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EARTH SCIENCE LABORATORY
UNIVERSITY OF UTAH RESEARCH INSTITUTE

Technical Capability, Experience and Facilities

General Statement

The Earth Science Laboratory (ESL) of the University of Utah Research Institute (UURI) was established in 1977 to aid the geothermal and minerals industries in exploration, evaluation and development of natural resources. The scientific techniques and interpretational skills of the staff have allowed ESL to develop new cost-effective geothermal and mining exploration and evaluation methods that are now in routine use by industry.

Geothermal Energy

ESL scientists have acquired extensive field experience in more than 10 high-temperature geothermal systems in the western U.S. and have helped the U.S. Department of Energy (DOE) to manage several major geothermal programs on which DOE has spent over \$50 million in the past five years.

ESL has extensive experience in geothermal exploration, evaluation and development throughout the western United States. Working mainly under contract to the U.S. Department of Energy, ESL has performed geological, geochemical, geophysical and hydrological studies of a regional and site-specific nature for high-, intermediate-, and low-temperature geothermal resources. ESL personnel have also worked in Canada (Meager Creek, B.C.) and El Salvador (Ahuachapan) in volcanic terrains and have interpreted data acquired by others from geothermal areas in Ethiopia and Kenya, as well as the United States.

Minerals

Our minerals exploration, evaluation and development experience is broad in topic and is both regional and site-specific in area. ESL geoscientists have worked in sedimentary, intrusive, skarn, and metamorphic environments on disseminated and massive sulfide deposits of base metals, and on precious metals, uranium, iron, coal, diamonds and petroleum. Our professionals have worked in most of the major mineral provinces of the United States and in Australia, Botswana, Brazil, Canada, Cyprus, Haiti, Mexico, South Africa, and Zambia.

Nuclear Waste Disposal

Dr. Howard Ross, ESL/UURI, has been active as a member of peer review panels for all of the nation's high level radioactive waste disposal geologic exploration programs. These include:

Geology Review Group - ONWI - Battelle - Salt Program, 1979 - present

Geology Peer Review Group - DOE - Nevada Test Site - 1979, 1981

Geology Overview Committee - Rockwell Hanford, Basalt Waste Isolation, 1979-present

Through this participation Dr. Ross has worked with various teams of national and local experts in hydrology, geochemistry, geology and geophysics in addressing geologic and environmental problems resulting from hazardous waste isolation. His duties have been expanded in the National Program to provide expert geophysical consultation to Battelle for specific work in the salt programs in Utah, Texas, Mississippi, Louisiana and for early stage planning and review of the granitic rocks program in the North Central, Northeastern and Southeastern United States.

The ESL/UURI have completed detailed model interpretations of induced polarization and electrical resistivity data for the USGS in support of the

nuclear waste disposal program at the Nevada Test Site. This work has been instrumental in delineating faults and potential resource conflicts.

Subsurface Fluid Flow

Regina Capuano of the Earth Science Laboratory professional staff, in conjunction with the consultants Dr. David Cole, Dr. Donald Langmuir and Dr. Denis Norton, has extensive experience in identifying and modeling subsurface fluid flow paths and mixing, and calculation of fluid-mineral equilibrium relationships. These techniques are used successfully to predict the possibility of pollution resulting from solid waste disposal, acid mine-water drainage, solution mining and other industrial related contamination.

Soil Geochemistry

Dr. Dennis Nielson and Regina Capuano have conducted numerous soil surveys to evaluate gas and trace element contaminations in soils resulting from the activity of hot subsurface water.

Drilling

Jon Zeisloft of the ESL professional staff has, in his 15 years of professional activities, extensive experience in well-site geology and in planning and supervising drilling operations. Following involvement in 12-5000' oil and gas test wells, he directed over 400,000 feet of rotary minerals tests. Two-thirds of that footage involved holes of 400-1000' and much of the remainder was in the 2500-3600' depth range. He is familiar with all drilling fluid techniques, most bits and other drilling tools, and in the operation of small truck-mounted drill rigs to deep drilling oil rigs.

Proper logging of drill cuttings in all type of rocks and unconsolidated materials, involving hundreds of thousands of feet of drill hole naturally

followed from his exposure to drilling projects. Accurate, clean, and orderly acquisition, curation, and labeling of drill-derived materials is a normal part of such a drilling operation.

Contaminants in Drill Cuttings

Jeffrey B. Hulen and Bruce Sibbett of ESL staff have made a systematic study of contaminants in drill cuttings. A brief summary of their findings is contained in Appendix A.

Research

ESL's research experience includes development and implementation of new geological, geochemical and geophysical techniques for geothermal and mineral resources. Specialities are: trace element geochemistry, fluid geochemistry, mineralogy, geochemical laboratory analyses, K-Ar and fission-track age dating, fluid/mineral equilibrium models, mercury geochemistry, isotope geochemistry, advanced interpretation techniques for electrical, gravity and magnetic data, physical properties studies, and development and implementation of computer algorithms.

General

The Earth Science Laboratory has broad technical capability and a record of cost-effective performance. The professional staff includes 28 geologists, geochemists, geophysicists, computer scientists and engineers, along with technical and administrative support. This staff brings to ESL over 200 cumulative professional years of experience in geothermal and mineral resource development and in research. The center-fold in the attached brochure shows the areas which ESL's staff has worked in the U.S.

The Earth Science Laboratory operates under a matrix management system

where a principal investigator is able to draw on members of the geology, geochemistry, geophysics, computer or electrical engineering groups to form a scientific team most qualified to handle a specific project. The principal investigator is then responsible for management and technical guidance of the working group. The principal investigator is responsible to the Associate Director/Technology and the Associate Director/Administration for the technical and financial portions of the contract respectively. The organizational structure of UURI and of ESL are shown in Figures 1 and 2.

Military Bases

ESL has performed geoscience studies on the following military bases:

China Lake Naval Air Station CA

Hill Air Force Base UT

Williams Air Force Base AR

A two man crew will be leaving July 6, 1982 to do geoscientific work at the U.S. Air Base on Ascension Island.

A phased exploration program for geothermal resources at Hill Air Force Base near Ogden, Utah was conducted by ESL as part of a cooperative agreement between the U.S. Departments of Energy and Defense. Lineaments detected on infra-red and aerial photographs have northwest, northeast, and east orientations. A soil Hg survey demonstrates an anomaly near Ogden Hot Springs, but results were not encouraging enough to continue the survey on the base. Evaluation of the chemical character of hot spring, cold spring, and well waters on and near the base indicates that thermal waters in Hill AFB area probably represent the surface manifestations of meteorical water circulated to depth along faults in a near-normal heat flow regime. Chemical geothermometer calculations yield low temperatures for well water on the base

