Attachment 7d ①

# "PROPOSAL ROUTING SHEET"

**Proposal Title:** Proposal to Provide Audit, Instrument Repair and Procedures Development Cooperation Between the Desert Research Institute and the Nevada State Department of Environmental Protection

**Sponsoring Agency:** Nevada State Department of Environmental Protection

**Amount Requested:** $25,084

**Duration of Program:** 1 Year

**Abstract:**

The work involves four tasks: 1) Performance Audits on CO and $O_3$ Monitors at Two Sites, 2) Repair of the Dasibi Calibration System and Other Monitoring Instruments, 3) Quality Assurance/Control Procedures, and 4) Reporting and Program Management.

Principal Investigator Ricci Capirci Date August 22, 1984

Names of Professional personnel to participate in this project:

Ric Capirci and John Watson

Approved by Center Executive Director _____ Date 8/23/84

Budget Review-DRI Vice President/Admin. _____ Date 8/23/84

President's Approval _____ Date 8/23/84

Estimated Proposal Prepartion: Hours _____ Other Costs _____

Probability of Success _____

Instructions:

- Send original Proposal Routing Sheet to Vice President for Administration for budget review prior to submittal of proposal to sponsoring agency.
- After budget review and action by President, Routing Sheet and original proposal shall be returned to Center Executive Director.
- The original Routing Sheet and three (3) copies of proposal should be furnished the Vice President for Administration.

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DESERT RESEARCH INSTITUTE
University of Nevada System

Atmospheric Sciences Center

P.O. Box 60220
Reno, Nevada 89506
(702) 972-1676

August 22, 1984

Mr. Richard Serdoz
Nevada Dept. of Environmental Protection
201 S. Fall
Carson City, NV 89701

Dear Dick:

This letter constitutes a proposal to provide audit, instrument repair, and procedures development cooperation between the Desert Research Institute (DRI) and the Nevada State Department of Environmental Protection (DEP).

The statement of work has been defined by Mr. Robert Smith of DEP and Mr. Ric Capirci of DRI. This scope has been reviewed and approved by Mr. John Kennedy of EPA Region IX. We submit it to you for your comment, revision, and approval. Needless to say, we are extremely pleased that funds can be made available to initiate the collaboration between DRI and DEP which you and I have been discussing for so long. We feel that this program will further strengthen the fine cooperative relationship we've enjoyed in the past and will open doors for new areas of cooperation in the future.

This letter consists of a work statement containing four tasks, a technical approach for accomplishing those tasks, and an estimated budget for the one-year duration of this project.

STATEMENT OF WORK

A. Task I: Performance Audits — Initial June, Final Sept — twice

The carbon monoxide (CO) and ozone ($O_3$) monitors at two sites will be audited ~~twice per year.~~ This can be done by auditing alternate sites each quarter for the year. Each analyzer at a site will be challenged with a series of known gas concentrations. These standards are completely independent of those used by the Nevada Department of Environmental Protection. The technical approach and standards protocol are discussed in Section III.

Audit: Anals
site Cal syst.
Logging devices
Systems Monitoring
Training/Audit

3) site documentation needed for data processing 4) revised SOP's

Attachment 7d cont'd. (3)

The performance audits will be conducted with DEP personnel who may be given the responsibility of performing audits after this project is completed. This collaboration will result in a general transfer of information concerning the details of each analyzer and/or audit system and the development of audit procedures, including data recording and reporting forms.

B. Task II: Repair of the Dasibi Calibration System and Other Monitoring Instruments

The present status and maintenance requirements for the Dasibi calibrator and clean air system will be evaluated. Depending on the need for repairs, a decision will be made to perform the maintenance at DRI or to return the calibrator to Dasibi. After the repairs have been made a full calibration and verification of the unit will be performed using DRI primary standards.

Repairs of other monitors will be performed as needed throughout the year, within funding constraints. After an initial investigation, DRI personnel will decide whether it is more cost effective and efficient to perform the maintenance at the site or at DRI, or to return the analyzer to the manufacturer. In either case, a complete check-out of the instrument will be made upon completion of the repair.

C. Task III: Quality Assurance/Control Procedures

Three phases are recommended for this task: 1) perform a systems audit and a review of present documentation, 2) recommend procedures which are needed and prioritize them, and 3) assist in writing the procedures based on the recommended priority list. This task includes implementing the procedures after they are developed.

D. Task IV: Reporting and Program Management

A meeting between DRI and state personnel will be held at the project inception to agree on a workplan and schedule. A report will be prepared following each audit containing audit results, audit procedures, and recommendations. A final report will be prepared after all audits have been completed which will summarize the quarterly audit results, contain procedures which have been developed, and make recommendations for future work. An accounting of expenditures will be delivered quarterly to DEP.

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TECHNICAL APPROACH

Performance audits for continuous gas analyzers (CO and $O_3$) are accomplished by testing analyzer response against standards at four or five evenly spaced concentrations covering the range of expected ambient concentrations. The technique for determining the actual concentration of the test atmospheres varies according to the type of pollutant being measured.

