

SUPPLEMENTAL AGREEMENT
BETWEEN
UNIVERSITY OF KANSAS
AND
THE U. S. NUCLEAR REGULATORY COMMISSION

THIS SUPPLEMENTAL AGREEMENT, effective the 30th day of June, 1985 by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), as represented by the UNITED STATES NUCLEAR REGULATORY COMMISSION (hereinafter referred to as the "Commission"), and UNIVERSITY OF KANSAS

(hereinafter referred to as the "Contractor"),

WITNESSETH THAT:

WHEREAS, the parties desire to modify Contract No. NRC-04-82-006-02 as hereinafter provided, and this supplemental agreement is authorized by law, including the Energy Reorganization Act of 1974, as amended, and the Atomic Energy Act of 1954, as amended.

NOW, THEREFORE, said contract is hereby modified as follows:

1. Appendix A, attached to this supplemental agreement and made a part hereof, provides for the research to be performed by the Contractor during the contract period specified therein.
2. In Article II - The Period of Performance, the date "June 30, 1986" is substituted for the date "June 30, 1985."
3. In Article III - Consideration, the sum "~~\$252,801.00~~" is substituted for the sum "~~\$252,801.00~~". *\$184,000.00* *BE/NRC 7/16/85*
4. In Appendix A, Article A-II(a)(3) the following is added:

"(iii) All contractor travel must have the prior approval of the NRC Project Officer."

IN WITNESS WHEREOF, the parties have executed this document.

UNITED STATES OF AMERICA

BY: Paul J. Edgeworth 7/16/85
Paul J. Edgeworth Date
Contracting Officer
(title)

Nuclear Regulatory Commission

UNIVERSITY OF KANSAS

BY: Edward Meyen
Edward Meyen Date
Acting Vice Chancellor
(title)

I, Ann Victoria Thomas, certify that I am the
(attester,

General Counsel of the Contractor named
(title)

under this document; that Edward Meyen
(signatory;

who signed this document on behalf of said Contractor was then

Acting Vice Chancellor of said Contractor; that
this document was duly signed for and on behalf of said Contractor by
authority of its governing body and is within the scope of its legal
powers.

IN WITNESS WHEREOF, I have hereunto affixed my hand and the seal of
said Contractor.

(SEAL)

Ann Victoria Thomas
Ann Victoria Thomas
General Counsel

CONTRACTOR: UNIVERSITY OF KANSAS

APPENDIX A

For the Contract period July 1, 1982 through June 30, 1986

Article A-I RESEARCH TO BE PERFORMED BY CONTRACTOR

- (a) The scope of work under this contract is unclassified and shall be in accordance with the Contractor's proposals entitled, "Kansas Seismograph Network," and "Nebraska Seismograph Network," both dated March 3, 1982, and as jointly revised on May 17, 1982, and proposal entitled, "Triggered Digital Recording of the NRC Kansas-Nebraska Microearthquake Network," dated December 10, 1982, all of which are, by this reference, incorporated herein. Specifically, the Contractor shall perform the following tasks.

TASK 1 - Kansas Seismograph Network

1. Continue to operate the network (a) with a minimum of down time (less than 5% of time) for the individual stations and the central recording facility, and (b) with fully-trained personnel qualified to operate the equipment. The Contractor shall provide a graphical representation of the temporal operational status of the network in each quarterly report.
2. Continue to determine the hypocentral location and magnitude (a local scale tied to a regional scale and the Richter scale) of all earthquakes within the instrumented area down to m_b 2.5.
3. Continue to conduct analyses of recorded data. The analyses will include, but not necessarily be limited to, the following:
 - a. Location of earthquakes within the study area including depth and assignment of a magnitude (the Contractor shall note that accurate depth information is very important to this project);
 - b. Continue delineation of seismically active areas based on new and historic data;
 - c. Continue determination of fault motions and stress directions through the calculation of focal mechanisms, single event and composite, when practical;
 - d. Continue to study the regional velocity structure using both earthquakes and explosions, such as quarry blasts; and
 - e. Continue to study the propagation characteristics of seismic waves in the study area.

4. With the concurrence of the PO, relocate or establish new stations as it becomes necessary.
5. Continue to report any interesting or significant earthquakes within the study area to the PO by telephone.

