3) Third, an increase in a family's annual income not only results in an increased ability to purchase consumer goods and accumulate wealth, but also in an increased ability to participate in subsistence harvesting and reciprocal networks based on the exchange of subsistence products. While families with a relatively low cash income are only able to invest 15% of their income in the harvest of subsistence resources and do not harvest in amounts great enough to allow them to participate extensively in community exchange networks, families with a high cash income can and do invest a larger percentage of their income in the harvest of subsistence resources and consequently obtain the products necessary to participate extensively in inter-village exchanges.

4) The smaller communities, like the poorer families, have definite social limitations, e.g., less education and employment, and less well educated and employable individuals reside there. They have the advantage, however, that subsistence resources are easier and cheaper to harvest, as the population pressure on the area is not as great.

5) Fifth, it is impossible to separate the effects of a disruption in the commercial salmon fishery from the ability of villages to harvest resources for subsistence purposes. A disruption of the commercial salmon fishery would drastically reduce annual incomes of 92% of the families in the villages under consideration, with a corresponding decrease in their ability to harvest subsistence resources from the present village sites. What would follow a disruption of the commercial salmon fishery would be increased dependence on welfare and/or the revival of seasonal camps for such activities as fall whitefish or spring pike fishing.

6) At present in the study area, the distance people go for resources is often very great, and reflects the point of origin of the harvester rather than the most proximate location of the harvested.

7) Present village populations are not simply concentrations of historically adjacent populations, but draw from broad, overlapping areas. All three villages under study are composed of separate and separable family groups which are themselves closely knit but which only in the last ten years are beginning to be consolidated through intermarriage and the effects of intercommunity distribution and exchange networks, both modern and traditional.

In conclusion, the harvest disruption of key species such as salmon or sea mammals would not only result in economic hardship but in extreme social disruption in the study area. The villages are not as permanent as they might appear to be.

Ann Fienup-Riordan
325 East Manor Street
Anchorage, Alaska 99501

Title: Effective Teachers in Rural Alaska
Grant Amount: $145,718.
Completion Date: June 30, 1984

Purpose: This study will examine how teachers who are effective in village Alaska go about the business of teaching. How do they teach reading, for example when students speak a language other than standard English? How do good teachers organize the classroom when they have twenty students ranging from the first to the sixth grade? How do they set standards for academic performance and student behavior when students come from a culture with different rules for conduct?

This study will identify a group of teachers whom both village communities and professional educators regard as unusually successful teachers. It will describe in practical terms exactly what these teachers do in the classroom and how they work with the community.

Application: The potential benefits of this research are immense. This study will develop more practical, applied methods of training teachers for village classrooms. Better trained teachers will ultimately result in better education for Indian and Eskimo children in isolated villages.

The results of this research will include:

1. Inservice workshops for rural teachers on effective teaching methods.

2. University education courses which deal with practical teaching problems in rural Alaska.

3. Professional papers and popular articles on rural teaching.

4. A 30 minute videotape showing what effective village teachers actually do in the classroom.

Status. During the first five months of this project, the research literature on teacher effectiveness has been reviewed. Investigators have talked to University faculty, representatives of National Education Association-Alaska, school superintendents, and village teachers about possible approaches and problems (e.g., validity of gains in standardized test scores with small numbers of students, obtaining permissions from all students to videotape rural classrooms). Three exploratory studies have been conducted to test different ways of identifying effective teachers.

A research team has been organized consisting of seven university faculty and research associates. Most members teach courses on rural education. By participating in the research itself, the team will be familiar with the results and can apply what is learned in their work.

The first problem in t s study is to identify a group of especially "effective" teachers in village Alaska. Experienced rural teachers will be selected who meet three or more of these criteria: 1) teachers nominated as unusually effective by professionsl colleagues; 2) teachers viewed as especially successful by village communities and students; 3) teachers viewed as outstanding by school district administrators; and 4) teachers whose students have greater than average gains on achievement tests.

Next, these teachers will be interviewed and observed. Investigators will see whether they are using the specific teaching practices that national research has found important to good teaching (e.g., assigning setting high standards, teaching to whole groups rather than using an individualized teaching approach).

The Alaska Department of Education's Effective Schooling Project is promoting the use of such teaching practices throughout Alaska schools. The Department wants to know whether or not the national research on effective teaching applies to rural Alaska. This study will provide the Department with this critical information.

In addition, we will see what unusual teaching stategies effective rural teachers have developed for the special teaching conditions in Alaska--small schools, multi-grade classrooms, and students with a different cultural background and frame of reference.

Judith Kleinfeld
Bill McDiarmid
Institute of Social and Economic Research
University of Alaska - Fairbanks

Title: Monitoring Program of Near-Shore Bottomfish
Grant Amount: $72,710.
Completion Date: June 30, 1983

Purpose: The developing bottom-fishery for inshore stocks of rockfish and lingcod in southeast Alaska is the subject of this project. A major goal is to develop a monitoring strategy that will provide information needed to manage this valuable resource.

Alaskan small-vessel fishermen are turning to new fishery resources to augment their traditional catches of salmon, halibut and crab. Near-shore bottomfish are accessible alternate resource for many of these fishermen, and expansion of markets will undoubtedly mean increased effort on these fish stocks. This project is designed to help avoid the short-lived, boom-and-bust nature of fisheries for underutilized or non-traditional species. The ultimate goal is to provide long-term, sustained production of local bottom-fisheries for small-vessel fishermen.

Application: Innovative, long-range plans are needed to insure the commercial viability of the fishery prior to increased exploitation. This project was designed to identify those characteristics of the exploited fish stocks that will provide the most economical and useful indicators of overfishing.

Status: The chief accomplishments of the research project are:

1) Completion of 30 days of test (survey) fishing aboard the M/V Searcher in the vicinity of Sitka Sound - a total of 2,140 fish were sampled with automatic jigging machines. Assessment techniques that were developed in this study will provide the mechanism for future repeat censuses in three major study areas and three depth zones. Procedures were established for estimating catch-per-unit-effort (CPUE) through standardization of gear type, fishing techniques, and accurate logging of fishing time and catch.

2) The dockside sampling of 3,401 bottomfish caught by the commercial fleet in order to monitor species composition and CPUE. Changes in commercial catch composition or catch rates may be useful indicators of changes in fish stocks.

3) Tagging of 1,031 rockfish and lingcod in the Sitka Sound region - none of these specimens have been taken by either commercial or recreational fishermen; however, dozens of tagged fish were sighted by project divers, indicating that tag retention was satisfactory.

4) Underwater censuses of juvenile and pre-recruit fishes were conducted by diver-biologists in key in-shore areas adjacent to major study areas and fishing grounds. These fish stocks were found to be highly structured by depth; consequently, inventories of juveniles in shallow waters may provide an index of future stock numbers.

Lewis Haldorson
University of Alaska, Juneau

Title: Sixty Seconds of Science
Grant Amount: $62,006.
Completion Date: December 31, 1982

Purpose: "Sixty Seconds of Science" is an award-winning series of radio programs written and produced at the University of Alaska's Arctic Environmental Information and Data Center. Ten 60-second programs are distributed each month for broadcast by public and commercial radio stations statewide. The series airs on 85% of the radio stations in Alaska.

Application: The overall goal of this project is to increase public knowledge and understanding of the role of science and its relevance to our lives. These science programs informally educate a broad and diverse audience including the general public and the science-literate public. In Alaska, young people and rural residents are higher-than-average radio listeners.

Status: "Sixty Seconds of Science" was developed in 1980-1981 under a grant from the National Science Foundation. Funding for the project was continued (1981-1982) through the Alaska Council on Science and Technology. Durings its two years on the air, "Sixty Seconds of Science" won an award as a finalist in the International Radio Festival of New York, 1982, and has won three awards for excellence from the Alaska Press Club, 1981 and 1982.

Topics cover the spectrum of science in Alaska, from the natural wonders of the arctic such as pingos, glaciers, and the aurora borealis to the animal life which inhabits this northern world, such as polar bears, whales, lemmings, and reindeer. The program attempts to answer some of the most commonly asked questions such as "What is hypothermia?" "Why to leaves turn colors in the fall?" "Why is a glacier blue?" and "What are petrochemicals?" It also explains subjects more out of the ordinary from Alaska's "drunken forest" and tropical underwater boulder patches to the sex life of a shrimp and the elephant seal's inflatable nose.

Nan Elliot, Producer
Arctic Environmental Information and
Data Center
University of Alaska - Anchorage

Title: Biogeochemistry of Arsenic Mine Drainage
Grant Amount: $83,500.
Completion Date: October 1, 1983

Purpose: Groundwater levels of arsenic high enough to pose human health problems have been discovered in the Ester Dome area near Fairbanks, Alaska. Ester Dome is historically a site of major lode-gold mining. Placer mining is presently active here and lode mining is being revitalized. The discovery of arsenic has aroused interest to determine the biogeochemical processes involved in the release of heavy metals such as arsenic from mine material and mine wastes into streams and groundwaters.

An iron-and sulfur-oxidizing bacterium call Thiobacillus ferrooxidans is known to be responsible for heavy-metal leaching and acid production in waters draining from sulfide deposits throughout the world. Since sulfides and heavy metals are commonly associated with lode-gold deposits and are sometimes associated with placer deposits, it was reasoned that this bacterium may play a role in the heavy-metal contamination of subarctic streams and groundwaters that are impacted by gold mining.

Application: The fact that T. ferrooxidans is ubiquitous in subarctic streams impacted by mining illustrates that preventing heavy-metal pollution will be problematical. On the other hand, its presence also indicates that biohydrometallurgy (microbial mining) may be successfully employed in Alaska. A lode mine operation designed using this biotechnology could efficiently extract more valuable metals (gold, molybdenum, zinc, antimony, copper, etc.) with less shipping costs than conventional separation technologies. In addition, because more heaving metals can be recovered for profit (using bacteria), fewer heavy metals would be left in the tailings for T. ferrooxidans to leach into nearby streams and groundwaters.

Status: The first step in the study was to determine if Thiobacillus ferrooxidans was present in subarctic streams affected by gold mining activities. Large numbers of these bacteria were found in 90% of the placer mine drainages sampled. Measurable amounts of dissolved arsenic were also found in 30% of the streams affected by placer mining activities.

With the discovery that T. ferrooxidans exists in subarctic streams affected by mining activities, a second phase of the study began -- to determine whether or not these bacteria are directly involved with the leaching of heavy metals from mine material into surface waters and groundwaters. Some active zones in tailings from abandoned lode mines were examined. Waters draining through these tailings are highly acidic, contain very large numbers of Thiobacillus ferrooxidans, and have dissolved arsenic concentrations as much as 500 times greater than the Environmental Protection Agency's recommended limit of 50 parts per billion for potable water. The presence of

dissolved metals (such as arsenic in water that has drained through mine tailings) indicates that heavy metals are leaching from the tailings under acidic conditions. The results also suggest that the bacterium, T. ferrooxidans, may be directly involved in the leaching of arsenic and other heavy metals into subarctic streams impacted by active and abandoned mines.

To investigate the mechanisms of arsenic leaching in more detail, the third phase of studies were begun. This phase includes several types of laboratory studies. A Thiobacillus ferrooxidans strain (isolated from a creek in the Fairbanks area impacted by a placer mine) is being used for laboratory studies in which we have been able to assess the amount of arsenic that can be biologically leached from gold-mine material. This strain is able to withstand dissolved arsenic concentrations exceeding 900 parts per million. The results of several experiments support the contention that heavy-metal leaching occurs in localized zones and not in the neutral pH streams where T. ferrooxidans and dissolved heavy metals have been detected. Further studies are being conducted to distinguish between biological and nonbiological dissolution of heavy metals and to describe the growth kinetics of T. ferrooxidans.

E.J. Brown
Institute of Water Resources
University of Alaska - Fairbanks

Title: Northern Plant Documentation Center
Grant Amount: $29,541.
Completion date: July 1, 1983

Purpose: The Northern Plant Documentation Center at the University of Alaska, Fairbanks, was established to meet the need for accurate information on the distribution of plants in Alaska by state, federal, and private (industry) land managers in order to exploit natural resources and comply with regulations that guide the development of wildlands. Although the requisite information might already be present in museum collections, until the advent of computerized data management, these sources could not be efficiently used.

Application: A fundamental step in the process of industrial development on state and federal lands in Alaska, pursuant to NEPA and other related legislative acts of Congress and the State Legislature, is a prior assessment and evaluation of social and environmental impacts that could result from a given project. The standard against which environmental impact is evaluated has become known as the environmental baseline, which is established in large part from inventories of biological resources. These inventories for a state as large and as varied as Alaska can become major efforts in themselves.

Since plants are the foundation of our ecosystem, a knowledge of vegetation and flora is paramount to describe the pre-impact conditions against which changes can be measured. With floristic details, there is documentation for vegetation analysis and knowledge of what plants are restricted and rare and suitable for protection under the Endangered Species Act.

Status: The Northern Plant Documentation Center has continued to place in its computerized file the label data from herbarium specimens at the University of Alaska Museum. Specimens are withdrawn, taxon by taxon, identifications are verified, label data are checked and missing elements are added, and the data (10 to 13 fields commonly, with the potential for 31 fields) are entered via a terminal linked to the University computer. Hard copy is proofed and corrected, after which reports of various types can be written. The project is labor intensive, and progress is incremental without quantum leaps. Each batch of specimens adds to the data base and thereby also to its usefulness both in terms of taxa and geographic areas covered.

Other accomplishments during the first six months include: proofing and editing of the first 10,000 entries for vascular plant specimens entered prior to the start of ACST funding; proofing and editing of some 9,000 records entered from the Moss Flora of Arctic Alaska; activation of SELGEN program for global commands; development of routine to check quadrangle against latitude and longitude; updating of our registry of type (nomenclatural) specimens; development of list of bryophytes by site along the Dalton Highway for the Moss Flora

of Arctic North America project workshop, an ACST sponsored meeting; preparation for the loading of specimens cited for the Alaskan Arctic Slope; and entered the data from 6,035 vascular plant specimens.

David F. Murray
Alan R. Batten
Institute of Arctic Biology
University of Alaska - Fairbanks

Title: Solar Radiation Assessment for Alaska
Grant Amount: $165,964.
Completion Date: September 30, 1983

Purpose: This project, the assessment of the solar radiation potential for Alaska, was designed to collect solar radiation data, which are of special interest for solar energy application.

Application: To undertake a complete assessment of the solar energy available in the four main climatic regions of Alaska in a form directly usable by the "solar energy community" within the State, and to disseminate solar radiation data to users through the newly formed Alaska State Climatic Center.

Status: The investigators are compiling a large amount of data which, when reduced to a form directly usable to the solar community, will enable the people of Alaska to have available to them a complete assessment of the solar energy available in all four climatic regions in Alaska.

The four climatic zones in Alask are: a) coastal maritime, b) transitional, c) continental interior and d) arctic. It is essential that data be obtained in each region, so data collection stations have been established in Kodiak, Anchorage, Fairbanks, and Barrow. The divisions into climatic zones, also form the logical breakdown of radiation regimes since each zone represents particular conditions of cloudiness, type of clouds, ground reflectivity, humidity, temperature, etc. These parameters are relevant in determining solar energy potential. The stations are also located within some of the largest populated parts of each climatic zone where the information is anticipated to be of primary interest; however, data can be extrapolated to bush communities in the same climatic zone.

Besides the stations in this study, there are only three other stations in Alaska (Fairbanks-National Weather Service, Palmer-University of Alaska and Barrow-GMCC), none of which measures the direct beam or energy received on a south wall or slope. Such measurements are essential for all solar energy applications.

