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Final report;

Geothermal Energy Planning and Communication
for Native Americans

Grant No. DE-FG01-80RA50094

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From: United Indian Planners Association

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March 30, 1982

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March 30, 1982

Final report; Geothermal Energy Planning and Communication for
Native Americans
Grant No. DE-FG01-80RA50094

To: Dr. Fred Abel
Department of Energy

From: United Indian Planners Association

Written By: Thomas A. Robertson
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This is the Final Report of the United Indian Planners Association, pursuant to the terms of their agreement and grant from the United States Department of Energy.

The Grant Number: DE-FG01-80RA50094, ending September 6, 1980.

Services rendered;

The United Indian Planners Association has been involved with the Department of Energy, Division of Geothermal Energy for a period of approximately two years. The purpose of that involvement was to explore and develop geothermal energy resources on Indian lands. In pursuit of that purpose, UIPA undertook a wide range of activities including the following:

- 1) Continued review of Indian Communities and their potential for geothermal energy development;
- 2) Met with community planners and their superiors in person and by telephone for the purpose of introducing Tribes to the availability of geothermal energy and removing the barriers to the implementation of this energy source;
- 3) Worked with numerous individual tribes by providing information by telephone and by mailing packages of information;
- 4) Published articles on geothermal energy development in the UIPA newsletter and supplied articles to other Indian publications;
- 5) Conducted two seminars specific to geothermal energy development on Indian lands in western states;

- 6) Had frequent exchanges of information with the National Congress of State Legislators;
- 7) Held 1980 UIPA annual convention in New York. The primary focus of the convention was on creating a better working relationship between Indian communities and the private sector.
- 8) Held sessions specific to geothermal energy development at the 1980 national convention of the UIPA;
- 9) Carried out survey of Indian attitudes and opinions toward energy in general and geothermal energy in specific at the 1980 Annual convention. This was a follow upon annual convention surveys held in 1978 and 1979.
- 10) Incorporated geothermal energy development information in Economic Development Administration sponsored tribal government management programs designed and presented by UIPA.
- 11) Developed draft written material addressing Indian planning problems and supporting their ability affect a more productive working relationship with government agencies and reduced dependency.
- 12) Typed up reports of previous year for editing and publication.

Contents of remainder of report:

1980 Annual convention energy survey	Appendix I
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(Appendices IV, V, VI, VII, VIII, and IX were written by David Larson.)

Appendix II adapted from a report to the Communities Service Administration by Karl Funke and Associates.

United Indian Planners Association
Energy Surveys

Energy surveys were conducted during the UIPA 1978 and 1979 annual conferences. During the 1980 UIPA annual conference, Tom Robertson and David Larson met with a number of planners in energy sessions held at the conference and in informal meetings. The following describes the results of these meetings and surveys.

The 1979 survey was quite comprehensive, serving to reinforce the survey done in 1978. Further, The meetings and conversations held during the 1980 conference were found to express continuing tendencies in terms of Indian planners and leadership attitudes toward energy awareness, planning, projects, and programs.

The 1979 survey was a random stratified sample representing 41 Indian tribes and consisted of 57 completed surveys.

92 percent of those surveyed work for a tribal government and 86 percent of the same group are active and influential in reservation planning and policy.

Energy and Economic Planning

Eighty-seven percent of those individuals surveyed stated that their tribe has an economic development plan, but only 30 percent recognized energy planning as a part of their comprehensive plan.

Sixty-three percent, or almost twothirds of the tribes, do not include any energy analysis or energy planning in their comprehensive plan. The survey responses suggest that where energy was considered it was generally in terms of specific technologies, conservation, development, or in reducing the impact of particular energy price increases.

This suggests that planning for energy development and management activities in these tribes is fragmented and probably not meeting the full potential to be found in the integration of energy opportunities with the economic attributes on the reservation.

Of those surveyed, 58 percent stated they have completed or are currently working on the tribal land use assessment and 60 percent have completed or are currently working on a tribal land use plan. Few, if any of the land use and assessment plans were identified with natural energy systems input as contributors to the tribal economy.

The next survey question consisted of six individual questions. Planners and councilmen were asked if they or anyone on their reservation had performed any energy analysis of existing tribal operations. Two responded that they had. The next question asked if they had incorporated energy and financial life-cycle costs in their capital investments. Three responded that they had. The next question -- and the one most responded to in this segment -- asked if they had considered an analysis approach to combine energy and economic conditions. Eighteen responded that they had.

