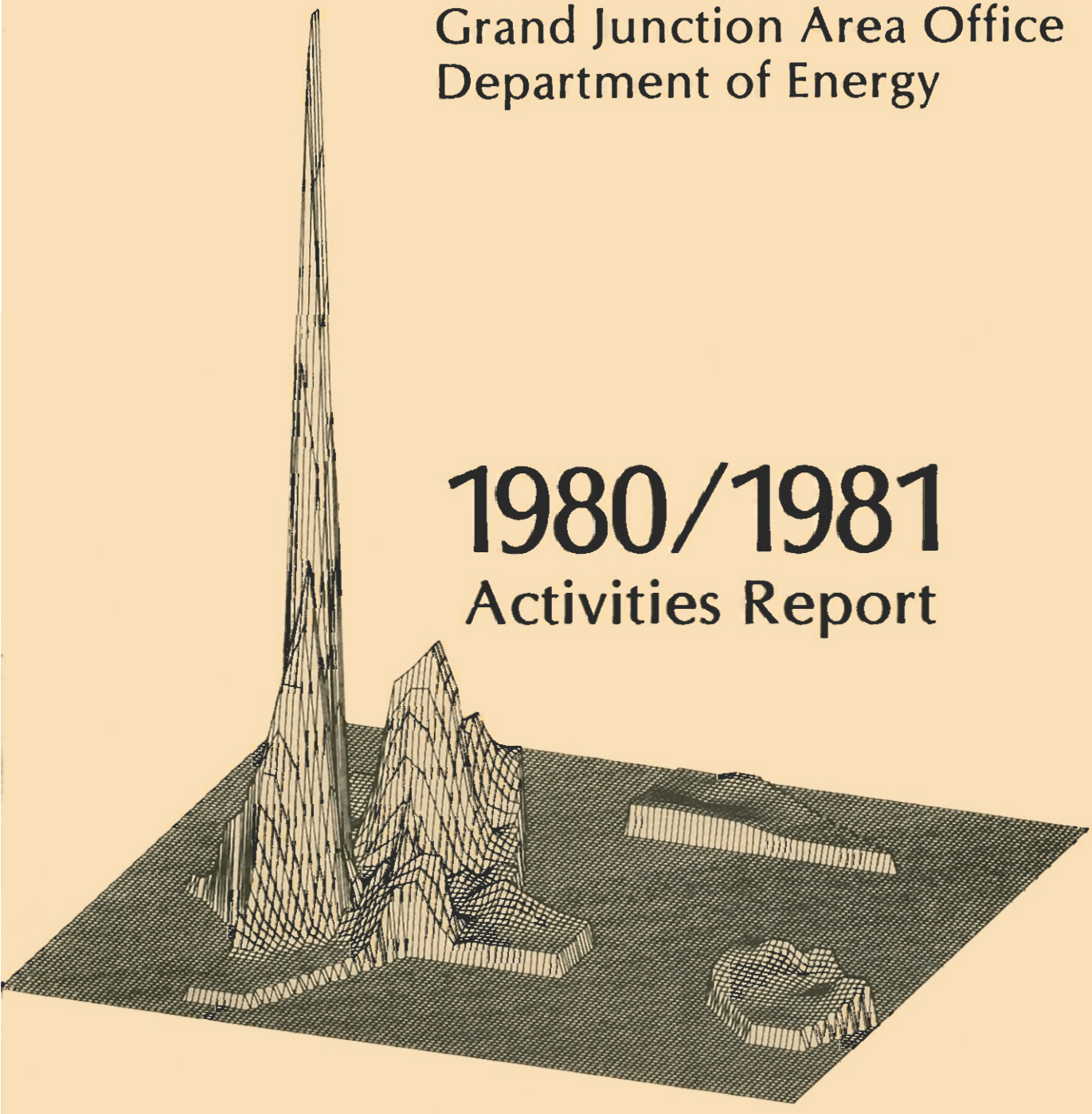
GJBX-11(82)

Grand Junction Area Office
Department of Energy

1980/1981
Activities Report



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DOE NEWS

FOR IMMEDIATE RELEASE
March 18, 1982

DOE GRAND JUNCTION AREA OFFICE ISSUES 1980/1981 ACTIVITIES REPORT

The Grand Junction Area Office, U.S. Department of Energy (DOE), has issued a report, GJBX-11(82), entitled "Grand Junction Area Office, Department of Energy, 1980/1981 Activities Report."

The 69-page report, prepared by Bendix Field Engineering Corporation, operating contractor for the DOE Grand Junction Facility, is a description of work done during calendar years 1980 and 1981 by DOE and Bendix and their contractors in support of the National Uranium Resource Evaluation (NURE) and other work assigned to the office.

NURE was a program of the DOE Grand Junction Area Office to acquire and compile geologic and other information with which to assess the magnitude and distribution of uranium resources and to determine areas favorable for the occurrence of uranium in the United States.

Report GJBX-11(82) will be available on microfiche from the DOE Grand Junction Area Office for $3.50. Prepaid orders should be sent to Bendix Field Engineering Corporation, Technical Library, P. O. Box 1569, Grand Junction, CO 81502-1569. Checks or money orders should be made payable to Bendix Field Engineering Corporation. For mail orders outside the United States and Canada, add $3.00 per report to cover postage. All foreign orders must be in U.S. dollars or international money orders. Checks must be drawn on a U.S. bank.

Report GJBX-11(82) has been placed on open-file at the following locations:

GRAND JUNCTION, CO: Technical Library, Grand Junction Area Office, Department of Energy

ALBUQUERQUE, NM: Government Publications Section, Zimmerman Library, University of New Mexico

AUSTIN, TX: Bureau of Economic Geology, Geology Building, University of Texas

BUTTE, MT: Montana Bureau of Mines and Geology, Montana College of Mineral Science and Technology

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CASPER, WY: Natrona County Public Library

CORPUS CHRISTI, TX: Corpus Christi State University, 6300 Ocean Drive.

DENVER, CO: Denver Public Library, Government Publications Department, 1357 Broadway

GOLDEN, CO: U.S. Geological Survey Library, 1526 Cole Blvd. (West Colfax and Hawthorne)

LARAMIE, WY: Wyoming Geological Survey, P.O. Box 3008, University Station.

LUBBOCK, TX: Documents Library, Texas Tech University.

MENLO PARK, CA: U.S. Geological Survey Library, 345 Middlefield Road

NORMAN, OK: Oklahoma Geological Survey, The University of Oklahoma, 830 Van Vleet Oval, Rm. 163

PHOENIX, AZ: State of Arizona, Dept. of Mineral Resources, Mineral Bldg., Fairgrounds.

PITTSBURGH, PA: Department of Energy, Pittsburgh Energy Technology Center, Bruceton Library, Bldg. 58, Rm. 311 (microfiche only).

RENO, NV: Nevada Bureau of Mines and Geology, Mackay School of Mines, University of Nevada.

RESTON, VA: U.S. Geological Survey Library, Gifts and Exchange Unit, National Center.

SALT LAKE CITY, UT: Documents Division, Marriott Library, University of Utah.

SAN FRANCISCO, CA: Department of Energy, Energy Resources Center, 333 Market St., 7th Floor (microfiche only).

SOCORRO, NM: New Mexico Bureau of Mines, Campus Station.

SPOKANE, WA: U.S. Geological Survey Library, U.S. Court House, Rm. 678

TUCSON, AZ: Arizona Bureau of Geological and Mineral Technology, University of Arizona, 845 Park Avenue.

WINDOW ROCK, AZ: The Navajo Tribe, Minerals Department, P.O. Box 146

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GJBX-11(82)

Grand Junction Area Office
United States Department of Energy

1980/1981

ACTIVITIES REPORT

March 1982

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado 81502

Prepared for the
U.S. Department of Energy
Assistant Secretary for Nuclear Energy
Grand Junction Area Office, Colorado
Under Contract No. DE-AC07-76GJO1664

CONTENTS

NATIONAL URANIUM RESOURCE EVALUATION

The National Uranium Resource Evaluation (NURE) was a program directed by the Department of Energy, which had as its major goal the development of reliable, timely, and comprehensive estimates of the uranium resources of the United States. Operating Contractor for the program was Bendix Field Engineering Corporation (Bendix), which provided management, technical, and facility support under U.S. Contract No. DE-AC07-76GJO1664. Geologic, geochemical, geophysical, and other data were acquired which contributed to assessment of the distribution and magnitude of these uranium resources, as well as to determination of areas favorable for the occurrence of uranium and to establishment of potential resource estimates. The data-collection phase of the NURE program ended September 30, 1980.

The NURE program was organized around six major activity elements: Quadrangle Evaluation, Data Acquisition, Resource Assessment, Geologic Studies, Technology Applications, and Mineral Economics. This fifth activities report presents summary results on work performed during the period 1980/1981 in each of these element areas, together with appendices that cite individual project data and resulting reports.* More detail is provided in *An Assessment Report on Uranium in the United States of America* [GJO-111(80)],** a major-milestone report published in October 1980, which incorporates results of all investigations completed by mid-1980 in 135 National Topographic Map Series (NTMS) quadrangles.

By the end of 1981, evaluation of an additional 28 quadrangles had been completed, bringing to 163 the total number covered by the NURE program. The resource information from these 28 additional quadrangles, along with data from evaluations completed for parts of other quadrangles, are contained in *Statistical Data of the Uranium Industry* (GJO-100), which is updated and published annually by the Department of Energy, most recently in 1981. Also published by the close of 1981 were detailed folio reports on 161 quadrangles; folios for the remaining 2 quadrangles are scheduled for release in 1982.

*For information on report availability, contact the Grand Junction Technical Library, Bendix Field Engineering Corporation, P.O. Box 1569, Grand Junction, Colorado 81502-1569, Area Code 303/242-8621, Extension 279.

**Referred to in subsequent sections of this document as the 1980 Uranium Assessment Report.

1980/1981 SUMMARY AND HIGHLIGHTS

Summarized below are the major 1980/1981 accomplishments of the NURE program, supplemental to the quadrangle evaluation and assessment activities previously cited.

- **Aerial Surveys**: Some 374,000 line-miles were flown in 1980/1981, bringing to 1,154,000 the total number of line-miles flown in reconnaissance surveys, and to 94,000 the total number of line-miles flown in detailed surveys. Radiometric and magnetic aerial data have been acquired for 562 NTMS quadrangles in the conterminous United States and Alaska.

- **Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) Surveys:** Field sampling was accomplished in 85 quadrangles in 1980/1981, bringing to 363 the number of quadrangles completely sampled and to 51 the number of quadrangles partially sampled. By the end of 1981, HSSR reports on 306 quadrangles had been open-filed.

- **Data Tapes**: In late 1981, the computer data tapes both from the aerial surveys and from the HSSR surveys were transferred from Oak Ridge National Laboratory to the Grand Junction Area Office (GJAO), which is now responsible for their duplication and distribution through the Technical Library.

- **Drilling and Logging**: Primarily in support of Quadrangle Evaluation, logging data were acquired during 1980/1981 from 87 boreholes drilled and logged in ten Drilling projects, from 336 additional boreholes logged by Bendix Field Engineering Corporation in eleven states, and from 681 boreholes logged by subcontractors in eight western states.

- **Geologic Quadrangle Maps**: The NURE program added to the nation's geologic data base a total of 419 geologic quadrangle maps at a scale of 1:250,000, 180 of which were produced during 1980/1981. These 419, together with 187 1:250,000-scale quadrangle maps available from the U.S. Geological Survey and state geological surveys, bring to 606 the total number of NTMS quadrangles that have been mapped at this scale.

- **Resource Assessment**: Improvements were effected in the methodology for estimating potential resources based on geologic analogy. One refinement included formalization of all steps involved in translating resource evaluation data into resource estimates.

- **Geologic Studies**: Geologic studies during 1980/1981 concentrated largely on World-Class Deposits and Intermediate-Grade Resources. The potential for finding uranium ore of economic grade in Precambrian quartz-pebble conglomerates was explored, with discouraging results. Data acquired do suggest that vast tonnages of intermediate-to-low-grade uranium ore exist in the carbonaceous mudstones, shales, and impure coals of central Wyoming.

- **Logging Technology**: Advancements in the state of the art of spectral gamma-ray logging resulting from NURE Technology Applications work were the subject of a special workshop conducted in Grand Junction in February 1981. Also during 1980/1981, the Prompt Fission Neutron (PFN) logging system and its associated data-reduction software were field-tested. Still other field tests were conducted which evaluated active and passive borehole logging systems that measure uranium directly.

- **Aerial Data**: During 1980/1981, quality assurance checks were performed on aerial radiometric data tapes for 400 quadrangles, and some 600 raw spectral and single-record data tapes were converted to the standard format established for subcontractors in 1979. In addition, NURE aerial radiometric data were used to generate cesium-137 fallout maps and radiation-exposure-rate maps for various parts of the United States. NURE aerial magnetic data are being used to generate contour maps and profiles for most of the quadrangles surveyed.

- **Aerial Technology**: Field-testing has proved the prototype phoswich airborne detector to be approximately 30 percent more sensitive than the conventional sodium iodide unit. Also, use

of a commercial aircraft inertial navigation unit in a survey helicopter has been found to greatly simplify navigation and flight-path data recovery.

- **Technology Integration:** Field work at the four Technology Integration research sites—Spokane Mountain, Red Desert, Copper Mountain, and San Juan Basin—is complete, and the final report on Spokane Mountain has been open-filed. This report postulates that the same type of genetic model may apply to both Spokane Mountain and Copper Mountain.

- **Emanometry:** Emanometry techniques and instrumentation were effectively utilized in Technology Integration studies at the four test sites cited above. The prototype drilling-mud emanometer was field-tested, and good agreement was found between borehole-mud monitoring during drilling and logs taken of the finished borehole.

- **Calibration:** New field facilities for calibrating borehole logging systems were established during 1980 at Spokane, Washington, at Reno, Nevada, and at Morgantown, West Virginia. Discrepancies among measurements, using the same equipment, at models in Canada, Australia, and the DOE Grand Junction Area Office in the United States have prompted initiation of a survey to compare measurements made on blind samples by assay laboratories located in the United States, Canada, Australia, and other participating IAEA countries.

- **Mineral Economics:** Four stand-alone computer-based Uranium Supply Analysis System (USAS) models have been refined to the point that they are undergoing preliminary test and will find active use in subsequent GJAO uranium-assessment and supply-analysis activities.

- **Earth Sciences Information System:** Because they represent an asset having considerable value to the United States, all NURE-generated data are being incorporated into a single computer-data-based indexing system, called the Earth Sciences Information System. Scheduled for completion in 1982, this system will permit an inquirer to access NURE geoscience data by quadrangle name, quadrangle number, geographic coordinates, or other key identifiers.

- **Strategic Minerals:** During 1981, the Grand Junction Area Office cooperated extensively with other Department of Energy and Federal Government organizations in the development of plans to survey and assess the nation's strategic mineral resources. Data and capabilities developed in the NURE program will be of considerable value as this assessment activity goes forward.

QUADRANGLE EVALUATION

Quadrangle evaluation consisted of the collection and analysis of geologic, geochemical, and radiometric data for the purpose of classifying geologic environments as favorable or unfavorable for the occurrence of uranium deposits. The conterminous United States and Alaska were evaluated on a quadrangle basis, using the 1:250,000-scale National Topographic Map Series (NTMS) 1° x 2° quadrangles as reporting units. The evaluation results provided a basis for quadrangle assessment, wherein potential uranium resources were estimated for favorable geologic environments.

For purposes of this evaluation, favorable environments were defined as areas or geologic units that, on the basis of all available geologic evidence, could contain at least 100 tons of U_3O_8 above a cutoff grade of 100 parts per million (ppm). Moreover, an environment is considered favorable if its geologic characteristics are similar to those that occur in close association with known uranium deposits.

Quadrangle evaluations were conducted by Bendix Field Engineering, working from nine field-office locations; by the U.S. Geological Survey (USGS), through a joint working agreement with the Department of Energy (DOE); and by universities, state geological surveys, and private firms, under subcontract to Bendix. All investigations were directed and monitored by Bendix in accord with guidelines and specifications established to ensure a uniform product from so diverse a geoscience community.

Of 163 quadrangle evaluations completed by the end of 1981 (see Figures 1 and 2), 77 were conducted by Bendix field offices, 24 by the U.S. Geological Survey, 20 by state surveys and universities, and 42 by private firms. Results from 135 quadrangle investigations available in mid-

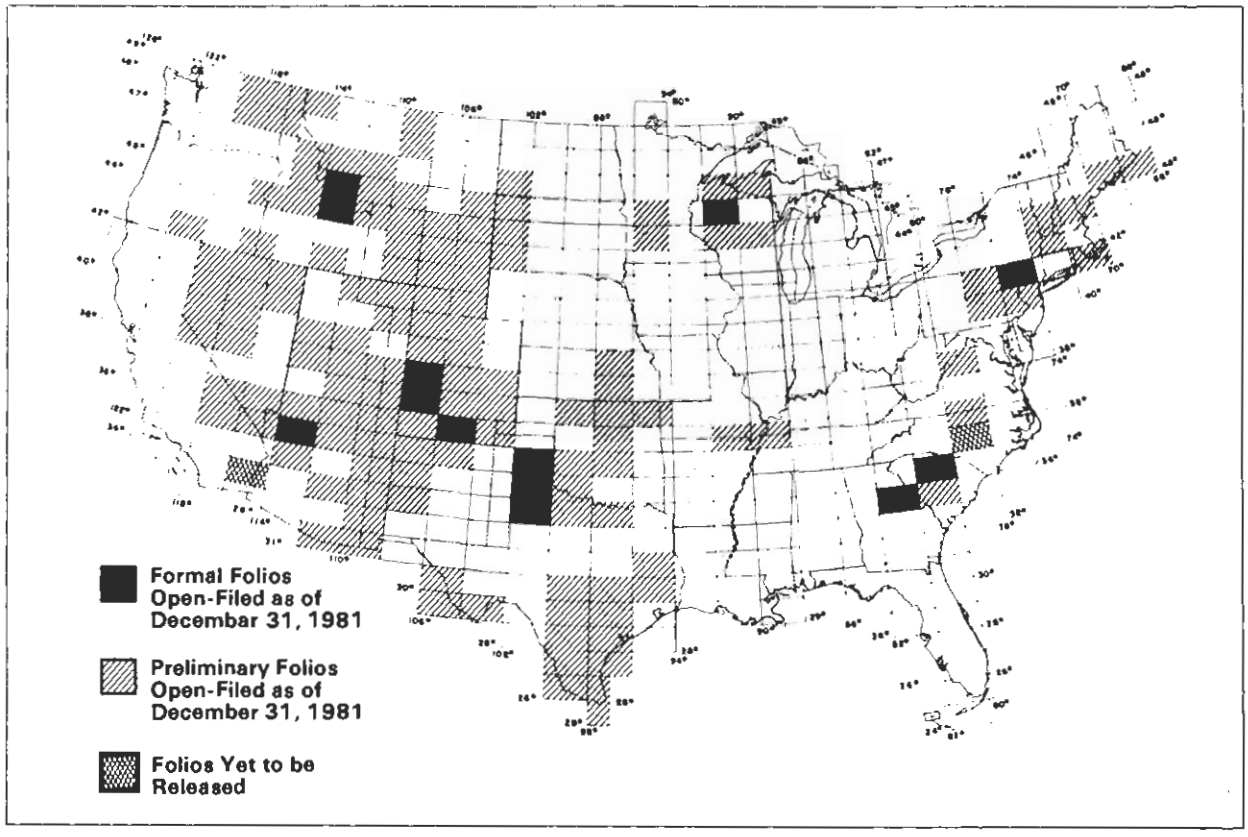

FIGURE 1. *Status of U.S. Quadrangle Evaluation as of December 31, 1981*

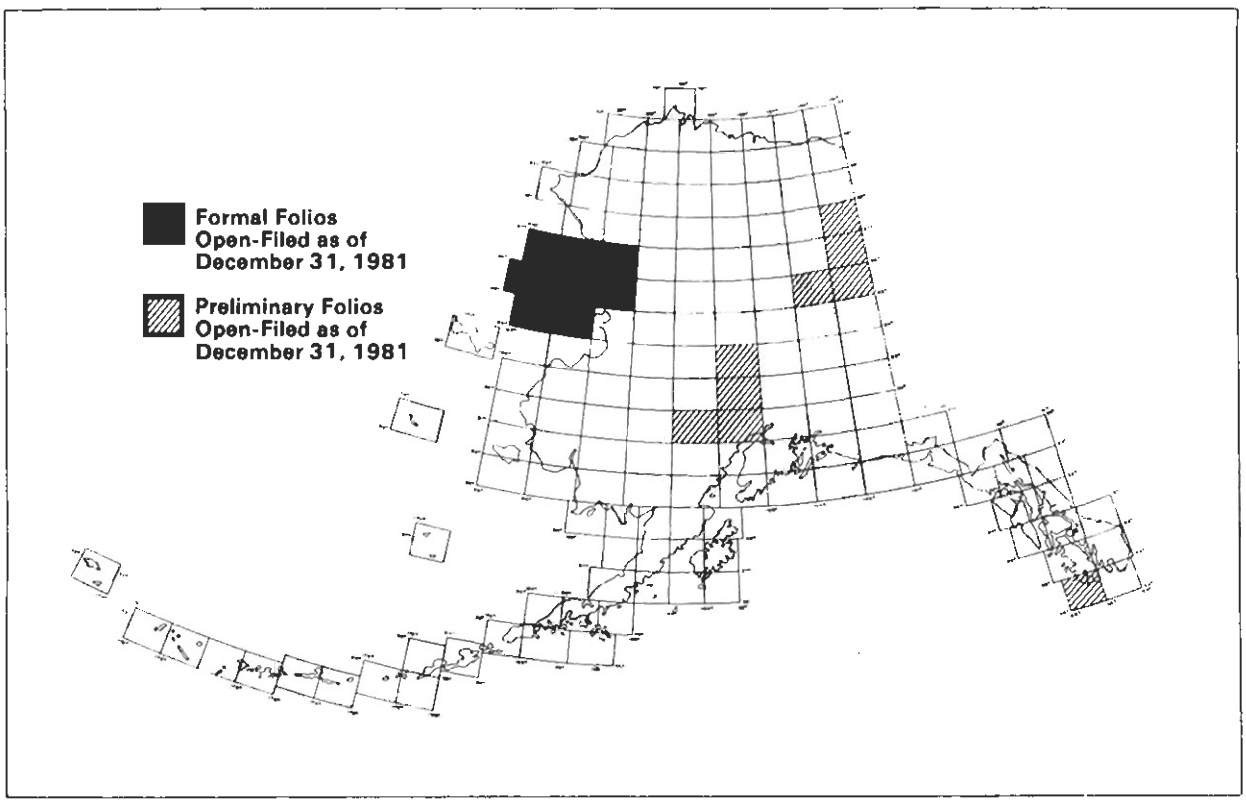

FIGURE 2. *Status of Alaska Quadrangle Evaluation as of December 31, 1981*

1980 were used as the basis for the estimates of potential resources presented in the 1980 Uranium Assessment Report, published in October 1980 by the Grand Junction Area Office (GJAO) of the Department of Energy.

As of December 1981, evaluation results on 161 quadrangles had been published in 152 folio reports, some covering more than a single quadrangle; two additional quadrangle reports are scheduled for release in 1982. Each folio contains information on the geologic setting, a description of methods and procedures used for performing the evaluation, sections that separately describe and discuss favorable, unfavorable, and unevaluated areas or environments, and appropriate illustrations and data tabulations.

Folios have been open-filed for public use in two forms, preliminary and formal; they differ only with respect to the degree of editorial review and graphic refinement they have undergone. Formal folios on 21 quadrangles, 12 of which were issued during 1980/1981, are available at all DOE open-file repositories, and may also be obtained in hard-copy or microfiche form from the Grand Junction Technical Library. Folios on 140 of the other quadrangles evaluated have been open-filed in preliminary form in order to make the information they contain available to the public at the earliest possible date; microfiche copies of these preliminary folios, as well as information concerning the purchase of hard copy, may also be obtained from the Grand Junction Technical Library.

Appendix A lists, alphabetically by quadrangle, the contractor or subcontractor, subcontract value, start and completion dates, and report number for each of the quadrangles evaluated.

DATA ACQUISITION

RADIOMETRIC AND MAGNETIC DATA FROM AERIAL SURVEYS

Over 374,000 line-miles were flown in aerial surveys during 1980/1981, completing the aerial data-acquisition program for 562 NTMS quadrangles in the conterminous United States and Alaska. This brings to 1,154,000 the total number of line-miles flown in NURE reconnaissance surveys at 3- to 6-mile flight-line spacings; an additional 94,000 line-miles have been flown in follow-up detailed surveys at quarter-mile spacings. The maps in Figures 3 and 4 summarize the current status of the Aerial Survey program.

Seven subcontractors flew the aerial surveys at a nominal ground clearance of 400 feet using rotary-wing and fixed-wing aircraft. Each craft was equipped with a high-sensitivity multichannel gamma-ray spectrometer and a state-of-the-art airborne magnetometer. Following processing, which included calibration and parameter adjustments, the digitally recorded data acquired in these surveys were presented and analyzed in aerial-survey quadrangle reports, 212 of which were open-filed by the Department of Energy in 1980/1981.

