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PLAN FOR OPERATION AND GROWTH

1985-1994

UNIVERSITY OF UTAH RESEARCH INSTITUTE

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CONTENTS

	<u>Page</u>
List of Tables.....	i
EXECUTIVE SUMMARY.....	1
INTRODUCTION.....	3
GOALS AND STRATEGIES.....	4
Goals.....	4
Strategies.....	5
Recommended Advisory Board.....	6
EXPANSION OF CURRENT WORK.....	8
Earth Science Laboratory.....	8
Center for Remote Sensing and Cartography.....	8
Environmental Studies Laboratory.....	9
NEW OPPORTUNITIES FOR GROWTH.....	10
Plan for Increasing the Academic Value of UURI to the University.....	10
Cooperative Research with the Idaho National Engineering Laboratory.....	11
Commercialization of Products and Services.....	12
Geological and Environmental Hazards Research Center.....	12
Research and Services for the Petroleum Industry.....	13
Expanded Uses of Remote Sensing.....	14
Small Business Innovation Research (SBIR) Programs.....	14
ONE-YEAR OPERATING PLAN -- FY 1985.....	16
Anticipated Income.....	16
Anticipated Expenditures.....	16
Marketing Plan.....	20
Provision of Administrative Services.....	20
Space Requirements.....	22
Replacement and Repair of Equipment.....	22
Salary Adjustments.....	24
LONG-RANGE OPERATING PLAN -- FY 1985 TO FY 1994.....	26
Assumptions in Ten-Year Financial Plan.....	26
Plan for Giving to the University of Utah.....	28
Additional Cash Requirements.....	28
Line of Credit from the University of Utah.....	28
SPECIAL APPROPRIATIONS.....	31
APPENDIX 1 - INTERVIEWS ON CAMPUS.....	32
APPENDIX 2 - LETTER FROM CEM TO FEMA.....	33

LIST OF TABLES

	<u>Page</u>
Table 1. Summary Financial History of UURI.....	17
Table 2. Anticipated Revenue -- FY 1985.....	18
Table 3. Anticipated Expenditures -- FY 1985.....	19
Table 4. Special Marketing Costs.....	21
Table 5. Equipment Replacement and Repair.....	23
Table 6. Average Salary Increases, 1981-1984.....	25
Table 7. Ten-Year Financial Plan.....	27
Table 8. Additional Cash Requirements as Part of Ten-Year Plan.....	30

EXECUTIVE SUMMARY

In response to instructions from the Board of Trustees, UURI intends to pursue an aggressive plan for long-term growth. We are recommending expansion of UURI's goals and we have developed comprehensive and specific strategies for accomplishment of these goals.

Our target growth rate is reflected in the Ten-Year Financial Plan (Table 7). We anticipate that revenues will increase from a current level of \$1.8 million to \$12.0 million by 1994. During the coming year, anticipated funding is \$2.2 million, mainly from federal agencies. A long-term increase will require a well-funded marketing effort as well as acquisition of new scientific talent and laboratory facilities. Such growth also anticipates an expansion from essentially zero at present to \$3.6 million per year in faculty-related research at UURI.

A special marketing effort at a total cost of \$150K will be undertaken in FY 1985, \$100K to be paid out of current cash reserve. This will supplement our normal marketing effort of \$50K out of operations. Whereas modest growth in current project areas appears possible, we have identified a number of excellent opportunities for growth in new technical areas. Our marketing effort will be directed primarily toward those new areas.

UURI plans a long-term program of giving to the University of Utah. We would like this to be a two-way street, such that we derive equal benefit from the University. Our long-term giving will consist of a graduate fellowship program, development funds for faculty who participate in research at UURI and eventual endowment of a chair in petroleum or reservoir engineering.

As we grow, UURI will require an increasing cash reserve to do business. A major increase in this requirement is anticipated during the coming year as a result of the probable loss of our letter-of-credit method of reim-

bursement for work done for the DOE-Idaho Operations Office. As a result of new federal regulations, the letter of credit we have had in the past appears now to be inappropriate, and DOE-ID is under considerable pressure to rescind it during our impending negotiations for a new contract. Table 8 addresses the cash requirements we anticipate as part of the ten-year plan.

We recommend setting aside \$150K for a contingency fund from currently available monies to cover unexpected events such as audit disallowances, project cost over-runs, and especially for unanticipated business opportunities. Spending from this contingency fund would require approval from the Board of Trustees. Additions to this fund will commence in FY 1987 and will reflect growth in the corporation.

Salary increases are recommended at an average level of 15 percent for fiscal year 1985. Of this total, 3 percent will be a non-recurring adjustment which will not add to the base.

Equipment repair and replacement will total \$97K for FY 1985, of which \$50K will be a special allocation from current cash and \$47K will come from operations.

Current space is 14,600 sq ft, and we are obligated to acquire an additional 700 sq ft. Contingent upon the outlook for near-term growth, we may acquire an additional 3,300 sq ft of contiguous space. All costs for space expansion will be covered from operations, unless management decides to spend reserves for this purpose.

Changes in the provision of our administrative services are anticipated over the next few months, and this is spelled out below.

A 15-member Advisory Board is recommended to help us define opportunities for growth. The makeup of this Advisory Board will be broad-based and national in character.

INTRODUCTION

At the April, 1984 meeting of the Board of Trustees of the University of Utah Research Institute, two highly significant near-term objectives were given to UURI management, namely: (1) achieve a closer working relationship with the University, and (2) develop a long-term plan for considerable growth of UURI. This document is a response to these instructions.

GOALS AND STRATEGIES

According to the bylaws of UURI, "the fundamental purpose of the corporation shall be to provide an organizational structure under the immediate and complete control of the University of Utah which shall be responsible for originating, developing, and performing research and related contracts with government agencies, private businesses, and charitable organizations". This purpose is further elaborated in the goals as stated below.

Goals

The following goals were adopted for the University of Utah Research Institute at the Board of Trustees' meeting on 3 September, 1980.

1. To originate and perform research and development programs for government and industry so as to achieve technical and scientific excellence, and to enable the University of Utah to fulfill its research mission beyond academic commitments.
2. To act as an interface between academic research and the community by applying knowledge developed at universities to solve problems for industry and thereby support the economic development of the community and the scientific and technical needs of society.
3. To develop and attract a scientific/technical, managerial and support staff capable of undertaking independent contract research programs of the highest quality.
4. To provide, as appropriate, technical, administrative, financial and other support for research and research-related programs at the University of Utah.

Two additional goals are herein recommended:

5. To develop a significant level of involvement of faculty and students from the University of Utah in UURI projects.
6. To stimulate intra-state and intra-region cooperative and multidisciplinary research.

Strategies

In order to fulfill these goals, a number of strategies are appropriate. The following list of strategies may be modified from time to time to account for changing scientific, financial, and political directions and conditions.

1. Maintain financial viability.
 - a. Develop a diverse funding base to minimize funding fluctuations.
 - b. Give priority to development of several large funding bases (> \$1 million/year).
 - c. Generate extra funds to equip and maintain existing and new laboratory facilities and to provide seed money for developing new staff capabilities.
2. Develop and maintain a capable technical staff.
 - a. Hire personnel having the highest technical qualifications.
 - b. Provide stimulating, efficient, state-of-the-art working environment and facilities.
 - c. Provide opportunity for continued training, advancement and participation in professional societies.
 - d. Provide overall compensation that is competitive.
3. Develop and maintain state-of-the art research equipment and facilities.
 - a. Provide for maintenance and upgrading of current research equipment and facilities.
 - b. Develop and pursue a long-range plan for acquisition of new research equipment and facilities.
 - c. Provide state-of-the-art computing and other support facilities.
4. Develop and maintain management, administrative and other support capabilities.
 - a. Maintain the current project management system for technical work.
 - b. Develop a flexible administrative management structure that can grow as UURI expands.
 - c. Provide, in-house, all administrative functions possible while subcontracting for others, with the eventual goal of providing all needs in-house.

5. Maintain active liasion both with the University of Utah and with the local community.
 - a. Facilitate technical interchange between UURI and the University of Utah, other universities, and state agencies.
 - b. Develop a long-term approach for financial contributions to the University.
 - c. Periodically assess local community needs and availability of new, university- or Institute-developed technology to help meet those needs.
 - d. Maintain coordination with the Engineering Experiment Station.
 - e. Conduct workshops on matters of local or regional interest.
6. Maintain a national and international presence.
 - a. Provide funds for scientific staff to attend selected national and international meetings.
 - b. Periodically assess needs of national and international communities and availability of university- or Institute-developed technology to help meet those needs.
 - c. Seek venture capital and working arrangements to bring ideas for products and services developed at the University and the UURI to commercial realization for the benefit of society.
 - d. Conduct workshops on matters of national or international interest.

Recommended Advisory Board

In order to facilitate communication between personnel of the University and UURI on one hand, and personnel from the government, community and private sector on the other hand, we propose formation of an Advisory Board consisting of the following representatives:

Private Sector	5
Universities	4
State Agencies	3
Federal Agencies	3
	<u>15</u>

This board would meet once per year to review UURI's activities, progress, problems, and challenges, and to give critical advice on future

trends. The information gained from this group would be used to help construct each year's operating plan and to modify and update long-term plans.

EXPANSION OF CURRENT WORK

There are two potential avenues of growth--expansion of current work and expansion into new areas. The first avenue is considered in this section and the second avenue is considered in the following section. In general, we conclude that growth in current research areas has limited potential, and in order to achieve substantial growth, we must expand UURI's capabilities into new areas by (1) acquisition of appropriate technical and support staff and (2) acquisition of appropriate laboratories, equipment and other facilities.

Earth Science Laboratory (ESL)

Approximately 90 percent of the current work is in research in geothermal energy development for the federal government. At the beginning of FY 1985, ESL will be negotiating a new contract with DOE-Idaho Operations Office. DOE appears to be willing to enter into a 4- or 5-year agreement. Opportunity for significant expansion of this work, however, appears to be modest at present because the federal budget has not been increased nor are there plans for increase. One possible avenue for expansion is in further application of our geothermal research and development results for industry. We intend to pursue development of an expanded commercial geothermal business over the coming year.

The Earth Science Laboratory also maintains commercial services in analytical geochemistry, X-ray diffraction analyses of rocks and minerals, geophysical field surveys and interpretation, and geologic mapping. There appears to be opportunity for modest near-term growth in each of these fields.

Center for Remote Sensing and Cartography (CRSC)

The principal projects consist of a grant for development of remote sensing techniques from the National Aeronautics and Space Administration and

several relatively small contracts from the states of Nevada and Utah, the U.S. Army, the Bureau of Land Management and the Soil Conservation Service. There is significant potential for expanding the NASA work modestly and for doubling other work over the next two years.

Environmental Studies Laboratory (EVSL)

There are currently three research projects in Environmental Studies -- an atmospheric visibility degradation study for Electric Power Research Institute, and studies of acid rain and changes in vegetation at the Hunter Power Plant for Utah Power and Light. Of these, there seems to be considerable potential for continuation and expansion of atmospheric visibility studies as we build experience and equipment because of the planned construction of power plants in the canyon areas of Utah and Arizona. Acid rain studies will probably be discontinued because EVSL is finding no evidence for acid rain in Utah.

NEW OPPORTUNITIES FOR GROWTH

During the past several years the research environment in the United States has changed considerably. The effects of world-wide recession and of an altered national research policy have been primary factors causing these changes. Research funds have become much more scarce than they were previously, and national priorities among research topics have changed.

Nevertheless, there is considerable new opportunity. Over the past year, it has become evident that industry is pursuing research and development with renewed vigor. In addition, President Reagan has recognized the primary role that universities and university-related research groups play in new scientific and engineering development, and has taken steps to foster growth of these groups. At UURI, we have been working to identify potential new opportunities for growth, and we intend to pursue these opportunities on a priority basis. We will concentrate significant effort in developing work that would lead to high levels of funding, more than \$1 million per year.

Acquisition of research and development funding in new areas will require considerable effort. Competition is intense. We will need supplemental funding for any significant effort to develop new markets. Our marketing plans, including estimates of the funds required, are discussed further below. In this section, we describe the primary new areas in which there appear to be considerable potential for growth.

Plan for Increasing the Academic Value of UURI to The University

Over the past several months, J. J. Brophy and S. H. Ward have held meetings with 19 faculty members* at the University for the purpose of determining whether or not it makes sense to bring some of the research

* See Appendix 1.

presently being done on campus to UURI for development and commercialization. Several potential opportunities have been identified, including work with Profs. Kim McCarter, Bob Seader, Om Gandhi, Joe Olsen, Steve Jacobsen, and Bob Smith. We intend to expand selectively our contacts with faculty, and to revisit the more likely prospects.

In addition, we have made long-term plans for a UURI Fellowship program at the University and a UURI Chair in Petroleum or Reservoir Engineering in the College of Engineering or the College of Mines and Mineral Industries. Each of these activities will involve faculty and students in UURI research.

Cooperative Research with the Idaho National Engineering Laboratory

We have learned through visits with DOE that the Reagan Administration has instructed DOE and its national laboratories to promote cooperative research projects with universities and university-related groups. This is in line with the Administration's belief that the predominant scientific strength of the USA resides in such groups. In particular, the Idaho Operations Office of DOE and their prime contractor for the Idaho National Engineering Laboratory (INEL), EG&G Idaho, Inc. have both informed us that INEL is actively seeking cooperative research projects with university groups.

There are a number of funded projects and ideas in EG&G that are logical candidates for UURI and/or one or more departments of the University of Utah to participate in with EG&G. Among these are:

1. Ocean Hydrothermal Energy
2. Strategic Materials Program
3. Production Reactor Facility
4. Hydrometallurgy

Commercialization of Products and Services

Over the past several months, UURI has had conversations with a number of companies that specialize in providing venture capital for development and commercialization of new products and services. We are also aware of a number of ideas for potentially saleable products that have been developed at the University. Two examples are (1) a process and apparatus to produce crude oil from tar sands, developed by Prof. J. D. Seader, and (2) equipment for monitoring potential landslides and earthen dams, developed jointly by Prof. M. K. McCarter and the electronics staff at UURI.

As one of our goals at UURI, we plan to pursue aggressively our role as a link between the University and the community by locating sources of capital to finance commercialization of ideas developed both at the University and at UURI. One venture capitalist is already attempting to raise funds for application of Seader's research for recovering oil from tar sands. Seader's heat pipe method, applied to general distillation, has considerable potential beyond the tar sands application.