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ORGANIZATIONAL CHART

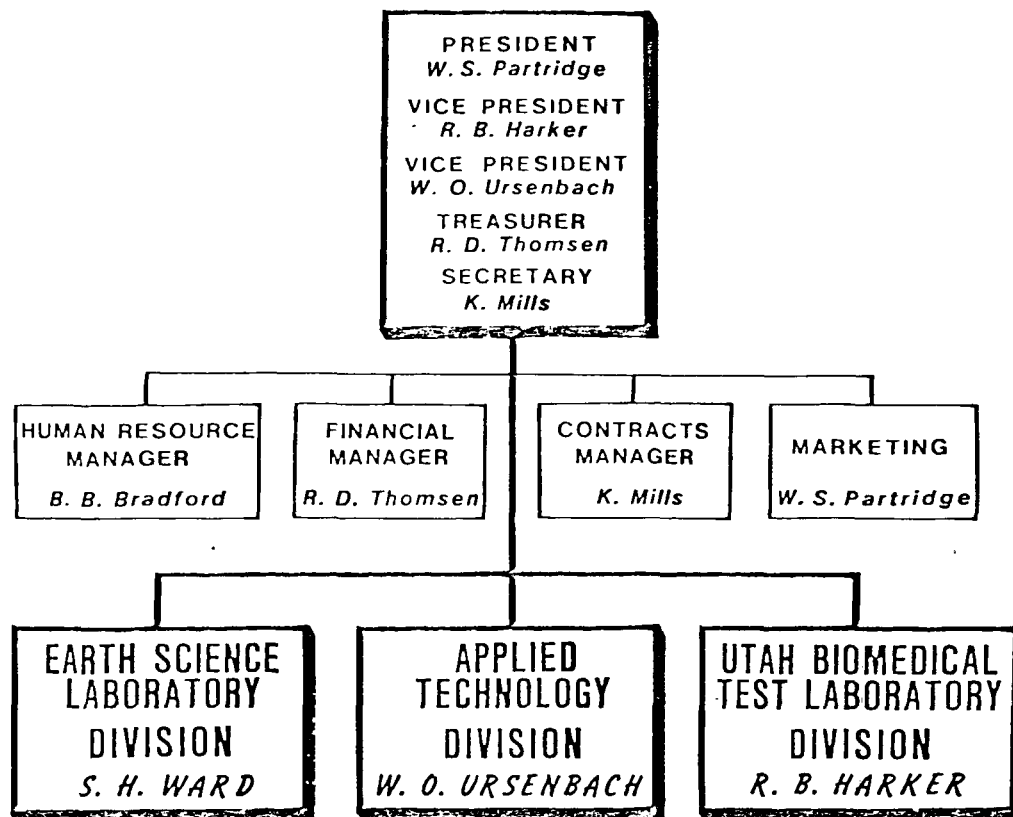


FIG. 1

MANAGEMENT STRUCTURE EARTH SCIENCE LABORATORY

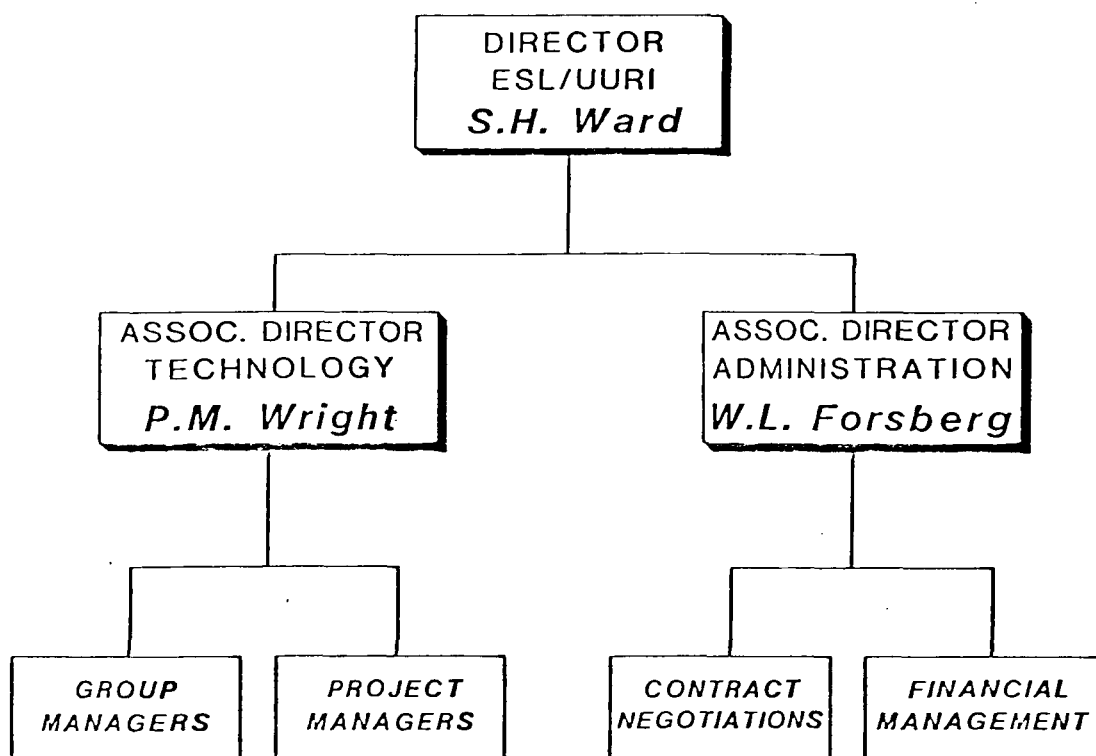


FIG. 2



and mixing of thermal waters with cold aquifers cannot be conclusively demonstrated. Non-unique, variable and constant density modeling of gravity data indicate that bedrock increases in depth from 0.9 km at the east side of the base to 2.85 km at the west side of the base. Reflection seismic traverses across the base indicate that west-dipping normal faults are the major structural features beneath the base. Results of the preliminary studies were used to target two thermal gradient holes. The thermal regime in both holes showed evidence of disturbance by the cold water aquifers of the Weber River Delta. The hole at the eastern edge of the base was drilled to 384 m and has a bottom hole temperature of 13°C. The hole drilled at the south gate reached a depth of 993 m and had a bottom hole temperature of 40°C recorded immediately after drilling.

Clients from Private Industry

Table 1 contains a list of industrial clients we have served since 4/1/80 to the present.

Quality Control

The Earth Science Laboratory has employed Mr. Carl A. Ruscetta to Manage the Quality Control Program at the Earth Science Laboratory.

Mr. Ruscetta received his B. S. degree in Chemical Engineering from the University of Massachusetts in 1957. Since then he has had extensive training and experience in the quality assurance field early in his career while employed by the General Electric Company, Power Tube Department, Schenectady, N.Y. from January, 1957 to February of 1964. The Power Tube Department developed and manufactured electronic vacuum tubes for a wide variety of commercial and military applications including VHF and UHF communications, radar and microwave heating. He received special training under the direction

Table 1

PRIVATE INDUSTRY CONTRACTS
4/80-6/82
DOMESTIC

- GEOPHYSICS
 - ANACONDA COPPER COMPANY
 - ENERGY FUELS NUCLEAR, INC.
 - FLORIDA EXPLORATION COMPANY
 - HUNT ENERGY CORPORATION
 - J.C.W., INC.
 - ROCKY MOUNTAIN ENERGY

- SOLUTION MINING
 - AMAX, INC.
 - AMOCO MINERALS COMPANY
 - ANACONDA COPPER COMPANY
 - DUVAL CORPORATION
 - KENNECOTT COPPER CORPORATION
 - PHELPS DOGE CORPORATION

- ELECTRONICS
 - GEOTRONICS CORPORATION

- GEOCHEMISTRY
 - AMOCO MINERALS COMPANY
 - CHEVRON OIL FIELDS RESEARCH COMPANY
 - GETTY OIL COMPANY
 - KENNECOTT MINERALS COMPANY
 - MAPCO
 - MORRISON-KNUDSEN CO., INC.
 - NATIVE PLANTS
 - OCCIDENTAL MINERALS CORPORATION
 - OCCIDENTAL RESEARCH CORPORATION
 - SILVER KING MINES
 - SUPRON ENERGY CORPORATION
 - TERRA TEK
 - UNION OIL COMPANY OF CALIFORNIA
 - UNITED STATES STEEL CORPORATION

- GEOLOGY
 - HOMESTAKE MINING COMPANY
 - HUNT ENERGY CORPORATION

- COMPUTER
 - UNITED STATES STEEL CORPORATION
 - JELCO DIVISION OF TOWNSEND AND BOTTUM, INC.

- DRAFTING
 - GETTY OIL COMPANY
 - SEEGMILLER INTERNATIONAL
 - UTAH INTERNATIONAL

of A. V. Feigenbaum, then corporate manager of manufacturing operations and quality control and president of the American Society for Quality Control. Mr. Ruscetta served in progressively responsible positions as a process and quality control engineer, and for approximately five years as manager, quality assurance and laboratory unit, reporting to the department QC manager. The QA&L unit consisted of a material testing laboratory and from 40 to 60 inspectors, and was responsible for all incoming material, in process and final product inspection and quality control. A substantial portion of Power Tube Department business was military hardware, requiring adherence to MIL-Q-9858 and a variety of other military standards. Mr. Ruscetta taught a course in quality control engineering and management for line supervisors at Utah Technical College in Salt Lake. His professional affiliations have included membership in ASQC and ASTM.

Federal Clients

U.S. Dept. of Energy
DOE/Idaho Operations Office
550 Second Street
Idaho Falls, Idaho 83401
Telephone: (208) 526-1668

Technical Administrator:
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Contracting Officer:
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Los Alamos National Laboratory
University of California
Department of Supply and Property
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Summary of Staff Expertise and Facilities

Geology

Geologic investigations provide essential data for successful completion of a wide variety of earth science projects. The ESL staff has a broad background in design and management of geologic work as well as in application of individual geologic techniques such as field mapping, structural and stratigraphic studies, mineralogy, petrology, and lithologic logging of drill chips and core. ESL's project management experience includes a full spectrum of exploration services from project design and execution to supervision of drilling evaluation of results. ESL is experienced in formulation of exploration models, regional geologic interpretation, and development and testing of techniques for specific applications.

Geochemistry

Geochemistry has, during the last decade, become an essential component of earth science investigations. ESL's broad practical experience and proven exploration and research capabilities allow us to offer services ranging from routine analysis of geologic materials to design, execution and management of fully integrated geochemical exploration programs and from application of existing geochemical techniques to development of new techniques. ESL has made significant contributions to development and application of new geochemical techniques for a wide variety of applications.

A geochemical laboratory designed especially for geothermal studies has been operational since 1977. The laboratory is equipped with an ARL Inductively Coupled Plasma Spectrometer (ICP), capable of analyzing 37 elements simultaneously, an IL Atomic Absorption Spectrophotometer, a Jerome Gold Film Mercury Detector, an Orion Specific Ion Meter and electrodes, and

complete sample facilities. In addition, facilities for electron microprobe, scanning electron microscope, X-Ray diffraction, and age dating studies are available. Interactive computer programs available on ESL's Prime 400 computer allow statistical treatment and provide geochemical plots of the analytical data.

Geophysics

Application of geophysical techniques greatly enhances ESL's ability to investigate the subsurface. The staff has broad competence and experience in survey design and management and in integrated geological interpretation of geophysical data for a wide variety of resources. ESL has a suite of user-interactive computer software that operates on the PRIME 400 computer to facilitate quantitative modeling and interpretation. ESL'S research scientists have pioneered in the development of new interpretation techniques for geophysical data and the implementation of these techniques on the computer in a highly cost-effective way. ESL can help the client to develop his in-house computer-based interpretation capabilities and can provide training of personnel in operation of available programs.

Electronics Engineering

High-quality field data are vital for today's earth scientists. ESL's electronics engineers provide broad competence and experience in instruments for electrical geophysical surveys. The latest hardware and software are available for custom application to your needs. The Electronics Laboratory is well equipped for development of microprocessor integrated geophysical instrumentation. Test, design and prototype construction facilities are state-of-the-art.

Computer Facilities

ESL's computer center offers a broad range of computer services. The group specializes in development and implementation of user-interactive software for display, analysis and interpretation of geological, geochemical and geophysical data. The software can be used either at your facility or on a time-sharing basis on ESL's computer via the telephone.

Computer facilities consist of a PRIME 400 minicomputer system with a link to the University of Utah's UNIVAC 1100/60 computer. The system includes a PRIME 400 CPU with time-sharing capability and virtual memory, 1256 K bytes of main memory, 460 M bytes of disk storage, a 9-track magnetic type drive, a 36-inch Zeta pen plotter, a Statos electrostatic plotter, a line printer, 2 Tektronix 4014 graphics terminals with digitizing tablets, a DECwriter terminal, 7 CRT terminals, and two Texas Instruments Silent 700 terminals. Three dial-in phone lines are available to users, two at 300 baud and one at 1200 baud data transmission rates. The system is specifically oriented to scientific and engineering computation and to handling and interpreting geoscience data.

Geothermal Sample Library

The Geothermal Sample Library provides open-file accessibility and archival storage for field and drill samples as well as reference to analyses done on the samples. We provide proprietary storage for confidential samples as well as storage of samples that are accessible by the public. At present, the Library contains over 80,000 meters of drill chip samples and 2,100 meters of core from 171 shallow thermal gradient holes and deep holes, mainly in geothermal areas. Samples may be studied at our facility by clients in order to compare their own drill results with samples from other geothermal areas.

Complete sample preparation facilities are available and are used to prepare samples for storage and for routine or special chemical or physical analyses. Density and magnetic susceptibility measurements can be done at our facility.

Document Library

ESL has an extensive document library that is available for use by clients. We have issues of all the important geoscience journals. Xerox and microfiche copies of many published articles are available. At present the library contains about 12,000 titles.

In addition, ESL has exchange privileges with the complete library facilities on the University of Utah campus which has 2,000,000 titles.

Office Facilities

The main offices of the Earth Science Laboratory are located in Research Park, on the east side of the Salt Lake Valley, adjacent to the University of Utah. There are over 4,600 square meters of laboratory and office space in two buildings. Located here are the geochemical laboratory, the electronics laboratory, the computer center and our extensive document library as well as offices. The Geothermal Sample Library occupies 450 square meters in a small building in suburban Salt Lake City and is accessible to the main offices in a 10-minute drive.