Table I in Appendix B lists report numbers for each quadrangle flown, with the year of release in parentheses. Table II in Appendix B lists, for surveys active in 1980/1981, the subcontractor, subcontract value, start and completion dates, line-miles flown, aircraft used, and associated report numbers. Data from 1980 aerial surveys on areas of interest were released in preliminary

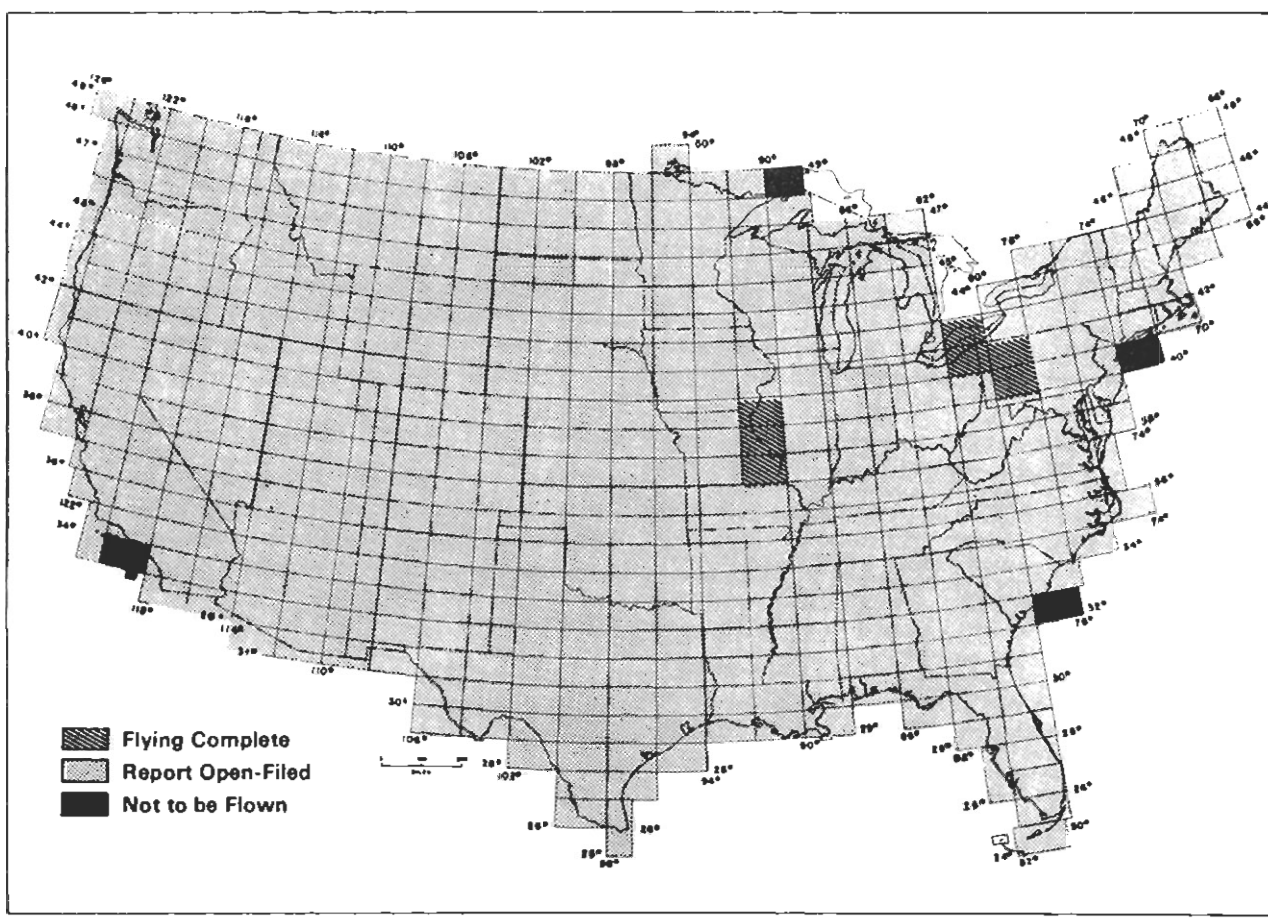

FIGURE 3. *Status of U.S. Aerial Surveying as of December 31, 1981*

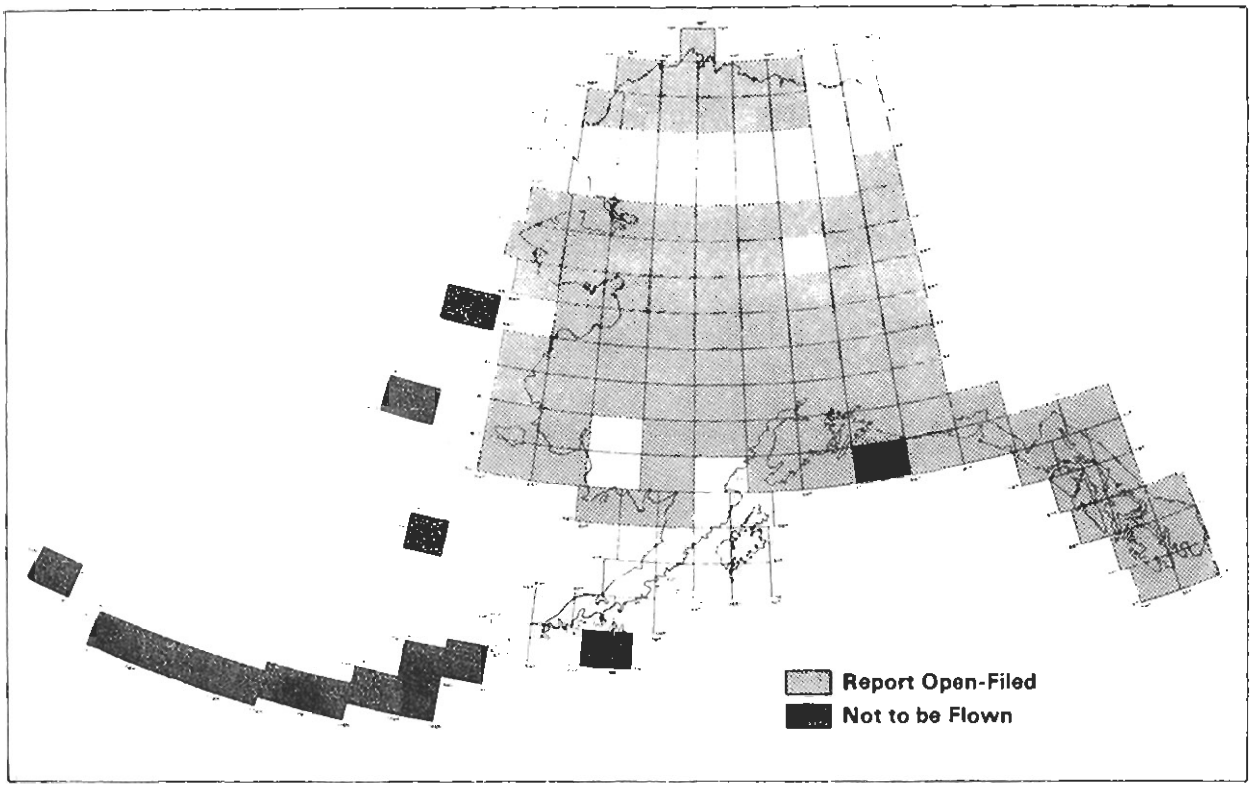

FIGURE 4. *Status of Alaska Aerial Surveying as of December 31, 1981*

form to Quadrangle Evaluation subcontractors for their consideration in the preparation of folio reports.

Quality assurance and standardization activity continued throughout 1980/1981. This activity was designed to ensure the high quality of the aerial data processed during these years and to upgrade to acceptable levels the data processed in prior years, before the present aerial calibration facilities had been put in place.

A program to integrate all NURE data into one data base was initiated late in 1981, with the result that all NURE data tapes formerly at Oak Ridge National Laboratory have been transferred to the Grand Junction Area Office. Copies of these tapes are available from the Grand Junction Technical Library.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE DATA

Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) sampling was completed in 85 quadrangles during 1980/1981, bringing to 363 the number of quadrangles completely sampled and to 51 the number of quadrangles partially sampled. The 1980/1981 time frame also saw analyses completed on samples from 263 quadrangles, and 278 HSSR quadrangle reports open-filed by the Department of Energy.

Table I in Appendix B lists report numbers for all HSSR quadrangle reports issued through 1981. Table III in Appendix B presents contract and report information on special surveys and topical studies conducted as a part of the HSSR program. Program status and data availability—whether in report form or on magnetic tape—are summarized on maps identified as Figures 5 and 6.

Four national DOE laboratories participated in the HSSR program during 1980/1981. Los Alamos National Laboratory and Oak Ridge Gaseous Diffusion Plant conducted sample analysis. Savannah River Laboratory did field sampling in 1980 and conducted sample analysis in both 1980 and 1981. Ames Laboratory in Iowa completed in 1980 an interlaboratory quality-assurance program designed to compare the analytical work of the other three laboratories.

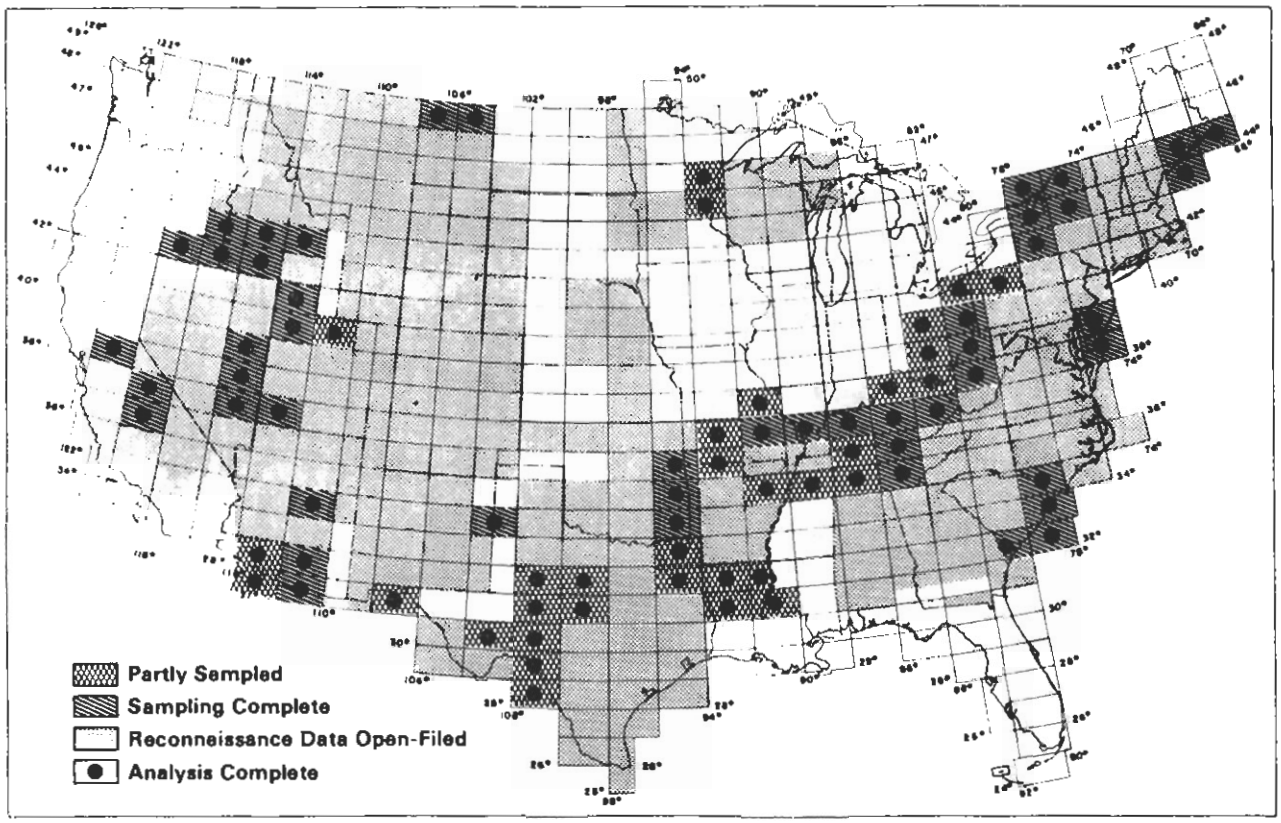

FIGURE 5. *Status of U.S. HSSR Surveying as of December 31, 1981*

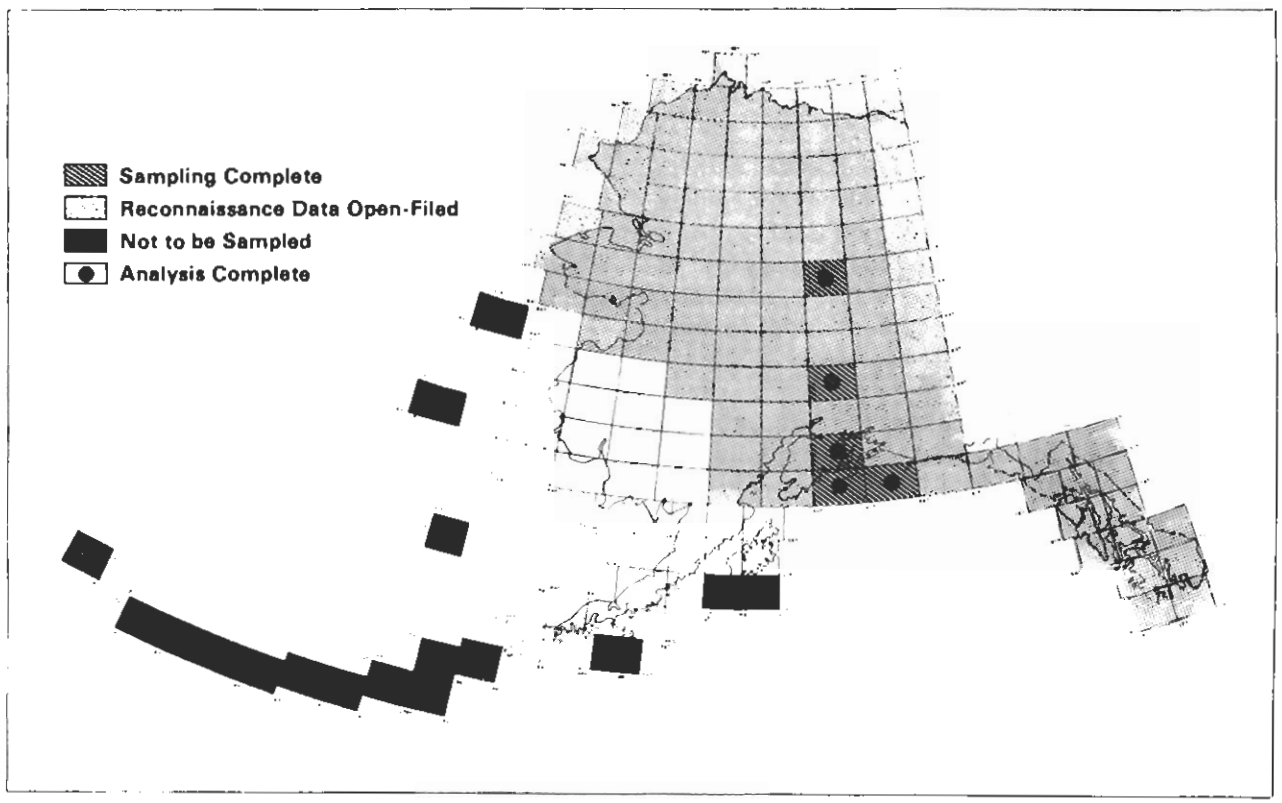

FIGURE 6. *Status of Alaska HSSR Surveying as of December 31, 1981*

The field samples collected for analysis were sediments and waters from streams, lakes, springs, and wells, taken at a sampling density that ranged from 5 to 10 square miles per sample site. Also collected at each sample site were field data that included air and water temperature; surface radioactivity levels; stream width, depth, and flow rate; well depth, casing, and aquifer formation (when known); presence of hydrogen sulfide; vegetation type and density; topographic relief; potential sources of contamination; pH, specific conductance, and alkalinity; date and time of collection; and surface geologic information.

The principal method of analysis for uranium in stream-sediment samples at each of the national laboratories utilized delayed neutron counting (DNC) following neutron irradiation in a nuclear reactor. Multielement analyses were also performed on these samples to facilitate interpretation of the geochemical significance of the total uranium concentrations found. Methods of chemical analysis for uranium in water varied from one laboratory to another. Residuals of all HSSR samples taken in the field are archived at Oak Ridge National Laboratory.

Microfiche copies of all HSSR quadrangle reports, as well as computer-readable magnetic tape containing the digitally recorded geochemical data, are available from the Grand Junction Technical Library.

NURE DRILLING PROGRAM

Ten NURE drilling projects were completed during 1980/1981, with 87 holes bored and 109,775 feet drilled and/or cored. One project was conducted in the Gulf Coastal Plain Region, four in the Wyoming Basins Resource Region, one in the Colorado Plateau Resource Region, three in the Basin and Range Resource Region, and one in the Southern Rockies Resource Region. These areas were drilled to obtain subsurface information for better evaluation of potential uranium resources, as well as to support Intermediate-Grade and World-Class programs and to provide data for certain research studies.

Table I in Appendix B lists report numbers for all drilling reports issued to date. Table IV in Appendix B lists, for projects active in 1980/1981, project location, category of resource effort, subcontractor, subcontract value, start and completion dates, number of holes bored, extent of drilling and/or coring, and identity of any associated published reports.

The ten 1980/1981 drilling projects resulted in the following significant findings:

- Data from one hole in the Oakville-Goliad Project (Gulf Coastal Plain Region)—conducted in support of Quadrangle Assessment—indicate that the lower part of the Goliad Formation has uranium potential.

- Two projects were conducted at Sand Wash Basin (Wyoming Basins Resource Region)—one in support of Quadrangle Assessment and one in support of Intermediate-Grade studies. Drilling here produced data that reduce the uranium potential of the Brown's Park Formation.

- All four holes bored in the Red Desert Project (Wyoming Basins Resource Region)—conducted in support of Intermediate-Grade studies—penetrated thin intervals of intermediate-grade uranium mineralization, producing data that enhance the potential for uranium at greater depths in the Wasatch Formation.

- Data from the Great Divide Basin Project (Wyoming Basins Resource Region)—also conducted in support of Intermediate-Grade studies—confirm most estimates of uranium favorability; the project also provided cores not previously available for chemical analysis.

- The San Rafael Swell Project (Colorado Plateau Resource Region)—conducted in support of Quadrangle Assessment—resulted in data that enhance the potential for uranium in the Moss Back Member of the Chinle Formation and decrease the potential for uranium in the Morrison Formation.

- In the Southwest Prescott Project (Basin and Range Resource Region)—conducted in support of Quadrangle Assessment—one borehole in the Big Sandy Basin suggested that the Tertiary has uranium favorability.

- Drilling in the Owens Valley Project (Basin and Range Resource Region)—also conducted in support of Quadrangle Assessment—produced data that decreased the area of favorability for uranium.

- Analysis of the drilling data obtained in the McDermitt Caldera Project (Basin and Range Resource Region)—conducted in support of Intermediate-Grade studies—is still in progress.

- Data obtained in the Southeast Wyoming Project (Southern Rockies Resource Region)—conducted in support of World-Class studies—reduce the favorability for uranium in the Precambrian quartz-pebble-conglomerate environment in that location.

QUADRANGLE BOREHOLE LOGGING PROGRAM

Computer-based logging units, owned by the Department of Energy, were operated by Bendix personnel during 1980/1981 to log a total of 1,336,300 feet in 423 boreholes situated in 41 quadrangles in 11 states. During the same period, subcontractors to Bendix logged a total of 4,248,200 feet in 681 boreholes in 8 western states.

Table I of Appendix B indicates those quadrangles in which logging has been conducted since the inception of the program, both in boreholes specifically drilled for the NURE program and in holes drilled by industry for various other mineral and energy programs. Table V of Appendix B lists, for logging conducted in 1980/1981, such information as location, subcontractor, subcontract value, start and completion dates, number of holes, and total footage.

The logs acquired were spectral gamma-ray (KUT) logs and most of the normal suite of logs used in uranium development and exploration, including gross-gamma-ray, neutron-neutron, spontaneous potential, single-point resistance, gamma-gamma density, temperature, and caliper. All KUT and gross-gamma-ray logging systems used in the program were calibrated on at least one of the borehole calibration facilities which the Department of Energy has established at the Grand Junction Area Office and six field sites.

Logs acquired in the program may be viewed at the Grand Junction Technical Library. Logging data are also periodically made available to the public through Petroleum Information in Denver, Colorado.

GEOLOGIC QUADRANGLE MAPS PROGRAM

The years 1980/1981 saw completion of the Geologic Quadrangle Maps program, with 180 quadrangle maps generated by Bendix subcontractors, bringing to 419 the number of 1:250,000-scale geologic maps compiled in support of NURE resource-assessment projects. Supplementing these contractor-generated maps are geologic maps for 187 quadrangles which are available at the same scale from the U.S. Geological Survey (USGS) or from individual state geological surveys. Thus, of the 621 NTMS quadrangles in the conterminous United States and Alaska, only the 15 that cover the Aleutian Islands in Alaska remain unmapped.

Table I in Appendix B indicates all quadrangles that were mapped in the course of the Geologic Quadrangle Maps program. Table VI in Appendix B lists, for mapping completed during 1980/1981, geographic area, subcontractor, subcontract value, start and completion dates, and number of maps produced.

In meeting geologic map requirements specified by Bendix, the 21 subcontractors were free to compile from preapproved published sources and university theses, and/or to utilize photogeologic interpretation methods. No original field-mapping or systematic field-checking was undertaken, and Bendix assumed responsibility for quality control.

Copies of any of the 419 1:250,000-scale maps produced in the Geologic Quadrangle Maps program may be obtained through one of a number of copy companies in Grand Junction. Names, addresses, and phone numbers for these companies may be obtained by contacting the Grand Junction Technical Library.

RESOURCE ASSESSMENT

The processes through which uranium resources are assessed or estimated involve two major methodologies.* Estimates of uranium reserves are based on data obtained from closely spaced drill holes. Estimates of potential resources, on the other hand, are subjective, based on a variety of geologic and geophysical information. The NURE program improved the reliability of reserve estimates by incorporating cumulative probability distribution factors into previously proven techniques. Far more significant was the effect of the program on potential-resource assessment.

Potential-resource assessment is based on geologic analogy, in which it is assumed that uranium deposits are formed in particular geologic settings by some of the same processes responsible for their formation in model settings. Areas with known uranium deposits, which are used as models in the geologic analogy process, are referred to as control areas. Examination of the geologic characteristics of an area to be assessed may disclose many of the characteristics known to exist in a control area; thus, the area under assessment may be presumed to contain uranium deposits, even though no significant concentration of uranium may yet have been identified.

As noted in an earlier section on Quadrangle Evaluation, all data generated in the evaluation process have been accumulated in quadrangle folios. A key aspect of each folio is the identification of so-called "favorable areas," i.e., geologic environments that may contain significant concentrations of uranium at a grade of at least 0.01 percent U_3O_8. Favorability is determined by comparing the geologic characteristics of a given setting with specific known deposition criteria and identifying those areas having similar key geologic characteristics. Depending on the location of the setting and the amount and type of information available, identified potential resources are classified as probable, possible, or speculative. Each class is individually estimated, using procedures described in the 1980 Uranium Assessment Report.

The period 1980/1981 added significantly to the refinement and formalization of procedures used to estimate potential resources. A number of these procedures were used during preparation of the 1980 Uranium Assessment Report, which documented assessment results on 135 quadrangles. Subsequently, 28 full quadrangles and portions of 45 others were assessed and the resulting data made available to the Department of Energy for inclusion in its annual report, GJO-100(81), *Statistical Data of the Uranium Industry*, issued in January 1981.

Appendix C lists subcontract information and associated report numbers for those projects in which subcontractors have assisted Bendix and DOE personnel on refinement of resource evaluation and assessment methodologies.

GEOLOGIC STUDIES

Among the studies that have been undertaken in support of the NURE program are a number of uranium-related geologic studies which had as their goals attainment of a better understanding of the uranium deposition process and identification of uranium sources in environments other than sandstone. During 1980/1981, these studies focused largely on World-Class Deposits and Intermediate-Grade Resources; two studies on Low-Grade Resources were also completed. Appendix D lists subcontract information and associated report numbers for all 1980/1981 Geologic Studies projects.

WORLD-CLASS DEPOSITS

The purpose of the World-Class studies was to evaluate those U.S. environments not yet identified as hosting significant uranium deposits but geologically similar to areas elsewhere in the world that are known to host economically impor-

*For greater detail, the reader is referred to the 1980 Uranium Assessment Report.

tant uranium resources. Study emphasis was placed on characterization of specific U.S. nonsandstone environments having the highest probability of containing large, high-grade deposits. The strategy pursued was to develop occurrence models based on the geologic characteristics of foreign deposits and then identify geologically analogous areas in the United States. Many such areas were selected for preliminary favorability studies, but only the most promising were chosen for detailed geologic evaluation, including drilling. The ultimate objective of the program was to assess all U.S. environments identified as favorable for the occurrence of World-Class-type resources.

Whereas studies in earlier years had dealt with such nonsandstone environments as calcretes, granites, volcanic rocks, and pegmatites, 1980/1981 World-Class studies concentrated largely on the Precambrian quartz-pebble-conglomerate environment. Outside the United States, large-tonnage uranium deposits are found in this type of environment in Witwatersrand, South Africa, and in the Elliot Lake area, Ontario, Canada. Within the United States, nine Precambrian terranes (for locations, see map in Figure 7) have been investigated to identify pebble-conglomerate sequences with uranium potential. Two of the nine—one in the Black Hills in South Dakota and the other in the Sierra Madre/Medicine Bow Mountains in Wyoming—proved promising enough to justify drilling for more detailed geologic information. The results of this work provided the basis for the resource estimates that were included in the 1980 Uranium Assessment Report.

A comprehensive report on the uranium potential of Precambrian quartz-pebble conglomerates in the United States will be open-filed in 1982.