The next question asked if they had evaluated any alternative energy opportunities. Fourteen responded that they had. The types of energies the tribes are investigating are covered in a subsequent question.

In response to the question, "Have you developed energy, economic and environmental awareness programs for tribal members?", ten responded that they had or were in the process of developing just such a program.

The last question received the second greatest response asking if there had been any council or tribal meetings on the role of change in energy supply and use on peoples' lives. Seventeed respondees said yes.

Reservation Energy Use

Ninety-four and a half percent of the respondents categorized their tribe or reservation dependence on outside or imported (non-reservation) energy from medium to high. This indicates the tribes are very much dependent on importing outside energy and are vulnerable to cost-price and availability fluctuations.

The next question was constructed for survey participants to place from highest to lowest incidence the type of heating systems the homes and buildings on their reservation use. After weighting and arriving at a mean for each type of energy (coal, electricity, fuel oil, natural gas, geothermal and wood), for the sample reservations, the greatest dependence was found to be on electricity and fuel oil. In order, the remaining reservation heating systems were; wood, natural gas, coal and geothermal.

In conversations with a number of planners and tribal officials, there was considerable concern for the future costs associated with heating on the reservations. Most of the houses on the reservations were built when energy was cheap and not a major consideration. This is no longer true. Energy costs are increasing at a very fast rate, as they are elsewhere in the country, and this is having a serious effect on the Indian's disposable income.

Building Codes

Participants were asked if their tribe had building codes and whether or not there was any inspection and enforcement mechanisms. In the sample, 59 percent stated their tribe had codes and 38 percent stated they did not. Of the group who had codes 39 percent said they inspected and enforced the codes while 58 percent they did not. In other words, while three out of five tribes have building codes, only one out of three enforce them at all.

Alternative Energies

The participants were asked to indicate their opinion on which

alternative energy development opportunities their tribe could have. The responses were:

Solar thermal	24 (4 in progress)
Solar electric	14 (4 in progress)
Wind	19 (2 in progress)
Geothermal	12 (1 in progress)
Gasohol	9 (1 being considered)
Lowhead hydro	9
Biomass	13
Sawmill waste to electricity	1
Wave power	3
Tidal power	5
Conservation	24

Tribal interest in many renewable energy resources and conservation are often related to the location of the reservation. If a recognized resource is apparently available to the reservation, such as wind, trees, or water, then there is a desire to tap it. Adequate insulation is a much recognized benefit, particularly in homes located in the northern tier of states.

A separate study on appropriate technology was done by Clair Reiniger and Associates, of Santa Fe, New Mexico, for the Institute of Local Self Reliance. Reiniger concluded "that when working with Indian people and appropriate technology, the particular Native American cultural, social, political, economic milieu must be understood by the project organizers, policy makers, and program funders. Community participation and local initiative must be a prerequisite for all Indian appropriate technology projects."

Federal Programs

42 percent of the tribes represented in the interview said they had looked to the federal government for assistance in their energy related programs. Another 39 percent of the sample stated they were developing alternative energy and conservation projects on their own.

Appropriate Energy Awareness

Implied in both the UIPA and Reiniger survey, was the feeling that there was more to energy than technologies. Because of the structure of the UIPA survey instrument, it was difficult to discover the full range of Indian awareness about the more pervasive and yet important aspects of what energy is in peoples changes in energy supply and price was seen to affect much more than heat for houses and fuel for automobiles.

Part 2

Indian Activities in Renewable Energy and Conservation

Projects, Programs, and Planning

This report places Indian renewable energy and conservation activities into three categories; projects, programs, and planning. There are very many different kinds of projects, some accomplished, and others in various stages from concept to completion.

There are few programs, in the sense of large efforts with well defined tasks and objectives. The major exception would be the weatherization programs. Most of the rest of the efforts consist of many separate projects carried out and sponsored by many separate agencies.

Planning is a special category because of its close connection to projects, programs, and the success and satisfaction that may or may not come from their implementation.

The preceeding UIPA survey showed that Indian individuals and communities were not only interested, but active in the development of renewable energy and conservation projects using tribal as well as external agency resources.

Code for summary of Indian and Native American renewable energy and conservation projects: All caps = finished projects; first letter in caps = project under way; all lower case = projects proposed.