Geological and Environmental Hazards Research Center

The University of Utah Research Institute proposes to form a Geological and Environmental Hazards Research Center within the Institute. Utah has a valuable pool of talent available in its several universities and colleges, state agencies and private industry to perform a great deal of the scientific, engineering and socio-political work that is needed. What is lacking is coordination of this talent. No single state agency has a coordination mandate, and, further, state agencies such as the Utah Geological and Mineral Survey and the Division of Comprehensive Emergency Management have no research or technology-development functions.

Assessment and mitigation of both man-induced and natural geologic and

environmental hazards require an interdisciplinary effort. A broad range of scientific and engineering studies is required. Of equal importance are studies of the social consequences of hazards and mitigation measures, and appropriate means to implement programs to deal with preparedness and emergency measures.

The Center will provide the broad range of talents needed to treat hazards problems. We will work closely with existing Utah state agencies in helping to prioritize activities in the Center and in implementation of results. We will also work closely with Federal agencies doing hazards work, such as the U.S. Geological Survey, the Federal Emergency Management Agency and the Environmental Protection Agency.

As a first step in the formation of the Geological and Environmental Hazards Research Center, UURI has written a research proposal in the amount of \$465,000 to the State Division of Comprehensive Emergency Management (CEM) for monitoring of potential landslides. Professors M. K. McCarter and J. Olsen of the University are co-investigators on the proposal. CEM has forwarded our proposal to the Federal Emergency Management Agency (FEMA) with a recommendation for funding (Appendix 2).

Research and Services for the Petroleum Industry

As the price of petroleum products rises higher, oil companies large and small are spending more domestically to improve the productivity of producing fields and discover new areas. During the past two years they have been spending increasing sums on research, and significant money is available to university-related research and service groups. Several items of technology either under development at UURI or identified as being within our expertise appear to be saleable to the petroleum industry. Among these are:

1. Geochemical Services
2. Thermal Maturation Studies

Expanded Uses of Remote Sensing

The National Aeronautics and Space Administration has been mandated by President Reagan to initiate more joint research programs with universities and university-related groups. These instructions have been passed down from NASA headquarters to the NASA laboratories (JPL, Goddard, etc.). UURI plans to take advantage of this mandate by initiating new contacts with the NASA laboratories to promote joint research ideas.

There are a number of ideas for new funding that will be pursued over the next year. Among these are:

1. There is potential for funding under the "Man-and-Biosphere" program of UNESCO. The U.S. intends to support this program even though it does not fully support UNESCO.
2. There is potential for combining the talents of ESL and CRSC in obtaining funding for research in remote sensing applications to geothermal exploration. NASA is the most likely funding source.
3. Opportunities for working with the governments of Mexico and Brazil have been identified and will be pursued.

Small Business Innovation Research (SBIR) Programs

Under Public Law 97-219, The Small Business Innovation Development Act of 1982, approximately \$45 million were set aside during Fiscal Year 1983 for research to be performed by small businesses. This amount will increase to \$450 million by Fiscal Year 1986. In addition to the federal SBIR program, the State of Utah is planning an SBIR program, patterned after the federal program, to become operational in the near future. Most federal agencies have

not been able to use this money because the small businesses eligible under the program do not have the expertise required.

We have been examining ways to take advantage of the SBIR program, and believe we have identified a vehicle. UURI can assume a minority position in a small business that others create and can license products or services to that business. The small business would hire appropriate staff to perform part of the research work, and could subcontract project management and a portion of the research back to UURI. UURI would be able to collect royalties and licensing fees on products or services that are brought to the commercialization stage. We plan to facilitate the formation or use of existing small businesses in this way to take advantage of the SBIR program.

ONE-YEAR OPERATING PLAN -- FY 1985

During the past year, UURI has undergone considerable change. The sale of UBTL resulted in a significant decrease in total income to UURI, but at the same time disposed of an organization that had consistently been a financial drain on other divisions (Table 1). Since that sale, the remaining parts of UURI¹ have been operating on a very tight budget in order to demonstrate financial viability.

The most significant adverse effect of our fiscal restraint has been in marketing. We have had a very limited amount of money to spend on development of new business. Obviously, this situation is not compatible with growth or even with maintenance of current funding levels. Accordingly, the one-year and long-term plans recognize and provide for an aggressive marketing effort.

Anticipated Income

Table 2 lists the income we anticipate from all funding sources in FY 1985. The figures are reasonably firm and are conservative. New markets generally take a period of months to years to develop, and we have allowed for modest growth in the coming year as a result of our recommended marketing effort.

Anticipated Expenditures

Table 3 shows anticipated expenditures assuming a technical staff of the same size as at present and the addition of staff time for the marketing effort, discussed below.

¹ UURI now consists of the Earth Science Laboratory (ESL), the Center for Remote Sensing and Cartography (CRSC) and the Environmental Studies Laboratory (EVSL). Utah Biomedical Test Laboratory (UBTL) was sold and the Applied Technology Division (ATD) was dissolved.

TABLE 1
SUMMARY FINANCIAL HISTORY OF UURI
(AUDITED FIGURES)

Fund Balance (September 30)

<u>YEAR</u>	<u>UBTL</u> ²	<u>ATD</u> ³	<u>ESLD</u> ⁴	<u>ADMN</u> ³	<u>TOTAL</u>
Cum to 1982	(\$587,655)	\$131,085	\$262,658	\$1,083,969	\$890,057
1983	52,978	(146,793)	8,410	(111,131)	(96,536)
Oct-Dec 1983	15,419 ⁵		31,024		46,443
Jan-July 1984			(18,108) ⁶		(18,108)
Total	(\$419,258)	(\$15,708)	\$283,984	\$ 972,838 ¹	\$821,856

¹ ESL and ATD generated an estimated 50% of the funds in this account. Therefore, funds belonging to UURI after the sale are:

	\$283,984
	(\$ 15,708)
	\$486,419
Total	<u>\$754,795</u>

² Sold

³ Dissolved

⁴ Includes Earth Science Laboratory, Center for Remote Sensing and Cartography and Environmental Studies Laboratory

⁵ Includes Reed Harker Settlement

⁶ Includes one-time cost items as follows:

Wayne Ursenbach Settlement	\$15,000
Costs of Moving and Transition	60,996
Total	<u>\$75,996</u>

TABLE 2
 ANTICIPATED REVENUE -- FY 1985
 (Thousands \$)

	<u>Revenue</u>
<u>Earth Science Laboratory (ESL)</u>	
U.S. Department of Energy	950
U.S. Department of Defense	200
Commercial Services	180
	1,330
 <u>Center for Remote Sensing and Cartography (CRSC)</u>	
U.S. National Aeronautical and Space Administration	100
State and Federal Contracts	85
Other	15
	200
 <u>Environmental Studies Laboratory (EVSL)</u>	
Electrical Power Research Institute	315
Utah Power and Light	150
	465
 <u>Faculty Related New Projects</u>	
	200
GRAND TOTAL	\$2,195K

TABLE 3
 ANTICIPATED EXPENDITURES -- FY 1985
 (Thousands \$)

Operating Budget

<u>Item</u>	<u>Costs</u>
Direct Costs	
Salaries and Wages	\$ 848
Employee Benefits	307
Consultants	40
Travel	25
Supplies	20
Computer	40
Sample Analyses	15
Miscellaneous	10
Total Direct Costs	<u>1,305</u>
Indirect Costs	587
G&A Costs	189
Fee	<u>114</u>
Total Expenditures	<u><u>\$2,195</u></u>

Marketing Plan

If UURI is to grow significantly, an aggressive marketing effort must be started at the earliest opportunity. Repeated contacts with a potential client are required to identify specific needs, determine a strategy for serving those needs and convincing the potential client that we can serve him best. Because of the low total funding base available in UURI during the past years, the overhead account, which can be charged for reasonable marketing expenses, has been insufficient to cover the marketing required. We therefore propose to spend some of the fee generated in past years for a special marketing effort. Table 4 shows special marketing costs anticipated for FY 1985.

Subject to negotiation with the Department of Geology and Geophysics, Dr. S. H. Ward would take two quarters of leave from the University to work on market development at UURI. In addition, the regular staff would spend an extra amount of their time marketing. This effort would be in addition to the amount that the overhead accounts can support.

In addition, the contacts with University faculty require repeat visits and new visits. Facilitating the placement of faculty-related new projects with industry, government, or venture capitalists will require a major effort, as we have already experienced with Prof. McCarter's landslide project.

Provision of Administrative Services

At the present time, our administrative services are being provided by former UURI employees through a contract with Deseret Research Corporation. This contract has been extended to the end of calendar year 1984, but in the long term it is obvious that UURI must make other provisions. Several options are available, including a contract to an accounting/administrative group for some or all of these needs or purchasing some or all of these needs from the

TABLE 4
SPECIAL MARKETING COSTS

Burdened Salaries		\$100,000
S. H. Ward	50%	
P. M. Wright	25%	
J. N. Moore	10%	
D. L. Nielson	10%	
M. K. Ridd	5%	
A. C. Hill	5%	
Travel		25,000
Consultants		20,000
Other		<u>5,000</u>
	Total	\$150,000

University. Our current plan is to select among the several opportunities and to terminate the arrangement with Deseret by the end of calendar year 1984.

Space Requirements

Our present 14,600 sq ft of space in Suites A, C and D at 391 Chipeta Way is marginally adequate only for current operations. At the beginning of October, 1984, we will expand into 700 sq ft more space in Suite C, which will relieve our present tight situation somewhat. We will be required to lease new space for any expansion of business or when an in-house administrative service group is formed.

Suite B, which comprises 3,300 sq ft, in the middle of our block of space, is currently open and the building manager is attempting to find a leasor. We have first right of refusal on this additional space and will probably have to make a decision about whether or not to lease it sometime during the next few months. If we can see a clear way to pay for this space, we will lease it, since it would be preferable to have contiguous facilities.

Replacement and Repair of Equipment

Because of very tight operating budgets over the past several years, needs for repair or replacement of field and laboratory equipment in UURI have been ignored. Table 5 shows our current needs. Our field vehicles date from 1978, and none has less than 70,000 hard field miles. We continue to be funded for field work. We will require replacement of 4 field vehicles during the coming year. In addition, we have several items in the computer center, including terminals and plotters, that need repair. We plan to repair these and put our computing equipment back in good shape. Other items of equipment are needed to upgrade or replace existing laboratory facilities. We will fund \$50K of equipment replacement and repair out of current cash and \$47K out of

TABLE 5
EQUIPMENT REPLACEMENT AND REPAIR
(Thousands \$)

<u>Items</u>	<u>Cost</u>
Field Vehicles (4 ea)	48
Repair of Computing Equipment	16
Field-Portable Computer	8
Replacement of Geochemical Equipment	25
	<u>\$97K</u>

FY 1985 operating funds.

Salary Adjustments

In order to ensure profitability for UURI for the past year, employees of ESL were required to take all of their vacation during the fiscal year and additionally were furloughed without pay for two weeks. In this way, employees contributed a salary savings of \$22,700. Most of the scientists worked during their furlough on projects and proposal writing.

Table 6, below, shows the average salary increases granted during the past several years. Increases were held down during the last two years to accomodate a shrinking research budget and to protect the positions of as many critical staff members as possible. In addition, the general level of salaries in UURI are significantly below the level paid for comparable professionals and non-professionals in industry and the national laboratories.

Considering these factors, we conclude that salary adjustments are needed for 1984-1985 and beyond. Our goal is to make our salary scale as competitive as possible over the next several years. This is necessary to attract the top people needed to make UURI prosper. We recommend an average salary increase of 15 percent during FY 1985, with further increases in outyears until our salary scales reach truly competitive levels.

TABLE 6
AVERAGE SALARY INCREASES, 1981-1984

	<u>% Increase</u>
1981 - 1982	14.5
1982 - 1983	0.7
1983 - 1984	5.2

Recommended Salary Increase: 15% average

LONG-TERM OPERATING PLAN

In the long term, UURI intends to pursue an aggressive plan for long-term growth. This is reflected in the Ten-Year Financial Plan (Table 7). We anticipate that income will grow from a current level of \$1.8 million to \$12.0 million by 1994. This will require a well-funded marketing effort as well as acquisition of new scientific talent and laboratory facilities. Such growth also anticipates an expansion from essentially zero at present to \$3.6 million per year in faculty-related research at UURI.

Assumptions in the Ten-Year Financial Plan

In devising our Ten-Year Financial Plan, several assumptions have been used. These are as follows.

1. A strong growth in internally generated funds will result from a sharply increased marketing effort.
2. As more faculty become involved, the faculty-related revenue will constitute about one-third of total revenue.
3. Fees generated from subcontracts will grow steadily as subcontract volume grows.
4. The mix of government and industrial sponsorship will shift towards industrial so that the fee rate will increase.
5. The indirect and G&A rates will be kept essentially constant.
6. Special marketing expenses will be paid from current and FY 1985 operations.
7. Provision will be needed to add critical personnel in key areas in order to provide a broader range of skills and lead us into new research areas.
8. New laboratory and support equipment will be needed as well as

TABLE 7
TEN-YEAR FINANCIAL PLAN

BUDGET FY 1985 - 1995 (thousands \$)	1985	1986	1987	1988	Year 1989	1990	1991	1992	1993	1994
REVENUE										
UURI Generated Income	1995	2718	3280	4030	4769	5499	6270	6933	7640	8340
Faculty Related New Projects	200	450	750	1150	1550	1950	2300	2750	3150	3550
Total	2195	3168	4030	5180	6319	7449	8570	9683	10790	11890
DIRECT COSTS										
In-house	1305	1660	2070	2655	3237	3787	4359	4929	5496	6060
Subcontracts		318	470	610	724	843	954	1057	1139	1229
INDIRECT COSTS	587	770	955	1218	1491	1777	2040	2302	2574	2834
% Rate	45%	45%	45%	45%	45%	46%	46%	46%	46%	46%
G & A COSTS	189	248	307	392	481	571	656	740	828	912
% Rate	14.5%	14.5%	14.5%	14.5%	14.5%	14.8%	14.8%	14.8%	14.8%	14.8%
FEE AND ROYALTY INCOME										
Fee Amount	114	172	228	305	386	471	561	655	753	855
% Fee	5.5%	5.75%	6.0%	6.25%	6.50%	6.75%	7.0%	7.25%	7.50%	7.75%
Royalty					50	60	70	80	90	100
Total	114	172	228	305	436	531	631	735	843	955
FEE AND ROYALTY EXPENDITURES										
UURI										
Equipment	15	54	50	84	100	130	150	175	200	225
Reserve			25	30	40	50	50	50	50	50
Contingency			21	30	40	50	50	50	50	50
Salaries Adjustment	47	25	25	25	25					
Development Funds For UURI Staff		36	45	56	70	83	97	112	126	141
Marketing	50	50	50	60	70	80	90	100	125	150
Fee - Other Purposes					23	49	84	116	137	160
Total	112	165	216	285	368	442	521	603	688	776
Donations To University (fee)										
Graduate Fellowships					16	24	32	40	48	56
Development Funds For Faculty	2	7	12	20	27	35	43	52	62	73
Reserve for Chair - Reservoir Engineering					25	30	35	40	45	50
Total	2	7	12	20	68	89	110	132	155	179
Total	114	172	228	305	436	531	631	735	843	955
SPECIAL MARKETING EXPENSE	100									

maintenance of existing equipment.