INTERMEDIATE-GRADE RESOURCES

The Intermediate-Grade Resource studies were conducted to evaluate potential uranium resources containing between 0.01 and 0.05 percent U_3O_8—resources not normally recoverable at less than $50 per pound. Bendix geologists, in cooperation with geologists from the U.S. Geological

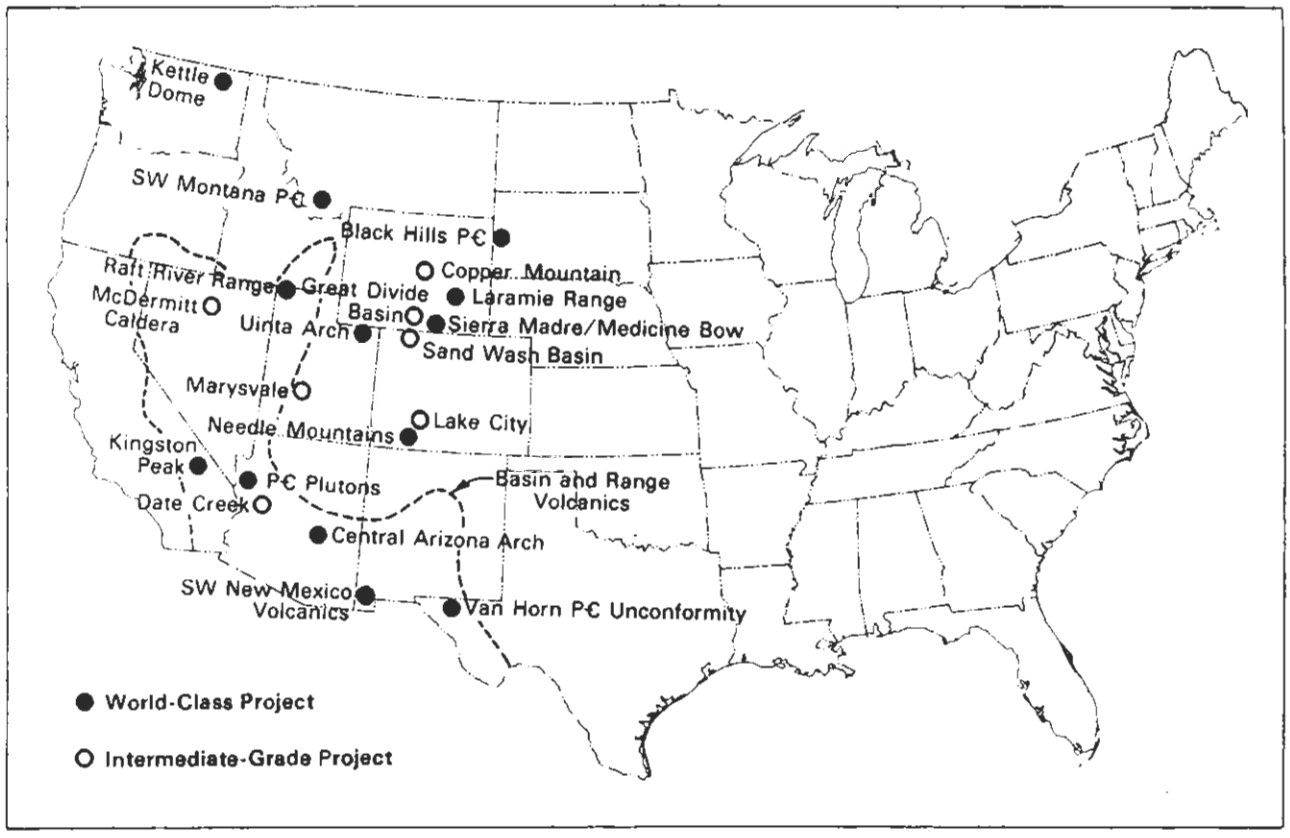

FIGURE 7. *World-Class and Intermediate-Grade Project Locations*

Survey, conducted such studies in the McDermitt caldera complex in Nevada and Oregon, at Copper Mountain in Wyoming, in the Sand Wash Basin in Colorado, and in the Great Divide Basin in Wyoming (see map in Figure 7 for these and other study locations). The geologic environments evaluated included a Precambrian granitic pluton, Tertiary volcanic flows and sediments, and Tertiary sandstones and carbonaceous shales in intermontane basins. Drilling was conducted at the McDermitt caldera and in the Great Divide Basin for purposes of obtaining detailed information on the subsurface configuration of potential host rocks.

Results of the Intermediate-Grade studies indicate, with a relatively high degree of certainty, that significant uranium resources in the grade range 0.01 to 0.05 percent U_3O_8 exist in essentially continuous deposits, though probably restricted to a few relatively small areas. The Copper Mountain area in Wyoming is particularly important in terms of potential resource magnitude.

Also important is the Great Divide Basin in central Wyoming, where fine-grained carbonaceous mudstones, shales, and impure coals of this Tertiary basin were found to contain vast tonnages of intermediate- to low-grade uranium. In one 4-square-mile area, an estimated 9000 tons U_3O_8 lie in a stratigraphic interval 17 feet thick, within 100 feet of the surface; an additional 26,000 tons lie in an interval approximately 60 feet thick, within 400 feet of the surface. In another 10-square-mile area, 90,000 tons U_3O_8 are estimated to exist within a depth of 800 feet. In fact, significant concentrations exist throughout a trend some 40 miles long and 12 miles wide, in six localized areas equivalent in size to at least two townships. Although the average grade of mineralized material in these areas is somewhat less than 0.01 percent U_3O_8, i.e., below intermediate grade, the quantities are significant enough to suggest that these areas may be important sources of uranium supply in years ahead.

TECHNOLOGY APPLICATIONS

Technology Applications is an element of the NURE program that encompasses development, evaluation, and technology transfer of instrumentation and techniques applicable to uranium exploration and resource assessment. The sections that follow summarize briefly the work done during 1980/1981 on logging systems, aerial data interpretation and evaluation, aerial technology, technology integration, emanometry and geochemistry, and calibration.

LOGGING SYSTEMS

Highlighting Technology Applications activity on logging systems during 1980/1981 was a workshop, conducted in Grand Junction in February 1981, which provided a forum for review and discussion of all NURE program accomplishments in the area of spectral gamma-ray logging. Other activity on gamma-ray logging in 1980/1981 included theoretical and measurement studies on spectral gamma-ray techniques, in which comparisons were made of the resolution and sensitivity characteristics of three types of detector: thallium-doped sodium iodide, sodium-doped cesium iodide, and bismuth germanate [cf. GJBX-21(81)]. Based on these studies, a module was added to the Compulogger software to implement field correction of raw KUT (potassium/uranium/thorium) log data for borehole fluid and casing factors.

The years 1980/1981 also saw significant development work on fission-neutron logging. Data-reduction software for the Prompt Fission Neutron (PFN) logging system was completed and tested, both on Grand Junction models and in the field, and PFN data were used to calculate ore grades and to profile uranium calibration models. Reports completed and open-filed during this period included the final report on the Californium-252-Based Direct Uranium Logging System [GJBX-254(80)], a report on Development of Interpretation Models for PFN Uranium Log Analysis [GJBX-52(81)], and a report on Field Evaluation of Active and Passive Direct Uranium Borehole Logging Systems [GJBX-113(81)].

The state of the art in logging systems was further advanced by research and development work of a general nature. Transport mechanisms were studied for gamma rays and neutrons in boreholes penetrating uranium-bearing geologic formations [cf. GJBX-21(81) and GJBX-149(81)]. A fiber-optic logging cable and data transmission system were tested, as was a prototype of a downhole pulse-height analyzer designed to work with the fiber-optic cable and a sodium iodide crystal detector system. Also completed were design and construction of a prototype borehole data acquisition and transmission system [cf. GJBX-224(81)], and field-testing of a new magnetic susceptibility probe and its interface to the Compulogger System [cf. GJBX-75(81)].

Table I in Appendix E lists 1980/1981 Technology Applications Logging Systems projects, together with associated information on subcontractor, subcontract value, start and completion dates, and report numbers, as appropriate.

AERIAL DATA INTERPRETATION AND EVALUATION

The STAARS program, "Statistical Techniques Applied to Aerial Radiometric Surveys," has developed a variety of statistical procedures which Bendix geoscientists have used to interpret NURE aerial radiometric data. Reports open-filed during 1980/1981 which describe these procedures include *Percentile Estimation with Normal and Log-normal Distributions* [GJBX-123(80)], *Principal Components Analysis User's Manual* [GJBX-9(81)], *Series Introduction and the Principal Components Analysis Method* [GJBX-114(81)], and *Estimating Upper Percentiles in Aerial Radiometric Data With and Without Distributional Assumptions* [GJBX-142(81)].

Discriminant analysis techniques have produced a number of significant results, among them the conclusion that the aerial radiometric data taken in South and East Texas reflect underlying lithologies rather than the different soils at the surface [cf. GJBX-281(81)]. Two other 1980/1981 interpretation studies have resulted in an Interpretation Methods Test Report for NURE Aerial Radiometric and Geochemical Data [GJBX-137(80)] and a report on Methods Development and Applications Evaluations of NURE Aerial Survey Data in the Beeville/Bay City and Crystal City Quadrangles in Texas [GJBX-69(81)].

Still other studies related to the evaluation and use of aerial data have resulted in open-filed reports on surface and near-surface phenomena such as soil type and moisture content, biomass and overburden influence, and atmospheric inversion [GJBX-136(80) and GJBX-141(81)]; on the distribution of radon in the atmosphere up to approximately 1500 feet above the surface [GJBX-280(81)]; on the interrelationships between aerial radiometric and magnetic data, hydrogeochemical sample data, and Landsat data, all in the Montrose quadrangle [GJBX-148(81)]; and on interpretation of aerial magnetic data [GJBX-352(81)].

Early in 1980, Calibration and Data Reduction Specification BFEC 1250B, called out in Survey Specification BFEC 1200C, was made a requirement of all aerial radiometric data acquisition contracts. During the period 1980/1981, Bendix geoscientists performed quality assurance checks on data tapes from some 400 quadrangles and 20 detail areas that were surveyed in accord with these specifications. In addition, to maximize the usability of data acquired early in the NURE program with developmental systems, Bendix has undertaken the systematic review of all pre-1980 radiometric data tapes, converting all formats to the standard format established early in 1979. Some 600 raw spectral and single-record tapes underwent such conversion during 1980/1981.

The aerial radiometric data acquired in the NURE program have been utilized in several unique applications. The raw spectral data are used in the generation of cesium-137 fallout maps; a procedure that relies on a pair of low-energy cesium-137 windows, one of which provides information to adjust the calibration constants for the other, makes possible the detection of the extremely weak cesium-137 signal. The single-record KUT aerial radiometric information is used to produce exposure-rate maps through a procedure in which the ground radiation data are combined with the bismuth/air radiation data (as a function of terrain altitude) to determine the total radiation exposure for a given location.

The NURE aerial magnetic survey data are being used to produce magnetic anomaly profiles and a

contour map for each of the NTMS quadrangles covered by the Aerial Survey program. Oak Ridge National Laboratory will produce these profiles and maps until mid-1982, using procedures developed with the assistance of Dr. W. J. Hinze of Purdue University [cf. GJBX-177(81)]. Bendix will take over production in 1982, at a rate that should permit completion in 1983. A report describing the latest procedures will be issued in 1982.

Table II in Appendix E lists all 1980/1981 Aerial Data Interpretation and Evaluation projects, together with associated information on subcontractor, subcontract value, start and completion dates, and report numbers, as appropriate.

AERIAL TECHNOLOGY

Accomplishments during the period 1980/1981 included completion of the phoswich airborne detector development project, with field-testing of the prototype. Test results indicate that the CsI-NaI detector configuration has an effective sensitivity approximately 30 percent greater than state-of-the-art sodium iodide (NaI) detectors, as well as better directionality for discriminating against bismuth/air radiation [cf. Final Report GJBX-292(81)].

A test program was also conducted on the Litton LTN-76 Inertial Navigation System to evaluate its performance in helicopter navigation. Results suggest that an inertial unit of this type provides good control for following a prescribed flight path, accuracy of the order of ±280 feet with constraining points at 20-minute flight intervals, and fast turnaround for recovery of flight-path information [cf. GJBX-363(81)].

Work continued during 1980/1981 on digital filters for aerial-radiometric-data smoothing and spectrum enhancement. A Monte Carlo transport computer code and a detector response function code were developed which permit spectrum generation by propagation of gamma rays to the airborne detector through overburden, vegetation, and air, and folding of the results with the detector response. Both discrete and continuum spectra can be obtained in this manner.

Computer programs resulting from these filter projects are being used by Bendix geoscientists to analyze aerial data on the computer systems at Grand Junction. A code for calculation of response functions of sodium iodide detectors, with cylindrical and rectangular geometries, has also been developed [cf. GJBX-414(81)].

Table III in Appendix E lists all 1980/1981 Aerial Technology projects, together with associated information on subcontractor, subcontract value, start and completion dates, and report numbers, as appropriate.

TECHNOLOGY INTEGRATION

The Technology Integration program has realized its three major objectives: to develop integrated approaches to uranium exploration and resource assessment, to characterize uranium occurrences by suites of geochemical, geologic, and geophysical parameters, and to develop ore genesis models.

During 1980/1981, field work was completed at all four of the research sites: Spokane Mountain in Washington, Red Desert and Copper Mountain in Wyoming, and San Juan Basin in Colorado. By the end of 1981, analysis of the resulting data was nearly complete for three of the sites, and the final report on the Spokane Mountain work [GJBX-200(81)] had been open-filed. Final reports on Red Desert, Copper Mountain, and San Juan Basin are scheduled for release in calendar year 1982.

As is indicated in the final report on Spokane Mountain, the NURE program has produced a significantly different genetic model for the region than had previously existed. From the data obtained, it is postulated that the extensive faulting in the area has resulted in a very complex intersection of major geologic structures. It is further postulated that this intensely fractured terrain provided channels for thermal-convection currents of uranium-bearing fluids to migrate from the granitic source rocks into the mineralized areas. It is interesting to note that data from the Copper Mountain studies suggest a similar genetic model for the Copper Mountain site.

Table IV in Appendix E lists all 1980/1981 Technology Integration projects, together with associated information on subcontractor, subcontract value, start and completion dates, and report numbers, as appropriate.

EMANOMETRY AND GEOCHEMISTRY

Emanometry—measurement of the gases radon and helium, both of which are uranium decay products—has been used for many years to explore for uranium. With a view to enhancing the value of emanometry as an exploration tool, Bendix geoscientists conducted studies during 1980/1981 on helium ratio measurements, various emanometry instruments, and primary transport mechanisms for radon and helium. Much of the data collected has been incorporated into the Technology Integration exploration systems studies carried out at Spokane Mountain, Red Desert, Copper Mountain, and San Juan Basin (cf. preceding section). A Technology Integration preliminary report covering geochemical exploration at the Red Desert site has been open-filed [GJBX-125(81)].

An interesting observation made at Red Desert was the fact that the quantity of radon emanating from an open drill hole is not significantly different than that emanating from the ground surface in the vicinity of the hole [cf. GJBX-146(81)].

The period 1980/1981 saw significant advances in emanometry instrumentation. Development of a drilling-mud emanometer was completed, and the prototype was field-tested [cf. GJBX-273(81)]. The correlation of data resulting from prototype monitoring of borehole mud during drilling with data resulting from a log run on the same borehole after drilling was so encouraging that two preproduction models of the emanometer are being built for more extensive field-testing. Also successfully field-tested were a prototype downhole system for sampling water formation gases, and a helium leak detector adapted to measure helium in soil gas [cf. GJBX-38(81)].

Subjects of reports open-filed in 1980/1981 include a helium measurement technique [GJBX-22(80)], a transport study [GJBX-140(80)], a ratio measurement technique [GJBX-242(81)], and daughter products of uranium [GJBX-364(81)]. Papers presented before professional societies included "Advances in Radon Exploration Techniques for Uranium," presented at the June 1980 meeting of the Association of American Petroleum Geologists (AAPG) in Denver, and "Helium and Radon in Ground Water as Indicators of Uranium Mineralization," presented at the November 1980 meeting of the Society of Exploration Geophysicists (SEG).

Table V in Appendix E lists all 1980/1981 Emanometry and Geochemistry projects, together with associated information on subcontractor, subcontract value, start and completion dates, and report numbers, as appropriate.

CALIBRATION

Field facilities for the calibration of radiometric borehole logging systems were expanded in 1980, with three new sites established in Spokane, Washington; Reno, Nevada; and Morgantown, West Virginia. This expansion brings to six the number of sites that currently provide borehole models for the calibration of gross-gamma-ray, KUT (potassium/uranium/ thorium), gamma-ray-spectrum, and fission-neutron borehole probes. Also designed and fabricated for the Grand Junction site and the six field sites were surface pads for use in calibrating portable gamma-ray scintillometers and spectrometers; installation of these pads is scheduled for fiscal year 1982.

During 1980, some 554 industry loggers representing 74 companies used the GJAO Grand Junction and field calibration facilities. Use dropped significantly during 1981, to 352 loggers representing 59 companies. To archive the large amount of industry logging and DOE calibration data that has been acquired as a result of this type of site use, a calibration data base has been created on a computer system at the Grand Junction Area Office.

In August 1981, at a meeting held in Adelaide, South Australia, the Nuclear Energy Agency/ International Atomic Energy Agency (NEA/IAEA) Joint Working Group of Experts on R&D in Uranium Exploration Techniques included on its agenda discussions on the calibration of gamma-ray logging tools, probes, and systems. Bendix geoscientists at that meeting described to the Group the GJAO program under way to improve the accuracy of the grades assigned to the DOE borehole logging calibration models. Measurements performed by Bendix at the AMDEL models in Adelaide, using the same equipment that had been used at the DOE/GJAO models, produced results indicating a grade about 15 percent higher than that established by Australia. Since differences of the same order of magnitude have been seen in calibrations performed on models in Canada, it is postulated that these dis-

crepancies may be the result of different assay methods having been used by the laboratories that established ore grades for the three sets of models. A program has been initiated to intercompare radiometric assaying results from the concerned laboratories in the United States, Canada, Australia, and other interested countries.

The Radon Calibration Unit (RCU) at Grand Junction has continued to be an important reference for radon measurement devices and systems. The installation of a microprocessor-controlled feedback system has improved the stability of the unit by reducing from 20 percent to 2 percent the variations in alpha count rate caused by diurnal atmospheric effects.

Table VI in Appendix E lists all 1980/1981 Calibration projects, together with associated information, as appropriate, on subcontractor, subcontract value, start and completion dates, and report numbers.

MINERAL ECONOMICS

The Grand Junction Area Office of the Department of Energy has had a long-standing need for a computer-based system to facilitate frequent and reliable response to new U_3O_8 demand projections, as these are impacted by updated ore-reserve and potential-resource estimates, economic changes, and evolving environmental and institutional constraints.

An initial version of each of the major components of a U_3O_8 Supply Analysis System (USAS) was delivered by the major subcontractor in early 1980. The principal USAS design objectives were to (1) provide an integrated system for long-term U_3O_8 supply analysis; (2) provide frequent and rapid projections of domestic U_3O_8 production capabilities; (3) develop U_3O_8 production schedules based on resource type, ore grade, forward and economic cost categories, production center class, mining/milling methods, and production life; and (4) identify institutional constraints and impacts on U_3O_8 supplies.

Because of the extreme complexity of the total USAS concept, the decision was made to subdivide the system into readily identifiable and workable subsystems, and to develop each subsystem as a separate stand-alone model. These subsystems are currently being consolidated into two basic functional components:

- Uranium Production Cost Models, which include exploration and development, mining (underground, surface, and in situ), milling, financial evaluation, and production-center definition.
- Uranium Production Scheduling and Planning Models, which include capacity expansion, production allocation, and production planning.

The initial version of the U_3O_8 Supply Analysis System was developed by a multidisciplinary team of experienced professionals with backgrounds appropriate to the respective submodels. This approach resulted in model and submodel logic which reflects the current operating practices of the domestic uranium industry. When completely structured, the system will utilize information from many sources, as well as data generated by the NURE program.

In 1981, the Department of Energy requested that priority be placed on refinement of four specific models: Exploration and Development (E&D), Mining (underground and surface), Milling, and Financial Evaluation. These models are currently undergoing preliminary testing. As development of the total system continues, these first models will find active use in GJAO uranium-assessment and supply-analysis activities. The other cost models and all the scheduling and planning models will undergo detailed review and further development in 1982.

Appendix F lists all 1980/1981 Mineral Economics projects, detailing as appropriate project name, subcontractor, subcontract value, start and completion dates, and associated report numbers.

APPENDIX A

Quadrangle Evaluation

Albany Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 1 November 1977
- Completion Date: 6 June 1980
- Report: PGJ-104(81)

Albuquerque Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 31 March 1980
- Report: PGJ-016(80)

Amarillo Quadrangle
- Subcontractor: University of Texas Bureau of Economic Geology
- Subcontract Value: $158,000
- Start Date: 31 March 1978
- Completion Date: 8 April 1980
- Report: GJO-013(81)

Arminto Quadrangle
- Contractor: Bendix/Casper Field Office
- Start Date: 2 October 1978
- Completion Date: 31 March 1980
- Report: PGJ-018(80)

Ashland Quadrangle
- Subcontractor: Derry, Michener & Booth
- Subcontract Value: $176,000
- Start Date: 1 February 1978
- Completion Date: 27 March 1980
- Report: PGJ-084(81)

Ashton Quadrangle
- Subcontractor: Meiiji Resources Consultants
- Subcontract Value: $166,000
- Start Date: 1 February 1978
- Completion Date: 17 February 1980
- Report: PGJ-074(81)

Athens Quadrangle
- Contractor: Bendix/Atlanta Field Office
- Start Date: 18 November 1977
- Completion Date: 30 April 1979
- Report: GJQ-002(80)

Auguste Quadrangle
- Subcontractor: Carolina GeoScience
- Subcontract Value: $169,000
- Start Date: 20 March 1978
- Completion Date: 8 April 1980
- Report: PGJ-031(80)

Austin Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 1 March 1978
- Completion Date: 2 February 1980
- Report: PGJ-035(81)

Aztec Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 31 March 1980
- Report: PGJ-012(80)

Baker Quadrangle
- Contractor: Bendix/Spokane Field Office
- Start Date: 3 March 1980
- Completion Date: 19 March 1980
- Report: PGJ-112(81)

Bangor Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 19 May 1980
- Completion Date: 12 March 1981
- Report: PGJ-113(81)

Beaumont Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 1 November 1978
- Completion Date: 28 March 1980
- Report: PGJ-062(81)

Beeville Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 2 October 1978
- Completion Date: 29 April 1980
- Report: PGJ-066(81)

Bendeleben Quadrangle
- Subcontractor: C. C. Hawley and Associates, Inc.
- Subcontract Value: $68,000
- Start Date: 19 April 1977
- Completion Date: 1 March 1978
- Report: GJBX-105(78)

Billings Quadrangle
- Subcontractor: Morris & Warchola, Inc.
- Subcontract Value: $175,000
- Start Date: 1 February 1978
- Completion Date: 5 March 1980
- Report: PGJ-015(80)

Black River Quadrangle
- Subcontractor: C. C. Hawley & Associates, Inc.
- Subcontract Value: $197,000
- Start Date: 10 May 1979
- Completion Date: 22 May 1980
- Report: PGJ-108(81)

Bozeman Quadrangle
- Subcontractors: University of Montana and Montana State University
- Subcontract Value: $188,000
- Start Date: 1 February 1978
- Completion Date: 6 February 1980
- Report: PGJ-077(81)

Brownsville Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 1 June 1980
- Completion Date: 31 May 1981
- Report: PGJ-134(81)

Butte Quadrangle
- Subcontractor: Salisbury & Dietz, Inc.
- Subcontract Value: $218,000
- Start Date: 1 February 1978
- Completion Date: 31 January 1980
- Report: PGJ-064(81)

Candle Quedrangle
- Subcontractor: C. C. Hawley and Associates, Inc.
- Subcontract Value: $68,000
- Start Date: 19 April 1977
- Completion Date: 1 March 1978
- Report: GJBX-105(78)

Casper Quadrangle
- Contractor: Bendix/Casper Field Office
- Start Date: 3 October 1977
- Completion Date: 27 December 1979
- Report: PGJ-033(80)

APPENDIX A

Quadrangle Evaluation (continued)

Challis Quadrangle
- Contractor: Bendix/Spokane Field Office
- Start Date: 3 October 1977
- Completion Date: 17 April 1980
- Report: PGJ-042(81)

Charley River Quadrangle
- Subcontractor: C. C. Hawley & Associates, Inc.
- Subcontract Value: $197,000
- Start Date: 10 May 1979
- Completion Oate: 16 May 1980
- Report: PGJ-106(81)

Charlottesville Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 1 March 1980
- Completion Date: 9 February 1981
- Report: PGJ-114(81)

Cheyenne Quadrangle
- Contractor: Bendix/Casper Field Office
- Start Date: 15 January 1980
- Completion Date: 31 October 1980
- Report: PGJ-115(81)

Circle Quadrangle
- Subcontractor: C. C. Hawley & Associates, Inc.
- Subcontract Value: $197,000
- Start Date: 10 May 1979
- Completion Date: 16 May 1980
- Report: PGJ-107(81)

Clifton Quadrangle
- Contractor: Bendix/Albuquerque Field Office
- Start Date: 15 February 1980
- Completion Date: 3 March 1981
- Report: PGJ-116(81)

Clinton Quadrangle
- Subcontractor: Oklahoma Geological Survey
- Subcontract Value: $169,000
- Start Date: 1 March 1978
- Completion Date: 3 March 1980
- Report: PGJ-096(81)

Cody Quadrangle
- Subcontractor: Garrand Corporation
- Subcontract Value: $186,000
- Start Date: 1 March 1978
- Completion Date: 28 March 1980
- Report: PGJ-043(81)

Coleen Quadrangle
- Subcontractor: C. C. Hawley & Associates, Inc.
- Subcontract Value: $197,000
- Start Date: 10 May 1979
- Completion Date: 22 May 1980
- Report: PGJ-040(81)

