

1. CONTRACT (Proc. Inst. Ident.) NO. NRC-02-83-029	2. EFFECTIVE DATE 12/6/82	3. REQUISITION/PURCHASE REQUEST/PROJECT NO. NMS-83-029	4. CERTIFIED FOR NATIONAL DEFENSE UNDER ROSA REG. 2 AND DOD/CFR/MS REG. J. FATING
5. ISSUED BY U. S. Nuclear Regulatory Commission Division of Contracts Washington, DC 20555		6. ADMINISTERED BY (If other than block 5) CODE	7. DELIVERY FOR DESTINATION <input checked="" type="checkbox"/> NATION <input type="checkbox"/> OTHER (See below)

8. CONTRACTOR NAME AND ADDRESS ARIZONA BOARD OF REGENTS The University of Arizona ATTN: Mr. Charles H. Peyton Tucson, AZ 85721 <i>(Street, city, county, State, and ZIP code)</i>	FACILITY CODE	9. DISCOUNT FOR PROMPT PAYMENT N/A
10. SUBMIT INVOICES (4 copies unless otherwise specified) TO ADDRESS SHOWN IN BLOCK 8 I/A w/attached billing instructions		

11. SHIP TO/MARK FOR U. S. Nuclear Regulatory Commission Division of Waste Management ATTN: Maxine Dunkelmann Washington, DC 20555	12. PAYMENT WILL BE MADE BY U. S. Nuclear Regulatory Commission Office of Resource Management Division of Accounting and Finance ATTN: GOV/COM ACCOUNTS Washington, DC 20555
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13. THIS PROCUREMENT WAS ADVERTISED, NEGOTIATED, PURSUANT TO:
 10 U.S.C. 2304 (a)(1) 41 U.S.C. 252 (a)(1)

14. ACCOUNTING AND APPROPRIATION DATA
 B&R NO. 50-19-03-02 FIN NO. B7363-3 OBLIGATE \$67,179.00

15. ITEM NO.	16. SUPPLIES/SERVICES	17. QUANTITY	18. UNIT	19. UNIT PRICE	20. AMOUNT
	PROVIDE ALL NECESSARY PERSONNEL, FACILITIES, MATERIALS, AND SERVICES TO ACCOMPLISH THE EFFORT ENTITLED "TRENCH CAP HYDRAULIC MONITORING BY TRACERS" AS SET FORTH IN THE STATEMENT OF WORK HEREIN AND AS IMPLEMENTED BY THE UNIVERSITY OF ARIZONA TECHNICAL PROPOSAL OF SEPTEMBER 23, 1982 AND LETTERS OF NOVEMBER 2, 1982, NOVEMBER 19, 1982, AND DECEMBER 2, 1982. (FULLY FUNDED COST-REIMBURSEMENT CONTRACT)				

8301140234 821202
 PDR CONTR
 NRC-02-83-029 PDR

TOTAL AMOUNT OF CONTRACT \$ 67,179.00

CONTRACTING OFFICER WILL COMPLETE BLOCK 22 OR 26 AS APPLICABLE

22. <input checked="" type="checkbox"/> CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return 2 copies to issuing office.) Contractor agrees to furnish and deliver all items as 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. (Attachments are listed herein.)	26. <input type="checkbox"/> AWARD (Contractor is not required to sign this document.) 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 ARIZONA BOARD OF REGENTS BY: _____ (Signature of person authorized to sign)	27. UNITED STATES OF AMERICA BY: _____ (Signature of Contracting Officer)
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24. NAME AND TITLE OF SIGNER Sherwood E. Carr, Treasurer and Contracting Officer	25. DATE SIGNED	28. NAME OF CONTRACTING OFFICER (If specified in contract) Kellogg V. Horton	29. DATE SIGNED
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PART III

CONTRACT SCHEDULE

ARTICLE I - STATEMENT OF WORK

1.0 BACKGROUND:

One of the lessons learned from observing commercial low-level waste disposal sites is the need to build a trench cap that will limit the infiltration of precipitation, either by areal-type recharge or by fracturing of the trench cap due to subsidence of the underlying wastes and backfill. Several promising designs for trench caps which will limit infiltration have been identified by the Illinois State Geological Survey (NUREG CR-2478, Vol. 1), the Interagency Task Force Report on Sheffield, SCS Engineers, and others.