Detailed Statement of Technical Capability

ESL conducts a broad range of scientific investigations that include field programs, data interpretation, research and technique development, geochemical analytical services, custom computer software, development of electronic instrumentation and training seminars and workshops. ESL emphasizes the integration of all scientific disciplines and techniques in solving problems in the earth sciences. An optimum, cost-effective combination of techniques from the fields of geology, geochemistry, geophysics, and hydrology can be applied by in-house experts to solve specific problems.

The ESL professional staff is broad and diversified in education and experience. Table 2 shows the distribution with scientific discipline of the 28 earth scientists. Even though the main portion of a given project may be done by a few scientists, the expertise of this entire staff would be made available as required and the personnel assigned to the project would be free to draw upon the talents of other personnel at ESL.

ESL has experience mainly along three different lines: 1) program management, 2) applied scientific work and 3) research.

Geothermal Program Management

Table 3 illustrates ESL's experience in geothermal project management. Under contract to the U.S. Department of Energy (DOE), ESL has assisted DOE to manage programs that have performed over \$50 million U.S. in research and field work during the past 5 years. ESL's roll in each of these programs is identified in the table.

Table 2
EARTH SCIENCE LABORATORY
PROFESSIONAL STAFF*

| | | | |
|-------------------------------|-------|-------|----|
| Geologists | | | 9 |
| | Ph.D. | 3 | |
| | M.S. | 2 | |
| | B.S. | 4 | |
| Geochemists | | | 5 |
| | Ph.D. | 2 | |
| | M.S. | 1 | |
| | B.S. | 2 | |
| Geophysicists | | | 7 |
| | Ph.D. | 6 | |
| | M.S. | 0 | |
| | B.S. | 1 | |
| Computer Scientists | | | 4 |
| | M.S. | 2 | |
| | B.S. | 2 | |
| Electronics Engineers | | | 2 |
| | B.S. | 2 | |
| Quality Assurance Personnel | | | 1 |
| | B.S. | 1 | |
| | | Total | 28 |
| Consulting Geochemists | Ph.D. | 2 | |
| Consulting Isotope Geochemist | Ph.D. | 1 | |

* This professional staff is supported by 3 business administrators, 8 technicians, 4 secretaries, 5 draftspeople and 1 librarian.

Geothermal Field Experience

Table 4 shows the major high-temperature geothermal areas where ESL has performed field work and research over the past 5 years. Many of these areas have similarities to geothermal areas worldwide. ESL has worked in most of the major, developing high temperature areas in the western U.S. This work has been done largely in conjunction with the DOE's Industry Coupled Program and Exploration Technology Program (see Table 4). ESL has made major contributions to the understanding of the geothermal resources in these areas and has worked very closely with the companies involved. The work has spanned the earth science field. During the course of this work our scientists have gained extensive experience, have developed new methods and techniques for exploration and resource evaluation, and have published more than 60 reports which are publically available through ESL or through the U.S. National Technical Information Service (NTIS).

Geothermal Research and Instrumentation Development

Table 5 shows the major topic areas where ESL has made significant research and development contribution in geothermal geoscience. The work in the development of trace element geochemistry has been well accepted by the U. S. geothermal industry. Results of this work and experience is applied to all data in the integrated interpretation.

ESL and the University of Utah have a unique center of excellence for development of geophysical data interpretation techniques. Advanced interpretation requires highly sophisticated mathematical development and ingenuity of implementation on computer systems. Few institutions can match our capability for development and implementation of new techniques.

Table 3
REPRESENTATIVE GEOTHERMAL PROGRAM MANAGEMENT
(for U. S. Department of Energy)

1. Industry Coupled Program. Assisted DOE in management of national program of cooperation in geothermal exploration between DOE and industry. Management assistance role consisted of helping to write procurement solicitations, helping to evaluate proposals from industry to DOE and helping to monitor contracts between industry and DOE. ESL was also responsible for the acquisition of new geological, geochemical and geophysical data from 10 geothermal areas in the western U.S. to supplement industry data. Published interpretations of new data along with data originally collected by the geothermal industry in reports and case studies. Total DOE expenditures on program were \$16 million during the past 4 years. Program will phase out in FY 1982.
 2. State Coupled Program. Coordinated DOE programs in western U.S. wherein teams of geologists under separate contract to DOE worked in each state to assess low- and moderate-temperature (<150°C) geothermal resources. Management role included formulating policy and procedures for program, communicating program goals to state teams, conducting workshops for bringing state teams together, evaluating proposals from state teams to DOE, and monitoring project progress. This program will ultimately result in publication of detailed geothermal resource maps for about 25 states in the western U.S. where most of the geothermal resources occur. Total DOE expenditures on program were \$24 million during the past 4 years. Program will phase out in FY 1982.
 3. Exploration Technology Development Program. Managed national program for the development of new technology for exploration and evaluation of geothermal resources. ESL's management role consisted of assisting DOE in issuing solicitations, evaluating proposals and evaluating quality of work performed by other contractors. In addition, ESL played a major role in this program by performing in-house research and technology development. Total DOE expenditures on program were \$4 million during the past 4 years. Program will continue after FY 1982.
 4. User Assistance Program. Provided geological, geochemical and geophysical consulting services to potential new users of geothermal energy in the western U.S. Coordinated engineering aspects of projects with other DOE contractors. Total DOE expenditures on program were \$1 million over past 3 years. Program phased out at end of FY 1981.
 5. User Coupled Confirmation Drilling Program. Designed and implemented new DOE program for cost sharing by DOE of drilling for low- and intermediate-temperature geothermal resources (T<150°C). Currently manage the geoscience aspects of program nationally for DOE. Total program expenditures by DOE were \$4 million over the past 2 years. Program will phase out in 1983.
-

6. Geothermal Sample Library. Manage national library where drill chip and core samples from geothermal wells drilled with DOE and other funding are studied and curated. Library currently contains nearly 60,000 m of drill chip samples and 2100 m of core from 169 geothermal wells.

Table 4
MAJOR GEOTHERMAL FIELD EXPERIENCE

| Area | Work Accomplished by ESL |
|------------------------------|--|
| 1. Roosevelt Hot Springs, UT | <p>Detailed geologic mapping (1:24,000) Lithologic logging of drill chips from 23 holes (10,440 m total length) Trace element geochemical studies of drill chips and surface samples Mercury geochemical soil survey Radon emanometry survey Interpretation of distribution of hydrothermal alteration minerals with respect to fluid chemistry and temperature Calculation of subsurface fluid composition and temperature from fluids sampled at surface Interpretation of resistivity, magnetic, gravity, seismic, magnetotelluric, self potential and temperature gradient geophysical data Interpretation of geophysical well logs from deep wells Installed and operated microearthquake monitoring network of 10 stations Publication of 10 reports</p> |
| 2. Cove Fort/Sulphurdale, UT | <p>Detailed geologic mapping (1:24,000) Lithologic logging of drill chips from 3 deep wells (5060 m total length) Trace element geochemical studies of drill chips and surface samples Interpretation of resistivity, magnetic, gravity, seismic, and temperature gradient geophysical data Interpretation of geophysical well logs Publication of 3 reports (+2 in prep.)</p> |
| 3. Beowawe, NV | <p>Detailed geologic mapping (1:24,000) Detailed distribution of hydrothermal alteration Lithologic logging of drill chips from 28 holes (12,960 m total length) Trace element geochemical studies of drill chips and surface samples Interpretation of resistivity, magnetotelluric, and temperature gradient geophysical data Interpretation of geophysical well logs Publication of 3 reports</p> |

4. Colado, NV
Detailed geologic mapping (1:24,000)
Lithologic logging of drill chips from 20 holes (3645 m total length)
Trace element geochemical studies of drill chips and surface samples
Interpretation of resistivity, telluric, and temperature gradient
geophysical data
Interpretation of geophysical well logs
Publication of 4 reports
5. Soda Lake/Stillwater, NV
Geologic reconnaissance mapping
Lithologic logging of drill chips from 4 holes (4080 m total length)
Interpretation of resistivity, seismic, magneto-
telluric, and temperature gradient geophysical data
Interpretation of geophysical well logs
Publication of one report
6. McCoy, NV
Detailed geologic mapping (1:24,000)
Lithologic logging of drill chips from 35 holes (1750 m total length)
Interpretation of resistivity, self potential and temperature gradient
geophysical data
Interpretation of geophysical well logs
Publication of 1 report (in press)
7. Baltazor, NV
Detailed geologic mapping (1:24,000)
Lithologic logging of drill chips from 14 holes (2380 m total length)
Mercury geochemical soil survey
Detailed gravity and magnetic surveys
Interpretation of resistivity, magnetic, gravity, magneto-
telluric, and temperature gradient geophysical data
Interpretation of microearthquake survey
Publication of 2 reports
8. Tuscarora, NV
Detailed geologic mapping (1:24,000)
Lithologic logging of drill chips from 2 holes (3430 m total length)
Interpretation of resistivity, magnetic, gravity, magneto-
telluric, and temperature gradient and geophysical data
Interpretation of geophysical well logs
Publication of 1 report, 2 in press

9. Coso Hot Springs, CA

Detailed geologic mapping (1:24,000)
Lithologic logging of drill chips from 1 hole (2100 m total length)
Interpretation of resistivity, magnetic, gravity, magneto-
telluric, self potential and temperature gradient geophysical data
Interpretation of geophysical well logs
Publication of 4 reports

10. The Geysers, CA

Detailed trace element geochemical studies of 10 deep wells including
wells within and peripheral to the field.
Formulation of an exploration geochemical model to help guide future
drilling at The Geysers
Publication of one report (in press).