Since this program commenced in Fairbanks, the project investigators have received requests for solar radiation data from architects, building contractors, design engineers, students as well as many persons interested in solar energy from different regions in Alaska. This data is also utilized by scientists in various fields including many with grants from ACST, State of Alaska and Federal Government. These scientists are in areas not directly related to solar energy, they work in agriculture, hydrology and the health field.

Gerd Wendler
Geophysical Institute
University of Alaska - Fairbanks

Title: Taiga Forest Management Model
Grant Amount: $63,236.
Completion Date: September 30, 1983

Purpose: The purpose of the project is to integrate existing data (collected mostly by the Forest Soils Laboratory of the University of Alaska and by the Institute of Northern Forestry of the U.S. Forest Service) into computer models which will allow prediction of forest growth and yield for managment purposes. These data can be divided into (1) aboveground tree growth, biomass accumulation and nutrient contents (this study is focusing solely upon nitrogen because it is most limiting in these forests), (2) decomposition of the forest floor organic matter, (3) climate data, (4) transfers between trees and forest floor (nitrogen uptake or response of growth to soil nitrogen, litterfall).

Application: The primary value of these models is prediction of the consequences of different harvest and silvicultural practices (e.g., whole-tree harvest, slash burning, thinning) and different rotation periods. It is not expected that these predictions will be exact, but precise enough to guide experimental forest practices work. For example, current and future field experiments will be used to check model predictions of harvest and of key related variables, especially soil nitrogen reserves.

Status: The first part of the study, underway now, is data reduction and statistical analysis, placing data in a form useable in the computer models. Biomass and density growth of white spruce stands have been described and suitable statistical models have been fitted to the data. There are publications submitted and in preparation on these topics. Data on decomposition have been gathered but not yet analyzed.

The second part of the study, integrating data into models, has begun. A large computer model (FORCYTE) obtained from University of British Columbia, is being modified to describe Alaskan white spruce growth. The model is very detailed, predicting stem growth and density, biomass growth, nitrogen distribution, decomposition, yield, economic performance and energy efficiency. It is too early to comment on the applicability and precision of this model. Present and continuing (1984+) modification and tuning of this model is supported jointly by this ACST grant, by the U.S. Forest Service through contracts, and by the Forest Soils Laboratory. We feel that this model, once fully modified for Alaskan forests, will represent a very significant step, bringing interior Alaska up to the state of the art in forest productivity and management modeling. Smaller, simpler, special purpose models are also being developed to predict forest biomass growth and yield and forest floor nitrogen reserve, following the lines of the simpler FORTNITE models of Oregon State University and University of Washington.

Without such models, field information on such related variables is interpretable only with guesswork and cannot be evaluated as well in terms of future growth, optimal harvest time or timing of forest treatments like thinning. With the model, ongoing data can be utilized to fine-tune forest practices for changing biological and economic conditions and for different site qualities. In fact, measures of site quality may not become available or manifest until 10-20 years of growth and/or field data collection; having a working model to interpret the consequences of such factors in 'midstream' is very important practically. It should be emphasized that such field research is just beginning in interior Alaska, but long term plans of the Forest Soils Laboratory and Institute of Northern Forestry will incorporate these models and results of their studies will be used to regularly modify and improve the models.

John F. Fox
Institute of Arctic Biology
University of Alaska - Fairbanks

Title: Study of Wind Characteristics for Applied Wind Power
Grant Amount: $149,408.
Completion Date: March 31, 1983

Purpose: To initiate a continuing program to further the successful application of wind power in Alaska. Tasks will be to computer-base analysis of 50 or more of the 195 Alaskan land locations for which wind data is available; and the analysis of the detailed characteristics of the wind field in the Fairbanks environs, since some data indicate a possible wind power potential in the Fairbanks area.

Application: Successful application of wind power requires information on the wind resource (including possible machine-threatening turbulence and extreme speeds), on suitable machines and on windmill performance in various wind regimes.

Status: The first year of a planned multi-year program has yielded considerable information; described below. Detailed reports on these and other tasks are in preparation.

Turbulence and extreme speeds. Contemporary properly installed windmills (WECS, wind energy conversion systems) have design goals of 15 to 25 years lifetime and survive wind speeds of 100 to 125 MPH. Alaskan WECS history shows failures ranging from within a few days to many years with only routine but careful maintenance. Expected extreme wind speeds for Alaska are, for the coastal regions, 80mph (every 2 years) to 120mph (every 100 years). These values are for 30 ft. height, and will be larger at expected windmill hub heights of 50 ft. or more.

High wind speeds less than the extreme values also can lead to fatigue failure, since the latter is often due to the accumulation of many small stress damages. Such accumulation often occurs in highly turbulent winds involving series of gusts. This, in practice, WECS selected for very windy sites should have appropriate test histories that confirm well engineered mechanical, as well as electrical and aerodynamic, design.

Environs Wind Survey. A task well along named Fairbanks Environs Wind Survey has two main objectives: (1) to determine the wind power potential in an area outside Fairbanks and (2) to establish methods and criteria that may be useful to wind-survey other Alaskan areas with similar land features, i.e., populated areas on often-sheltered plains with adjacent hills, ridges, etc. For instance, at the Fairbanks International Airport (460 ft. altitude) the average annual wind speed is 5.4mph while atop (3000 ft.) Murphy Dome (at the Air Force Station) it is about 14.3mph and well suited for year-round windmill use.

Since these results are from normally quiet interior Alaska, surveys of other areas with exposed ridges at about 1800 ft. or more should uncover sites with useable wind power potential.

Tunis Wentink, Jr.
Geophysical Institute
University of Alaska

Title: Persistence of Herbicides in Agricultural Soils
Grant Amount: $132,973.
Completion Date: February 28, 1985

Purpose: The objectives of the research are to determine the persistence of five commonly used herbicides which have potential for remaining in soil under Alaskan conditions. Degredation rates of the herbicides are being determined through periodic soil sampling and extraction of residues. The effect of soil residues on rotational crops in following years is also being investigated. The effects of pH, soil moisture and soil temperature on herbicide persistence are being determined through growth chamber experiments where environmental conditions can be closely controlled.

Application: The results of this study will allow us to determine: 1) whether herbicies in soils will persist for longer periods of time under Alaskan conditions; 2) which rotational crops (if any) would be affected by soil herbicide residues; 3) the effects of soil pH, temperature, moisture and depth of herbicide incorporation on herbicide degredation in soil. With this information in hand, more knowledgeable decisions could be made regarding clearing and management of agricultural land, since the amount of organic matter left on the land and the manner in which it is disposed of (burned in place vs. in berms) has dramatic affects on soil pH and moisture.

Status: Progress to date has been to set up a 2.5-year experiment to determine persistence of five herbicides and associated carry-over problems with rotational crops. Soil samples were obtained at monthly time intervals for residue analysis. A depth of incorporation study was also set up, and residue samples collected. Analysis of residue samples is in the beginning phases.

Dr. Jeff Conn
C.W. Knight
Agricultural Experiment Station
University of Alaska - Fairbanks

Title: A Study of Airborne Pollen and Spores for Medical and Other Purposes
Grant Amount: $73,341.
Completion Date: November 30, 1983

Purpose: 1. To document the seasonality of pollen and spores in the atmosphere through periodic measures of concentration.

2. To produce a preliminary pollen calendar for each pollen and spore taxon showing average seasonal dynamics as well as record conditions.

3. To analyze the data on aeroflora dynamics in conjunction with weather data to determine any relationships and, from this, to develop a pollen and spore predictive capability.

4. To establish a scientific basis in Alaska for a continuing program of routine sampling and information release and for later and more beneficial analyses.

Application: The benefits of this project will, in the first place, be for those who suffer with hay fever, or pollen and spore induced allergic reactions, and for the physicians who have to treat them. For example, the list of plant taxa will help physicians in the Fairbanks area to narrow the range of their testing and make it easier to choose hyposensitization treatments.

The benefits to the hay fever community are only the most immediate from this research. Additional benefits to the state, and to the broader scientific community, will be in two areas: 1) Ecosystem analysis. Seasonal pollen and spore productivity is a critical aspect of ecosystem function; 2) Paleoecology. Fossil assemblages of pollen grains and spores may be extracted from peats and other kinds of sedimentary materials indicating the kinds of plants in the vegetation at the time the sediments were deposited.

Status: The first list of plant taxa for Alaska aeroflora on the University of Alaska Fairbanks campus has been completed. It will be possible to upgrade and expand this list when results from the proper samplers are available. Then, similar lists will be prepared for Juneau, Anchorage, Palmer, and possibly Kenai or Homer.

Pollen calendars for 1978, 1981, and 1982 on the Fairbanks campus, illustrating the dynamics of the aeroflora in these have also been completed. These pollen calendars are the first for Alaska and show that while there is a general similarity in aeroflora dynamics between the years, there are significant differences in times of first appearance, peak abundances, and disappearance from the atmosphere. There also appear to be differences in the number of pollen and spores trapped from year to year. It is these differences that must be analyzed in terms of meteorological or biological factors in an attempt to determine their causes and predictability.

A prototype of what will be called a standard pollen calendar for birch has been developed, a device that may be used to estimate in advance the birch pollen severity on any day during the average flowering season. Similar calendars will be developed for the other major pollen and spore taxa. The present one is only a prototype because three seasons' data are insufficient for statistical analysis. Sampling should continue for at least ten years to facilitate the development of standard pollen calendars. Then, standard deviations or confidence intervals for the averages could be calculated and plotted, thereby increasing the usefulness of the calendars.

J.H. Anderson
Institute of Arctic Biology
University of Alaska - Fairbanks

Title: Investigations of the Geothermal Energy Resources of the Lower Susitna Basin

Grant Amount: $149,664.

Completion Date: June 30, 1983

Purpose: The initial D.O.E. funded study suggests that a substantial warm water resource may be present in the Willow-Big Lake area. However, large gaps exist in the survey data base that have been used to delineate this resource, and the nature of the geothermal system supplying the reservoirs is not yet well understood.

The ACST funded follow-on program of exploration geophysics which will focus on providing a much better definition of the nature of the geothermal system and the lateral and vertical distribution of suspected geothermal reservoirs. Specific work will include completion of helium and gravity surveys and deep resistivity surveys in selected areas of large helium anomalies. Also, an attempt will be made to obtain a few shallow exploratory drill holes in critical areas in cooperation with the water resources division of the Alaska Division of Geological and Geophysical Surveys.

Application: The potentially favorable economics resulting from the shallow predicted reservior depths and the rapidly growing population of this area along the Parks Highway make an exploration program very attractive. This is one of the few areas in Alaska where a sizeable future population could be located in the vicinity of a large geothermal resource that could be economically utilized.

Status: Four dry wildcat wells drilled in the lower Susitna basin have encountered anomalously high temperatures, suggesting that low temperature geothermal resources might be present which could be used for space heating and agriculture. Estimated temperature gradients range from 40 to 123°C/km. One well had an indicated maximum temperature of 76.7°C within 2050' depth. There are not known surface manifestations of a geothermal resource in the area but water wells have encountered warm saline water at a depth of 40 ft. in one locality and reportedly at 200 ft. in two wells at Nancy Lake.

A helium soil gas and water survey corroborates the temperature anomalies in the three hot wells studied and suggest that discontinuous hot water reservoirs totalling 40 square miles may be present in the Willow-Big Lake area. Several areas of state land in the previously proposed state capital site near Willow contain substantial helium anomalies. The helium anomalies extend to within six miles of Wasilla, where the preliminary survey ended. It is possible that this anomaly trend may extend as far east as Wasilla, or even possibly farther to the east.

Two possible models have been proposed - radioactive heating of aquifers by U and Th-rich basement rocks, and fault-controlled

hydrothermal convection to account for the geothermal system in the area studied. Although both models are generally consistent with available field evidence, the very large extent and apparent orientation of discontinuous geothermal reservoirs appear to favor the fault model.

It should be emphasized that the presence of large amounts of hot water has not yet been confirmed in the study atea. Indirect evidence from the helium survey is very encouraging, but the actual confirmation of the suspected geothermal resource will require exploratory drilling and well testing. Drilling should be relatively inexpensive due to the shallow depths to suspected reservoirs inferred from the gravity survey.

Donald L. Turner
Eugene M. Wescott
Geophysical Institute
University of Alaska - Fairbanks

Title: Removal Process of Air Pollution Particles in Ice Fog Conditions
Grant Amount: $118,816.
Completion Date: July 1, 1984

Purpose: This study was started in the winter of 1981 to determine if pollution is removed from the air by nucleation and diffusion. Nucleation is the process of an ice crystal forming around a pollution particle.

Application: Ice fog is produced whenever water vapor is injected into very cold air and it freezes into tiny ice crystals. Water vapor is continuously being emitted into the atmosphere from automobiles and homes, as well as from natural sources such as rivers, lakes, plants, and animals. At low temperatures, generally -30°C (-23°F) and below, ice fog is formed in Fairbanks, for example, and at the same time certain meteorological conditions occur where this dense, cold air hugs the ground and may remain for days at a time. This stagnant air means that there is very slow and inefficient mixing and little removal of materials from the atmosphere. Ice fog and air pollution coexist in this situation, providng a dangerous and unhealthy environment. This study will examine the removal of the air pollution particles.

Ice fog in a polluted atmosphere consists of ice crystals formed from water droplets alone, and pollution particles around which an ice crystal often forms. Nucleation to form crystals and diffusion of air pollution particles in the air have been considered to be the major processes for removal of the pollution in ice fog.

Status: Air samples were taken with a Casella cascade impactor and an electrostatic aerosol sampler when air temperature was below -29°C (-34°F). These samplers collect particles in the air, and size distribution of the particles can be determined.

Residence time of the aerosol particles (the total time particles stay in the air) was calculated from known ice fog crystal precipitation rates, solid water content of the air, and vertical thickness of the ice fog layer. It was calculated that at -30°C the residence time is 5 minutes, at -35°C residence time is 37 minutes, and at -40°C residence time is 5 hours. This shows that at lower temperatures the ice fog stays in the air much longer than at warmer temperatures.

Preliminary results indicate that the major removal process of aerosols in ice fog is diffusion into the air or sedimentation on the ground of aerosol particles not attached to ice fog crystals. Nucleation appears to be a less important process, and scavenging is least important.

Research is continuing on the possibility of artificially enhancing the effect by small ice fog crystals in order to accelerate the removal of harmful particles from the air.

Takeshi Ohtake
Geophysical Institute
University of Alaska

Title: Fate of Fertilizer Nitrogen in Agricultural Soils in Interior Alaska
Grant Amount: $191,257.
Completion Date: December 31, 1983

Purpose: At present, very little is known about the behavior of nitrogen in Alaskan agricultural soils. Since Alaska's climate is much different from most other agricultural areas of the world, information from other regions cannot be transferred here. Thus, a need was seen by agriculturists to determine what happens to nitrogen fertilizer when it is applied to soil in Alaska. The primary objectives of the work are to: 1) measure the rates of the major transformations of nitrogen in Alaskan agricultural soils; 2) determine nitrate leaching losses, and hence, potential pollution of waters from urea and nitrate fertilizers in field soils in Interior Alaska; and 3) measure recovery of fertilizer nitrogen by barley.

Application: Results of this project will be used to make recommendations to farmers and agricultural policy planners in Alaska on methods of management for best use of fertilizer nitrogen. Types of recommendations likely to ensue will be on kind of nitrogen fertilizer to use under certain conditions, and on methods of application of nitrogen fertilizer. This in turn, will hopefully maximize efficiency of utilization of nitrogen fertilizer by crop plants and minimize potential pollution problems from the use of nitrogen fertilizer.

