THE FACULTY SENATE

August 14, 1997

Dr. Ray M. Bowen
President
Texas A&M University

Dear President Bowen:

At its regular meeting held August 11, 1997 the Faculty Senate considered and approved the following proposal from the University Curriculum Committee:

Substantive Degree Program Request — New Degree Program:
Department of Geology and Geophysics for a change in the B.A. in Geology.

Enclosed is the information considered by the Senate. Please inform me of your decision on this recommendation.

Sincerely yours,

Wayne E. Wylie
Speaker, 1997-98

Enclosure

pc:  Dr. Ronald G. Douglas, Executive Vice President & Provost
     Dr. R. Bruce Simpson, Chair, Curriculum Committee
     Ms. Linda F. Lacey, Director of Academic Support Services

bcc: Ms. Susan Ambrose

APPROVED

DATE

9/1/97
Report of the University Curriculum Committee
July 11, 1997

The University Curriculum Committee recommends approval of the following:

Substantive Degree Program Request

*New Degree Program*
- B.A. in Geology
- Department of Geology and Geophysics
TITLE PAGE FOR SUBSTANTIVE REQUESTS

NAME OF INSTITUTION  Texas A&M University

NAME OF PROPOSED PROGRAM: Bachelor of Arts in Geology

Display how proposed program(s) would appear on the Coordinating Board program inventory; include Texas CIP code designation(s).

Geology 40.0601.0002

How would name(s) of program(s) appear on student diplomas?

Bachelor of Arts in Geology

How would name(s) of program(s) appear on student transcripts?

B.A. in Geology

Administrative unit(s) responsible for the program(s):

Department of Geology and Geophysics

Proposed date for implementation of program: Fall 1998

Person to be contacted for further information about proposed program(s):

Name: David V. Wiltschko  Title: Professor

Phone: (409) 845-9680  FAX: (409) 845-3002

Signatures:

Campus Chief Executive Officer  Date

System Chief Executive Officer  Date

System Chief Executive Officer (As appropriate)

Governing Board approval date:
EXECUTIVE SUMMARY
B.A. in Geology (GEOL)

Overview - The BA degree in Geology would provide those students who have an interest in earth science yet wish to pursue careers in journalism, business, law, medicine, planning, education and other fields a route to that goal. The degree would integrate well with the BS in the Department of Geology and Geophysics and require no new resources. The proposed degree would mirror other BA programs at Texas A&M (Biology, Chemistry, Mathematics and Physics) and would remove Texas A&M from the short list of 4-year institutions in Texas that do not offer this flexibility to its students.

Program Needs - Oil and gas will continue to be an important industry in Texas requiring appropriately trained individuals to fill a variety of roles. Also, in the important areas of environmental health and law, land use planning and science reporting, an earth science degree (with appropriate minors in political science, biology, chemistry, planning, journalism and the like) would form a substantive base on which to knowledgeably address and communicate public policy issues.

Prospective Student Demand - In a recent survey we conducted in our introductory course (GEOL 101), over 20% expressed an interest in this degree. A similar rate of interest is being reported to our Department academic advisors. Without this degree, there is no way that these students can achieve a broad base in earth science yet at the same time prepare for a career in science writing, management, law and health.

Job Market - Although there will always be a need for professionals with specialized technical knowledge, there has been an increasing demand for individuals with a broad-based understanding of the earth and human interaction with it. Government agencies such as the U. S. Geological Survey, Forest Service, Bureau of Land Management and Park Service are managing their resources with a broader 'interdisciplinary' perspective and as a result are hiring people with a broad background. There is a continuing need for business and law professionals with a knowledge of the earth sciences to work in this industry. The job outlook for graduates of this program is bright.

Estimated Enrollment - We estimate 20 students the first year and 110 by the fifth year.

New Resources Needed - None
I. PROGRAM ADMINISTRATION

A. Describe how the program would be administered.
   The BA program in Geology (GEOL) will be administered by the Assistant
   Department Head, Dr. Andrew Hajash, reporting to the Head of the Department of
   Geology and Geophysics, Dr. Philip Rabinowitz.

   1. Indicate name and title of person(s) who would be responsible for curriculum
      development and on-going review.
      Dr. Andrew Hajash, Assistant Department Head, Department of Geology and
      Geophysics.

   2. Describe responsibilities for student advisement and supervision.
      The Assistant Department head works with four undergraduate advisors, one
      for each year. The advisor positions rotate among those faculty of the Department
      who have degrees in geology.

   3. If the program would be administered by more than one administrative unit,
      what factors make this desirable?
      The program is administered only by the Department of Geology and
      Geophysics.

II. PROGRAM DESCRIPTION

A. Educational Objectives

   Graduates of this program will be prepared to pursue careers in environmental and
   resource law, business management, planning and medicine, science writing, and
   others where a general background in geology and related sciences is an asset.

B. Admission Standards

   The requirements for admission to this program are the same as entry into Texas
   A&M University.

C. Degree requirements

   In Appendix I, please find the curriculum for this proposed degree program.

   1. In tabular form, indicate the semester credit hour (SCH) requirements in
      each of the following categories applicable to the proposed program; include
      the total SCH requirement for the degree:

      a. Foundation Courses                     46 SCH
      b. Required Courses                      36 SCH
      c. Prescribed electives*                 35 SCH
      d. Free electives                       7 SCH  
      e. KINE 199                               4 SCH
         TOTAL                                 128 SCH
      *Includes required Minor

   2. Identify and describe special requirements for the program, e.g., clinicals,
      field experience, internship, practicum, thesis, etc.
The BA degree would require a minor in another field chosen by the student. If a minor is not offered by the other department, then, upon approval of the student’s Departmental advisor, a secondary area of emphasis will be substituted for the Minor.

D. Curriculum

1. Identify by prefix, number, title, and description (including prerequisites) courses to be required or elected in the proposed program.

   See Appendix II for the list of courses offered as part of the proposal degree program.

2. If the program design includes multiple curricula (concentrations, emphases, options, specializations, tracks, etc.), identify courses unique to each alternative.

   No multiple curricula are involved with the propose program.

3. Provide a semester-by-semester projection for offering of the required and prescribed courses during the first 5 years.

   Please see Appendix III for a semester-by-semester projection for offering of the required and prescribed courses. These are the same as our current BS program.

E. Supporting Fields

1. Identify existing degree programs and non-degree supporting fields that would complement the proposed program; describe the relationship of each to the proposed program.

   The other parallel course in the Department of Geology and Geophysics is the BS degree in Geology. What follows are two comparisons between the proposed BA and our existing BS degrees. First is an aggregate comparison by subject area. The second is a semester-by-semester comparison.
1. Comparison by Subject Area

<table>
<thead>
<tr>
<th>Totals (hours):</th>
<th>Proposed BA</th>
<th>Existing BS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Physics</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Mathematics</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>Geology</td>
<td>27</td>
<td>47</td>
</tr>
<tr>
<td>Geology electives</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Tech electives</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Courses in a Minor</td>
<td>15</td>
<td>--</td>
</tr>
<tr>
<td>Free electives</td>
<td>7</td>
<td>--</td>
</tr>
<tr>
<td>TOTAL (includes core)</td>
<td>128</td>
<td>129</td>
</tr>
</tbody>
</table>

2. Semester-by-Semester Differences Between Proposed BA and existing BS Degrees

<table>
<thead>
<tr>
<th>Semester</th>
<th>Delete</th>
<th>Add</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman, 1st</td>
<td>Math 151</td>
<td>Math 166</td>
</tr>
<tr>
<td>Freshman, 2nd</td>
<td>Math 152 computer science</td>
<td>Math 131</td>
</tr>
<tr>
<td></td>
<td>course</td>
<td></td>
</tr>
<tr>
<td>Sophomore, 1st</td>
<td>Math 251</td>
<td>Minor elective, Physics 201</td>
</tr>
<tr>
<td></td>
<td>Physics 218</td>
<td></td>
</tr>
<tr>
<td>Sophomore, 2nd</td>
<td>Math 308</td>
<td>Minor elective, Physics 202,</td>
</tr>
<tr>
<td></td>
<td>Physics 219</td>
<td></td>
</tr>
<tr>
<td>Junior, 1st</td>
<td>GEOL 304, GEOP 435</td>
<td>GEOL elective, Tech elective,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minor elective</td>
</tr>
<tr>
<td>Junior, 2nd</td>
<td>GEOL 305, GEOL 451</td>
<td>2 GEOL electives, Tech elective</td>
</tr>
<tr>
<td>Summer</td>
<td>GEOL 300</td>
<td>GEOL 330</td>
</tr>
<tr>
<td>Senior, 1st</td>
<td>GEOL elective</td>
<td>Minor elective, Free elective</td>
</tr>
<tr>
<td>Senior, 2nd</td>
<td>2 Tech electives</td>
<td>Minor elective, Free elective</td>
</tr>
</tbody>
</table>

2. If the existing programs or supporting fields would require updating or expansion because of the new program, explain how and why.