Table 5
MAJOR GEOTHERMAL RESEARCH AND INSTRUMENTATION DEVELOPMENT

| Research Accomplishments | Where Applied |
|--|--|
| <p>1. <u>Trace Element Geochemistry</u>. Developed new techniques for geothermal exploration and resource evaluation, for siting of drill holes and for gathering data during drilling of holes using trace element geochemistry of surface samples and of drill chips and cores. Conducted major research studies at The Geysers, CA and Roosevelt Hot Springs, Utah. Applied techniques at several other areas. These techniques are currently in use by major geothermal companies in the U.S. Published 7 reports.</p> | <p>The Geysers, CA Roosevelt Hot Springs, UT Cove Fort/Sulphurdale, UT Colado, NV Beowawe, NV McCoy, NV</p> |
| <p>2. <u>Mercury Geochemistry</u>. Documented relationships between temperature distribution underground and occurrence of mercury in drill chip samples. Showed that mercury geochemistry can be used to site drill holes, guide drilling and locate fluid entries in drill holes. Published 2 reports.</p> | <p>The Geysers, CA Roosevelt Hot Springs, UT Beowawe, NV Colado, NV McCoy, NV</p> |
| <p>3. <u>Resistivity Data Interpretation</u>. Developed new highly sophisticated programs using two-dimensional and three-dimensional models for interpretation of resistivity and induced polarization geophysical data. Complete mathematical formulation had never been done before. Published 6 reports.</p> | <p>Roosevelt Hot Springs, UT Cove Fort/Sulphurdale, UT Beowawe, NV Colado, NV Tuscarora, NV McCoy, NV Lakes District, Ethiopia Olkaria District, Kenya</p> |
| <p>4. <u>Magnetotelluric Data Interpretation</u>. Developed new and unique computer programs using two-dimensional and three-dimensional models for interpretation of magnetotelluric geophysical data. Mathematical formulation had never been done before. Published 3 reports.</p> | <p>Roosevelt Hot Springs, UT Tuscarora, NV</p> |
| <p>5. <u>Self Potential Data Interpretation</u>. Developed new and unique methods for interpretation of self potential data. Report in press.</p> | <p>Roosevelt Hot Springs, UT</p> |

6. Resistivity and Induced Polarization Instrumentation. Developed a new, state-of-the-art, four-channel field receiver for resistivity and induced polarization data collection. Features are light weight, field programmable computer control, phase and amplitude measurement. Receiver will be marketed by Geotronics, Inc. of Austin, TX. Field tested in Colorado.

7. Magnetotelluric Instrumentation. Developed a new and unique field system for acquisition of magnetotelluric geophysical data. Features are computer control with digital magnetic recording of data. Uses SQUID magnetometers. For research purposes -- this field system will not be marketed. Roosevelt Hot Springs, UT

APPENDIX A

GEOCHEMISTRY OF DRILL CUTTINGS

- A. Multi-element geochemistry, like alteration, is useful in estimating the size and configuration of a geothermal reservoir and in locating or predicting approach to thermal fluid entries (Christensen, 1980; Bamford and others, 1980; Bamford, 1978; Ewers and Keays, 1977).
- B. Geochemistry of cuttings may be different than that of corresponding undrilled rock.
 1. Clays, sulfides, limonites and other minerals in which diagnostic trace elements are commonly concentrated (Levinson, 1974, 1980) may be enriched or depleted in cuttings (this outline, sections II-D-6 and IV-C).
 2. Contaminants in a cuttings sample may dilute a potentially useful geochemical indicator beneath its detection limit.
 3. Metallic contaminants in cuttings may produce confusing geochemical signatures (Bamford et al., 1980).
- C. Sources of metallic contaminants in drill cuttings:
 1. Abrasion and corrosion of drillpipe, bottom-hole assemblies (particularly bits) and casing
 - a. Particularly troublesome when air-drilling (Nicholson, 1980; Wolke, 1980)
 - b. Drill steels, or rust derived therefrom, commonly contain, in addition to iron, the following elements in major concentration: chromium, molybdenum, nickel, vanadium and manganese (U.S. Steel, 1964).
 - c. Threads on tool joints may be lightly plated with copper (for example Hughes, 1980-1981).

- d. Tungsten carbide is commonly used as a wear-resistant component of bits, stabilizers and reamers, drill collars and tool joints (Scott, Jr., 1980; Hendrikson et al., 1980; Sutton; 1980; and, for example, Hughes, 1980-1981, and Reed Rock Bit Company, 1980-1981).
 - e. Monel drill collars, such as commonly used at the Geysers geothermal field (Scott, Jr., 1980) may yield nickel and copper to the cuttings (Chemical Rubber Company, 1976-1977).
2. Drilling through downhole cement placement assemblies.
 - a. Cementing collars, float and guide shoes and stabilizers are generally made of drillable metal such as aluminum or cast iron (see, for example, Halliburton, 1980-1981; Smith, 1974).
 - b. Drillable cores of cementing plugs, drop balls and ball components are now generally made of aluminum (see, for example, Halliburton, 1980-1981). In the past, however, they have also been made of lead (Bamford et al., 1980, pers. communication with D. Bristol of Halliburton Mfg.). In Well Utah State 14-2 at Roosevelt Hot Springs KGRA, highest lead values in cuttings are recorded at and below two of three cementing locations (Figure 3).
3. Thread and tool joint compounds, particularly those used for high-temperature/high-pressure applications (see, for example, Jet-Lube, 1980-1981; Bestolife, 1980-1981; Oil Center Research Inc. (Liquid-O-Ring) 1980-1981; Standco, 1980-1981) may contain, in various combinations, lead, zinc, copper and molybdenum.
4. Paints contain a wide variety of metallic coloring agents (Chemical Rubber Company, 1976-1977), the most common of which include:
 - a. lead, zinc and titanium (white)

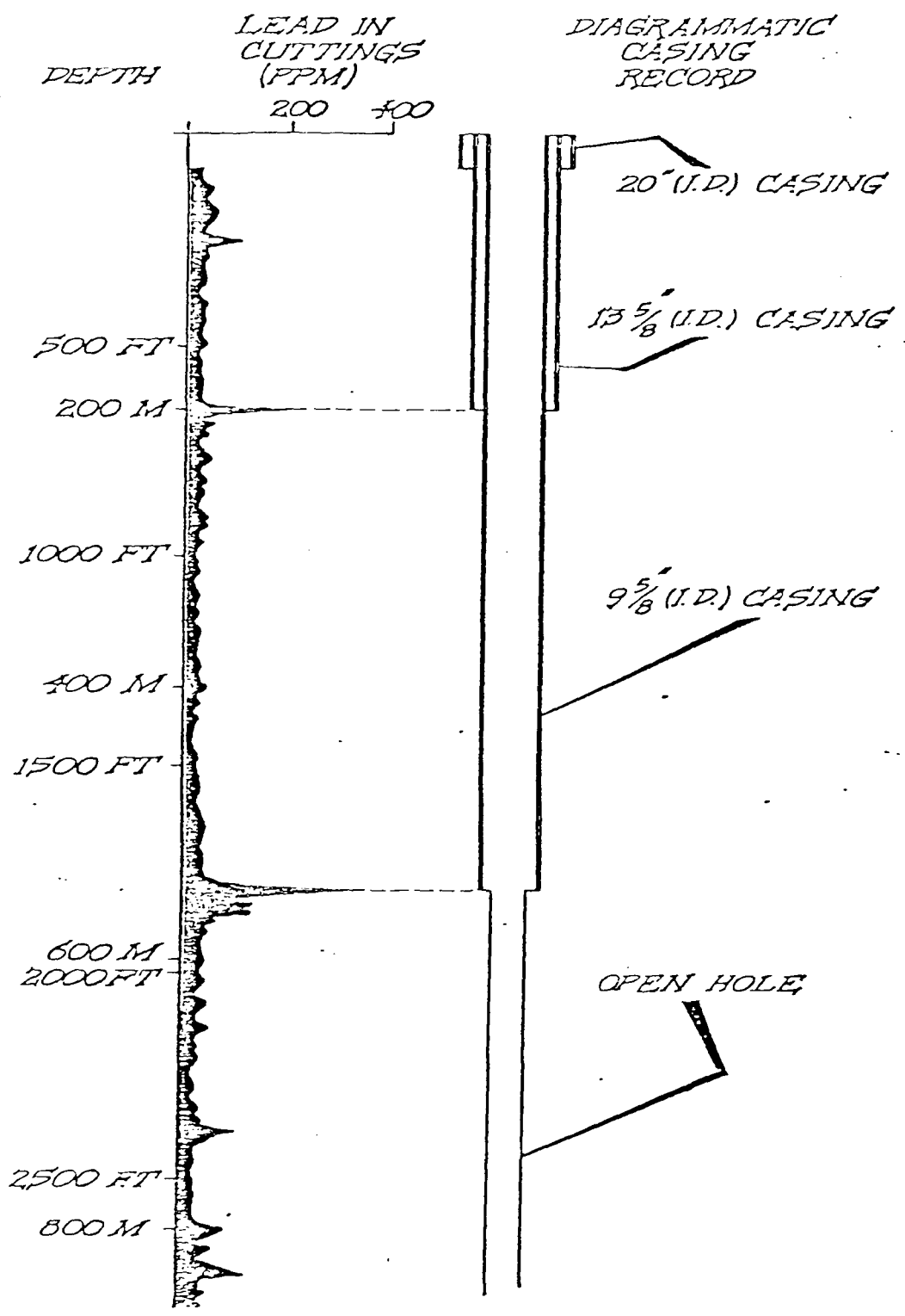


FIGURE 3.
 LEAD GEOCHEMISTRY OF CUTTINGS COMPARED WITH CASING RECORD FOR THE UPPER PORTION OF WELL UTAH STATE 14-2, ROOSEVELT HOT SPRINGS AREA, UTAH.

DATA FROM BAMFORD ET AL. (1980) AND GLENN AND JIULEN (1979)

- b. chromium (green)
 - c. copper (blue and green)
 - d. tin (blue)
 - e. cobalt (blue, violet)
 - f. cadmium (red, orange, yellow)
 - g. manganese (blue, violet)
5. Various mud weighting agents may contribute to metallic contamination of cuttings.
- a. galena (lead)
 - b. hematite (iron)
 - c. barite (barium)

Personnel Resumes

MAILED JULY 2, 1952

Attachment

ESL Brochures.

Hill AFB. Report - ESL - 34

Personnel Resources.

ESL. Personnel

Consultant.

Cole

Langmuir

Norton.