Status: The research is being conducted primarily on the University of Alaska's research farm near the Delta Agricultural Project. A laboratory study is also planned in order to obtain detailed information that cannot be obtained in a field study. In the field aspect of the research, barley is being used as the test crop. Barley is used because it is, and will likely continue to be the most important large scale crop in Alaska. Urea and nitrate fertilizers are being used in the study. Urea is being studied because it is manufactured in Alaska and is likely to become the major form of nitrogen fertilizer used in the state. Nitrate is being tested because of all the forms of nitrogen fertilizer, nitrate is likely to have the greatest leaching potential, since it does not have to undergo transformations in order to be leached.

The field aspect of the study was begun in spring of 1982, and numerous plant, soil, and water samples were collected during the growing season. Many of the soils in the Delta Agricultural Project are underlain at shallow depths by sand or gravel, and thus may be susceptible to leaching. On the other hand, the low amount of rainfall in the area is not likely conducive to leaching of nitrates. Information on the amount of leaching of nitrogen through these soils is needed before any assessment of potential pollution problems can be made.

The cost of nitrogen fertilizer has increased dramatically in recent years and is likely to continue to do so in coming years. Thus, farmers are becoming concerned about the cost of nitrogen and would like to get maximum utilization from the nitrogen fertilizer they use. Research in other areas indicate that in most farming situations, only about half of the applied nitrogen is recovered by the crop.

When nitrogen fertilizer is added to soil, it undegoes a number of chemical transformations. For example, some of it can be converted to nitrate, which is the form most susceptible to leaching. Some can be transformed to gaseous forms of nitrogen which are lost from the soil. Some of it is "tied-up" by the soil organic matter or soil clay particles. All of these processes result in the nitrogen being unavailable for utilization by crop plants, and hence, from the standpoint of the farmer, wasted. Through proper soil and fertilizer management, these losses of nitrogen can sometimes be reduced and hence the efficiency of utilization by crops can be improved. If this can be done, application rates of nitrogen fertilizer can be reduced. This will result not only in lower costs to the farmer but also in reduced potential for pollution from nitrogen fertilizer.

At present samples are being prepared for analysis, no results are available yet. The study will continue for one more year.

Stephen D. Sparrow
Agricultural Experiment Station
University of Alaska - Fairbanks

Title: Catalog of Alaskan Earthquakes
Grant Amount: $128,334.
Completion Date: February 28, 1983

Purpose: This project's main purpose is the compilation of a machine-readable catalog of all Alaskan earthquakes recorded to date.

Application: The project was undertaken in order to pull together the earthquake information gathered by different agencies into a representative Alaskan earthquake catalog. Without such a catalog, much of Alaskan seismological research and evaluation of the seismic safety of critical seismic areas cannot proceed.

Status: 1. The earthquake data gathered by the different state (Alaska), national and international agencies have been assembled into a computer-readable file in which the earthquakes have been arranged in chronological order.

2. The above file has been carefully studied for each year of data, and listings of duplicate earthquakes were identified.

3. Using earthquake location solutions with uncertainty values, whenever available as a guide, duplicate listings of earthquakes have been eliminated.

4. A new Alaska earthquake catalog without any duplication has been created which consists of about 40,000 earthquakes of all magnitudes.

5. Using two well-studied earthquakes -- Rampart earthquake (magnitude = 6.5) of 1968 and St. Elias earthquake (magnitude = 7.1) of 1979 -- a magnitude formula has been established in cooperation with Professor K. Aki of Massachusetts Institute of Technology.

6. The magnitude formula has been tested successfully for 25 local Fairbanks earthquakes.

7. Next, the catalog mentioned in (4) was sorted for all earthquakes of magnitudes equal to or greater than 4.0. Since 1967 to the present time, calibrated seismographic stations in Alaska are in operation and available. This time period has been selected for the recomputation of magnitudes for the sorted events.

8. The sorted eqrthquakes (about 900), have been selected for the magnitude computations. On completion, further magnitude computations are planned. In this way, we intend to compile homogeneous magnitudes for all Alaskan earthquakes that occurred since 1967. The next task will be to recompute the locations of earthquakes for magnitude equal to and greater than 4.0. The output of this project, if supported for FY84, will constitute the fundamental data source for seismic risk studies in the immediate future and for much of future seismological research in Alaska.

N. N. Biswas
Geophysical Institute
University of Alaska - Fairbanks

Title: Alaskan Dulse for Treatment or Prevention of Herpes Infections
Grant Amount: $75,000.
Completion Date: June 30, 1984

Purpose: This proposal was to study the medical implications for treatment of herpes infections, to determine the effectiveness of Alaskan Dulse in Southeast Alaska, to determine availability of Alaskan Dulse (two species of Alaskan red seaweeds).

Application: There are two potential benefits of this research for Alaskans and for the rest of the nation. First, the possible prevention of herpes infection, reduction of length of infections and relief of pain and suffering from the several severe diseases caused by the herpes virus. Second, a new industry in Southeast Alaska of gathering and processing Alaskan Dulse could be developed.

Status: Empirical use of Alaskan Dulse for several years in Alaska has shown the effectiveness of topical application in relieving symptoms of herpes simplex and herpes zoster (shingles) in humans. The purpose of the research is to determine if clinical testing of the effectiveness of Alaskan Dulse against herpes is warranted, and it has two parts: (1) Medical: Objective testing to determine safety and effectiveness using tissue cultures and live animals, and to determine the chemical characteristics of the active fraction, and (2) Resource availability: Field studies of the abundance of Alaskan Dulse to discover if enough is available to justify further expenditures of money for clinical testing.

Preliminary results of work completed in 1982 are promising. The laboratory studies indicate that extracts of Alaskan Dulse are effective against herpes virus both in tissue cultures and in mice (using eye infections). While toxicity studies have not yet been conducted, there has been no evidence of toxicity in either tissue cultures or animals. In the abundance studies, based on only a few days of sampling in 1982, Alaskan Dulse appears to be more generally distributed and abundant than was first apparent.

Robert J. Ellis
Natasha I. Calvin
Marine Botanicals
Sitka

Title: Impact of Community Participation on Rural Alaska Education
Grant Amount: $146,332.
Completion Date: September 30, 1983

Purpose: The purposes of this research project are:

1) To collect information systematically on the incidence of involvement and participation in school activities and operations by community members;

2) To assess the relationship between different degrees and types of participation and educational results; and

3) To make recommendations useful to educators, interest groups, and the state in the evaluation of the effectiveness of community participation.

Application: Presentations and reports designed to be useful to educators will be produced during the next year. A presentation on the findings of the principal's survey was made to the principals' conference in Anchorage, and a report will be distributed to all rural principals within two months. A presentation on the teachers' survey will be made at the National Education Association-Alaska conference in early spring, 1983; a report derived from the findings of this project will be distributed to all rural teachers before the close of the shcool year. Results from the board members' survey will be presented to the Americal Association of School Boards meeting in November, and a report prepared for board members, designed to be useful in board member training, will be drafted for distribution before the end of the calendar year.

The major projects of the research, however, will be comprehensive analyses of findings from surveys and field research and development of policy recommendations. An analytical study will be written which will merge all data sources in an examination of the relationship between community participation and school quality in rural Alaska. Executive summaries of this study will be widely distributed throughout the state. Second, analysis of the types of rural educational participation and their effects in communities will be the basis of recommendations for changes in school board training and for review of regulations and legislation on state education policy.

Status: The activites conducted under this research project include both survey and ethnographic research as well as analysis of files, records, electoral data, and reports.

Survey Research. Data are being collected by means of this method that will describe the incidence of community involvement in educational processes and the participation of communities in areas of educational decision making. Because involvement and participation are quite subjective concepts, information is being collected from

four different groups of school actors: principals or principal teachers, teachers, district superintendents, and school board members.

1. Survey of Rural Alaska School Principals. A survey of school building principals in rural Alaska was conducted from March to May, 1981, as part of the project "Decentralized Education in Rural Alaska," funded by the National Institute of Education (NIE).

2. Survey of Rural Alaska School Teachers. A survey of one, randomly selected teacher in each rural school was conducted from February to May, 1982.

3. Survey of Rural Alaska School Superintendents. A survey of all rural superintendents who had not been interviewed in previous field research is now being conducted.

4. Survey of Rural Alaska School Board Members. The final survey is scheduled for administration from February to May, 1983 and will be sent to all members of district school boards in rural Alaska and to a sample of members of local (advisory) school boards.

5. Field Research. During school year 1981-82, field research for the NIE project was conducted in 30 rural Alaska communities. Field sites were sampled randomly to represent all school-communities in rural areas of the state, and access was gained to each community in the sample. Beginning in January, 1983, field research will be initiated in more than half of the field sites visited during the 1981-82 school year, three types of data-gathering activities will be undertaken. Semi-structured guides; unstructured informant interviews; and observation of school processes will also be used.

6. Data Analysis. Data collected from the principals' and teachers' surveys are not being analyzed. The body of data collected from district office personnel and school board members will be anlalyzed during the summer, 1983, along with analysis of field interviews.

Gerald A. McBeath
Department of Political Science
University of Alaska - Fairbanks

Title: Arctic Alaska Soils Data Base
Grant Amount: $45,548.
Completion Date: December 31, 1983

Purpose: At present there is no single source from which to access detailed soils information on arctic Alaska. It is with this perceived need to assemble and cross-reference existing soils data for arctic Alaska, while it is still in a manageable state, that research with the following objectives was initiated. The goals of the project are:

1) To identify exisiting soils data sources, published and unpublished, in arctic Alaska by author and geographic position;
2) To abstract pertinent morphological data, e.g., horizon, thickness, color, associated vegetation and classification, and all chemical, physical (including geotechnical), and biochemical information in such a way that they are compatible with the program library selected;
3) To compile averages and ranges for variables selected in objective (2) and reduce these to compatible units;
4) To provide cross-reference by soil variable, author and geographic site;
5) To provide a general overview of the soils of arctic Alaska with reference to the existing exploratory soil survey; and
6) To compile these data at the University of Alaska in a format that is easily accessible and updated.

Application: The study will provide a complete integrated soils data base (that is compatible with existing vegetation data) to local, state and federal agencies within Alaska charged with evaluation of environmental impact statements and the issuance of use permits within the arctic.

The study will also provide individuals and groups an information base from which research and/or development plans can be formulated. The data will give industry and state agencies a complete, internally consistent source of soils information from which to develop impact mitigation plans. Finally an up-to-date overview of Alaska's arctic soils resource will be generally available.

Status: Funds became available for this study in August 1982. A brief preliminary survey of the soils holdings in the University of Alaska (Fairbanks) library, the Forestry Research Institute and Public Library was undertaken in September in conjunction with other business. Also, at that time a meeting was held with Dr. Samuel Rieger, a consultant in this study, in which published and unpublished federal materials were identified. These publications have been requested. The following standard data bases have been searched: AGRICOLA, GEOREF, SCISEARCH, SSIE, BIOSIS, NTIS, ENVIROLINE, COLD, MIC, SDC, and Comprehensive Dissertation Abstracts. The products are being evaluated prior to acquiring publications. A letter is being prepared to solicit input of relevant unpublished materials.

A preliminary study is underway to determine the most suitable general formatting procedure.

K. R. Everett
Institute of Polar Studies
The Ohio State University

ACST/ANNUAL REPORT

APPENDIX C

Conferences, Seminars, and Small-Scale Research Funded to Date

Title	Amount	Recipient
Women in Science	$ 3000.00	Anchorage Community College
Fourth International Conference on Permafrost	5000.00	Geophysical Institute
Conference on Old Growth Forest in Relation to Wildlife	2000.00	The Wildlife Society
Conference on Old Growth Forests and Fish	2000.00	American Institute of Fishery Research Biologists
The Alaska Symposium on Social, Economic and Cultural Impacts of Natural Resources Development	3000.00	Dept. of Conferences and Institutes, UAF
Seventh Annual Alaska Health Congress	5000.00	Alaska Public Health Ass.
Learn Alaska Video Conference	3000.00	Parker Associates, Inc.
Exhibit on Distribution of Plants, Trees, and Permafrost	5000.00	University of Alaska Foundation
Hokkaido University School of Fisheries Symposium	5000.00	Institute of Marine Science, UAF
Moss Flora of Arctic North America - Workshop	5000.00	University of Alaska Museum
Permafrost Abstract Volume	5000.00	University of Alaska
33rd Alaska Science Conference	5000.00	Institute of Marine Science, UAF
25th Annual Alaska Science and Engineering Fair	5000.00	Alaska Science and Engineering Fair, Inc.
Special Issue of The Northern Engineer	5000.00	Geophysical Institute, UAF

Title	Amount	Recipient
Development of National Arctic Health Scienc Policy	5000.00	Alaska Public Health Association
Moss Flora of Arctic North America - publication	5000.00	University of Alaska Museum
Pacific Northwest Regional Meeting of American Geophysical Union	3000.00	Organizational Committee of American Geophysical Union
4th Alaska Alternative Energy Conference	5000.00	Alaska Center for the Environment
Glaciation in Alaska - Conference	5000.00	Office of Quaternary Studies Uni y of Alaska - Museum
Printing Smoke Detector Report	4200.00	Arc nvironmental Information & Data Center
Nortech Poster Session	2000.00	Institute of Marine Science
Women in Science Speaker - AAAS Meeting	1000.00	
Index USGS/Military Aerial Photos of Alaska	5000.00	Arctic Environmental Information & Data Center
6th International Symposium on Circumpolar Health	5000.00	American Society for Circumpolar Health
American Fisheries Society Meeting	4000.00	American Fisheries Society
Symposium on Telecommunications	5000.00	Dept. of Continuing Studies, UAF
Smoke Detector Report - Articles	3000.00	Geophysical Institute, UAF
1st International Muskox Symposium	5000.00	Alaska Cooperative Wildlife Research Unit, UAF
TOTAL	$115,200.00	

ACST/ANNUAL REPORT

APPENDIX D

Publications

General Reports
U.S. Arctic Science Policy
Alaska Science Policy
Synopses of Research Activities Funded
Results of Joint Meeting Between Polar Research Board and ACST - Scientific and Technological Research Needs in Alaska
Synopses of Grants - Northern Technology Grants Program
Federal Involvement in Scientific Research and Development in Alaska

Research Needs
Communications and Information Transfer
Transportation
Rural Primary and Secondary Education
Living Resources and Habitat Protection
Seismology
Energy
Agriculture and Animal Husbandry
Minerals
Health and Life
Natural Hazards

Research Results
Smoke Detector Testing in Rural Alaska
Storm Surge Climatology and Forecasting in Alaska

Technical Briefs
Waterproofing Earth-sheltered Home
Window Insulation
Converting Clothes Dryer to Hot Water Heat Source
Solar Kiln to Dry Wood
Greenhouses
Arctic Home Construction and Insulation Techniques
Off-Peak Electric Heating System
Willow Rake - Farm Land Development
Home Built Wind Energy
Solar Heating Domestic Hot Water System
Using Solar Power to Operate Boat Equipment
Conversion of Oil Furnace to Wood Furnace

APPENDIX E

Identification of State Research Organizations in Response to Alaska Council on Science and Technology Letter Survey

	Yes	No
Alaska	X[1]	
Connecticut		X[2]
Delaware		X
Georgia		X
Hawaii	X[3]	
Illinois	X[4]	
Kentucky	X[5]	
Louisiana	X[6]	
Michigan		X[7]
Montana		X
Nebraska		X
New Hampshire		X
New Mexico		X
North Carolina	X[8]	
North Dakota		X
Ohio		X
Oklahoma		X
Tennessee	X[9]	
Texas	X[10]	
Vermont		X
Virginia		X
Washington		X
Wisconsin		X

1. Research proposals accepted in all areas but must address state needs as defined by science council.
2. Product development to provide employment and state royalties.
3. University research institutes fund applied research in alternate energy development and high tech areas. Also state loans to foster innovation and encourage commercial development of new products.
4. Research in environmental, energy and natural resource areas. Also, environmental education, information dissemination and economic review of environmental regulations.
5. Energy research and demonstration, primarily for coal and oil shale. Also, grants and loans for alternative energy.
6. Proposals accepted in priority areas listed yearly by academic advisory body.
7. Product or process development in energy - not research.
8. "Seed" money in waste management research and molecular biology.
9. Private research corporation and private research foundation with state representatives serving ex officio.
10. Alternate energy technologies which show commercial promise.

