BEAK CONSULTANTS INCORPORATED

1300 South Potomac, Suite 114
Aurora, Colorado 80012
303-695-1733

December 16, 1983

0067

Utah Division of Oil, Gas & Mining
State of Utah
Division of Purchasing
4241 State Office Bldg.
Salt Lake City, Utah 84114

Dear Sir:

Enclosed please find the bid and associated qualifications information for the Review of the Mine and Reclamation Plan for the Rilda Canyon Mine, Requisition No. #580322.

If you have any questions, please do not hesitate to contact me.

Sincerely,

C V Braun

Constance V. Braun
Manager, Denver Operations
BEAK CONSULTANTS INCORPORATED

CVB:cll

FILE IN Expandable
Refer to Record No. 0067
in C/015/026, 1983, Incoming
for additional information

DP-10

11-04-24

STATE OF UTAH
INVITATION AND BID
REQUEST FOR PROPOSAL

PAGE 1 OF 1 PAGES

STATE OF UTAH
DIVISION OF PURCHASING
2112 STATE OFFICE BLDG.
SALT LAKE CITY, UTAH 84114

DATE December 07, 1983

REQUISITION NO. 580322

DEPARTMENT Natural Resources

Bids properly marked as to Bid No., Date and Hour of Opening, subject to the conditions herein stipulated and in accordance with the specifications set forth and/or attached hereto, will be accepted in the office of the DIVISION OF PURCHASING, Room 2112, State Office Building, Salt Lake City, Utah 84114, prior to following date and time.

DATE December 20, 1983 TIME 10:30 A.M. _____ P.M.

ALL INQUIRIES AND CORRESPONDENCE TO BE ADDRESSED TO: Becky Curtis **PHONE:** 533-4618

QUOTE PRICES F.O.B. DESTINATION ☒ **SEE FREIGHT BID REQUIREMENT SHEET** ☐

DELIVERY LOCATION 4241 State Office Bldg, SLC, Utah 84114

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	FREIGHT CHARGE IF APPLICABLE	TOTAL
		Brand names and model numbers must be furnished with bid. CONTRACT: TECHNICAL ASSISTANCE IN PERMIT REVIEW RELATED TO THE COAL MINING AND RECLAMATION PERMANENT PROGRAM, as per attached specifications: See attached Statement of Work			$20,950

Cash discounts of less than 30 days will not be considered in awarding.

IMPORTANT: PLEASE READ

FAILURE TO SIGN THIS PROPOSAL IN INK WILL RESULT IN THIS BID BEING REJECTED.

Cash discount terms _____

Requested Delivery Date See attached

THIS MUST BE NOTED

Please quote number of calendar days required for delivery after receipt of purchase order

30 days.

Company Beak Consultants Incorporated

Address 1300 S. Potomac, Suite 114

Aurora, Colorado 80012 ZIP CODE

Telephone (303) 695-1733

Signature Constance V. Beaver

Title Manager, Denver Operations

NOTE: See terms and conditions governing bids and sales to State on Reverse side.

REVIEW OF MINE AND RECLAMATION PLAN

RILDA CANYON MINE

IN EMERY COUNTY, UTAH

Prepared for:

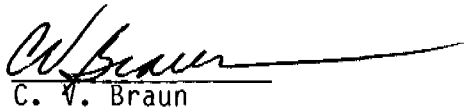
Utah Division of Oil, Gas and Mining
State of Utah
4241 State Office Bldg
Salt Lake City, Utah 84114

Prepared by:

Beak Consultants Incorporated
1300 S, Potomac, Suite 114
Aurora, Colorado 80012

Beak Proposal No. P2149
December 1983

Authorized by:



C. V. Braun
Manager

1.0 INTRODUCTION

Beak Consultants Incorporated (BEAK) is pleased to submit this proposal to conduct a review of the Permit Application Package (PAP) for the Rilda Canyon Mine in Carbon County, Utah. This review will be conducted for the Utah Division of Oil, Gas an Mining (DOGM).

The project team includes the environmental and engineering expertise necessary to complete the PAP review in a timely and efficient manner. The proposed personnel have conducted numerous studies for underground coal mines and, therefore, are familiar with the development of coal regulations by federal and state agencies. BEAK's capabilities ensure completion of the work scope within the defined schedule. Capabilities, pertinent to this study, include:

- Multidisciplinary team with extensive experience in underground coal mining projects.

- This project team is available to meet the proposed schedule. The project is expected to be initiated on January 6, 1983 at a meeting in Salt Lake City.

- BEAK's project team includes expert capabilities in mining engineering in the person of Mr. L.A. Stinnett. Mr. Stinnett has conducted several studies for underground coal mines in Utah. He has also been contracted to OSM for studies relating to hazards potential and abandoned mine land programs. His background includes financial analysis of mining which is critical for the evaluation of bonding requirements.

- The Project Manager, Ms. C.V. Braun, has conducted completeness and technical reviews for an earlier OSM contract. Thus she can provide the necessary coordination and management to meet the proposed schedule.

- BEAK has a CPT word processor and Kodak copier to facilitate timely completion and production of reports.

- Beak Consultants Incorporated and the individual personnel proposed for this project do not have a conflict of interest as defined by Requisition No. #580322, nor will BEAK accept work from West Appa Coal Company for a period of one year following completion of the contract.

2.0 WORK SCOPE

The work scope for the review of the Permit Application Package (PAP) for the Rilda Canyon Mine will include three phases: Phase I - Initial Review; Phase II - Determination of Completeness; and Phase III - Findings and Supporting Documentation. These phases will include the following tasks.

2.1 Phase I - Initial Review

- o Meeting in Salt Lake City with DOGM and BEAK personnel (Project Manager and one technical specialist).
- o Review of DOGM files.
- o On-site inspection of the Rilda Canyon Mine (Project Manager and two technical specialists).
- o Review the PAP (adequacy and deficiency of information) based on the Utah Coal Mining and Reclamation Permanent Program.
- o Prepare the Initial Review Report.