These programs do not required updating.

F. Effect on Existing Programs
1. Describe how existing courses would be affected by enrollments generated in the proposed program, including, but not limited to, the potential need for additional sections or increased class sizes, faculty, library resources, equipment, supplies, and/or space.

We anticipate minimal impact on existing programs. Space, equipment and supplies are adequate to accommodate the proposed program because they are already required for the existing BS program. The faculty will be teaching the same courses anyway as part of the BS program. For the same reason, no new GANT/GATs will be required unless the program grows beyond our anticipated enrollment.

G. Accreditation

1. If there is a professional program accreditation procedure in this field, attach current standards.

There is no professional accreditation in this area.

III. EVALUATION

A. Describe procedures for evaluation of the program and its effectiveness in the first five years of the program, including admission and retention rates, program outcomes assessments, placement of graduates, changes of job market need/demand, ex-student/graduate survey, or other procedures. How would evaluations be carried out?

The Assistant Department Head will convene annual meetings of the undergraduate advisors who are actively involved in student advising. At this meeting concerns regarding continued applicability of courses, appropriateness of prerequisites, etc. will be discussed. As is done for BS graduates, graduates of the BA program will be monitored. Initially, we will seek employment information such as where, with whom, and in what capacity. Three or four years post graduation, graduates will be asked to evaluate the curriculum with respect to their particular employment history.

IV. PROGRAM NEED/DEMAND

A. Identify similar programs at Texas public and independent universities

Surprisingly, Texas A&M is one of the last 4-year institutions with a Geology department to implement a BA program. BA degrees are offered at A&M Corpus Christi and Kingsville, UT Austin, Dallas and Arlington, SMU, Baylor, Rice, Texas Tech, TCU and the University of Houston, among others. We would like to offer the same flexibility to our students.

B. Describe justification for the proposed program in terms of the following, as applicable:

1. Local, regional, state, national, and international needs.

Although there will always be a need for professionals with specialized technical knowledge, there has been an increasing demand for individuals with a broad-based understanding of the earth and human interaction with it. Government agencies such as the U. S. Geological Survey, Forest Service, Bureau of Land
Management, Park Service are managing their resources with a broader
‘interdisciplinary’ perspective and as a result are hiring people with a broad
background. Oil and gas will continue to be an important industry in Texas. There
is a continuing need for business and law professionals with a knowledge of the
earth sciences to work in this industry. Also, in the important areas of
environmental health and law, land use planning and science reporting, an earth
science degree (with appropriate minors in political science, biology, chemistry,
planning, journalism and the like) forms a substantive base on which to
knowledgeably address and communicate public policy issues.

2. The long-range academic plan of the institution.

In a recent University-wide strategic planning process, the College of
Geosciences and Maritime Studies declared its intention to add a BA degree in
Geology as a way to serve students wishing a broad earth science background
coupled with a minor in another field. This initiative has the support of the College
administration.

3. Demand from prospective students.

We conducted a survey of students in GEOL 101 during Spring semester,
1997. These students state that as a group they are presently considering business,
journalism, elementary education, political science and law among others, as
majors. Of the 238 respondents, 56 or 23% expressed interest in the BA program.
Our undergraduate advisors are also receiving enthusiastic interest from students
who have yet to choose a major. It is difficult to translate the enthusiasm of these
students for the proposed BA program into numbers, but we view the enrollment
numbers we give below as conservative. We also expect new freshmen, transfer
students, change of major and other students to take up this program.

4. Job market needs.

The demand for broadly trained individuals in the earth sciences is exemplified
by recent job postings with various government agencies, oil companies and
environmental firms. A sampling of these advertisements is attached as Appendix
IV. All of these jobs require a degree in science. Others require additional
graduate/professional work (MBA, Law). The unifying theme is an underlying
broad knowledge of the earth sciences. See B1, above.

5. Educational and cultural needs of the community.

Concerns about resource availability, use and proper disposal, land use
planning for natural disasters and environmental hazards are almost daily topics in
the news, corporate boardrooms and regulatory and municipal agencies. There is
and will continue to be a need for individuals with a basic understanding of both
how the earth works and how society interacts with it to properly meet both long-
range planning and educational needs of society.

V. PROGRAM POTENTIAL

A. Estimate the cumulative headcount and full time equivalent (FTE)
    enrollment for each of the first 5 years (majors only, considering
    expected attrition and graduation) and indicate the number expected to
    be new to the institution each year.
Total Enrollment - First Five Years

Year 1 = 20  
Year 2 = 45  
Year 3 = 70  
Year 4 = 90  
Year 5 = 110

B. Explain assumptions used in making these estimates.

As mentioned previously, these numbers are based on, 1) a survey of students enrolled in GEOL 101 during Spring, 1997 and, 2) response of students who approached our undergraduate advisors; the students were questioned about their interest in this proposed program and many responded enthusiastically.

VI. RESOURCES

A. Personnel

1. Describe any personnel additions or changes in the past three years made in anticipation of the program.

No personnel have been added. Current faculty already teach the courses which are part of the BA program, because they are the same as the BS.

2. Indicate for the first five years the cumulative number of FTE personnel who would be involved in delivery of the program.

Note that these are the current faculty, GAT/GANT and support staff in the Department of Geology and Geophysics. We will be able to handle the BA program with current resources. Year 1 is 1998-1999.

<table>
<thead>
<tr>
<th>Year</th>
<th>ADMIN FTE</th>
<th>FULL-TIME FTE</th>
<th>PART-TIME FTE</th>
<th>GAT/GANT FTE</th>
<th>SUPPORT STAFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5</td>
<td>30.0</td>
<td>0.0</td>
<td>22.5</td>
<td>4.0</td>
</tr>
<tr>
<td>2</td>
<td>0.5</td>
<td>30.0</td>
<td>0.0</td>
<td>22.5</td>
<td>4.0</td>
</tr>
<tr>
<td>3</td>
<td>0.5</td>
<td>30.0</td>
<td>0.0</td>
<td>22.5</td>
<td>4.0</td>
</tr>
<tr>
<td>4</td>
<td>0.5</td>
<td>30.0</td>
<td>0.0</td>
<td>22.5</td>
<td>4.0</td>
</tr>
<tr>
<td>5</td>
<td>0.5</td>
<td>30.0</td>
<td>0.0</td>
<td>22.5</td>
<td>4.0</td>
</tr>
</tbody>
</table>

3. List current faculty members, indicating highest earned degree/institution, field of study, current teaching and research assignments, dates of appointment, and anticipated contribution to the program. Specify course(s) each faculty member would teach.


Anticipated contribution: GEOP 489


Anticipated contribution: GEOL 101, 305.


4. If current faculty would be teaching new courses, how would their teaching assignments change, and how would their current assignments be accommodated?

There will be no change in teaching assignments because no new courses are required.

5. List all new positions required during the first five years of the program and indicate whether the positions would be additions or reassignments. If reassignment, indicate the source.

No new positions are required.

B. Library
1. List any library holdings added in the past three years in anticipation of the program.

None have been added. Because we have graduate programs in both geology and geophysics (MSc, PhD), the library has adequate resources for the proposed BA degree.