Corpus Christi Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 1 June 1980
- Completion Date: 31 March 1981
- Report: PGJ-117(81)

Cortez Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 30 April 1980
- Report: PGJ-051(81)

Craig Quadrangle (Colorado)
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 29 February 1980
- Report: PGJ-017(80)

Crystal City Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 1 November 1977
- Completion Date: 30 July 1979
- Report: PGJ-073(81)

Dalhart Quadrangle
- Subcontractor: Consulting Professionals, Inc.
- Subcontract Value: $147,000
- Start Date: 1 February 1978
- Completion Date: 22 February 1979
- Report: PGJ-081(81)

Death Valley Quadrangle
- Contractor: Bendix/Reno Field Office
- Start Date: 3 January 1978
- Completion Date: 31 January 1980
- Report: PGJ-083(81)

Delta Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 31 January 1980
- Report: PGJ-0D2(80)

Denver Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 29 February 1980
- Report: PGJ-078(81)

Dickinson Quadrangle
- Contractor: Bendix/Atlanta Field Office
- Start Date: 2 October 1978
- Completion Date: 3 June 1980
- Report: PGJ-036(81)

Dillon Quadrangle
- Subcontractor: GeoExplorers International, Inc.
- Subcontract Value: $227,000
- Start Date: 1 February 1978
- Completion Date: 5 March 1980
- Report: GJQ-007(81)

Dixon Entrance Quadrangle
- Contractor: Bendix/Anchorage Field Office
- Start Date: 1 March 1978
- Completion Date: 25 April 1980
- Report: PGJ-047(81)

Douglas Quadrangle
- Contractor: Bendix/Albuquerque Field Office
- Start Date: 25 February 1980
- Completion Date: 9 February 1981
- Report: PGJ-118(81)

Dubois Quadrangle
- Subcontractor: GeoExplorers International, Inc.
- Subcontract Value: $224,000
- Start Date: 1 February 1978
- Completion Date: 5 March 1980
- Report: GJQ-008(81)

APPENDIX A

Quadrangle Evaluation (continued)

Durango Quadrangle
- Contractor: Bendix/Grand Junction Field Office
- Start Date: 3 October 1977
- Completion Date: 21 January 1980
- Report: GJQ-011(81)

Dyersburg Quadrangle
- Subcontractor: Geochemex
- Subcontract Value: $122,000
- Start Date: 1 March 1978
- Completion Date: 29 February 1980
- Report: PGJ 103(81)

Eastport Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 19 May 1980
- Completion Date: 12 March 1981
- Report: PGJ-113(81)

Eau Claire Quadrangle
- Subcontractor: Golder Associates, Inc.
- Subcontract Value: $194,000
- Start Date: 1 February 1978
- Completion Date: 1 February 1980
- Report: PGJ-071(81)

Ekalaka Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 3 January 1978
- Completion Date: 31 March 1980
- Report: PGJ-007(80)

Elk City Quadrangle
- Subcontractor: Salisbury & Dietz, Inc.
- Subcontract Value: $289,000
- Start Date: 1 February 1978
- Completion Date: 31 January 1980
- Report: PGJ-065(81)

Elko Quadrangle
- Subcontractor: Uranium Services Company
- Subcontract Value: $162,000
- Start Date: 1 March 1978
- Completion Date: 16 May 1980
- Report: PGJ-046(81)

Emory Peek Quadrangle
- Subcontractor: University of Texas Bureau of Economic Geology, jointly with Bendix/Albuquerque Field Office
- Subcontract Value: $57,000
- Start Date: 15 August 1978
- Completion Date: 3 April 1980
- Report: PGJ-110(81)

Enid Quadrangle
- Subcontractor: Oklahoma Geological Survey
- Subcontract Value: $169,000
- Start Date: 1 March 1978
- Completion Date: 3 March 1980
- Report: PGJ-095(81)

Escalante Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 30 April 1980
- Report: PGJ-049(81)

Flagstaff Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 31 January 1980
- Report: PGJ-014(80)

Gallup Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 31 March 1980
- Report: PGJ-013(80)

Gillette Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 31 March 1980
- Report: PGJ-060(81)

Glens Falls Quadrangle
- Subcontractor: Chiasma Consultants, Inc.
- Subcontract Value: $137,000
- Start Date: 9 February 1978
- Completion Date: 31 January 1980
- Report: PGJ-025(80)

Grand Canyon Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 1 November 1978
- Completion Date: 25 February 1980
- Report: PGJ-020(80)

Greeley Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 29 February 1980
- Report: PGJ-079(81)

Green Bay Quadrangle
- Subcontractor: Golder Associates, Inc.
- Subcontract Value: $195,000
- Start Date: 1 March 1978
- Completion Date: 3 March 1980
- Report: PGJ-093(81)

Greensboro Quadrangle
- Contractor: Bendix/Atlanta Field Office
- Start Date: 19 October 1977
- Completion Date: 1 August 1979
- Report: PGJ-063(81)

Hamilton Quadrangle
- Subcontractor: Salisbury & Dietz, Inc.
- Subcontract Value: $252,000
- Start Date: 1 February 1978
- Completion Date: 31 January 1980
- Report: PGJ-087(81)

Harrisburg Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 1 November 1977
- Completion Date: 9 January 1980
- Report: PGJ-086(81)

Havre Quadrangle
- Contractor: Bendix/Casper Field Office
- Start Date: 1 April 1980
- Completion Date: 24 February 1981
- Report: PGJ-119(81)

Hot Springs Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 20 November 1978
- Completion Date: 2 June 1980
- Report: PGJ-029(80)

APPENDIX A

Quadrangle Evaluation (continued)

Hutchinson Quadrangle
- Subcontractor: Wichita State University
- Subcontract Value: $139,000
- Start Date: 16 March 1978
- Completion Date: 10 March 1980
- Report: PGJ-088(81)

Iron River Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 20 February 1981
- Report: PGJ-120(81)

Joplin Quadrangle
- Subcontractor: Geological Services of Tulsa
- Subcontract Value: $169,000
- Start Date: 16 March 1978
- Completion Date: 10 March 1980
- Report: PGJ-092(81)

Jordan Valley Quadrangle
- Contractor: Bendix/Spokane Field Office
- Start Date: 1 April 1980
- Completion Date: 2 July 1981
- Raport: PGJ-132(81)

Kalispell Quadrangle
- Contractor: Bendix/Spokane Field Office
- Start Date: 1 May 1980
- Completion Date: 29 June 1981
- Report: PGJ-133(81)

Kingman Quadrangle
- Contractor: Bendix/Albuquerque Field Office
- Start Date: 3 October 1977
- Completion Date: 4 June 1979
- Report: PGJ-137(81)

Klamath Falls Quadrangle
- Contractor: Bendix/Spokane Field Office
- Start Date: 15 November 1978
- Completion Date: 29 May 1980
- Report: PGJ-061(81)

Kotzebue Quadrangle
- Subcontractor: C. C. Hawley and Associates, Inc.
- Subcontract Value: $68,000
- Start Date: 19 April 1977
- Completion Date: 1 March 1978
- Report: GJBX-105(78)

La Junta Quadrangle
- Contractor: Bendix/Grand Junction Field Office
- Start Date: 1 April 1978
- Completion Date: 30 May 1979
- Report: PGJ-100(81)

Lamar Quadrangle
- Contractor: Bendix/Grand Junction Field Office
- Start Date: 3 October 1977
- Completion Date: 30 May 1979
- Raport: PGJ-082(81)

Landar Quadrangle
- Contractor: Bendix/Casper Field Office
- Start Date: 2 October 1978
- Completion Date: 31 March 1980
- Report: PGJ-050(81)

Laredo Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 1 November 1978
- Completion Date: 20 June 1980
- Report: PGJ-069(81)

Las Vegas Quadrangle
- Contractor: Bendix/Reno Field Office
- Start Date: 1 May 1980
- Completion Date: 6 May 1981
- Report: PGJ-121(81)

Lawton Quadrangle
- Subcontractor: Oklahoma State University
- Subcontract Value: $166,000
- Start Date: 1 March 1978
- Completion Date: 8 May 1980
- Report: PGJ-023(80)

Leadville Quadrangle
- Subcontractor: Colorado Geological Survey
- Subcontract Value: $169,000
- Start Date: 1 March 1978
- Completion Date: 31 March 1980
- Report: PGJ-027(80)

Lemmon Quadrangle
- Contractor: Bendix/Atlanta Field Office
- Start Date: 2 October 1978
- Completion Date: 6 June 1980
- Report: PGJ-039(81)

Lewistown Quadrangle
- Subcontractor: Charles S. Robinson & Associates, Inc.
- Subcontract Value: $158,000
- Start Date: 1 February 1978
- Completion Date: 19 February 1980
- Report: PGJ-111(81)

Lime Hills Quadrangle
- Subcontractor: C. C. Hawley & Associates, Inc.
- Subcontract Value: $197,000
- Start Date: 11 April 1978
- Completion Date: 3 August 1979
- Report: PGJ-057(81)

Lleno Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 1 July 1980
- Completion Date: 30 April 1981
- Report: PGJ-122(81)

Lovelock Quadrangle
- Subcontractor: Berge Exploration, Inc.
- Subcontract Value: $191,000
- Start Date: 1 March 1978
- Completion Date: 3 March 1980
- Report: PGJ-090(81)

Lubbock Quadrangle
- Subcontractor: University of Texas Bureau of Economic Geology
- Subcontract Value: $168,000
- Start Date: 31 March 1978
- Completion Date: 8 April 1980
- Report: GJQ-012(81)

APPENDIX A

Quadrangle Evaluation (continued)

Manhattan Quadrangle
- Subcontractor: Wichita State University
- Subcontract Value: $100,000
- Start Date: 1 March 1978
- Completion Date: 10 March 1980
- Report: PGJ-097(81)

Marble Canyon Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 1 November 1978
- Completion Date: 4 March 1980
- Report: PGJ-022(80)

Marfa Quadrangle
- Subcontractor: University of Texas Bureau of Economic Geology, jointly with Bendix/Albuquerque Field Office
- Subcontract Value: $57,000
- Start Date: 15 August 1978
- Completion Date: 3 April 1980
- Report: PGJ-001(80)

McAllen Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 1 June 1980
- Completion Date: 31 May 1981
- Report: PGJ-134(81)

McDermitt Quadrangle
- Subcontractor: Nevada Bureau of Mines and Geology
- Subcontract Value: $166,000
- Start Date: 1 March 1978
- Completion Date: 22 April 1980
- Report: PGJ-045(81)

Mesa Quadrangle
- Contractor: Bendix/Albuquerque Field Office
- Start Date: 2 October 1978
- Completion Date: 6 March 1980
- Report: PGJ-032(80)

Millett Quadrangle
- Contractor: Bendix/Reno Field Office
- Start Date: 3 October 1977
- Completion Date: 31 July 1981
- Report: PGJ-138(81)

Moab Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 30 April 1980
- Report: PGJ-056(81)

Montrose Quadrangle
- Contractor: Bendix/Grand Junction Field Office
- Start Date: 3 October 1977
- Completion Date: 21 December 1979
- Report: GJQ-010(81)

Mt. McKinley Quadrangle
- Subcontractor: C. C. Hawley & Associates, Inc.
- Subcontract Value: $197,000
- Start Date: 11 April 1978
- Completion Date: 8 August 1979
- Report: PGJ-054(81)

Newark Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 1 January 1980
- Completion Date: 6 January 1981
- Report: PGJ-123(81)

Newcastle Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 1 February 1978
- Completion Date: 31 March 1980
- Report: PGJ-008(80)

New Ulm Quadrangle
- Subcontractor: Minnesota Geological Survey
- Subcontract Value: $163,000
- Start Date: 1 March 1978
- Completion Date: 3 April 1980
- Report: PGJ-052(81)

Nogales Quadrangle
- Contractor: Bendix/Albuquerque Field Office
- Start Date: 1 March 1980
- Completion Date: 12 February 1981
- Report: PGJ-130(81)

Nome Quadrangle
- Subcontractor: C. C. Hawley and Associates, Inc.
- Subcontract Value: $68,000
- Start Date: 19 April 1977
- Completion Date: 1 March 1978
- Report: GJBX-105(78)

Ogden Quadrangle
- Contractor: Bendix/Grand Junction Field Office
- Start Date: 1 May 1980
- Completion Date: 25 February 1981
- Report: PGJ-124(81)

Okanogan Quadrangle
- Contractor: Bendix/Spokane Field Office
- Start Date: 3 October 1977
- Completion Date: 2 January 1980
- Report: PGJ-003(80)

Oklahoma City Quadrangle
- Subcontractor: Geological Services of Tulsa
- Subcontract Value: $169,000
- Start Date: 16 March 1978
- Completion Date: 10 March 1980
- Report: PGJ-091(81)

Palestine Quadrangle
- Subcontractor: University of Texas Bureau of Economic Geology
- Subcontract Value: $160,000
- Start Date: 31 March 1978
- Completion Date: 8 April 1980
- Report: PGJ-105(81)

Plainview Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 3 October 1977
- Completion Date: 31 January 1979
- Report: GJQ-001(79)

Pocatello Quadrangle
- Subcontractor: Charles S. Robinson & Associates, Inc.
- Subcontract Value: $161,000
- Start Data: 1 February 1978
- Completion Date: 31 January 1980
- Report: PGJ-076(81)

Poplar Bluff Quadrangle
- Subcontractor: Geochemex
- Subcontract Value: $122,000
- Start Date: 1 March 1978
- Completion Date: 29 February 1980
- Report: PGJ-102(81)

APPENDIX A

Quadrangle Evaluation (continued)

Portland Quadrangle
- Subcontractor: Chiasma Consultants, Inc.
- Subcontract Value: $130,000
- Start Date: 9 Fabruary 1978
- Completion Date: 31 January 1980
- Report: PGJ-028(80)

Pratt Quadrangle
- Subcontractor: Wichita State University
- Subcontract Value: $176,000
- Start Date: 1 March 1978
- Completion Date: 10 March 1980
- Report: PGJ-099(81)

Prescott Quadrangle
- Contractor: Bendix/Albuquerque Field Office
- Start Date: 3 October 1977
- Completion Date: 16 July 1979
- Report: PGJ-006(80)

Presidio Quadrangle
- Subcontractor: University of Texas Bureau of Economic Geology, jointly with Bendix/Albuquerque Field Office
- Subcontract Value: $57,000
- Start Date: 15 August 1978
- Completion Date: 3 April 1980
- Raport: PGJ-109(81)

Price Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Data: 30 April 1980
- Report: PGJ-055(81)

Providence Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 15 November 1977
- Completion Date: 26 February 1980
- Report: PGJ-101(81)

Pueblo Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 29 February 1980
- Report: PGJ-075(81)

Raleigh Quadrangle
- Contractor: Bendix/Atlanta Field Office
- Start Date: 1 November 1979
- Completion Date: 1 November 1981
- Report: Scheduled for 1982 PGJ Release

Rapid City Quadrangle
- Contractor: Bendix/Casper Field Office
- Start Date: 1 March 1980
- Completion Date: 30 January 1981
- Report: PGJ-125(81)

Raton Quadrangle
- Subcontractor: New Mexico Bureau of Mines and Mineral Resources
- Subcontract Value: $191,000
- Start Date: 1 March 1978
- Completion Date: 10 March 1980
- Report: GJQ-005(80)

Rawlins Quadrangle
- Contractor: Bendix/Casper Field Office
- Start Date: 3 October 1977
- Completion Date: 10 March 1980
- Report: PGJ-019(80)

Reno Quadrangle
- Contractor: Bendix/Reno Field Office
- Start Date: 2 October 1978
- Completion Date: 5 May 1980
- Report: PGJ-037(81)

Rice Lake Quadrangle
- Subcontractor: Derry, Michener & Booth
- Subcontract Value: $179,000
- Start Date: 1 February 1978
- Completion Date: 10 April 1980
- Report: GJQ-006(81)

Richfield Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 29 February 1980
- Report: PGJ-044(81)

Ritzville Quadrangle
- Contractor: Bendix/Spokane Field Office
- Start Date: 15 November 1978
- Completion Date: 29 April 1980
- Report: PGJ-041(81)

Rock Springs Quadrangle
- Subcontractor: Morris & Warchola, Inc.
- Subcontract Value: $162,000
- Start Date: 1 February 1978
- Completion Date: 3 March 1980
- Report: PGJ-080(81)

St. Cloud Quadrangle
- Subcontractor: Minnesota Geological Survey
- Subcontract Value: $159,000
- Start Date: 1 March 1978
- Completion Date: 3 April 1980
- Report: PGJ-048(81)

St. Johns Quadrangle
- Contractor: Bendix/Albuquerque Field Office
- Start Date: 2 October 1978
- Completion Date: 6 March 1980
- Report: PGJ-011(80)

Salina Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 30 April 1980
- Report: PGJ-053(81)

Salton Sea Quadrangle
- Contractor: Bendix/Reno Field Office
- Start Date: 2 October 1978
- Completion Date: 28 February 1982
- Report: Scheduled for 1982 PGJ Release

San Antonio Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 1 August 1979
- Completion Date: 2 Merch 1981
- Report: PGJ-126(81)

Sandpoint Quadrangle
- Contractor: Bendix/Spokane Field Office
- Start Date: 3 October 1977
- Completion Date: 15 August 1979
- Report: PGJ-005(80)

APPENDIX A

Quadrangle Evaluation (continued)

Santa Fe Quadrangle
- Subcontractor: New Mexico Bureau of Mines and Mineral Resources
- Subcontract Value: $191,000
- Start Date: 1 March 1978
- Completion Date: 10 March 1980
- Report: PGJ-021(80)

Scranton Quadrangle
- Contractor: Bendix/Pittsburgh Field Office
- Start Date: 1 November 1977
- Completion Date: 2 May 1979
- Report: GJQ-003(80)

Seguin Quadrangle
- Contractor: Bendix/Austin Field Office
- Start Date: 3 October 1977
- Completion Date: 2 July 1979
- Report: PGJ-072(81)

Selawik Quadrangle
- Subcontractor: C. C. Hawley and Associates, Inc.
- Subcontract Value: $68,000
- Start Date: 19 April 1977
- Completion Date: 1 March 1978
- Report: GJ8X-105(78)

Sheridan Quadrangle
- Contractor: Bendix/Casper Field Office
- Start Date: 1 April 1980
- Completion Date: 31 March 1981
- Report: PGJ-127(81)

Sharman Quadrangle
- Subcontractor: University of Texas Bureau of Economic Geology
- Subcontract Value: $175,000
- Start Date: 31 March 1978
- Completion Date: 4 April 1980
- Report: PGJ-089(81)

Shiprock Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 January 1978
- Completion Date: 31 March 1980
- Report: PGJ-024(80)

Shishmaref Quadrangle
- Subcontractor: C. C. Hawley and Associates, Inc.
- Subcontract Value: $68,000
- Start Date: 19 April 1977
- Completion Date: 1 March 1978
- Report: GJBX-105(78)

Silver City Quadrangle
- Contractor: Bendix/Albuquerque Field Office
- Start Date: 1 March 1980
- Completion Date: 3 April 1981
- Report: PGJ-131(81)

Socorro Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 23 July 1978
- Completion Date: 31 January 1980
- Report: PGJ-068(81)

Solomon Quadrangle
- Subcontractor: C. C. Hawley and Associates, Inc.
- Subcontract Value: $68,000
- Start Date: 19 April 1977
- Completion Date: 1 March 1978
- Report: GJBX-105(78)

Spartanburg Quadrangle
- Contractor: Bendix/Atlanta Field Office
- Start Date: 3 October 1977
- Completion Date: 4 June 1979
- Report: GJQ-004(80)

Spokane Quadrangle
- Contractor: Bendix/Spokane Field Office
- Start Date: 1 November 1977
- Completion Date: 30 July 1979
- Report: PGJ-009(80)

Talkeetna Quadrangle
- Subcontractor: C. C. Hawley & Associates, Inc.
- Subcontract Value: $197,000
- Start Date: 11 April 1978
- Completion Date: 3 August 1979
- Report: PGJ-058(81)

Taller Quadrangle
- Subcontractor: C. C. Hawley and Associates, Inc.
- Subcontract Value: $68,000
- Start Date: 19 April 1977
- Completion Date: 1 March 1978
- Report: GJBX-105(78)

Thermopolis Quadrangle
- Contractor: Bendix/Casper Field Office
- Start Date: 2 October 1978
- Completion Date: 31 March 1980
- Report: PGJ-030(80)

Tonopah Quadrangle
- Contractor: Bendix/Reno Field Office
- Start Date: 1 May 1980
- Completion Date: 6 May 1981
- Report: PGJ-128(81)

Torrington Quadrangle
- Contractor: U.S. Geological Survey
- Start Date: 30 January 1978
- Completion Date: 31 March 1980
- Report: PGJ-067(81)

Trinidad Quadrangle
- Contractor: Bendix/Grand Junction Field Office
- Start Date: 2 October 1978
- Completion Date: 24 March 1980
- Report: PGJ-034(81)

Trona Quadrangle
- Subcontractor: California Division of Mines and Geology
- Subcontract Value: $170,000
- Start Date: 14 April 1978
- Completion Date: 16 May 1980
- Report: PGJ-038(81)

Tulerosa Quadrangle
- Subcontractor: Berge Exploration, Inc.
- Subcontract Value: $191,000
- Start Date: 1 March 1978
- Completion Date: 3 March 1980
- Report: PGJ-004(80)

Tyonek Quadrangle
- Subcontractor: C. C. Hawley & Associates, Inc.
- Subcontract Value: $197,000
- Start Date: 11 April 1978
- Completion Date: 3 August 1979
- Report: PGJ-059(81)

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Aberdeen	X		GJBX-357(81) GJBX-386(81)				
Abilene			GJBX-17(77) GJBX-386(81)		GJBX-131(81)		
Adel		X	GJBX-104(80)				GJBX-115(81)
Afognak	X						
Ajo	X		GJBX-12(80)				
Albany	X		GJO-1666-1		GJBX-140(79) GJBX-107(81)		
Albuquerque		X	GJBX-116(79)		GJBX-145(79)	GJBX-351(81)	GJBX-101(79) GJBX-98(80) GJBX-215(80)
Alexandria	X		GJO-1632 GJBX-152(80)				
Alliance	X	X	GJBX-25(80)		GJBX-219(80)		
Alpena	X		GJBX-39(80)				
Alturas			GJBX-406(81)				
Amarillo			GJBX-33(76)		GJBX-111(79)		
Ambler River					GJBX-87(78) GJBX-208(81)		
Anchorage	X		GJBX-108(78)		GJBX-204(81)		
Andalusia	X		GJBX-123(81)		GJBX-190(81) GJBX-403(81)		
Apalachicola	X		GJBX-120(81)				
Arctic					GJBX-151(81) GJBX-253(81)		
Ardmore			GJBX-17(77)		GJBX-142(78)		
Arminto		X	GJO-1631-1 GJO-1631-2 GJBX-63(80)	GJBX-113(79)	GJBX-94(77) GJBX-3(80)	GJBX-174(81)	
Ashland	X		GJBX-50(78)		GJBX-61(79)		
Ashton	X		GJBX-106(79)		GJBX-189(80)		
Athens	X		GJO-1663-1		GJBX-20(79) GJBX-73(79) GJBX-403(81)		
Atlanta			GJBX-47(80)		GJBX-129(79) GJBX-403(81)		
Atlin	X		GJBX-48(79)		GJBX-166(81)		
Augusta	X		GJO-1663-1		GJBX-45(79) GJBX-403(81)		
Aurora	X		GJBX-181(81)				
Austin		X	GJO-1632 GJBX-148(79)		GJBX-18(79) GJBX-131(81)	GJBX-34(80)	

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Aztec	X	X	GJBX-65(80)		GJBX-129(78) GJBX-321(81)		GJBX-101(79) GJBX-98(80) GJBX-215(80)
Baird Inlet	X		GJBX-5(77)				
Baird Mts.	X				GJBX-87(78) GJBX-262(81)		
Baker	X		GJBX-101(78)		GJBX-231(81)		
Bakersfield		X	GJBX-231(80)		GJBX-419(81)		
Baltimore	X		GJBX-133(78)		GJBX-286(81)		
Bangor	X		GJBX-327(81)				
Barrow	X		GJBX-295(81)		GJBX-272(81)		
Barter Island	X				GJBX-152(81)		
Bath	X		GJBX-327(81)				
Baton Rouge	X		GJBX-221(80)				
Bay City			GJBX-69(79)		GJBX-170(81)		
Beaufort	X		GJBX-36(80)		GJBX-17(81)		
Beaumont		X	GJO-1632 GJBX-44(80)		GJBX-67(80)		
Beaver			GJBX-5(77)		GJBX-153(81) GJBX-379(81)		
Beechey Point	X		GJBX-300(81)		GJBX-246(81)		
Beeville		X	GJO-1635 GJBX-69(79)		GJBX-19(77) GJBX-2(80)		
Belleville	X		GJBX-241(81)				
Beloit	X		GJBX-100(78) GJBX-386(81)				
Bemidji	X		GJBX-331(81)				
Bend	X		GJBX-240(81)				
Bendeleben	X		GJO-1653		GJBX-79(78) GJBX-85(78) GJBX-26(79)		
Bering Glacier	X		GJBX-127(78)		GJBX-189(81)		
Bettles			GJBX-5(77)		GJBX-198(81)		
Big Delta	X		GJBX-113(78)		GJBX-195(81)		
Big Spring			GJBX-196(80)		GJBX-73(78)		
Billings	X		GJBX-87(79)		GJBX-150(79)		
Binghamton			GJBX-327(81)		GJBX-192(81)		
Birmingham	X		GJBX-70(80)		GJBX-191(81) GJBX-403(81)		
Bismarck	X		GJBX-85(81)				
Black			GJBX-5(77)				
Black River			GJBX-5(77)		GJBX-339(81)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Blind River	X		GJBX-39(80)				
Bluefield	X		GJBX-92(80)		GJBX-234(81)		
Blying Sound	X		GJBX-108(78)				
Blytheville	X		GJBX-205(80)				
Boise	X		GJBX-10(80)				
Boston	X		GJO-1666-1		GJBX-72(81) GJBX-255(80)		
Bozeman	X		GJBX-81(79)		GJBX-8(79) GJBX-235(80)	GJBX-237(80)	
Bradfield Canal	X		GJBX-48(79)		GJBX-154(81) GJBX-376(81)		
Brainerd	X		GJBX-332(81)				
Breton Sound	X		GJBX-223(80)				
Brigham City			GJBX-124(79)			GJBX-238(80)	
Broken Bow	X		GJBX-100(78) GJBX-386(81)		GJBX-274(81)		
Brownfield			GJBX-36(76)		GJBX-103(78) GJBX-319(81)		
Brownsville		X	GJBX-118(78)		GJBX-249(80)		
Brownwood			GJBX-68(79) GJBX-386(81)		GJBX-131(81)		
Brunswick	X		GJBX-103(81)		GJBX-27(81) GJBX-403(81)		
Buffalo			GJ8X-211(81)				
Burlington	X						
Burns			GJBX-240(81)				
Butte	X		GJBX-126(79)		GJBX-129(80)		
Caliente		X	GJBX-52(80)				
Campbellton	X		GJBX-327(81)				
Candle			GJO-1653		GJBX-79(78) GJBX-85(78)		
Canton	X		GJBX-92(80)				
Canyon City			GJBX-240(81)				
Cape Flattery	X		GJBX-135(81)				
Cape Mendenhall	X		GJBX-5(77)				
Carlsbad	X		GJBX-412(81)		GJBX-415(81)		
Casper		X	GJO-1631-1 GJO-1631-2 GJBX-158(79)		GJBX-144(80)		GJ8X-56(76) GJBX-50(80) GJBX-51(80) GJBX-124(80)
Cedar City			GJBX-93(80)				
Centerville	X		GJBX-28(81)				