Plan for Giving to the University of Utah

UURI has planned a long-term program of giving to the University of Utah. We would like this to be a two-way street, such that we derive equal benefit from the University. Our long-term giving will consist of a graduate fellowship program, development funds for faculty who participate in research at UURI and eventual endowment of a chair in petroleum or reservoir engineering. These contributions will come from new faculty-related projects; no other source of gifts to the University is anticipated.

Additional Cash Requirements

As we grow, UURI will require an increasing cash reserve to do business. A major increase in this requirement is anticipated during the coming year as a result of the probable loss of our letter-of-credit method of reimbursement for work done for the DOE-Idaho Operations Office. As a result of new federal regulations, the letter of credit we have had in the past appears now to be inappropriate, and DOE-ID is under considerable pressure to rescind it during our impending negotiations for a new contract. Table 8 addresses the cash requirements we anticipate as part of the ten-year plan.

Line of Credit from the University of Utah

The University of Utah has expressed a willingness to extend to UURI a line of credit in the amount of \$500,000. This amount approximately equals the total value of the gifts that UURI has contributed to the University of Utah Research Foundation and the University of Utah. Funds would be available to UURI from this line of credit at no interest. There would be a requirement for UURI to demonstrate need for use of this line of credit and the money would be available as long as the need remained, with monthly review to

establish continuing need.

We recommend that this line of credit be used to supply cash needs of UURI beyond that which can be supplied internally.

TABLE 8
ADDITIONAL CASH REQUIREMENTS AS PART OF TEN-YEAR PLAN

	1984-85	1985-86	1986-87
INCREASE IN BUDGETED REVENUE OVER PRIOR YEAR REVENUE			
BUDGETED REVENUE	2290000	2820000	3530000
PRIOR YEAR REVENUE	1860000	2290000	2820000
INCREASED REVENUE	430000	530000	710000
INCREASED REVENUE PER DAY	1178.08	1452.05	1945.21
ACCOUNTS RECEIVABLE TURNOVER IN DAYS*	70.1	70.1	70.1
ADDITIONAL CASH REQUIREMENTS	82584	101789	136359
CHANGE IN D.O.E. CONTRACT FROM LETTER OF CREDIT			
PORTION OF CURRENT BUDGET	1148000		
PASS THRU MONEY ON DRILLING SUBCONTRACT**	1410000		
TOTAL DOE FUNDING	2558000		
DOE FUNDING PER DAY	7008.22		
ADDITIONAL ACCTS./REC. TURNOVER IN DAYS***	67		
ADDITIONAL CASH REQUIREMENTS	469551		
SPECIAL MARKETING FROM 10 YEAR BUDGET	150000	75000	25000
ADDITIONAL CASH REQUIREMENTS	702134	176789	161359

* ACTUAL ACCTS./REC. TURNOVER EXPERIENCED FOR ESLD/ATD THRU 8-31-84

** PASS THRU MONEY NOT SHOWN IN YEARLY BUDGETED REVENUE

*** ASSUMES 0 DAYS TURNOVER (ADVANCED PAYMENT) FOR LETTER OF CREDIT.
BILLING INCLUDES 30 DAYS TO INVOICE, 7 DAYS MAILING, 30 DAYS TO PAY.

SPECIAL APPROPRIATIONS

In order to implement the plan presented, three special appropriations are recommended:

1. Special Marketing Effort \$100,000

This special one-year effort, as described above, is necessary during the coming fiscal year to broaden the base of support, both in terms of new faculty-related projects, additional geoscience programs, and special projects.

2. Equipment Purchases \$ 50,000

In order to engage in continuing contract research efforts, upgrade of equipment is necessary. Immediate acquisition of 2 field vehicles and repair of computer peripherals is part of the first-year plan.

3. Contingency Fund \$150,000

Prudent business practice for not-for-profit research organizations includes an internal contingency fund of approximately 25% of annual revenues. This recommended allocation is a beginning of an appropriate contingency fund. It is understood that no expenditures from the fund can be made without specific approval by the Board of Trustees.

APPENDIX 1

INTERVIEWS ON CAMPUS

May 31 Attended meeting of Council of Academic Deans, JJB & SHW
June 6 Visited with Dean Milton Wadsworth, JJB & SHW
June 9 Visited with Dean Joseph Andrade, JJB & SHW
June 11 Visited with R. B. Smith, JJB & SHW
June 12 Visited with G. W. Hohmann
June 13 Visited with M. K. McCarter, SHW, PMW & DF
June 14 Visited with Larry Devries, JJB & SHW
June 15 Visited with Gordon Jensen, JJB & SHW
June 19 Visited with Dean David Grant, JJB, SHW, & DLN
June 19 Visited with V. Lal and J. Olsen, JJB & SHW
June 19 Visited with T. Stockham and C. Rushforth, JJB & SHW
June 20 Visited with Steve Jacobsen and Sam Drake, JJB & SHW
July 31 Visited with J. Stringfellow, JJB & SHW
Aug. 14 Visited with J. Seader, JJB & SHW
Sept. 11 Visited with R. Riesenfeld, JJB & SHW



SCOTT M. MATHESON
Governor

STATE OF UTAH
DIVISION OF COMPREHENSIVE EMERGENCY MANAGEMENT

DEPARTMENT OF PUBLIC SAFETY
1543 SUNNYSIDE AVENUE
P.O. BOX 8100, SALT LAKE CITY, UTAH 84108
TELEPHONE (801) 533-5271

September 12, 1984



LARRY E. LUNNEN
Commissioner
LORAYNE TEMPEST
Director

APPENDIX 2

Mr. Alton D. Cook, Regional Director
Federal Emergency Management Agency, Region VIII
Denver Federal Center, Building 710
Denver, Colorado 80225

Dear Mr. Cook:

I recommend approval of the Proposal on Landslide Monitoring, Prediction and Mitigation in Utah, which has been submitted by the University of Utah Research Institute.

As you are aware, the damages and costs associated with Utah's 1983 flooding and landslide disaster amounted to more than \$480,000,000 and the 1984 damages have by now, reached more than \$42,000,000. Occurrences like the Rudd Canyon debris flow have unexpectedly wiped out homes and endangered lives. A similar event in the middle of the night could result in many deaths. The hazards associated with such landslides are increased when they can occur at locations and times which are undetected and unpredicted until the slide occurs.

The one-time monitoring and telemetry installed in the Fall of 1983, in Rudd Canyon and Reynolds Gulch, were pilot installations aimed at providing continuous monitoring to receiving sites which could initiate warnings to save lives and permit responsive actions. These installations were designed and emplaced by the U of U Research Institute Earth Science Laboratory.

This proposal should be viewed in a perspective similar to that of the seismograph station monitoring system which provides earthquake information. Of greater value however, the proposed landslide monitoring system can warn citizens in advance and provide for life-saving responses before the hazard strikes.

In view of the past two years' historic catastrophies in Utah, associated with landslides and debris flows, I highly recommend approval of this proposal as a Hazard Mitigation Grant which will provide direct life-saving potential from the outset of the installations. It applies the mitigation component of the Integrated Emergency Management System and concepts.

Your assistance is appreciated.

Sincerely,

Lorayne Tempest

Lorayne Tempest, Director

LT/RFF/js

cc: U of U RI, UGMS

"If You Fail to Prepare You Prepare to Fail"

PLAN FOR OPERATION AND GROWTH

1985 - 1994

UNIVERSITY OF UTAH RESEARCH INSTITUTE

by

J.J. BROPHY , President

SH. WARD , Executive Vice President

P.M. WRIGHT , Technical Vice President

R.D. THOMSEN , Acting Secretary-Treasurer

W.L. FORSBERG, Associate Director ESLD, Administration

SEPTEMBER 27, 1984

PLAN FOR OPERATION AND GROWTH

1985-1994

UNIVERSITY OF UTAH RESEARCH INSTITUTE

by

J. J. Brophy, President
S. H. Ward, Executive Vice President
P. M. Wright, Technical Vice President
R. D. Thomsen, Acting Secretary-Treasurer
W. L. Forsberg, Associate Director ESLD,
Administration

27 September 1984

CONTENTS

	<u>Page</u>
List of Tables.....	i
EXECUTIVE SUMMARY.....	1
INTRODUCTION.....	3
GOALS AND STRATEGIES.....	4
Goals.....	4
Strategies.....	5
Recommended Advisory Board.....	6
EXPANSION OF CURRENT WORK.....	8
Earth Science Laboratory.....	8
Center for Remote Sensing and Cartography.....	8
Environmental Studies Laboratory.....	9
NEW OPPORTUNITIES FOR GROWTH.....	10
Plan for Increasing the Academic Value of UURI to the University.....	10
Cooperative Research with the Idaho National Engineering Laboratory.....	11
Commercialization of Products and Services.....	12
Geological and Environmental Hazards Research Center.....	12
Research and Services for the Petroleum Industry.....	13
Expanded Uses of Remote Sensing.....	14
Small Business Innovation Research (SBIR) Programs.....	14
ONE-YEAR OPERATING PLAN -- FY 1985.....	16
Anticipated Income.....	16
Anticipated Expenditures.....	16
Marketing Plan.....	20
Provision of Administrative Services.....	20
Space Requirements.....	22
Replacement and Repair of Equipment.....	22
Salary Adjustments.....	24
LONG-RANGE OPERATING PLAN -- FY 1985 TO FY 1994.....	26
Assumptions in Ten-Year Financial Plan.....	26
Plan for Giving to the University of Utah.....	28
Additional Cash Requirements.....	28
Line of Credit from the University of Utah.....	28
SPECIAL APPROPRIATIONS.....	31
APPENDIX 1 - INTERVIEWS ON CAMPUS.....	32
APPENDIX 2 - LETTER FROM CEM TO FEMA.....	33

LIST OF TABLES

	<u>Page</u>
Table 1. Summary Financial History of UURI.....	17
Table 2. Anticipated Revenue -- FY 1985.....	18
Table 3. Anticipated Expenditures -- FY 1985.....	19
Table 4. Special Marketing Costs.....	21
Table 5. Equipment Replacement and Repair.....	23
Table 6. Average Salary Increases, 1981-1984.....	25
Table 7. Ten-Year Financial Plan.....	27
Table 8. Additional Cash Requirements as Part of Ten-Year Plan.....	30

EXECUTIVE SUMMARY

In response to instructions from the Board of Trustees, UURI intends to pursue an aggressive plan for long-term growth. We are recommending expansion of UURI's goals and we have developed comprehensive and specific strategies for accomplishment of these goals.

Our target growth rate is reflected in the Ten-Year Financial Plan (Table 7). We anticipate that revenues will increase from a current level of \$1.8 million to \$12.0 million by 1994. During the coming year, anticipated funding is \$2.2 million, mainly from federal agencies. A long-term increase will require a well-funded marketing effort as well as acquisition of new scientific talent and laboratory facilities. Such growth also anticipates an expansion from essentially zero at present to \$3.6 million per year in faculty-related research at UURI.

A special marketing effort at a total cost of \$150K will be undertaken in FY 1985, \$100K to be paid out of current cash reserve. This will supplement our normal marketing effort of \$50K out of operations. Whereas modest growth in current project areas appears possible, we have identified a number of excellent opportunities for growth in new technical areas. Our marketing effort will be directed primarily toward those new areas.

UURI plans a long-term program of giving to the University of Utah. We would like this to be a two-way street, such that we derive equal benefit from the University. Our long-term giving will consist of a graduate fellowship program, development funds for faculty who participate in research at UURI and eventual endowment of a chair in petroleum or reservoir engineering.

As we grow, UURI will require an increasing cash reserve to do business. A major increase in this requirement is anticipated during the coming year as a result of the probable loss of our letter-of-credit method of reim-

bursement for work done for the DOE-Idaho Operations Office. As a result of new federal regulations, the letter of credit we have had in the past appears now to be inappropriate, and DOE-ID is under considerable pressure to rescind it during our impending negotiations for a new contract. Table 8 addresses the cash requirements we anticipate as part of the ten-year plan.

We recommend setting aside \$150K for a contingency fund from currently available monies to cover unexpected events such as audit disallowances, project cost over-runs, and especially for unanticipated business opportunities. Spending from this contingency fund would require approval from the Board of Trustees. Additions to this fund will commence in FY 1987 and will reflect growth in the corporation.

Salary increases are recommended at an average level of 15 percent for fiscal year 1985. Of this total, 3 percent will be a non-recurring adjustment which will not add to the base.

Equipment repair and replacement will total \$97K for FY 1985, of which \$50K will be a special allocation from current cash and \$47K will come from operations.

Current space is 14,600 sq ft, and we are obligated to acquire an additional 700 sq ft. Contingent upon the outlook for near-term growth, we may acquire an additional 3,300 sq ft of contiguous space. All costs for space expansion will be covered from operations, unless management decides to spend reserves for this purpose.

Changes in the provision of our administrative services are anticipated over the next few months, and this is spelled out below.

A 15-member Advisory Board is recommended to help us define opportunities for growth. The makeup of this Advisory Board will be broad-based and national in character.

INTRODUCTION

At the April, 1984 meeting of the Board of Trustees of the University of Utah Research Institute, two highly significant near-term objectives were given to UURI management, namely: (1) achieve a closer working relationship with the University, and (2) develop a long-term plan for considerable growth of UURI. This document is a response to these instructions.

GOALS AND STRATEGIES

According to the bylaws of UURI, "the fundamental purpose of the corporation shall be to provide an organizational structure under the immediate and complete control of the University of Utah which shall be responsible for originating, developing, and performing research and related contracts with government agencies, private businesses, and charitable organizations". This purpose is further elaborated in the goals as stated below.