Energy use efficiency;
personal;

automobile

household; retrofit

cooking

laundry

space heating

air conditioning

weatherization

community;

services

transportation

health services

recreation

education

communication

EP

EPA

EHR

EHC

EHL

EHH

EHAC

EHW

EC

ECS

ECCT

ECCHS

ECCR

ECCE

ECSC

Energy Awareness and Education

EAE

Planning;

energy projects

community operations

community strategic

PEP

PCO

PCS

Solar, passive, space heating

"

greenhouse

SPS

SPG

Solar. active, thermal, hot water

"

active, thermal, space heating

"

active, thermal, process heat.

"

active, photovoltaic

SATW

SATS

SATP

SAP

Biomass, direct combustion

"

conversion, gas

conversion, liquid

conversion, animal feed

BDC

BCG

BCL

BCA

Hydropower, mechanical

"

electrical

HM

HE

Wind, mechanical

"

electrical

WM

WE

Small scale fossil fuel development;

coal

oil

natural gas

oil shale

SFFC

SFFO

SFFNG

SFFOS

Geothermal

direct heat

electricity

GD

GE

COMMERCIAL & INDUSTRY

Check list of Indian renewable energy and conservation activities. (See code on page three.)

Alaska:

Arizona:

Ak Chin; gd
Fort McDowell Mohave-Apache; gd
Havasupai; gd, sap
Hopi; sap, Satw
Hualapai; gd, hm, we, sap
Navajo; gd, Eae, Stap, Sap
Papago; SAP, gd
San Carlos; he, gd, Sap, bdc

California:

Hoop Valley; Bdc, gd

Idaho:

Fort Hall; gd, Ehw, bdc

Michigan:

Saginaw-Chippewa (Isabella); bdc, Ehw

Minnesota:

Leech Lake Reservation; bdc, Ehw
Red Lake; Bdc, Ehw

Montana:

Chippewa Cree (Rocky Boy's); gd, Ehw, Spg, Bdc, (sffc, sffo-g?)
Crow Tribe; Sffc, Ehw, bdc
Flathead; Hm, Hc, Ehw, Bdc
Fort Peck (Assiniboine and Sioux); Gd, Ehw, Bdc, we, wm, Sffc
Northern Cheyenne; Sffc, Ehw

Nebraska:

Omaha; bdc, Ehw

Nevada:

Duckwater Shoshone; gd
Fallon Paiute Shoshone; gd
Moapa; Gd, satp, SPG
Pyramid Lake Paiute; gd, he
Shoshone Paiute (Duck Valley); gd
Walker River Paiute; he hm, gd,
Washoe; gd, hm, he
Yerington; gd

New Mexico:

Acoma Pueblo; gm, SPS
Jemez Pueblo; gd
Jicarilla Apache; gd
Laguna Pueblo; gd
San Juan Pueblo; gd
Santa Clara Pueblo; SPS
Tesuque Pueblo; he

New York:

St. Regis Mohawk (Akwasasne); Bdc, Bcg, Ehw

North Dakota:
Fort Berthold; Eae, Ehw, sffc

Oregon:
Umatilla; ehw, spg
Warm Springs; gd, Bdc, bdg

South Dakota:
Cheyenne River Sioux; gd, Ehw
Rosebud Sioux; Ehw

Washington:
Nisqually; He
Quinault; Bdc, hm, he

Wisconsin:
Oneida; Bdc, he Ehw

Wyoming:
Arapaho (Wind River); we, wm, Ehw
Shoshone (Wind River); we, Ehw

Appendix II

DRAFT

This section is adapted from a report to the Communities Service Administration by Karl Funke and Associates.

The following is an outline of the conditions and circumstances in the major procedural areas related to Indian policy in general with a focus on renewable energy and conservation programs.

I. Federal Government

A. Statutory barriers to tribal participation in federal domestic assistance programs:

- Legislation authorizing federal domestic assistance programs often fails to specify tribal government or Indian organization eligibility;
- Specifically excludes tribal governments from eligibility as a sponsoring entity within the program delivery system;
- Often provides for state and/or general local government unit administration of programs, thereby placing Indian governments in competition with other state governments and often effectively excluding tribal governments from the benefits of federal domestic assistance programs;
- The separate and sovereign status of tribal governments is often ignored in statutes authorizing program administration.

From a tribal perspective, such acts tend to undermine the recognition of tribal governments' legal status within the federal system.