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Challis	X		GJBX-156(79)		GJBX-91(80)		
Chandalar					GJBX-172(81) GJBX-254(81)		
Chandler Lake					GJBX-155(81)		
Charleston			GJBX-92(80)				
Charley River	X		GJBX-113(78)		GJBX-79(78) GJBX-235(81)		
Charlotte	X		GJO-1644 GJBX-57(79)		GJBX-40(78) GJBX-73(79)		
Charlottesville	X		GJBX-92(80)		GJBX-175(81)		
Chattanooga	X		GJBX-92(80)				
Cheboygan	X		GJBX-39(80)				
Cheyenne	X	X	GJBX-17(79)		GJBX-106(78) GJBX-324(81)	GJBX-100(80)	
Chicago			GJBX-31(81)				
Chico		X	GJBX-407(81)				
Choteau			GJBX-126(79)		GJBX-370(81)		
Christian					GJBX-205(81)		
Cincinnati	X		GJBX-96(81)				
Circle	X		GJBX-113(78)		GJBX-220(81)		
Clarksburg	X		GJBX-92(80)				
Cleveland	X						
Clifton	X		GJO-1643 GJBX-23(79)		GJBX-69(78) GJBX-359(81)		
Clinton			GJBX-34(76) GJ8X-386(81)		GJBX-62(79)	GJBX-66(80)	
Clovis	X		GJBX-33(76)				
Cody			GJBX-105(79)		GJBX-233(80)		
Coleen			GJBX-5(77)		GJBX-345(81)		
Columbia			GJBX-199(80)				
Columbus	X		GJBX-225(81)				
Concrete	X		GJ8X-136(81)				
Coos Bay	X		GJBX-408(81)				
Copalis Beach	X		GJBX-135(81)				
Corbin	X		GJBX-92(80)				
Cordova	X		GJBX-127(78)		GJBX-185(81)		
Corpus Christi		X	GJO-1632 GJBX-99(79)		GJBX-134(80) GJBX-131(81)		
Cortez			GJBX-144(79)		GJBX-22(77) GJBX-77(79)		
Craig, Alaska	X		GJBX-48(79)		GJBX-343(81)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Craig, Colorado		X	GJBX-153(79)		GJBX-76(79)	GJBX-216(81)	GJBX-125(80) GJBX-194(80) GJ8X-176(81)
Crescent	X		GJBX-240(81)				
Crystal City		X	GJO-1632 GJBX-98(79) GJBX-386(81)		GJBX-19(77)	GJBX-34(80)	
Cumberland	X		GJ8X-92(80)		GJBX-287(81)		
Cut Bank	X		GJBX-126(79)		GJBX-48(77) GJBX-375(81)		
Dalhart	X		GJ8X-46(80)		GJBX-207(80)		
Dallas			GJBX-17(77)		GJBX-318(81)		
Danville			GJ8X-48(81)				
Davenport	X		GJBX-59(81)				
Daytona Beach	X		GJBX-101(81)				
Death Valley		X	GJBX-164(79)		GJBX-135(80)		GJ8X-131(80) GJ8X-128(81)
Decatur	X		GJBX-241(81)				
De Long Mts.	X				GJ8X-251(81)		
Del Rio			GJBX-156(80)		GJBX-131(81)	GJ8X-29(80)	
Delta		X	GJBX-18(77) GJBX-24(79)		GJBX-161(79) GJBX-198(80)	GJBX-238(80)	GJBX-103(79) GJBX-19(80)
Demarcation Point	X				GJBX-156(81)		
Denver		X	GJBX-49(79)		GJ8X-60(78) GJBX-263(81)		
Des Moines	X		GJBX-62(81)				
Detroit	X		GJBX-238(81)				
Devil's Lake	X		GJBX-354(81) GJBX-386(81)				
Dickinson	X		GJBX-139(79)		GJBX-99(80)		
Dillingham	X		GJBX-113(78)				
Dillon	X		GJBX-107(79)		GJ8X-28(78) GJBX-38(79)		
Dixon Entrance	X		GJ8X-48(79)		GJBX-257(80)		
Dodge City			GJBX-100(78)		GJBX-77(81)		
Dothan	X		GJBX-121(81)		GJBX-27(81) GJBX-403(81)		
Douglas	X		GJO-1643 GJBX-23(79)		GJBX-69(78) GJBX-244(81)		
Driggs	X		GJBX-93(81)		GJBX-70(78) GJBX-368(81)		
Dubois	X	X	GJBX-155(79)		GJBX-28(78) GJ8X-208(80)		GJ8X-87(80)

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Dubuque	X		GJBX-64(81)				
Duluth	X		GJBX-330(81)			GJBX-60(80)	
Durango			GJBX-143(79)	GJBX-58(80) GJBX-212(80)	GJBX-22(77) GJBX-10(79) GJBX-139(80)	GJBX-217(81)	
Dyersburg	X		GJBX-40(80)		GJBX-58(79)		
Eagle			GJBX-113(78)		GJBX-79(78) GJBX-227(81)		
Eagle Pass		X	GJBX-157(80)		GJBX-131(81)		
Eastport	X		GJBX-327(81)				
Eastville	X		GJBX-89(80)		GJBX-18(81) GJBX-283(81)		
Eau Claire	X		GJBX-26(78)		GJBX-94(78)		
Edmundston	X		GJBX-327(81)				
Ekalaka		X	GJO-1631-2 GJBX-82(79)		GJBX-55(78) GJBX-309(81)		
El Centro	X		GJBX-12(80)				
El Dorado	X		GJBX-182(80)		GJBX-349(81)		
Elk City	X		GJBX-10(80)		GJBX-28(78) GJBX-176(80)		
Elko	X	X	GJBX-159(79)		GJBX-163(80)		
Elmira			GJBX-211(81)				
El Paso	X		GJBX-412(81)				
Ely	X	X	GJBX-244(80)				
Emory Peak	X		GJBX-88(79)		GJBX-6(79)	GJBX-29(80)	
Enid	X		GJBX-100(78)		GJBX-7(79)		
Erie	X						
Escalante			GJBX-15(80)		GJBX-209(80)		
Escanaba	X		GJBX-39(80)		GJBX-218(81)		
Eureka			GJBX-409(81)				
Evansville	X		GJBX-30(80)				
Fairbanks			GJBX-113(78)		GJBX-74(79)		
Fairmont	X		GJBX-63(81)				
Fargo	X	X	GJBX-13(80)		GJBX-167(81)		GJBX-130(78) GJBX-3(79)
Flagstaff			GJBX-157(79)		GJBX-137(81)		
Flaxman Island	X				GJBX-157(81)		
Flint	X		GJBX-239(81)				
Florence	X		GJO-1644 GJO-1663-1				
Forsyth	X	X	GJO-1631-2 GJBX-179(81)	GJBX-113(79)	GJBX-398(81)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Ft. Dodge	X		GJBX-47(81)				
Ft. Pierce	X		GJBX-118(81)				
Ft. Smith	X		GJBX-200(80)				
Ft. Stockton	X		GJBX-88(79)			GJBX-29(80)	
Ft. Sumner			GJBX-412(81)		GJBX-395(81)		
Ft. Wayne			GJBX-49(81)				
Ft. Yukon	X		GJBX-5(77)		GJBX-201(81)		
Fredericton	X		GJBX-327(81)				
Fremont			GJBX-20(78) GJM-013(81)		GJBX-392(81)		
Fresno		X	GJBX-231(80)				
Gadsden	X		GJBX-70(80)		GJBX-213(81) GJBX-403(81)		
Gainesville	X		GJBX-101(81)				
Gallup			GJBX-116(79)		GJBX-186(80)		
Georgetown	X		GJO-1663-1				
Gillette		X	GJO-1631-2 GJBX-82(79)	GJBX-112(79) GJBX-113(79)	GJBX-94(77) GJBX-234(80)		
Glasgow	X		GJBX-82(81)				
Glendive	X	X	GJBX-180(81)		GJBX-399(81)		
Glens Falls	X		GJO-1666-1		GJBX-70(81) GJBX-44(79)		
Goldfield		X	GJBX-66(79)		GJBX-418(81)		
Goodland	X		GJBX-44(81)				
Grand Canyon	X		GJBX-35(80)		GJBX-142(80)		
Grand Forks	X	X	GJBX-13(80)		GJBX-169(81)		GJBX-130(78) GJBX-3(79)
Grand Island	X		GJBX-100(78) GJM-012(81) GJBX-386(81)		GJBX-185(80)		
Grand Junction			GJBX-112(81)		GJBX-264(81)		
Grand Rapids	X		GJBX-237(81)				
Grangeville	X		GJBX-98(81)				
Great Bend	X		GJBX-100(78) GJBX-386(81)				
Great Falls	X		GJBX-126(79)		GJBX-396(81)		
Greeley		X	GJBX-17(79)		GJBX-39(77) GJBX-60(78) GJBX-265(81)		
Green Bay	X		GJBX-26(78)		GJBX-93(78)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Greensboro	X		GJO-1644 GJBX-16(79)		GJBX-74(78)		
Greenville	X		GJO-1663-1		GJBX-47(78) GJBX-73(79) GJBX-403(81)		
Greenwood	X		GJBX-183(80)		GJBX-349(81)		
Gulkana			GJO-1653		GJBX-31(77) GJBX-79(78) GJBX-202(81)		
Hagemeister Island	X		GJBX-5(77)				
Hailey	X		GJBX-10(80)				
Hamilton	X	X	GJBX-119(79)		GJBX-57(78) GJBX-236(80)		GJBX-127(79) GJBX-7(81)
Hancock	X		GJBX-50(78)				
Hardin	X	X	GJO-1631-2 GJBX-179(81)	GJBX-113(79)	GJBX-372(81)		
Harrisburg			GJBX-33(78)		GJBX-31(79) GJBX-347(81)		
Harrison	X		GJBX-150(80)				
Harrison Bay	X		GJBX-299(81)		GJBX-252(81)		
Hartford	X		GJO-1666-1		GJBX-94(79)		
Hattiesburg	X		GJBX-155(80)		GJBX-190(81) GJBX-403(81)		
Havre	X		GJBX-126(79)		GJBX-184(81)		
Healy	X		GJBX-113(78)		GJBX-88(81)		
Helena	X		GJBX-201(80)		GJBX-349(81)		
Hibbing	X		GJBX-355(81)				
Hobbs			GJBX-228(80)		GJBX-103(78) GJBX-288(81)		
Holbrook	X		GJBX-412(81)				
Holy Cross	X		GJBX-5(77) GJM-006(81)				
Hoopar Bay			GJBX-5(77) GJM-003(81)				
Hoquiam	X		GJBX-291(81)				
Hot Springs	X		GJBX-126(79)		GJBX-27(80)	GJBX-133(80) GJBX-230(81)	
Houston			GJO-1632 GJBX-102(78)		GJBX-141(78) GJBX-131(81)		
Howard Pass	X				GJBX-193(81)		
Hughes			GJO-1653		GJBX-79(78) GJBX-158(81) GJBX-258(81)		
Huntington	X		GJBX-134(81)				

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Huron	X		GJBX-386(81) GJBX-405(81)				
Hutchinson	X		GJ8X-20(78) GJM-015(81)		GJBX-133(79)		
Icy Bay	X		GJBX-127(78)		GJBX-186(81)		
Idaho Falls	X		GJBX-10(80)				
Iditarod	X		GJBX-80(80)		GJ8X-310(81)		
Ikpikpuk River	X		GJBX-304(81)		GJBX-275(81)		
Iliamna					GJ8X-89(81)		
Indianapolis			GJBX-97(81)				
International Falls	X		GJBX-356(81)				
Iron Mountain	X		GJBX-26(78)		GJBX-97(78)		
Iron River	X	X	GJBX-50(78)		GJBX-115(80)		GJBX-50(79) GJBX-162(79)
Jackson	X		GJBX-153(80)				
Jacksonville	X		GJBX-100(81)				
James Island	X						
Jamestown	X		GJ8X-353(81) GJBX-386(81)				
Jefferson City	X		GJBX-260(80)				
Jenkins	X		GJBX-92(80)				
Johnson City	X		GJBX-16(79)		GJBX-26(81)		
Joplin	X		GJBX-100(78) GJM-014(81)		GJBX-84(79)		
Jordan	X		GJBX-180(81)		GJBX-400(81)		
Jordan Valley	X	X	GJBX-95(80)				GJBX-115(81)
Juneau	X		GJBX-4B(79)		GJBX-159(81)		
Kalispell	X		GJBX-76(81)		GJBX-48(77) GJBX-394(81)		
Kansas City	X		GJBX-259(80)				
Kantishna River	X		GJBX-94(80)		GJBX-337(81)		
Kateel River			GJBX-5(77) GJM-005(81)		GJBX-85(78) GJBX-360(81)		
Kenai	X		GJBX-108(78)		GJBX-206(81)		
Kenora	X		GJBX-328(81)				
Ketchikan	X		GJBX-48(79)		GJBX-222(81) GJBX-381(81)		
Key West	X		GJBX-119(81)				
Killik River	X				GJBX-160(81)		
Kingman	X		GJ8X-59(79)		GJBX-122(78)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Kingston			GJBX-211(81)				
Klamath Falls	X		GJ8X-20(80)		GJBX-171(80)	GJBX-141(80)	
Knoxville	X		GJBX-57(79)		GJBX-75(79)		
Kotzebue	X		GJO-1653 GJM-008(81)		GJBX-86(78) GJBX-26(79)		
Kuskokwim Bay	X		GJ8X-5(77)				
Kwiguk			GJ8X-5(77) GJM-001(81)				
La Crosse	X		GJ8X-60(81)				
La Junta			GJ8X-100(78)		GJBX-41(79)		
Lake Clark	X		GJ8X-113(78)		GJBX-203(81)		
Lake Champlain	X		GJO-1666-1		GJBX-108(81) GJBX-282(81)		
Lake Charles	X		GJO-1632 GJBX-224(80)				
Lamar			GJ8X-100(78)		GJBX-64(79)		
Lander		X	GJO-1631-1 GJ8X-62(80)		GJBX-147(79)		GJBX-50(80) GJBX-51(80) GJBX-124(80) GJBX-294(81)
Laredo		X	GJO-1632 GJBX-99(79) GJBX-386(81)		GJBX-14(80)		GJBX-19(81)
Las Cruces	X		GJ8X-412(81)		GJBX-416(81)		
Las Vegas	X		GJBX-59(79)		GJBX-123(78)		
Lawrence	X		GJBX-239(80)				
Lawton	X		GJBX-34(76) GJBX-386(81)		GJ8X-27(79)	GJBX-66(80)	
Leadville			GJBX-95(79)		GJBX-13(81)		
Lemmon	X	X	GJBX-138(79)		GJBX-49(80)	GJ8X-241(80)	
Lewiston	X				GJBX-14(81) GJBX-348(81)		
Lewistown	X		GJBX-126(79) GJBX-327(81)		GJBX-206(80)		
Lime Hills	X		GJBX-113(78)		GJ8X-29(79)		
Limon	X	X	GJBX-56(81)		GJBX-367(81) GJBX-378(81)		
Lincoln			GJBX-20(78) GJM-018(81)		GJBX-229(81)		
Little Rock	X		GJBX-115(79)		GJ8X-349(81)		
Llano	X		GJBX-24(80) GJBX-386(81)		GJBX-39(81) GJBX-131(81)		
Lookout Ridge	X		GJBX-303(81)		GJBX-161(81)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Los Angeles			GJBX-214(80)				
Louisville	X		GJBX-94(81)				
Lovelock	X		GJBX-125(78)		GJBX-90(79)		
Lubbock			GJO-1654		GJBX-73(78) GJBX-151(79)		
Lukeville	X		GJBX-12(80)				
Lund	X	X	GJBX-244(80)				
Macon	X		GJBX-84(80)		GJBX-40(81) GJBX-403(81)		
Madison	X		GJBX-181(81)				
Manhattan	X		GJBX-20(78)		GJBX-134(79)		
Manitowoc	X		GJBX-270(81)				
Manteo	X		GJBX-57(80)		GJBX-16(81)		
Marble Canyon	X		GJBX-16(80)		GJBX-138(81)		
Marfa	X		GJBX-88(79)		GJBX-250(80)	GJBX-29(80)	
Marion	X		GJBX-210(81)				
Mariposa	X	X	GJBX-231(80)				
Marquette	X	X	GJBX-50(78)		GJBX-106(80)		GJBX-50(79) GJBX-162(79)
Marshall			GJBX-5(77) GJM-009(81)				
Martin	X		GJBX-42(81)				
Mason City	X		GJBX-65(81)				
McAlester	X		GJBX-174(79)				
McAllen		X	GJO-1632 GJBX-118(78) GJBX-386(81)		GJBX-249(80)		GJBX-19(81)
McCarthy			GJBX-91(78)		GJBX-79(78) GJBX-226(81) GJBX-382(81)		
McClusky	X		GJBX-84(81)				
McCook	X		GJBX-55(81)				
McDermitt	X	X	GJBX-168(79)		GJBX-117(80) GJBX-173(80)		GJBX-115(81)
McGrath	X		GJBX-77(80)		GJBX-123(79)		
McIntosh	X		GJBX-86(81)				
Meade River	X		GJBX-297(81)		GJBX-247(81)		
Medford			GJBX-384(81)				
Medfra	X		GJBX-76(80)		GJBX-30(79)		
Melozitna	X		GJBX-5(77) GJM-004(81)		GJBX-340(81)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Memphis	X		GJBX-179(80)				
Meridian	X		GJ8X-154(80)		GJBX-190(81) GJBX-403(81)		
Mesa	X		GJO-1643 GJBX-23(79)		GJBX-81(80) GJBX-216(80)		
Miami	X		GJBX-119(81)				
Midland	X		GJBX-268(81)				
Milbank	X	X	GJBX-13(80)		GJBX-271(81)		GJBX-130(78) GJBX-3(79)
Miles City	X	X	GJO-1631-2 GJBX-180(81)		GJBX-371(81)		
Millett	X		GJBX-154(79)		GJBX-39(79)		
Millinocket	X		GJBX-327(81)				
Milwaukee	X		GJBX-268(81)				
Minot	X		GJBX-67(81)				
Misheguk Mtn.	X				GJBX-276(81)		
Mitchell	X		GJBX-385(81) GJBX-386(81)				
Moab			GJBX-95(79)		GJBX-22(77) GJBX-146(79)		
Moberly	X		GJBX-29(81)				
Mobile	X		GJBX-222(80)				
Monterey		X					
Montgomery	X		GJBX-88(80)		GJBX-190(81) GJBX-403(81)		
Montrose			GJBX-95(79)	GJBX-212(80)	GJBX-22(77) GJBX-125(79)	GJBX-105(81)	
Mt. Fairweather	X		GJBX-48(79)		GJBX-162(81)		
Mt. Hayes	X		GJBX-113(78)		GJBX-79(78) GJBX-91(81)		
Mt. McKinley			GJBX-113(78) GJM-002(81)		GJBX-30(79)		
Mt. Michelson					GJBX-196(81)		
Mt. St. Elias	X		GJBX-127(78)				
Muncie			GJBX-30(81)				
Nabesna			GJBX-91(78)		GJBX-221(81) GJBX-377(81)		
Naknek	X		GJBX-5(77)				
Nashville	X		GJBX-202(80)				
Natchez	X		GJBX-180(80)				
Nebraska City	X		GJBX-261(80)				
Needles	X		GJBX-114(79)		GJBX-232(81)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Newark	X		GJBX-16(78)	GJBX-90(80)	GJBX-128(80) GJBX-71(81)		
Newcastle		X	GJO-1631-2 GJBX-82(79)	GJBX-113(79)	GJBX-187(80)	GJBX-174(81)	
New Orleans	X		GJBX-223(80)				
New Rockford	X		GJBX-386(81) GJBX-387(81)				
New Ulm	X		GJBX-13(80)		GJBX-120(79)		
New York	X						
Noatak	X				GJBX-63(77) GJBX-87(78) GJBX-26(79)		
Nogales	X		GJO-1643 GJBX-23(79)				
Nome			GJO-1653		GJBX-187(81)		
Norfolk	X		GJBX-89(80)		GJBX-283(81)		
North Platte	X		GJBX-53(81)				
Norton Bay			GJO-1653 GJBX-72(80)		GJBX-207(81)		
Nulato	X		GJBX-73(80)		GJBX-341(81)		
Nunivak Island	X		GJBX-5(77) GJM-011(81)				
Nushagak Bay	X		GJBX-5(77)				
Ogden	X		GJBX-71(80)		GJBX-70(78) GJBX-289(81)	GJBX-238(80)	
Ogdensburg			GJBX-327(81)				
Okanogan	X		GJBX-142(79)		GJBX-210(80)		
Oklahoma City			GJBX-34(76)		GJBX-109(78)		
Omaha	X		GJBX-46(81)				
O'Neill	X		GJBX-100(78) GJBX-386(81)		GJBX-307(81)		
Ophir	X		GJBX-78(80)		GJBX-323(81)		
Orlando	X		GJBX-104(81)				
Paducah	X		GJBX-41(80)				
Palestine		X	GJO-1632 GJBX-45(80)		GJBX-92(79)		
Pecos			GJBX-2(78) GJM-016(81)				
Pendleton			GJBX-291(81)				
Pensacola	X		GJBX-122(81)				
Peoria	X		GJBX-241(81)				
Perryton			GJBX-229(80)				

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Petersburg	X		GJBX-48(79)		GJBX-27B(81)		
Phenix City	X		GJBX-101(80)		GJBX-316(81) GJBX-403(81)		
Philip Smith Mts.					GJBX-163(81) GJBX-259(81)		
Phoenix	X		GJBX-12(80)		GJBX-315(81)		
Pierre	X		GJBX-54(81)				
Pittsburgh					GJBX-287(81)		
Plainview			GJO-1654		GJBX-73(78) GJBX-92(78)		
Plant City	X						
Pocatello	X		GJBX-126(79)		GJBX-161(80)		
Point Hope	X				GJBX-245(81)		
Point Lay	X		GJBX-301(81)		GJBX-228(81)		
Poplar Bluff	X		GJBX-42(80)		GJBX-63(79)		
Port Alexander	X		GJBX-48(79)		GJBX-342(81)		
Port Arthur	X		GJBX-224(80)				
Portland	X		GJO-1666-1		GJBX-28(79) GJBX-106(81)		
Pratt	X		GJBX-100(78) GJBX-386(81)		GJBX-83(79)		
Prescott	X	X	GJBX-59(79)		GJBX-122(79)	GJBX-164(80) GJBX-243(81)	GJBX-86(80) GJBX-293(81)
Presidio	X		GJBX-88(79)		GJBX-12(79)	GJBX-29(80)	
Presque Isle	X		GJBX-327(81)				
Preston	X	X	GJBX-74(81)		GJBX-70(78) GJBX-325(81)		
Price		X	GJBX-117(79) GJBX-35(81)			GJBX-172(80)	GJBX-31(80) GJBX-48(80) GJBX-102(80) GJBX-78(81)
Prince Rupert	X		GJBX-48(79)		GJBX-257(80) GJBX-194(81)		
Providence	X		GJO-1666-1		GJBX-15(81)		
Pueblo			GJBX-49(79)		GJBX-135(78) GJBX-14(79)	GJBX-42(79)	
Pullman	X		GJBX-117(81)				
Quebec	X		GJBX-327(81)				
Quetico	X		GJBX-335(81)				
Quincy	X						
Racine	X		GJBX-237(81)				

