Project No. E-19-512
Project Director: Dr. J. E. Husted
Sponsor: U. S. Dept. of Interior; Office of Surface Mining; Washington, D.C. 20241

Type Agreement: Grant No. G1124113
Award Period: From 7/1/82 To 9/30/83 (Performance) 9/30/83 (Reports)
Sponsor Amount: $150,000
Cost Sharing: $150,000 (E-19-222)
Title: Allotment Grant for the Georgia Mining and Mineral Resources and Research Institute

ADMINISTRATIVE DATA
1) Sponsor Technical Contact:
   Dr. John D. Morgan
   Chief Staff Officer
   U. S. Dept. of the Interior
   Bureau of Mines
   2401 E. St., N.W.
   Washington, D.C. 20241

   Defense Priority Rating: none

   OCA Contact Linda H. Bowman x4820

   2) Sponsor Admin/Contractual Matters:
   Mr. Jeff Hatfield
   Grants Management Office
   U. S. Dept. of the Interior
   Bureau of Mines
   2401 E. St., N.W.
   Washington, D.C. 20241
   702-634-1313

   Security Classification: none

RESTRICTIONS
See Attached n/a Supplemental Information Sheet for Additional Requirements.
Travel: Foreign travel must have prior approval — Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.
Equipment: Title vests with GIT

COMMENTS:

COPIES TO:
Administrative Coordinator
Research Property Management
Accounting
Procurement/EES Supply Services

Research Security Services
Reports Coordinator (OCA)
Legal Services (OCA)
Library

EES Public Relations (2)
Computer Input
Project File
Other
Date 1/27/84

Project No. E-19-512

School/Dept. C&EE


Project Director(s) Dr. J. E. Husted

Sponsor U.S. Department of Interior: Office of Surface Mining

U.S. Bureau of Mines

Title Allocation Grant for the Georgia Mining and Mineral Resources and Research Institute

Effective Completion Date: 9/30/83 (Performance) 12/31/83 (Reports)

Grant/Contract Closeout Actions Remaining:

[ ] None

[ ] Final Invoice or Final Fiscal Report

[ ] Closing Documents

[ ] Final Report of Inventions

[ ] Govt. Property Inventory & Related Certificate

[ ] Classified Material Certificate

[ ] Other _______________________________

Continues Project No. ____________________________ Continued by Project No. __________________________

COPIES TO:

Project Director
Research Administrative Network
Research Property Management
Accounting
Procurement/EES Supply Services
Research-Security Services
Reports, Coordination (OCA)
Legal Services

Library
GTRI
Research Communications (2)
Project File
Other _______________________________

Form OCA 60:1028
**Project Administration Data Sheet**

**Project No.:** E-18-501  
**Original**

**Project Director:** Dr. Alan T. Chapman  
**School/Ceramic Eng.**

**Sponsor:** US Dept. of Interior, Bureau of Mines

<table>
<thead>
<tr>
<th>Type Agreement</th>
<th>Grant No. G1124113</th>
</tr>
</thead>
<tbody>
<tr>
<td>Award Period:</td>
<td>From 3/28/83 To 9/30/83* (Performance) 12/31/83 (Reports)</td>
</tr>
<tr>
<td>Sponsor Amount:</td>
<td>Total Estimated: $12,680 Funded: $12,680</td>
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<tr>
<td>Cost Sharing Amount:</td>
<td>$5,985</td>
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<tr>
<td>Title:</td>
<td>Allotment Grant for the Georgia Mining &amp; Mineral Resources and Research Institute</td>
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</table>

### Administrative Data

**OCA Contact:** Frank Huff x4820

1) Sponsor Technical Contact: Dr. John Husted

2) Sponsor Admin/Contractual Matters:

### Restrictions

See Attached NA Supplemental Information Sheet for Additional Requirements.

**Travel:** Foreign travel must have prior approval—Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

**Equipment:** Title vests with GIT; none proposed.

### Comments

*Original grant terminates 6/30/83; a no-cost extension request until 9/30/83 is in process.*

### Copies To:

- Research Administrative Network
- Research Security Services
- Research Communications (2)
- Research Property Management
- Project File
- Accounting
- Other
- Procurement/EES Supply Services
- Library
- Other

*Research Reports*
Project No. E-20-501 (subproject under E-19-512) x GIT

Project Director: Dr. R. D. Barksdale

Sponsor: US Dept. of Interior, Bureau of Mines

Type Agreement: Grant No. G1124113

Award Period: From 3/28/83 To 9/30/83 (Performance) 12/31/83 (Reports)

Sponsor Amount: Total Estimated: $13,025 Funded: $13,025

Cost Sharing Amount: $6,143 Cost Sharing No: E-19-822

Title: Allotment Grant for the Georgia Mining and Mineral Resources and Research Institute

ADMINISTRATIVE DATA

1) Sponsor Technical Contact:
   Dr. John Husted

2) Sponsor Admin/Contractual Matters:

OCA Contact

Frank Huff x4820

Defense Priority Rating: 

Military Security Classification: 

(or) Company/Industrial Proprietary:

RESTRICTIONS

See Attached Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval — Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with GIT; but none proposed

COMMENTS:

*Original grant terminates 6/30/83; a no-cost extension request until 9/30/83 is in process.