The objective of Phase I is to determine the completeness of the PAP in accordance with Utah coal mining regulations and to make a preliminary assessment of the adequacy of the submitted information. This preliminary assessment of data adequacy is extremely important for the completion of the overall PAP review within the proposed schedule. Any significant deficiencies must be identified during Phase I.

2.2 Phase II - Determination of Completion (DOC)

- o Meeting with DOGM, West Appa Coal Company, and BEAK (Project Manager and one technical specialist).
- o West Appa Coal responds to the Initial Review.
- o Preparation of DOC (eight copies to be submitted). This will be accomplished by reviewing West Appa Coal's response to the Initial Review and providing the DOC which addresses the adequacy of the submitted information.

2.3 Phase III - Findings and Supporting Documentation (FSD)

- o Preparation of the FSD for the PAP (eight copies) in the format as directed by DOGM. The FSD will address by discipline:
  - Concise description of the environment
  - Description of applicant's proposal
  - Evaluation of compliance of proposal

- Revisions to applicant's proposal
- Re-analysis of compliance
- Proposed special stipulations and justification
- Summary of compliance
- Proposed departmental action
- Alternatives to the proposed action
- Environmental impacts

o Attend one meeting in Salt Lake City with DOGM and BEAK (Project Manager only) regarding the FSD.

o Revision to the FSD (eight copies to be submitted).

The objective of this phase is to provide the FSD which determines the adequacy of the PAP in regards to environmental protection standards, special performance standards of the Utah coal mining program, coal lease regulations, and bonding requirements.

The schedule for these three phases is presented in Exhibit 1.

Exhibit 1. SCHEDULE

Phase I - Initial Review	
Contractor prepares and submits report to DOGM	January 31
DOGM reviews and transmits to applicant	February 10
Phase II - DOC	
Applicant reviews Initial Review and attends meeting	February 7
Applicant responds to Initial Review; Contractor reviews response and prepares DOC	March 30
Phase III - FSD	
Contractor prepares draft FSD	April 30
Applicant reviews draft FSD and attends meeting	May 17
Contractor prepares final FSD	June 21

3.0 PROJECT ORGANIZATION

3.1 Project Personnel

To best accomplish the objectives of the review of the PAP for the Rilda Canyon Mine, BEAK has formed a project team which includes the engineering and environmental expertise necessary to conduct the project. BEAK will provide personnel to conduct project management, geology, surface and ground water hydrology, fish and wildlife, soils, vegetation, and air resources. Mr. Landy Stinnett will be a consultant for the mining and engineering aspects.

The proposed project team is outlined in Exhibit 2. Brief descriptions of each person's qualifications and experience are provided below. Resumes are presented in the Appendix.

Constance V. Braun, Project Manager & Reclamation Specialist - Ms. Braun has nine years experience in environmental studies for energy developments throughout the Rocky Mountain area. She has managed numerous coal studies which involved feasibility assessments, permitting analyses, fatal flaw determinations, environmental baseline studies, preparation of state and federal coal mine permit applications and review of mine applications. Typical project experience includes:

- Office of Surface Mining - Review of mine permit applications for completeness an acceptability and preparation of EIS.
- Energy Reserves, Inc. - Preparation of permit revisions for their underground coal mine.
- Rocky Mountain Energy, Long Canyon Project - Project management of a permit evaluation, fatal flaw assessment, and preparation of a multidisciplinary work scope for baseline studies.
- NERCO, Jim Bridger Mine - Project management of environmental studies and preparation of permit application.
- Westmoreland, Sarpy Creek Mine - Preparation of expert testimony regarding reclamation potential.
- AMAX, Belle Ayr Mine - Project management of greenhouse reclamation studies, vegetation reference studies, and alluvial valley floor studies.
- El Paso Coal Company - Project management of vegetation studies on the Navajo Indian Reservation

Landy A. Stinnett - Mr. Stinnett has had extensive experience in several facets of deep underground mining ranging from assessing opening stability through mine planning and costing. Past experience includes design and field tests on

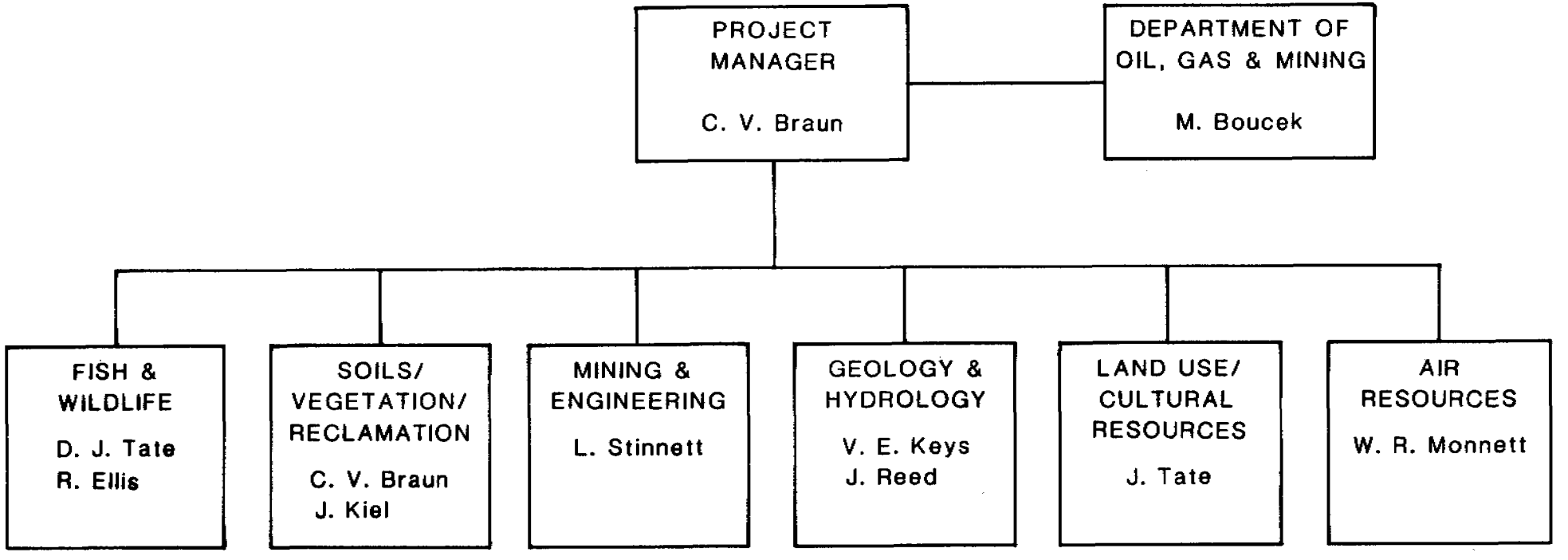


Exhibit 2. PROJECT ORGANIZATION

smoothwall blasting for preservation of rock opening stability, and presplit blasting to assist in ore draw control. More recently he has been involved with mine layout, planning, and costing. He has directed rock mechanic studies for determining optimum opening configuration and spacing, assessed operational practices and efficiencies, and has performed numerous feasibility studies on underground mining approaches. His experience in Utah includes:

- o Kaiparowits - Definition drilling, reserve estimates, mine planning, property valuation.
- o Church Mine, Wilberg Mine, Deer Creek Mine - Operational analyses, mine planning, engineering studies.
- o Dugout Canyon - Reserve estimates, mine planning, property valuation.
- o Kaiser South Lease - Feasibility study.

Other pertinent coal mining experience includes:

- o U.S. Bureau of Mines - Assessed hazard potential of nearly 400 surface and underground mines in South Dakota.
- o Office of Surface Mining - Develop handbook for mine operators and OSM personnel for design of final cut impoundments created upon cessation of surface mining.
- o Deer Creek Mine - Evaluation of subsidence.
- o Office of Surface Mining - Survey of public health, safety, and general welfare problems associated with past mining in South Dakota.

Vernon E. Keys, Senior Hydrogeologist - Mr. Keys has five years experience in geologic and hydrogeologic investigations associated with coal and mineral mine development. The particular emphasis of Mr. Keys' experience has been related to coal mine dewatering and monitoring systems, geologic and groundwater regime characterization for baseline studies and coal resource evaluation. Specific projects include:

- o Preparation of permit comments for surface and ground water hydrology for underground coal mine in Utah.
- o Participated in the development of the USGS Coal Resource Occurrence and Coal Development Potential (CRO-CDP) Open file report map series for quadrangles in northwestern Colorado and southern Wyoming.
- o Geologic and hydrologic investigations for the final design of a dewatering control system for the Phillips Coal-Delta Star open pit lignite mine in Mississippi.
- o Design and implementation of a ground water monitoring system in response to permitting requirements for Sundeco Coal's proposed Ferron Canyon underground mine in Utah.

Joseph L. Reed, Hydrologist - Mr. Reed has conducted numerous water investigations involving ground water surface water relationships, aquifer analysis, water well evaluations, and water rights. Surface water monitoring included maintenance of field equipment, such as well probes, stream gauging equipment, and water quality instruments. Recent experience include:

- o Preparation of permit comment responses for an underground coal mine in Utah.
- o Aquifer testing for a project in northern Saskatchewan.
- o Aquifer testing and data evaluation for the Asamera Wenatchee Project.
- o Conduct and interpretation of acquifer tests for a gravel quarry.

Jean E. Kiel, Soils/Vegetation Specialist - Ms. Kiel has extensive experience in conducting vegetation baseline studies and designing reclamation programs in the Rocky Mountain Region. She has been involved in vegetation, reclamation, and soils studies in Montana, Wyoming, Washington, Colorado, Oregon, California, and New Mexico. Ms. Kiel has supervised and coordinated staff in multidisciplinary energy development project. Her experience includes:

- o Conducted soils and reclamation studies throughout the Rocky Mountain States.
- o Vegetation studies for Stillwater PGM Resources' hard rock mine and mill, Montana.
- o Vegetation studies for a major oil shale project, Colorado.
- o Numerous reclamation plans for mine plans, state regulatory agencies, and right-of-way permit applications.
- o Provided technical assistance for CMLRD permitting phase for an oil shale operation.

Dr. D. Jean Tate, Senior Wildlife Biologist - Dr. Tate is a recognized expert in wildlife investigations and has conducted multidisciplinary studies of wildlife, including small, medium-sized and big mammals, song birds, game birds and raptors in a variety of habitats and states ranging from Alaska to Illinois to Nevada. She has had extensive experience in organizing and conducting field baseline studies, including numerous big game, grouse, prairie dog and raptor nest aerial surveys, pellet group analyses, small mammal trapping, roadside and Emlen transects. Her research interests have stressed habitat usage. Dr. Tate has also performed numerous multidisciplinary studies involving data synthesis, analysis and evaluation in the disciplines of land use, cultural resources and socioeconomics. She has done these multidisciplinary studies in Nevada, Colorado, Wyoming, North Dakota and British Columbia. In addition, Dr. Tate has been a professional biological editor and has extensive experience in literature surveying, analysis, summarization and evaluation. This experience plus frequent interaction with regulatory agency personnel, has enabled Dr. Tate to develop the depth of professional judgement necessary in an effective permit analysis.

More specific experience directly pertinent to this project involves projects in Utah and on the Western Slope of Colorado and frequent interaction with federal, state, and local agencies. Specific studies include:

- o Wildlife data analysis for Tosco in Uintah County, Utah
- o Multidisciplinary reconnaissance and fatal flaw study for Rocky Mountain Energy Company in Elbert County, Colorado.
- o Reconnaissance and baseline studies for A.T. Massey in LaPlata County, Colorado.
- o Multidisciplinary reconnaissance and an existing baseline data summary for ARCO Coal in Gunnison and Delta Counties.
- o Elk calving ground studies and fatal flaw analysis for AMCA in Routt County.
- o Wildlife baseline studies for AMAX in Gunnison County.
- o Multidisciplinary environmental assessment for ARCO Oil and Gas in Garfield County.
- o Third party EIS on Mobil Oil Corporation and Pacific Partners Oil shale projects in Garfield County.