Goals

The following goals were adopted for the University of Utah Research Institute at the Board of Trustees' meeting on 3 September, 1980.

1. To originate and perform research and development programs for government and industry so as to achieve technical and scientific excellence, and to enable the University of Utah to fulfill its research mission beyond academic commitments.
2. To act as an interface between academic research and the community by applying knowledge developed at universities to solve problems for industry and thereby support the economic development of the community and the scientific and technical needs of society.
3. To develop and attract a scientific/technical, managerial and support staff capable of undertaking independent contract research programs of the highest quality.
4. To provide, as appropriate, technical, administrative, financial and other support for research and research-related programs at the University of Utah.

Two additional goals are herein recommended:

5. To develop a significant level of involvement of faculty and students from the University of Utah in UURI projects.
6. To stimulate intra-state and intra-region cooperative and multidisciplinary research.

Strategies

In order to fulfill these goals, a number of strategies are appropriate. The following list of strategies may be modified from time to time to account for changing scientific, financial, and political directions and conditions.

1. Maintain financial viability.
 - a. Develop a diverse funding base to minimize funding fluctuations.
 - b. Give priority to development of several large funding bases (> \$1 million/year).
 - c. Generate extra funds to equip and maintain existing and new laboratory facilities and to provide seed money for developing new staff capabilities.
2. Develop and maintain a capable technical staff.
 - a. Hire personnel having the highest technical qualifications.
 - b. Provide stimulating, efficient, state-of-the-art working environment and facilities.
 - c. Provide opportunity for continued training, advancement and participation in professional societies.
 - d. Provide overall compensation that is competitive.
3. Develop and maintain state-of-the art research equipment and facilities.
 - a. Provide for maintenance and upgrading of current research equipment and facilities.
 - b. Develop and pursue a long-range plan for acquisition of new research equipment and facilities.
 - c. Provide state-of-the-art computing and other support facilities.
4. Develop and maintain management, administrative and other support capabilities.
 - a. Maintain the current project management system for technical work.
 - b. Develop a flexible administrative management structure that can grow as UURI expands.
 - c. Provide, in-house, all administrative functions possible while subcontracting for others, with the eventual goal of providing all needs in-house.

5. Maintain active liasion both with the University of Utah and with the local community.
 - a. Facilitate technical interchange between UURI and the University of Utah, other universities, and state agencies.
 - b. Develop a long-term approach for financial contributions to the University.
 - c. Periodically assess local community needs and availability of new, university- or Institute-developed technology to help meet those needs.
 - d. Maintain coordination with the Engineering Experiment Station.
 - e. Conduct workshops on matters of local or regional interest.
6. Maintain a national and international presence.
 - a. Provide funds for scientific staff to attend selected national and international meetings.
 - b. Periodically assess needs of national and international communities and availability of university- or Institute-developed technology to help meet those needs.
 - c. Seek venture capital and working arrangements to bring ideas for products and services developed at the University and the UURI to commercial realization for the benefit of society.
 - d. Conduct workshops on matters of national or international interest.

Recommended Advisory Board

In order to facilitate communication between personnel of the University and UURI on one hand, and personnel from the government, community and private sector on the other hand, we propose formation of an Advisory Board consisting of the following representatives:

Private Sector	5
Universities	4
State Agencies	3
Federal Agencies	3
	<u>15</u>

This board would meet once per year to review UURI's activities, progress, problems, and challenges, and to give critical advice on future

trends. The information gained from this group would be used to help construct each year's operating plan and to modify and update long-term plans.

EXPANSION OF CURRENT WORK

There are two potential avenues of growth--expansion of current work and expansion into new areas. The first avenue is considered in this section and the second avenue is considered in the following section. In general, we conclude that growth in current research areas has limited potential, and in order to achieve substantial growth, we must expand UURI's capabilities into new areas by (1) acquisition of appropriate technical and support staff and (2) acquisition of appropriate laboratories, equipment and other facilities.

Earth Science Laboratory (ESL)

Approximately 90 percent of the current work is in research in geothermal energy development for the federal government. At the beginning of FY 1985, ESL will be negotiating a new contract with DOE-Idaho Operations Office. DOE appears to be willing to enter into a 4- or 5-year agreement. Opportunity for significant expansion of this work, however, appears to be modest at present because the federal budget has not been increased nor are there plans for increase. One possible avenue for expansion is in further application of our geothermal research and development results for industry. We intend to pursue development of an expanded commercial geothermal business over the coming year.

The Earth Science Laboratory also maintains commercial services in analytical geochemistry, X-ray diffraction analyses of rocks and minerals, geophysical field surveys and interpretation, and geologic mapping. There appears to be opportunity for modest near-term growth in each of these fields.

Center for Remote Sensing and Cartography (CRSC)

The principal projects consist of a grant for development of remote sensing techniques from the National Aeronautics and Space Administration and

several relatively small contracts from the states of Nevada and Utah, the U.S. Army, the Bureau of Land Management and the Soil Conservation Service. There is significant potential for expanding the NASA work modestly and for doubling other work over the next two years.

Environmental Studies Laboratory (EVSL)

There are currently three research projects in Environmental Studies -- an atmospheric visibility degradation study for Electric Power Research Institute, and studies of acid rain and changes in vegetation at the Hunter Power Plant for Utah Power and Light. Of these, there seems to be considerable potential for continuation and expansion of atmospheric visibility studies as we build experience and equipment because of the planned construction of power plants in the canyon areas of Utah and Arizona. Acid rain studies will probably be discontinued because EVSL is finding no evidence for acid rain in Utah.

NEW OPPORTUNITIES FOR GROWTH

During the past several years the research environment in the United States has changed considerably. The effects of world-wide recession and of an altered national research policy have been primary factors causing these changes. Research funds have become much more scarce than they were previously, and national priorities among research topics have changed.

Nevertheless, there is considerable new opportunity. Over the past year, it has become evident that industry is pursuing research and development with renewed vigor. In addition, President Reagan has recognized the primary role that universities and university-related research groups play in new scientific and engineering development, and has taken steps to foster growth of these groups. At UURI, we have been working to identify potential new opportunities for growth, and we intend to pursue these opportunities on a priority basis. We will concentrate significant effort in developing work that would lead to high levels of funding, more than \$1 million per year.

Acquisition of research and development funding in new areas will require considerable effort. Competition is intense. We will need supplemental funding for any significant effort to develop new markets. Our marketing plans, including estimates of the funds required, are discussed further below. In this section, we describe the primary new areas in which there appear to be considerable potential for growth.

Plan for Increasing the Academic Value of UURI to The University

Over the past several months, J. J. Brophy and S. H. Ward have held meetings with 19 faculty members* at the University for the purpose of determining whether or not it makes sense to bring some of the research

* See Appendix 1.

presently being done on campus to UURI for development and commercialization. Several potential opportunities have been identified, including work with Profs. Kim McCarter, Bob Seader, Om Gandhi, Joe Olsen, Steve Jacobsen, and Bob Smith. We intend to expand selectively our contacts with faculty, and to revisit the more likely prospects.

In addition, we have made long-term plans for a UURI Fellowship program at the University and a UURI Chair in Petroleum or Reservoir Engineering in the College of Engineering or the College of Mines and Mineral Industries. Each of these activities will involve faculty and students in UURI research.

Cooperative Research with the Idaho National Engineering Laboratory

We have learned through visits with DOE that the Reagan Administration has instructed DOE and its national laboratories to promote cooperative research projects with universities and university-related groups. This is in line with the Administration's belief that the predominant scientific strength of the USA resides in such groups. In particular, the Idaho Operations Office of DOE and their prime contractor for the Idaho National Engineering Laboratory (INEL), EG&G Idaho, Inc. have both informed us that INEL is actively seeking cooperative research projects with university groups.

There are a number of funded projects and ideas in EG&G that are logical candidates for UURI and/or one or more departments of the University of Utah to participate in with EG&G. Among these are:

1. Ocean Hydrothermal Energy
2. Strategic Materials Program
3. Production Reactor Facility
4. Hydrometallurgy

Commercialization of Products and Services

Over the past several months, UURI has had conversations with a number of companies that specialize in providing venture capital for development and commercialization of new products and services. We are also aware of a number of ideas for potentially saleable products that have been developed at the University. Two examples are (1) a process and apparatus to produce crude oil from tar sands, developed by Prof. J. D. Seader, and (2) equipment for monitoring potential landslides and earthen dams, developed jointly by Prof. M. K. McCarter and the electronics staff at UURI.

As one of our goals at UURI, we plan to pursue aggressively our role as a link between the University and the community by locating sources of capital to finance commercialization of ideas developed both at the University and at UURI. One venture capitalist is already attempting to raise funds for application of Seader's research for recovering oil from tar sands. Seader's heat pipe method, applied to general distillation, has considerable potential beyond the tar sands application.

Geological and Environmental Hazards Research Center

The University of Utah Research Institute proposes to form a Geological and Environmental Hazards Research Center within the Institute. Utah has a valuable pool of talent available in its several universities and colleges, state agencies and private industry to perform a great deal of the scientific, engineering and socio-political work that is needed. What is lacking is coordination of this talent. No single state agency has a coordination mandate, and, further, state agencies such as the Utah Geological and Mineral Survey and the Division of Comprehensive Emergency Management have no research or technology-development functions.

Assessment and mitigation of both man-induced and natural geologic and

environmental hazards require an interdisciplinary effort. A broad range of scientific and engineering studies is required. Of equal importance are studies of the social consequences of hazards and mitigation measures, and appropriate means to implement programs to deal with preparedness and emergency measures.

The Center will provide the broad range of talents needed to treat hazards problems. We will work closely with existing Utah state agencies in helping to prioritize activities in the Center and in implementation of results. We will also work closely with Federal agencies doing hazards work, such as the U.S. Geological Survey, the Federal Emergency Management Agency and the Environmental Protection Agency.

As a first step in the formation of the Geological and Environmental Hazards Research Center, UURI has written a research proposal in the amount of \$465,000 to the State Division of Comprehensive Emergency Management (CEM) for monitoring of potential landslides. Professors M. K. McCarter and J. Olsen of the University are co-investigators on the proposal. CEM has forwarded our proposal to the Federal Emergency Management Agency (FEMA) with a recommendation for funding (Appendix 2).

Research and Services for the Petroleum Industry

As the price of petroleum products rises higher, oil companies large and small are spending more domestically to improve the productivity of producing fields and discover new areas. During the past two years they have been spending increasing sums on research, and significant money is available to university-related research and service groups. Several items of technology either under development at UURI or identified as being within our expertise appear to be saleable to the petroleum industry. Among these are:

1. Geochemical Services
2. Thermal Maturation Studies

Expanded Uses of Remote Sensing

The National Aeronautics and Space Administration has been mandated by President Reagan to initiate more joint research programs with universities and university-related groups. These instructions have been passed down from NASA headquarters to the NASA laboratories (JPL, Goddard, etc.). UURI plans to take advantage of this mandate by initiating new contacts with the NASA laboratories to promote joint research ideas.

There are a number of ideas for new funding that will be pursued over the next year. Among these are:

1. There is potential for funding under the "Man-and-Biosphere" program of UNESCO. The U.S. intends to support this program even though it does not fully support UNESCO.
2. There is potential for combining the talents of ESL and CRSC in obtaining funding for research in remote sensing applications to geothermal exploration. NASA is the most likely funding source.
3. Opportunities for working with the governments of Mexico and Brazil have been identified and will be pursued.

Small Business Innovation Research (SBIR) Programs

Under Public Law 97-219, The Small Business Innovation Development Act of 1982, approximately \$45 million were set aside during Fiscal Year 1983 for research to be performed by small businesses. This amount will increase to \$450 million by Fiscal Year 1986. In addition to the federal SBIR program, the State of Utah is planning an SBIR program, patterned after the federal program, to become operational in the near future. Most federal agencies have

not been able to use this money because the small businesses eligible under the program do not have the expertise required.

We have been examining ways to take advantage of the SBIR program, and believe we have identified a vehicle. UURI can assume a minority position in a small business that others create and can license products or services to that business. The small business would hire appropriate staff to perform part of the research work, and could subcontract project management and a portion of the research back to UURI. UURI would be able to collect royalties and licensing fees on products or services that are brought to the commercialization stage. We plan to facilitate the formation or use of existing small businesses in this way to take advantage of the SBIR program.

ONE-YEAR OPERATING PLAN -- FY 1985

During the past year, UURI has undergone considerable change. The sale of UBTL resulted in a significant decrease in total income to UURI, but at the same time disposed of an organization that had consistently been a financial drain on other divisions (Table 1). Since that sale, the remaining parts of UURI¹ have been operating on a very tight budget in order to demonstrate financial viability.

The most significant adverse effect of our fiscal restraint has been in marketing. We have had a very limited amount of money to spend on development of new business. Obviously, this situation is not compatible with growth or even with maintenance of current funding levels. Accordingly, the one-year and long-term plans recognize and provide for an aggressive marketing effort.

Anticipated Income

Table 2 lists the income we anticipate from all funding sources in FY 1985. The figures are reasonably firm and are conservative. New markets generally take a period of months to years to develop, and we have allowed for modest growth in the coming year as a result of our recommended marketing effort.

Anticipated Expenditures

Table 3 shows anticipated expenditures assuming a technical staff of the same size as at present and the addition of staff time for the marketing effort, discussed below.

¹ UURI now consists of the Earth Science Laboratory (ESL), the Center for Remote Sensing and Cartography (CRSC) and the Environmental Studies Laboratory (EVSL). Utah Biomedical Test Laboratory (UBTL) was sold and the Applied Technology Division (ATD) was dissolved.