REC'D JUL 7 8, 1982
FROM VIBTL

The U.S. Air Force's Installation Restoration objective to identify and ultimately control or of contaminants resulting from past installation is divided into four phases which are summarized

Phase I

A. Objective: Establish the existence of waste problem

B. Activities:

- 1) Review records of processes ca
- 2) Inspect waste disposal sites
- 3) Prepare a Phase I Report which:
 - a) Identifies and locates hazardous wastes (chemicals, explosives, radioactive waste)
 - b) Recommends specific Phase II activities

Phase II

A. Objective: Quantitatively characterize the environmental problem and recommend a cleanup approach

B. Activities:

- 1) Visit installation to inspect waste disposal sites (pre-survey)
- 2) Review Phase I Report
- 3) Prepare a Pre-Survey Report which:
 - a) Outlines technical approach for Phase II work
 - b) Estimates costs for Phase II work
- 4) Perform tasks related to characterizing the environmental problem which will probably include:
 - a) Determining a survey strategy
 - b) Drilling monitoring wells
 - c) Geologic characterization (magnetometer, ground penetrating radar, seismic investigations and earth resistivity)
 - d) Characterization of surface and underground water flows
 - e) Obtaining samples of water, soil, sediment, air and biota
 - f) Chemical analysis (EPA, ASTM, NRC, or equivalent)
 - g) Developing a model of contaminant migration
 - h) Identifying the legislation which applies to the contamination
- 5) Recommend a cleanup strategy which may include:
 - a) Carbon adsorption
 - b) Reverse osmosis
 - c) Chemical fixation
 - d) Incineration
 - e) Containment
- 6) Prepare a Phase II Report summarizing findings and recommendations

Phase III

A. Objective: Clean up site

B. Activities: As specified in Phase II Report

Phase IV

A. Objective: Restore site to original condition

B. Activities:

1) Grading

2) Filling

3) Revegetation

office shown are not announcement before to any limitations individuals, specialized technical more firms considered required will be chosen receiving services will be negotiation shall be necessary for the satisfaction of the requirements, including any Firms desiring to register the procurement office are encouraged to submit data utilizing Standard Questionnaire.

ad to participate as prime her small businesses, and possible contractor will be acceptable extent with small divisions of Public Law 95-

tion for increased quantity exercise the option at time and in the solicitation.

and specific in the technical and qualifications: (1) Experience previously performed or development effort (2) Personal experience of scientist, engineer as principal investigator, and description of special facilities for consideration. A statement specific and pertinent information that would enhance our understanding.

1 this procurement office may need to duplicate such data. Trying the above question must sponsor will not be made.

Qualified Products List may be obtained from Commanding 5801 Tabor Avenue, Philadelphia

and Deviation Lists may be examined at the Defense General Supply Center.

by addressing the Directorate PO, or by calling 804/275-3350. Refer to both the Pre-Invitation numbers are cited in the synopsis, first served basis until the bidder's list for these items will be

ing to the procurement described by the Government. If the bidder has previously awarded a Job Order, a Master (DD-ASPR For 731).

It will be directed to the Naval Avionics Indianapolis, IN 46218. Attention:

use within vital submarine pressure relief 1/500-Safe systems. As a result contractors whose inspection system is a joint DCAS/SPCC survey team. to the survey team has awareness of set forth in the "Additional Ordering

per cent set-aside for Small Business of the concern and its affiliates for its bid \$7,500,000.00.

ation, please furnish self-addressed on number at bottom edge of label, in limited for each solicitation required.

previously approved by the Government or approval of a new supplier is non-

pending approval of the new source. If can furnish either (i) proof of your similar items satisfactory for the Government the same or similar items self-

produced the same or similar items commercial source, or (ii) test data indicating requirements, or (iv) other persons to produce the required item, please and proof or data along with your request

ments of the proposed procurement listed as Daily are available, through individual

The Secretary by law of this Do through 31 Jul 82 Government Pt Washington Dc Superintendent Official Business

Date 1 Feb 1 P.20

requests for each solicitation Operations Office 77058, TELEX 762-93 ed, on a first come, first the above address. Closing following: NASA Health Utilization, FB-108, P 20546.

85. The General Forms-314, -315, -317 will be mailed with time solicitation is Education, and Well

86. Copies of Form among General, U.S. Director, DRSTA-PT. Tel: anti-addressed purchase

87. Published notices. Requests for contract Firms must be in the Writen requests and shall be submitted to U.S. Government Procurement Section, Washington, D.C. Each proposal

88. The estimated cost and \$100,000. Additional under the new of County country, it is

89. Caution: resultant cost of proposal or other authorized.

90. PERTIC DATA PR COMPANY The office Force is in the ing Comp The office

(1) The drawing of contract (2) The features information (4) All completed 94. I contract less a 95. with th 96. (Armed requan article award

97. The Government's annual exceed \$10,000

USAFSAM/HRK, Lt. Col. Donna L. Gaughan, Phone: A/C 512, 536-2842. Brooks AFB, TX 78235. (028)

91 -- LUBRICATING OIL, Semi-Fluid, Military Symbol LSA, MIL-L-46000B. A Qualified Product--1-gallon can - 4,381 gallons--For delivery to various destinations within CONUS--FB DLA600-82-B-0095/B--Opening date: 26 Feb 82. (028)

Defense Fuel Supply Center, Attn: Bid Custodian, Cameron Station, Alexandria, VA 22314

RESEARCH AND DEVELOPMENT SOURCES SOUGHT

In order that potential sources may learn of research and development programs, advance notice of the Government's interest in a specific research field is published here. Firms having the research and development capabilities described are invited to submit complete information to the purchasing office listed. Information should include: the total number of employees and professional qualifications of scientists, engineers, and personal specially qualified in the R&D area outlined, and description of general and special facilities, an outline of previous projects including specific work previously performed or being performed in the listed R&D area; statement regarding industrial security clearance previously granted; and other available descriptive literature. Note that these are not requests for proposals. Respondents will not be notified of the results of the evaluation of the information submitted, but the sources deemed fully qualified will be considered when requests for proposals are solicited. Closing date for submission of responses is 14 days from publication of the notice, unless otherwise specified.

FIELD EVALUATION AND SAMPLE COLLECTION AND ANALYSIS FOR THE AIR FORCE INSTALLATION RESTORATION PROGRAM. Test and Development Area PMRN 82-80. This effort will provide technical man-

hours and materials on a task basis (discrete work orders) for the evaluation, sample collection, and analysis necessary to carry out the requirements for Phase II of the Air Force Installation Restoration Program. The work may entail collection of surface and subsurface samples, analyses for priority and other pollutants; geophysical and geohydrological investigations including installation/protection of groundwater monitoring wells, and surface/subsurface water modeling; and, chemical contamination/migration potential assessments based on these data. Work may be conducted simultaneously at several locations in and around Air Force installations. Investigations to determine the magnitude and extent of contamination in soil, sediment, and biota may be required. Survey work in the areas of radiological, chemical, and explosive/propeflant contamination may be conducted. Photogrammetric analysis of conventional and infrared photographs may be required. Surveys may also include ground and surface water and geophysical assessments, to include magnetometer, ground-penetrating radar, seismic investigations and earth resistivity studies. Analyses of a wide variety of contaminants in complex matrices, including all the 297 compounds currently listed as hazardous materials by the US Environmental Protection Agency (EPA), may be required. Hydrogeological investigations to determine the magnitude and extent of groundwater contamination problems at Air Force facilities may be required. Hydrogeological efforts may require determination of direction and rate of movement of contaminants, and the development of a system to mitigate the adverse environmental effects of the incident. The work may require the use of a variety of instruments, equipment, and procedures. The work may be performed on a continuous basis. The work may require the utilization of manual/instrumental methods, continuous monitors, analytical support, and mathematical models, using EPA, ASTM, NRC, and/or equivalent procedures as specified by the Air Force. Reports, tabulations, and/or oral presentations will be the final product of each work order. Experience by the contractor(s) in these areas is required. Personnel capabilities and related equipment availabilities must be shown. The work may be performed on a continuous basis. Firms responding should indicate whether they are, or are not, a socially and economically disadvantaged business and whether or not they are a woman-owned business. The Air Force reserves the right to consider a small business set-aside based upon responses hereto. Closing date for submission is 20 days from publication of this notice. In responding, please reference PMRN 82-80. Sponsor USAF DEHL/ECC, Brooks AFB, TX 78235, Emile Bala-di, Phone: A/C 512, 536-2158 or 536-2159.

92. This effort is designed to accomplish the following objectives: (a) provide a configuration analysis of the International Standards Organization (ISO) shelters for use as medical decontamination and second echelon treatment facilities, (b) design a combined CBR filter and environmental control system integral to the shelters to provide shelter pressurization, filtered internal recirculation air flow directional control, (c) provide design modifications to existing ISO shelters and chemical defense airlocks to correct deficiencies identified while performing this effort, (d) develop the techniques necessary to design and fabricate removable, sealable internal partitions in the expandable shelters which can be stored in the shelter in shipment mode and (e) perform a structural stress analysis of the existing two way expandable shelter. Experience by the contractor in the fields of mechanical, structural and environmental engineering is required. Contractor familiarity with the mobile structural fabrication techniques used in shelter technology is desirable. See note 31, 11 and the first paragraph of 68. Firms responding should indicate whether they are, or are not, a socially and

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USAFSAM/HRK, Lt. Col. Donna L. Gaughan, Phone: A/C 512, 536-2842. Brooks AFB, TX 78235. (028)

Directorate of R&D Contracting Attn: ASD/PMR-1 Wright-Patterson AFB, OH 45433

"CONTAMINATION MONITORING TECHNOLOGY" The government is seeking qualified sources to evaluate and quantify the critical factors which affect monitoring of low levels of residual nerve and blister agents on surfaces and to design, fabricate, and test probes which optimally sample surface contamination. The contract will comprise a 27 month exploratory development effort. The contractor will be required to plan, conduct, and evaluate agent surface contamination testing in a systematic, efficient manner to accomplish the contract objectives. Extensive agent testing is required to quantify the critical factors which affect contamination monitoring. Also the contractor will be required to design, fabricate, and test sampling probes. The probes will be designed to collect and transport agent vapors from a contaminated surface to be detected by a point sampling detector. The contractor will be required to provide a design handbook detailing design criteria for construction of sampling probes. In designing sampling probe, compatibility with current and future point sampling detectors is essential for application to contamination monitoring. Performance of the contract will require expertise in chemistry, chemical and mechanical engineering, technical documentation, materials selection, fabrication, and chemical agent and other testing facilities. Security (confidential) and safety clearances needed for testing with toxic chemical agents will be required. A nuclear regulatory commission or agreement state radiation license (for isotopes americium 241 and nickel 63) will be required. Interested firms should submit their request for receipt of RFQ DAAK11-82-Q-0079 to above address within fourteen (14) days of the publication of this notice. Telephone request will not be honored. This synopsis does not commit the government to award. (028)

U.S. Army Armament R&D Command Chemical/Ballistics Procurement Div. Edgewood Arsenal, Aberdeen Proving Ground, MD 21020

HYBRID ARRAY OPTICAL LINK STUDY Theoretical and experimental study of fiber optic links for use within phased array radars. Experimental work involves bench tests of broadband or laboratory models of fiber optic links. The investigation will result in a Technical Documentary Report. Potential sources must be familiar with phased array radar systems design, electro-optics and fiber optics technology. Interested firms must demonstrate their capabilities in the above areas in their reply. Closing date for submission of responses is twenty (20) days after date of publication of this notice. When responding reference Code A-2-1612Z. See notes 11 and 68 (disregard second paragraph of 68). Acknowledgement of receipt of responses will not be sent to respondents. (Any technical questions concerning this effort should be addressed to Gary Plotz 315/330-4049. (028)

Rome Air Development Center Contracting Division (PKRZ) Attn: Capt Paul Gustafson Griffies AFB NY 13441 Tel 315-330-3204

DESIGN OF A MODERN INTEGRATED GAS WELL PRODUCTION FACILITY LOCATED ABOVE THE ARCTIC CIRCLE. Seeking firms with recent experience in designing a gas well production facility which operates in a gas field located in ice-rich permafrost. The facility shall be designed to function safely in a cold remote area and paramount importance shall be the uninterrupted supply of gas to users. The facility shall be designed to accommodate up to nine wells. Capable firms shall submit information which provides evidence of experience, within the last 5 years, of designing a workable facility which operates under the same conditions. Information must be received within 15 days of the date of publication of this announcement. No direct contact with any other individual is authorized. Respondents will not be notified of the results of the evaluation of the submitted information, but the sources deemed adequate for purposes of submitting a proposal will be solicited. (028)

USGS, 151 National Center, Reston, VA 22092, Att M.E. Jones

CONTRACT AWARDS

It is the Government's policy to publish information on unclassified contract awards exceeding \$25,000 in value for civil agencies and \$100,000 for military agencies.