(10 BIA/CRNL)

B. Regulatory barriers to effective tribal participation in the federal domestic assistance program.

Regulations vary in the specific manner in which they present obstacles to tribal participation, but some examples are;

- regulations requiring programs to be administered by state governments or their political subdivisions;
- where program applicants must apply through state offices, and the funds received are a function of discretionary authority exercised by state government officials.

(Tribes assert that not only are such regulations in conflict with the legal relationship between tribal governments and the federal government, but they have the additional effect of promoting discriminating against the funding of tribal applications.)

(Regulations of this sort rarely contain a mandate that some portion of the funding received by the state be allocated to tribal projects or tribal government functions.)

(Previous studies point out that many state government officials are unaware of their obligation to consider tribal applicants as among those eligible for federal funding channeled through state auspices.)

(Past studies also indicate that tribes are fearful that if they apply to state governments for federal funding, the state will have the right to tax Indian citizens residing on reservations in exchange for the provision of services or funding. While the latter notion is erroneous, attitudes of both state and tribal government officers tend to make state administration of federal funding targeted to tribes an unworkable mechanism.)

D Financial Evaluation Barriers

The financial justification and evaluation of projects and programs for Native Americans may call for considerations of different kinds than are usually applied to proposals. Dependency, inflation, and emerging energy realities create a need and opportunity to reconsider the basis for investments in Indian interests.

Because of the long term relationship of Indian people to their land, considerations like life-cycle costing, specifically applied to reservation and other Indian circumstances, may offer a more effective return on federal and other investments.

A particular effort should be made to reconsider the parameters of financial feasibility. A focus of this inquiry could be the inflation and fuel price adjustment numbers used to fix the return on investment of proposed projects. Recent Indian projects were evaluated on the basis of a 10 percent annual inflation index and a 12 percent annual fuel price escalator. Both of these cost increase rates have been exceeded in the past few years, and there is a considerable possibility they may be exceeded in the future. While there may be a legal requirement to use these rates, there is probably no restraint to using a complementary calculation that would look at the possible rates of inflation and fuel price increase that could be expected in the future.

E. Inter-Agency Coordination

Because many tribal governments find themselves in a continuous state of crisis management, relatively few tribal organizations have had the time or the resources necessary to engage in comprehensive planning.

Federal programs which have similar project goals but are sponsored by different agencies are difficult to coordinate at the local tribal level.

Tribes continue to express their frustration over their inability to get representatives of the various agencies whose joint participation is needed to accomplish a tribal project, to sit down together and work out the technical mechanics of project operation and funding.

The passage of the Joint Funding Simplification Act provided the potential mechanism for interagency coordination of program services and funding, and some tribes even participated in pilot projects under the authority of that Act and other coordinating legislation. However, reports continue to document the failure of coordinating efforts among agencies, and officials of OMB attest to the fragmentation of federal program coordination efforts.

Coordination is relegated to the local level, and lacking the political clout possessed by state governments, tribes find themselves unable to effectuate the coordination necessary to smooth implementation of comprehensive and longrange planning goals.

In many instances, tribes are forced to take funding where they can get it, and put off for another day, the coordination of domestic assistance funds to accomplish specific tribal development goals.

All studies reviewed by UIPA place a high priority on inter-agency coordination of program objectives, funds and services.

(TR Notes; Subsidy push, external generation of programs, tendency for programs to reflect the needs of the strongest lobbys.)

E. Technical Assistance and Consultation

The results of UIPA's interviews with federal agency and tribal government officers clearly indicate that where tribes are effectively participating in federal domestic assistance programs, there is readily available the technical assistance and consultation many tribes need either to successfully apply for federal program monies, or to effectively administer programs once funds are received.

Technical assistance and staff available for consultation either in the region or within the state in which a reservation or tribal organization is located appears to have a positive impact upon efficient tribal utilization of domestic assistance resources;

Technical assistance and available staff do much to equalize the position of tribal governments in the competition with state governments and their political subdivisions for federal funding.

Studies recommend increased appropriations for the provision of technical assistance and consultation which continues to be very much needed by tribal governments and Indian organizations.

G. Program Information Dissemination

With the passage and implementation of the Federal Program Information Act, there exists new technology to address the needs of federal program information users, and specifically, the informational needs of often rurally isolated tribal governments.

Early UIPA interviews with personnel at OMB responsible for the implementation of the Act, the revision and dissemination of the Federal Domestic Assistance Catalog, and the creation of an automated information retrieval system derived from the Catalog, however indicate that program information relating to tribal eligibility has not been made more accurate or more clear as to whether tribal organizations are eligible program sponsors.