2. Describe library holdings specifically relevant to the proposed program, noting strengths and weaknesses. If there are guidelines for the discipline, do current holdings meet or exceed standards? Describe planned actions that would maintain strengths and/or remedy weaknesses.

We have extensive holdings in geology and geophysics. See VI B1, above. No weaknesses exist and in the course of maintaining our holdings for the graduate and existing BS degrees, none will develop assuming continued funding for acquisitions.

3. Describe cooperative library arrangements that would be available to students in this program.

There is no anticipated need for specialized cooperative library arrangements for this program. However, TAMU faculty and students have access to other library holdings through existing interlibrary loan services.

4. Provide library director's assessment of library resources necessary for the proposed program.

See Appendix V

C. Equipment

1. List any equipment acquired in the past three years in anticipation of the program.

No equipment was purchased in the past three years because the equipment exists in the BS program to conduct the proposed BA program.

2. Itemize expenditures projected during each of the first 5 years for equipment and supplies specifically for the proposed program.

No specialized major additional equipment will be required to offer this degree beyond that which is already in use for our BS degree.

D. Facilities

1. Describe any facility added or modified in the past three years in anticipation of the program.

No new facilities are necessary.

2. Describe the availability and adequacy of existing facilities that would be used for the proposed program.
The Department of Geology and Geophysics is housed in the M. T. Halbouty Geoscience building. This building has adequate lecture and teaching laboratory space to accommodate the modest increases in enrollment we anticipate in the new BA program.

3. Describe planned alteration or renovation of existing facilities needed for the program; estimate date of availability and display estimated cost in Item VII.

No renovation or alterations are required.

4. Describe planned new facilities needed for the program; estimate date of availability and display estimated cost in Item VII.

No new facilities will be needed.

VII. COSTS

On the attached form, provide estimates of new costs to the institution related to the proposed program(s) and provide information regarding sources of the funding that would defray those costs.

The Costs of Program form was not completed because there are no new costs for this program to TAMU. Cost to the state would be the increased SCH for students in this program in years 3, 4 and 5.

VIII. ADDITIONAL COMMENTS THAT WOULD BE HELPFUL TO THE COORDINATING BOARD IN EVALUATING THIS PROGRAM REQUEST.

In summary, this degree will provide students interested in earth science but at the same time wishing to pursue careers in journalism, business, law, medicine, planning, education and other fields a route to that goal. There will be no significant cost to Texas A&M University in that the facilities and personnel are already in place for the existing BS program. The increase in student numbers can be accommodated s part of the normal operations of the Department. This proposed degree would offer students at Texas A&M the same career flexibility available to nearly every other public and private 4-year institution in the state. In addition, it will mirror BA programs in Mathematics, Physics, Chemistry and Biology and Texas A&M.
### APPENDIX I.

#### B.A. Degree in GEOLOGY

**Freshman Year**

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>(Th-Pr)</th>
<th>Cr</th>
<th>Spring Semester</th>
<th>(Tr-Pr)</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101 Fund. of Chemistry I</td>
<td>(3-3)</td>
<td>4</td>
<td>CHEM 102 Fund. of Chemistry II</td>
<td>(3-3)</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 104 Comp. &amp; Rhetoric</td>
<td>(3-0)</td>
<td>3</td>
<td>GEOL 106 Historical Geology</td>
<td>(3-3)</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 104 Physical Geology</td>
<td>(3-3)</td>
<td>4</td>
<td>MATH 131 Math Concepts-Calculus</td>
<td>(3-0)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 166 Topics in Contemp. Math II</td>
<td>(3-0)</td>
<td>3</td>
<td>History or Political Science elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Military, air or naval science</td>
<td></td>
<td></td>
<td>Military, air or naval science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINE 199</td>
<td>(0-2)</td>
<td>1</td>
<td>KINE 199</td>
<td>(0-2)</td>
<td>1</td>
</tr>
</tbody>
</table>

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**Sophomore Year**

| GEOL 202 Mineralogy | (2-6) | 4 | GEOL 302 Introduction to Petrology | (3-3) | 4 |
| PHYS 201 College Physics | (3-3) | 4 | GEOL 309 Intro to Field Methods | (1-6) | 3 |
| History or Political Science elective | 3 | | PHYS 202 College Physics | (3-3) | 4 |
| Minor elective | 3 | | Minor elective | 3 |
| Military, air, or naval sciences | | | Military, air, or naval sciences | |
| KINE 199 | (0-2) | 1 | KINE 199 | (0-2) | 1 |

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**Junior Year**

| ENGL 301 Technical Writing | (3-0) | 3 | GEOL 306 Sed/Strat | (3-3) | 4 |
| Geology elective | 4 | | GEOL 312 Structural Geology & Tectonics | (3-3) | 4 |
| Technical elective | 3 | | History or Political Science elective | 3 |
| Humanities elective | 3 | | Geology elective | 3 |
| Minor elective | 3 | | Technical elective | 3 |

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**SUMMER FIELD STUDIES**

| GEOL 330 Geology Field Trips | 3 |

**Senior Year**

| Technical elective | 3 | Geology elective | 4 |
| Humanities elective | 3 | History or Political Science elective | 3 |
| Social science elective | 3 | Social science elective | 3 |
| Minor elective | 3 | Minor elective | 3 |
| Free Elective | 4 | Free Elective | |

16

**Total** 128

### NOTES

1. May substitute Math 141
2. May substitute Math 142, 151, 171
3. These electives must be selected from the approved list of courses satisfying the University Core Curriculum.
4. May substitute Physics 218
5. May substitute Physics 219
6. Fifteen hours of electives must be selected in a Minor. Electives must be chosen in consultation with advisor.
7. Any 300 or 400 level geology or geophysics course not already required, such as GeOL 301, 304, 305, 321, 410, 440, 451, 453, 454, and GEOP 435
8. A technical course that augments your major or minor, with the approval of your advisor.
Appendix II

Geology Courses

101. Principles of Geology. (3-3). Credit 4. I, II, S Physical and chemical nature of the Earth and dynamic processes that shape it; Plate tectonics, Earth's interior, materials it is made of, age and evolution, earthquake, volcanism, erosion and deposition; introduces physical and chemical principles applied to the Earth. Not open to students who have taken GEOL 103 or 104.

103. Elements of Geology. (3-0). Credit 3. I, II Geological observations and deductions; designed to give non-geoscience majors appreciation of the Earth's physical, chemical, and biological processes and their products. Not to be used for fulfillment of laboratory science requirements. Not open to students who have taken GEOL 101 or 104.

104. Physical Geology. (3-3). Credit 4. I Earth materials, structures, external and internal characteristics; physical processes at work upon or within the planet; required for students in geology, geophysics and petroleum engineering. A working knowledge of high-school chemistry and mathematics is required.*

106. Historical Geology. (3-3). Credit 4. II Hypotheses of Earth's origin; age dating of geologic materials; development and history of life; plate tectonic reconstructions, geologic history, and paleography, with emphasis on the North American plate. Prerequisite: GEOL 101 or equivalent.

202. General Earth Science. (3-3). Credit 4. I Earth's crust, continents, ocean basins, atmosphere, the place of the Earth in the universe and related fundamental principles and processes.

203. Mineralogy. (2-6). Credit 4. I Crystallography, crystal chemistry, mineral chemistry, optical crystallography, physical properties, and geologic occurrence of rock-forming and economic minerals. Prerequisites: CHEM 101 or approval of instructor.

300. Field Geology. Credit 6. S Basic concepts of field relationships and modern field techniques are used to develop geologic maps for a variety of geologic provinces. Course conducted off-campus as a field camp for six weeks. Prerequisites: GEOL 304, 306, 309, 312 or approval of instructor.*

301. Mineral Resources. (2-3). Credit 3. II Origin, geologic relations, geographic distribution, reserves and uses of exhaustible mineral and energy resources. Not available to geology majors. Prerequisite: GEOL 202 or 101 or 103 or 320.