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Raleigh	X		GJO-1644 GJBX-85(80)		GJBX-233(81)		
Rapid City	X	X	GJ8X-83(80)	GJBX-96(80)	GJBX-159(80)		GJ8X-17(80) GJ8X-127(80)
Raton	X		GJ8X-9(80)		GJBX-138(78) GJ8X-358(81)		
Rawlins	X	X	GJBX-17(79)		GJBX-81(78) GJBX-308(81)	GJBX-216(81)	GJ8X-116(81) GJBX-139(81) GJ8X-294(81)
Redding			GJBX-411(81)				
Reno	X	X	GJBX-117(78)		GJ8X-108(80)		GJBX-49(77) GJBX-53(78)
Rice Lake	X		GJBX-26(78)		GJBX-95(78)		
Richfield			GJBX-172(79)		GJBX-161(79) GJBX-242(80)	GJBX-175(80)	
Richmond	X		GJO-1644 GJBX-133(78)		GJBX-18(81)		
Ritzville	X		GJBX-126(79)		GJBX-162(80)		
Roanoke	X		GJO-1644 GJBX-92(80)		GJBX-73(81)		
Rochester			GJBX-211(81)				
Rockford	X		GJBX-181(81)				
Rock Springs	X	X	GJBX-17(79)		GJBX-126(81)		GJBX-294(81)
Rocky Mount	X		GJBX-57(80)		GJBX-16(81)		
Rolla			GJBX-43(80)				
Rome	X		GJBX-92(80)		GJBX-25(81) GJBX-403(81)		
Roseau	X		GJBX-329(81)				
Roseburg	X		GJBX-388(81)				
Roswell	X		GJBX-412(81)		GJBX-397(81)		
Roundup	X		GJBX-179(81)		GJBX-361(81)		
Ruby			GJBX-75(80)		GJBX-290(81)		
Russellville	X		GJBX-204(80)		GJBX-349(81)		
Russian Mission			GJBX-5(77)				
Sacramento		X	GJBX-51(81)				
Sagavanirktok	X		GJBX-306(81)		GJBX-279(81)		
St. Cloud	X		GJBX-13(80)		GJBX-55(79)		
St. Johns	X		GJBX-126(79)		GJBX-69(78) GJBX-191(80)	GJBX-23(81)	
St. Louis	X						
St. Matthews	X						

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
St. Michael			GJBX-5(77) GJM-007(81)		GJBX-322(81)		
St. Paul	X		GJBX-333(81)				
Salem	X		GJBX-240(81)				
Salina		X	GJBX-95(79) GJBX-35(81)		GJBX-218(80)		GJBX-102(80) GJBX-78(81)
Salisbury	X		GJBX-37(80)				
Salt Lake City			GJBX-71(80)			GJBX-238(80)	
Salton Sea	X		GJBX-12(80)		GJBX-113(80) GJBX-217(80)		
San Angelo			GJBX-168(80)		GJBX-131(81)		
San Antonio		X	GJBX-160(80) GJBX-386(81)		GJBX-96(78)	GJBX-34(80)	
San Bernardino			GJBX-214(80)		GJBX-317(81)		
San Diego			GJBX-214(80)				
Sandpoint	X		GJBX-142(79)		GJBX-48(77) GJBX-70(79)		
San Francisco			GJBX-50(81)				
San Jose		X	GJBX-50(81)				
San Luis Obispo		X	GJBX-20(81)		GJBX-401(81)		
Santa Ana			GJBX-214(80)				
Santa Cruz			GJBX-50(81)				
Santa Fe	X		GJBX-9(80)		GJBX-197(80)		
Santa Maria			GJBX-20(81)				
Santa Rosa		X	GJBX-51(81)				
Sault Sainte Marie	X		GJBX-39(80)				
Savannah	X		GJO-1663-1		GJBX-403(81)		
Scott City	X		GJBX-43(81)				
Scottsbluff	X	X	GJBX-25(80)		GJBX-145(81)		
Scranton	X		GJBX-32(78)	GJBX-90(80)	GJBX-2(79) GJBX-24(81)		
Seattle	X		GJBX-135(81)				
Seguin		X	GJO-1632 GJBX-37(79)		GJBX-116(78)	GJBX-34(80)	
Selawik			GJO-1653		GJBX-79(78) GJBX-86(78) GJBX-26(79)		
Seldovia	X		GJBX-108(78)		GJBX-92(81)		
Seward	X		GJBX-108(78)				
Shelby	X		GJBX-126(79)		GJBX-374(81)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Sherbrooke			GJBX-327(81)				
Sheridan			GJO-1631-2 GJBX-179(81)	GJBX-113(79)	GJBX-94(77) GJBX-362(81)		
Sherman			GJBX-17(77)		GJBX-134(78)		
Shiprock			GJBX-116(79)		GJBX-143(80)		
Shishmaref	X		GJO-1653		GJBX-86(78) GJBX-26(79)		
Shreveport	X		GJBX-151(80)				
Shungnak			GJO-1653		GJBX-79(78) GJBX-86(78) GJBX-26(79) GJBX-369(81)		
Silver City	X		GJO-1643 GJBX-23(79)		GJBX-69(78) GJBX-320(81)		
Sioux City	X		GJBX-100(78)		GJBX-393(81)		
Sioux Falls	X		GJBX-389(81)				
Sitka	X				GJBX-344(81)		
Skagway	X		GJBX-48(79)		GJBX-164(81) GJBX-260(81)		
Sleetmute	X		GJBX-79(80)				
Socorro			GJBX-163(79)		GJBX-12(81)	GJBX-23(81)	
Solomon			GJO-1653		GJBX-188(81)		
Sonora	X		GJBX-251(80)		GJBX-131(81)		
Spartanburg	X		GJO-1663-1 GJO-1644		GJBX-9(78) GJBX-73(79)		
Spokane			GJBX-121(78)		GJBX-211(80) GJBX-195(80)		
Springfield	X		GJBX-149(80)				
Sterling		X	GJBX-87(81)		GJBX-39(77) GJBX-90(78) GJBX-380(81)		
Stillwater	X		GJBX-334(81)			GJBX-60(80)	
Sumdum	X		GJBX-48(79)		GJBX-346(81)		
Survey Pass					GJBX-150(81) GJBX-255(81)		
Susanville			GJBX-410(81)				
Table Mountain	X				GJBX-223(81) GJBX-256(81)		
Taku River	X		GJBX-48(79)		GJBX-165(81)		
Talkeetna	X		GJBX-113(78)		GJBX-123(79)		
Talkeetna Mts.	X		GJBX-113(78) GJO-1653		GJBX-31(77) GJBX-79(78)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Tallahassee	X		GJBX-120(81)				
Tampa	X		GJBX-124(81)				
Tanacross	X		GJBX-21(78)		GJBX-197(81)		
Tanana			GJBX-5(77)		GJBX-338(81)		
Tarpon Springs			GJBX-104(81)				
Tawas City	X		GJBX-239(81)				
Taylor Mts.	X		GJBX-5(77)				
Teller			GJO-1653 GJM-010(81)		GJBX-85(78) GJBX-26(79)		
Teshekpuk	X		GJBX-298(81)		GJBX-248(81)		
Texarkana		X	GJBX-69(80)				
The Dalles	X		GJBX-291(81)				
Thermopolis		X	GJO-1631-1 GJBX-64(80)		GJBX-188(80)		
Thief River Falls	X	X	GJBX-13(80)		GJBX-168(81)		GJBX-130(78) GJBX-3(79)
Thunder Bay	X						
Toledo	X		GJBX-209(81)				
Tonopah	X	X	GJBX-104(79)		GJBX-89(79)		
Tooele			GJBX-118(79)			GJBX-238(80)	
Toronto			GJBX-211(81)				
Torrington		X	GJO-1631-1 GJO-1631-2 GJBX-158(79)		GJBX-190(80)	GJBX-100(80) GJBX-174(81)	
Travarse City	X		GJBX-270(81)				
Trinidad	X		GJBX-59(80)		GJBX-139(78) GJBX-138(80)		
Trona			GJBX-65(79)		GJBX-243(80)		
Tucson	X		GJO-1643 GJBX-23(79)				
Tucumcari	X		GJBX-33(76)		GJBX-183(81)		
Tularosa	X		GJBX-67(79)		GJBX-104(78) GJBX-326(81)	GJBX-215(81)	
Tulsa	X		GJBX-100(78)				
Tupelo	X		GJBX-203(80)		GJBX-213(81) GJBX-403(81)		
Twin Falls	X		GJBX-126(79)				
Two Harbors	X		GJBX-336(81)				
Tyler		X	GJBX-69(80)				
Tyonek	X		GJBX-108(78)		GJBX-29(79)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Ugashik	X						
Ukiah		X					
Umiat	X		GJBX-305(81)		GJBX-249(81)		
Unalaklaet	X		GJBX-74(80)		GJ8X-277(81)		
Utica			GJBX-327(81)				
Utukok Rivar	X		GJBX-302(81)		GJBX-250(81)		
Valdez	X		GJBX-127(78)		GJBX-79(7B) GJBX-90(81)		
Valdosta	X		GJBX-100(81)		GJBX-403(81)		
Valentine	X		GJBX-41(81)				
Vancouver	X		GJBX-291(81)				
Van Horn			GJBX-2(78) GJM-017(81)				
Vernal		X	GJBX-167(79)		GJBX-232(80)	GJBX-173(81)	GJBX-125(80) GJBX-176(81)
Victoria	X		GJBX-135(81)				
Vincennes			GJBX-95(81)				
Vya	X	X	GJBX-136(79)		GJBX-285(81)		GJBX-115(81)
Waco			GJBX-69(80)		GJBX-131(81) GJBX-366(81)		
Wainwright	X		GJBX-296(81)		GJ8X-236(81)		
Walker Lake		X	GJBX-126(78)		GJBX-107(80)	GJBX-184(80)	GJBX-18(80) GJBX-132(81)
Wallace	X	X	GJBX-111(81)		GJBX-373(81)		GJBX-127(79) GJBX-7(81)
Walla Walla	X		GJBX-291(81)				
Washington	X		GJBX-133(78)		GJBX-284(81)		
Waterloo	X		GJBX-61(81)				
Watertown	X		GJBX-13(80)		GJBX-219(81)		
Watford City	X	X	GJBX-180(81)				
Waycross	X		GJBX-103(81)		GJBX-27(81) GJBX-403(81)		
Weed			GJBX-391(81)				
Wells	X		GJBX-137(79)		GJBX-117(80) GJBX-174(80)		
Wenatchee	X		GJBX-136(81)				
West Palm Beach	X		GJBX-102(81)				
West Point	X		GJBX-181(80)		GJ8X-191(81) GJBX-403(81)		
White Sulphur Springs	X		GJ8X-96(79)		GJBX-266(81)		

APPENDIX B

Table I. Summary by Quadrangle of Available NURE-Generated Data as of December 31, 1981 (continued)

Quadrangle	NURE-Generated Map (X)	Logging Conducted (X)	Open-File Report Numbers				
			Aerial Surveys	Detailed Aerial Surveys	HSSR Surveys	Detailed HSSR Surveys	Drilling Projects
Wichita	X		GJBX-100(78)		GJBX-54(79)		
Wichita Falls	X		GJBX-34(76) GJBX-386(81)		GJBX-93(79)		
Williams	X	X	GJBX-59(79)		GJBX-71(79)		GJBX-86(80) GJBX-293(81)
Williamsport			GJBX-34(78)		GJBX-152(79) GJBX-313(81)		
Williston	X		GJBX-83(81)				
Wilmington	X		GJBX-68(80)				
Winchester	X		GJBX-23(80)				
Winnemucca	X	X	GJBX-21(79)		GJBX-89(78)		
Winston-Salem	X		GJBX-16(79)		GJBX-66(77) GJBX-58(78)		
Wiseman					GJBX-171(81) GJBX-257(81)		
Wolf Point	X		GJBX-68(81)				
Woodstock	X		GJBX-327(81)				
Woodward			GJBX-251(80) GJBX-386(81)				
Yakima	X		GJBX-291(81)				
Yakutat	X		GJBX-127(78)		GJBX-199(81) GJBX-261(81)		

APPENDIX B

Table II. Aerial Radiometric and Magnetic Surveys

Appalachian Basin Rotary-Wing Survey
- Subcontractor: Carson Helicopters, Inc.
- Subcontract Value: $555,000
- Start Date: 1 June 1979
- Completion Date: 24 May 1980
- Line-Miles: 17,488
- Aircraft: Rotary-Wing
- Report: GJBX-92(80)

Arizona/Colorado Rotary-Wing Survey
- Subcontractor: LKB Resources, Inc.
- Subcontract Value: $778,000
- Start Date: 6 September 1978
- Completion Date: 30 April 1979
- Line-Miles: 15,870
- Aircraft: Rotary-Wing
- Reports: GJBX-12(80), -16(80), -35(80)

Brushy Basin Detailed Aerial Survey
- Subcontractor: High Life Helicopters, Inc.
- Subcontract Value: $133,000
- Start Date: 7 September 1978
- Completion Date: 19 January 1981
- Line-Miles: 3,260
- Aircraft: Rotary-Wing
- Report: GJBX-35(81)

Central Alaska Aerial Survey
- Subcontractor: Aero Service
- Subcontract Value: $1,117,000
- Start Date: 1 June 1979
- Completion Date: 23 June 1980
- Line-Miles: 14,018
- Aircraft: Rotary-Wing
- Reports: GJBX-72(80), -73(80), -74(80), -75(80), -76(80), -77(80), -78(80), -79(80), -80(80), -94(80), -116(80)

Dakotas/Nebraska Airborne Survey
- Subcontractor: Geodata International, Inc.
- Subcontract Value: $548,000
- Start Date: 16 June 1980
- Completion Date: 11 May 1981
- Line-Miles: 3,034(RW)/22,136(FW)
- Aircraft: Rotary- and Fixed-Wing
- Reports: GJBX-41(81), -42(81), -43(81), -44(81), -53(81), -54(81), -55(81), -56(81), -67(81), -68(81), -82(81), -83(81), -84(81), -85(81), -86(81), -87(81)

Durango Detailed Rotary-Wing Survey
- Subcontractor: Litton Aero Service Corp.
- Subcontract Value: $707,000
- Start Date: 23 June 1978
- Completion Date: 29 February 1980
- Line-Miles: 4,540
- Aircraft: Rotary-Wing
- Report: GJBX-58(80)

Eastern Montana Airborne Survey
- Subcontractor: High Life Helicopters, Inc.
- Subcontract Value: $472,000
- Start Date: 30 June 1980
- Completion Date: 26 May 1981
- Line-Miles: 15,186
- Aircraft: Rotary-Wing
- Reports: GJBX-179(81), -180(81)

Florida/Mississippi Airborne Surveys
- Subcontractor: geoMetrics, Inc.
- Subcontract Value: $1,136,000
- Start Date: 18 April 1980
- Completion Date: 30 May 1981
- Line-Miles: 63,747
- Aircraft: Fixed-Wing
- Reports: GJBX-149(80), -150(80), -151(80), -152(80), -153(80), -154(80), -155(80), -179(80), -180(80), -181(80), -182(80), -183(80), -199(80), -200(80), -201(80), -202(80), -203(80), -204(80), -205(80), -221(80), -222(80), -223(80), -224(80), -100(81), -101(81), -102(81), -103(81), -104(81), -118(81), -119(81), -120(81), -121(81), -122(81), -123(81), -124(81)

Great Lakes and Iowa/Missouri Airborne Surveys
- Subcontractor: geoMetrics, Inc.
- Subcontract Value: $1,051,000
- Start Date: 13 August 1980
- Completion Date: 16 August 1981
- Line-Miles: 52,897
- Aircraft: Fixed-Wing
- Reports: GJBX-239(80), -259(80), -260(80), -261(80), -28(81), -29(81), -30(81), -31(81), -46(81), -47(81), -48(81), -49(81), -59(81), -60(81), -61(81), -62(81), -63(81), -64(81), -65(81), -94(81), -95(81), -96(81), -97(81), -134(81), -209(81), -210(81), -225(81), -237(81), -238(81), -239(81), -268(81), -270(81)

Idaho Rotary-Wing Airborne Survey
- Subcontractor: geoMetrics, Inc.
- Subcontract Value: $726,000
- Start Date: 13 June 1979
- Completion Date: 15 July 1980
- Line-Miles: 29,273(FW)/17,518(RW)
- Aircraft: Rotary- and Fixed-Wing
- Reports: GJBX-10(80), -71(80), -83(80), -96(80)

Kentucky/Texas Fixed-Wing Survey
- Subcontractor: Texas Instruments, Inc.
- Subcontract Value: $350,000
- Start Date: 1 March 1979
- Completion Date: 15 February 1980
- Line-Miles: 17,690
- Aircraft: Fixed-Wing
- Reports: GJBX-40(80), -41(80), -42(80), -43(80), -44(80), -45(80), -46(80), -47(80)

Lakeview/McDermitt/Staens Mountain Detailed Survey
- Subcontractor: LKB Resources, Inc.
- Subcontract Value: $39,000
- Start Date: 25 July 1979
- Completion Date: 30 July 1981
- Line-Miles: 1,259
- Aircraft: Rotary-Wing
- Report: Scheduled for 1982 Release

APPENDIX B

Table II. Aerial Radiometric and Magnetic Surveys (continued)

Llano Uplift Fixed-Wing Survey
- Subcontractor: Geodata International, Inc.
- Subcontract Value: $250,000
- Start Date: 28 June 1978
- Completion Date: 31 January 1980
- Line-Miles: 3,220
- Aircraft: Fixed-Wing
- Report: GJ8X-24(80)

Maine Airborne Survey
- Subcontractor: Carson Helicopters, Inc.
- Subcontract Value: $499,000
- Start Date: 1 May 1980
- Completion Date: 27 March 1981
- Line-Miles: 2,097(FW)/5,417(RW)
- Aircraft: Rotary- and Fixed-Wing
- Report: GJ8X-327(81)

Minnesota Fixed-Wing Survey
- Subcontractor: geoMetrics, Inc.
- Subcontract Value: $283,000
- Start Date: 7 May 1979
- Completion Date: 2 March 1980
- Line-Miles: 15,163
- Aircraft: Fixed-Wing
- Reports: GJBX-13(80), -39(80)

Minnesota/Wisconsin and North Slope Airborne Surveys
- Subcontractor: Litton Aero Service Corp.
- Subcontract Value: $911,000
- Start Date: 6 June 1980
- Completion Date: 20 September 1981
- Line-Miles: 6,962(RW)/24,894(FW)
- Aircraft: Rotary- and Fixed-Wing
- Reports: GJBX-295(81), -296(81), -297(81), -298(81), -299(81), -300(81), -301(81), -302(81), -303(81), -304(81), -305(81), -306(81), -328(81), -329(81), -330(81), -331(81), -332(81), -333(81), -334(81), -335(81), -336(81), -353(81), -354(81), -355(81), -356(81), -357(81), -385(81), -386(81), -387(81), -389(81), -405(81)

Montrose and Uncompahgre Areas/Airborne Survey
- Subcontractor: geoMetrics, Inc.
- Subcontract Value: $629,000
- Start Date: 28 June 1978
- Completion Date: 30 September 1980
- Line-Miles: 4,077
- Aircraft: Rotary-Wing
- Report: GJBX-212(80)

Nebraska/Texas Fixed-Wing Survey
- Subcontractor: geoMetrics, Inc.
- Subcontract Value: $226,000
- Start Date: 9 July 1979
- Completion Date: 5 May 1980
- Line-Miles: 9,479
- Aircraft: Fixed-Wing
- Reports: GJBX-25(80), -69(80)

New Mexico Airborne Survey
- Subcontractor: LKB Resources, Inc.
- Subcontract Value: $557,875
- Start Date: 25 July 1979
- Completion Date: 30 July 1981
- Line-Miles: 12,971
- Aircraft: Rotary-Wing
- Report: GJ8X-412(81)

Northern California Airborne Survey
- Subcontractor: Litton Aero Service Corp.
- Subcontract Value: $587,000
- Start Date: 16 July 1980
- Completion Date: 1 October 1981
- Line-Miles: 16,881
- Aircraft: Rotary-Wing
- Reports: GJBX-384(81), -388(81), -390(81), -391(81), -406(81), -407(81), -408(81), -409(81), -410(81), -411(81)

Northeast Washington Detailed Survey
- Subcontractors: LKB Resources, Inc., and Carson Helicopters, Inc.
- Subcontract Value: $39,000
- Start Date: 25 July 1979
- Completion Date: 30 July 1981
- Line-Miles: 9,105
- Aircraft: Rotary-Wing
- Report: Scheduled for 1982 Release

Raton Basin Rotary-Wing/Fixed-Wing Survey
- Subcontractor: geoMetrics, Inc.
- Subcontract Value: $496,000
- Start Date: 28 June 1978
- Completion Date: 23 May 1979
- Line-Miles: 2,251(FW)/2,706(RW)
- Aircraft: Rotary- and Fixed-Wing
- Report: GJ8X-9(80)

Reading Prong Detailed Airborne Survey
- Subcontractor: LKB Resources, Inc.
- Subcontract Value: $232,000
- Start Date: 6 September 1978
- Completion Date: 30 April 1980
- Line-Miles: 5,936
- Aircraft: Rotary-Wing
- Report: GJBX-90(80)

Rockies Wrap-Up Airborne Survey
- Subcontractor: Geodata International, Inc.
- Subcontract Value: $465,000
- Start Date: 16 June 1980
- Completion Date: 11 May 1981
- Line-Miles: 14,712
- Aircraft: Rotary-Wing
- Reports: GJBX-74(81), -76(81), -93(81), -98(81), -111(81), -112(81), -117(81)

APPENDIX B

Table II. Aerial Radiometric and Magnetic Surveys (continued)

Rocky Mountains Rotary-Wing Survey
- Subcontractor: Geodata International, Inc.
- Subcontract Value: $578,000
- Start Date: 13 July 1979
- Completion Date: 8 May 1980
- Line-Miles: 19,984
- Aircraft: Rotary-Wing
- Reports: GJBX-62(80), -63(80), -64(80), -65(80), -93(80), -95(80), -104(80)

Southeast U.S. Aerial Survey
- Subcontractor: Geodata International, Inc.
- Subcontract Value: $454,000
- Start Date: 13 June 1979
- Completion Date: 8 May 1980
- Line-Miles: 23,237
- Aircraft: Fixed-Wing
- Reports: GJBX-23(80), -30(80), -36(80), -57(80), -68(80), -84(80), -85(80), -88(80), -89(80), -101(80)

Trinidad Areas Airborne Survey
- Subcontractor: Texas Instruments, Inc.
- Subcontract Value: $158,000
- Start Date: 16 October 1978
- Completion Date: 15 December 1979
- Line-Miles: 3,212
- Aircraft: Rotary-Wing
- Report: GJBX-59(80)

Western U.S. Rotary-Wing Survey
- DOE/SBA Contract: High Life Helicopters, Inc.
- Start Date: 1 October 1978
- Completion Date: 28 February 1980
- Line-Miles: 86,058
- Aircraft: Rotary-Wing
- Reports: GJBX-15(80), -20(80), -52(80), -70(80), -214(80), -231(80), -244(80), -20(81), -50(81), -51(81), -135(81), -136(81), -181(81), -211(81), -240(81), -241(81), -291(81)

West Texas Airborne Survey
- Subcontractor: Geodata International, Inc.
- Subcontract Value: $407,000
- Start Date: 15 February 1980
- Completion Date: 11 December 1980
- Line-Miles: 21,557
- Aircraft: Fixed-Wing
- Reports: GJBX-156(80), -157(80), -168(80), -196(80), -228(80), -229(80), -245(80), -251(80)

APPENDIX B

Table III. HSSR Special Surveys and Topical Studies

SPECIAL SURVEYS

Deep Creek Mountains, Utah
- Quadrangles: Delta/Tooele
- Laboratory: Lawrence Livermore Laboratory
- Report: GJBX-8(80)

Central and Northern Alaska Mineral Resource Investigations
- Quadrangles: Arctic/Beaver/Bettles/Black River/Chandler Lake/Charley River/Circle/Coleen/Eagle/Livengood/Mt. Michelson/Philip Smith Mountains/Table Mountain/Tanana
- Contractor: Bendix Field Engineering
- Subcontractor: Los Alamos National Laboratory
- Subcontract Value: $39,000
- Start Data: 29 September 1978
- Completion Date: 28 February 1980
- Report: GJBX-33(80)

Eastern Alaska Uranium and Thorium Analysis
- Quadrangles: Black River/Charley River/Circle/Coleen/Eagle/Livengood/Table Mountain
- Cooperative Agreement: U.S. Bureau of Mines
- Subcontractor: Alaska Department of Natural Resources
- Subcontract Value: $13,000
- Start Date: 1 November 1977
- Completion Date: 28 October 1978
- Report: GJBX-158(80)

Central and Eastern Alaska Mineral Resource Investigations
- Quadrangles: Beaver/Bettles/Black River/Chandalar/Charley River/Circle/Eagle/Fairbanks/Fort Yukon/Livengood/Melozitna/Tanacross/Tanana/Teller/Wiseman
- Cooperative Agreement: U.S. Bureau of Mines
- Report: GJBX-178(81)

Evaluation of Uranium Geochemical Anomalias near Pacolat Mills, South Carolina
- Quadrangle: Spartanburg
- Laboratory: Savannah Rivar Laboratory
- Report: GJBX-350(81)

Durham Triassic Basin, North Carolina, Uranium Potential
- Quadrangle: Greensboro
- Laboratory: Savannah River Laboratory and University of North Carolina at Wilmington
- Report: GJ8X-402(81)

Evaluation of Uranium Geochamical Anomalies
- Quadrangle: Greensboro
- Laboratory: Savannah River Laboratory and Carpenter Minerals Exploration
- Report: GJBX-417(81)

TOPICAL STUDIES

Computer Program Requests Manual/HSSR Data
- Laboratory: Oak Ridge Gaseous Diffusion Plant
- Report: GJBX-21(80)

Uranium Resource Evaluation Project/HSSR Procedures
- Laboratory: Oak Ridge Gaseous Diffusion Plant
- Report: GJBX-32(80)

Neutron Activation Analysis Facility
- Laboratory: Savannah River Laboratory
- Report: GJBX-56(80)

Utilizing NURE Geochemical Data
- Quadrangles: Billings/Butte
- Laboratory: Los Alamos National Laboratory and Montana College of Mineral Science and Technology
- Reports: GJBX-120(80), -58(81)