ACST
THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

SYNOPSES OF GRANTS

For the Alaska Council on Science and Technology

Northern Technology Grants Program

1979 through 1982

April, 1982

Christopher Noah, Executive Director - Pouch CV, Juneau, Alaska 99811 - (907) 465-3510

Northern Technology Grants Program

The Northern Technology Grants Program began when the Alaska state government appropriated funds in July, 1979. These funds were to be awarded by ACST in grants up to $5000 to Alaskans with innovative ideas in northern technology.

The initial program was so successful that in 1980, 1981 and 1982 additional grant funds were awarded to ACST to conduct three more Northern Technology programs.

The program has awarded grants to projects that are low-cost alternatives for Alaskans in such areas as building design, food production, recycling, transportation, energy generation and waste disposal. The immediate benefit of the grant is to the person with the idea but the long-range benefit will be to all Alaskans. Grant recipients are required to provide a progress report to the ACST and in many cases, recipients conduct demonstration workshops on project results for community members or other interested Alaskans. Also, the Alaska Council on Science and Technology publishes "Technical Briefs" on the successful projects. These short "how to" reports are intended to show others in the state how grant recipients completed their projects while also describing pertinent results.

This is a list of all 113 Northern Technology awardees and synopses of the projects. For more information concerning the program contact: Alaska Council on Science and Technology; Pouch CV; Juneau, Alaska 99811 or telephone (907) 465-3510.

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ALPHABETICAL CROSS REFERENCE
1979-1982 GRANTS

REGENERATIVE FREEZER (0011)

Kevin McDougall
P. O. Box 503
Delta, Alaska 99737

Amount Funded: $3,100

Awardee will build a multi-family freezer which will store the winter's cold for summer use. It will maintain freezing temperatures for 3,000 pounds of meat or fish year-round without need of any power source whatsoever. The freezer will be a buried 14' x 14' room housing a 10 foot high, 10 foot diameter brine-filled tank. A fluid-filled convection loop will be installed in the tank and a project above ground. When the outside air is colder than the brine, the convection loop will continuously remove heat from the freezer and dissipate it above ground. The freezer will be insulated well enough to keep heat out during the summer.

JUICE BOTTLING PLANT (0107)

M. Michael Rowcroft
c/o St. Judes Center
3272 Hospital Drive
Juneau, Alaska 99801

Amount Funded: $3,250

Awardee will set up a juice processing, bottling and distributing center in Juneau. Overripe produce purchased from local markets and wholesale distributors will be processed, bottled in recycleable containers and sold to the public at reasonable cost. All processing will be performed according to the State Division of Public Health regulations -- Mr. Rowcroft is the Juneau District Sanitarian.

HYDRAULIC-POWERED AUTO (0146)

Bert Bingham
1650 Beaver Road
Fairbanks, AK 99701
(Ken Kunkel)
(Don Luterbach)
456-2491
452-2718 (message)

Amount Funded: $4,045

This grant will help finance the building of an automobile with a hydraulic propulsion system. A volkswagen chassis and running gear with a sleek fiberglass body will house the low-fuel/high-energy system. The system starts with a 16 h.p. Briggs and Stratton engine. This drives a hydraulic pump. The hydraulic pump supplies charge pressure to two 5000 psi accumulators, and drive pressure to a Sunstrand hydraulic motor. The small gas engine operates at full power until the accumulators are fully charged. At that point the engine drops back to idle and the accumulator takes over. The sequence repeats automatically when the accumulators are drained to a certain level. The propulsion system, which has been previously demonstrated elsewhere, is expected to develop 75 mpg while cruising at 55 mph to 75 mph.

BEE-OVERWINTERING BUILDING (0083)

David Stoops
Mile 2.8 Kalifonsky Loop
S.R. 2, Box 707
Kasilof, Alaska 99610
Phone: 262-4904 or 262-7212
262-4904 or
262-7212

Amount Funded: $3,775

The awardee will construct a building in which he will over-winter bees in a controlled environment. Presently, the state's 250 beekeepers have no alternative but to kill their bees each fall and face the difficulty and expense of shipping in new bees each spring.

WASTE-HEAT-CLAIMING GREENHOUSE (0029)

James Barger
Galena Regional Learning Ctr.
P. O. Box 181
Galena, Alaska 99741

Amount Funded: $2,570

GRLC is a rural extension of the University of Alaska involved in facilitating subsistence gardening programs in 17 villages along the Yukon and Koyukuk Rivers. The group will use grant money to build a 1,500 square foot greenhouse heated by waste heat from the local power plant. The Galena Air Force Site will provide access to the glycol solution in the plant's cooling system. The hot glycol will be piped to a unit heater inside the greenhouse as well as through the soil bed of a garden behind the power plant.

SOLAR HOT WATER HEATER (0089)

Julie Scott
Camp Property Committee
c/o Box 80435
College, Alaska 99708

Amount Funded: $1,200

Camp Bingle-Harding Lake Camp is a non-profit camp operating at Harding Lake, a recreational area 40 miles east of Fairbanks. The camp is used by various children's groups and its program is educational in nature. The staff will build a solar collector into the camp's hot water system to help offset operating expenses and incorporate energy awareness into the camp's educational program.

INSULATED SHUTTERS (0144)

Robert Walton
P. O. Box 1480
Fairbanks, Alaska 99701
Phone: 479-6838
479-6838

Amount Funded: $1,100

The awardee will design and construct insulating shutters that can be used to cover large window areas to reduce heat loss. The shutters will take advantage of garage door technology and photoelectric or temperature sensing switches to achieve ease of operation.

TIDAL/CURRENT HYDRAULIC SUCTION DREDGE (0162)

O. Alexander Hoke
P.O. Box 963
Juneau, AK 99802
Phone: 789-0065
789-0065

Amount Funded: $5,000

Awardee will design and develop a working model of a tidal/current hydraulic suction dredge. A tide or current powered low velocity hydraulic turbine will drive a centrifugal water pump after the high-torque, low-RPM turbine energy has been translated into low-torque, hihg-RPM energy by a water tight gear box. The high-velocity discharge of water will be injected through a reduction nozzle and create a vacuum at the suction head. This vacuum will lift sand and gravel through a flexible hose to a sediment stockpile on the bank. Mr. Hoke will also consider methods of achieving a regular, automatic sweep of a channel by the dredge.

SOLAR GREENHOUSE (0139)

Cyndie & Stephen Tack
S.R. Box 51113
Mile 24 Chena Hot Springs Road
Fairbanks, Alaska 99701
488-9632

Amount Funded: $5,000

The awardees will build a greenhouse which combines several of the better greenhouse construction and energy conservation principles now in use. The structure will be similar to a large cold frame with solar storage in the back wall and in the soil. Some of the features expected to make the greenhouse free of dependence on fuel heat from mid-April to lat September include:

a) Burying to north wall and parts of the other three walls to moderate the effect of very cold and very hot weather;

b) Using solar collectors and an underground array of pipes to heat the soil;

c) Using a massive north wall to store heaat during the day and radiate heat at night;

d) Glazing the greenhouse with a twin-wall stressed material;

e) Making an easily-used blanket to cover the glazed surfaces at night.

OIL FIRED CLOTHES DRYER (0145)

Mike Potter
P. O. Box 80293
Fairbanks, Alaska 99708

Amount Funded: $500

Awardee will convert a standard household dryer from electric to oil-fired hot water heat to take advantage of the oil-fired boiler which heats his house. Hot water will be piped to a radiator core whicch will be mounted on the rear of the dryer; air forced across the radiator will dry the clothes. The energy requirements and cost of drying clothes with an electric dryer will be measured before the conversion; when the oil-fired system is installed, its heat requirements will also be tested.

Mr. Potter says the high cost of electricity and gas, and the fact that a large number of Alaskan homes use hot water heat suggest significant potential savings.

METHYL-FUEL PLANT (0165)

Douglas Grimm
S.E. Applied Electronics
P. O. Box 324
Auke Bay, Alaska 99821
789-2542

Amount Funded: $5,000

The awardee will build a scale model of a system capable of accomodating the electrical and automotive energy needs of a typical urban or rural residence in southeast Alaska. The methyl-fuel plant will produce approximately one gallon of methylfuel for every 20 pounds of waste material. This project will make use of the large quantity of sawmill wood chips available in southeast Alaska. Experimentation will also be done with many other forms of "garbage." The fuel produced will then be applied to a modified 4 H.P. internal combustion engine driving an 1800 watt generator. This scale model should supply about 1/10 of the electrical energy requirement of a typical residence.

HYDROELECTRIC GENERATOR (0155)

Richard Ford
P. O. Box 158
Copper Center, Alaska 99573
344-6988 or 822-5847 (work)

Amount Funded: $2,500

Awardee will build a small-scale hydroelectric system to reduce his family's dependence on a diesel generator. The system will be mounted on a raft in the Copper River and provide enough electricity to the residence for 8 months of the year.

WOOD FURNACE (0136)

Donald Ruef
P. O. Box 1906
Palmer, Alaska 99645

Amount Funded: $2,150

The awardee will build, instrument and test a wood-coal furnace with a fluid-filled jacket. The fluid tube will store heat and be controlled to produce a low-pressure hot fluid and not vapor. Mr. Ruef expects the furnace to deliver 100,000 BTU/H, provide long-term even heat, require no electricity, and be marketable at less than $1,500 each.

ELECTRIC CAR (0098)

Dav Grove
214 Larwood Hall
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $5,000

Awardee will build and test an electric car for operation in cold climates. The plans for the vehicle will be purchased, but modifications will be incorporated, such as the use of light weight aircraft steel, an insulated battery compartment, and solid state devices for startup. Mr. Grove expects to demonstrate that the electric car is uniquely suited to Alaska for three reasons: first, gasoline is

generally priced higher here; second, because pollution, especially ice fog, is a serious problem; and finally, because much of Alaska's road system is disconnected, the auto's 60-mile range per charge will not be a serious limitation.

SOLAR GREENHOUSE (0074)

Jeremy & Linda Weld
P. O. Box 165
Mile 128 Ft. Richardson Highway
Gakona, Alaska 99586

Amount Funded: $5,000

The awardees will build an add-on solar greenhouse which will utilize a thick gravel pad to store heat from the greenhouse for later use in the greenhouse and in the attained cabin. The gravel pad will be insulated from the ground around it and a heat collector at the greenhouse ridge will pump warm air into it. In addition, a rain water collection system will be incorporated into the greenhouse such that the stored water will also bank heat.

AMBULANCE SPLINT (0027)

Steve Carney
Fire Department
University of Alaska
Fairbanks, Alaska 99701
479-7535

Amount Funded: $200

Awardee will build a modification of the long spine board used by ambulances which he expects to be an improvement. His patient stabilization system will utilize vacuum "bean bags" in conjunction with conventional straps. The vacuum bags would rely on the same principal as the vacuum splints, be adjustable, and would attach to the board with velcro.

HYDROELECTRIC GENERATOR (0129)

Ted Neville
313 Lakeview Trailer Court
Fairbanks, Alaska 99701
456-8108

Amount Funded: $350

The awardee will build a small-scale water-powered electric generator to be powered by a river. A paddle wheel's rotation will be translated by a 2:1 ratio gearbox, and then drive an electric motor. The electric motor, when driven, produces current. Mr. Neville hopes to produce enough current to run small power tools.

SOLAR HEATER (0065)

Chris Johansen
P. O. Box 81162
College, Alaska 99708
452-2153 (work) or 479-4563

Amount Funded: $600

Awardee will use grant money to build a simple solar air heater which could be placed in window openings. The heater would consist of a plastic panel which would admit fresh cold air from outside, allow the sun to heat it as it rises toward the window opening, and have a simple thermostatic device at the top to allow air to pass in

only when it is warmer than the ambient room temperature.

WASTE-OIL HEATER (0106)

Donald Pendergrast
S.R. Box 50342
Fairbanks, Alaska 99701
Phone: 456-3516 (home) or 356-1400, ext. 428 (work)

Amount Funded: $250

The awardee will build a stove that burns waste crankcase oil. The stove will provide a more complete use of a scarce resource and an efficient method of waste disposal. The design utilizes a discarded electric water heater, several frying pans, and generally available aand inexpensive hardware.

EXPERIMENTAL GREENHOUSES (0180)

Jim Donally & Norm Stoppenbrink
1014 East 11th, #4
Anchorage, Alaska 99501
Phone: 277-1794 or (message) 277-4050

Amount Funded: $1,000

Awardees will build three greenhouses to test the efficiency of a plastic product, called ACPS, as a greenhouse wall material. ACPS is commercially available in long sheets or on rolls. Its common purpose is as a packing stock for fragile merchandise. It is a clear plastic film with little bubbles in it which, Mr. Donally notes, when squeezed "give a satisfying little pop." But, the bubbles also seem ideally suited to provide insulating dead air space for greenhouse walls. The first greenhouse built will have only a 6-mill visqueen covering. The second greenhouse will have ACPS, and the third, ACPS plus an insulated north wall. Maximum-minimum thermometers will be installed in each greenhouse and daily readings taken to determine the length of frost-free season.

INDUCTION GENERATOR (0506-80D)

Alakanuk City Council
City of Alakanuk
P. O. Box 51
Alakanuk, AK 99554
238-3313

Amount Funded: $4000

The use of an Enertech 1500 wind powered generator will create an energy conservation project for remote villages, and supply power to these remote areas on an uninterrupted schedule.

SOLAR SPACE HEATER (0226-80)

Alaska Alternative Energy Resources Center
1069 W. 6th Avenue
Anchorage, AK 99501
274-3621

Amount Funded: $1500

To construct an easily adaptable solar space heater for retrofitting onto existing homes and to conduct a workshop in conjunction with the construction. The simplicity of the construction of the solar collector should be conducive to assembly by the average Alaskan homeowner. At the workshops, the retrofitting topic will be combined with a weatherization session.

FURNACE CONVERSION (0068-80)

Don Bailey
P. O. Box 70
Anchor Point, AK 99566
235-8485

Amount Funded: $400

A unique conversion - from oil to wood. The conversion of the forced air oil furnace heating system is simple and is a means of beating the high cost of oil. The existing wiring will not be touched so a circulation fan can activate at the correct temperature and continue to blow air.

TREATMENT UNIT (0312-80)

Norman Bair
Box 10043
Dillingham, AK 99576

Amount Funded: $1100

To help establish state regulations for the disposal of greywater. A 30 yard septic tank would be installed outside with a gravel filter installed downline in the basement of a home. The gravel filter would further purify waste material.

BATTERY OR FUEL CELL MADE FROM SCRAP METAL (0508-80D)

Thomas R. Berson
SR 937
Chugiak, AK 99567

Amount Funded: $800

To develop a cheap, long-life, high energy battery or mechanically charged fuel

cell to be made from common materials or scrap metal. This will provide an alternative power/storage supply which could replace or assist fossil fuel generators, in vehicles and in home heating systems.

WINDOW INSULATION (0036-80)

Jim Cunningham
5300 "A" Street
Anchorage, AK 99504
278-2819

Amount Funded: $200

With the use of styrofoam panels. Students at the Specialized Academic Vocational Education Center (S.A.V.E.) will participate and earn credits. Other schools will be invited to view the panels and share the resultant data to be recorded on comparative values of these and other types of window insulation.