302. Introduction to Petrology. (3-3). Credit 4. II Introduction to the origin and evolution of igneous, sedimentary, and metamorphic rocks; classification and petrographic analysis of major rock types; relationships to tectonic settings. Prerequisites: GEOL 104, 203 or approval of instructor.

304. Igneous and Metamorphic Petrology. (3-3). Credit 4. I Origin, identification and classification of igneous and metamorphic rocks; genetic processes inferred from laboratory studies and field occurrences. Prerequisites: GEOL 302 and 309 or approval of instructor.*
305. Paleobiology. (2-3). Credit 3. I Principles of paleobiology; study of organisms important in the marine fossil record; application of paleontology to geologic problems. Prerequisite: GEOL 106 or approval of instructor.

306. Sedimentology and Stratigraphy. (3-3). Credit 4. II Origin of sediments and sedimentary rocks; climate, weathering, and weathering products; transport, deposition, and depositional environments for sediments; field and laboratory studies in description and interpretation of genesis of sedimentary rocks; principles of stratigraphy and basin analysis; plate tectonics and the formation of sedimentary basins; stratigraphic nomenclature; geologic time and correlation; sequence stratigraphy and basin architecture. Prerequisite: GEOL 101 or 104 or approval of instructor.*

307. Dinosaur World. (3-3). Credit 4. Evolutionary development of dinosaurs and Mesozoic geography, climate and terrestrial environments including dinosaur morphology; evolutionary relationships; dinosaur metabolism; and constraints imposed by gigantism; their latitudinal distribution; causal mechanism for dinosaur extinction.

309. Introduction to Geological Field Methods. (1-6). Credit 3. II Geological mapping methods, field observation procedures and data gathering and recording; use of Brunton compass; pace and-compass mapping; topographic map use and interpretation; measurement of structural elements; interpretation of geologic map patterns; measurement of stratigraphic sections; construction of geologic cross sections; six day geologic mapping project during spring break. Prerequisite: GEOL 101 or 104 and GEOL 106.*

312. Structural Geology and Tectonics. (3-3). Credit 4. II Interpretation of rock structures; their relation to stratigraphic, physiographic and economic problems; regional tectonics of several selected areas. Prerequisites: GEOL 101, 104 or 320.*

320. Geology for Civil Engineers. (2-3). Credit 3. I, II Principles of physical geology; common minerals and rocks with their relationships and applications to construction, foundations and excavation. Prerequisite: Sophomore classification.

321. Urban Geology. (3-0). Credit 3. Study, analysis and interpretation of the geology in urban areas; earth materials, land forms, geologic processes and hazardous conditions as applied to the planning, development, improvement, management and governance of the urban environment. Prerequisite: Junior classification recommended.

330. Field Trips. Credit 1-3. Field trips to observe, analyze and interpret the geology and geophysics of selected localities in Texas and adjacent regions; complements classroom experience. Trip frequencies, durations, dates and study locations vary with semester. Prerequisites GEOL 101 or 104 or approval of instructor. May repeat for credit.

410. Hydrogeology. (3-0). Credit 3. I Geologic conditions determining the distribution and movement of ground water and their effect on the hydrologic properties of aquifers. Prerequisite: Senior classification or approval of instructor. Offered irregularly as demand merits.

440. Engineering Geology. (2-3). Credit 3. I Fundamentals of soil, rock and fluid mechanics and basic engineering practices as applied to the analysis of the geologic environment for engineering uses. Designed for geoscience majors who have not had engineering courses. Prerequisites: PHYS 218, GEOL 312 or approval of instructor.

451. Introduction to Geochemistry. (3-0). Credit 3. II Chemical principles and processes responsible for the formation and cycling of earth materials, with emphasis on low
temperature equilibria and kinetics in rock-water systems. Prerequisite: GEOL 302 or approval of instructor.

453. Tectonics. (3-0). Credit 3. Plate motion and interactions through time; structural geology, paleontology, petrology and stratigraphy of plate margins such as compressional mountain belts, passive margins, mid-oceanic ridges and transform boundaries. Prerequisites: Senior classification in geology; approval of instructor. Offered irregularly as demand merits.

454. Evolution of the Earth's Crust. (3-0). Credit 3. Petrology, stratigraphy and structure of the oceanic and continental lithosphere relative to the unifying hypotheses of sea-floor spreading and plate tectonics; geological data integrated to provide a coherent overview of the Earth's crust. Prerequisites: GEOL 101 or 104 and 306, or approval of instructor. Offered irregularly as demand merits.

485. Problems. Credit 1 or more each semester. I, II, S Advanced problems in geology.

489. Special Topics in ... Credit 1 to 4. I, II Selected topics in an identified area of geology. Prerequisite: approval of instructor. May repeat for credit.

Geophysics Courses

213. Exploration of the Earth and Moon. (1-0). Credit 1. Introductory study of the Earth's internal constitution; physical basis for the prediction and control of earthquakes; differences in the structure of continental and oceanic crust; exploration of the moon. A relatively non-technical course open to all students.

214. Introduction to Exploration Geophysics. (1-0). Credit 1. Physical properties of rocks; seismic refraction and reflection methods; interpretation of gravity and magnetic anomalies; electro-magnetism and heat flow. Prerequisite: GEOP 213 or approval of instructor.

435. Principles of Geophysical Exploration. (3-3). Credit 4. Introduction to theory of gravity, magnetic, electrical seismic exploration methods; physical properties of earth materials and their influence on geophysical measurements; limitations of geophysical data in the interpretation of subsurface structure. Prerequisites: MATH 251, PHYS 219, GEOL 309.*

436. Exploration Seismology. (3-0). Credit 3. I Physical basis for seismic remote-sensing methods; interpretative techniques and problems. Wave propagation in elastic media. Theoretical basis for digital and analog methods for computing the seismic response of an earth with arbitrary velocity variation with depth. Reflected and refracted arrivals, surface waves and diffractions. Limitations of ray theory; the eikonal equation. Determination of seismic-wave velocity with depth and depth and dip on interfaces using reflected and refracted seismic waves. Prerequisites: MATH 312, PHYS 302, or approval of instructor.

438. Experimental Seismology. (1-3). Credit 2. I Experiments on seismic velocity variation in rocks with pressure; seismic wave propagation, reflection, refraction and diffractions; interpretation of seismic records; gathering and interpreting digital seismic data in the field. Prerequisite: GEOP 436 or
enrollment therein.

441. Physics of the Earth and Planets. (3-3). Credit 4. I The structure and properties of planetary interiors inferred from seismology, gravity, topography, magnetics and heat flow; analysis of earthquakes; methods of age determination; causes and consequences of plate tectonics; tides and lunar orbit. Prerequisites: MATH 122 or 253, PHYS 219, GEOL 312.

450. Geophysical Data Processing. (3-0). Credit 3. II Time and frequency analysis of linear systems; treatment of continuous and sampled data; elements of optimum filter theory; construction of geophysical models; applications to array theory, velocity filtering, resonant layer systems, pulse compression, controlled waveform sources. Prerequisite: Approval of instructor.

475. Interpretation of Gravity and Magnetic Fields. (3-0). Credit 3. II Applications of potential theory in the interpretation of gravity and magnetic fields; analysis of geophysical anomalies produced by geologic structures and by variation in the physical properties of rocks; use of regional gradients, residual anomalies, higher derivatives and surfaces, line integrals and two and three dimensional models. Prerequisites: GEOL 312; MATH 311 or approval of instructor.

480. Electromagnetic Induction in the Earth. (3-0). Credit 3. Electrical structure of the crust and mantle; factors influencing electrical conductivity of rocks; Maxwell's equations, induction, eddy currents; field methods and instrumentation; mineral exploration, environmental and solid earth applications; electric and magnetic dipoles, Hankel transforms, transients; magnetotellurics, TE/TM modes, static distortion; modeling and inversion; global studies, electromagnetic induction in a sphere. Prerequisites: MATH 308 and PHYS 219.

485. Problems. Credit 1 or more each semester. I, II, S Advanced problems in geophysics.

489. Special Topics in ... Credit 1 to 4. I, II Selected topics in geophysics. Prerequisite: Junior or senior classification in science or geoscience curriculum.