Robert H. Ellis, Aquatic Biology - Dr. Ellis is a Senior Aquatic Biologist/ Project Manager with over 10 years experience in applied and theoretical fisheries studies. He has served as Project Manager or Task Leader on over 15 environmental impact and monitoring studies, and he has conducted numerous environmental assessments relating to hard rock mining shale oil development, electric generating facilities, hydroelectric projects, and right-of-way studies. His expertise includes baseline studies involving the distribution, ecology, and habitat requirements for benthic macroinverterate, periphyton, and fish species. Dr. Ellis had conducted numerous threatened and endangered species surveys throughout the Northwest. He has also conducted several instream flow studies to asses potential impacts of projects of fish habitat.

William R. Monnett, Supervisor/Air Quality & Meteorological Studies - Mr. Monnett is an air pollution meteorologist with extensive experience in the air quality evaluation of coal and related mining activities throughout the Rocky Mountain area. He has been responsible for over 25 studies of the air quality implications and permitting of coal mining facilities and has had extensive experience and interaction with State and Federal regulatory agencies. More specific to the Getty project, Mr. Monnett has directed several coal mine permitting and feasibility studies including the following projects:

- o UCO Inc, Scofield Mine
- o Hayden-Gulch Coal Company, Hayden Gulch West Mine

- Colowyo Coal Company, Colowyo Mine
- Dorchester Coal Company, Fruita Mine
- Snowmass Coal Company, Snowmass Mine
- Western Associated Coal Company, Cameo Mine
- Anchor Coal Company, Bear Mine
- Arco Coal Company (West Elli Coal) Mt. Gunnison #1 Mine
- Capstan Mining Company, Bacon Mine

4.0 RELEVANT PROJECT EXPERIENCE

BEAK has completed numerous environmental studies in the western US for coal mining developments. These projects have ranged from full multidisciplinary baseline studies to permit applications. Other studies have addressed specialized issues such as alluvial valley floors, reclamation, and erosion/sedimentation. These projects were conducted in regards to the OSM and appropriate state regulations. Some of BEAK's key project experience is summarized below. below.

Coal Mining

- AMAX Coal Company - Air Quality Modeling and Permit Analyses for a Surface Coal Mine in the Powder River Basin.
- AT Massey Coal Company - Reconnaissance and Permit Evaluation for Two Proposed Underground Coal Mines in Southwestern Colorado.
- Burlington Northern - Evaluation of Proposed Mining Area in Montana as Unsuitable For Mining.
- Burlington Northern - Environmental Reconnaissance and Fatal Flow Studies for Three Proposed Underground Coal Mines in Washington.
- Carter Mining Company - A Wildlife Study for Golden Eagles at a Coal Mine.
- Cordero Mining Company (SUNEDCO) - Hydrological Alluvial Valley Floor Study near Gillette, Wyoming.
- Dorchester Coal Company - Air Quality Modeling and Monitoring for a Proposed Underground Coal Mine near Fruita, Colorado.
- Energy Reserves Group - Permit Revisions for the Knight Mine in Utah.
- George McVehil - Air Quality Impact Assessment for a Surface Coal Mine in Wyoming.
- Hayden Gulch Coal Company - Analysis of On-site Dispersion Conditions and Air Quality Modeling for a Coal Mine near Hayden, Colorado.
- Kemmerer Coal Company - Meteorological and Air Quality Assessment for Two Surface Coal Mines in Western Wyoming.
- Norcen - A Feasibility Study for a Surface Coal Mine in Wyoming to Assess Required Environmental Studies in Regards to the WDEQ and OSM Regulations.
- Northern Energy Resources Company (NERCO) - Environmental Services for Surface Mines in Montana and Wyoming.

- Rocky Mountain Energy Company - Reconnaissance Studies for a Surface Lignite Mine in Eastern Colorado and for a Surface Coal Mine near Rawlins, Wyoming.

- San Juan Coal Company - Hydrology Studies for the La Plata Coal Project in San Juan County, New Mexico.

- Thunder Basin Coal Company - Air Quality Analyses for two Surface Coal Mine and Preparation Plant Facility in the Powder River Basin.

- UCO, Inc. - Air Quality Permit Application Preparation for an Underground Mine in Utah.

- Western Slope Carbon, Inc. - Environmental Services and Permit Application for an Underground Mine in Colorado.

CONSTANCE V. BRAUN

Project Manager/Reclamation Specialist

M.S. 1974, Utah State University, Ecology
B.S., 1971, University of Dayton, Ecology

Member: Colorado Mining Association

1981 to Date — Beak Consultants Incorporated, Project Manager, Reclamation Specialist. Ms. Braun has extensive experience in project management of large multidisciplinary environmental studies for oil shale, coal, uranium, and other mining projects in the Rocky Mountain states. Documents written and/or prepared by Ms. Braun include a third-party EIS, a third party review of a mining and reclamation plan, permit applications, reclamation programs, and environmental baseline reports.

1980-1981 — Envirosphere Company, Denver, Colorado, Project Manager, Reclamation Specialist. Ms. Braun's responsibilities included project management of multidisciplinary projects; supervision of a staff of terrestrial ecologists; design and implementation of revegetation programs for mining permit applications; and presentation of environmental reports and other license applications. Specific reclamation experience included:

- Preparation of expert testimony regarding postmining reclamation potential for a coal mine in Montana.
- Preparation of a reclamation plan for a surface coal mine near Beulah, North Dakota.

1974-1980 — NUS Corporation, Denver, Colorado, Project Manager. Ms. Braun's project management responsibilities included overall coordination of project activities with the client; integration and coordination of interdisciplinary tasks; management of budgetary aspects of contracts; and providing a liaison with applicable governmental agencies. Responsibilities included management of four energy-related projects which encompassed air quality/meteorology, hydrology, geology, soils/vegetation/wildlife, reclamation, and socioeconomic disciplines with a total budget in excess of one-half million dollars. Reclamation project experience included:

- Responsibility for the conduct and management of a three and one-half year revegetation experimental program for oil shale Tract C-a in western Colorado. Responsibilities included design of the experimental program; supervision of the construction of the experimental plots (earth moving seeding, mulching); monitoring the revegetation results; statistical analysis and interpretation; and preparation of reports.