There are currently two NRC funded trench cap studies. One is Fin No. B6965*, Trench Cap Study, in Illinois. The contractor is the Illinois State Geological Survey (ISGS). The other is Fin No. B7072**, Burial Ground Design, Construction, and Operations Practices, at Tucson, Arizona. The contractor is the University of Arizona. In addition, the USGS is performing several studies at the Sheffield site related to determining the effectiveness of present trench cap covers in limiting infiltration. These include a hydrometeorological station on Trench 2 and an instrumented tunnel under Trenches 1, 2, 3, and 11.

The ISGS study is concerned with determining the ability of various layered systems of native earth materials to limit the movement of moisture through experimental trench caps. In order to determine this, changes in temperature, volume, and moisture are being monitored using tensiometers, thermocouples, and neutron probes installed in test trench caps of various designs.

The University of Arizona study consists of a series of test trenches, whose fill material is designed to collapse, in order to study the ability of various test trench caps to withstand settlement and still effectively limit infiltration. In order to monitor the ability of these test caps to keep moisture out of the trenches, tracers are applied at specific areas inside and outside of the trenches and trench caps and the movements of these tracers is monitored.

* Contract No. NRC-02-80-074

**Contract No. NRC-04-81-220

The USGS study on Trench 2 is to determine a total energy balance, including infiltration of moisture through the trench cap cover. The tunnel studies are intended to quantify the amount of moisture movement in the unsaturated zone below the trenches. Current measurements are made with tensiometers and suction lysimeters; however, the application of tracers offers the possibility of confirming measurements made by the other techniques and establishing any areal differences in recharge rates (e.g., differences between separate covers and drainage areas between covers).

The objective of this project, B7363, is to use tracers to hydraulically monitor trench caps currently being tested as part of the ISGS and USGS studies. In this manner, use of the tracers in this project will help to verify the results of these studies and will provide a common data base to compare techniques for measuring moisture movement. These techniques include soil tensiometers and neutron probes (used in B6965 and the USGS studies) and tracers (used in B7072).

2.0. WORK REQUIRED:

Task 1: The contractor shall submit a detailed plan for hydraulic monitoring of the movement of moisture through trench caps by tracers at the Trench Cap Study, B6965, and through the trench covers of Trenches 1, 2, 3, and 11. This plan will be based on those used for the experimental trenches at the Tucson, Arizona study, B7072. The plan should lay out in detail the frequency of field monitoring, types of tracers used, detection techniques and threshold values for the tracers, differences in hydraulic monitoring of the test trench caps, duration of hydraulic monitoring, limitations of the techniques, quality assurance and quality control procedures, and costs. This plan should include the type, number, and location of any instrumentation to be installed; the locations of where tracers will be applied; and the method of application. The data collection locations should include those of the Illinois State Geological Survey; the plan should indicate how the two types of data collection locations will provide a basis for comparison of the techniques of monitoring moisture movement.

The hydraulic monitoring plan will be due within 2 weeks of the start of the project. This hydraulic monitoring plan will be reviewed and approved by the NRC Project Officer prior to start of any field work. Any changes shall be approved in advance by the NRC Project Officer and coordinated with the Illinois State Geological Survey.

Task 2: The ISGS and the USGS will provide and install the instrumentation, apply the tracers, collect water samples, and send samples and associated data to the contractor for laboratory analyses. The contractor will select and provide the tracers,

including instructions on the application of the tracers and the collection and preservation of the water samples. The contractor will analyze these samples and compare the results with soil moisture data from the other projects as provided by the NRC Project Officer.