The letter or number preceding each item is the service or supplies classification code.

Services

A Experimental, Developmental, Test and Research Work (includes both basic and applied research).

A -- TAC SITUATION ANAL Contr F33657-78-G0012, 000207 (RFP F33657-78-R0012) for \$199,757 to Applications Rsch Corp, 330 S. Ludlow St., Dayton OH 45402. Sponsor: ASD/XRS, S. Tate. WPAFB OH 45433.

A -- USIS CONCEPTUAL DESIGN STUDY. Contr F33615-80-C0141, P00006 (RFP F33615-80-R0141) for \$199,998 to Bendix, E. Joppa Rq, Bath-

A -- PERSON Contr F33615-80- Life Support Sys for: USOF SAM/N A -- LOW FID F33615-81-R154 ois MN 55440. S A -- SPACE (RFP F33615-79- Lean VA 22101. A -- AOA CO 82-R1742) for S Sponsor: AFNWL A -- CONTR. C1716 (RFP F33615-79- SBA, 3195 Kingston, VA 22101. A -- AOA CO 81-R1536) for S: sor: AFWAL/AW: A -- RELIABIL TROL FOR ELE (RFP F33615-81-4 W. Palm Beach FL A -- EXPL DE C2070 (RFP F33615-81-4 W. Palm Beach FL A -- TAPEDED F33615-82-R2203 Indianapolis IN 46218. A -- ADV. MA' C2045, P00006 (R: PO Box 5217, Ft. 5308.

A -- HIGH THW (RFP F33615-78-R Sponsor: AFWAL, F

A -- X-RAY FI MONITOR. Contr F UTIC/Pratt & Whit AFWAL/PSOL, H

A -- STUDY OF F33615-81-C362E thods Inc. 2047 AFWAL/FIGC, LI 7

A -- HIGH POW F33615-82-C3223 Maryland St. E Se 513/255-5229

A -- PILOT FAC 82-C3620 (RFP F: Branch Dr, McLea 513/255-6696

A -- TECHNOLI Contr F33615-81-C 86 S. Cobb Dr. 1 513/255-2377.

A -- FORWARD F33615-82-R300C: LI NY 11714 Spons

A -- AIRCREW P00002 (RFP F336: Hwy, Dayton OH 4 45433.

A -- RSCH OF F RIA. Contr F3361: \$137,014 to GE B: Drake, 513/255-20

A -- OPTICAL E C5137, P00005 (R: Park, Dayton OH 45

A -- MT EFFOR OF KLYSTRON F P00004 (RFP F336: nactely NY 12345 45433.

A -- OPTION/A: 81-C5100, P0000: an Ripple Rd, Deys: OH 45433.

A -- OPTION/W PROCESSING. Co: for \$648,617 to G AFWAL/MLTM R: F

A -- CONFIG M Contr F33615-80-C: Systan, 4126 Linc: rsys. WPAFB OH 45

A -- OPTION/M

part number will be considered for award.

2. Solicitation Forms will be made available as soon as opening date is established.

4. Availability of Specifications, Drawings and Specification Exception. Specifications available at Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA, 19120. Drawings and Spec. exceptions available at Defense Industrial Supply Center, Attn: Code PDA, Bldg. 36, 700 Robbins Avenue, Philadelphia, PA., 19111.

5. This export lead is provided by the Trade Opportunities Program (TOP). Additional information is unavailable from TOP unless otherwise stated in the description of the lead. U.S. firms should be aware that these listings do not necessarily imply approval to export by the Department of Commerce or responsibility for any transactions with firms or individuals listed. Every effort is made to insure the accuracy of the information and to include only foreign contacts with good reputations. For further information about TOP, write U.S. Department of Commerce, Room 2014, Washington, D.C. 20230 or contact your local Commerce District office.

7. This is the second part of a two part solicitation. The first part is the Master Solicitation. Requests for copies of the solicitation Part II should request a copy of the Master Solicitation (Part I) if the prospective bidder has not received a copy.

8. Qualified Products List Information, Services of Dept. of Defense and General Services Administration. To obtain products of requisite quality, certain government specifications call for qualification testing and approval of the products covered thereunder for listing on Qualified Products Lists. In such cases, qualification of specific products is required prior to the opening of bids or the award of negotiated contracts.

This publicizes the intention of the government to require qualification approval of and establish Qualified Products Lists on items covered by the specifications indicated. Suppliers are urged to write appropriate activities responsible for qualification as cited in the specification and to request information in the procedures for qualifying their products.

9. Copies of Military and Federal Specifications and Standards. Qualified Products Lists and Military Handbooks may be obtained from Commanding Officer, Naval Publications and Forms Center (NPC), 5801 Tabor Ave., Philadelphia, PA 19120. A request can be obtained by telephone (215/697-3321), telegraph, or mail in any form. However, it is noted that private industry use a simplified order form, DD Form 1425, which includes a self-addressed label. Once a customer orders documents, NPC will automatically provide the customer with sufficient blank forms to continually order in the preferred manner. Patterns, Drawings, Deviation Lists, Purchase Descriptions, etc. are not stocked at NPC.

10. Interested firms may request copies of this proposed procurement from Commander, Naval Electronic Systems Command, Code ELEX 2013, Navy Department, Washington, D.C. 20360.

11. In a connection with this proposed procurement information as to whether your concern is considered small or large business is desired. For this item the general definition is to be used to determine whether your firm is either small or large, as follows:

"A small business concern is a concern that is independently owned and operated in the field of operation in which it is bidding on Government contracts and with its affiliates, the number of employees does not exceed 500 persons."

State in your response the size status of your concern utilizing the above definition.

12. One or more items under this procurement may be subject to the requirement of the agreement on government procurements approved and implemented in the United States by the Trade Agreements Act of 1979. All offers shall be in the English language and U.S. dollars. The procurement solicitation procedure is open; that is, all interested suppliers may submit an offer.

13. This proposed procurement is under a 100 per cent small business set aside, the size standard for which is a concern, including its affiliates, having average annual sales receipts for its preceding three fiscal years not in excess of \$2,000,000.

14. This proposed procurement is under a 100 per cent small business set aside, the size standard for which is a concern, including its affiliates, having average annual sales receipts for its preceding three fiscal years not in excess of \$4,000,000.

15. This acquisition is being accomplished under Small Purchase procedures. No data packages are available. A copy of the solicitation is available for review at the Office of Small and Disadvantaged Business Utilization (WR-ALC/BC), Robins AFB GA.

16. Copies of Military and Federal Specifications, Standards and Qualified Products Lists may be examined at the Defense Personnel Support Center, or obtained from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Road, Philadelphia, PA, 1120. Such requests should be made on DD Form 1425 (Specifications and Standards Acquisition) indicating the specification title, number, date and any applicable amendment info. Requests may be made by letter if DD Form 1425 is not available or telegram in urgent situations. Telegrams should be addressed to Naval Publications and Forms Center, dress above. All other Specifications, Drawings, Deviation Lists, Purchase Descriptions, Form Purchase Descriptions and other documents referred to in the specifications may be obtained upon application to: Defense Personnel Support Center, Directorate of Clothing Textiles, Attn: DPSC-TFT, 2800 South 20th Street, Philadelphia, PA 19101, or by Hing (215)952-3177.

17. Sponsored by the Air Force Rocket Propulsion Laboratory, Research and Technology Division, Air Force Systems Command.

18. The proposed procurement is under a 100 per cent small business set aside, the size standard for which is a concern including its affiliates, having an average annual sales receipts for its preceding three fiscal years not in excess of \$4,500,000.

19. The proposed procurement is under a 100 per cent small business set aside, the size standard for which is a concern including its affiliates, having an average annual sales receipts for its preceding three fiscal years not in excess of \$7,000,000.

20. The proposed procurement is under a 100 per cent small business set aside, the size standard for which is a concern including its affiliates, having an average annual sales receipts for its preceding three fiscal years not in excess of \$5,000,000.

21. Requests for solicitation forms for the procurement of Clothing, Textiles, and Apparel should be sent to Defense Personnel Support Center, Directorate of Clothing and Textiles, Attn: DPSC-TFP, Procurement Processing Branch, 2800 South 20th Street, Philadelphia, PA 19101, or by calling (215) 952-3168.

23. Copies of IFB's and RFP's may be obtained by applying to Bid Room (Code 205.4C) of 311-4E, Naval Regional Procurement Department, Naval Supply Center, Oakland, Illinois 94625, or by calling Area Code 415/466-6220.

24. A request for copies of the proposal should be received by issuing office no later than ten days from the date of listing of this synopsis in the Commerce Business Daily.

Request for Proposal (RFP) availability is limited and will be furnished to the requestor on a first received, first served basis until the supply is exhausted (which could be before the 10 day period has elapsed).

Telephone requests will not be honored.

25. Requests for copies of this solicitation must be postmarked not later than 10 days from the date of publication of this synopsis in the CBD. Requests postmarked later than that date will not be honored. Requests may be made by letter or telegram but telephone requests will not be honored. Availability of the solicitation is limited and will be furnished on a first received, first served basis. Please furnish a self-addressed stamped envelope for the solicitation requested or if a non-availability notice is desired.

26. Complete data not available. Available specifications, plans or drawings relating to the procurement described, do not fully provide all necessary manufacturing and construction detail.

27. It is suggested that small business firms or others interested in subcontracting opportunities in connection with the described procurement, make contact with the firm(s) listed.