*Field trips may be required for which departmental fees may be assessed to cover costs.
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APPENDIX IV

Sampling of Job Announcements
UNITED STATES
DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT

VACANCY ANNOUNCEMENT

*** THE DEPARTMENT OF THE INTERIOR IS AN EQUAL OPPORTUNITY EMPLOYER ***

Selection for this position will be made solely on the basis of merit, fitness, and qualifications. All applicants will receive consideration without regard to race, color, age, sex, marital status, religion, national origin, political affiliation, handicap or other non-merit factors.

POSITION: NATURAL RESOURCE SPECIALIST OR PHYSICAL SCIENTIST GS-0401-11
ANNOUNCEMENT NUMBER: WY-97-25
FULL PERFORMANCE LEVEL: GS-0401-11
RECRUITING AREA: GOVERNMENT-WIDE

OPENING DATE: JUNE 26, 1997
CLOSING DATE: JULY 18, 1997

LOCATION: RAWLINS DISTRICT, GREAT DIVIDE RESOURCE AREA, BRANCH OF RESOURCE USE/AUTHORIZATION RAWLINS, WYOMING

CONTACT TELEPHONE NUMBER: (307) 775-6021
ADDRESS OF PERSONNEL OFFICE: BUREAU OF LAND MANAGEMENT
BLM WYOMING STATE OFFICE
SERVICING PERSONNEL OFFICE, WY-953
5353 YELLOWSTONE ROAD, P.O BOX 1828
CHEYENNE, WYOMING 82001

This is a permanent full-time position.

Only those applicants who possess the following mandatory selective factors will be considered. 1. Must demonstrate experience in utilizing image processing techniques and relational data bases in support of a variety of natural resource disciplines. 2. Must demonstrate experience in integrating spatial data from a variety of sources (i.e., GPS, aerial photographs, related data bases) into a geographic information system, and to utilize GIS in conducting analytical modeling in support of a variety of natural resource disciplines. RELOCATION EXPENSES ARE NOT AUTHORIZED. SPECIALIZED EXPERIENCE: SEE QUALIFICATIONS STANDARDS HANDBOOK.

STATEMENT OF DUTIES:
The incumbent serves as the remote sensing and resource inventory specialist for the Great Divide Resource Area. Provides technical expertise and assistance in the development and analysis of various natural resource inventories utilizing both field inspection and interpretations from aerial photographs and satellite imagery.

KNOWLEDGES, ABILITIES, SKILLS AND OTHER CHARACTERISTICS (KASOCS):
1. Knowledge of the principles, theories and practices for designing natural resource inventories, data analysis, statistical analysis, and sampling techniques, including techniques for image processing and relational data base analysis.
2. Knowledge of the availability, interpretation and limitations of
various remote sensing products, including both satellite imagery and aerial photography.

3. Ability to integrate spatial data from GPS, aerial photos, and related data bases into geographic information systems, and to utilize GIS in conducting analytical modeling.
UNITED STATES
DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT

VACANCY ANNOUNCEMENT

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POSITION: WRITER-EDITOR GS-1082-07
OPENING DATE: JUNE 26, 1997
CLOSING DATE: JULY 09, 1997

LOCATION: ARIZONA STATE OFFICE, EXTERNAL AFFAIRS STAFF
PHOENIX, ARIZONA

CONTACT TELEPHONE NUMBER: (602) 417-9277
ADDRESS OF PERSONNEL OFFICE: BUREAU OF LAND MANAGEMENT
BLM ARIZONA STATE OFFICE
HUMAN RESOURCES SECTION, AZ-951
222 NORTH CENTRAL AVENUE
PHOENIX, ARIZONA 85004-2203

ANNOUNCEMENT NUMBER: AZ-97-43
FULL PERFORMANCE LEVEL: GS-1082-11
RECRUITING AREA: ALL QUALIFIED PERSONS

This is a permanent full-time position.

QUALIFICATION REQUIREMENT: *****************************************************

One year specialized experience equivalent to the gs-5 level

STATEMENT OF DUTIES:
Incumbent writes, researches and provides editorial guidance for newsletters, news releases, brochures, exhibits, correspondence, environmental and planning documents and all outreach materials, both written and electronic format. Manages the Statewide internal and external internet home pages. Coordinates with Arizona BLM specialists Statewide to keep information current and present new information as appropriate. Advises specialists in composition and presentation of home page information and establishes information on line. Participates on the Statewide management staff. Also researches, writes, edits, does layouts and coordinates production of "desert digest" newsletter. The incumbent will also be responsible for writing and editing news releases, scripts, brochures and other BLM outreach documents.

KNOWLEDGES, ABILITIES, SKILLS AND OTHER CHARACTERISTICS (KASOCS):
1. Describe your ability to communicate orally and in writing.
2. Describe your knowledge of technical and journalistic writing practices.
3. Describe your ability to work as a team member with a diversity of individuals and groups.
4. Describe your ability to work with computers and your experience with the internet.
UNITED STATES
DEPARTMENT OF INTERIOR
UNITED STATES GEOLOGICAL SURVEY

VACANCY ANNOUNCEMENT

* THIS IS A PERMANENT POSITION *

POSITION: HYDROLOGIC TECHNICIAN GS-1316-06  ANNOUNCEMENT NUMBER: H-97-232
OPENING DATE: JUNE 30, 1997  FULL PERFORMANCE LEVEL: GS-1316-09
CLOSING DATE: JULY 14, 1997  RECRUITING AREA: ALL QUALIFIED PERSONS

LOCATION: WATER RESOURCES DIVISION, NORTHEASTERN REGION,
PENNSYLVANIA DISTRICT, MALVERN WATER-QUALITY UNIT
MALVERN, PENNSYLVANIA

CONTACT TELEPHONE NUMBER:  (703) 648-6131  (TTY) 648-7788
ADDRESS OF PERSONNEL OFFICE:  U.S. GEOLOGICAL SURVEY
RECRUITMENT AND PLACEMENT BRANCH, ROOM 1A315
12201 SUNRISE VALLEY DRIVE, MS-601
RESTON, VIRGINIA 20192

*OPM QUALIFICATION STANDARDS*  GS-1316-06: Applicants must possess at least 1 year of specialized experience equivalent to GS-5 in the Federal service which provides the necessary skills to perform the duties above. Experience can be substituted by a 4-year course of study above high school leading to a bachelor's degree with courses related to the occupation. Two full academic years of study, or 60 semester hours, beyond the 2nd year is equivalent to 1 year of specialized experience. To be considered well-qualified under the provisions of CTAP: SSP and ICTAP eligibles must earn a minimum score of 85 (prior to the assignment of veteran's preference points).

STATEMENT OF DUTIES:
Makes routine stream discharge measurements, performs specific phases of field work in support of indirect measurement of flood-flows, check computation of current measurements, and records notes of professional personnel in connection with survey of stream cross-sections. Collects water samples for chemical or biological analysis, makes field determinations on surface and/or ground water for parameters of temperature, specific conductance, dissolved oxygen, pH, and alkalinity etc., assembles and prepares field and laboratory data for tabulation, and assists in technical studies of water-quality parameters. Installs, adjusts, and services water and sediment sampling equipment, assists in installing and adjusting scientific instruments, and adjusts and repairs water-level recorders and other equipment. Follows verbal instructions of professionals in field activities, responds to queries for measurements, gauge readings, etc., and records written notes of professionals and assists in preparing a variety of written reports and scientific papers.

KNOWLEDGES, ABILITIES, SKILLS AND OTHER CHARACTERISTICS (KASOCS):
1. Ability to collect, analyze, compute, and compile streamflow data.
2. Ability to collect, analyze, compute, and compile water-quality and biologic data.
3. Ability to install, service, and maintain measuring and/or sampling
instruments.
4. Ability to communicate interpersonally/orally and in writing.
5. **NOTE: All KASOCs are selective placement factors.**
UNITED STATES
DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT

**TERM APPOINTMENT**

VACANCY ANNOUNCEMENT

*** THE DEPARTMENT OF THE INTERIOR IS AN EQUAL OPPORTUNITY EMPLOYER ***

Selection for this position will be made solely on the basis of merit, fitness, and qualifications. All applicants will receive consideration without regard to race, color, age, sex, marital status, religion, national origin, political affiliation, handicap or other non-merit factors.