3.0 REPORTING REQUIREMENTS:

3.1 Monthly Letter Status Report:

Each month, the contractor shall submit four (4) copies of a letter report which summarizes: (1) the work performed during the previous month and the estimated percent completion of all tasks; (2) the personnel time expenditures during the previous month; and (3) costs and uncosted obligations, listed separately (a) during the previous month, (b) cumulative to date (fiscal year and total), and (c) projection by month for the current fiscal year. Major sources of obligations, such as personnel, travel, and subcontracts shall be included for each month and cumulative to date. The first monthly report shall provide the initial cost projection and subsequent reports shall either provide revised projections or indicate that there is no change in these projections. Monthly reports shall also include such items as activities in progress or completed, key milestones achieved, anticipated problem areas and their effects on other activities and the project schedule, meetings held or attended, and peer review group recommendations.

The first monthly status report shall be due within one and one-half months of the effective contract date. All subsequent reports shall be due on the 15th of the next month.

The distribution of reports shall be as follows:

Maxine Dunkelman, MRC Project Officer, 1 copy

Office of the Director, NMSS
Attn: Program Support Branch, 1 copy

John B. Martin, Director
Division of Waste Management, 1 copy

Kellogg V. Morton, Contracting Officer
Division of Contracts, 1 copy

3.2 Draft Final and Final Reports:

The contractor will submit a draft final report to the MRC project officer within 60 days after analytical work is completed. The contractor shall present all relevant information gathered during the tracer experiment at the Trench Cap Study area. A comparison shall be made with results generated by the Trench Cap Study itself.

The report will include a complete description of the techniques used, including the physical aspects of the experiment, and the results as observed. The contractor shall use the information he has gathered to formulate conclusions concerning the design of trench caps.

The NRC Project Officer will furnish comments on the draft final report within one month. Based upon those comments, the contractor shall revise the draft final report and submit a final report within 30 days of receipt of the NRC Project Officer's comments. The contractor shall distribute the final report as follows:

Maxine Dunkelmann, NRC Project Officer, 2 copies

Office of the Director, NMSS
Attn: Program Support Branch, 1 copy

John B. Martin, Director
Division of Waste Management, 1 copy

Kellogg V. Morton, Contracting Officer
Division of Contracts, 1 copy

One (1) copy of the final report sent to the NRC Project Officer shall be camera-ready.

3.3 Format of Draft Final and Final Reports:

The format of the draft final and final reports shall be in accordance with the provisions as stated in NRC Manual Appendix 3202 for "Formal Contractor Documents," Appendix B.

3.4 Microfiche of Final Report:

Microfiche is required of the final report. The specifications for this microfiche are listed in Appendix D and the distribution is as follows:

Document Management Branch, Division of Technical Information
and Document Control, 1 master

Docket Control Center, Division of Waste Management, 1 duplicate

4.0 MEETINGS AND TRAVEL:

The contractor will attend one meeting with the NRC in Silver Spring, Maryland. The meeting will be held to discuss NRC comments on the draft final report approximately 3 weeks after its submittal. Also, the contractor will be required to make two trips to Urbana and

Sheffield, Illinois to coordinate this study with the ISGS and the USGS. Two individuals will attend the Silver Spring meeting. One individual may also attend a hydrogeologic meeting. The choice of this meeting shall be approved by the NRC.

5.0 NRC-FURNISHED MATERIALS:

The NRC Project Officer will provide the following material within one week of the contract start date:

SOW, Trench Cap Study, B6965
Detailed Test Plan and Drawings, Trench Cap Study

The NRC Project Officer will provide task reports, as finalized, from the ISGS and USGS studies. In addition, the NRC Project Officer will provide soil moisture data by June 1, 1983 for use in comparing tracer results with results of other techniques.

6.0 QUALITY ASSURANCE:

For all draft final and final reports delivered under this Agreement, the contractor shall assure that an independent review and verification of all numerical computations and mathematical equations and derivations are performed by qualified personnel other than the original author(s) of the reports. If the contractor proposes to verify/check less than 100 percent of all computations and mathematical equations and derivations in the report(s), (such as might be the case when there are a large number of routine, repetitive calculations), the contractor must first obtain written approval from the NRC Project Officer. Computer-generated calculations will not require verification where the computer program has already been verified.

In addition, for all reports, including those which do not contain numerical analyses, a management review shall be conducted by the contractor's Project Manager prior to submission to the NRC. All reports shall be annotated to indicate that the review and verification has been accomplished prior to their submission to the NRC. (This may be accomplished by use of a cover letter accompanying the report, if preferable).