- Supervision of revegetation activities for a plant site in western Colorado. Responsibilities included selection of contractor, preparation of specifications, and supervision of field activities.

- Prepared the reclamation plan for the Colorado Mined Land Reclamation (CMLR) permit for the preliminary phases of operations for Tract C-a.

- Conducted tours of the experimental plots at Tract C-a.

- Conducted greenhouse studies to determine soil potential to support specific plant species for a coal mine in Wyoming.

- Managed a third-party review of mine and reclamation plan for a uranium mine near Grants, New Mexico.

- Designed an experimental study for toxic wastes for a trona operation in western Wyoming.

- Supervised seeding operations on drill pads for an in-situ uranium project in southern Montana.

- Participated in the review of mining permit application submitted to OSM. Specific responsibilities included the review of reclamation plans.

- Prepared a CMLR permit, including reclamation plan, for a major open pit uranium mine, mill, and tailings, disposal site near Canyon City, Colorado.

ROBERT H. ELLIS

Senior Fisheries Biologist/Project Manager

Ph.D., 1972, The Pennsylvania State University, Zoology
M.S., 1967, Oregon State University, Fisheries Science
B.S., 1965, Oregon State University, Fisheries Science

Member: American Fisheries Society
North American Benthological Society
Pacific Estuarine Research Society
Phi Kappa Phi, Society of Sigma Xi

Publications: Dr. Ellis has published on the effects of pulpmill wastes on juvenile salmon growth, production dynamics and food relations; on long-term effects of oil pollution and has written and presented numerous technical papers on the potential impact of nuclear power plants and dredging operations on benthic community structure and food relations of fish.

1978 to Date — Beak Consultants Incorporated, Senior Fisheries Biologist/Project Manager. Dr. Ellis' experience in both fresh and saltwater environments and his strong background in applied and theoretical fisheries ecology makes him ideally suited for management of a broad spectrum of fishery studies. Since coming to BEAK, Dr. Ellis has been involved in assessment of the Northern Tier Pipeline permit application, assessment of impact of a proposed electric generating station on fishery resources and a survey of rare, threatened or endangered aquatic species. He is presently involved in a large fishery study to assess potential impacts of a coppor-molybdenum mine in east-central Washington.

1977-1978 — University of Oregon, Oregon Institute of Marine Biology, Charleston, Oregon, Research Associate. Responsible for the initial development of a research program in the newly established South Slough National Estuarine Sanctuary. The work involved grant preparation and research dealing with aspects of the carbon cycle in Pacific Northwest estuaries.

1973-1977 — State University College, Brockport, New York, Department of Biological Sciences, Associate Professor of Biology. Taught upper division and graduate courses in aquatic biology, invertebrate taxonomy, community and ecosystem processes and biometrics. Research activities included studies of the food habits, migrations and spawning activities of fish in Irondequoit Bay, New York and ecological studies of the New York State Barge Canal.

1971-1973 — Ichthyological Associates Inc., Pottstown, Pennsylvania, Senior Aquatic Ecologist. Responsible for designing, and directing a large preoperational macroinvertebrate sampling program for the proposed Limerick Nuclear Power Plant.

1967-1971 The Pennsylvania State University, Graduate Research Assistant. Doctoral research on the relationships between organic enrichment and the structure and dynamics of a benthic stream community.

1966-1967 Oregon State University, Graduate Research Assistant. Research on the effects of pulpmill wastes on the growth, production dynamics, and food relations of juvenile salmon.

VERNON E. KEYS

Senior Hydrogeologist

B.A., 1978 Geology
University of South Florida, Tampa, Florida

Member: National Water Well Association
Rocky Mountain Association of Geologists
Colorado Ground Water Association

1983 to Present — Beak Consultants Incorporated. Mr. Keys is responsible for supervision of BEAK's hydrology studies. He is presently conducting ground water studies for an underground gold mine in Washington.

1981 to 1983 — Wahler Associates, Staff Hydrogeologist. Field program design, field implementation, office analysis, project management, report and proposal writing and preparation, business development and client contact for geological and ground water investigations including design and installation of aquifer tests and ground water monitoring systems, aquifer test analysis and interpretation, coal resource evaluation, and geological mapping and interpretation. Ultimately responsible for all activities associated with three ground water monitoring projects over the last year and administered their combined 250K budgets. Major projects include:

- Templeton Gap Landfill - Design and implementation of a ground water and methane monitoring system.
- Phillips Coal-Delta Star, - Field investigations, office analysis and design of a dewatering control system for an open pit lignite mine in Mississippi.
- Sunedco Coal-Ferron Canyon, - Hydrogeological field investigation designed to comply with Utah Division of Oil, Gas, and Mining's (UDOG&M) Coal Mine Regulations. Included design, material selection, installation supervision, and development of five multiple completed (two aquifers) monitor wells to 1500 ft. depths and the characterization of the ground water regime at the Wasatch Plateau site.
- Cotter Corporation-Charlie Project, Office and field investigation for open-pit uranium mine permit application to be submitted to Wyoming Department of Environmental Quality (WDEQ).
- DeLamar Silver Mine - Supervised tailings dam abutment grouting operation.
- Cotter Canyon City Project - Hydrology Studies

1979-1981 Dames & Moore Company, Geologist. Supervised all phases of a ground water supply project in the Ohio River Valley; conducted hydrogeological investigations to define the effects of seepage losses from existing uranium tailings ponds and the extent of ground water contamination; principal investigator for a preliminary exploration and evaluation study of peat deposits for a potential boiler fuel source; coal resource evaluation in Northwestern Colorado and Southern Wyoming included data acquisition, coal correlation and preparation of detailed subsurface isopach and contour maps of individual coal beds.

1978-1979 Mobil Chemical Company, Exploration Geologist-Phosphorus Division. Graphically illustrated prospecting data, isopach and overburden contouring, and field surveying.

JEAN E. KIEL

Vegetation/Reclamation Specialist

M.S., 1979, Department of Botany and Plant Pathology, Colorado State University
B.S., 1976, Department of Botany and Plant Pathology, CSU

Disturbed lands revegetation and reclamation, soil microbiology soil fertility and genesis; micology.