POSITION: RESOURCE INFORMATION SPECIALIST

GS-0301-11

OPENING DATE: JUNE 26, 1997

CLOSING DATE: JULY 24, 1997

ANNOUNCEMENT NUMBER: CA-97-51

FULL PERFORMANCE LEVEL: GS-0301-11

RECRUITING AREA: DEPARTMENT-WIDE

LOCATION: CALIFORNIA ST OFC, EUR OF LAND MGMT, CALIFORNIA DESERT DISTRICT OFC, EL CENTRO RESOURCE AREA, MULTI-RESOURCE STAFF

EL CENTRO, CALIFORNIA

If appointed to this position, while a BLM employee you cannot hold an active real estate license, and you cannot have an interest in Federal lands, or hold stocks in firms that have interest in Federal lands.

WHO MAY APPLY: Any current BLM or Department of the Interior employee Nationwide who has competitive civil service status. U. S. Citizenship is required for appointment to this position.

CONTACT TELEPHONE NUMBER: (916) 979-3090

ADDRESS OF PERSONNEL OFFICE:

BUREAU OF LAND MANAGEMENT
BLM, CALIFORNIA STATE OFFICE
HUMAN RESOURCE SERVICES
2135 BUTANO DRIVE
SACRAMENTO, CALIFORNIA 95825

QUALIFICATION REQUIREMENTS: Candidates must have one year of specialized experience equivalent to the GS-9 level in the federal service; or Ph.D. or equivalent doctoral degree or 3 full years of graduate education in a field directly related to the position. Candidates must demonstrate experience/graduate education which has provided the necessary knowledge, skills, and abilities to be able to perform the duties of the position. Specialized experience is work in the geographic/cartographic sciences to analyze and manage database systems such as Geographic Information System, Land Information System, Automated Land and Mineral Record System and Automated Resources Data; and experience in the operational aspects of computer networks and software programs.

STATEMENT OF DUTIES:
Coordinates and provides technical direction for data preparation, entry and analysis by resource specialists, planners and managers who will use this data in preparing Resource Management Plans and Activity Plans for the management of BLM resources. Manages Area's Automated Resource Data (ARD) by maintaining the interface between the specific project schedule needs,
data entry/digitizing activities, and the end user products and data base maintenance; and responsible for the Resource Area Land Information Data Base Administration such as maintains data integrity establishes data standards for users, verifies data formatting and provides training on data standards/administration etc.

KNOWLEDGES, ABILITIES, SKILLS AND OTHER CHARACTERISTICS (KASOCS):


2. Knowledge of the operational aspects of computer networks, computer communication software and hardware and their applications to area-wide networks.

3. Knowledge of UNIX, ARCINFO, and two or more of the following or comparable application software programs: WordPerfect, CbaseIII+ or dBaseIV, and Lotus.

4. Knowledge of office computer equipment, software, and what constitutes an operating system.

5. Ability to communicate orally and in writing to individuals with varying degrees of previous knowledge on the subject.
UNITED STATES
DEPARTMENT OF INTERIOR
OFFICE OF SURFACE MINING

VACANCY ANNOUNCEMENT

APPLICATIONS WILL BE ACCEPTED FROM STATUS AND NON-STATUS CANDIDATES.

****************************AMENDMENT****************************

Amended to change closing date

POSITION: (INTERDISCIPLINARY) GENERAL
ENGINEER, GS-801 GS-0801-09/11
CIVIL ENGINEER, GS-810 OR GS-0810-09/11
PHYSICAL SCIENTIST, GS-1301-9/11 GS-1301-09/11

ANNOUNCEMENT NUMBER: HDQS-97-27

OPENING DATE: JUNE 09, 1997
CLOSING DATE: JULY 28, 1997

FULL PERFORMANCE LEVEL: GS-0800-11

LOCATION: APPALACHIAN REGIONAL COORDINATING CENTER, DIVISION OF FEDERAL RECLAMATION PROGRAMS, APPALACHIA TEAM.
ASHLAND, KENTUCKY

DISTRIBUTION: ALL QUALIFIED PERSONS

AREA OF CONSIDERATION: ALL QUALIFIED PERSONS

CONTACT TELEPHONE NUMBER:
(202) 208-2773 (202) 219-1703

ADDRESS OF PERSONNEL OFFICE:
OFFICE OF SURFACE MINING
OFFICE OF PERSONNEL, ROOM 44-S
1951 CONSTITUTION AVENUE, N.W.
WASHINGTON, D.C. 20240

QUALIFICATIONS: Candidates must meet the requirements specified in the Office of Personnel Management (OPM) Qualification Standards. Physical Scientist - Bachelor's degree in physical science, engineering and mathematics that includes 24 semester hours in physical and/or related engineering science such as mechanics, dynamics, properties of material and electronics or a combination of education and experience which includes 24 semester hours in physical or engineering science. In addition to the above, candidates must possess one year of specialized experience which is in or directly related to the work of the position being filled. For the GS-9, this experience must be equivalent to the GS-7 grade level and for the GS-11, this experience must be equivalent to the GS-9 grade level in the Federal service. FAX ON DEMAND: Copies of this announcement are available through the use of OSM's fax on demand service. You may access the Fax on Demand 24 hours a day by call (202) 219-3107 for a complete listing of the vacancies available and instructions about how to obtain them from the system. Applicants may phone from the handset of a fax machine and receive requested documents immediately over the same machine. Or, by calling from a regular touch-tone phone, candidates may follow the recordings directions and have documents sent promptly to a fax machine on a different number.

STATEMENT OF DUTIES:
Conducts field investigations of proposed mining and reclamation projects to determine directive and design requirements, and reviews projects under reclamation to assure adequacy of and conformance to plans and
specifications. Makes site investigations to analyze potential life-threatening situations and makes appropriate recommendations for disposition of abandoned mine lands (AML) referrals. Evaluates the potential courses of action and makes recommendations for declaration of emergency, negative determination or further investigation. Prepares technical recommendations and rough construction cost estimates and assists in the preparation of design and technical specifications appropriate to the assigned projects. Coordinates investigations engineering, realty, and procurement support requests and schedules. Reports on project progress and furnishes statistical information. Gives briefings on a routine basis for status of assigned work. Reviews research proposals for technical feasibility and adequacy and recommends to OSM Headquarters acceptance of most feasible technical approach. Provides input and support in the development of ARCC computer programs for earth slope stability and hydrology and sedimentology. Uses existing computer programs to solve complex geotechnical problems, and initiates the use of new programs as required. Plans technical subjects relating to Title IV and Title V of Public Law 95-87 at National Surface Mining Symposium seminars, conferences, and workshops. Meets with contractors, operators applicants, State and local government agencies, the general public interest groups, to review and analyze reclamation plans and operations and develops solutions. Participates in review, development and evaluation of Agency regulations, guidelines, and rule changes.

KNOWLEDGES, ABILITIES, SKILLS AND OTHER CHARACTERISTICS (KASOCS):
1. Knowledge and experience in the identification of abandoned mine land problems and methods to be used in eliminating problems.
2. Experience in evaluating the progress and effectiveness of construction projects and recommending improvements.
3. Ability to communicate effectively both orally and in writing.
UNITED STATES
DEPARTMENT OF INTERIOR
MINERALS MANAGEMENT SERVICE

VACANCY ANNOUNCEMENT

POSITION: PHYSICAL SCIENTIST GS-1301-12/13 ANNOUNCEMENT NUMBER: MMSH-97-56
PETROLEUM ENGINEER GS-0881-12/13
APPLIED STATISTICIAN GS-1530-12/13

OPENING DATE: JUNE 26, 1997
CLOSING DATE: JULY 24, 1997

FULL PERFORMANCE LEVEL: GS-1301-13
RECRUITING AREA: ALL QUALIFIED PERSONS

LOCATION: MINERALS MANAGEMENT SERVICE, OFFSHORE MINERALS MANAGEMENT, DIVISION HERNDON, VIRGINIA

CONTACT TELEPHONE NUMBER: (202) 606-2700
OPM SERVICING OFFICE:
OPM, WASHINGTON SERVICE CENTER
P.O. BOX 14080
WASHINGTON, DC 20044
CALL THE NUMBER ABOVE, PRESS 3 THEN 1

** PLEASE REFER TO VACANCY NUMBER: MMS-MMSH-97-56 **

QUALIFICATION REQUIREMENTS: Applicants must meet qualification and time-in-grade requirements as of the closing date.*****************

SPECIALIZED EXPERIENCE: The specialized experience under the Physical Science series are primarily in the GS-1313 Geophysicist and GS-1350 Geologist.