In the case of CO, a known concentration will be created by accurately metering flows from a CO (in a balance of air or $N_2$) compressed gas cylinder and zero air. The gas cylinder is analyzed for its content of CO by both the gas manufacturer and the DRI Standards Lab. In both cases the results are traceable to NBS standards. Zero air is dried ambient air from which CO has been removed. The DRI system utilizes a heated catalyst to oxidize CO to $CO_2$ to create CO-free air.

The dilution system which mixes the span gas and zero air consists of two mass flow controllers. The span gas flow controller meters gas in the 0 to 30 sccm or 0 to 100 sccm range, and the dilution air flow controller meters gas in 0 to 5 slm or 0 to 10 slm range. Both mass flow controllers are tested before each audit by comparing their flow indications to NBS traceable Vol-u-mets, laminar flow elements, or a bubblemeter. The complete test gas generation system is verified by challenging analyzers that are kept in the Standards Lab.

For auditing $O_3$ analyzers, a test atmosphere is created and analyzed at the same time as the monitor being challenged. Ozone is created by exposing clean dry air to ultraviolet light (185 nm wavelength). The concentration can be varied by adjusting the power to the lamp. This sample is drawn by both the site analyzer and the audit standard. The audit standard is a Dasibi 1003-PC which is calibrated against a primary standard (Dasibi 1008-PC) before each audit. Appropriate corrections are made for temperature and pressure for both the checkout and audit. Once each year the 1008-PC is sent to the California Air Resources Board for certification against a long-path photometer.

Statistical calculations for both types of continuous analyzers are the same and include the percent deviation of analyzer response from the audit standard, the average deviation, and the standard deviation as defined by 40 CFR Part 50 Appendix A.

After completing the basic 4 or 5 point audit and determining that the analyzer is operational, linear, and operating in a predictable manner, one or two audit concentrations are reproduced to test the analyzer's repeatability. If the analyzer indication is within 2% of the initial test then an assay of the in-station calibration gas standard (CO only) can be performed. The in-station gas standard is considered valid if

the field assay is within 4% of the most recently certified value. If the deviation is greater than 4% then a laboratory assay is recommended.

The final audit step compares the results of performance tests obtained from the in-station calibration system (gas standard plus dilution unit) with the audit results. If the audit reveals possible problems (flow or contamination) with the calibration system then comparative tests can be done at the time of the audit. If the monitoring system has been stable, according to the last few zero/span checks, then the most recent checks will be used for comparison.

The auditor and site technician will do as much system troubleshooting as is needed and time allows. By the end of the performance audit enough information should be gathered to determine what, if any, maintenance, changes, or additions to the monitoring program are needed.

The instrument repair task is self-explanatory. Appropriate technical staff at DRI will perform the recommended diagnostic tests when an analyzer is found to be malfunctioning. If these tests do not identify the problem, or if the problem cannot be solved within project resources, the instrument will be returned to the manufacturer's repair center.

The full-scale systems audit will be conducted early in the project, probably in conjunction with the first performance audit. It will result in a description of the field operations, data management and data validation systems which presently exist. A list of needed procedures and documentation forms will be formed with a schedule for completing them. Where applicable, existing DRI procedures will be modified for use in the DEP system. This will be advantageous to both DRI and DEP in that both agencies may benefit from future updates of procedures made by either one.

The reporting task is self-explanatory. The quarterly cost summary will follow the audits and will allow DEP to evaluate the financial status of this project relative to work performed.

PERSONNEL

Mr. Ric Capirci, head of DRI's quality assurance program, will serve as program manager and auditor. Mr. Eric Broten will perform monitor diagnostics and repairs. Dr. John Watson, Director of DRI's Air Resources Laboratory, will assist Mr. Capirci in the preparation of reports and procedures.

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COST ESTIMATES

The estimated costs of the project by task are presented in Table 1.

This project is offered on a cost reimbursement basis at DRI's federally approved rate. As part of such an agreement, DRI scientists will devote their best efforts to perform the work and accomplish the objectives within the costs and schedule proposed. DRI will notify DEP, in advance, and as soon as it is known to the project manager, if actual costs are expected to exceed the estimated costs. There are three alternatives in such an event: 1) authorize additional funds to complete the work as originally defined, 2) re-define the scope of work in order to fit the remaining funds, or 3) request that work be stopped at a specified expenditure level. If Option 3 is chosen, DRI will turn over such data, results, and maintenance completed at the authorized expenditure level without further obligation to either party except for payment of work performed.

Invoices will be issued monthly for services and other direct costs incurred during that month. These invoices are payable within 30 days, unless otherwise agreed.

Please call Ric Capirci, John Watson, or me if you have any questions regarding this proposal.

Sincerely,

Richard T. Egami
Progam Manager
Air Resources Laboratory

APPROVALS:

Dr. John G. Watson, Director
Air Resources Laboratory

Dr. Joseph A. Warburton
Acting Executive Director
Atmospheric Sciences Center

Dr. George M. Hidy, President
Desert Research Institute