DOG, WATER OR WIND POWERED WASHING MACHINE (0358-80 & 0359-80)

Bill Hall
SR 1438
Eagle River, AK 99577
694-2238 (message)

Amount Funded: $400

To be used in remote region of Skwentna. For dog power, an exercise wheel will be used to harness the dog or dogs for operating the washing machine. The method would be demonstrated at local dog mushing club meetings.

GREENHOUSE (0515-80D)

K. Quinn Hart
SR 196 H
Eagle River, AK 99577
862-5292

Amount Funded: $2200

An energy efficient greenhouse using soil thermal mass storage and waste heat recovery on a year-round basis. In the summer months, the excess solar heat collected is transferred and stored in the soil. In the winter, waste heat from the residential coal stove is recovered to maintain soil temperatures. Upon completion of construction, a workshop will be conducted.

WIND GENERATOR (0098-80)

Steve Hicks
Box 147
Glennallen, AK 99588
822-5872

Amount Funded: $1600

To build and demonstrate a 12 volt generator constructed from junk auto parts. The main component will be a shortened rear axle which will serve as the propeller shaft. A demonstration seminar will be conducted in Glennallen upon completion of the project.

WATERPROOFING FOR EARTH SHELTER HOUSE (0165-80)

Marnie & John Isaacs
2418 Forest Park Drive
Anchorage, AK 99503
279-8900

Amount Funded: $3300

To utilize and test existing material"Bituthene" for waterproofing house. Bituthene is used primarily in tunnels and subways. The Isaacs wish to demonstrate that this material will be more effective and less costly than other more commonly used products.

GREENHOUSE (0055-80)

Ed Knoebel
P. O. Box 84
Glennallen, AK 99588

Amount Funded: $4100

Knoebel has excess domestic warm water from his home heating system. He plans to recycle this water to a greenhouse as a heat method. Tests will be run for a one-year period on the practicality of growing vegetables under these greenhouse conditions.

TRAILER STEERING DEVICE (0081-80)

Alex Matheson
1817 W. 13th Avenue
Anchorage, AK 99501
388-4618

Amount Funded: $5000

To develop a remote control rear axle steering device for truck trailers. The problem with multi/trailer rigs is maneuverability. Three trailer rigs would be used more frequently if they were more maneuverable. In addition, a moveable rear axle will eliminate the problems of backing up a multi/trailer rig.

RECYCLING ALUMINUM SCRAP (0085-80)

John Phillips
4211 Cope, #3
Anchorage, AK 99503
272-7992

Amount Funded: $700

This is an alternate method of handling scrap aluminum cans and other aluminum scrap material. A small crucible furnace will transform the scrap into ingots. The ingots could be packed in a small area per unit weight for economy of shipping.

GENERATOR (0332-80)

Radio Communications Inc.
3350 Mountain View Drive
P. O. Box 98190
Anchorage, AK 99508

Amount Funded: $5000

To construct a hybrid solar panel/wind generator system supplemented by lead-acid battery plant, that would have the capacity to power a moderate 25 Watt 12 V.D.C.

load. The proposed system would be suitable for providing power to such equipment as microwave relays, VHF/UHF communications, repeaters, hydrologic telemetering instruments and low power television translators.

SOLAR HEAT HOUSE (0072-80)

Robert Reinhardt
General Delivery
Aniak, AK 99557

Amount Funded: $5000

Will also provide heat for hot water heating system. During winter months, additional heat will come from a modified multi-fuel stove boiler. The heat house could also be used as a fruit drying house, a greenhouse and a clothes drying area.

BOILER SYSTEM (0155-80)

Alfred Doner
SR 5620
Wasilla, AK 99687
376-5540

Amount Funded: $1800

Design and install heat storage tank with solar assist. This will demonstrate the feasibility of year-round wood burning boiler operation. This will also demonstrate the feasibility of adding a wood or coal burning boiler in series with any existing oil or gas-fired boiler.

SOLAR WOOD DRYING KILN (0116-80)

Bruce Forster
P. O. Box 1021
Homer, AK 99603
235-7286

Amount Funded: $3000

This is an air transfer solar kiln. Forster is a cabinet maker and would prefer using local woods which are of higher quality than imported woods. The kiln will hold up to 2000 board feet of lumber (1" thick) and is designed to dry a loan in approximately one month's time. The body is a two-layer sandwich of clear fibre glass supported by four insulated walls.

WIND GENERATOR (0540-80D)

William Hightower
P. O. Box 4 (Mile 24)
Moose Pass, AK 99631

Amount Funded: $2600

Using auto electrical parts for 12 volt wind generator to light outbuildings such as chicken house, etc. A Savenius rotor will be installed on a hill with three or four alternators attached to it. The current will be transmitted to storage batteries in the outbuilding area. When 110 volt current is needed, a power inverter will be employed.

DIGESTER (0045-80)

Edward Johnson
P. O. Box 1347
Soldotna, AK 99669
262-7941

Amount Funded: $5000

Methane gas producing digester which will generate energy as well as dispose of waste. Waste from the digester will be transformed into fertilizer. A reinforced 2000 gallon digester in four compartments will facilitate total digestion and keep the gas supply stable.

IMPROVED WILLOW RAKE (0374-80)

Cecil R. Jones
Star Route A, Box 49A
Homer, AK 99603

Amount Funded: $3000

Designed to speed up farm land development. It will remove willow and alder roots in the area with little disturbance to topsoil. Current methods remove excessive topsoil with removal of growth.

FRUIT AND NUT TREE CULTIVATION (0298-80)

Karen Leis
P. O. Box 923
Homer, AK 99603

Amount Funded: $1000

To grow various fruit and nut bearing trees in remote area. Orchard is planned on a remote plateau at the head of Kachemak Bay, east of Homer. Leis is a knowledgeable grower and believes Pecan trees and other varieties of fruits and nuts will do well on the site under proper controlled growing conditions.

PERMAFROST EXCAVATION (0232-80)

Charles Posciri
SR Box 9360
Palmer, AK 99645
745-3892

Amount Funded: $5000

A pre-facture method for excavating permafrost and rock formations. The method is designed to save on gas and oil and at the same time preserve the environment by eliminating the major portion of environmental damage normally suffered during excavation.

HYBRID ELECTRIC CAR (0281-80)

Ricardo Quiroz
P. O. Box 770
Valdez, AK 99686
835-4614 or 835-4322 Ext. 229 (work)

Amount Funded: $2300

To modify a conventionally powered gasoline engine in a 1970 Volvo station wagon. The Volvo presently gets 16 MPG and Quiroz hopes to bring that figure up to 75 MPG. This hybrid electric propulsion system is selfcontaining and self-generating. Emphasis will be geared to learning if additional modifications will be required

to produce a hybrid electric car compatible with Alaskan weather. A 16 gallon tank should yield about 1200 miles.

PLANT HYDRO FEED SYSTEM (0290-80)

Elizaveta Shadura
P. O. Box 181
Galena, AK 99741

Amount Funded: $5000

Using the nutrient film technique which is a streamlined version of hydroponics. A recirculating system allows a weak concentration of a complete nutrient solution to constantly run by the plant roots. This method supplies a constant flow of nutrients that can be taken up by the roots on a continuous basis.

PASSIVE SOLAR HOME PLANS (0159-80)

Steven B. Smiley
SRA Box 41-C
Homer, AK 99603

Amount Funded: $1700

To design standard superinsulated passive solar home plans that will meet FHA approvals. It is difficult to obtain FHA approval on a "custom" looking home, rather than a conventional design. These plans will combine energy-saving features in an FHA acceptable design.

SHUTTERS FOR GREENHOUSE (0327-80)

Ak. Federation for Community Self-Reliance
P. O. Box 73488
Fairbanks, AK 99707

Amount Funded: $1000

Insulated shutter demonstration project on site of Federations's community garden project. Roll-down quilt/type shutters in super insulated solar heated greenhouse. The system would have the advantages of light weight, low cost and esthetic appeal. Local artists will donate their time to decorate the shutters. The shutters can easily be modified for residential use.

SUBTERRANEAN OUTBUILDINGS (0130-80)

Phillip Albert
General Delivery
Ruby, AK 99768

Amount Funded: $4800

To build subterranean area for chickens, goats, etc. On the earth surface, a greenhous will be constructed on the top of the animal stock outbuilding. Produce for local consumption would be grown in the greenhouse. Eggs and milk would be available from the chickens and goats on a year-round basis.

SOLAR THAWING OF PERMAFROST (0044-80)

Joseph Balch
Mile 34 Salcha
Fairbanks, AK 99701

Amount Funded: $5000

Thermal tube method using heat jacket at base of tube. Could be used for specific

research programs. With the use of a wind pump and solar collector, could possibly supply water year-round in the remote regions.

EFFECTIVE U-VALUE MEASUREMENTS (0139-80)

Axel R. Carlson
SR Box 30183 Scenic Heights
Fairbanks, AK 99702
479-6434

Amount Funded: $5000

To develop a technique with instruments to measure the effect of thermal mass, solar orientation and color of exterior surfaces. Also to determine effective U-values (R-value) of floors, walls and roofs below grade for earth shelter homes. Will also determine the effective U-values of heavy timber and masonry of walls above grade. A computer program will be developed to convert and tabulate the data as U-values.

ARCTIC HOME CONSTRUCTION (0505-80D)

Bobby Cloyd
3750 Geist Road
Fairbanks, AK 99701

Amount Funded: $3400

Various techniques will be implemented by the vocational carpentry class at the Hutchinson Career Center. Results will be monitored and compared for effectiveness with other types of home construction.

SOLAR GREENHOUSE (0328-80)

Michael Crawford
Box 73560
Fairbanks, AK 99707
456-6843

Amount Funded: $4800

An air/hydronic solar collector system. An attached solar greenhouse to be constructed on the south wall of the Two Rivers Grange (Alaska #3). Labor to be donated by members. The greenhouse will be utilized by the community, including the 4H Club and other young people's organizations.

HOME ENERGY SYSTEM (0118-80)

John Dillon
Mary Moorman
P. O. Box 81123
College, AK 99708

Amount Funded: $5000

Plan to design, build and demonstrate hybrid solar, wood and coal energy system as conservation features in a home. There will be a solar-chimney attached greenhouse with energy storage in eutectic salts. Use will be made of locally available resources to avoid rising fuel costs.

METHANE GENERATOR (0362-80)

Chris Lamb
P. O. Box 602
Nome, AK 99762

Amount Funded: $400

Utilizing honeybuckets with a two-stage generator. The two stages allow for continuous gas production. Disposal of human waste is a major problem in northern areas. Fuel costs are high. Lamb hopes to alleviate both problems with the generator.

AUTOMATED THERMAL SHUTTERS (0309-80)

Ed McGrath
P. O. Box 80807
Fairbanks, AK 99708
452-6690

Amount Funded: $2400

Four motor operated retrofit automated shutters when combined with 2 panes of glass have an R value of 18 - substantially higher than most insulated shutters.

TECHNIQUE FOR SHALLOW SUBSURFACE EXPLORATION (0020-80)

Robert McHattie
Richard Jurick
1921 Capitol Avenue
Fairbanks, AK 99701

Amount Funded: $5000

To be developed with an electromagnetic solid conductivity instrument to delineate permafrost and ground ice conditions for building, map subsurface conditions and for small placer and hard rock mining operations.

GENERATING SYSTEM (0538-80D)

Carl Pelz
P. O. Box 93
Petersburg, AK 99833

Amount Funded: $5000

A hillside stream will be the energy source. A dam will be built 200 feet above the generating system. A pipe in the dam will guarantee a steady flow of water. A Pelton wheel will be used to transmit mechanical energy from the water to the generator.

DATA RECORDING INSTRUMENT (0205-80)

James Raymond
P. O. Box 81504
Fairbanks, AK 99708
456-3128

Amount Funded: $1100

Will build a multi-purpose instrument for recording environmental data in remote regions. The data would provide information that could help to improve the design of buildings and other projects for suitability of construction in the wilderness areas.

SOLAR ENERGY HEATING SYSTEM (0064-80)

Richard Seifert
Gary Newman
Box 80147
Fairbanks, AK 99708

Amount Funded: $5000

To purchase two identical thermal and flow monitoring systems, two differential thermostate controllers and temperature sensors and two recording and integrating pyranometers. Seifert and Newman will monitor the systems for the lifetime of the units. Seifert's system will be heating a basement using panel heating (pipes imbedded in a concrete pad) and Newman's system will be used to provide space heating and domestic hot water heating, with additional exchangers to be used for extended gardening ground warming at a later date.

SOLAR WOOD DRYING KILN (0248-80)

Charles Simmons
Box 81724
College, AK 99708

Amount Funded: $2000

To dry wood for use in woodworking and woodcarving. This would enable artist Simmons to utilize local rather than imported wood. The kiln will utilize fiberglass for insulation on a 2 x 4 construction, with control from thermostate operated fans.

WATER HEATING (0177-80)

Leslie A. Viereck
HR 20791
Fairbanks, AK 99701

Amount Funded: $2000

A method for heating domestic water by a combination of wood stove and solar panels. The solar panels will heat the water from March through October and assist in heating during late fall and early spring. The project is designed to demonstrate that domestic water need not be heated by oil or electricity in the interior of Alaska.

FISH DRYING PROCESS (0145-80)

Ole Wik
Savoonga, AK 99769

Amount Funded: $5000

A method of drying fish in a vacuum chamber, powered by existing wind electric system. The Danes use a similar process called pressfisk, where the fish is squeezed into blocks during the process.

STEAM PLANT FOR SMALL BOAT (0262-80)

Ronald Klein
P. O. Box 1587
Juneau, AK 99802
586-9492 or 465-2925/465-2944 (work)

Amount Funded: $5000

To install and modify a commercially made steam boiler and engine for a small launch hull. To demonstrate practical use of steam as a means of locomotion, especially in the southeastern area where wood is plentiful.

1 WATT TRANSLATOR (0166-80)

David Molvik
Narrows Broadcasting Corporation
Box 149
Petersburg, AK 99833
772-3770

Amount Funded: $5000

Translators are low power repeater stations. This would be erected on a mountain top for energy generation via solar voltaic cells for the operation of radio broadcast transmission equipment.

HOME ENERGY CONSERVATION SYSTEM (0234-80)

Jay Moor
9175 Skywood Lane
Juneau, AK 99801
789-9583

Amount Funded: $4800

A dual domestic system comprised of heaters, controls, and environmental stabilizers that can be coordinated by means of small computer, or operated manually when the electrical power supply fails. To demonstrate the system can be packaged in modules for easy adaption to professionally built housing in Alaska.

DEVELOPMENT OF CLAM HARVESTING TECHNIQUE (063-81)

Carl DeBoard
608 Kim Place
Anchorage, AK 99504
337-3191 or 344-9602

Amount Funded: $5000

A clam dredge that is an amphibious vehicle that will travel in 7 feet of water before it floats. It could harvest razor clams 8 months per year, for 8 hours a day. Awardee will experiment with a design modification of a clam digger he has developed. It is anticipated the clam dredge could harvest a swath 4 feet wide and have a forward speed, while harvesting of 5000 feet per hour. A beach area of 20,000 square feet per hour could be harvested.

DEVELOPMENT OF A CAM OPERATED ARCTIC DOOR DESIGN (061-81)

Phillip W. Sanders
P.O. Box 80982
Fairbanks, AK 99708
479-5920

Amount Funded: $1100

To design a door with beveled edges and a cam operated pin hinge to eliminate the problem of air infiltration of exterior doors. Awardee will convert standard metal door. The door would revolve around one central axis. As the door is opened, the cam lift mechanism raises the door and allows it to clear the threshold. As the door closes, the cam drops the door back down on the threshold for a tight seal.