STATEMENT OF DUTIES:
The Minerals Management Service (MMS) has the responsibility for developing, administering, and enforcing a regulatory program to ensure exploration, drilling, and production operations for oil and gas on the Outer Continental Shelf (OCS) are conducted in a safe and environmentally sound manner. The incumbent serves as a physical scientist or petroleum engineer or statistician in a multidisciplinary team in the Resource Evaluation Division. The Team is responsible for the Bureau's models used for lease sale tract evaluation, resource assessment, and generating resource estimates. These principal MMS models are MONTCAR, GRASP, and PRESTO. The specific work required is the analysis of geologic engineering, and economic data relative to estimating the value of offshore oil and gas tracts and/or estimating the amounts of undiscovered oil and gas in an area offshore. Such analysis requires knowledge and skill in applied statistics, geostatistics, and mathematics. The incumbent will take the results of their analysis and codify them for testing in the RE models. In addition, the incumbent will be responsible for assisting in maintaining the models and developing new ones. Therefore, a need exists for the incumbent to be knowledgeable of computer programming language such as FORTRAN, C++, Visual Basic, etc. The incumbent will also assist in planning and conducting studies into techniques and procedures for modeling OCS activities. Assists in the preparation of instructions and manualization of Bureau procedures with respect to resource evaluation.
Provides input into development and analysis of regulations, procedures and policies relating to the OCS oil and gas leasing program. Provides technical expertise in the refinement of new methods for resource assessment and economic evaluation.

KNOWLEDGES, ABILITIES, SKILLS AND OTHER CHARACTERISTICS (KASOCS):

1. Skill in using sophisticated computer models in the assessment and/or evaluation of oil & gas resources. (Selective Factor)
2. Ability to use applied statistics, geostatistics, and mathematics in the assessment and/or evaluation of oil & gas resources. (Selective Factor)
3. Skill in computer programming as applied to developing or modifying computer models used in assessing/evaluating oil & gas properties. (Selective Factor)
4. Knowledge of petroleum geology applicable to resource evaluation.
5. Skill in communicating technical information both orally and in writing.
6. Ability to interact with technical staffs on major projects.
7. Knowledge of the OCS Oil & Gas Leasing Program.
UNITED STATES
DEPARTMENT OF INTERIOR
UNITED STATES GEOLOGICAL SURVEY

VACANCY ANNOUNCEMENT

POSITION: CARTOGRAPHER GS-1370-13/14
PHYSICAL SCIENTIST GS-1301-13/14
MATHEMATICIAN GS-1520-13/14

ANNOUNCEMENT NUMBER: W-97-184

OPENING DATE: JUNE 30, 1997
CLOSING DATE: AUGUST 01, 1997

FULL PERFORMANCE LEVEL: GS-1301-14
RECRUITING AREA: GOVERNMENT-WIDE

LOCATION: GEOLOGIC DIVISION, OFC WESTERN REGIONAL GEOLOGIST,
ASTROGEOLOGY TEAM
FLAGSTAFF, ARIZONA

CONTACT TELEPHONE NUMBER: (415) 329-4104 (TTY) 329-4123
ADDRESS OF PERSONNEL OFFICE: U.S. GEOLOGICAL SURVEY
PERSONNEL OFFICE
345 MIDDLEFIELD ROAD MS-612
MENLO PARK, CALIFORNIA 94025

This is a supervisory position. Employees who are initially appointed
to supervisory positions must serve a probationary period of 1 year.
Department of the Interior (DOI) Career Transition Assistance Plan (CTAP)
procedures apply in filling this vacancy. 5 CFR 330, Career Transition
Assistance for Surplus and Displaced Federal Employees requires the
following order of selection for this position:
a) At Bureau option, personnel actions listed in 5 CFR 330.606(b);
b) Any well-qualified SSP candidate who applies within the local commuting
area (Surplus and displaced employees will be given equal consideration);
c) At Bureau option, personnel actions not subject to RPL;
d) Qualified RPL candidates in the local commuting area;
e) At Bureau discretion, any other former displaced well-qualified DOI
employee, e.g. a well-qualified RPL candidate who applies from outside the
local commuting area;
f) Well-qualified ICTAP applicants in the local commuting area;
g) Other outside applicants.
Candidates must have at least 1 year of specialized experience at or
equivalent to the next lower grade, that is directly related to the duties
described below, and that has equipped the candidate with the particular
knowledges, skills, and abilities identified below to successfully perform
the work.
In addition to meeting the minimum qualification requirements, applicants
must meet all selective factors.
To be considered well-qualified under the provisions of CTAP: SSP and
ICTAP eligibles must meet the "GOOD" or equivalent rating level on all
KASOC's.
BASIC QUALIFICATION REQUIREMENTS: Physical Scientist - a bachelor's degree in
physical science, engineering, or mathematics that included 24 semester
hours in physical science and/or engineering science.

STATEMENT OF DUTIES:
As principal investigator and team leader, plans, conducts, and seeks
funding for research in the development of innovative concepts, methods and
techniques for mapping the surfaces of planets and satellites. Designs and
ducts cartographic research: conceives and defines cartographic
objectives, performs tests and evaluates the results. Works with raw
digital data transmitted by spacecraft imaging systems and remote-sensing
instruments in both optical and radar wavelengths. The research focuses on
transformation of the data into cartographic format by means of digital
computer systems; conducting theoretical analyses on the synthesis and
geometric transformation, or photogrammetry, of remotely sensed data to
produce topographic maps of planets; enhancing the quality and detail of
resulting materials for geologic study; and innovative use of digital and
hardcopy techniques for data presentation. Supervises research scientists
and technicians. Prepares proposals for project work, determines work
plans and operating budgets. Responsible for large projects; establishes
work schedules and directs production.

KNOWLEDGES, ABILITIES, SKILLS AND OTHER CHARACTERISTICS (KASOCS):
1. Knowledge of photogrammetry and cartography and one or more of the
   following: surveying and mapping, geodesy, research statistics or computer
   vision in order to develop techniques for the photogrammetric mapping of
   the surfaces of planets and satellites. (SELECTIVE FACTOR)
2. Knowledge of one or more related areas of physical science such as
   geology, geophysics, celestial mechanics, optics and/or of engineering
   (electrical/electronic) in order to understand and interpret data.
3. Knowledge of advanced mathematics and programming languages (preferably
   C/C++ or FORTRAN) in order to develop planetary sensor models and new
   cartographic software for digital photogrammetric systems and general
   computer systems. (SELECTIVE FACTOR)
4. Skill in written and oral presentation of results in planetary research
   and mission activities.
5. Skill in operating analytical photogrammetric plotters and/or digital
   photogrammetric systems. (GS-13 only)
6. Skill in design, execution, and data processing for missions of
   planetary exploration, including development of instrumentation and
   participation in scientific investigations. (GS-14 only)
Wanted: Project Manager

The assignment:
Strategic Planning and Integration Project Manager - Petroleum Products Marketing

Amoco Corporation
200 E. Randolph Dr., MC 3408
Chicago, IL 60601

Contact: Staffing Representative/Petroleum Products Marketing
Fax: 312/856-5723

Send resume and salary history to above address, please refer to job # CB125.