COPIES TO:

Research Administrative Network
Research Property Management
Accounting
Procurement/EES Supply Services
Research Security Services
Reports Coordinator (OCA) GTRI Library
Research Communications (2)
Project File
Other
Other

Dr. R. D. Barksdale
Sponsor Technical Contact: Dr. John Rusted

Defense Priority Rating: __________________________

(OR) Military Security Classification: __________________________

(OR) Company/Industrial Proprietary: __________________________

See Attached Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval — Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with GIT; none proposed

COMMENTS:

*Original grant terminates 6/30/83; a no-cost extension request until 9/30/83 is in process.

COPIES TO:

Research Administrative Network  Research Security Services  Research Communications (2)
Research Property Management  Reports Coordinator (OCA)  Project File
Accounting  GTRI  Other
Procurement/EES Supply Services  Library  Other
**Administrative Data**

1) Sponsor Technical Contact: Dr. John Husted

2) Sponsor Admin/Contractual Matters: FRANK HUFF X4820

**Restrictions**

See Attached NA Supplementary Information Sheet for Additional Requirements.

**Travel**

Foreign travel must have prior approval — Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

**Equipment**

Title vests with GIT; none proposed

**Comments**

*Original grant terminates 6/30/83; a no-cost extension request until 9/30/83 is in process.*

**Copies To:**

Research Administrative Network
Research Property Management
Accounting Department (E700 South, Tech Square)
Research Communications (2)
Research Security Services
Reports Coordinator (OCA) GTRI
Research Communications (2) Project File
Other

**Date:** 4/18/83

**GEORGIA INSTITUTE OF TECHNOLOGY**

**OFFICE OF CONTRACT ADMINISTRATION**

**PROJECT ADMINISTRATION DATA SHEET**

(subproject under E-19-512)  

**Original** [ ] **Revision No.** [ ]

Project No. G-35-503  

Project Director: Dr. Charles Pollard

Sponsor: US Dept. of Interior, Bureau of Mines

Type Agreement: Grant No. G1124113

Award Period: From 3/28/83 To 9/30/83* (Performance) 12/31/83 (Reports)

Sponsor Amount: Total Estimated: $14,953 Funded: $14,953

Cost Sharing Amount: $7,058

Cost Sharing No:

Title: Allotment Grant for the Georgia Mining & Mineral Resources and Research Institute

Defense Priority Rating: ____________________________

Military Security Classification: ____________________________

(or) Company/Industrial Proprietary: ____________________________
During the subject period the Director was full-time until September 20 when the Fall Quarter started. During the Fall Quarter the Director is teaching Ch.E. 4111, Fossil Fuels, for one-fourth time and three-fourths time as Director.

A major effort during the subject period was the continuation of work with administrators, faculty, and students to build the mineral engineering program.

Conferences with representatives of industry on various problems were held during the period. Visits to members of the mining industry within the state were made.

The search for new mineral processing personnel continued with letters to the Dean of Engineering recommending the employment of an internationally known surface chemist working in problems of mineral processing. Also interviewed was a young Ph.D. candidate with background in materials science and mineral processing.

Changes were made in the Advisory Board of the GMNRI in that Mr. Roy Richards, Chairman of the Board of Southwire Corporation, rotated off the Board. Mr. Jim Dellinger, President of New Riverside Ochre Corporation, was appointed for a new term of three years in his place. Other changes are anticipated when the Georgia Mining Association meets in October, as they appoint three members to the Board.

A new Carpcro induced roll magnetic separator, capable of an 18,000 gauss field, was approved and an order submitted for purchase. Carpcro also agreed to overhaul and recondition without cost our electrostatic-high tension electric separator. This is in process.
## 1. Grant Recipient
Georgia Institute of Technology
Atlanta, Georgia 30332

## 2. Project Title/Program
Allotment Program

## 3. Investigator(s)/Fellowships Recipients
Dr. John E. Husted, Director

## 4. Performing Organization:
Georgia Mining and Mineral Resources Institute (GMMRI)

## 5. Summary:
During the Fall Quarter the Director taught Ch.E. 4111, Fossil Fuels, for one-fourth time and served three-fourths time as Director.