TABLE 1
SUMMARY FINANCIAL HISTORY OF UURI
(AUDITED FIGURES)

Fund Balance (September 30)

<u>YEAR</u>	<u>UBTL</u> ²	<u>ATD</u> ³	<u>ESLD</u> ⁴	<u>ADMN</u> ³	<u>TOTAL</u>
Cum to 1982	(\$587,655)	\$131,085	\$262,658	\$1,083,969	\$890,057
1983	52,978	(146,793)	8,410	(111,131)	(96,536)
Oct-Dec 1983	15,419 ⁵		31,024		46,443
Jan-July 1984			(18,108) ⁶		(18,108)
Total	(\$419,258)	(\$15,708)	\$283,984	\$ 972,838 ¹	\$821,856

¹ ESL and ATD generated an estimated 50% of the funds in this account. Therefore, funds belonging to UURI after the sale are:

	\$283,984
	(\$ 15,708)
	\$486,419
Total	<u>\$754,795</u>

² Sold

³ Dissolved

⁴ Includes Earth Science Laboratory, Center for Remote Sensing and Cartography and Environmental Studies Laboratory

⁵ Includes Reed Harker Settlement

⁶ Includes one-time cost items as follows:

Wayne Ursenbach Settlement	\$15,000
Costs of Moving and Transition	60,996
Total	<u>\$75,996</u>

TABLE 2
 ANTICIPATED REVENUE -- FY 1985
 (Thousands \$)

	<u>Revenue</u>
<u>Earth Science Laboratory (ESL)</u>	
U.S. Department of Energy	950
U.S. Department of Defense	200
Commercial Services	180
	1,330
 <u>Center for Remote Sensing and Cartography (CRSC)</u>	
U.S. National Aeronautical and Space Administration	100
State and Federal Contracts	85
Other	15
	200
 <u>Environmental Studies Laboratory (EVSL)</u>	
Electrical Power Research Institute	315
Utah Power and Light	150
	465
 <u>Faculty Related New Projects</u>	
	200
GRAND TOTAL	\$2,195K

TABLE 3
 ANTICIPATED EXPENDITURES -- FY 1985
 (Thousands \$)

Operating Budget

<u>Item</u>	<u>Costs</u>
Direct Costs	
Salaries and Wages	\$ 848
Employee Benefits	307
Consultants	40
Travel	25
Supplies	20
Computer	40
Sample Analyses	15
Miscellaneous	10
Total Direct Costs	<u>1,305</u>
Indirect Costs	587
G&A Costs	189
Fee	<u>114</u>
Total Expenditures	<u><u>\$2,195</u></u>

Marketing Plan

If UURI is to grow significantly, an aggressive marketing effort must be started at the earliest opportunity. Repeated contacts with a potential client are required to identify specific needs, determine a strategy for serving those needs and convincing the potential client that we can serve him best. Because of the low total funding base available in UURI during the past years, the overhead account, which can be charged for reasonable marketing expenses, has been insufficient to cover the marketing required. We therefore propose to spend some of the fee generated in past years for a special marketing effort. Table 4 shows special marketing costs anticipated for FY 1985.

Subject to negotiation with the Department of Geology and Geophysics, Dr. S. H. Ward would take two quarters of leave from the University to work on market development at UURI. In addition, the regular staff would spend an extra amount of their time marketing. This effort would be in addition to the amount that the overhead accounts can support.

In addition, the contacts with University faculty require repeat visits and new visits. Facilitating the placement of faculty-related new projects with industry, government, or venture capitalists will require a major effort, as we have already experienced with Prof. McCarter's landslide project.

Provision of Administrative Services

At the present time, our administrative services are being provided by former UURI employees through a contract with Deseret Research Corporation. This contract has been extended to the end of calendar year 1984, but in the long term it is obvious that UURI must make other provisions. Several options are available, including a contract to an accounting/administrative group for some or all of these needs or purchasing some or all of these needs from the

TABLE 4
SPECIAL MARKETING COSTS

Burdened Salaries		\$100,000
S. H. Ward	50%	
P. M. Wright	25%	
J. N. Moore	10%	
D. L. Nielson	10%	
M. K. Ridd	5%	
A. C. Hill	5%	
Travel		25,000
Consultants		20,000
Other		<u>5,000</u>
	Total	\$150,000

University. Our current plan is to select among the several opportunities and to terminate the arrangement with Deseret by the end of calendar year 1984.

Space Requirements

Our present 14,600 sq ft of space in Suites A, C and D at 391 Chipeta Way is marginally adequate only for current operations. At the beginning of October, 1984, we will expand into 700 sq ft more space in Suite C, which will relieve our present tight situation somewhat. We will be required to lease new space for any expansion of business or when an in-house administrative service group is formed.

Suite B, which comprises 3,300 sq ft, in the middle of our block of space, is currently open and the building manager is attempting to find a leasor. We have first right of refusal on this additional space and will probably have to make a decision about whether or not to lease it sometime during the next few months. If we can see a clear way to pay for this space, we will lease it, since it would be preferable to have contiguous facilities.

Replacement and Repair of Equipment

Because of very tight operating budgets over the past several years, needs for repair or replacement of field and laboratory equipment in UURI have been ignored. Table 5 shows our current needs. Our field vehicles date from 1978, and none has less than 70,000 hard field miles. We continue to be funded for field work. We will require replacement of 4 field vehicles during the coming year. In addition, we have several items in the computer center, including terminals and plotters, that need repair. We plan to repair these and put our computing equipment back in good shape. Other items of equipment are needed to upgrade or replace existing laboratory facilities. We will fund \$50K of equipment replacement and repair out of current cash and \$47K out of

TABLE 5
EQUIPMENT REPLACEMENT AND REPAIR
(Thousands \$)

<u>Items</u>	<u>Cost</u>
Field Vehicles (4 ea)	48
Repair of Computing Equipment	16
Field-Portable Computer	8
Replacement of Geochemical Equipment	25
	<u>\$97K</u>

FY 1985 operating funds.

Salary Adjustments

In order to ensure profitability for UURI for the past year, employees of ESL were required to take all of their vacation during the fiscal year and additionally were furloughed without pay for two weeks. In this way, employees contributed a salary savings of \$22,700. Most of the scientists worked during their furlough on projects and proposal writing.

Table 6, below, shows the average salary increases granted during the past several years. Increases were held down during the last two years to accomodate a shrinking research budget and to protect the positions of as many critical staff members as possible. In addition, the general level of salaries in UURI are significantly below the level paid for comparable professionals and non-professionals in industry and the national laboratories.

Considering these factors, we conclude that salary adjustments are needed for 1984-1985 and beyond. Our goal is to make our salary scale as competitive as possible over the next several years. This is necessary to attract the top people needed to make UURI prosper. We recommend an average salary increase of 15 percent during FY 1985, with further increases in outyears until our salary scales reach truly competitive levels.

TABLE 6
AVERAGE SALARY INCREASES, 1981-1984

	<u>% Increase</u>
1981 - 1982	14.5
1982 - 1983	0.7
1983 - 1984	5.2

Recommended Salary Increase: 15% average

LONG-TERM OPERATING PLAN

In the long term, UURI intends to pursue an aggressive plan for long-term growth. This is reflected in the Ten-Year Financial Plan (Table 7). We anticipate that income will grow from a current level of \$1.8 million to \$12.0 million by 1994. This will require a well-funded marketing effort as well as acquisition of new scientific talent and laboratory facilities. Such growth also anticipates an expansion from essentially zero at present to \$3.6 million per year in faculty-related research at UURI.

Assumptions in the Ten-Year Financial Plan

In devising our Ten-Year Financial Plan, several assumptions have been used. These are as follows.

1. A strong growth in internally generated funds will result from a sharply increased marketing effort.
2. As more faculty become involved, the faculty-related revenue will constitute about one-third of total revenue.
3. Fees generated from subcontracts will grow steadily as subcontract volume grows.
4. The mix of government and industrial sponsorship will shift towards industrial so that the fee rate will increase.
5. The indirect and G&A rates will be kept essentially constant.
6. Special marketing expenses will be paid from current and FY 1985 operations.
7. Provision will be needed to add critical personnel in key areas in order to provide a broader range of skills and lead us into new research areas.
8. New laboratory and support equipment will be needed as well as

TABLE 7
TEN-YEAR FINANCIAL PLAN

BUDGET FY 1985 - 1995
(thousands \$)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
REVENUE										
UURI Generated Income	1995	2718	3280	4030	4769	5499	6270	6933	7640	8340
Faculty-Related New Projects	200	450	750	1150	1550	1950	2300	2750	3150	3550
Total	2195	3168	4030	5180	6319	7449	8570	9683	10790	11890
DIRECT COSTS										
In-house	1305	1660	2070	2655	3237	3787	4359	4929	5496	6060
Subcontracts		318	470	610	724	843	954	1057	1139	1229
INDIRECT COSTS										
% Rate	58%	77%	95%	121%	149%	177%	204%	230%	257%	283%
% Rate	45%	45%	45%	45%	45%	46%	46%	46%	46%	46%
6 & A COSTS										
% Rate	18%	24%	30%	39%	48%	57%	65%	74%	82%	91%
% Rate	14.5%	14.5%	14.5%	14.5%	14.5%	14.8%	14.8%	14.8%	14.8%	14.8%
FEE AND ROYALTY INCOME										
Fee Amount	114	172	228	305	386	471	561	655	753	855
% Fee	5.5%	5.75%	6.0%	6.25%	6.50%	6.75%	7.0%	7.25%	7.50%	7.75%
Royalty				50	60	70	80	90	90	100
Total	114	172	228	305	436	531	631	735	843	955
FEE AND ROYALTY EXPENDITURES										
UURI										
Equipment	15	54	50	84	100	130	150	175	200	225
Reserve			25	30	40	50	50	50	50	50
Contingency			21	30	40	50	50	50	50	50
Salaries Adjustment	47	25	25	25	25	25	25	25	25	25
Development Funds For UURI Staff		36	45	56	70	83	97	112	126	141
Marketing	50	50	50	60	70	80	90	100	125	150
Fee - Other Purposes					23	49	84	116	137	160
Total	112	165	216	285	368	442	521	603	688	776
Donations To University (fee)										
Graduate Fellowships					16	24	32	40	48	56
Development Funds For Faculty	2	7	12	20	27	35	43	52	62	73
Reserve for Chair - Reservoir Engineering					25	30	35	40	45	50
Total			12	20	68	89	110	132	155	179
Total	114	172	228	305	436	531	631	735	843	955
SPECIAL MARKETING EXPENSE										

maintenance of existing equipment.

Plan for Giving to the University of Utah

UURI has planned a long-term program of giving to the University of Utah. We would like this to be a two-way street, such that we derive equal benefit from the University. Our long-term giving will consist of a graduate fellowship program, development funds for faculty who participate in research at UURI and eventual endowment of a chair in petroleum or reservoir engineering. These contributions will come from new faculty-related projects; no other source of gifts to the University is anticipated.

Additional Cash Requirements

As we grow, UURI will require an increasing cash reserve to do business. A major increase in this requirement is anticipated during the coming year as a result of the probable loss of our letter-of-credit method of reimbursement for work done for the DOE-Idaho Operations Office. As a result of new federal regulations, the letter of credit we have had in the past appears now to be inappropriate, and DOE-ID is under considerable pressure to rescind it during our impending negotiations for a new contract. Table 8 addresses the cash requirements we anticipate as part of the ten-year plan.

Line of Credit from the University of Utah

The University of Utah has expressed a willingness to extend to UURI a line of credit in the amount of \$500,000. This amount approximately equals the total value of the gifts that UURI has contributed to the University of Utah Research Foundation and the University of Utah. Funds would be available to UURI from this line of credit at no interest. There would be a requirement for UURI to demonstrate need for use of this line of credit and the money would be available as long as the need remained, with monthly review to

establish continuing need.

We recommend that this line of credit be used to supply cash needs of UURI beyond that which can be supplied internally.

TABLE 8
 ADDITIONAL CASH REQUIREMENTS AS PART OF TEN-YEAR PLAN

	1984-85	1985-86	1986-87
<hr/>			
INCREASE IN BUDGETED REVENUE OVER PRIOR YEAR REVENUE			
BUDGETED REVENUE	2290000	2820000	3530000
PRIOR YEAR REVENUE	1860000	2290000	2820000
<hr/>			
INCREASED REVENUE	430000	530000	710000
INCREASED REVENUE PER DAY	1178.08	1452.05	1945.21
ACCOUNTS RECEIVABLE TURNOVER IN DAYS*	70.1	70.1	70.1
<hr/>			
ADDITIONAL CASH REQUIREMENTS	82584	101789	136359
CHANGE IN D.O.E. CONTRACT FROM LETTER OF CREDIT			
PORTION OF CURRENT BUDGET	1148000		
PASS THRU MONEY ON DRILLING SUBCONTRACT**	1410000		
<hr/>			
TOTAL DOE FUNDING	2558000		
DOE FUNDING PER DAY	7008.22		
ADDITIONAL ACCTS./REC. TURNOVER IN DAYS***	67		
<hr/>			
ADDITIONAL CASH REQUIREMENTS	469551		
SPECIAL MARKETING FROM 10 YEAR BUDGET	150000	75000	25000
<hr/>			
ADDITIONAL CASH REQUIREMENTS	702134	176789	161359

* ACTUAL ACCTS./REC. TURNOVER EXPERIENCED FOR ESLD/ATD THRU 8-31-84
 ** PASS THRU MONEY NOT SHOWN IN YEARLY BUDGETED REVENUE
 *** ASSUMES 0 DAYS TURNOVER (ADVANCED PAYMENT) FOR LETTER OF CREDIT.
 BILLING INCLUDES 30 DAYS TO INVOICE, 7 DAYS MAILING, 30 DAYS TO PAY.

SPECIAL APPROPRIATIONS

In order to implement the plan presented, three special appropriations are recommended:

1. Special Marketing Effort \$100,000

This special one-year effort, as described above, is necessary during the coming fiscal year to broaden the base of support, both in terms of new faculty-related projects, additional geoscience programs, and special projects.

2. Equipment Purchases \$ 50,000

In order to engage in continuing contract research efforts, upgrade of equipment is necessary. Immediate acquisition of 2 field vehicles and repair of computer peripherals is part of the first-year plan.

3. Contingency Fund \$150,000

Prudent business practice for not-for-profit research organizations includes an internal contingency fund of approximately 25% of annual revenues. This recommended allocation is a beginning of an appropriate contingency fund. It is understood that no expenditures from the fund can be made without specific approval by the Board of Trustees.