ARTICLE II - PERIOD OF PERFORMANCE

The performance of work described in ARTICLE I hereof shall commence as of the effective date of this contract and shall continue to completion thereof, estimated to occur within thirteen months after said contract is effective.

ARTICLE III - CONSIDERATION AND PAYMENT (Fully Funded Cost Reimbursement)Estimated Cost and Obligation

1. The presently estimated cost of the work under this contract is \$67,179.00.
2. The amount presently obligated by the Government with respect to this contract is \$67,179.00.

Note: Additional provisions relating to payment are contained in Clauses 5.1, 5.7, 5.8 and 5.9 of the General Provisions hereto.

ARTICLE IV - OVERHEAD/GENERAL AND ADMINISTRATIVE RATES

- A. The Contractor shall be reimbursed for Fringe Benefits at the fixed rate of [REDACTED] of salary for the Faculty and at the fixed rate of [REDACTED] of salary for the staff.
- B. The Contractor shall be reimbursed for Indirect Costs at the fixed rate of [REDACTED] of total costs.

ARTICLE V - PRIVATE USE AND PROTECTION OF UNCLASSIFIED GOVERNMENT INFORMATION

- A. Except as specifically authorized by this contract, or as otherwise approved by the Contracting Officer, records or other information, documents and material furnished by the Commission to the contractor in the performance of this contract, or information developed by the contractor in the course of the work hereunder, shall be used only in connection with the work performed under this contract. The contractor shall, upon completion or termination of this contract, transmit to the Commission all records or other information, documents and material, and any copies thereof, furnished by the Commission to the contractor or developed by the contractor in the performance of this contract.
- B. The contractor shall be responsible for safeguarding from unauthorized disclosure any information or other documents and material exempt from public disclosure by the Commission's regulations and made available to the contractor in connection with the performance of work under this contract. The contractor agrees to conform to all regulations, requirements, and directions of the Commission with respect to such material.

- C. The Contractor's duties under this clause shall not be construed to limit or affect in any way the Contractor's obligation to conform to all security regulations and requirements of the Commission pertaining to classified information and material.

ARTICLE VI - - KEY PERSONNEL

Pursuant to this ARTICLE (Key Personnel), the following individuals are considered to be essential to the successful performance of the work hereunder and shall not be replaced without the prior approval of the Contracting Officer. In such event, the contractor agrees to substitute persons possessing substantially equal abilities and qualifications satisfactory to the Contracting Officer.

G. Thompson

J. McCray

ARTICLE VII - TECHNICAL DIRECTION

- A. Performance of the work under this contract shall be subject to the technical direction of the WRC Project Officer named in ARTICLE VIII of this contract. The term "Technical Direction" is defined to include the following:
1. Technical direction to the contractor which shifts work emphasis between areas of work or tasks, requires pursuit of certain lines of inquiry, fills in details or otherwise serves to accomplish the contractual scope of work.
 2. Providing assistance to the contractor in the preparation of drawings, specifications or technical portions of the work description.
 3. Review and where required by the contract, approval of technical reports, drawings, specifications and technical information to be delivered by the contractor to the Government under the contract.
- 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."
 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 SUCH PERSON IN WRITING WITHIN TEN (10) WORKING DAYS AFTER VERBAL ISSUANCE. A copy of said written direction shall be submitted to the Contracting Officer.

The contractor shall proceed promptly with the performance of technical directions duly issued by the Project Officer in the manner prescribed by this article and within such person's authority under the provisions of this article.

If, in the opinion of the contractor, any instruction or direction issued by the Project Officer is within one of the categories as defined in B(1) through (4) above, the contractor shall not proceed but shall notify the Contracting Officer in writing within five (5) working days after the receipt of any such instruction or direction and shall request the Contracting Officer to modify the contract accordingly. Upon receiving such notification from the contractor, the Contracting Officer shall issue an appropriate contract modification or advise the contractor in writing that, in the Contracting Officer's opinion, the technical direction is within the scope of this article and does not constitute a change under the Changes Clause.