The clarification as to such eligibility in program authorizing legislation and associated regulations could be accomplished by seeking administrative interpretations or official determinations of eligibility from each agency providing programs of domestic assistance, or from Congress. The clarifying information thus gathered could become part of the permanent data base in an automated retrieval system of federal program information.

While none of the studies reviewed by UIPA had been conducted subsequent to the passage of the Federal Program Information Act, or if conducted subsequent to the Act, were not concerned with this particular aspect of problems in the federal domestic assistance program delivery system, and thus did not address recommendations in this area, it is the recommendation of UIPA that this onetime effort be undertaken while automated data systems are still being constructed and capable of being modified to include such information.

II. Tribal Government

A. The Planning Function

As stated earlier, many studies document the continuing state of crisis management that characterize the operations of numerous tribal governments. Resources and personnel directed toward assessing the needs of the tribal governments constituency and identifying the means by which to address those needs are seldom available.

The formulation of long-range goals for economic and social development is thwarted by the kind, scarcity, and general lack of consistency of funding alternatives to assure progress toward those goals.

The lack of plans often means that the use of tribal resources are rarely optimized.

The planning function often does not receive a sufficient priority by the tribal governing body.

Tribal memberships are often unaware of the role tribal planners play in securing much needed funding and planning for the wisest use of scarce resources.

Tribal planners emphasize the need for better program information and for more frequent dissemination of program information such as current funding levels, fund availability, tribal eligibility, and technical assistance in proposal writing. UIPA interviews with tribal planners indicate the need for orientation to the federal domestic assistance program system and training in the areas of proposal writing and fund raising.

B. Program Administration

Reports of the General Accounting Office document the need for improved tribal systems of personnel management, financial management, accounting, recordkeeping, coordination among programs and program administration.

Because renewal of funding is often contingent upon prior success in effective program operation, the importance of a tribe's technical capability to efficiently manage programs of domestic assistance was emphasized in each interview with federal agency officials.

Results of studies and interviews are unanimous in their conclusion that tribes need training and technical assistance in the management systems which are necessary for effective program operation to increase their technical capability to efficiently administer programs of federal domestic assistance.

Studies indicate that tribes have been unable to express their needs in the context of comprehensive planning goals, and thus, fail to compete equally with other funding applicants.

II. Tribal Government ((Continued)

C. Fund-Raising Process

Interviews conducted with federal agency officials and Indian lobbying organizations indicate that tribes are particularly unsuccessful in their fundraising efforts.

Various criticisms concern;

the apparent lack of a comprehensive fundraising strategy tied to tribal plans for economic and social development;

a lack of awareness of the appropriations process;

a lack of awareness as to the means of lobbying relevant legislative offices;

failure to followup on proposals which the tribe has submitted;

failure to contact Senators and Congressmen and other key people who might assist the tribe in securing funding;

a failure to explore potential funding sources in the private sector.

Recommendations for technical assistance and training to realize success in fundreising efforts was endorsed by all those interviewed.

D. Intergovernmental Relations

As referenced above, tribal governments are reluctant to interact with state and local governmental units for a variety of reasons.

A lack of understanding of other governmental entities (including the federal government) and how they operate is often cited.

In addition, some tribes mistakenly believe that if they receive services from a state government, even if such services are federally funded, that the state will then have the right to tax tribal citizens residing on the reservation.

State governments, on the other hand, have been known to misunderstand the relationship between Indian tribal governments and organizations and the Bureau of Indian Affairs believing that tribes receive all the funding and programs that the Federal government intends for them to have through the auspices of the Department of the Interior and the Indian Health Service and thus are reluctant to provide a portion of the funding they receive from the federal government to eligible tribal applicants or Indian individuals.

Federal government personnel are often unaware that tribes are governments providing services to their respective tribal populations and assume that tribal funding needs are being addressed by the Bureau of Indian Affairs or state governments.

While none of the studies reviewed by UIPA address this problem in depth, it is UIPA's conclusion that intergovernmental relations between tribal, state and federal governments could be vastly improved through communicational and relational session, as well as the distribution of information about each entity.

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Appendix III

UNITED INDIAN PLANNERS ASSOCIATION

GENERAL DEVELOPMENT PLAN

Adopted February 16, 1979
by the UIPA Board
of Directors

Introduction

The United Indian Planners Association founded in October, 1975 began as a result of Indian economic development planners recognizing the need for a united effort in economic development. From this initial effort of organizing primarily economic planners into an organization, the United Indian Planners Association has grown into a national organization encompassing planning areas such as health, environment, energy, economic, industrial, managerial, social, manpower and transportation as witnessed by the membership.