APPENDIX 1

INTERVIEWS ON CAMPUS

May 31 Attended meeting of Council of Academic Deans, JJB & SHW
June 6 Visited with Dean Milton Wadsworth, JJB & SHW
June 9 Visited with Dean Joseph Andrade, JJB & SHW
June 11 Visited with R. B. Smith, JJB & SHW
June 12 Visited with G. W. Hohmann
June 13 Visited with M. K. McCarter, SHW, PMW & DF
June 14 Visited with Larry Devries, JJB & SHW
June 15 Visited with Gordon Jensen, JJB & SHW
June 19 Visited with Dean David Grant, JJB, SHW, & DLN
June 19 Visited with V. Lal and J. Olsen, JJB & SHW
June 19 Visited with T. Stockham and C. Rushforth, JJB & SHW
June 20 Visited with Steve Jacobsen and Sam Drake, JJB & SHW
July 31 Visited with J. Stringfellow, JJB & SHW
Aug. 14 Visited with J. Seader, JJB & SHW
Sept. 11 Visited with R. Riesenfeld, JJB & SHW



SCOTT M. MATHESON
Governor

STATE OF UTAH
DIVISION OF COMPREHENSIVE EMERGENCY MANAGEMENT

DEPARTMENT OF PUBLIC SAFETY
1543 SUNNYSIDE AVENUE
P.O. BOX 8100, SALT LAKE CITY, UTAH 84108
TELEPHONE (801) 533-5271



LARRY E. LUNNEN
Commissioner
LORAYNE TEMPEST
Director

September 12, 1984

APPENDIX 2

Mr. Alton D. Cook, Regional Director
Federal Emergency Management Agency; Region VIII
Denver Federal Center, Building 710
Denver, Colorado 80225

Dear Mr. Cook:

I recommend approval of the Proposal on Landslide Monitoring, Prediction and Mitigation in Utah, which has been submitted by the University of Utah Research Institute.

As you are aware, the damages and costs associated with Utah's 1983 flooding and landslide disaster amounted to more than \$480,000,000 and the 1984 damages have by now, reached more than \$42,000,000. Occurrences like the Rudd Canyon debris flow have unexpectedly wiped out homes and endangered lives. A similar event in the middle of the night could result in many deaths. The hazards associated with such landslides are increased when they can occur at locations and times which are undetected and unpredicted until the slide occurs.

The one-time monitoring and telemetry installed in the Fall of 1983, in Rudd Canyon and Reynolds Gulch, were pilot installations aimed at providing continuous monitoring to receiving sites which could initiate warnings to save lives and permit responsive actions. These installations were designed and emplaced by the U of U Research Institute Earth Science Laboratory.

This proposal should be viewed in a perspective similar to that of the seismograph station monitoring system which provides earthquake information. Of greater value however, the proposed landslide monitoring system can warn citizens in advance and provide for life-saving responses before the hazard strikes.

In view of the past two years' historic catastrophies in Utah, associated with landslides and debris flows, I highly recommend approval of this proposal as a Hazard Mitigation Grant which will provide direct life-saving potential from the outset of the installations. It applies the mitigation component of the Integrated Emergency Management System and concepts.

Your assistance is appreciated.

Sincerely,

Lorayne Tempest
Lorayne Tempest, Director

LT/RFF/js

cc: U of U RI, UGMS

"If You Fail to Prepare You Prepare to Fail"

Change Copy

PLAN FOR OPERATION AND GROWTH

1985-1994

UNIVERSITY OF UTAH RESEARCH INSTITUTE

by

J.J. BROPHY , President

SH. WARD , Executive Vice President

PM. WRIGHT , Technical Vice President

RD. THOMSEN , Acting Secretary-Treasurer

W.L. FORSBERG, Associate Director ESLD, Administration

Earth Science Laboratory

University of Utah Research Institute
391 Chipeta Way, Suite C
Salt Lake City, Utah 84108
(801) 524-3422



SEPTEMBER 27, 1984

PLAN FOR OPERATION AND GROWTH

1985-1994

UNIVERSITY OF UTAH RESEARCH INSTITUTE

by

J. J. Brophy, President
S. H. Ward, Executive Vice President
P. M. Wright, Technical Vice President
R. D. Thomsen, Acting Secretary-Treasurer
W. L. Forsberg, Associate Director ESLD,
Administration

27 September 1984

LIST OF TABLES

	<u>Page</u>
Table 1. Summary Financial History of UURI.....	17
Table 2. Anticipated Revenue -- FY 1985.....	18
Table 3. Anticipated Expenditures -- FY 1985.....	19
Table 4. Special Marketing Costs.....	21
Table 5. Equipment Replacement and Repair.....	23
Table 6. Average Salary Increases, 1981-1984.....	25
Table 7. Ten-Year Financial Plan.....	27
Table 8. Additional Cash Requirements as Part of Ten-Year Plan.....	30

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CONTENTS

List of Tables

i
1

EXECUTIVE SUMMARY

INTRODUCTION

GOALS AND STRATEGIES

- Goals
- Strategies
- Recommended Advisory Board

EXPANSION OF CURRENT WORK

- Earth Science Laboratory
- Center for Remote Sensing and Cartography
- Environmental Studies Laboratory

NEW OPPORTUNITIES FOR GROWTH

- Plan for Increasing the Academic Value of UURI to the University
- Cooperative Research with the Idaho National Engineering Laboratory
- Commercialization of Products and Services
- Geologic and Environmental Hazards Research Center
- Research and Services for the Petroleum Industry
- Expanded Uses of Remote Sensing
- Small Business Innovation Research (SBIR) Programs

ONE-YEAR OPERATING PLAN -- FY 1985

- Anticipated Income
- Anticipated Expenditures
- Marketing Plan
- Provision of Administrative Services
- Space Requirements
- Replacement and Repair of Equipment
- Salary Adjustments

LONG-RANGE OPERATING PLAN -- FY 1985 TO FY 1994

- Assumptions in Ten-Year Financial Plan
- Plan for Giving to the University of Utah
- Additional Cash Requirements
- Line of Credit from the University of Utah

SPECIAL APPROPRIATIONS

~~LIST OF TABLES~~

APPENDIX 1 - INTERVIEWS ON CAMPUS

APPENDIX 2 - LETTER FROM CEM TO FEMA

NEW DRAFT

EXECUTIVE SUMMARY

In response to instructions from the Board of Trustees, UURI intends to pursue an aggressive plan for long-term growth. We are recommending expansion of UURI's goals and we have developed comprehensive and specific strategies for accomplishment of these goals.

Our target growth rate is reflected in the Ten-Year Financial Plan (Table 7). We anticipate that revenues will increase from a current level of \$1.8 million to \$12.0 million by 1994. During the coming year, anticipated funding is ^{BZ.2} ~~\$3.9~~ million, mainly from federal agencies. A long-term increase will require a well-funded marketing effort as well as acquisition of new scientific talent and laboratory facilities. Such growth also anticipates an expansion from essentially zero at present to \$3.6 million per year in faculty-related research at UURI.

A special marketing effort at a total cost of \$150K will be undertaken in FY 1985, \$100K to be paid out of current cash reserve. This will supplement our normal marketing effort of \$50K out of operations. Whereas modest growth in current project areas appears possible, we have identified a number of excellent opportunities for growth in new technical areas. Our marketing effort will be directed primarily toward those new areas.

UURI plans a long-term program of giving to the University of Utah. We would like this to be a two-way street, such that we derive equal benefit from the University. Our long-term giving will consist of a graduate fellowship program, development funds for faculty who participate in research at UURI and eventual endowment of a chair in petroleum or reservoir engineering.

As we grow, UURI will require an increasing cash reserve to do business. A major increase in this requirement is anticipated during the coming year as a result of the probable loss of our letter-of-credit method of reim-

bursement for work done for the DOE-Idaho Operations Office. As a result of new federal regulations, the letter of credit we have had in the past appears now to be inappropriate, and DOE-ID is under considerable pressure to rescind it during our impending negotiations for a new contract. Table 8 addresses the cash requirements we anticipate as part of the ten-year plan.

We recommend setting aside \$150K for a contingency fund from currently available monies to cover unexpected events such as audit disallowances, project cost over-runs, and especially for unanticipated business opportunities. Spending from this contingency fund would require approval from the Board of Trustees. Additions to this fund will commence in FY 1987 and will reflect growth in the corporation.

Salary increases are recommended at an average level of 15 percent for fiscal year 1985. Of this total, 3 percent will be a non-recurring adjustment which will not add to the base.

Equipment repair and replacement will total \$97K for FY 1985, of which \$50K will be a special allocation from current cash and \$47K will come from operations.

Current space is 14,600 sq ft, and we are obligated to acquire an additional 700 sq ft. Contingent upon the outlook for near-term growth, we may acquire an additional 3,300 sq ft of contiguous space. All costs for space expansion will be covered from operations, unless management decides to spend reserves for this purpose.

Changes in the provision of our administrative services are anticipated over the next few months, and this is spelled out below.

A 15-member Advisory Board is recommended to help us define opportunities for growth. The makeup of this Advisory Board will be broad-based and national in character.

INTRODUCTION

At the April, 1984 meeting of the Board of Trustees of the University of Utah Research Institute, two highly significant near-term objectives were given to UURI management, namely: (1) achieve a closer working relationship with the University, and (2) develop a long-term plan for considerable growth of UURI. This document is a response to these instructions.

GOALS AND STRATEGIES

According to the bylaws of UURI, "the fundamental purpose of the corporation shall be to provide an organizational structure under the immediate and complete control of the University of Utah which shall be responsible for originating, developing, and performing research and related contracts with government agencies, private businesses, and charitable organizations". This purpose is further elaborated in the goals as stated below.

Goals

The following goals were adopted for the University of Utah Research Institute at the Board of Trustees' meeting on 3 September, 1980.

1. To originate and perform research and development programs for government and industry so as to achieve technical and scientific excellence, and to enable the University of Utah to fulfill its research mission beyond academic commitments.
2. To act as an interface between academic research and the community by applying knowledge developed at universities to solve problems for industry and thereby support the economic development of the community and the scientific and technical needs of society.
3. To develop and attract a scientific/technical, managerial and support staff capable of undertaking independent contract research programs of the highest quality.
4. To provide, as appropriate, technical, administrative, financial and other support for research and research-related programs at the University of Utah.

Two additional goals are herein recommended:

5. To develop a significant level of involvement of faculty and students from the University of Utah in UURI projects.
6. To stimulate intra-state and intra-region cooperative and multidisciplinary research.

Strategies

In order to fulfill these goals, a number of strategies are appropriate. The following list of strategies may be modified from time to time to account for changing scientific, financial, and political directions and conditions.

1. Maintain financial viability.
 - a. Develop a diverse funding base to minimize funding fluctuations.
 - b. Give priority to development of several large funding bases (> \$1 million/year).
 - c. Generate extra funds to equip and maintain existing and new laboratory facilities and to provide seed money for developing new staff capabilities.
2. Develop and maintain a capable technical staff.
 - a. Hire personnel having the highest technical qualifications.
 - b. Provide stimulating, efficient, state-of-the-art working environment and facilities.
 - c. Provide opportunity for continued training, advancement and participation in professional societies.
 - d. Provide overall compensation that is competitive.
3. Develop and maintain state-of-the art research equipment and facilities.
 - a. Provide for maintenance and upgrading of current research equipment and facilities.
 - b. Develop and pursue a long-range plan for acquisition of new research equipment and facilities.
 - c. Provide state-of-the-art computing and other support facilities.
4. Develop and maintain management, administrative and other support capabilities.
 - a. Maintain the current project management system for technical work.
 - b. Develop a flexible administrative management structure that can grow as UURI expands.
 - c. Provide, in-house, all administrative functions possible while subcontracting for others, with the eventual goal of providing all needs in-house.

5. Maintain active liasion both with the University of Utah and with the local community.
 - a. Facilitate technical interchange between UURI and the University of Utah, other universities, and state agencies.
 - b. Develop a long-term approach for financial contributions to the University.
 - c. Periodically assess local community needs and availability of new, university- or Institute-developed technology to help meet those needs.
 - d. Maintain coordination with the Engineering Experiment Station.
 - e. Conduct workshops on matters of local or regional interest.
6. Maintain a national and international presence.
 - a. Provide funds for scientific staff to attend selected national and international meetings.
 - b. Periodically assess needs of national and international communities and availability of university- or Institute-developed technology to help meet those needs.
 - c. Seek venture capital and working arrangements to bring ideas for products and services developed at the University and the UURI to commercial realization for the benefit of society.
 - d. Conduct workshops on matters of national or international interest.

Recommended Advisory Board

In order to facilitate communication between personnel of the University and UURI on one hand, and personnel from the government, community and private sector on the other hand, we propose formation of an Advisory Board consisting of the following representatives:

Private Sector	5
Universities	4
State Agencies	3
Federal Agencies	3
	<u>15</u>

This board would meet once per year to review UURI's activities, progress, problems, and challenges, and to give critical advice on future

trends. The information gained from this group would be used to help construct each year's operating plan and to modify and update long-term plans.

EXPANSION OF CURRENT WORK

There are two potential avenues of growth--expansion of current work and expansion into new areas. The first avenue is considered in this section and the second avenue is considered in the following section. In general, we conclude that growth in current research areas has limited potential, and in order to achieve substantial growth, we must expand UURI's capabilities into new areas by (1) acquisition of appropriate technical and support staff and (2) acquisition of appropriate laboratories, equipment and other facilities.

Earth Science Laboratory (ESL)

Approximately 90 percent of the current work is in research in geothermal energy development for the federal government. At the beginning of FY 1985, ESL will be negotiating a new contract with DOE-Idaho Operations Office. DOE appears to be willing to enter into a 4- or 5-year agreement. Opportunity for significant expansion of this work, however, appears to be modest at present because the federal budget has not been increased nor are there plans for increase. One possible avenue for expansion is in further application of our geothermal research and development results for industry. We intend to pursue development of an expanded commercial geothermal business over the coming year.

The Earth Science Laboratory also maintains commercial services in analytical geochemistry, X-ray diffraction analyses of rocks and minerals, geophysical field surveys and interpretation, and geologic mapping. There appears to be opportunity for modest near-term growth in each of these fields.

Center for Remote Sensing and Cartography (CRSC)

The principal projects consist of a grant for development of remote sensing techniques from the National Aeronautics and Space Administration and

several relatively small contracts from the states of Nevada and Utah, the U.S. Army, the Bureau of Land Management and the Soil Conservation Service. There is significant potential for expanding the NASA work modestly and for doubling other work over the next two years.

Environmental Studies Laboratory (EVSL)

There are currently three research projects in Environmental Studies -- an atmospheric visibility degradation study for Electric Power Research Institute, and studies of acid rain and changes in vegetation at the Hunter Power Plant for Utah Power and Light. Of these, there seems to be considerable potential for continuation and expansion of atmospheric visibility studies as we build experience and equipment because of the planned construction of power plants in the canyon areas of Utah and Arizona. Acid rain studies will probably be discontinued because EVSL is finding no evidence for acid rain in Utah.