- D. 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 funds for unallowable costs under the contract.
- E. A failure of the parties to agree upon the nature of the instruction or direction or upon the contract action to be taken with respect thereto shall be subject to the provisions of the contract clause entitled "Disputes."

ARTICLE VIII - PROJECT OFFICER

Maxine Dunkelman is hereby designated as the Contracting Officer's authorized representative (hereinafter called Project Officer) for technical aspects of this contract. The Project Officer is not authorized to approve or request any action which results in or could result in an increase in contract cost; or terminate, settle any claim or dispute arising under the contract; or issue any unilateral directive whatever.

The Project Officer is responsible for: (1) monitoring the contractor's technical progress, including surveillance and assessment of performance, and recommending to the Contracting Officer changes in requirements; (2) interpreting the 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 Project Officer is authorized to review all costs requested for reimbursement by contractors and submit recommendations for approval, disapproval, or suspension 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 Project Officer to the contractor to be valid, it must: (1) be consistent with the description of work set forth in the 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; and, as stated above, (4) not constitute a basis for any increase in the contract cost.

ARTICLE IX - TRAVEL REIMBURSEMENT

1. The contractor will be reimbursed for reasonable domestic travel costs incurred directly and specifically in the performance of this contract and accepted by the Contracting Officer, in accordance with the contractor's approved travel policy on file with the NRC.
2. The cost of travel by privately owned automobile shall be reimbursed at the mileage rate prescribed by the contractor's established, generally applicable travel policy; provided, however, that such reimbursement shall not exceed the cost of less than first-class travel by common carrier.
3. The cost of travel by rented automobile shall be reimbursed on a reasonable actual expense basis that does not exceed the rates prescribed by the contractor's established, generally applicable travel policy.
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. Reasonable actual costs of lodging and subsistence, or per diem in lieu of actual costs, shall be allowable to the extent that such actual costs or per diem amounts do not exceed the amounts or per diem rates prescribed by the contractor's established, generally applicable travel policy.
6. Receipts are required for common carrier transportation, lodging and miscellaneous items in excess of \$15.00.
7. Any revision to the contractor's established, generally applicable travel policy approved by the cognizant audit agency during the period of performance of this contract shall be effective, without formal modification to this contract, upon delivery to the Contracting Officer of a copy of such revised policy together with evidence of cognizant audit agency approval thereof.

ARTICLE X - GENERAL PROVISIONS/ALTERATIONS

This contract is subject to the attached provisions of Appendix A, General Provisions, entitled "Cost Type Research and Development Contracts With Educational Institutions", dated 1/6/82.

Provisions Added:

5.7 Interest on Overdue Payments

- (a) The Prompt Payment Act, Public Law 97-177 (96 STAT. 85, 31 USC 1801) is applicable to payment of the expiration invoice under this contract and requires the payment to contractors of interest on overdue payment of the expiration invoice or improperly taken discounts.
- (b) Determinations of interest due will be made in accordance with the provisions of the Prompt Payment Act and Office of Management and Budget Circular A-125.
- (c) For purposes of this clause, an expiration invoice is defined as a claim submitted for costs incurred for performance through the expiration date of a Cost Type contract.

- (b) For the purpose of determining the due date for payment and for no other purpose, acceptance will be deemed to occur N/A calendar day after the date of delivery of the deliverable product(s)/services performed in accordance with the terms of the contract.
- (c) The date of the check issued in payment shall be considered to be the date payment is made.

5.9 Invoice Requirements

Invoices shall be submitted in an original and 4 copies to the U.S. Nuclear Regulatory Commission, Division of Accounting and Finance, Office of Resource Management, ATTN: GOV/COM Accounts Section, Washington, D.C. 20555. To constitute a proper invoice, the invoice must include the following information and/or attached documentation:

- (1) Name of the business concern and invoice date.
- (2) Contract number or other authorization for delivery of property or services.
- (3) Description price and quantity of property and services actually delivered or rendered.
- (4) Shipping and payment terms.
- (5) Name (where practicable), title, phone number, and complete mailing address of responsible official to whom payment is to be sent.
- (6) Other substantiating documentation or information as required by the contract.