Geologic and Geochemical Aspects of Uranium Deposits: Annotated Bibliography
- Laboratory: Oak Ridge Gaseous Diffusion Plant
- Reports: GJBX-132(80), -230(80)

Multivariate Statistical Analysis of Stream Sediments
- Quadrangle: Craig
- Laboratory: Los Alamos National Laboratory
- Report: GJBX-145(80)

Derivation of Occurrence Distributions from Geologic Faatures
- Laboratory: Oak Ridga Gaseous Diffusion Plant
- Report: GJBX-165(80)

Overview of NURE HSSR Program
- Laboratory: Los Alamos National Laboratory
- Report: GJBX-220(80)

Multilaboratory Analytical Quality Control
- Laboratory: Ames Laboratory
- Report: GJBX-240(80)

Processing of HSSR Data: FORTRAN Computer Programs
- Contractor: Bendix Field Engineering
- Reports: GJBX-246(80), -247(80), -248(80), -10(81), -11(81)

Application of Kriging to HSSR Data
- Laboratory: Los Alamos National Laboratory
- Report: GJBX-57(81)

HSSR Data Display and Analysis Program
- Laboratory: Oak Ridge Gaseous Diffusion Plant
- Report: GJBX-81(81)

Quality Assurance Evaluation
- Laboratory: Oak Ridge Gaseous Diffusion Plant
- Report: GJBX-130(81)

Reactor Activation Facility: Software Documentation
- Laboratory: Savannah River Laboratory
- Report: GJBX-147(81)

HSSR Surveying as Internationally Practiced
- Laboratory: Los Alamos National Laboratory
- Report: GJBX-214(81)

Water and Sediment Geochemical Reconnaissance
- Laboratory: Savannah River Laboratory
- Report: GJBX-420(81)

APPENDIX B

Table IV. NURE Drilling Program

Brushy Basin Drilling Project
- Category: Intermediate-Grade Resources
- Quadrangle: Price
- Subcontractor: Himes Drilling Co.
- Subcontract Value: $78,000
- Start Date: 13 April 1979
- Completion Date: 15 December 1979
- Number of Holes: 12
- Total Feet Drilled: 6,868
- Reports: GJBX-31(80), -48(80)

East Chaco Canyon Drilling Project
- Category: Quadrangle Assessment
- Quadrangles: Albuquerque/Aztec
- Subcontractors: Brinkerhoff Drilling Co., Chesney Drilling Co., Century Geophysical Corp., and University of New Mexico
- Subcontract Value: $1,970,000
- Start Date: 3 July 1978
- Completion Date: 30 September 1980
- Number of Holes: 15
- Total Feet Drilled: 70,421
- Reports: GJBX-101(79), -98(80), -215(80)

Great Divide Basin Drilling Project
- Category: Intermediate-Grade Resources
- Quadrangles: Lander/Rock Springs
- Subcontractor: B&B Drilling
- Subcontract Value: $77,000
- Start Date: 22 June 1981
- Completion Date: 22 July 1981
- Number of Holes: 6
- Total Feet Drilled: 4,697
- Report: GJBX-294(81)

Lamhi Pass Drilling Project
- Category: Thorium Studies
- Quadrangle: Dubois
- Subcontractors: Wild Cat Drilling Service, Inc., and Udy Core Drilling
- Subcontract Value: $121,000
- Start Date: 25 June 1978
- Completion Date: 23 September 1979
- Number of Holes: 4
- Total Feet Drilled: 2,415
- Report: GJBX-87(80)

McDermitt Caldera Drilling Project
- Category: Intermediate-Grade Resources
- Quadrangles: Adel/Jordan Valley/McDermitt/Vya
- Subcontractor: Wildcat Drilling
- Subcontract Value: $394,000
- Start Date: 3 November 1980
- Completion Date: 30 October 1981
- Number of Holes: 11
- Total Feet Drilled: 7,419
- Report: GJBX-115(81)

Missoula/Bitterroot Valleys Drilling Project
- Category: Quadrangle Assessment
- Quedrangles: Hamilton/Wallace
- Subcontractors: X-L Drilling Co. and Monaco Engineering, Inc.
- Subcontract Value: $424,000
- Start Date: 3 April 1978
- Completion Date: 30 October 1978
- Number of Holes: 7
- Total Feet Drilled: 14,437
- Reports: GJBX-127(79), -7(81)

Northwest Black Hills Drilling Project
- Category: World-Class Deposits
- Quadrangle: Rapid City
- Subcontractor: Longyear Co.
- Subcontract Value: $64,000
- Start Date: 3 July 1979
- Completion Date: 10 October 1979
- Number of Holes: 5
- Total Feet Drilled: 2,211
- Reports: GJBX-17(80), -127(80)

Oakville-Goliad, Texas, Drilling Project
- Category: Quadrangle Assessment
- Quadrangles: Laredo/McAllen
- Subcontractors: MHC X-Ploration Corp., Stewart Brothers Drilling Co., and University of Texas Bureau of Economic Geology
- Subcontract Value: $685,000
- Start Date: 28 August 1979
- Completion Date: 31 December 1980
- Number of Holes: 12
- Total Feet Drilled: 26,327
- Report: GJBX-19(81)

Owens Valley, California, Drilling Project
- Category: Quadrangle Assessment
- Quadrangle: Death Valley
- Subcontractor: X-L Drilling Co., Inc.
- Subcontract Value: $836,000
- Start Date: 6 June 1979
- Completion Date: 1 March 1980
- Number of Holes: 8
- Total Feet Drilled: 19,513
- Reports: GJBX-131(80), -128(81)

Red Desert (Great Divide Basin) Drilling Project
- Category: Intermediate-Grade Resources
- Quadrangles: Casper/Lander/Rock Springs
- Subcontractor: Teton Exploration Drilling Co., Inc.
- Subcontract Value: $90,000
- Start Date: 25 April 1980
- Completion Date: 31 July 1980
- Number of Holes: 4
- Total Feet Drilled: 9,771
- Report: GJBX-124(80)

APPENDIX B

Table IV. NURE Drilling Program (continued)

Red Desert (Great Divide Basin) R&D Drilling Project
- Category: Technology Integration
- Quadrangles: Casper/Lander
- Subcontractor: R&R Drilling
- Subcontract Value: $203,000
- Start Date: 2 May 1979
- Completion Date: 29 November 1979
- Number of Holes: 6
- Total Feet Drilled: 4,697
- Reports: GJBX-50(80), -51(80)

Sand Wash Basin Drilling Project
- Category: Intermediate-Grade Resources
- Quadrangles: Craig/Vernal
- Subcontractor: Camp Drilling Co.
- Subcontract Value: $108,000
- Start Date: 24 April 1980
- Completion Date: 18 July 1980
- Number of Holes: 19
- Total Feet Drilled: 13,439
- Report: GJBX-194(80)

Sand Wash Basin R&D Drilling Project
- Category: Research and Development
- Quadrangles: Craig/Vernal
- Subcontractor: American Drilling Co.
- Subcontract Value: $639,000
- Start Date: 26 December 1978
- Completion Date: 1 November 1979
- Number of Holes: 27
- Total Feet Drilled: 26,107
- Reports: GJ8X-125(80), -176(81)

San Juan R&D Drilling Project
- Category: Technology Integration
- Quadrangle: Albuquerque
- Subcontractor: Stewart Brothers Drilling Co.
- Subcontract Value: $687,000
- Start Date: 31 May 1979
- Completion Date: 26 November 1979
- Number of Holes: 14
- Total Feet Drilled: 33,714
- Report: Scheduled for 1982 Release

San Rafael Swell Drilling Project
- Category: Quadrangle Assessment
- Quadrangles: Price/Salina
- Subcontractors: Chesney Drilling, Inc., and Himes Drilling Co., Inc.
- Subcontract Value: $892,000
- Start Date: 11 September 1978
- Completion Date: 15 Dacember 1979
- Number of Holes: 22
- Total Feet Drilled: 34,866
- Reports: GJBX-102(80), -78(81)

Sonora Pass Drilling Project
- Category: Quadrangle Assessment
- Quadrangle: Walker Lake
- Subcontractors: California Department of Mines and Geology, and Salisbury & Dietz, Inc.
- Subcontract Value: $248,000
- Start Date: 23 May 1979
- Completion Date: 15 January 1980
- Number of Holes: 19
- Total Feet Drilled: 6,573
- Reports: GJBX-18(80), -132(81)

Southeast Wyoming Drilling Project
- Category: World-Class Deposits
- Quadrangle: Rawlins
- Subcontractor: Earth Exploration Drilling Co.
- Subcontract Value: $725,000
- Start Date: 29 May 1980
- Completion Date: 31 August 1980
- Number of Holes: 8
- Total Feet Drilled: 6,229
- Reports: GJ8X-116(81), -139(81)

Southeast Wyoming Pebble Conglomerates Drilling Project
- Category: World-Class Deposits
- Quadrangle: Rawlins
- Subcontractor: Earth Exploration Drilling of Utah
- Subcontract Value: $1,031,000
- Start Date: 5 June 1979
- Completion Date: 1 February 1980
- Number of Holes: 20
- Total Feet Drilled: 13,327
- Report: GJBX-116(81)

Southwest Arizona Drilling Project
- Category: Quadrangle Assessment
- Quadrangles: Prescott/Williams
- Subcontractor: Stewart Brothers Drilling Co.
- Subcontract Value: $1,421,000
- Start Date: 6 June 1979
- Complation Date: 30 September 1979
- Number of Holes: 18
- Total Feet Drilled: 63,520
- Reports: GJ8X-86(80), -293(81)

Spor Mountain Drilling Project
- Category: Quadrangle Assessment
- Quadrangle: Delta
- Subcontractors: Boyle Brothers Drilling Co. and Century Geophysical Corp.
- Subcontract Value: $929,000
- Start Date: 13 June 1978
- Completion Date: 28 June 1979
- Number of Holes: 30
- Total Feet Drilled: 33,143
- Reports: GJBX-103(79), -19(80)

APPENDIX B

Table V. Quadrangle Borehole Logging Program

Acquisition of Subsurface Data
- Subcontractor: Petroleum Information Services, Inc.
- Subcontract Value: $100,000
- Start Date: 1 April 1979
- Completion Date: 24 April 1981

California/Nevada Industry Logging Project
- Subcontractor: J. H. Kleinfelder & Associates
- Subcontract Value: $861,000
- Start Date: 14 September 1979
- Completion Date: 31 December 1980
- Number of Holes: 189
- Total Logged Interval: 291,390 Feet
- Report: GJBX-133(81)

Logging of Denver-Julesburg Basin, Williston Basin, and Central Wyoming Basins
- Subcontractor: High Life Helicopters, Inc.
- Subcontract Value: $1,663,971
- Start Date: 31 May 1979
- Completion Date: 31 December 1981
- Number of Holes: 268
- Total Logged Interval: 626,845 Feet

Logging of Industry Drilling in South Texas
- Subcontractor: Fugro, Inc. (now ERTEC, Inc.)
- Subcontract Value: $230,000
- Start Date: 1 May 1979
- Completion Date: 1 August 1979
- Number of Holes: 20
- Total Logged Interval: 52,504 Feet

Logging of Industry Drilling in South Texas
- Subcontractor: Fugro, Inc. (now ERTEC, Inc.)
- Subcontract Value: $685,000
- Start Date: 17 March 1980
- Completion Date: 15 May 1981
- Number of Holes: 77
- Total Logged Interval: 316,953 Feet

Logging of Industry Drilling in Texas/Wyoming
- Subcontractor: Fugro, Inc. (now ERTEC, Inc.)
- Subcontract Value: $1,264,000
- Start Date: 1 October 1979
- Completion Date: 31 March 1980
- Number of Holes: 226
- Total Logged Interval: 841,377 Feet

APPENDIX B

Table VI. Geologic Quadrangle Maps Program

Alaska
- Subcontractor: ESCA-Tech Corp.
- Subcontract Value: $19,000
- Start Date: 13 March 1980
- Completion Date: 3 July 1980
- Number of Maps: 4

Alaska
- Subcontractor: Amuedo & Ivey
- Subcontract Value: $5,000
- Start Date: 13 March 1980
- Completion Date: 8 May 1980
- Number of Maps: 2

Alaska
- Subcontractor: Martel Laboratories, Inc.
- Subcontract Value: $5,000
- Start Date: 14 March 1980
- Completion Date: 6 June 1980
- Number of Maps: 2

Alaska
- Subcontractor: AAA Engineering & Drafting, Inc.
- Subcontract Value: $18,000
- Start Date: 22 April 1980
- Completion Date: 30 September 1980
- Number of Maps: 11

Alaska and Iowa
- Subcontractor: AAA Engineering & Drafting, Inc.
- Subcontract Value: $11,000
- Start Date: 27 August 1980
- Completion Date: 19 November 1980
- Number of Maps: 5

Alaska: Kantishna River Quadrangle
- Subcontractor: Amuedo & Ivey
- Subcontract Value: $3,000
- Start Date: 7 December 1979
- Completion Date: 9 January 1980
- Number of Maps: 1

Colorado: Limon Quadrangle
- Subcontractor: ESCA-Tech Corp.
- Subcontract Value: $2,000
- Start Date: 12 June 1980
- Completion Date: 14 August 1980
- Number of Maps: 1

Florida
- Subcontractor: Martel Laboratories, Inc.
- Subcontract Value: $49,000
- Start Date: 7 May 1980
- Completion Date: 7 June 1980
- Number of Maps: 21

Idaho
- Subcontractor: Fremont Geologic Consultants
- Subcontract Value: $9,000
- Start Date: 10 June 1980
- Completion Date: 23 July 1980
- Number of Maps: 3

Idaho and Montana: Wallace Quadrangle
- Subcontractor: International Exploration, Inc.
- Subcontract Value: $3,000
- Start Date: 30 May 1980
- Completion Date: 8 September 1980
- Number of Maps: 1

Illinois
- Subcontractor: ESCA-Tech Corp.
- Subcontract Value: $15,000
- Start Date: 28 August 1980
- Completion Date: 20 November 1980
- Number of Maps: 4

Iowa
- Subcontractor: Fremont Geologic Consultants
- Subcontract Value: $7,000
- Start Date: 11 September 1980
- Completion Date: 12 February 1981
- Number of Maps: 3

Kansas
- Subcontractor: ESCA-Tech Corp.
- Subcontract Value: $7,000
- Start Date: 8 September 1980
- Completion Date: 8 October 1980
- Number of Maps: 3

Louisiana
- Subcontractor: Amuedo & Ivey
- Subcontract Value: $6,000
- Start Date: 13 February 1980
- Completion Date: 26 March 1980
- Number of Maps: 2

Maine
- Subcontractor: Amuedo & Ivey
- Subcontract Value: $8,000
- Start Date: 15 April 1980
- Completion Date: 6 June 1980
- Number of Maps: 4

Maine
- Subcontractor: Greenhorne & O'Mara, Inc.
- Subcontract Value: $3,000
- Start Date: 22 April 1980
- Completion Date: 6 June 1980
- Number of Maps: 2

Maine
- Subcontractor: AAA Engineering & Drafting, Inc.
- Subcontract Value: $5,000
- Start Date: 14 April 1980
- Completion Date: 8 July 1980
- Number of Maps: 4

Michigan
- Subcontractor: Amuedo & Ivey
- Subcontract Value: $15,000
- Start Date: 18 August 1980
- Completion Date: 25 September 1980
- Number of Maps: 4

APPENDIX B

Table VI. Geologic Quadrangle Maps Program (continued)

Midwestern States
- Subcontractor: AAA Engineering & Drafting, Inc.
- Subcontract Value: $15,000
- Start Date: 20 August 1980
- Completion Date: 21 September 1980
- Number of Maps: 5

Minnesota
- Subcontractor: AAA Engineering & Drafting, Inc
- Subcontract Value: $16,000
- Start Date: 9 June 1980
- Completion Date: 23 September 1980
- Number of Maps: 12

Minnesota
- Subcontractor: ESCA-Tech Corp.
- Subcontract Value: $6,000
- Start Date: 12 June 1980
- Completion Date: 12 September 1980
- Number of Maps: 3

Missouri
- Subcontractor: Martel Leboratories, Inc.
- Subcontract Value: $12,000
- Start Date: 11 September 1980
- Completion Date: 13 October 1980
- Number of Maps: 6

Montana and Washington
- Subcontractor: International Exploration, Inc
- Subcontract Value: $14,000
- Start Date: 10 June 1980
- Completion Date: 16 September 1980
- Number of Maps: 6

Nabraska
- Subcontractor: AAA Engineering & Drafting, Inc.
- Subcontract Value: $7,000
- Start Date: 3 September 1980
- Completion Date: 4 November 1980
- Number of Maps: 3

Nabraska and South Dakota
- Subcontractor: AAA Engineering & Drafting, Inc.
- Subcontract Value: $12,000
- Start Date: 9 June 1980
- Completion Date: 21 August 1980
- Number of Maps: 5

Nebraska: Valantine Quadrangle
- Subcontractor: Amuedo & Ivey
- Subcontract Value: $2,000
- Start Date: 11 June 1980
- Completion Date: 4 July 1980
- Number of Maps: 1

Naw Mexico
- Subcontractor: Martel Laboratories, Inc.
- Subcontract Value: $6,000
- Start Date: 10 December 1979
- Completion Date: 27 February 1980
- Number of Maps: 2

New Mexico and Texas: El Paso Quadrangle
- Subcontractor: AAA Engineering & Drafting, Inc.
- Subcontract Value: $2,000
- Start Date: 30 November 1979
- Completion Date: 15 January 1980
- Number of Maps: 1

New York
- Subcontractor: Fremont Geologic Consultants
- Subcontract Value: $2,000
- Start Date: 3 April 1981
- Completion Date: 4 May 1981
- Number of Maps: 1

North Dakota
- Subcontractor: Martel Laboratories, Inc.
- Subcontract Value: $7,000
- Start Date: 30 May 1980
- Completion Date: 29 July 1980
- Number of Maps: 3

North Dakota
- Subcontractor: Martel Laboratories, Inc.
- Subcontract Value: $9,000
- Start Date: 11 June 1980
- Completion Date: 24 July 1980
- Number of Maps: 4

North Dakota
- Subcontractor: Amuedo & Ivey
- Subcontract Value: $10,000
- Start Date: 28 May 1980
- Completion Date: 11 July 1980
- Number of Maps: 4

Northeast States: Lewiston Quadrangle
- Subcontractor: W. C. Riggle
- Subcontract Value: $1,000
- Start Date: 7 March 1980
- Completion Date: 10 March 1980
- Number of Maps: 1

Ohio
- Subcontractor: AAA Engineering & Drafting, Inc.
- Subcontract Value: $8,000
- Start Date: 20 August 1980
- Completion Date: 21 October 1980
- Number of Meps: 4

Oregon
- Subcontractor: Greenhorne & O'Mara, Inc.
- Subcontract Value: $3,000
- Start Date: 28 April 1980
- Completion Date: 12 June 1980
- Number of Maps: 2

Oragon
- Subcontractor: Martel Laboratories, Inc.
- Subcontract Value: $10,000
- Start Date: 23 April 1980
- Completion Date: 11 June 1980
- Number of Maps: 4

APPENDIX B

Table VI. Geologic Quadrangle Maps Program (continued)

South Carolina: James Island Quadrangle
- Subcontractor: Fremont Geologic Consultants
- Subcontract Value: $1,000
- Start Date: 4 April 1981
- Completion Date: 8 May 1981
- Number of Maps: 1

South Dakota
- Subcontractor: AAA Engineering & Drafting, Inc.
- Subcontract Value: $4,000
- Start Date: 4 June 1980
- Completion Date: 8 August 1980
- Number of Maps: 2

South Dakota: Aberdeen Quadrangle
- Subcontractor: International Exploration, Inc.
- Subcontract Value: $3,000
- Start Date: 30 May 1980
- Completion Date: 8 September 1980
- Number of Maps: 1

Southwest United States
- Subcontractor: Martel Laboratories, Inc.
- Subcontract Value: $35,000
- Start Date: 13 March 1980
- Completion Date: 30 June 1980
- Number of Maps: 18

Texas: Sonora Quadrangle
- Subcontractor: University of Texas at Austin
- Subcontract Value: $7,000
- Start Date: 28 January 1980
- Completion Date: 21 April 1980
- Number of Maps: 1

Washington
- Subcontractor: ESCA-Tech Corp.
- Subcontract Value: $9,000
- Start Date: 19 April 1980
- Completion Date: 16 July 1980
- Number of Maps: 2

Washington
- Subcontractor: Mineral Resources Development, Inc.
- Subcontract Value: $7,000
- Start Date: 3 April 1980
- Completion Date: 15 May 1980
- Number of Maps: 2

Washington
- Subcontractor: Salisbury & Dietz, Inc.
- Subcontract Value: $38,000
- Start Date: 28 April 1980
- Completion Date: 31 July 1980
- Number of Maps: 6

Wisconsin
- Subcontractor: Fremont Geologic Consultants
- Subcontract Value: $6,000
- Start Date: 29 August 1980
- Completion Date: 13 October 1980
- Number of Maps: 3

APPENDIX C

Resource Assessment

Improved Appraisal System for U_3O_8 Endowment
- Subcontractor: University of Arizona
- Subcontract Value: $273,000
- Start Date: 18 January 1977
- Completion Date: 29 February 1980
- Report: GJ8X-112(80)

Preparation of Uranium Deposit Occurrence Models
- Subcontractor: Samuel S. Adams and Associates
- Subcontract Value: $372,000
- Start Date: 2 April 1979
- Completion Date: 15 January 1981
- Reports: GJ8X-1(81), -2(81), -3(81), -4(81), -5(81), -6(81)

NURE Geostatistical Evaluation Study
- Subcontractor: Terradata
- Subcontract Value: $72,000
- Start Date: 18 July 1979
- Completion Date: 30 June 1981
- Report: GJ8X-34(81)

HSSR Data and Identification of Favorable Areas
- Subcontractor: University of Georgia
- Subcontract Value: $140,000
- Start Date: 1 August 1979
- Completion Date: 16 February 1981
- Report: GJBX-140(81)

Potential Supply Systems
- Subcontractor: University of Arizona
- Subcontract Value: $345,000
- Start Date: 18 September 1978
- Completion Date: 18 September 1981
- Report: GJ8X-269(81)

Improved Appraisal System for U_3O_8 Endowment
- Subcontractor: University of Arizona
- Subcontract Value: $104,000
- Start Date: 15 April 1980
- Completion Date: 30 December 1980
- Report: GJ8X-383(81)

A Decision Model for Quadrangle Assessment
- Subcontractor: Woodward-Clyde Consultants
- Subcontract Value: $78,000
- Start Date: 10 April 1980
- Completion Date: 10 July 1981
- Report: Scheduled for 1982 Release

Estimation of Intermediate-Grade Uranium Resources
- Subcontractor: Terradata
- Subcontract Value: $45,000
- Start Date: 2 June 1981
- Completion Date: 31 August 1981
- Report: Scheduled for 1982 Release

APPENDIX D

Geologic Studies

WORLD-CLASS DEPOSIT STUDIES

Uranium in Precambrian Quartz-Pebble Conglomerates
- Subcontractor: University of Wyoming
- Subcontract Value: $76,000
- Start Date: 1 August 1978
- Completion Date: 1 November 1979
- Report: GJBX-1(80)

Northwest Black Hills Drilling Project
- Subcontractor: Longyear Co.
- Subcontract Value: $64,000
- Start Date: 3 July 1979
- Completion Date: 10 October 1979
- Reports: GJBX-17(80), -127(80)

Genesis of the Bokan Mountain, Alaska, Uranium Deposits
- Subcontractor: Colorado State University
- Subcontract Value: $82,000
- Start Date: 20 September 1978
- Completion Date: 15 February 1980
- Report: GJBX-38(80)

Calcretes and Gypcretes in Southwest United States/ Uranium Favorability
- Subcontractor: University of California at Los Angeles
- Subcontract Value: $111,000
- Start Date: 13 July 1976
- Completion Date: 31 January 1980
- Report: GJBX-53(80)

Lacustrine Uranium, Kern Lake
- Subcontractor: Lamar-Merifield, Geologists
- Subcontract Value: $21,000
- Start Date: 18 October 1978
- Completion Date: 29 February 1980
- Report: GJBX-61(80)

Study of the Proterozoic Unconformity, Van Horn, Texas
- Subcontractor: University of Texas at El Paso
- Subcontract Value: $37,000
- Start Date: 10 May 1979
- Completion Date: 15 April 1980
- Report: GJBX-97(80)

Uranium in Accessory Minerals: Part I
- Subcontractor: Colorado School of Mines Research Institute
- Subcontract Value: $137,000
- Start Date: 27 September 1978
- Completion Date: 30 April 1980
- Report: GJBX-103(80)

Precambrian Pebble Conglomerates, Needle Mountains, Colorado
- Subcontractor: Colorado State University
- Subcontract Value: $74,000
- Start Date: 7 May 1979
- Completion Date: 6 June 1980
- Report: GJBX-118(80)

Asphaltites of the Texas Panhandle
- Subcontractors: University of Texas Bureau of Economic Geology and Fugro, Inc.
- Subcontract Value: $46,000
- Start Date: 31 March 1978
- Completion Date: 31 March 1980
- Report: GJBX-121(80)

Geochemical Exploration/Sandstone-Ores
- Subcontractor: Pennsylvania State University
- Subcontract Value: $58,000
- Start Date: 2 January 1978
- Completion Date: 30 May 1980
- Report: GJBX-126(80)

Geologic Evaluation of Northeast Black Hills, South Dakota
- Subcontractor: South Dakota School of Mines and Technology
- Subcontract Value: $53,000
- Start Date: 15 May 1979
- Completion Date: 1 July 1980
- Report: GJBX-127(80)