Member: American Society of Agronomy
Soil Science Society of America
Colorado Native Plant Society

Publications: Berg, W.A., J. T. Herron, H. P. Harbert III, J. E. Kiel. 1979. Vegetation stabilization of Union Oil Company process B retorted oil shale 1975-1978. Colo. State University Expmnt. Stn. Tech. Bull. 135.

Kiel, Jean E. 1979. The effects of soil phosphorus on growth and endomycorrhizal development in plant species native to Colorado's oil shale region. In Oil Shale Symposium: Sampling, analysis and quality assurance, March 1979 proceedings. p. 555-565. EPA-600/980-022.

Reeves, F. B., T. Moorman, D. Wagner, and J. Kiel. 1979. The role of endomycorrhizae in revegetation practices in the semi-arid west. I. A comparison of incidence of mycorrhizae in severely disturbed vs. natural environments. Amer. J. of Botany. 66:6-18.

1981 to Date — Ms. Kiel brings to BEAK extensive experience in vegetation and soils related to mining projects, including oil shale baseline studies for Exxon and Union Oil in western Colorado.

1979-1980 — Earth Sciences and Reclamation Group Leader/Program Coordinator, Stearns-Roger Engineering Corporation.

- Responsible for supervision and coordination of Earth Sciences and Reclamation staff in geologic, hydrogeologic, soil survey, and reclamation programs. Also involved in project management on multidisciplinary project studies.
- Involved in soil and reclamation studies in Colorado, Wyoming, Montana, New Mexico, and West Virginia.
- Developed and supervised soil baseline programs for the proposed SRC-II coal liquefaction plant in Morgantown, W. VA. and for Exxon's West Willow oil shale project in Rio Blanco County, Colorado.
- Participated in and provided technical assistance for the Colorado Mined Land Reclamation (MLR) permitting phase of the Union Oil Prototype oil shale operation (1979) and the Colony Development oil shale operation (1980).

- o Carried reclamation planning through the MLR permitting phase for a central Colorado uranium mine; presently supervising reclamation implementation on this mine.

- o Presently developing reclamation plan for a large coal mine in Campbell County, Wyoming.

1977-1978 Graduate Research Assistant, Colorado State University

- o Member of a multidisciplinary team of Colorado State University researchers and graduate students conducting a large-scale oil shale reclamation study.

- o Designed and implemented research project aimed at identifying growth differences in mycorrhizal and nonmycorrhizal native plant species.

- o Jointly conducted plant survey to determine mycorrhizal condition of native, introduced and colonizing plants in Piceance Basin region of Colorado.

- o Taught and prepped mycology and general botany laboratories at Colorado State University

1976-1977 Reclamation Botanist, Union Oil Company of California.

- o Monitored soil moisture and salinity as well as plant growth and survival on experimental retorted shale revegetation plots.

- o Planned and completed revegetation of several core-drilling sites.

- o Analyzed and sampled vegetation inside and outside of rangeland enclosures.

- o Conducted tours of the experimental plots and the surrounding areas.

- o Wrote progress report for Union Oil Company; coordinated physical, chemical and meteorological data with vegetation analysis data.

1975 Supervisory Laboratory Assistant, RAPIC (Rapid Access Plant Information Center) of Colorado.

- o Collected information for insertion into data bank

- o Ran queries through data bank.

- o Plotted plant distributions throughout the state of Colorado.

WILLIAM R. MONNETT, JR.

Supervisor/Air Quality & Meteorological Services

B.S. 1976. Purdue University, Atmospheric Sciences

Member: American Meteorological Society
Secretary - Denver Chapter, 1979-1980
Air Pollution Control Association

Publications: Mr. Monnett has prepared over 50 technical reports related to ambient air quality assessments for industry.

1981 Beak Consultants Incorporated, Air Quality/Meteorology Supervisor. Mr. Monnett brings to BEAK a high level of knowledge of applied air pollution modeling techniques, boundary layer meteorology and environmental regulations with respect to oil shale, coal and hardrock mining. He has managed professionals in the areas of ambient air impact assessments, applied meteorology and preparation of PSD and NSR applications for industry.

1980 - 1981 Camp Dresser & McKee, Inc., Environmental Planning and Sciences Division, Midwest Regional Office, Senior Meteorologist, Milwaukee. Mr. Monnett was responsible for technical services for air quality and meteorological services in the regional office of a major environmental engineering and sciences firm. He managed air quality programs (Environmental Reports, PSD and NSR applications) for a variety of industries including utilities, sludge incineration and indirect source (transportation) assessments. Mr. Monnett was also involved in ambient noise monitoring and assessment programs.

1979 - 1981 Gibbs & Hill, Inc., Manager of Air Resources, Western Operations, Denver. Mr. Monnett was responsible for the overall development and technical supervison of an air quality consulting group of a major engineering firm. Mr. Monnett developed and supplied air quality and meteorological services to mining, milling, and petrochemical clients.

1978 - 1979 Camp Dresser & McKee, Inc., Environmental Sciences Division, Atmospheric Scientist/Project Manager, Wheat Ridge, Colorado. Mr. Monnett was responsible for air quality/meteorological analyses and dispersion modeling studies. He was responsible for the supervision and direction of project-assigned scientists and technicians. Atmospheric studies included site selection, data collection and analysis, emission inventory development, dispersion modeling, and extensive report and proposal writing. Performed various air quality impact assessments (PSD, NSR, Attainment/Emission Offsets) for clients including mining, milling, oil shale, petroleum refining, and municipal sludge management districts.

1976 - 1978 Indiana State Board of Health, Air Pollution Control Division, Division Meteorologist, Indianapolis. Mr. Monnett was responsible for all phases of air quality dispersion modeling and meteorological studies. He was also responsible for the computerized air quality data handling system (SAROAD) and for PSD, NSR, and EO review. Mr. Monnett was involved in regional modeling analyses in support of nonattainment and State Implementation Plan revisions. He authorized the locations and extent of private air quality and meteorological monitoring networks.