A continuing major effort during the subject period was work with administrators, faculty, and students to build the mineral engineering program.

Conferences with representatives of industry on various problems were held during the period. Illness prevented attendance at the annual AMID meeting in Houston, Texas.

The search for new mineral processing personnel continued with letters to the Dean of Engineering recommending the employment of an internationally known surface chemist working in problems of mineral processing. Also interviewed was a young Ph.D. candidate with background in materials science and mineral processing.

The Advisory Board of the GMMRI met in October and will meet again in February, 1983.

A new Carpco induced roll magnetic separator, capable of an 18,000 gauss field, was received as well as our reconditioned electrostatic-high tension electric separator.
<table>
<thead>
<tr>
<th>1. Grant Recipient</th>
<th>Type of Report</th>
<th>Reporting Period</th>
<th>Control Number(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia Institute of Technology</td>
<td>Quarterly Technical Report</td>
<td>1/1/83-3/31/83</td>
<td>G-1124113</td>
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2. Project Title/Program

Allotment Program

3. Investigator(s)/Fellowships Recipients

Dr. John E. Husted, Director

4. Performing Organization:

Georgia Mining and Mineral Resources Institute (GMMRI)
Georgia Institute of Technology
Atlanta, Georgia 30332

5. Summary:

During the Winter Quarter the Director taught Ch.E. 4114, Introduction to Mining, for one-fourth time and served three-fourths time as Director.

A continuing major effort during the subject period was work with administrators, faculty, and students to build the mineral engineering program.

Conferences with representatives of industry on various problems were held during the period. Illness prevented attendance at the annual AMID meeting in Houston, Texas.

An offer of employment as a full Professor was made to Eric Clayfield of Shell Research Ltd. in England.

The Advisory Board of the GMMRI met in February and will meet at least once more in 1983.
1. Grant Recipient
Georgia Institute of Technology
Atlanta, Georgia 30332

2. Project Title/Program
Allotment Program

3. Investigator(s)/Fellowships Recipients
Dr. John E. Husted, Director

4. Performing Organization:
Georgia Mining and Mineral Resources Institute (GMMRI)
Georgia Institute of Technology
Atlanta, Georgia 30332

5. Summary:
During the Spring Quarter the Director taught Met. 4116, Separation Technology, for one-fourth time and served three-fourths time as Director.

A continuing major effort during the subject period was work with administrators, faculty, and students to build the mineral engineering program.

Conferences with representatives of industry on various problems were held during the period.

An offer of employment as a full Professor was made to Eric Clayfield of Shell Research Ltd. in England. He has accepted the offer, to start approximately January 1, 1984. He visited the campus in May.

Mr. Mark Pritzker, a doctoral candidate at V.P.I. was also interviewed concerning a teaching and research position, provided we have sufficient budget. This would strengthen our move to build in the area of mineral processing.

Travel during the period included:

5/12-5/15 - Visits to Thiele Kaolin and Crawford Mining Corporation in Sandersville and Perry, GA, respectively.
5/11 - Plant trip (class) to New Riverside Ochre, Cartersville, GA.
6/2-6/5 - AIME Meeting, Georgia Section, Thomasville, GA.
6/27-7/1 - Attended Separation Science Symposium sponsored by DOE, Oak Ridge National Laboratory, and the American Chemical Society, Gatlinburg, TN.
### 1. Grant Recipient
Georgia Institute of Technology
Atlanta, Georgia  30332

### Type of Report
Quarterly
Technical

### Reporting Period
7/1/83–9/30/83

### Control Number(s)
G-1124113

### 2. Project Title/Program
Allotment Program

### 3. Investigator(s)/Fellowships Recipients
Dr. John E. Husted, Director

### 4. Performing Organization:
Georgia Mining and Mineral Resources Institute (GMMRI)
Georgia Institute of Technology
Atlanta, Georgia  30332

### 5. Summary:
Contract G-1124113 received a no-cost extension through Sept. 30, 1983. Expenditures on the contract were for completion of faculty and student research. Titles and faculty are as follows:

- **"Rock Slope Stability of Quarries and Open Pit Mines,"** conducted by Dr. R. D. Barksdale, School of Civil Engineering. Three interactive user-friendly computer programs were developed for analysis of rock slope stability. A full report will be released in the near future.

- **"Preparation of Simulated Chromite Ores,"** by Dr. A. T. Chapman, School of Ceramic Engineering. The objective of the work was to provide well characterized chromite powders for use as standards in extractive metallurgy leaching studies of domestic chromites.

- **"Uranium Content in Georgia Phosphate Deposits,"** by Dr. Geoffrey G. Eichholz, Nuclear Engineering. A study of radiation effects of uranium content of Georgia coastal phosphates was examined.