28. Requests for copies of this solicitation should be received by Defense Construction Supply Center, Columbus, OH 43215, Attn: DCS-POAB, not later than 10 days from the date of listing of this synopsis. Such requests may also be made by telephone (AC) 614/236-3446. Availability of the solicitation is limited and will be furnished on a first received, first served basis. If nonavailability notice is desired, furnish self-addressed stamped envelope.

30. If drawings are cited in the solicitation, a written request for same may be submitted to Directorate of Technical Operations Defense Construction Supply Center, Columbus, OH 43215, Attn: DCS-STR, or by calling 614/236-2344 or 236-2612. Requests should give the solicitation number and the bid opening date. Only drawings referenced in the solicitation will be furnished by DCS. Copies of unclassified federal, military, and other specifications and standards (excluding commercial) may be obtained upon written request using DD Form 1425 to Commanding Officer, U.S. Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia PA 19120, or by Telex 834295, Western Union, 710-670-1685, or telephone (215/697-3321) in case of urgency. Commercial specifications, standards and descriptions are not available from government sources, but must be obtained from the publishers.

31. Responses submitted should be in one copy only. Each response must be identified by the area number (reference) at the top (beginning) of each technical description. Responses should be sent to: Directorate of R&D Procurement, Attn: ASD/PNR-1, Wright-Patterson AFB, OH 45433. Non-technical assistance may be secured by calling 513/255-3825.

32. When requesting bid set(s), provide information as to whether your organization (together with its affiliate) is a large or small business.

33. In accordance with the DOD High Dollar Spare Parts Breakout Program only the firms who are identified during technical screening as either the prime equipment manufacturer or as the actual manufacturer of the part being procured have been solicited. Other offerors proposing to manufacture the part will not be considered for award under this solicitation (UNLESS: (1) the offeror submits prior to or concurrent with its proposal evidence of having satisfactorily produced the required part(s) for the government or the prime equipment manufacturer(s); OR (2) the offeror submits prior to or concurrent with his proposal such complete and current engineering data for the part(s) (including manufacturing control drawings, qualification test reports, quality assurance procedures, etc) as may be required for evaluation purposes to determine the acceptability of the part as supplied by your firm for government use.

A dealer offering newly manufactured item must submit concurrent with his proposal a certification specifying that the required part(s) will be obtained from one of the sources who has satisfactorily supplied the same part(s) to the government or the prime equipment manufacturer(s).

An offeror proposing to provide surplus parts manufactured by one of the sources identified during technical screening shall so notify the procuring contracting officer (PCO) at least ten days prior to the opening of bids or proposals. (See Note 36 below). The government will determine on a case-by-case basis, whether or not surplus parts can be considered in view of the criticality of the parts, and impossibility of applying normal in-process inspection and quality assurance procedures to surplus parts. If it is determined that surplus parts can be considered the solicitation will be amended to incorporate inspection criteria adequate to establish that the surplus parts conform to the applicable specifications.

If you desire to be solicited as a potential manufacturer for future procurements of these parts, do not request the solicitation, but contact the procuring activity indicated in the synopsis for further information.

34. An additional approximate equal quantity being reserved for Labor Surplus Area Concerns under a partial determination, the procedures for which are outlined under ASPR 1-804.

35. Award will be made only for products which are qualified for inclusion in the Qualified Products List (QPL) at the time set for openings of bids, or award for negotiated contracts.

36. Concurrent with the notification for the PCO that surplus material is being offered, the offeror will provide the following certificate (if the material being offered is former government surplus, this certificate must be provided in addition to the information required by ASPR 1-1208 Government Surplus.)

The undersigned hereby certifies that the material to be furnished in response to solicitation (insert solicitation number) was manufactured by the original design manufacturer and/or his approved source. (Indicate quantities of each manufacturer). This material is new, unused, meets applicable specifications and is offered without rework or refurbishment of any kind. The undersigned further certifies that no changes have been made to the materials being offered. The quantities of material offered are available for shipment. The material (is/is not) in the original, unbroken container which is dated (show packaging date, if known, or indicate the type and condition of packaging). The offeror (does/does not) have in possession the drawings/specifications applicable to the item(s) offered. (If drawings/specifications are available indicate the issue letter and date of such drawings/specifications.) The offeror (does/does not) agree to release drawings/specifications for Government quality assurance use upon request of the PCO.

37. Procurement is for a kit used in the overhaul or repair of government equipment. Kit consists of both competitive and source-directed items. Source-directed items are so designated to assure requisite interchangeability and reliability. Such parts must be

furnished by USAF-approved sources shown herein, or at the discretion of the contracting officer, from a currently USAF approved source not shown, evidence of approval must accompany the other, otherwise proposed substitute items will not be considered for award. Acceptance under previous awards of substitute items will not be considered to constitute prior approval. If you are interested in furnishing parts source-directed here, in future buys, contact DCAMA/PPDM, Tinker AFB, OK 73145 for specific information on how to be approved as a supplier, furnishing specific FSM and/or part numbers. Complete data (specifications, plans and drawings) for source-directed items are not available. Data for competitive items will be furnished with the solicitation.

38. Short lead time for bidding necessary because of urgency of procurement.

40. This notice does not solicit additional proposals but is issued for the benefit of prospective subcontractors.

41. This notice does not solicit proposals but is issued for the benefit of prospective subcontractors with appropriate security clearance. Make direct contact with above firm(s) for subcontracting opportunities.

42. The proposed procurement is under a 100 per cent small business set aside, the size standard for which is 500 employees.

43. This proposed procurement is under a 100 per cent small business set aside, the size standard for which is 750 employees.

44. This proposed procurement is under a 100 per cent small business set aside, the size standard for which is 1,000 employees.

45. This proposed procurement is under a 100 per cent small business set aside, the size standard for which is 1,500 employees.

46. Synopsis published for informational purposes only. Solicitation documents are not available.

48. Security clearance will be required of all bidders or offerors.

49. Security clearance will be required of the successful bidder or offeror.

50. This procurement is subject to the requirements of Public Law 96-527 which authorizes the Defense Logistics Agency to conduct a test to increase contract awards in labor surplus areas (LSAs). This is a Priority 1 solicitation. Bidding is restricted to only small business concerns whether located in LSAs or outside LSAs. Bidders located in LSAs will be given preferential treatment in evaluation of bid prices.

51. The General provisions applicable to this solicitation will be either HEW Forms-313, -314, -315, -316 or SF-32. To conserve paper General Provisions will be mailed with solicitation only if specifically requested. This office maintains a listing of offerors who have previously been provided copies of the General Provisions, so no duplicate copies will be mailed. The information above applies only to those solicitations issued by the Department of Health, Education & Welfare, OS, Division of Contract and Grant Operations, Room 443H, Humphrey Bldg. 200 Independence Ave, SW, Washington, DC 20201.

52. An additional approximate equal quantity is being reserved for small business under a partial determination, the procedures for which are outlined under ASPR 1-706. The small business size standard for this procurement is 500 employees.

53. The proposed procurement is under a 100 per cent small business set aside, the size standard for which is a concern including its affiliates, having an average annual sales or receipts for the preceding three fiscal years not in excess of \$12,000,000.

54. This procurement is subject to the requirements of Public Law 96-527 which authorizes the Defense Logistics Agency to conduct a test to increase contract awards in labor surplus areas (LSAs). This is a Priority 2 solicitation. This procurement is divided into two parts; an unrestricted portion and a restricted portion. Any firm, large or small may bid on the unrestricted portions. Only small business firms which bid on the unrestricted portion will be eligible to bid on the restricted portions, with LSA Small Business Firms being given preferential treatment in the evaluation of bid prices.

55. This procurement is subject to the requirements of Public Law 96-527 which authorizes the Defense Logistics Agency to conduct a test to increase contract awards in labor surplus areas (LSAs). This is a Priority 3 solicitation in which all bidders, large and small firms alike, may bid, with LSA firms being given preferential treatment in the evaluation of bid prices.

56. Requests for copies of this proposed procurement should be received not later than 10 days from the date of publication of this notice in order to facilitate mailing of same to the extent copies are available directly to the inquirer at time of issuance. Availability of the solicitation is limited and will be furnished on a first-received first served basis.

57. Requests for copies of this proposed procurement should be received as soon as possible in order to facilitate mailing of same to the extent copies are available, directly to the inquirer at time of issuance.

58. Bid sets are not available through the NAVSEA purchasing office or project office. Bid sets may only be obtained by applying to the Navy Regional Procurement Office, Building 200, 4th Floor, Washington Navy Yard, Washington DC 20374, or calling 202/433-2923, NO COLLECT CALLS.

59. Interested firms may request copies of the proposed procurement from Commander, Naval Sea Systems Command, Code 0215, Washington, D.C. 20362, or by phone to AC 202/692-7508.

60. Request for unpriced technical proposals pursuant to Two-Step Formal Advertising procedures in Sect. II, Part 5 of the ASPR or Part 1-2, Subpart 5 of the FPR. Under Step One, offerors are to submit only one technical proposal (unless multiple proposals are authorized by the request for technical proposal in sufficient detail to enable engineering personnel to make a thorough evaluation and arrive at a sound determination as to whether or not the proposed product meets the requirements of the Government. Price or cost estimates are not to be included in the first step invitation for bids (Step 2) will be issued at a later date to those firms whose technical proposals are determined to be acceptable.

61. ARRADCOM solicitations will be provided on a first received, first served basis only to large business, and to any small business upon request.

62. Architect-engineer firms which meet the requirements described in this announcement are invited to submit: (1) a Standard Form 254, Architect-Engineer and Related Services Questionnaire; (2) a Standard Form 255, Architect-Engineer and Related Services Questionnaire for Specific Project, when requested; and (3) any requested supplemental data to the procurement office shown. Firms having a current Standard Form 254 on file with the procurement office are not required to resubmit this form. Firms responding to this announcement before the closing date will be considered for selection, subject to any limitations indicated with respect to size and geographic location of firm, specialized technical expertise or other requirements as listed. Following an initial evaluation of the qualification and performance data submitted, three or more firms considered to be the most highly qualified to provide the services required will be chosen for interview.

The Department of Defense policy for selection of architect-engineer firms is not based upon competitive bidding procedures, but rather upon the professional qualifications necessary for the satisfactory performance of the professional services required, subject to the following additional considerations: (1) specialized experience of the firm in the type of work required; (2) capacity of the firm to accomplish the work in the required time; (3) past experience, if any, of the firm with respect to performance on Department of Defense contracts; (4) location of the firm in the general geographical area of the project, provided that there is an appropriate number of qualified firms therein for consideration; and (5) volume of work previously awarded to the firm by the Department of Defense, with the object of effecting an equitable distribution of contracts among qualified architect-engineer firms including minority-owned firms and firms that have not had prior Department of Defense contracts. Firms desiring to register for consideration for future projects administered by the procurement office (subject to specific requirements for individual projects) are encouraged to submit annually a statement of qualifications and performance data, utilizing Standard Form 254, Architect-Engineer and Related Services Questionnaire.