TO GROW FRUIT TREES IN THE YUKON-TANANA UPLANDS (115-81)

Bonnie Friedman
P.O. Box 81110
College, AK 99708

Amount Funded: $1650

To coordinate the experience, research and expertise of those growing fruit trees in Alaska and to utilize those methods of growing fruit trees used in other arctic countries. To date, results are not recorded by individuals in a scientific manner and results are not passed along to other Alaskans. The grant will permit an investigation through experimentation into the response of fruit trees grown through a variety of techniques.

TO CONVERT A VW BUG TO A HYBRID-ELECTRIC VEHICLE (110-81)

W. Charles Newell
P.O. Box 80302
College, AK 99708
456-2800

Amount Funded: $2700

To attempt to demonstrate a viable transportation design which will eliminate wasteful warm-up periods, provide reliable car service and conserve fuel emissions. The prime movers in the system would be eight 12 VDC batteries in series connection and a 2000 watt motor generator set.

TO USE SPILL-OVER ENERGY FROM A HYDRAULIC WINDMILL (117-81)

Clark Corbridge
7420 Tikchik Circle
Anchorage, AK 99504
333-4587 or 279-0641

Amount Funded: $5000

To build a windmill incorporating a controllable-pitch, full-feathering propeller; hydraulic control of propeller pitch, a hydraulic pump, motor and 'lock.' If successful, the project will prove the viability of the theoretical ideas concerning the use of full-feathering, ground controllable propellers and hydraulic methods of power transportation for windmills. Alaskans could benefit from windpower systems, which are quieter and therefore, more environmentally acceptable. Because the hydraulic windmill should provide that all adjustments be made from the ground, it would be substantially safer than a conventional windmill.

EQUIPMENT FOR SENSITIVITY AND COLD TEMPERATURE TESTING OF SMOKE DETECTORS (131-81)

John Benevento
Geophys. Inst., U of A
Fairbanks, AK 99701
479-7560

Amount Funded: $4900

To be used for equipment in basic laboratory tests for smoke detectors to be used in the bush. Tests would be run that would be difficult to document and evaluate under field test conditions.

HEAT PUMP FOR FOUNDATION STABILIZATION (118-81)

R. Dale Guthrie
SR Box 20044-B
Fairbanks, AK 99701
479-6034 or 479-7142 (work)

Amount Funded: $5000

This would be a dual function heat pump; to stabilize a house foundation on permafrost with energy efficient interior heating. Building on permafrost in Alaska is expensive and sometimes unsatisfactory. It is difficult to remove subfoundation heat in an even and controlled manner without producing the undesired side effects of expansion and differential heaving of the slab and foundation. It may be possible to avoid these problems and at the same time, salvage building threatened by permafrost with a modification of a heat pump system already in existence. Instead of pumping heat into the basement from the soil surrounding the house, heat could be evenly extracted from beneath the existing slab.

TO INSTALL A HIGH-PRESSURE JET MODIFICATION TO A CLAM HARVESTER (066-81)

Ed Stultz
7020 E. 11th
Anchorage, AK 99504
333-4348

Amount Funded: $5000

A competent hand digger can harvest 200 to 300 pounds of clams per day. It is proposed that the suggested high-pressure digger could harvest 5000 pounds per hour, by using a water-pressure method.

DEVICE TO TEST SOIL STRENGTH (068-81)

Douglas Beaudoin
50 Valley Drive
Fairbanks, AK 99701
488-9228

Amount Funded: $2050

This would be a tri-dimensional stress-strain controlled field testing apparatus. It would predict settlement rates of foundation materials. It would also determine size, shape and type of foundations and footings for each type of soil condition. The objective would be to perform field tests throughout the Anchorage and Fairbanks areas where foundation failures occur and where cohesive soils exist.

TO DEVELOP A SUBMERSIBLE INVESTIGATING DRONE (069-81)

Randy and Larry Smith
P.O. Box L
Haines, AK 99827
766-2810

Amount Funded: $5000

For underwater research, mapping and salvage. The drone would also have application in pollution investigation, fisheries and halibut studies, harbor maintenance and light underwater salvage. It would be an unmanned, remote-controlled drone capable of being towed and/or maneuvered under its own power at ocean depths up to 35 fathoms. It would fit in a standard hold of any vessel over 50 feet in length and could be lowered into the water with a modes winch.

TO STUDY THE FEASIBILITY OF MIGRATORY BEE/HONEY OPERATION SYMPATHETIC TO DELTA BARLEY PROJECT (070-81)

Paul Carlson
Chilkat Valley Farm
P.O. Box B
Haines, AK 99827
766-2770

Amount Funded: $2350

Bees would be purchased and installed in the Delta area. Bees from Haines would be sent by truck to the Delta area where eight acres of rapeseed will be planted for bee pasture. The bees would then be transported back to Haines following the bloom period. The benefit would be increased honey production, a sounder agricultural program, utilizing honey bee pollination for seed set and fruit yields.

WIND POWERED HEAT PUMP AND LIGHTING SYSTEM (003-81)

Erick Olson
P.O. Box 393
Haines, AK 99827

Amount Funded: $5000

Project will demonstrate the feasibility of heating and lighting a house in southeast Alaska using wind power. The power will be generated by a 10 kilowatt "Elektro" wind generator and fed through battery banks to a six kilowatt modified sine wave inverter. The heat pump will optimize power that is produced by turning energy into heat in an energy conservative manner.

MARICULTURE OF SUBTIDAL RED SEAWEEDS (005-81)

Natasha Calvin
P.O. Box 112
Auke Bay, AK 99821

Amount Funded: $5000

The species of Alaskan seaweeds of the Rhodophyta, or red algae group, when used as natural herbs, applied topically, give significant relief from the symptoms of herpes infections. Awardee would dive in many places of the outer Chichagof area which provide algae species.

TO CONSTRUCT A DUAL-LAYER GREENHOUSE ON ALASKAN PENINSULA (020-81)

Charles & Sara Hornberger
P.O. Box 69
Illiamna, AK 99606

Amount Funded: $3400

To demonstrate that it is possible to grow major portion of food needs on the Alaskan peninsula and enjoy a growing period of 8 months. The greenhouse would be geographically situated and constructed to utilize solar heat to the maximum efficiency.

TO REFINE INDOOR HYDROPONIC SYSTEM (022-81)

Ira Winograd
435 Kennedy St.
Juneau, AK 99801
465-3991 (day) 586-6417 (eve.)

Amount Funded: $1500

To create an indoor hydroponic system for home use producing vegetables at a price which is cost competitive with market produce. Compact in size, 3 feet by 8 feet, awardee plans to market the units in kit form.

TO DEVELOP A METHOD OF PRODUCING ETHANOL ALCOHOL (026-81)

Craig Delbridge
% Northland Maint. Co.
Pump Station #1
P.O. Box 73608
Fairbanks, AK 99707
479-3983

Amount Funded: $5000

Alcohol would be removed from fermentation as it is formed, by tying together the fermentation and distillation functions in a continuous loop. The efficient production of ethanol as a fuel could cut costs in marketing Alaskan grain and Alaskan wood products. Exportation to overseas markets is almost prohibitive at this time, due to high transportation costs.

HIGH TEMPERATURE SURFACE COMBUSTION TECHNIQUES (028-81)

Horace Simmons
Box 2464
Kodiak, AK 99615
486-4890

Amount Funded: $1500

Incomplete combustion in stoves and furnaces increases fuel consumption. Awardee will try to eliminate this problem by constructing two types of surface combustion units. One will be intended for use with natural-draft oil ranges and heaters and

TO CONSTRUCT A CHICKEN HOUSE AND SOLAR PIT GREENHOUSE (031-81)

with wood and coal heaters. Another type will be constructed for use in forced-draft furnaces and boilers.

Joy Orth
P.O. Box 1171
Wrangell, AK 99929

Amount Funded: $4200

To develop a system of food production which would provide a continuous supply of fresh vegetables, eggs and meat suitable to southeast Alaskan conditions.

COMPOSTING TECHNIQUES EXPERIMENTATION (033-81)

Eugene Gerow
P.O. Box 8265 NPS
Kenai, AK 99611
776-8996

Amount Funded: $4900

To develop a process of utilizing heat from decomposing brushwood and trimmings. Branches are chipped and stacked. Water is circulated through the stacks where it is heated by the exothermic reaction of the decomposing brushwood. This hot water is then used to heat buildings. Completion of the decomposition cycle results in a high quality compost that can be tested for use for agricultural purposes.

TO REUSE WASTE HEAT FROM LAUNDROMAT (038-81)

James Wilcox
1914 Churchill Ct.
Juneau, AK 99801
586-2637

Amount Funded: $4400

Rocks would collect heat while the dryers are in use. After dryers have run, tops of rocks should be warm anough to change temperature of water in pipes, which would lower cost of heating water. Rocks would be in a box above the dryer, with vents entering from the dryers. Heat recovery fans on top of the box would draw heat back from rocks and distribute heat to building.

TO CONSTRUCT A SOLAR SEMI-SUBTERRANEAN BARN/ROOT CELLAR (052-81)

Jack Detzel, Jr.
P.O. Box 278
2 Mile Tanana Loop Rd.
Delta Junction, AK 99737
895-4696 (work)

Amount Funded: $4000

To make use of the heat loss from poultry and passive solar collector in the barn and root cellar. The root cellar would provide necessary storage area for vegetables. The barn would provide shelter to laying chickens and turkeys. Vegetables, eggs and poultry could be provided to Delta residents all year around.

CONSTRUCTION OF ELECTRIC HYBRID CAR (057-81)

H. J. Coutts
Mile 348 Nenana Hwy.
Nenana, AK 99760
353-1106 (Mon. - Thurs.) 479-3645 (Fri.)

Amount Funded: $5000

Not only construct but demonstrate its use under cold climate conditions. The car will be assembled from off-the-shelf components. Fuel economy, which may approach 100 miles per gallon including electric power consumption will be measured and reported.

IMPROVED HYDRAULIC RAM FOR USE ON STREAMS IN INTERIOR ALASKA (056-81)

N. Meade Riche
1379 Alaska Hwy.
Delta Junction, AK 99737
895-4842 (message)

Amount Funded: $4900

A lighter, more compact and more efficient ram than used now. It will be fabricated from local materials and will be easy to install. The renewable hydro-power will be used in the nearby stream to pump water to gardens, greenhouses and animal barns, without using electric-powered or gasoline-driven engine pumps currently in use.

WOOD FUELED ELECTRICITY GENERATOR (059-81)

Richard Miller
P.O. Box 4005
Kenai, AK 99611
283-4426

Amount Funded: $5000

To build and demonstrate an efficient, technologically simple producer gas refactory to convert firewood into a flammable gas vapor to fuel a portable piston driven electic generator. This would provide a means for comparatively economical sources of electricity for many Alaskan areas where conventional means have proven too costly.

TO DEVELOP A MICRO HIGH HEAD HYDROELECTRIC SITE FOR REDUCTION OF FOSSIL FUELS (077-81)

Kenneth Cassell
5680 Thane Rd.
Juneau, AK 99801
586-2394 or 586-3911 (work)

Amount Funded: $5000

Along the five mile length of Thane Road in Juneau, there are 27 streams; all having potential to produce electricity. The need for fossil fuel would be less by promoting the use of micro hydro. A community involvement program is planned in all facets of the project.

TO REUSE WASTE COMPUTER PAPER (079-81)

Nancy North
401 8th St., #108
Juneau, AK 99801

Amount Funded: $1000

To find a secondary use for waste computer paper which is thrown away in vast amounts in the State of Alaska offices.

EMERGENCY SOLAR POWER FOR SMALL BOATS (004-81)

George Olanna
Shishmaref, AK 99772
479-7987 or 452-6519 (home)

Amount Funded: $3000

To use the photovoltaic application of battery charging for boats. This could be used not only to start the motor, but operate CB radios. There is almost 24 hours of sun during the spring seal hunt and, as batteries very often go 'dead', this could be a method to possibly save the lives of hunters who are 75 miles out sea.

TO RECYCLE ALUMINUM CANS (013-81)

Daniel Moen
Kodiak Scrap Metals
P.O. Box 3074
Kodiak, AK 99615
486-3881

Amount Funded: $2400

To modify a log-splitter for the purpose of crushing cans. This method of decreasing volume of used cans would be especially beneficial to the bush country, where disposal methods are a problem.

RIVER-POWERED ELECTRICAL GENERATOR (021-81)

Pete Brown
General Delivery
Aniak, AK 99557

Amount Funded: $3000

Using the power of the river in a similar manner as the fish wheel. The 12 VDC generator would be designed to power lights, a freezer and power tools at a fish camp.

INSTALLATION OF SELF-TIMER SILENCERS ON SMOKE DETECTORS (130-81)

Nancy Smoyer
Geophys. Inst., U of A
Fairbanks, AK 99701
479-7125

Amount Funded: $5000

There is a high incidence of false alarms in smoke detectors now being used in Alaskan villages. A simple electronic circuit has been designed which will allow de-activation of smoke detectors for ten minutes, by pushing a remotely connected push button. The awardee will use the grant to construct approximately 100 of these devices for installation in six villages.

TO DIVE TO RECORD ABUNDANCE AND DISTRIBUTION OF SEAWEEDS (006-81)

Robert Ellis
P.O. Box 112
Auke Bay, AK 99821

Amount Funded: $5000

Awardee is an experienced research diver. Collect plants for microscopic inspection for possible use as medicine and food. At present, there is not a systematic, coordinated effort being expended in Alaska in this area.

WOOD UTILIZATION SURVEY IN THE FAIRBANKS NORTH STAR BOROUGH (N-82-01)

Steve Laroe
226 Glacier Avenue
Fairbanks, Alaska 99701
456-6094

Amount Funded: $2500

The Interior Woodcutters Association will conduct a survey to determine if adequate wood supplies are available for domestic and commercial use. Due to an increased demand for fuel wood in the area, there is a notable decrease in available areas for wood cutting. 1,200 questionnaires will be sent to Fairbanks residents to determine the actual demand for use of firewood in the area. The Association's goal is to educate Alaskans concerning the use of timber and to promote the proper use and management of this resource in interior Alaska on a sustained yield basis.

DEVELOPMENT OF AN AUTOMATIC AND MANUAL FUEL-SAVING FLOOR REGISTER (N-82-02)

Dane Wagner
919 Cherry Street
Anchorage, Alaska 99504
338-4555

Amount Funded: $4000

The register will direct the air in a heating system ductwork to the area of a room most in need of heat. Directional louvres will automatically direct initial cool air to the ceiling area. As air becomes warmer, it will be directed to floor area. A two-selector manual system will operate on the same principle. The plastic louvred register will be mounted over the outlet of a conventional forced air heating system.

FROZEN FOOD PROCESSING PLANT (N-82-04)

Max Stark
St. Rt. 10603
Fairbanks, Alaska 99701
479-2891

Amount Funded: $3750

The purpose of this project is to grow broccoli, cabbage and cauliflower and to explore methods of freezing these products on a large scale. Produce will be grown by the awardee, as well as 4-H members and other residents. Plans for a much larger food plant will be undertaken if the smaller plant is successful. Stark is a retired vocational agriculture teacher and is currently supervisor of the Alaska Experimental Farm.

DOCUMENTATION OF OFF-PEAK ELECTRIC HEATING SYSTEMS AND USAGE (N-82-23)

Albert Shaw
631 West 11th Street
Juneau, Alaska 99801
586-1602

Amount Funded: $500

The problem to be addressed is the apparent lack of information on electric off-peak heating systems. The grantee will collect and document the names of suppliers of these systems plus information on what utilities are doing to implement such systems. The information could be used by individuals and utilities to determine if off-peak electric power is adaptable to their particular needs.