TASK 2 - Nebraska Seismograph Network

1. Continue to operate the network (a) with a minimum of down time (less than 5% of time) for the individual stations and the central recording facility, and (b) with fully-trained personnel qualified to operate the equipment. The Contractor shall provide a graphical representation of the temporal operational status of the network in each quarterly report.
2. Continue to determine the hypocentral location and magnitude (a local scale tied to a regional scale and the Richter scale) of all earthquakes within the instrumented area down to m_b 2.5.
3. Continue to conduct analyses of recorded data. The analyses will include, but not necessarily be limited to, the following:
 - a. Location of earthquakes within the study area including depth and assignment of a magnitude (the Contractor shall note that accurate depth information is very important to this project);
 - b. Delineation of seismically active areas based on new and historic data;
 - c. Determination of fault motions and stress directions through the calculation of focal mechanisms, single event and composite, when practical;
 - d. Study of the regional velocity structure using both earthquakes and explosions, such as quarry blasts; and
 - e. Study of the propagation characteristics of seismic waves in the study area.
4. With the concurrence of the PO, relocate or establish new stations as it becomes necessary.
5. Continue to report any interesting or significant earthquakes within the study area to the PO by telephone.

(b) The Principal Investigator expects to devote the following approximate amount(s) of time to the contract work:

Don W. Steeples - Ten (10) hours per week throughout the contract period
Ralph W. Knapp - Five (5) hours per week throughout the contract period

ARTICLE A-11 WAYS AND MEANS OF PERFORMANCE

(a) Items for which support will be provided as indicated in A-111, below

(1) Salaries and Wages	\$ 116,633.00
(2) Equipment to be purchased or fabricated by the Contractor	\$ 35,455.00

Items Estimated to Cost More Than \$1,000.00

Drum Recorders for 3 stations	\$11,000.00
Telemetry equipment for 6 stations	9,060.00
Portable frequency counter and oscilloscope	2,000.00
Installation hardware for 6 stations	2,400.00
Batteries and solar chargers for 6 stations	1,800.00
Single Board computer with a 8086 CPU, including 32 Kbytes read/write memory and a RS-232 interface	2,500.00
Rack mountable system chasis and power supply	1,000.00
Large disk drive for KGS computer (10% of cost)	2,400.00

Items Estimated to Cost Less Than \$1,000.00

Discriminator Rack and Power Supply	\$ 765.00
Spare telemetry components	955.00
32-Channel A/D Converter board	800.00
GPIB controller/interface board with a GPIB cable, SBC-988	775.00

(3) Travel	
(i) Domestic	\$ 15,368.00
(ii) Foreign	\$ 0

(iii) All Contractor travel must have the prior approval of the NRC Project Officer.

(4) Other direct costs including fringe benefits

(5) Indirect costs based on a predetermined rate of 45 percent applicable to Modified Total Direct Cost.

- (b) Items, if any, significant to the performance of this contract, but excluded from computation of Support Cost and from consideration in proportioning costs: NRC CONTRIBUTION: NRC shall directly contract with the applicable telephone company(s), to provide telephone telemetry services, for the transmission of seismic network data gathered by the Contractor for this contract.
- (c) Time or effort of Principal Investigator(s) including indirect costs and fringe benefits contributed by Contractor but excluded from computation of Support Cost and from consideration in proportioning costs:
- Don W. Steeples - Ten (10) hours per week throughout the contract period
Ralph W. Knapp - Five (5) hours per week throughout the contract period

Article A-III

The total estimated cost of items under A-II(a) above for the contract period stated in this Appendix A is \$282,434.00; the Commission will pay 100 percent of the actual costs of these items incurred during the contract period stated in this Appendix A, subject to the provisions of Article III and Article B-XXVIII. The estimated NRC Support Cost for the contract period stated in this Appendix A is \$282,434.00.

The estimated NRC Support Cost is funded as follows:

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|---|--------------|
| (a) Estimated unexpended balance from prior period(s) | \$ 0 |
| (b) New funds for the current period | \$ 68,801.00 |
| (c) Additional funds to be provided subject to their availability in FY86 | \$ 29,633.00 |
| (d) The new funds being added in A-III(b) constitute the basis for advance payments provided under Article B-X. | |