We're looking for tomorrow's leaders

Since its founding more than 100 hundred years ago, Amoco Corporation has grown from a small, regional company in the United States to a worldwide enterprise engaged in virtually all phases of energy development, petroleum refining and marketing, and chemical manufacture and sales. Today, Amoco is one of the 15 largest U.S. industrial corporations, and has a prestigious reputation as one of the Fortune "Global 500." By taking full advantage of cutting edge technology, Amoco has been consistently recognized as a leader in all facets of its many operations, all over the world.

The Strategic Planning and Integration (SPI) Project Manager is a member of the Market and Capital Planning (MCP) Team within the Marketing Business Group. MCP has the overall responsibility for defining capital strategies and associated capital plans for each market and ensuring that the plans are executed. The role of the SPI Project Manager is to define the strategic objectives, market share, preferred channel of growth, level of capital investment, brand concepts to be used, and types of facility for each market. This requires developing a solid understanding of individual markets, their key issues, and working to coordinate cross-functional teams to develop and evaluate alternatives.

Qualifications

A bachelors degree in finance, economics, or sciences required, MBA a plus. Demonstrated strategy and economics experience, as well as acquisition experience is desirable.

Status: Full time
Salary: Competitive salary and solid benefits including medical and dental insurance, and 401(k) program
Locations: Chicago, Ill.
Starting date: Immediately
Wanted: Tax Attorney

The assignment:

Tax Attorney - Amoco Corporation

Amoco Corporation
200 E. Randolph Dr., MC 3408
Chicago, IL 60601

Contact: Staffing Representative/Law Department
Fax: 312/856-5723

Send resume and salary history to above address, please refer to job #IZ-Tax

We're looking for tomorrow's leaders

Since its founding more than 100 hundred years ago, Amoco Corporation has grown from a small, regional company in the United States to a worldwide enterprise engaged in virtually all phases of energy development, petroleum refining and marketing, and chemical manufacture and sales. Today, Amoco is one of the 15 largest U.S. industrial corporations, and has a prestigious reputation as one of the Fortune "Global 500." By taking full advantage of cutting edge technology, Amoco has been consistently recognized as a leader in all facets of its many operations, all over the world.

Houston-based Tax Attorney: The emphasis of this position is advice on transactional issues involving oil and gas ventures. Significant expertise in the taxation of natural resources and partnerships is required.

Houston-based Tax Attorney-International: This position deals primarily with counsel on transactional issues involving international oil and gas ventures. While experience in the oil and gas industry is valuable, it is not required. Much work involves structuring transactions which accommodate the laws of one or more foreign countries as well as the laws of the U.S. The work may involve existing operations or entry into countries where Amoco does not have operations. Amoco has significant operations in the UK, Norway, the Netherlands, Egypt, Trinidad, Canada, Bolivia, Colombia, Argentina, and China. Some travel is required.

Chicago-based Tax Attorney-International: In this position, your role will be to advise the Amoco Chemicals group which has extensive operations in Europe and Asia-Pacific. Considerable international taxation experience in structuring transactions is required.

Qualifications

Seasoned tax attorneys with five or more years of experience.

Status: Full-time
Salary: Competitive salary and solid benefits including medical and dental insurance, and 401(k) program
Locations: Chicago, IL and Houston, TX
Starting date: Immediately
Wanted: Pricing Specialists

The assignment:

Pricing Specialist - Petroleum Products Marketing

Amoco Corporation
200 E. Randolph Dr., MC 3408
Chicago, IL 60601

Contact: Staffing Representative/Petroleum Products Marketing
Fax: 312/856-5723

Send resume and salary history to above address, please refer to job #CBE1310

We're looking for tomorrow's leaders

Since its founding more than 100 hundred years ago, Amoco Corporation has grown from a small, regional company in the United States to a worldwide enterprise engaged in virtually all phases of energy development, petroleum refining and marketing, and chemical manufacture and sales. Today, Amoco is one of the 15 largest U.S. industrial corporations, and has a prestigious reputation as one of the Fortune "Global 500." By taking full advantage of cutting edge technology, Amoco has been consistently recognized as a leader in all facets of its many operations, all over the world.

The Pricing Specialist is a critical member of the pricing team, which is part of the Gasoline Category in Brand Marketing. Brand Marketing is responsible for developing the Light Oils and Convenience Retailing strategies, the annual APP, and tactics for market implementation to achieve these strategic goals. The cornerstone for developing Brand's strategies are consumer research and other fact-based data.

The Pricing Specialist will use a combination of data to develop market based pricing strategies and tactics for gasoline, as well as metrics to measure performance for strategies and execution. The Pricing Specialist will be responsible for building detailed familiarity with market structure, product costs, competitive retail tactics, consumer behavior patterns and price elasticities.

The Pricing Specialist is responsible for profit, volume, and margin results, and achieving other strategic and tactical goals for the Gasoline Category and Brand Marketing.

Qualifications

Bachelors degree in marketing, finance, economics, or sciences required. MBA a plus. Three+ years experience in marketing, financial, economic, project, business evaluations, or pricing analysis. Strong and varied PC, spreadsheet, LAN, database management skills. Strategic planning and development and/or previous brand management experience a plus.

Status: Full-time
Salary: Competitive salary and solid benefits including medical and dental insurance, and 401(k) program
Locations: Chicago, IL
Starting date: Immediately
Wanted: Economic Analyst

The assignment:

Economic Analyst - Amoco Chemicals Polymers
Alpharetta, Georgia

Amoco Corporation
375 Northridge Road, Suite 600
Atlanta, GA 30350

Contact: Staffing Representative/Amoco Chemicals
Fax: 770/512-6966

Mail resume and salary history to above address. Refer to job # CC2489

Since its founding more than 100 hundred years ago, Amoco Corporation has grown from a small, regional company in the United States to a worldwide enterprise engaged in virtually all phases of energy development, petroleum refining and marketing, and chemical manufacture and sales. Today, Amoco is one of the 15 largest US industrial corporations, and has a prestigious reputation as one of the Fortune 500. By taking full advantage of cutting edge technology, Amoco has been consistently recognized as a leader in all facets of its many operations, all over the world.

Amoco’s Polymers business group manufactures and markets polypropylene and a wide range of advanced engineering polymers used in specialized, demanding applications. Amoco produces the widest array of high temperature and engineering resins for specialized applications in automotive, electrical/electronic, aerospace and other exacting industries. This group is a leading producer of a full line of carbon fibers, and the second largest polypropylene manufacturer in the world.

As a member of the Planning and Economics Group, you will provide business and planning support for the Polymers business group. Primary roles include economic evaluation of capital expenditures; economic and strategic evaluation of mergers and acquisitions; support for strategy development and reassessment; and coordination of the Polymers ten-year plan.

Qualifications

MBA required along with a minimum of five years experience in finance. Previous experience in project economics and/or strategic planning strongly preferred. Demonstrated strategic planning skills and advanced oral and written communication skills. Experience in chemicals a plus.

Status: Full-time
Salary: Competitive salary and solid benefits including medical and dental insurance, and 401(k) program
Locations: Alpharetta, GA (approx. 20 miles north of Atlanta)
Starting date: Immediately
APPENDIX V

Supporting Letter from Dr. Fred Heath, Dean and Director, Evans General Libraries

See item VI B 4 in the Main Body of the Proposal
July 8, 1998

Dave Wiltschko
Center for Tectonophysics
Texas A&M University
Halbouty Building, Room 125
College Station, TX 77843-3113

Dear Dr. Wiltschko:

The Evans General Libraries can easily support a BA program in geology. Based on a title count from this year's holdings, the Library has one of the top ten collections in geology in the United States and ranks almost as high worldwide. Our geology collection is strong enough to support several doctoral programs in geology. The Library also subscribes to nearly a hundred journals which contain articles of interest to geology students. Besides books and journals, the Library provides access to the database GeoRef for faculty and student use. I believe that these materials are more than adequate to support a new BA in geology.

Sincerely yours,

Fred Heath
Dean and Director
Evans General Libraries

FH:jm