Sierra Madre Gravimetar Survey
- Subcontractor: Scott B. Smithson
- Subcontract Value: $2,000
- Start Date: 14 September 1979
- Completion Date: 31 December 1979
- Report: GJBX-130(80)

Geologic Study of Uranium in Carbonatites, United States
- Subcontractor: J. Dan Powell and Associates
- Subcontract Value: $93,000
- Start Date: 1 July 1979
- Completion Date: 31 July 1980
- Report: GJBX-147(80)

Exparimantal Leaching Tuffs
- Subcontractor: University of Texas at El Paso
- Subcontract Value: $39,000
- Start Date: 1 June 1978
- Completion Date: 30 July 1980
- Report: GJBX-148(80)

Study of Uranium- and Thorium-Bearing Pegmatites
- Subcontractor: Derry, Michener, & Booth
- Subcontract Value: $83,000
- Start Date: 29 September 1978
- Completion Date: 15 July 1980
- Report: GJBX-166(80)

Tertiary Volcanic Rocks in Southwestern Naw Mexico
- Subcontractor: University of Kansas
- Subcontract Value: $34,000
- Start Date: 1 June 1979
- Completion Date: 30 August 1980
- Report: GJBX-169(80)

Evaluation of Precambrian Metasedimentary Rocks, Uinta Arch
- Subcontractor: Research Associates of Wyoming
- Subcontract Value: $96,000
- Start Date: 15 June 1979
- Completion Date: 28 April 1980
- Report: GJBX-170(80)

APPENDIX D

Geologic Studies (continued)

Regional Geology and Uranium Favorability in Alaska
- Subcontractor: University of Alaska
- Subcontract Value: $75,000
- Start Date: 3 August 1978
- Completion Date: 15 November 1980
- Report: GJBX-178(80)

Study of Uranium and Thorium Potential of "Red Muds"
- Subcontractor: Zellars-Williams, Inc.
- Subcontract Value: $55,000
- Start Date: 12 September 1978
- Completion Date: 31 July 1980
- Report: GJBX-192(80)

Precambrian Plutonic Rocks of Northwest Arizona
- Subcontractor: Loghry - Heinrichs
- Subcontract Value: $60,000
- Start Date: 5 July 1979
- Completion Date: 31 August 1980
- Report: GJBX-213(80)

Mineralization in Fluorine-Enriched Rocks
- Subcontractor: Arizona State University
- Subcontract Value: $79,000
- Start Date: 12 January 1979
- Completion Date: 25 September 1980
- Report: GJBX-225(80)

Geologic/Geochemical Evaluation of Raft River Mountains
- Subcontractor: Meiiji Resource Consultants
- Subcontract Value: $92,000
- Start Date: 9 July 1979
- Completion Date: 30 August 1980
- Report: GJBX-227(80)

Uranium in Precambrian Conglomerates, Southwest Montana
- Subcontractor: Robert E. Cohenour & Associates
- Subcontract Value: $115,000
- Start Date: 12 July 1979
- Completion Date: 31 October 1980
- Report: GJBX-252(80)

Geologic Study of Kettle Dome, Northeast Washington
- Subcontractor: Cruson & Pansze, Geologists
- Subcontract Value: $52,000
- Start Date: 1 June 1979
- Completion Date: 31 July 1980
- Report: GJBX-253(80)

Geologic Study of Uranium and Metamorphic Core Complexes
- Subcontractor: University of Arizona
- Subcontract Value: $106,000
- Start Date: 19 July 1979
- Completion Date: 30 October 1980
- Report: GJBX-258(80)

Uranium Evaluation of Laramie Range, Wyoming
- Subcontractor: Research Associates of Wyoming
- Subcontract Value: $65,000
- Start Date: 16 May 1980
- Completion Date: 31 December 1980
- Report: GJBX-22(81)

Precambrian Conglomerates of the Central Arizona Arch
- Subcontractor: Wallaby Enterprises
- Subcontract Value: $102,000
- Start Date: 1 August 1979
- Completion Date: 31 October 1980
- Report: GJBX-33(81)

Geologic Study of Kingston Peak, Southeast California
- Subcontractor: University of California at Los Angeles
- Subcontract Value: $94,000
- Start Date: 4 May 1979
- Completion Date: 31 October 1980
- Report: GJBX-37(81)

Uranium in Granites of Southwest North America
- Subcontractor: California Institute of Technology
- Subcontract Value: $259,000
- Start Date: 20 August 1979
- Completion Date: 30 June 1982
- Report: GJ8X-45(81)

Sedimentology and Uranium Occurrences
- Subcontractor: Dr. James E. Fox
- Subcontract Value: $4,000
- Start Date: 16 July 1979
- Completion Date: 30 April 1980
- Report: GJBX-66(81)

Favorability for World-Class Deposits, Northeast United States
- Subcontractor: H. H. Adler
- Subcontract Value: $32,000
- Start Date: 8 September 1980
- Completion Date: 7 March 1981
- Report: GJBX-80(81)

Pebble Conglomerates, Southeast Wyoming, Drilling Project
- Subcontractor: Earth Exploration Drilling of Utah
- Subcontract Value: $1,031,000
- Start Date: 5 June 1979
- Completion Date: 1 February 1980
- Report: GJBX-116(81)

Southeast Wyoming Drilling Project
- Subcontractor: Earth Exploration Drilling Co.
- Subcontract Value: $725,000
- Start Date: 29 May 1980
- Completion Date: 31 August 1980
- Reports: GJBX-116(81), -139(81)

Uranium in Precambrian Quartz-Pebble Conglomerates
- Subcontractor: University of Wyoming
- Subcontract Value: $338,000
- Start Date: 16 July 1979
- Completion Date: 1 April 1981
- Report: GJBX-139(81)

Radioactive Mineral Occurrences
- Subcontractor: University of Arizona
- Subcontract Value: $54,000
- Start Date: 1 September 1979
- Completion Date: 31 March 1981
- Report: GJBX-143(81)

APPENDIX D

Geologic Studies (continued)

Criteria for Post-Eocene Age Paleochannels
- Subcontractor: Colorado Geologic Survey
- Subcontract Value: $12,000
- Start Date: 1 August 1980
- Completion Date: 30 June 1981
- Report: TM-241

Publication of Precambrian Correlation Charts
- Subcontractor: University of Wyoming
- Subcontract Value: $9,000
- Start Date: 1 November 1977
- Completion Date: 30 June 1981
- Report: Scheduled for 1982 Release

Anomalies in Wilson Creek, Cranberry Gneisses, North Carolina
- Subcontractor: Chiasma Consultants, Inc.
- Subcontract Value: $71,000
- Start Date: 25 February 1980
- Completion Date: 15 January 1981
- Report: Scheduled for 1982 Release

Radioactive Mineral Occurrences in Utah
- Subcontractor: Utah Geologic and Mineral Surveys
- Subcontract Value: $12,000
- Start Date: 31 July 1981
- Completion Date: 30 July 1982
- Report: Scheduled for 1982 Release

Nonsandstone Uranium/Thorium Occurrences in New Mexico
- Subcontractor: New Mexico Bureau of Mines
- Subcontract Value: $11,000
- Start Date: 1 September 1981
- Completion Date: 31 January 1982
- Report: Scheduled for 1982 Release

Gravity Survey of Wells Quadrangle
- Subcontractors: University of Navada and Nevada Bureau of Mines and Geology
- Subcontract Value: $14,000
- Start Date: 25 September 1978
- Completion Date: 1 March 1980
- Report: Map No. 65, Released by Nevada Bureau of Mines and Geology

INTERMEDIATE-GRADE RESOURCE STUDIES

Brushy Basin Drilling Project
- Subcontractor: Himes Drilling Co.
- Subcontract Value: $78,000
- Start Date: 13 April 1979
- Completion Date: 15 December 1979
- Reports: GJBX-31(80), -48(80)

Red Desert (Great Divide Basin) Drilling Project
- Subcontractor: Teton Exploration Drilling Co., Inc.
- Subcontract Value: $90,000
- Start Date: 25 April 1980
- Completion Date: 31 July 1980
- Report: GJBX-124(80)

Sand Wash Basin Drilling Project
- Subcontractor: Camp Drilling Co.
- Subcontract Value: $108,000
- Start Date: 24 April 1980
- Completion Date: 18 July 1980
- Report: GJBX-194(80)

McDermitt Caldera Drilling Project
- Subcontractor: Wildcat Drilling
- Subcontract Value: $394,000
- Start Date: 3 November 1980
- Completion Date: 30 October 1981
- Report: GJ8X-115(81)

Great Divide Basin Drilling Project
- Subcontractor: B&B Drilling
- Subcontract Value: $77,000
- Start Date: 22 June 1981
- Completion Date: 22 July 1981
- Report: GJ8X-294(81)

Biogeochemical Indicators of Uranium Mineralization
- Subcontractor: Montana Applied Research Group
- Subcontract Value: $14,000
- Start Date: 1 November 1980
- Completion Date: 28 February 1982
- Report: Scheduled for 1982 Release

LOW-GRADE STUDIES

Chattanooga Shale
- Subcontractor: Mountain States Research
- Subcontract Valua: $297,000
- Start Date: 6 September 1977
- Completion Date: 1 October 1979
- Report: GJBX-167(80)

Uranium from Seawater
- Subcontractor: Massachusetts Institute of Technology
- Subcontract Value: $139,000
- Start Date: 2 September 1980
- Completion Date: 25 September 1981
- Report: GJBX-212(81)

APPENDIX E

Table I. Logging Systems

Uranium Borehole PFN Logging
- Interagency Agreement: Sandia National Laboratories
- 1980/81 Budget: $525,000
- Start Date: 1 July 1975
- Completion Date: 30 September 1981
- Reports: GJBX-122(80), -52(81)

^{252}Cf-Based Direct Uranium Logging System
- Subcontractor: IRT Corp.
- Subcontract Value: $771,000
- Start Date: 1 June 1977
- Completion Date: 30 November 1979
- Report: GJ8X-254(80)

Spectral-Gamma Logging Studies
- Contractor: Bendix Field Engineering
- Report: GJBX-21(81)

Magnetic Susceptibility Logging System
- Contractor: Bendix Field Engineering
- Subcontractor: Simplec Manufacturing Co.
- Subcontract Value: $67,500
- Start Date: 1 June 1976
- Completion Date: 17 July 1979
- Report: GJBX-75(81)

IG Detector Evaluation
- Cooperative Agreement: U.S. Bureau of Mines
- Start Date: 22 March 1978
- Completion Date: 30 July 1981
- Report: GJ8X-113(81)

Borehole Model Neutron Calculations: Phase III
- Subcontractor: Science Applications, Inc.
- Subcontract Value: $63,000
- Start Date: 25 June 1979
- Completion Date: 24 March 1981
- Report: GJBX-149(81)

Borehole Data Acquisition and Transmission System
- Subcontractor: Science Applications, Inc.
- Subcontract Value: $111,000
- Start Date: 17 December 1979
- Completion Date: 30 June 1981
- Report: GJ8X-224(81)

Computation and Nondestructive Assay Methods
- Interagency Agreement: Los Alamos National Laboratory
- 1980/81 Budget: $455,000
- Start Date: 1 June 1976
- Completion Date: 30 September 1981
- Reports: Scheduled 1982 Releases

Gamma-Gamma Log Transport Calculation
- Subcontractor: Science Applications, Inc.
- Subcontract Value: $142,000
- Start Date: 16 April 1979
- Completion Date: 31 May 1981
- Reports: Scheduled 1982 Releases

Borehole Neutron Correlation: Phase II
- Subcontractor: Consolidated Controls Corp.
- Subcontract Value: $89,000
- Start Date: 17 May 1979
- Completion Date: 15 October 1981
- Report: Scheduled for 1982 Release

Fiber-Optic Logging Cable
- Subcontractor: Optelecom, Inc.
- Subcontract Value: $91,000
- Start Date: 27 October 1978
- Completion Date: 15 August 1981
- Report: Scheduled for 1982 Release

Multielement Logging
- Interagency Agreement: Sandia National Laboratories
- 1980/81 Budget: $650,000
- Start Date: 1 January 1979
- Completion Date: 31 December 1982

Delayed Neutron Logging Demonstration
- Subcontractor: IRT Corp.
- Subcontract Value: $120,000
- Start Date: 31 March 1980
- Completion Date: 30 September 1980

Acquisition of a High-Purity Germanium Probe
- Subcontractor: Princeton Gamma-Tech
- Subcontract Value: $44,000
- Start Date: 13 June 1979
- Completion Date: 16 December 1979

Vehicular Borehole Logging Systems
- Subcontractor: Century Geophysical Corp.
- Subcontract Value: $297,000
- Start Date: 1 November 1979
- Completion Date: 1 July 1980

Acquisition and Implementation of Radiation Transport Codes
- Subcontractor: Science Applications, Inc.
- Subcontract Value: $34,000
- Start Date: 12 November 1979
- Completion Data: 30 June 1980

APPENDIX E

Table II. Aerial Data Interpretation and Evaluation

LANDSAT
- Subcontractor: Earth Satellite Corp.
- Subcontract Value: $110,000
- Start Date: 3 July 1978
- Completion Date: 26 December 1979
- Report: GJBX-26(80)

Development of Data Enhancement and Display Techniques
- Subcontractor: University of Georgia
- Subcontract Value: $55,000
- Start Date: 21 July 1978
- Completion Date: 4 September 1979
- Report: GJBX-28(80)

Effect of Ground Vegetation
- Subcontractor: Radiation Research Associates, Inc.
- Subcontract Value: $45,000
- Start Date: 29 September 1980
- Completion Date: 31 January 1981
- Reports: GJ8X-55(80), -141(80)

Vertical Radon Propagation
- Subcontractor: Radiation Research Associates, Inc.
- Subcontract Value: $172,000
- Start Date: 31 January 1978
- Completion Date: 1 August 1981
- Reports: GJBX-110(80), -111(80), -280(81)

Statistical Techniques Applied to Aerial Radiometric Surveys (STAARS)
- Ongoing Cooperative Agreement: Los Alamos National Laboratory
- Reports: GJBX-123(80), -9(81), -114(81), -142(81)

Integration of Airborne Geophysical and HSSR Data
- Subcontractor: Texas Instruments, Inc.
- Subcontract Value: $653,000
- Start Date: 13 April 1979
- Completion Date: 30 October 1980
- Reports: GJBX-136(80), -137(80), -32(81)

Geostatistics Project
- Ongoing Interagency Agreement: Los Alamos National Laboratory
- 1980/81 Budget: $480,000
- Reports: GJBX-226(80), -99(81), -109(81), -311(81)

Crystal City/Beeville Study
- Subcontractor: Rice University
- Subcontract Value: $73,000
- Start Date: 23 July 1979
- Completion Date: 29 September 1980
- Report: GJ8X-69(81)

Multisource Data Set for Montrose Quadrangle
- Interagency Agreement: Los Alamos National Laboratory
- Total Budget: $75,000
- Start Date: 1 June 1980
- Completion Date: 30 September 1980
- Report: GJ8X-148(81)

Magnetic Data from NURE Aerial Survey Program
- Cooperative Agreement: Oak Ridge National Laboratory
- Subcontractor: Purdue Research Foundation
- Subcontract Value: $44,000
- Start Date: 1 April 1979
- Completion Date: 30 September 1981
- Report: GJ8X-177(81)

Soil Discrimination with Aerial Data
- Cooperative Agreement: Los Alamos National Laboratory
- Start Date: 1 January 1980
- Completion Date: 1 January 1981
- Report: GJ8X-281(81)

Reconnaissance Magnetics Interpretation
- Subcontractor: QEB, Inc.
- Subcontract Value: $58,000
- Start Date: 23 October 1978
- Completion Date: 30 November 1980
- Report: GJ8X-352(81)

Interpretations, Van Horn/Pecos Quadrangles
- Subcontractor: University of Texas at El Paso
- Subcontract Value: $132,000
- Start Date: 19 September 1978
- Completion Date: 20 September 1981
- Report: GJ8X-365(81)

Northeast Washington Mines, Airborne Data
- Subcontractor: International Exploration, Inc.
- Subcontract Value: $7,000
- Start Date: 22 September 1980
- Completion Date: 30 June 1981
- Report: Scheduled for 1982 Release

APPENDIX E

Table III. Aerial Technology

Airborne Detector Improvement (Phoswich Detector)
- Subcontractor: Grumman Aerospace Corp.
- Subcontract Value: $253,000
- Start Date: 2 April 1976
- Completion Date: 15 April 1981
- Report: GJBX-292(81)

Litton LTN-76 Inertial Navigation System
- DOE/SBA Contract: High Life Helicopters, Inc., and Applied Geophysics, Inc.
- Subcontract Value: $82,500
- Start Date: 24 September 1979
- Completion Date: 10 December 1981
- Report: GJBX-363(81)

Subcontractor's MAZE Code
- Subcontractor: Science Applications, Inc.
- Subcontract Value: $237,000
- Start Date: 4 June 1979
- Completion Date: 1 February 1981
- Report: GJBX-414(81)

Spectrum Enhancement
- Subcontractor: Science Applications, Inc.
- Subcontract Value: $509,000
- Start Date: 1 February 1977
- Completion Date: 14 August 1981
- Report: Scheduled for 1982 Release

Solid-State Photomultiplier Tube Application
- Subcontractor: Science Applications, Inc.
- Subcontract Value: $70,000
- Start Date: 1 April 1980
- Completion Date: 31 July 1981
- Report: Scheduled for 1982 Release

APPENDIX E

Table IV. Technology Integration

Spokane Mountain: Site Study
- Contractor: Bendix Field Engineering
- Subcontractors: Barringer Research, Inc., at al.
- Start Date: Fiscal 1977
- Completion Date: 15 April 1981
- Report: GJBX-200(81)

Spokane Mountain: Airborne Geochemical Survey Evaluation
- Subcontractor: Barringer Research, Inc.
- Subcontract Value: $158,000
- Start Date: 1 September 1977
- Completion Date: 4 February 1980

Copper Mountain: Site Study
- Contractor: Bendix Field Engineering
- Subcontractors: Dighem, Ltd., et al.
- Start Date: Fiscal 1977
- Completion Date: Merch 1982
- Report: Scheduled for 1982 Release

Copper Mountain: Aerial Resistivity and VLF-EM Survey
- Subcontractor: Digham, Ltd.
- Subcontract Value: $61,000
- Start Date: 31 October 1979
- Completion Date: 28 March 1980

Red Desert: Site Study
- Contractor: Bendix Field Engineering
- Subcontractors: R&R Drilling et al.
- Start Date: Fiscal 1976
- Completion Date: June 1982
- Report: Scheduled for 1982 Release

Red Desert (Great Divide Basin): R&D Drilling Project
- Subcontractor: R&R Drilling
- Subcontract Value: $203,000
- Start Date: 2 May 1979
- Completion Date: 29 November 1979
- Reports: GJBX-50(80), -51(80)

Red Desert: Airborne EM Application
- Subcontractor: Geoterrex, Ltd.
- Subcontract Value: $76,000
- Start Date: 13 November 1979
- Completion Date: 9 April 1981

San Juan Basin: Site Study
- Contractor: Bendix Field Engineering
- Subcontractors: Geophysical Service, Inc., California State University LA Foundation, et al.
- Start Date: Fiscal 1978
- Complation Date: August 1982
- Report: Scheduled for 1982 Release

San Juan Basin: R&D Drilling Project
- Subcontractor: Stewart Brothers Drilling Co.
- Subcontract Value: $687,000
- Start Date: 31 May 1979
- Completion Date: 26 November 1979

San Juan Basin: Seismic Reflection Applications
- Subcontractor: Geophysical Service, Inc.
- Subcontract Value: $120,000
- Start Date: 1 January 1980
- Completion Date: 15 May 1980

San Juan Basin: Lead Isotopes in Ground Water
- Subcontractor: California State University LA Foundation
- Subcontract Value: $57,000
- Start Date: 1 September 1979
- Completion Date: 30 August 1981

Uranium and Radon Daughters by Nuclear Emulsion
- Subcontractor: Stieff Research & Development Company, Inc.
- Subcontract Value: $105,000
- Start Date: 23 April 1979
- Completion Date: 30 September 1981
- Report: GJBX-144(81)

APPENDIX E

Table V. Emanometry and Geochemistry

Helium Emanometry
- Subcontractor: Helium Surveys, Inc.
- Subcontract Value: $107,500
- Start Date: 10 August 1977
- Completion Date: 15 February 1980
- Report: GJBX-22(80)

Uranium Measurements in Ground Water
- Contractor: Bendix Field Engineering
- Report: GJBX-109(80)

Uranium Isotopes in Ground Water
- Subcontractor: Florida State University
- Subcontract Value: $122,000
- Start Date: 1 April 1978
- Completion Date: 21 September 1981
- Reports: GJBX-119(80), -364(81)

Radon Transport Numerical Modeling
- Subcontractor: Teledyne Isotopes, Inc.
- Subcontract Value: $69,000
- Start Dete: 1 December 1977
- Completion Date: 1 July 1980
- Report: GJBX-140(80)

Radon and Helium Studies
- Contractor: Bendix Field Engineering
- Reports: GJBX-177(80), -38(81), -146(81)

Geochemical Exploration in Red Desert
- Contractor: Bendix Field Engineering
- Report: GJBX-125(81)

Geochemical Interpretation of Ground Water Data
- Subcontractor: Colorado School of Mines
- Subcontract Value: $118,000
- Start Date: 1 May 1979
- Completion Date: 31 July 1981
- Reports: GJBX-129(81), -404(81)

$^{4}He/^{36}Ar$ Ratio and ^{222}Rn Measurements
- Subcontractor: Teledyne Isotopes, Inc.
- Subcontract Value: $147,000
- Start Date: 19 August 1977
- Completion Date: 31 March 1981
- Report: GJBX-242(81)

Drilling Mud Emanometer Development
- Contractor: Bendix Field Engineering
- Subcontractor: Overhoff & Associates, Inc.
- Subcontract Value: $18,000
- Start Date: 18 August 1978
- Completion Date: 31 October 1980
- Report: GJBX-273(81)

Stable Isotopes and Geochemical Analysis
- Subcontractor: Global Geochemistry Corp.
- Subcontract Value: $94,000
- Start Date: 10 October 1979
- Completion Date: 31 May 1981
- Report: GJBX-312(81)

Porosity and Permeability in Core Samples
- Subcontractor: Helium Surveys, Inc.
- Subcontract Value: $81,000
- Start Date: 20 July 1978
- Completion Date: 18 August 1981
- Report: Scheduled for 1982 Release

Ge(Li) Spectrometer Calibration and Software
- Subcontractor: Science Applications, Inc.
- Subcontract Value: $15,000
- Start Date: 17 November 1978
- Completion Date: 31 August 1981

APPENDIX E

Table VI. Calibration

GJAO Calibration Facility Development
- Contractor: Bendix Field Engineering
- Reports: GJBX-4(80), -54(80), -267(81)

Dynamic Test Range I: Follow-On
- Subcontractor: LKB Resources, Inc.
- Subcontract Value: $110,000
- Start Date: 6 September 1978
- Completion Date: 31 March 1981
- Report: GJBX-110(81)

Dynamic Test Range II
- Subcontractor: Golder Associates, Inc.
- Subcontract Value: $73,000
- Start Date: 5 February 1979
- Completion Date: 30 June 1980

Dynamic Test Range II: Ground Support Vehicle
- Subcontractor: Radiation Management Corp.
- Subcontract Value: $65,000
- Start Date: 5 July 1979
- Completion Date: 5 January 1980

Core Drilling: Calibration Borehole Model D
- Subcontractor: Himes Drilling Company, Inc.
- Subcontract Value: $52,000
- Start Date: 13 February 1979
- Completion Date: 15 June 1979

Morgantown, West Virginia, Field Calibration Models
- Subcontractor: Vigil Enterprises, Inc.
- Subcontract Value: $59,000
- Start Date: 3 June 1980
- Completion Date: 30 June 1980

Reno, Nevada, Field Calibration Models
- Subcontractor: Vigil Enterprises, Inc.
- Subcontract Value: $69,000
- Start Date: 17 July 1980
- Completion Date: 15 August 1980

APPENDIX F

Mineral Economics

U_3O_8 Supply Analysis System
- Contractor: Bendix Field Engineering
- Subcontractor: Dames & Moore
- Subcontract Value: $996,000
- Start Date: 20 February 1979
- Completion Date: 21 March 1980
- Report: Scheduled for 1982 Release

Coal and Uranium Mining
- Subcontractor: University of Utah
- Subcontract Value: $10,000
- Start Date: 11 April 1977
- Completion Date: 1 October 1979
- Report: GJBX-7(80)

Long-Run Price Projections for Uranium
- Subcontractor: Charles River Associates, Inc.
- Subcontract Value: $86,000
- Start Date: 23 May 1979
- Completion Date: 31 May 1980
- Report: GJBX-36(81)

International Stockpile of Nuclear Fuel
- Subcontractor: Nuclear Resources, Inc.
- Subcontract Value: $45,000
- Start Date: 19 November 1979
- Completion Date: 5 June 1981
- Report: GJBX-182(81)

International Commercial Enrichment and Uranium Study
- Subcontractor: Nuclear Assurance Corp.
- Subcontract Value: $255,000
- Start Date: 29 May 1979
- Completion Date: 30 April 1981

World Nuclear Fuel Market-Subscription Agreement
- Subcontractor: Nuclear Assurance Corp.
- Subcontract Value: $15,000
- Start Date: 1 June 1980
- Completion Date: 30 September 1982

Special Studies in Uranium Enrichment Marketing
- Subcontractor: Nuclear Assurance Corp.
- Subcontract Value: $203,000
- Start Date: 27 July 1979
- Completion Date: 15 May 1981

U.S. Role in International Uranium Enrichment Market
- Subcontractor: Massachusetts Institute of Technology
- Subcontract Value: $78,000
- Start Date: 3 November 1980
- Completion Date: 30 September 1981