63. Architect-Engineer firms which meet the requirements described in this announcement are invited to submit: (1) a Standard Form 254, Architect-Engineer and Related Services Questionnaire (2) a Standard Form 255, Architect-Engineer and Related Services Questionnaire for Specific Project and (3) any requested supplemental data, to the procurement office shown. Firms having a current Standard Form 254 on file with the procurement office shown are not required to resubmit this form. Firms responding to this announcement before the closing date will be considered for selection, subject to any limitations indicated with respect to size and geographic location of firm, specialized technical expertise, or other performance data submitted, three or more firms considered to be the most highly qualified to provide the services required will be chosen for interview. The contract for architectural and/or engineering services will be negotiated. Selection of an architect-engineer firm for negotiation shall be based on demonstrated competence and qualifications necessary for the satisfactory performance of the type of professional services required, including any special qualifications required by the procuring agency. Firms desiring to register for consideration for future projects administered by the procurement office (subject to specific requirements for individual projects) are encouraged to submit annually a statement of qualifications and performance data utilizing Standard Form 254, Architect-Engineer and Related Services Questionnaire.

64. Requests for copies of this solicitation should be received by issuing office not later than 10 days from the date of listing of this Synopsis in the Commerce Business Daily. Availability of the solicitation is limited and will be furnished on a first received, first served basis. Telephone requests will not be honored. If nonavailability notice is desired, furnish self-addressed, stamped envelope.

65. Small and disadvantaged firms are encouraged to participate as prime contractors or as members of joint ventures with other small businesses, and all interested contractors are reminded that the successful contractor will be expected to place subcontracts to the maximum practicable extent with small and disadvantaged firms in accordance with the provisions of Public Law 95-507.

66. This proposed procurement contains an option for increased quantity not to exceed 100%. The government may elect to exercise the option at time of award or after award for a specified time as stated in the solicitation.

68. Information submitted should be pertinent and specific, in the technical area under consideration, on each of the following qualifications: (1) Experience: An outline of previous projects, specific work previously performed or being performed and any in-house research and development effort (2) Personnel: Name, professional qualifications and specific experience of scientist, engineers and technical personnel who may be assigned as principal investigator, and/or project officer, (3) Facilities: Availability and description of special facilities required to perform in the technical area under consideration. A statement regarding industrial security clearance. Any other specific and pertinent information as pertains to this particular area or procurement that would enhance our consideration and evaluation of the information submitted.

Organizations having information on file with this procurement office may have reference to such information. There is no need to duplicate such data. However, supplemental specific information regarding the above question must be submitted. Acknowledgement of receipt of response will not be made.

70. Copies of Specifications, Standards and Qualified Products List may be examined at the Defense General Supply Center, or obtained from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. Area Code 215/697-3321.

71. Drawings Interim Purchase Descriptions and Deviation Lists may be examined or obtained from the Defense General Supply Center.

72. Copies of IFB's and RFP's issued by the Defense General Supply Center, Richmond, Virginia 23297, may be obtained by addressing the Directorate of Procurement and Production, Attn: DGSC-PO, or by calling 804/275-3350. Requests for copies of IFB's and RFP's should refer to both the Pre-Invitation Number (PIN) and IFB/RFP Number when both numbers are cited in the synopsis. Requests will be furnished on a first received, first served basis until supply is exhausted. Firms on established bidder's list for these items will be mailed bid sets when they are issued.

73. Specifications, plans, or drawings relating to the procurement described are not available and cannot be furnished by the Government.

74. A responsible bidder shall be considered eligible if the bidder has previously executed or agrees to execute prior to award of a Job Order, a Master contract by Repair and Alteration of Vessel (DD-ASPR Form 731).

75. Written requests for solicitation shall be directed to the Naval Avionics Center, 21st Street and Arlington Avenue, Indianapolis, IN 46218. Attention: Bid Preparation Section, D/634.2.

76. The material being procured is for use within vital submarine pressure boundaries, commonly referred to as Level 1/Sub-Safe systems. As a result contracts will be made only with those contractors whose inspection system conforms to MIL-1-45208A as certified by a joint DCAS/SPCC survey team. Additionally, the offeror must demonstrate to the survey team his awareness of any ability to provide the special controls set forth in the "Additional Ordering Data."

78. Proposed procurement is a 100 per cent set-aside for Small Business Concerns whose average annual receipts of the concern and its affiliates for its preceding three fiscal years must not exceed \$7,500,000.00.

80. To expedite requests for solicitation, please furnish self-addressed gummed label, including the full solicitation number at bottom edge of label, in addition, individual

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request should be submitted for each solicitation required.

61. Only those sources for this item previously approved by the Government have been solicited. The time required for approval of a new supplier is normally such that award cannot be delayed pending approval of the new source. If you have not been solicited and you can furnish either (i) proof of your prior approval as a supplier of this item, or similar items satisfactorily for the Government or (ii) data showing you have produced the same or similar items satisfactorily for the Government or a commercial source, or (iii) test data indicating your product can meet service operating requirements, or (iv) other pertinent data concerning your qualifications to produce the required item, please notify the PCO in writing, furnishing said proof or data along with your request for a solicitation.

62. Copies of the solicitation documents of the proposed procurement listed in this issue of the Commerce Business Daily are available, through individual requests for each solicitation, after date of release from Betty Hall, Procurement Operations Office/BL5, NASA, Johnson Space Center, Houston, TX 77058, TELEX 762-931, when requested on letterhead, until supply is exhausted, on a first come, first served basis, after which a copy may be examined at the above address. Copies may also be examined, but are not available at the following: NASA Headquarters, Office of Small and Disadvantaged Business Utilization, FB-108, Room 116, 600 Independence Ave., SW, Washington, DC 20546.

65. The General Provisions applicable to this solicitation will be either HEW Forms-314, -315, -315A, -316, or SF-32. To conserve paper, General Provisions will be mailed with solicitation only if specifically requested in writing at the time solicitation is requested. Solicitations issued by the Department of Health, Education, and Welfare's Public Health Service.

68. Copies of IFB's and RFP's may be obtained by addressing the Commanding General, US Army Tank-Automotive Command, Procurement and Production Directorate, Warren, Michigan 48090, Attn: DRSTA-IPD, Tel: 313/574-8149; 313/574-8148; 313/574-7064. To expedite requests, firms should furnish self-addressed gummed labels with each request for solicitation.

67. Published GPO Information is current but subject to change without notice. Firms interest in solicitation must conform to all requirements; and must be in the file of eligible suppliers of the U.S. Government Printing Office. Written requests must contain the program or jacket number as stated in the synopsis and shall be submitted to:

U.S. Government Printing Office
Procurement Support Div. PPS
Bid Section, Room A-843
Washington, DC 20401

Each proposal and each request must be made separately on firm's letterhead.

68. The estimated cost of the proposed construction is under \$25,000.

68. The estimated cost of the proposed construction is between \$25,000 and \$100,000.

68. Additional information on foreign government procurement procedures under the new MTN codes is available from the Department of Commerce's Office of Country Marketing, ITA, (202) 377-5341. When responding to issuing country, it is recommended that all correspondence be in the language of that country.

61. Caution—The drawings which will be furnished under this RFP and any resultant contract are proprietary to the Boeing Company. Firms interested in proposing on this RFP must submit the following certificate signed by an individual authorized to bind your company, or the bid package will not be furnished.

CERTIFICATE REGARDING THE USE OF
DATA PROPRIETARY TO THE BOEING
COMPANY

The offeror hereby acknowledges that the data to be furnished by the Air Force in this solicitation and any resultant contract, is proprietary to The Boeing Company and contains the appropriate proprietary legend.

The offeror certifies that he will observe the following data use restrictions:

(1) The limited rights legend will be strictly observed.

(2) The offeror shall be prohibited from reproducing in whole or in part any drawing so restricted except as required to respond to the bid request or full contract requirements.

(3) The offeror is to be prohibited from incorporating any information and features of the drawings into other documentation or otherwise utilizing such information except for the performance of the bid and/or contract.

(4) All drawings or copies thereof will be returned to the Government at the completion of the bid or contract period.

64. In requesting bid set please indicate if interest is as a general or subcontractor. Potential sub-contractors will be supplied an abbreviated bid set unless a full set is specifically requested.

65. Business requesting copies of solicitations must furnish representation with their request as to whether they are a small disadvantaged business.

68. First Article Testing in accordance with Defense Acquisition Regulation (Armed

Services Procurement Regulation DAR (ADPT) Section I Part 19 will be required unless the successful bidder/offeror has previously been given first article approval within 24 months prior to time set for opening of bids or for award of negotiated contracts.

67. The Government's annual requirements for this item are not expected to exceed \$10,000.

68. Offers from sources whose product does not have current approval as a result of (1) previously supplying the subject item(s) of the solicitation to the Government, (2) furnishing subject item(s) to the original equipment manufacturer, or (3) specifying that the subject item(s) will be supplied by firms identified in (1) or (2) above, will not be considered for award for this procurement.

68. Responses will be directed to: Hqs Space Division, Attention BC (213) 643-2855, P.O. Box 92960 Worldway Postal Center, Los Angeles, California 90009

100. Potential subs should immediately reflect their interest by telephone to the agency number indicated in the synopsis with "Subcontracting Possibilities" to be included in the solicitation document.

Description of Legend

- ① The Procurement item is 100 percent set aside for small business concerns
- ② A partial quantity or a portion of the procurement item is set aside for small or minority business concerns
- ③ The contract is a labor surplus area set-aside under the provisions of Defense Manpower Policy No. 48
- ④ Notices of intention to purchase which are published before the IFB's are issued directly to those requesting the proposal.
- ⑤ The procurement will be made in accordance with either DAR part 5, paragraph 2-501 (Military agencies) or FPR part 1-2, paragraph 1.2.501 (Civil agencies) and is the first step of a two step formally advertised procurement. Only those firms submitting qualified responses on the first step will receive notifications when the purchase is made.

★ This synopsis is published for information purposes to alert potential subcontractors and/or suppliers of the proposed procurement. Additional proposals are not solicited. NUMBERED NOTES are published only on the first working day of each week. The pages containing the "notes" should be retained for reference.

JULIAN DATE — eg (800). The number in parenthesis is the Julian Date indicating when this item was edited. It is not part of the synopsis.

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