- **"A Study of the Potential for Producing Ultra-Hard Surface Coatings for Comminution Processes,"** by Dr. R. F. Hochman. This was a part of a continuing study using titanium carbide and titanium nitride.

- **"Bauxite Residue Fractionation with Magnetic Separators,"** by Dr. D. W. Tedder. The study was on both domestic and foreign muds and sands and is part of continuing research.

- **"Work on Predicting Physical Behavior of Coal Systems,"** by Gus K. Georgeton, doctoral candidate. Work is directed toward accurate predictions of physical characteristics of coal derived fluids. Work is under Dr. A. S. Teja.

- **"The Effect of Physical and Chemical Characteristics of Coal on the Adsorption of 'Thiobacillus ferroxidans' to Coal,"** by Dr. A. S. Meyerson. This is part of a continuing study.

- **"Search for Exposures of Ultramafic Rocks in Georgia by Landsat Imagery,"** by Dr. C. O. Pollard, Jr. and Nick Faust. So far the image techniques were not...
successful on known Georgia deposits.

"The Effects of Iron on the High Temperature Leaching of Chromite with Sodium Hydroxide," by L. M. Mohnkern. This is a master's thesis effort.

Reports resulting from the studies are expected to be included in a publication from the Georgia Mining and Mineral Resources Institute. A summary was given in the Institute Annual Report.
1. Grant Recipient

| Georgia Institute of Technology | FINAL | 7/1/82-9/30/83 | G-1124113 |

2. Project Title/Program

Allotment Program

3. Investigator(s)/Fellowships Recipients

Dr. John E. Husted, Director

4. Performing Organization:

Georgia Mining and Mineral Resources Institute (GMMRI)
Georgia Institute of Technology
Atlanta, Georgia 30332

5. Summary:

Under separate cover bound copies of research performed under this contract are being forwarded. Where work is in progress, such as incomplete thesis and dissertations, a summary progress report is included.

Quarterly report for period July 1 - September 30, 1983 lists the research projects.

During the period covered by this report active liaison was maintained with industry, both through the external Advisory Board and through direct contact with staffs of individual companies.

Mr. Eric Clayfield, Principal Scientist of the Shell Oil Company, Thornton Research Centre, Chester, England, accepted a position as Professor and will replace Dr. Husted when he retires April 1, 1984.

Due to severe financial limitations imposed by the University System of Georgia, no other new personnel were employed at this time for the mineral engineering program.
October 12, 1983

Dr. John E. Husted
Georgia Mining and Mineral Resources Institute
School of Chemical Engineering
Georgia Institute of Technology
Atlanta, Georgia 30332


Dear Dr. Husted:

Enclosed is a paragraph description of the status of the project as of this date. The resources are now available to us for Rochie Tschirhart to identify a "signature" for the ultramafic deposits, if it is going to be possible at all to apply these techniques in the Southeastern U.S. We have visited the best test localities (Buck Creek, Laurel Creek, Lake Burton, and Lake Chatuge), obtained pertinent maps and reports, obtained the Landsat imagery data set, and activated the correct computer algorithms to identify a signature.

Rochie Tschirhart continues as a Graduate Research Assistant with Nick Faust. Nick and I will continue to advise him as he completes work on this project for his Masters thesis.

Sincerely

C.O. Pollard, Jr.

xc: Nick Faust
    Rochie Tschirhart
    C.S. Kiang
    L.T. Long
Search for Exposures of Ultramafic Rocks in Georgia by Landsat Imagery

Co-Principal Investigators: C.O. Pollard, Jr. and Nick Faust
Graduate Research Assistant: Rochie E. Tschirhart

The purpose of this project was to evaluate the ability of Thematic Mapper data from the Landsat-4 satellite, and the techniques applied to the data, to provide information that could be of economic use in geological exploration of Georgia's olivine, nickel, and chromium deposits.

Two areas of known ultramafic deposits were studied in detail. One area was in the vicinity of Lake Chatuge in North Georgia and the other area was the Buck Creek deposit in North Carolina. After radiometric and geometric corrections were applied to the data, the digital images were rectified to topographic maps for accurate identification of the known deposits. By locating known deposits on the digital images, enhancement techniques were used in an attempt to make the ultramafic deposits "stand out" on the image. It is anticipated that, once the correct technique is identified, other areas that "stand out" will be checked to see if they are ultramafic deposits not yet identified.

So far, the image enhancement techniques that have been applied have not been successful in discriminating the known deposits. The search for the correct treatment of the data is continuing, principally by Rochie Tschirhart, who will complete a Master's thesis in connection with this effort.