DESIGN, DEVELOP AND TEST MANUAL, SEMI-AUTOMATIC AND AUTOMATIC CONTROLS FOR THERMAL SHUTTERS (N-82-26)

John Davies (Ph: 479-7424)
Richard Siegrist (Ph: 479-7131)
SR 20123-K
Fairbanks, Alaska 99701

Amount Funded: $4900

The grantees feel that energy-efficient thermal shutters will not be used by Alaskans to any degree until reliable, automatic controls are available at a reasonable cost. The four control designs will be: a single shutter manually cranked from the interior of the house; single or multiple shutters semi-automatically cranked by a switch-activated motor; multiple shutters automatically cranked in unison by a motor controlled by hard-wired electronics that monitor light, temperature and/or time of day, and multiple shutters automatically and individually cranked at arbitrary times by a motor controlled by software-based microcomputer electronics that monitor a large number of environmental conditions.

DESIGN AND CONSTRUCT WASTE OIL FURNACE (N-82-44)

Frank Abegg III
3762 Erickson Road
Fairbanks, Alaska 99701
479-6045

Amount Funded: $3450

The proper disposal of waste oil is an ongoing problem. The Environmental Protection Agency and the Alaska Department of Environmental Conservation encourage disposal through incineration. Although the cleanest method, it too can create pollution. The design for this prototype waste-oil fired hot air furnace will enable it to generate up to 100,000 BTU/Hour for space heating. The grantee has extensive experience in this area and has marketed many devices such as this. However, although there are many waste oil burners on the market there still is not one designed for Alaska's unique conditions that can burn more than a few gallons per day. The furnace will use a standard high pressure fuel oil burner modified to burn waste oil. The furnace will be capable of operating on a wide range of oils which could be stored underground in a heated tank.

TO DEVELOP A MICROPROCESSOR CONTROLLER TO OPTIMIZE HOT WATER HEATER USAGE (N-82-49)

Richard Jablonowski
Box 638
Juneau, Alaska 99802
586-3833

Amount Funded: $5000

The project will utilize a microcomputer to design the logic for and test the energy savings of an "intelligent" black box controller for domestic hot water heaters. The computer program will be able to direct the controls to turn a hot water heater on and off; sense thermostat "on" and "off" conditions; sense requests for hot water (flow or pressure changes); measure, and record and analyze operating characteristics for financial and energy analyses. The computer's data will be doublechecked by cumulative energy meters. The final outcome will be the development of "micro-chips" as the major component and memory of these proposed devices which will be installed, at a minimal cost, in hot water heaters.

BANDSAW POWER ALTERNATIVE FOR BUSH AREAS (N-82-51)

Matthew Kirchhoff
Box 8800
Port Alexander, Alaska 99801

Amount Funded: $500

The absence of electricity in many rural Alaskan communities prohibits the use of power tools. Using a commercial bandsaw kit, the grantee proposes to build a bandsaw and utilize a treadle in lieu of power. Components for the treadle design are readily available. A 50 pound automobile flywheel, pulleys, shaft, gears and foot sprocket will be used to activate the bandsaw. He estimates that the lowest gear setting will yield a blade speed of 340 feet per minute, and the highest gear setting will yield a blade speed of 4900 feet per minute. His ultimate goal is to produce the kits for use by other Alaskans in remote areas.

CROSS-TRANSMISSION OF COCCIDIOSIS BETWEEN WILD AND DOMESTIC ALASKAN SHEEP (N-82-72)

Carol Nielson
P. O. Box 81751
Fairbanks, Alaska 99708

Amount Funded: $5000

In central and northern Alaska, the further development of commercial sheep herds as a local source of meat through "fat lamb" production would probably involve summer pasture grazing and winter confinement feeding. While on pasture, it is very possible that domestic lambs and ewes could acquire coccidia, harbored by Alaskan Dall sheep. The grantee proposes to investigate the possibilities for cross-transmission of coccidiosis between Dall sheep and domestic sheep by determining if both kinds of sheep harbor similar species of Eimeria and if infective cocysts from wild sheep can cause coccidiosis in susceptible domestic lambs. Alaskans who are considering commercial sheep-raising, even on a small scale, need to know if the use of summer pastures will expose their animals to increased risk of coccidiosis.

STUDIO-SIZED, HYDRAULICALLY POWERED IMPACT MILL (N-82-77)

David Stannard
1009 O'Connor
Fairbanks, Alaska 99701
452-7208

Amount Funded: $4100

To address the high cost of imported clay and the unavailability of local sources, the applicant plans to develop a mill to pulverize local ceramic raw materials. It will not only provide an example of one person's ability to subsist on local materials, but will also provide other potters in the Fairbanks area with practical experience so that they too can extend their ceramic endeavors without being completely dependent on outside suppliers.

SOIL HEATED FOOD PRODUCTION WITH SEEP IRRIGATION (N-82-87)

John Quirk
P. O. Box 29
Galena, Alaska 99741
656-1238

Amount Funded: $3750

Hot water plastic pipe will be placed two feet apart underground, and 18 inches deep to use the waste heat from the Ruby, Alaska powerplant water jacket heat to warm the soil from April through September. Seep irrigation will be used along all the rows and slitted row covers on two rows for early production. This should extend the growing season and increase the production of vegetable crops.

WINTER STORAGE FOR ROOT CROPS (N-82-103)

Stanford Gurtler
General Delivery
Ruby, Alaska 99768

Amount Funded: $4950

To build a 24' X 48' root cellar for winter storage of excess vegetables. This will be a village effort and will eventually be turned over to the local school as a students' project. The awardee is a native rural Alaskan trained in arctic agriculture by the local Learning Center.

DEVELOPMENT OF A LOW-COST, LIGHTWEIGHT, SOLAR SNOW MELTER FOR EXPEDITIONARY AND REMOTE SITE USE (N-82-107)

Matthew Sturm
Dan Solie
Geophysical Institute
University of Alaska
Fairbanks, Alaska 99701
479-7369

Amount Funded: $1300

To maximize the amount of solar energy collected in the snow melting device, maximize the efficiency of the heat transfer process to the snow and minimize the heat losses. An important part of the work will consist of experimenting with a variety of materials in a number of configurations in order to determine the best possible arrangement. Obtaining water is often a problem in cold climates.

Despite the limited availability of sunlight, it is possible to melt snow using only the sun's rays.

TO DEVELOP A HYDRO-POWER GENERATION SYSTEM (N-82-109)

Michael Loeffler
P. O. Box 595
Chugiak, Alaska 99567
694-3920

Amount Funded: $5000

To build a turbine test unit which will incorporate various impeller designs and test in several locations under different water conditions. The system will need little, if any, stream damming and components are off-the-shelf items that are readily available and inexpensive. The ultimate goal of the project is to produce inexpensive kits simple enough for Alaskans in remote areas to build.

MONITORING OF INTERIOR WINDOW INSULATIONS (N-82-80)

William McDonald
James Bershire
1551 East Tudor
Anchorage, Alaska 99507
274-2627

Amount Funded: $4650

Since determining the right type of thermal shutter in Alaska has yet to be undertaken, the awardees propose to gather and disseminate information on the performance of several different types of interior shutters, in actual application in southcentral Alaska. The approach to monitoring will be twofold; microprocessor measurements of heat loss through the windows with and without shutters in place, and visual observation with a log noting condensation problems that may exist. The period of testing will be one complete heating season.

INSTRUMENTATION FOR A SMALL HYDRO-POWER PROJECT (N-82-108)

Louis Butera
University of Alaska, Anchorage
274-9344

Amount Funded: $3750

The project will enable the collection of data to substantiate and make possible the compilation of an Alaskan Small Hydropower Guide. The instrumentation will be installed on a 5 KW hydroelectric project currently under construction on a local stream.

FISH MEAL AND OIL PRODUCING RAFT (N-82-119)

John Stam
Box 21
Galena, Alaska 99741

Amount Funded: $3800

The awardee is a subsistence fisherman who has an alternative for current fish camp methods of cutting and drying fish for use as dog food. He proposes to build a large raft, using oil drums for flotation. The whole fish would be boiled in large containers aboard the raft, the excess water drained off, and the remaining fish sludge laid out under the raft roof to dry. Using this method, fish dries in 2 to 4 days, as opposed to the 1 to 2 week period on racks at the fish camp and there is no waste of fish. When the fish is dried, it will be mixed with dog meal to provide a nutritious feed all winter.

HYDROGEN GAS GENERATION BY AND FOR BOATS (N-82-38)

Joseph Charles Black
Dawn Lee Black
Box 1912
Kodiak, Alaska 99615
486-4666 or 5516

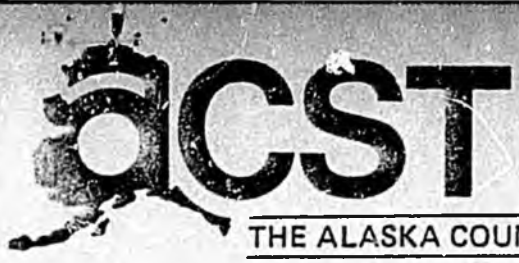
Amount Funded: $5000

Although the testing is being conducted in Kodiak the proposal is based upon research conducted by Paul H. Lee, Research Physicist, University of California - Santa Barbara. Dr. Lee has offered to loan the awardees a 12 ft. buoy to investigate the possibility of producing hydrogen gas as fuel to power a boat. The buoy would be cabled to an electrolysis system in the boat that would produce hydrogen gas. The hydrogen gas would be stored in metal hydride flakes. In turn, heat would release the gas from the flakes.

Dr. Lee's approach is to use inertial coupling to design a generator for buoys. The generator has only one moving part. It is carried by the buoy for the purpose of recharging its batteries. The device is hermetically sealed from the ocean environment. The power it will produce from a 3-ft. wave, having periods ranging between 4 and 8 sec, is substantially that near 12 watts. For a 5-ft. wave, a maximum power of over 40 watts can be produced.

In conjunction with the project, the awardees will produce an educational film depicting step-by-step procedures. The film will be shown on public television statewide.

According to the awardees, the village of Old Harbor on Kodiak Island has been designated for a pilot program by the Alaska State Division of Energy for conversion to hydrogen gas with the use of wind power. The awardees think that the use of tidal/wave power to produce hydrogen gas as outlined in the proposal, will be timely.



THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

RESEARCH ACTIVITIES

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SEPTEMBER 1982

Christopher Noah, Executive Director - Pouch CV, Juneau, Alaska 99811 - (907) 465-3510

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GEOTHERMAL ENERGY RESOURCES OF THE LOWER SUSITNA BASIN

Principal Investigators: Donald L. Turner
Eugene M. Westcott
Geophysical Institute
University of Alaska
Fairbanks, Alaska

Amount Funded: $149,664

This project proposes the continuation of geothermal exploration in the lower Susitna valley near communities along the Parks Highway. Very large areas in the Willow-Wasilla-Big Lake region show substantial geothermal resources exist, but there are gaps in the data base outlining this resource.

Proposed follow on work will focus on providing a much better definition of the nature and area and vertical distribution of the geothermal system and on providing specific recommendations for exploratory drilling. This is one of the few areas in Alaska where a sizeable future population could be located directly over a large geothermal resource that can be economically utilized.

EFFECTS OF COMMERCIAL TELEVISION ON RURAL AL/SKAN CHILDREN

Prinicpal Investigator: Norma Forbes
Center for Cross Cultural Studies
University of Alaska
Fairbanks, Alaska

Amount Funded: $77,714

The proposed research is the third phase of a study of effects of the introduction of television on rural Alaskan Native children.

Data will be collected in two Tlingit-Haida villages in Southeast Alaska and four Eskimo villages in the Kotzebue Basin. Villages in each area are paired such that one had television and one did not during an earlier phase of the study. All village sites now have television. A wide range of social, psychological, and educational data will be utilized, with most of the measures reflecting television's role as a change agent.

PERSISTENCE OF HERBICIDES IN AGRICULTURAL SOILS

Principal Investigators: C.W. Knight & J.S. Conn
Agricultural Experiment Station
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $132,973

Agricultural acreage in the Alaskan Interior is increasing at a dramatic pace. By 1990, approximately 500,000 acres are expected to be under cultivation. The majority of the acreage will be located in the interior. A complicating factor in this development is that it is occurring in the subarctic, where little research has been undertaken to determine the effect of cold soils, long photoperiod, and short growing season on the various agroecosystems. One such component is agricultural herbicides. Herbicides are used extensively in agriculture throughout the developed world and now in Alaska.

Since persistence of herbicides could result in damage to herbicide-susceptible rotational crops, or in longterm buildup of residues sufficient to damage even less susceptible crops, information on herbicide degradation is urgently needed.

This information would be directly useful to extension personnel and farmers for: selection between alternative herbicides; planning clearing practices that optimize soil pH and organic matter content for minimizing herbicide buildup; and in the planning of crop rotation sequences. The information would also benefit those evaluating the length of environmental impact that would be caused by herbicide contamination of non-agricultural lands.

SNOWPACK STRUCTURE AND REGIONAL AVALANCHE HAZARD FORECASTING

Principal Investigator: Edward R. LaChapelle
Professor of Atmospheric Sciences
and Geophysics
University of Washington
Seattle, Washington

Amount Funded: $28,503

Forecasting avalanches for widely varying mountainous terrain is a growing problem for many areas throughout the world. It is proposed that the role of snowpack structure analysis be formalized and included into regional avalanche forecasting.

A computer program will be applied to a large data base in order to isolate snowpack features that discriminate stable from unstable conditions. This information can then be synthesized with meteorological data into an operational guidance model for avalanche forecasting in Alaska.

FOREST ECOSYSTEM MANAGEMENT MODEL

Principal Investigator: John Fox
Institute of Arctic Biology
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $63,236

There will be increasing utlization of interior Alaska forests in the next several decades for saw logs, house logs and firewood. The effects of all management options cannot be evaluated by field studies alone because of the costs and time lags involved. The alternative, increasingly in use now in the eastern U.S., is development of forest growth and ecosystem computer simulation models. Such models aid in the selection of possible field experiments and in the refinement through field studies of the assumptions rationale of the models and consequently of predictive capabilities.

There is a current need for forest production-decomposition-nutrient exchange models capable of predicting effects of forest management practices and climatic changes for interior Alaska forests. A large data base now exists, suitable for building a first generation of such models fully comparable to, or even exceeding performances of the models currently used for eastern deciduous forests.

Such a modelling program would benefit and complement current management oriented research by the state and federal institutions in Alaska.

VOLCANO-GLACIER INTERACTIONS ON MT. WRANGELL

Principal Investigator: Carl S. Benson
Professor of Geophysics and Geology
Geophysical Institute
University of Alaska
Fairbanks, Alaska

Amount Funded: $154,500

A major goal of this proposed research will be to complete selected parts of research which deals with the behavior of glaciers on the flanks of Mt. Wrangell. (Mt. Wrangell is an explosive volcano similar to Mt. St. Helens. It is the northernmost and one of the largest active volcanoes on the Pacific Rim.)

The research will cover site selection for a deep ice core to be obtained in 1982 for analysis of climatic and volcanic history. The research will also continue detailed monitoring of volcanic activity. Monitoring is important because of the three-fold increase in heat from Mt. Wrangell since the Mt. St. Elias earthquake in 1979 and the increased activity currently reported by long-term residents of the Copper Valley.

