total Amounts Claimed	(105)	
(p) Adjustments(Less 15% fee withheld and Outstanding Suspensions, if applicable)	(0)	(1,700)
(q) Grand Totals	\$16,195	\$26,350

Article XIV- Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals

- (A) It is the policy of the United States that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals shall have the maximum practicable opportunity to participate in the performance of contracts let by any federal agency.
- (B) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with the efficient performance of this contract. The Contractor further agrees to cooperate in any studies or surveys that may be conducted by the Small Business Administration or the contracting agency which may be necessary to determine the extent of the Contractor's compliance with this clause.
- (C)
 - (1) The term "small business concern" shall mean a small business as defined pursuant to Section 3 of the Small Business Act and in relevant regulations promulgated pursuant thereto.
 - (2) The term "small business concern owned and controlled by socially and economically disadvantaged individuals" shall mean a small business concern --
 - (i) which is at least 51 per centum owned by one or more socially and economically disadvantaged individuals; or in the case of any publicly owned business, at least 51 per centum of the stock of which is owned by one or more socially and economically disadvantaged individuals; and;
 - (ii) whose management and daily business operations are controlled by one or more of such individuals.

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

- (D) Contractors acting in good faith may rely on written representations by their subcontractors as either a small business concern or a small business concern owned and controlled by socially and economically disadvantaged individuals.

Article XV UTILIZATION OF WOMEN-OWNED BUSINESS CONCERNS (Over \$10,000)

- (a) It is the policy of the United States Government that women-owned businesses shall have the maximum practicable opportunity to participate in the performance of contracts awarded by any Federal agency.
- (b) The Contractor agrees to use his best efforts to carry out this policy in the award of subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, a "woman-owned business" concern means a business that is at least 51% owned by a woman or women who also control and operate it. "Control" in this context means exercising the power to make policy decisions. "Operate" in this context means being actively involved in the day-to-day management. "Women" mean all women business owners.

Article XIV General Provisions/Alterations

- A. This contract is subject to the Provisions of Appendix A, General Provisions Cost-Type Contracts for Research and Development with Educational Institutions, dated February 15, 1978, which is attached hereto and by this reference made a part hereof.
- B. In addition to those general provisions set forth in Appendix A hereto, which are by their terms self-deleting, the following deletions and/or modifications to Appendix A are as follows:
 1. Clause 13, entitled, "Disputes" is hereby deleted in its entirety and the clause contained in FPR 1-7.102 as published in Federal Register, Vol. 45, No. 34, February 19, 1980, page 10791, is substituted in lieu thereof.
 2. Clause 31 entitled, "Listing of Employment Opening" is deleted in its entirety and substituted in lieu thereof by this reference is the clause entitled, "Disabled Veterans and Veterans of the Vietnam Era" (FPR Temp. Reg. 39).
 3. Clause 50 entitled, "Drawings, Designs, Specifications" lines 11 and 12 are modified by deleting the words beginning with "Subject to the . . ." and ending with ". . . its own uses", in their entirety.
 4. Clause 30 entitled, "Utilization of Minority Business Enterprises" is deleted in its entirety.