JOSEPH L. REED

Ground Water Geologist

B.S., 1982, Indiana University - Bloomington, Geology

1983 to Present — Beak Consultants Incorporated. Mr. Reed has been involved in a surface water monitoring program for a mining project in northwest Colorado. He has been responsible for monthly water quality sampling and maintenance of the surface water monitoring stations. Mr. Reed has also assisted in packer testing and piezometer installation for a project in northern Saskatchewan.

1980 to 1983 — Leonard Rice Consulting Water Engineers, Inc., Groundwater Geologist/Technician. Mr. Reed was engaged in ground water investigations involving water rights, ground water-surface water relationships, aquifer analysis and water well evaluations for private land owners, municipalities, and land development companies. He was responsible for planning, conducting and interpreting aquifer tests and for conducting and maintaining several ground water monitoring programs for mining operations. He also obtained and interpreted well records and diversion records for water rights analysis. Mr. Reed also was involved with well completion and development, water sampling and stream gauging for a monitoring program related to a coal mine operation.

- Proposed Gravel Quarry

  Responsible for planning, conducting and interpreting aquifer tests and for developing and maintaining a ground water monitoring program.

- White Rocks Gravel Quarry

  Responsible for maintaining a ground and surface water monitoring program and preparing an annual report.

- Aquifer Tests

  - Purgatory Ski Area
  - Alluvial wells near Parker, Co.,
  - Municipal well, Broomfield

  Responsible for planning, conducting and data analysis of aquifer tests.

- City of Lakewood

  Inventory of city water rights and evaluation of ditches servicing the area and their current and potential use. Present use and source of water on city land and future use and source of water on proposed city developments.

- o City of Rawlins, Wyoming

  Evaluation of present and future water resources. Evaluation of obtaining H_2O from deep aquifers.

- o Salinity Investigations of Colorado River

  Water rights tabulation and straight line diagram of Colorado river water rights from Potsero to Colorado-Utah border

- o Well evaluations - Denver Basin

  Responsible for determining possible well yields and legal availability of water for wells in the Denver Basin

1979 to 1980 WATEC, Inc. Geologist/Technician. Mr. Reed was responsible for surface and ground water sample collection, coal mine water sample collection, steam gauging, aquifer testing, and well completion and development in connection with a coal mine monitoring program.

- o Coal Mine - Meeker Colorado

  Completion of monitoring wells and maintain ground and surface water monitoring program.

1978 to 1979 Indiana Geological Survey, Bloomington, Indiana, Preparator. Mr. Reed was responsible for taking physical testing and preparation of core samples for a DOE - New Albany Shale Project.

- o New Albany Oil Shale Project

  Responsible for retrival of oriented core samples, physical testing of core sampling and preparing samples for trace element analysis.d

1975 to 1976 Alaskan Resource Science Corporation, Field Engineer. Mr. Reed was responsible for logging soils, determining embedment depth of vertical support members, and other minor engineering duties for the Trans Alaska Pipeline Project.

- o Trans Alaskan Pipeline Project

  Responsbile for logging soils and then determining embedment depth of vertical support members.

LANDY A. STINNETT
Professional Mining Engineer and Geologist

1658 Cole Blvd., Suite 180
Golden, Colorado 80401
(303) 234-0500

Independent Consultant, 1979 to present: Performed engineering and management related assignments covering reserve estimation, mine layout and planning, and economic feasibility. Conducted risk analysis of contracts and new ventures; completed minerals searches and developed mine budgets and schedules. Served as expert witness in legal proceedings. Organized and managed projects of varying complexity working in conjunction with client staff.

NUS Corporation, Denver, Colorado, General Manager, Robinson & Robinson Division, 1975-1979: Directed activities of offices in Denver, Houston, and Charleston, West Virginia to provide consulting services in the areas of exploration, feasibility studies, property appraisals and mine engineering. Developed mine production cost models, conducted mine planning for both surface and underground operations, performed subsidence analyses and identified approaches to mine closure, designed engineering audits for production monitoring, reviewed contracts, and supervised collateral inspection programs.

El Paso Natural Gas Company, El Paso, Texas, Manager-Resources, Synfuels Division, 1971-1975: Initiated company's coal and lignite exploration and reserve evaluation work. Developed and directed group engaged in exploration, evaluation and mine development engineering of coal properties, both surface and underground; coordinated engineering studies related to coal and synthetic gas supplies including mining operations, gasification complexes, and transportation systems; and performed general corporate planning regarding future energy supply and demand.

Freeport Minerals Company, New Orleans, Louisiana, Mining Engineer, 1967-1971: Conducted mineral property examination and evaluation, geological interpretation of aerial photos; supervision of prospect drilling programs, determination of ore tonnages and grade; geochemical prospecting programs; and analyses of ground subsidence and mining efficiency.

University of Minnesota, Minneapolis, Minnesota, Editorial Assistant for Surface Mining, 1966-1967: Participated in preparation of a major American Institute of Mining, Metallurgical and Petroleum Engineers textbook.

Climax Molybdenum Company, Climax, Colorado, Industrial Engineer, 1964-1966: Responsible for optimum opening configuration and support of underground crusher complex; analysis of ground conditions using computers; testing and evaluation of methods and equipment; economic justification reports and research in presplit blasting for ore cutoff control.

Earlier experience included oil and gas exploration, highway engineering, claim staking and mine labor.

EDUCATION

University of Minnesota, M.S., Mining Engineering, (Eng. Mgt. Option), 1967
South Dakota School of Mines, M.S., Geological Engineering, 1963
South Dakota School of Mines, B.S., Geological Engineering, 1959

PROFESSIONAL REGISTRATION

Professional Engineer, Colorado, Louisiana, West Virginia
Professional Geologist, Idaho

PUBLICATIONS AND REPORTS

"Availability of Potential Coal Supply through 1985 by Quality Characteristics", August, 1976, NTIS PB-256-680.

"Uranium Procurement Strategy," Nuclear Fuel Management Workshop, NUS Corporation, October, 1976.

"Coal Mining Cost Models - Surface Mines," February 1977, Electric Power Research Institute, EPRI EA-437.

"Hazardous Surface Openings to Abandoned Underground Mines, Black Hills National Forest," September 1979, U.S. Bureau of Mines, OFR 74-80.