NEW OPPORTUNITIES FOR GROWTH

During the past several years the research environment in the United States has changed considerably. The effects of world-wide recession and of an altered national research policy have been primary factors causing these changes. Research funds have become much more scarce than they were previously, and national priorities among research topics have changed.

Nevertheless, there is considerable new opportunity. Over the past year, it has become evident that industry is pursuing research and development with renewed vigor. In addition, President Reagan has recognized the primary role that universities and university-related research groups play in new scientific and engineering development, and has taken steps to foster growth of these groups. At UURI, we have been working to identify potential new opportunities for growth, and we intend to pursue these opportunities on a priority basis. We will concentrate significant effort in developing work that would lead to high levels of funding, more than \$1 million per year.

Acquisition of research and development funding in new areas will require considerable effort. Competition is intense. We will need supplemental funding for any significant effort to develop new markets. Our marketing plans, including estimates of the funds required, are discussed further below. In this section, we describe the primary new areas in which there appear to be considerable potential for growth.

Plan for Increasing the Academic Value of UURI to The University

Over the past several months, J. J. Brophy and S. H. Ward have held meetings with 19 faculty members* at the University for the purpose of determining whether or not it makes sense to bring some of the research

* See Appendix 1.

presently being done on campus to UURI for development and commercialization. Several potential opportunities have been identified, including work with Profs. Kim McCarter, Bob Seader, Om Gandhi, Joe Olsen, Steve Jacobsen, and Bob Smith. We intend to expand selectively our contacts with faculty, and to revisit the more likely prospects.

In addition, we have made long-term plans for a UURI Fellowship program at the University and a UURI Chair in Petroleum or Reservoir Engineering in the College of Engineering or the College of Mines and Mineral Industries. Each of these activities will involve faculty and students in UURI research.

Cooperative Research with the Idaho National Engineering Laboratory

We have learned through visits with DOE that the Reagan Administration has instructed DOE and its national laboratories to promote cooperative research projects with universities and university-related groups. This is in line with the Administration's belief that the predominant scientific strength of the USA resides in such groups. In particular, the Idaho Operations Office of DOE and their prime contractor for the Idaho National Engineering Laboratory (INEL), EG&G Idaho, Inc. have both informed us that INEL is actively seeking cooperative research projects with university groups.

There are a number of funded projects and ideas in EG&G that are logical candidates for UURI and/or one or more departments of the University of Utah to participate in with EG&G. Among these are:

1. Ocean Hydrothermal Energy
2. Strategic Materials Program
3. Production Reactor Facility
4. Hydrometallurgy

Commercialization of Products and Services

Over the past several months, UURI has had conversations with a number of companies that specialize in providing venture capital for development and commercialization of new products and services. We are also aware of a number of ideas for potentially saleable products that have been developed at the University. Two examples are (1) a process and apparatus to produce crude oil from tar sands, developed by Prof. J. D. Seader, and (2) equipment for monitoring potential landslides and earthen dams, developed jointly by Prof. M. K. McCarter and the electronics staff at UURI.

As one of our goals at UURI, we plan to pursue aggressively our role as a link between the University and the community by locating sources of capital to finance commercialization of ideas developed both at the University and at UURI. One venture capitalist is already attempting to raise funds for application of Seader's research for recovering oil from tar sands. Seader's heat pipe method, applied to general distillation, has considerable potential beyond the tar sands application.

Geological and Environmental Hazards Research Center

The University of Utah Research Institute proposes to form a Geological and Environmental Hazards Research Center within the Institute. Utah has a valuable pool of talent available in its several universities and colleges, state agencies and private industry to perform a great deal of the scientific, engineering and socio-political work that is needed. What is lacking is coordination of this talent. No single state agency has a coordination mandate, and, further, state agencies such as the Utah Geological and Mineral Survey and the Division of Comprehensive Emergency Management have no research or technology-development functions.

Assessment and mitigation of both man-induced and natural geologic and

environmental hazards require an interdisciplinary effort. A broad range of scientific and engineering studies is required. Of equal importance are studies of the social consequences of hazards and mitigation measures, and appropriate means to implement programs to deal with preparedness and emergency measures.

The Center will provide the broad range of talents needed to treat hazards problems. We will work closely with existing Utah state agencies in helping to prioritize activities in the Center and in implementation of results. We will also work closely with Federal agencies doing hazards work, such as the U.S. Geological Survey, the Federal Emergency Management Agency and the Environmental Protection Agency.

As a first step in the formation of the Geological and Environmental Hazards Research Center, UURI has written a research proposal in the amount of \$465,000 to the State Division of Comprehensive Emergency Management (CEM) for monitoring of potential landslides. Professors M. K. McCarter and J. Olsen of the University are co-investigators on the proposal. CEM has forwarded our proposal to the Federal Emergency Management Agency (FEMA) with a recommendation for funding (Appendix 2).

Research and Services for the Petroleum Industry

As the price of petroleum products rises higher, oil companies large and small are spending more domestically to improve the productivity of producing fields and discover new areas. During the past two years they have been spending increasing sums on research, and significant money is available to university-related research and service groups. Several items of technology either under development at UURI or identified as being within our expertise appear to be saleable to the petroleum industry. Among these are:

1. Geochemical Services
2. Thermal Maturation Studies

Expanded Uses of Remote Sensing

The National Aeronautics and Space Administration has been mandated by President Reagan to initiate more joint research programs with universities and university-related groups. These instructions have been passed down from NASA headquarters to the NASA laboratories (JPL, Goddard, etc.). UURI plans to take advantage of this mandate by initiating new contacts with the NASA laboratories to promote joint research ideas.

There are a number of ideas for new funding that will be pursued over the next year. Among these are:

1. There is potential for funding under the "Man-and-Biosphere" program of UNESCO. The U.S. intends to support this program even though it does not fully support UNESCO.
2. There is potential for combining the talents of ESL and CRSC in obtaining funding for research in remote sensing applications to geothermal exploration. NASA is the most likely funding source.
3. Opportunities for working with the governments of Mexico and Brazil have been identified and will be pursued.

Small Business Innovation Research (SBIR) Programs

Under Public Law 97-219, The Small Business Innovation Development Act of 1982, approximately \$45 million were set aside during Fiscal Year 1983 for research to be performed by small businesses. This amount will increase to \$450 million by Fiscal Year 1986. In addition to the federal SBIR program, the State of Utah is planning an SBIR program, patterned after the federal program, to become operational in the near future. Most federal agencies have

not been able to use this money because the small businesses eligible under the program do not have the expertise required.

We have been examining ways to take advantage of the SBIR program, and believe we have identified a vehicle. UURI can assume a minority position in a small business that others create and can license products or services to that business. The small business would hire appropriate staff to perform part of the research work, and could subcontract project management and a portion of the research back to UURI. UURI would be able to collect royalties and licensing fees on products or services that are brought to the commercialization stage. We plan to facilitate the formation or use of existing small businesses in this way to take advantage of the SBIR program.

ONE-YEAR OPERATING PLAN -- FY 1985

During the past year, UURI has undergone considerable change. The sale of UBTL resulted in a significant decrease in total income to UURI, but at the same time disposed of an organization that had consistently been a financial drain on other divisions (Table 1). Since that sale, the remaining parts of UURI¹ have been operating on a very tight budget in order to demonstrate financial viability.

The most significant adverse effect of our fiscal restraint has been in marketing. We have had a very limited amount of money to spend on development of new business. Obviously, this situation is not compatible with growth or even with maintenance of current funding levels. Accordingly, the one-year and long-term plans recognize and provide for an aggressive marketing effort.

Anticipated Income

Table 2 lists the income we anticipate from all funding sources in FY 1985. The figures are reasonably firm and are conservative. New markets generally take a period of months to years to develop, and we have allowed for modest growth in the coming year as a result of our recommended marketing effort.

Anticipated Expenditures

Table 3 shows anticipated expenditures assuming a technical staff of the same size as at present and the addition of staff time for the marketing effort, discussed below.

¹ UURI now consists of the Earth Science Laboratory (ESL), the Center for Remote Sensing and Cartography (CRSC) and the Environmental Studies Laboratory (EVSL). Utah Biomedical Test Laboratory (UBTL) was sold and the Applied Technology Division (ATD) was dissolved.

TABLE 1
SUMMARY FINANCIAL HISTORY OF UURI
(AUDITED FIGURES)

Fund Balance (September 30)

<u>YEAR</u>	<u>UBTL</u> ²	<u>ATD</u> ³	<u>ESLD</u> ⁴	<u>ADMN</u> ³	<u>TOTAL</u>
Cum to 1982	(\$587,655)	\$131,085	\$262,658	\$1,083,969	\$890,057
1983	52,978	(146,793)	8,410	(111,131)	(96,536)
Oct-Dec 1983	15,419 ⁵		31,024		46,443
Jan-July 1984			(18,108) ⁶		(18,108)
Total	(\$419,258)	(\$15,708)	\$283,984	\$ 972,838 ¹	\$821,856

¹ ESL and ATD generated an estimated 50% of the funds in this account. Therefore, funds belonging to UURI after the sale are:

	\$283,984
	(\$ 15,708)
	\$486,419
Total	<u>\$754,795</u>

² Sold

³ Dissolved

⁴ Includes Earth Science Laboratory, Center for Remote Sensing and Cartography and Environmental Studies Laboratory

⁵ Includes Reed Harker Settlement

⁶ Includes one-time cost items as follows:

Wayne Urnsbach Settlement	\$15,000
Costs of Moving and Transition	60,996
Total	<u>\$75,996</u>

TABLE 2

ANTICIPATED REVENUE -- FY 1985
(Thousands \$)

	<i>Revenue</i> <u>\$K</u>
<u>Earth Science Laboratory (ESL)</u>	
U.S. Department of Energy	950
U.S. Department of Defense	1,817
Fee Income on Subcontracts	83
Commercial Services	<u>210</u>
	3,060
<u>Center for Remote Sensing and Cartography (CRSC)</u>	
U.S. National Aeronautical and Space Administration	100
State and Federal Contracts	85
Other	<u>15</u>
	200
<u>Environmental Studies Laboratory (EVSL)</u>	
Electrical Power Research Institute	315
Utah Power and Light	<u>150</u>
	465
<u>Faculty Related New Projects</u>	200
GRAND TOTAL	\$3,925K

NEW
 PROJECTIONS

TABLE 3
 ANTICIPATED EXPENDITURES -- FY 1985
 (Thousands \$)

Operating Budget

<u>Item</u>	<u>Costs</u>
Direct Costs	
Salaries and Wages	\$ 906
Employee Benefits	226
Consultants	90
Travel	39
Supplies	29
Computer	53
Sample Analyses	24
Miscellaneous	14
Total Direct Costs	<u>1,381</u>
Subcontracts	1,502
Indirect Costs	633
G&A Costs	204
Fee	<u>205</u>
Total Expenditures	<u><u>\$3,925</u></u>

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Marketing Plan

If UURI is to grow significantly, an aggressive marketing effort must be started at the earliest opportunity. Repeated contacts with a potential client are required to identify specific needs, determine a strategy for serving those needs and convincing the potential client that we can serve him best. Because of the low total funding base available in UURI during the past years, the overhead account, which can be charged for reasonable marketing expenses, has been insufficient to cover the marketing required. We therefore propose to spend some of the fee generated in past years for a special marketing effort. Table 4 shows special marketing costs anticipated for FY 1985.

Subject to negotiation with the Department of Geology and Geophysics, Dr. S. H. Ward would take two quarters of leave from the University to work on market development at UURI. In addition, the regular staff would spend an extra amount of their time marketing. This effort would be in addition to the amount that the overhead accounts can support.

In addition, the contacts with University faculty require repeat visits and new visits. Facilitating the placement of faculty-related new projects with industry, government, or venture capitalists will require a major effort, as we have already experienced with Prof. McCarter's landslide project.

Provision of Administrative Services

At the present time, our administrative services are being provided by former UURI employees through a contract with Deseret Research Corporation. This contract has been extended to the end of calendar year 1984, but in the long term it is obvious that UURI must make other provisions. Several options are available, including a contract to an accounting/administrative group for some or all of these needs or purchasing some or all of these needs from the

TABLE 4
SPECIAL MARKETING COSTS

Burdened Salaries		\$100,000
S. H. Ward	50%	
P. M. Wright	25%	
J. N. Moore	10%	
D. L. Nielson	10%	
M. K. Ridd	5%	
A. C. Hill	5%	
Travel		25,000
Consultants		20,000
Other		<u>5,000</u>
	Total	\$150,000

University. Our current plan is to select among the several opportunities and to terminate the arrangement with Deseret by the end of calendar year 1984.

Space Requirements

Our present 14,600 sq ft of space in Suites A, C and D at 391 Chipeta Way is marginally adequate only for current operations. At the beginning of October, 1984, we will expand into 700 sq ft more space in Suite C, which will relieve our present tight situation somewhat. We will be required to lease new space for any expansion of business or when an in-house administrative service group is formed.

Suite B, which comprises 3,300 sq ft, in the middle of our block of space, is currently open and the building manager is attempting to find a leasor. We have first right of refusal on this additional space and will probably have to make a decision about whether or not to lease it sometime during the next few months. If we can see a clear way to pay for this space, we will lease it, since it would be preferable to have contiguous facilities.

Replacement and Repair of Equipment

Because of very tight operating budgets over the past several years, needs for repair or replacement of field and laboratory equipment in UURI have been ignored. Table 5 shows our current needs. Our field vehicles date from 1978, and none has less than 70,000 hard field miles. We continue to be funded for field work. We will require replacement of 4 field vehicles during the coming year. In addition, we have several items in the computer center, including terminals and plotters, that need repair. We plan to repair these and put our computing equipment back in good shape. Other items of equipment are needed to upgrade or replace existing laboratory facilities. We will fund \$50K of equipment replacement and repair out of current cash and \$47K out of

TABLE 5

EQUIPMENT REPLACEMENT AND REPAIR
(Thousands \$)

<u>Items</u>	<u>Cost</u> \$K
Field Vehicles (4 ea)	48
Repair of Computing Equipment	16
Field-Portable Computer	8
Replacement of Geochemical Equipment	25
	<u>\$97k</u>

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FY 1985 operating funds.

Salary Adjustments

In order to ensure profitability for UURI for the past year, employees of ESL were required to take all of their vacation during the fiscal year and additionally were furloughed without pay for two weeks. In this way, employees contributed a salary savings of \$22,700. Most of the scientists worked during their furlough on projects and proposal writing.