ALASKAN EARTHQUAKE CATALOG

Principal Investigator: Niren N. Biswas
Geophysical Institute
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $128,334

It is proposed to establish and test a homogeneous catalog of Alaskan earthquakes with local magnitude greater than or equal to 4.0, for the period January 2, 1966 through December 31, 1980. Prior to the great Alaskan earthquake of 1964, there were only two seismographic stations in Alaska. In 1964, the National Weather Service began establishing a network of seismic and tide gauging stations along the south coast of Alaska. Shortly thereafter, in late 1965 and early 1966, the University of Alaska's new seismic laboratory began establishing a network of stations in central Alaska.

Now there are more than 200 short-period seismic stations in Alaska, divided into at least six major networks, and operated by five different groups for a variety of different purposes. A clear need exists to synthesize all of this data on Alaskan earthquakes into one list.

ENHANCED OIL RECOVERY

Principal Investigator: Christine Ehlig-Economides
Dept. of Petroleum Engineering
School of Mineral Industry
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $120,000

Alaska owes most of its present and much of its future prosperity to revenues from oil and gas production within the state. While exploration continues on the North Slope and offshore, the ongoing production from fully developed reservoirs in Alaska already provide the U.S. with nearly 20 percent of the total domestic production.

As primary production rates begin to decline and the secondary measures such as gas cap injection or water flooding reach the limits of effectiveness, the Alaskan reserves will be greatly extended through design of appropriate enhanced oil recovery processes.

To aid the design effort, the investigators propose a major, two part research project on enhanced oil recovery in Alaska. The first part will deal with the physical properties of the Alaskan crude oil. The second part, which is not a component of this proposal, will deal with the geological description of the formation properties of Alaskan reservoirs.

NEAR-SHORE BOTTOMFISH MANAGEMENT PROGRAM

Investigators: Lewis Haldorson
University of Alaska
Juneau, Alaska

Alaska Coastal Research, Inc.
Box 368
Langely, Washington 98260

Amount Funded: $72,710

With the recent trend to very short halibut openings in southeast Alaska, and reduced salmon troll seasons, increasing numbers of fishermen are turning to, or investigating the possibility of fishing previously underutilized resources. Near-shore bottomfish are the first alternative for most of these fishermen. It appears that these previously unexploited fish populations are beginning to be targeted by small boat fishermen who are seeking alternate resources.

Research underway since 1980 has gathered extensive baseline information on important species caught in these fisheries. However, the state in 1981 almost eliminated the bottomfish study program in Alaska. The data gathered remains of relatively little value to the state unless it can be used as the basis for developing effective management plans. The proposed research is designed to complement this research program by developing a monitoring procedure for the inshore aggregation of fishes.

EFFECT OF HYDROCARBONS ON FISH

Principal Investigator: John P. Harrington
Chemistry Department
University of Alaska
Anchorage, Alaska 99501

Amount Funded: $47,029

This project will help answer any questions on the long term effect that hydrocarbons, especially aromatic and polycyclic aromatic hydrocarbons, have on fish.

The rapid exploration and development of oil potential in Alaska may soon overlap all the richest fishing areas of the state. The investigator plans to obtain dissolved hydrocarbons and raw crude oil from Port Valdez ballast, fractionate it by solvent extraction and test the effects of these fractions on the mutation rate of bacteria and Alaskan fish.

One of the chief values of this project will be to raise the general awareness of interactions between industry and the environment.

STUDY OF WIND CHARACTERISTICS FOR APPLIED WIND POWER

Principal Investigator: Tunis Wentink, Jr.
Professor of Physics
Geophysical Institute
University of Alaska
Fairbanks, Alaska 99701

Amount Funded $149,408

The objective of the proposal is to provide information leading to the early implementation of wind powered systems as energy supplements for use by the people of Alaska. The work involves the analysis of existing wind data, acquisition of new wind data and transference of the information to the users of wind power.

The research will provide an improved service program for dissemination of wind power information, involving coordination with the University and other extension services and agencies. One improvement in particular will be in servicing specific information requests by private enterprise and state and local governments.

INFLUENCE OF CLIMATIC FLUCTUATION ON PERMAFROST

Principal Investigator: T.E. Osterkamp
Geophysical Institute
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $142,733

Permafrost is a common soil condition in Alaska, with about three-fourths of the land area underlain by permanently frozen ground. Long-term needs of understanding the basic permafrost properties and processes and the short-term needs of developing solutions to permafrost detection and engineering problems, require intensive study and a comprehensive approach.

The study will include the monitoring of the thermal regime of the permafrost in Alaska at 15-20 sites. Measurements will be made of the thickness of the active layer and any thawing that may occur at the permafrost table and base, and of the temperature profiles through the permafrost section.

Interpretation and modeling of the temperature profiles will then be carried out to determine the effects of past and present changes in surface temperatures on the permafrost and to predict future changes in the permafrost regime.

SOLAR RADIATION ASSESSMENT

Principal Investigator: Gerd Wendler
Geophysical Institute
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $165,964

Before an alternative energy source can be applied intelligently in Alaska, knowledge of how much energy is available from this specific source is essential. There is very little information concerning solar energy. Although a sophisticated system of solar radiation data acquisition is in use at the Geophysical Institute in Fairbanks, most of the data is only for the Fairbanks vicinity.

In order to obtain radiation data from each of the four major climatic regions in the state, substations were established in Kodiak, Anchorage and Barrow, using a limited number of sensors and antiquated data systems. The resultant data from these three stations are incomplete for proper evaluation of solar energy utilization.

The investigators propose to maintain operation of all four radiation stations in Alaska after the Deptartment of Energy support discontinues. The Fairbanks station will operate as it is at the present, but the other three stations will be upgraded by using additional sensors needed for the assessment of solar energy. All data will be reduced and presented in a form directly usable by individuals or agencies within Alaska. The data will be archived and disseminated by the investigators and the State Climatologist at the State Climate Center.

BIOGEOCHEMISTRY OF ARSENIC MINE DRAINAGE

Principal Investigator: Edward J. Brown
Institute of Water Resources
University of Alaska
Fairbanks, Alaska

Amount Funded: $83,500

The contribution of micro-organisms to the accelerated leaching of arsenic associated with gold mining to groundwater is unclear. The proposed research will study the biogeochemistry of arsenic in both placer and lode gold mining areas in Alaska where arsenic is prevalent.

This research could determine the specific causes for the increased levels of arsenic in streams and groundwater. The results of the study will be used to formulate solutions to water quality problems caused by placer and gold mining (if mining, in fact, is determined to be the cause).

STUDY OF AIRBORNE POLLEN AND SPORES FOR MEDICAL PURPOSES

Principal Investigator: James H. Anderson
Research Associate
Institute of Arctic Biology
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $81,341

Many Alaskans suffer with allergies induced by airborne pollen and spores. Alaska is practically unknown "aeropalynologically", and research is needed to help allergic patients and their physicians toward more effective prevention and treatment.

The objectives of this proposal will be to acquire detailed knowledge of the composition and seasonality of the atmospheric pollen and spore flora and to develop a method of predicting significant pollen inducing events.

This proposal is partly for funding to finish analysis of 1978 samples and to analyze the samples from three Durham samplers in 1981. The major portion of the funding is to upgrade, expand and intensify aeropalynological research more adequately to meet medical and scientific needs and criteria in the state.

FATE OF FERTILIZER NITROGEN IN AGRICULTURAL SOILS

Principal Investigator: Stephen Sparrow
Agricultural Experiment Station
University of Alaska
Fairbanks, Alaska 99701

Amount Funded $191,257

Very little is known about the behavior of nitrogen fertilizer in Alaskan soils. A better understanding of this behavior is needed to enable efficient utilization of applied nitrogen by crops and to minimize potential pollution problems.

The proposed research will study the various transformations and fates of nitrogen fertilizer in Alaskan soils. These include nitrification, immobilization and mineralization, leaching and gaseous loss of nitrogen. The results will be used to make recommendations to farmers and to policy planners on methods of management for best use of nitrogen fertilizer.

The study site will be located on University land at mile 1408, Fairbanks, within the Delta Agricultural Project. A leaching study will also be conducted at the University of Alaska Research Farm, at Fairbanks.

GROWTH RATES IN MUSKOX CALVES

Principal Investigator: Robert G. White
Institute of Arctic Biology
University of Alaska
Fairbanks, Alaska

Amount Funded: $52,059

Muskox herds reintroduced to Alaska are expanding rapidly and show extremely high population growth rates. This phenomena warrants further study as these muskox may compete for food with caribou, reindeer, and moose.

There are no data on the milk requirements and food conversion efficiency in muskox calves, which is needed to interpret the nutritional basis for differences in growth and reproductive performance of circumpolar muskox populations.

IMPACT OF COMMUNITY PARTICIPATION ON RURAL EDUCATION

Principal Investigator: Gerald A. McBeath
Department of Political Science
University of Alaska
Fairbanks, Alaska

Amount Funded: $146,332

Alaska lacks information on the extent and degree of community participation and involvement in its schools, as well as what effect such participation has had on students and parents.

This project will describe the range of variation in community activity in rural areas of the state. Field research is proposed in 20 sites with data collection using several methods. Case studies will be formed and compared, and the project will also provide information necessary for the formulation of strategies for effective community participation.

HUMPBACK WHALE SURVEY IN PRINCE WILLIAM SOUND

Principal Invesitgator: Olga von Ziegesar
North Gulf Oceanic Society
P.O. Box 156
Cordova, Alaska

Amount Funded: $17,987

The purpose of this research is to photo-document individual humpback whales and determine their number, movements, and activities in Prince William Sound, Alaska.

This information will be used to determine any critical habitats or critical time periods in humpback whale utilization of the area. In addition, data collected will provide a baseline against which future changes can be measured.

ARCTIC ALASKA SOILS DATA BASE

Principal Investigator: K.R. Everett
Ohio State University
Research Foundation
Columbus, Ohio

Amount Funded: $45,548

A large data pool exists for the characteristics of soils in arctic Alaska, and these data are being added to at an ever increasing rate. At present there is no single source from which to access the existing soils information.

It is the goal of this project to assemble and cross reference existing soils data for arctic Alaska while it is still in a manageable state.

EFFECTIVE TEACHERS IN RURAL ALASKA

Principal Investigator: Judith Kleinfeld
Professor of Psychology
The Institute of Social and Economic Research
University of Alaska
Fairbanks, Alaska 99701

Co-Principal Investigator: Bill McDiamond
Research Associate
The Center for Cross-Cultural Studies
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $145,718

The extremely high teacher turnover rate in rural Alaska disrupts the continuity of educational programs, contributing to academic deficiencies for many students. Often these problems are caused by the teachers themselves who cannot cope with a cross-cultural, multi-grade classroom in a different cultural situation, and the rigors of a rural Alaskan lifestyle. Despite the significance of the problem, very little research has been done on the characteristics of teachers who are successful in isolated cross-cultural situations, or with Eskimo and Indian students.

This proposal will examine the characteristics of teachers who are effective in rural native communities. The research will identify the criteria which rural communities use in evaluating the effectiveness of rural teachers. It will also identify the criteria which school administrators and other professional educators use in evaluating teachers in rural settings. Finally, it will describe the characteristics and adaptive strategies of rural teachers who have been considered effective by these groups.

The research target school districts will include some with a high teacher turnover rate. In the high rate districts are: Southwest Region, Northwest Arctic and Kuspuk school districts. The low rate districts are: Lower Yukon, Lake and Peninsula and Yukon Flats school districts.

GENETIC ANALYSIS OF BITING ALASKAN BLACK FLIES

Principal Investigator: Gerald F. Shields
Associate Professor of Zoology
Institute of Arctic Biology
University of Alaska
Fairbanks, Alaska 99501

Amount Funded: $39,216

An increase in agricultural and livestock production is expected to continue in Alaska. Species of black flies, after emergence, extract blood from a variety of hosts, including man and cattle. In addition, little is known of the deleterious effects of black flies on subsistence resources such as reindeer and caribou. In areas outside of Alaska, these flies have severely reduced productivity through host harassment, and in extreme cases, death has resulted.

The more noxious biters are known as Gnu arcticum and the study will concentrate on this species. Preliminary analyses of the distribution of arcticum indicate that this species reproduces in abundance in the very areas of Alaska in which livestock increases are planned. This particular insect presents a potential threat to the success of the livestock industry in Alaska.

When the studies are completed, control agencies will be provided with information concerning the location and distribution of cattle biting flies in the areas proposed for livestock production, the relative abundance of these taxa in relation to non-biting types and the emergence time at these locations.

EVALUATION OF EMERGENCY TRAUMA TRAINING IN LOGGING CAMPS IN SOUTHEAST ALASKA

Principal Investigator: Laurel Anderson
Southeast Region EMS Council, Inc.
Sitka, Alaska

Amount Funded: $24,525

Logging is the most hazardous industry in Alaska. In 1978, accidents and injuries in logging camps were four times the rate of all private sector industries. In 1974, an advanced emergency care course was introduced to two logging camps in Southeast Alaska. Since that time, Emergency Trauma Training (ETT) has been conducted in nine other camps. Reports from independent sources indicate that the training reduces the severity of the injury and the incidence of accidents. This study will determine if these reports are related to the ETT. This will be done by examining Workers' Compensation claims of some logging camps from 1973-1979 and comparing camps that received ETT with camps that did not.

NORTHERN PLANTS DOCUMENTATION CENTER

Principal Investigator: David F. Murray
Institute of Arctic Biology
University of Alaska
Fairbanks, Alaska

Amount Funded: $39,541

This proposal is for funds to supplement federal and University of Alaska support of a computerized data bank of information on Alaskan plants. These data provide fundamental information required in environmental assessments, land use planning, vegetation maping, and impact evaluation.

Although the data have been available, their retrieval has not been practical until the development of appropriate computer programs. These project funds will be used to expand the master file.

STUDIES OF ALASKAN DULSE (Marine red algae)

Principal Investigators: John W. Chandler
Robert J. Ellis
Natasha I. Calvin
Marine Botanicals
Auke Bay, Alaska

Amount Funded: $75,000

Preliminary laboratory studies indicate that two species of seaweed found primarily in southeast Alaska are effective against herpes virus. Alaskan Dulse is the name given these two species by their discoverers.

Prior to determination of the abundance of seaweed in Alaska the medical effectiveness must be researched. This project will analyze the properties of the Dulse and explore the medical implications for treatment of herpes infection through topical application of Dulse.

ALASKAN TEPHROCHRONOLOGY PROJECT

Principal Investigator: Robert Thorson
Assistant Professor of Geology
Geology/Geophysics Department
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $121,365

Tephrochronology is the study of volcanic deposits or tephra (volcanic ash) which results from explosive eruptive events. Geologists in this discipline attempt to determine the characteristics, age, source and distribution of volcanic ash, so that volcanic hazards can be properly assessed. Compiling this information is critical for understanding the regional hazards associated with explosive volcanic events.

This proposal will fund the organization and completion of an Alaskan Tephrochronology Project at the University of Alaska Museum. The purpose of the project is to define and facilitate the study of tephra layers throughout the state. The objectives will be to establish a reference collection and data file on Alaskan tephra; to coordinate future tephrochronology research.

The end result of the two-year project will be the first comprehensive view of the entire volcanic ash sequence in Alaska. Such an overview will be vitally important in identifying volcanic hazards and enhancing the safety and well-being of the state's residents.

COASTAL FLOODING BY STORM SURGES & OBJECTIVE FORECASTING PROCEDURES

Principal Investigator: James L. Wise
Arctic Environmental Information
& Data Center
University of Alaska
707 "A" Street
Anchorage, Alaska 99501

Amount Funded: $57,500

Coastal flooding from storm surges is a real hazard to communities along the Bering, Chuckchi, and Beaufort Sea coasts. The project will gather storm surge occurrence data, then work with the National Weather Service and a storm surge modeling expert to:

1) prepare a climatology of storm surges;
2) develop manual objective forecast procedures; and
3) develop an automated objective forecast procedure.