"Uranium Supply Analysis System - Mining Model," December 1979, prepared for Bendix Field Engineering Corporation/Department of Energy, GJO.

"Preliminary Economic Evaluation of Coal Mine Feasibility," in Computer Methods for the 80's in the Mineral Industry, American Institute of Mining, Metallurgical & Petroleum Engineers, New York, New York, 1979.

"Economics of Backfilling Mine Cuts," in Manual for Planning and Management of Mine-Cut Lakes at Surface Coal Mines, U.S. Department of Interior, Office of Surface Mining, 1981.

"Resource Requirements and Environmental Economics of Coal Conversion", (with Charles Beasley) March 1983, AIME Annual Meeting, Atlanta, Georgia.

Personnel Qualifications

LANDY A. STINNETT

Mr. Stinnett is exceptionally qualified to direct and perform mine hazard evaluations. Recent experience which is directly relevant to this subject includes the following:

1. During 1981-1982 Mr. Stinnett was project leader under contract to the federal Office of Surface Mining to accomplish data collection for the National Abandoned Mine Lands Inventory in South Dakota. A complete survey of the public health, safety, and general welfare problems associated with past coal mining was conducted in all the coal producing areas of the state, and estimates were made for the cost of reclamation at each site visited. As a training exercise in preparation for the survey, the Marshall, Colorado mining area was analyzed and reported on under the direction of OSM team members. Contacts for the South Dakota project were:

Jerry White Office of Surface Mining 1020 15th Street, Brooks Tower Denver, Colorado 80202 (303) 837-5918	Charles Tanner Lockheed Missiles & Space Co. 800 Oak Ridge Turnpike Oak Ridge, Tennessee 37830 (615) 482-6200

2. Mr. Stinnett participated as a subcontractor to the Office of Surface Mining in 1980-1981 to develop a handbook usable by mine operators and OSM personnel, and which would serve as a national guideline in the design of final cut impoundments created upon cessation of surface mining. Mr. Stinnett's contribution was in estimating comparative

costs of alternative schemes for earthmoving and overburden replacement that would avoid creation of unneeded or undesirable end-cut impoundments. Feasible alternatives depended upon the type of terrain, underlying coal seam orientation, ground water elevation and other variables. The handbook was published by OSM as "Manual for Planning and Management of Mine-Cut Lakes at Surface Coal Mines" in 1981. Primary contact for the project was:

Robert Glazier
Office of Surface Mining
Federal Building, U. S. Courthouse
46 E. Ohio Street
Indianapolis, Indiana 46204
(317) 269-2600

3. In 1979 Mr. Stinnett was project manager under contract to the U. S. Bureau of Mines to locate and assess the hazard potential of nearly 400 surface and underground mines in the Black Hills National Forest in South Dakota. Activities included examining a representative sample of abandoned mine openings, identifying and assessing those mines which constituted a public hazard, designing low-cost protection for eliminating the hazard, analyzing the laws and regulations pertaining to hazard elimination, and discussing jurisdictional and enforcement problems. Study results have been published as "Hazardous Surface Openings to Abandoned Underground Mines, Black Hills National Forest," USBM OFR 74-80, 1980, vol. 1-3, 843 p. Primary contact for the project was:

Richard Oitto
U. S. Bureau of Mines
Federal Center
Denver, Colorado 80225
(303) 234-3918

4. The most recent analysis of subsidence which Mr. Stinnett performed as a consulting engineer was for Utah Power & Light Company's Deer Creek Mine in Utah. This is a 2,000,000 ton/year, multiple seam operation which has a 345 KV power line and other utilities traversing the ground surface over the future mining area. Based on the mine layout, depth, overburden characteristics, and projected coal recoveries, a prediction was postulated for the expected subsidence in the various areas of the mine, the induced radius of surface curvature and slope caused by mining, the intersection of break angles and the ground surface within the transmission corridor, and the maximum displacement along subsidence fractures. Contact person on this project was:

Merrill Heward
Utah Power & Light Co.
Box 899
Salt Lake City, Utah 84110
(801) 535-2000

JEAN TATE

Terrestrial Ecologist

Ph.D., 1973, University of Nebraska, Zoology
M.S., 1966, University of Nebraska, Zoology
B.S., 1964, Northern Illinois University, Biology

Member: Phi Sigma, Sigma Zeta, Sigma XI, Sigma Delta Epsilon
American Ornithologists' Union
Trumpeter Swan Society

Publications: Dr. Tate has published several articles in scientific journals on various aspects of ornithology, including distribution, morphological variation, ontogeny, habitat usage, and interactions of bird and man.

1974 to Date — Dr. Tate has been an environmental consultant in recent years. She has worked in Colorado, Wyoming, Nevada, Illinois and Alaska on sites for potential underground and surface coal mines, surface and in situ uranium mines, and surface and underground heavy metal mines. Field work has included assessing mine-wildlife conflicts for elk, Mule Deer, raptors, and other wildlife species; preliminary and full scale baseline studies for wildlife, including amphibians, reptiles, birds, and mammals; and vegetation assessment. Dr. Tate has conducted extensive resource data surveys including literature review and resource personnel surveys which have encompassed all aspects of the environment. Field work and resource data surveys together with mine plans have provided a base for he rimpact analysis. She has made major contributions to route selection studies and environmental assessments. Dr. Tate has frequently had a major role in final report preparation and editing in her own and other disciplines. During the past several years she has worked for the following companies: AMCA Resources, Inc.; Amselco Minerals, Inc.; Atlantic Richfield Company; Carter Mining Company; Ecology Consultants, Inc.; Federal-American Partners; A.T. Massey Coal Company; Noranda Exploration, Inc.; Nuclear Assurance Corporation; Rocky Mountain Energy Company; Tenneco Oil; and the U.S. Army Corps of Engineers.

1973 — Journal of Wildlife Management. Dr. Tate served as an editorial assistant during the year.

1970-1972 — Cornell Laboratory of Ornithology. Dr. Tate participated in the Nest Record Card Program as a coding editor.

1969-1970 — State University of New York College, Cortland. Dr. Tate served as an assistant professor at the University.