Table 6, below, shows the average salary increases granted during the past several years. Increases were held down during the last two years to accomodate a shrinking research budget and to protect the positions of as many critical staff members as possible. In addition, the general level of salaries in UURI are significantly below the level paid for comparable professionals and non-professionals in industry and the national laboratories.

Considering these factors, we conclude that salary adjustments are needed for 1984-1985 and beyond. Our goal is to make our salary scale as competitive as possible over the next several years. This is necessary to attract the top people needed to make UURI prosper. We recommend an average salary increase of 15 percent during FY 1985, with further increases in outyears until our salary scales reach truly competitive levels.

TABLE 6
AVERAGE SALARY INCREASES, 1981-1984

	<u>% Increase</u>
1981 - 1982	14.5
1982 - 1983	0.7
1983 - 1984	5.2

Recommended Salary Increase: 15% average

TABLE 7
TEN-YEAR FINANCIAL PLAN

BUDGET FY 1985 - 1995
(thousands \$)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
REVENUE										
UURI Generated Income	3725	2718	3280	4030	4769	5499	6270	6933	7640	8340
Faculty Related New Projects	200	450	750	1150	1550	1950	2300	2750	3150	3550
Total	3925	3168	4030	5180	6319	7449	8570	9683	10790	11890
DIRECT COSTS										
In-house	1380	1660	2070	2655	3237	3787	4359	4929	5496	6060
Subcontracts	1502	308	470	610	724	843	954	1057	1139	1229
INDIRECT COSTS	633	770	955	1210	1491	1777	2040	2302	2574	2834
% Rate	45%	45%	45%	45%	45%	46%	46%	46%	46%	46%
B & A COSTS	204	248	307	392	481	571	656	740	828	912
% Rate	14.5%	14.5%	14.5%	14.5%	14.5%	14.8%	14.8%	14.8%	14.8%	14.8%
FEE AND ROYALTY INCOME										
Fee Amount	205	172	228	305	386	471	561	655	753	855
% Fee	5.5%	5.75%	6.0%	6.25%	6.50%	6.75%	7.0%	7.25%	7.50%	7.75%
Royalty				50	60	70	80	90	100	100
Total	205	172	228	305	436	531	631	735	843	955
FEE AND ROYALTY EXPENDITURES										
UURI										
Equipment	47	54	50	84	100	130	150	175	200	225
Reserve			25	30	40	50	50	50	50	50
Contingency			21	30	40	50	50	50	50	50
Salaries Adjustment	57	25	25	25	25					
Development Funds For UURI Staff	48	36	45	56	70	83	97	112	126	141
Marketing	50	50	50	60	70	80	90	100	125	150
Fee - Other Purposes				23	49	84	116	137	160	160
Total	202	165	216	285	368	442	521	603	688	776
Donations To University (fee)										
Graduate Fellowships					16	24	32	40	48	56
Development Funds For Faculty	3	7	12	20	27	35	43	52	62	73
Reserve for Chair - Reservoir Engineering					25	30	35	40	45	50
Total	3	7	12	20	68	89	110	132	155	179
Total	205	172	228	305	436	531	631	735	843	955
SPECIAL MARKETING EXPENSE	100									

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27
26

TABLE 7
TEN-YEAR FINANCIAL PLAN

BUDGET FY 1985 - 1995
(thousands \$)

	Year									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	----	----	----	----	----	----	----	----	----	----
REVENUE										
UURI Generated Income	1995	2718	3280	4030	4769	5899	6270	6933	7640	8340
Faculty Related New Projects	200	450	750	1150	1550	1950	2300	2750	3150	3550
Total	2195	3168	4030	5180	6319	7449	8570	9683	10790	11890
DIRECT COSTS										
In-house	1305	1660	2070	2655	3237	3787	4359	4928	5496	6060
Subcontracts		318	470	610	724	843	954	1067	1139	1229
INDIRECT COSTS										
% Rate	587	770	955	1218	1491	1777	2040	2302	2571	2834
% Rate	45%	45%	45%	45%	45%	46%	46%	46%	46%	46%
G & A COSTS										
% Rate	189	248	307	392	481	571	656	740	828	912
% Rate	14.5%	14.5%	14.5%	14.5%	14.5%	14.8%	14.8%	14.8%	14.8%	14.8%
FEE AND ROYALTY INCOME										
Fee Amount	114	172	228	305	386	471	561	655	753	855
% Fee	5.5%	5.75%	6.0%	6.25%	6.50%	6.75%	7.0%	7.25%	7.50%	7.75%
Royalty					50	60	70	80	90	100
Total	114	172	228	305	436	531	631	735	843	955
FEE AND ROYALTY EXPENDITURES										
UURI										
Equipment	15	54	50	84	100	130	150	175	200	225
Reserve			25	30	40	50	50	50	50	50
Contingency			21	30	40	50	50	50	50	50
Salaries Adjustment	47	25	25	25	25					
Development Funds For UURI Staff		36	45	56	70	83	97	112	126	141
Marketing	50	50	50	60	70	80	90	100	125	150
Fee - Other Purposes					23	49	84	116	137	160
Total	112	165	216	285	368	442	521	603	688	776
Donations To University (fee)										
Graduate Fellowships					16	24	32	40	48	56
Development Funds For Faculty	2	7	12	20	27	35	43	52	62	73
Reserve for Chair - Reservoir Engineering					25	30	35	40	45	50
Total	2	7	12	20	68	89	110	132	155	179
Total	114	172	228	305	436	531	631	735	843	955
SPECIAL MARKETING EXPENSE										
	100									

Handwritten notes:
 UURI
 100%
 100%
 100%
 100%
 100%

27

LONG-TERM OPERATING PLAN

In the long term, UURI intends to pursue an aggressive plan for long-term growth. This is reflected in the Ten-Year Financial Plan (Table 7). We anticipate that income will grow from a current level of \$1.8 million to \$12.0 million by 1994. This will require a well-funded marketing effort as well as acquisition of new scientific talent and laboratory facilities. Such growth also anticipates an expansion from essentially zero at present to \$3.6 million per year in faculty-related research at UURI. OK
HA

Assumptions in the Ten-Year Financial Plan

In devising our Ten-Year Financial Plan, several assumptions have been used. These are as follows.

1. A strong growth in internally generated funds will result from a sharply increased marketing effort.
2. As more faculty become involved, the faculty-related revenue will constitute about one-third of total revenue.
3. Fees generated from subcontracts will grow steadily as subcontract volume grows.
4. The mix of government and industrial sponsorship will shift towards industrial so that the fee rate will increase.
5. The indirect and G&A rates will be kept essentially constant.
6. Special marketing expenses will be paid from current and FY 1985 operations.
7. Provision will be needed to add critical personnel in key areas in order to provide a broader range of skills and lead us into new research areas.
8. New laboratory and support equipment will be needed as well as

maintenance of existing equipment.

Plan for Giving to the University of Utah

UURI has planned a long-term program of giving to the University of Utah. We would like this to be a two-way street, such that we derive equal benefit from the University. Our long-term giving will consist of a graduate fellowship program, development funds for faculty who participate in research at UURI and eventual endowment of a chair in petroleum or reservoir engineering. These contributions will come from new faculty-related projects; no other source of gifts to the University is anticipated.

Additional Cash Requirements

As we grow, UURI will require an increasing cash reserve to do business. A major increase in this requirement is anticipated during the coming year as a result of the probable loss of our letter-of-credit method of reimbursement for work done for the DOE-Idaho Operations Office. As a result of new federal regulations, the letter of credit we have had in the past appears now to be inappropriate, and DOE-ID is under considerable pressure to rescind it during our impending negotiations for a new contract. Table 8 addresses the cash requirements we anticipate as part of the ten-year plan.

Line of Credit from the University of Utah

The University of Utah has expressed a willingness to extend to UURI a line of credit in the amount of \$500,000. This amount approximately equals the total value of the gifts that UURI has contributed to the University of Utah Research Foundation and the University of Utah. Funds would be available to UURI from this line of credit at no interest. There would be a requirement for UURI to demonstrate need for use of this line of credit and the money would be available as long as the need remained, with monthly review to

establish continuing need.

We recommend that this line of credit be used to supply cash needs of UURI beyond that which can be supplied internally.

TABLE 8
 ADDITIONAL CASH REQUIREMENTS AS PART OF TEN-YEAR PLAN

	1984-85	1985-86	1986-87
INCREASE IN BUDGETED REVENUE OVER PRIOR YEAR REVENUE			
BUDGETED REVENUE	2290000	2820000	3530000
PRIOR YEAR REVENUE	1860000	2290000	2820000
INCREASED REVENUE	430000	530000	710000
INCREASED REVENUE PER DAY	1178.08	1452.05	1945.21
ACCOUNTS RECEIVABLE TURNOVER IN DAYS*	70.1	70.1	70.1
ADDITIONAL CASH REQUIREMENTS	82584	101789	136359
CHANGE IN D.O.E. CONTRACT FROM LETTER OF CREDIT			
PORTION OF CURRENT BUDGET	1148000		
PASS THRU MONEY ON DRILLING SUBCONTRACT**	1410000		
TOTAL DOE FUNDING	2558000		
DOE FUNDING PER DAY	7008.22		
ADDITIONAL ACCTS./REC. TURNOVER IN DAYS***	67		
ADDITIONAL CASH REQUIREMENTS	469551		
SPECIAL MARKETING FROM 10 YEAR BUDGET	150000	75000	25000
ADDITIONAL CASH REQUIREMENTS	702134	176789	161359

* ACTUAL ACCTS./REC. TURNOVER EXPERIENCED FOR ESLD/ATD THRU 8-31-84

** PASS THRU MONEY NOT SHOWN IN YEARLY BUDGETED REVENUE

*** ASSUMES 0 DAYS TURNOVER (ADVANCED PAYMENT) FOR LETTER OF CREDIT.
 BILLING INCLUDES 30 DAYS TO INVOICE, 7 DAYS MAILING, 30 DAYS TO PAY.

SPECIAL APPROPRIATIONS

In order to implement the plan presented, three special appropriations are recommended:

1. Special Marketing Effort \$100,000

This special one-year effort, as described above, is necessary during the coming fiscal year to broaden the base of support, both in terms of new faculty-related projects, additional geoscience programs, and special projects.

2. Equipment Purchases \$ 50,000

In order to engage in continuing contract research efforts, upgrade of equipment is necessary. Immediate acquisition of 2 field vehicles and repair of computer peripherals is part of the first-year plan.

3. Contingency Fund \$150,000

Prudent business practice for not-for-profit research organizations includes an internal contingency fund of approximately 25% of annual revenues. This recommended allocation is a beginning of an appropriate contingency fund. It is understood that no expenditures from the fund can be made without specific approval by the Board of Trustees.

LIST OF TABLES

- Table 1. Summary Financial History of UURI
- Table 2. Anticipated Revenue -- FY 1985
- Table 3. Anticipated Expenditures -- FY 1985
- Table 4. Special Marketing Costs
- Table 5. Equipment Replacement and Repair
- Table 6. Average Salary Increases, 1981-1984
- Table 7. Ten-Year Financial Plan
- Table 8. Additional Cash Requirements as part of Ten-Year Plan

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page ii*

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APPENDIX 1
INTERVIEWS ON CAMPUS

May 31 Attended meeting of Council of Academic Deans, JJB & SHW
June 6 Visited with Dean Milton Wadsworth, JJB & SHW
June 9 Visited with Dean Joseph Andrade, JJB & SHW
June 11 Visited with R. B. Smith, JJB & SHW
June 12 Visited with G. W. Hohmann
June 13 Visited with M. K. McCarty, SHW, PMW & DF
June 14 Visited with Larry Davies, JJB & SHW
June 15 Visited with Gordon Jensen, JJB & SHW
June 19 Visited with Dean David Grant, JJB, SHW, & DLN
June 19 Visited with V. Lal and J. Olsen, JJB & SHW
June 19 Visited with T. Stockham and C. Rushforth, JJB & SHW
June 20 Visited with Steve Jacobsen and Sam Drake, JJB & SHW
July 31 Visited with J. Stringfellow, JJB & SHW
Aug. 14 Visited with J. Seader, JJB & SHW
Sept. 11 Visited with R. Riesenfeld, JJB & SHW



SCOTT M. MATHESON
Governor

STATE OF UTAH

DIVISION OF COMPREHENSIVE EMERGENCY MANAGEMENT

DEPARTMENT OF PUBLIC SAFETY

1543 SUNNYSIDE AVENUE

P.O. BOX 8100, SALT LAKE CITY, UTAH 84108

TELEPHONE (801) 533-5271

September 12, 1984



LARRY E. LUNNEN
Commissioner

LORAYNE TEMPEST
Director

APPENDIX 2

Mr. Alton D. Cook, Regional Director
Federal Emergency Management Agency, Region VIII
Denver Federal Center, Building 710
Denver, Colorado 80225

Dear Mr. Cook:

I recommend approval of the Proposal on Landslide Monitoring, Prediction and Mitigation in Utah, which has been submitted by the University of Utah Research Institute.

As you are aware, the damages and costs associated with Utah's 1983 flooding and landslide disaster amounted to more than \$480,000,000 and the 1984 damages have by now, reached more than \$47,000,000. Occurrences like the Rudd Canyon debris flow have unexpectedly wiped out homes and endangered lives. A similar event in the middle of the night could result in many deaths. The hazards associated with such landslides are increased when they can occur at locations and times which are undetected and unpredicted until the slide occurs.

The one-time monitoring and telemetry installed in the Fall of 1983, in Rudd Canyon and Reynolds Gulch, were pilot installations aimed at providing continuous monitoring to receiving sites which could initiate warnings to save lives and permit responsive actions. These installations were designed and emplaced by the U of U Research Institute Earth Science Laboratory.

This proposal should be viewed in a perspective similar to that of the seismograph station monitoring system which provides earthquake information. Of greater value however, the proposed landslide monitoring system can warn citizens in advance and provide for life-saving responses before the hazard strikes.

In view of the past two years' historic catastrophies in Utah, associated with landslides and debris flows, I highly recommend approval of this proposal as a Hazard Mitigation Grant which will provide direct life-saving potential from the outset of the installations. It applies the mitigation component of the Integrated Emergency Management System and concepts.

Your assistance is appreciated.

Sincerely,

Lorayne Tempest, Director

LT/RFF/js

cc: U of U RI, UGMS

"If You Fail to Prepare You Prepare to Fail"



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