The Board of Directors has mandated that in passing through an organizational, growth and stability phase, the United Indian Planners Association should embark on a second phase geared to serving the membership through continued organizational development, planning skill development and professionalism, research and technical information dissemination and community and public planning involvement.

Planning Process

The planning process - a management tool - is a methodology of the analysis of data and the establishment of a plan to achieve a stated goal. This process has the adaptability to serve small scale projects, localities, regions, and governments. The United Indian Planners Association strives to maximize the utilization of the process through the adaption of classical methods to meet the planning requirements of Indian Country.

Policy

The policy contained herein will serve as a guideline in carrying out the goals expressed. The United Indian Planners Association shall operate according to the following policy statements:

- 1) A planning process shall be utilized in establishing the general development plan.
- 2) Programmatic and project approaches shall conform to the general development plan.
- 3) An annual executive plan shall be prepared and implemented as a means of accomplishing the general development plan.
- 4) An organization chart shall be adopted by the Board of Directors, reviewed and updated at least annually.
- 5) An operations manual, accounting manual, personnel manual, and any other manuals needed for compliance, shall be adopted, used and maintained in compliance with applicable laws.
- 6) An evaluation and performance system shall be adopted, implemented and reviewed at least annually to determine effectiveness.
- 7) The general development plan shall be assessed annually to determine effectiveness and for making changes or updates.

Element II

Professional Development

Objective: To establish and maintain a professional educational and certifications program which will strengthen the planning skills of the individual planner.

Activity (A) Develop and establish a professional education program.

Activity (B) Develop and establish professional standards, practices and ethics.

Activity (C) Develop a professional planning journal.

Activity (D) Develop and establish a professional forum for idea exchange, technical papers, methodologies and other professional technique developments.

Activity (E) Develop, establish and maintain the UIPA Planning Institute.

Element IV

Community and the Public

Objective: To establish and maintain a relationship with the community and the public, creating an awareness of the planning profession and its abilities and capabilities, educating on the planning process, providing reviews on legislation and policy, utilizing processes for community input and citizen participation, and learning from community experiences.

Activity (A) Develop and maintain a community planning education program.

Activity (B) Develop and maintain a community services^{*/} and information program.

Activity (C) Develop a legislative and policy program

Activity (D) Develop a general public awareness program.

^{*/} Includes technical assistance to the community. Service is indirect to the planner but direct to the community geared to meet the community's planning need; i.e., planning documents, complete studies, plans, technical assistance to meet a community planning objective.

3.0 UIPA Geothermal Project 1978-1979

Tasks accomplished and resource files developed.

I. Reports

3.1 Draft UIPA Commercialization Development Plan-Appendix A

Summary of issues re land mgmt. at Small Farms Conf.

3.2 UIPA Annual Conf. Energy Survey-1978, Minneapolis, Mn. Appendix B

UIPA Annual Conf. Energy Survey-1979, Spokane, Wa. Appendix B

3.3 Coso Hot Springs report Appendix C

3.4 District Heating Systems report Appendix D

3.5 Reservation Profiles (draft examples)

These are reservation profiles for use in working with reservation planners and other agencies in the introduction and development of geothermal energy potential. Appendix E

UIPA is currently working on many other reservation profiles that are identifying development opportunities. Numerous articles have also been written for the UIPA News.

3.6 Reservation files:

files on 114 reservations with data including but not restricted to:

- local climatological data (LCD)
- BIA geothermal data
- USGS geothermal data
- EDA industrial parks
- DOC reservation summaries
- state/reservation geothermal maps
- bid sheets of KGRA in proximity to reservations
- EDA handbooks of reservation businesses

State and Federal

files on legal issues in geothermal development

DOE regulations

NCSL state summaries and reports

DOE Commercialization plans

State maps, profiles and data including:

- geological provinces
- regional commercialization plans
- state surveys

Alaska

Arizona

California

Colorado

Hawaii

Idaho

Montana

Nevada

New Mexico

North Dakota

Oregon

South Dakota

Utah

Washington

Wyoming

3.6 (con't.)

Industry and Private Sector
files on 19 energy industries
files on GRC
files on Old West Regional Commission

Institutions
educational materials
brochures
mining and geological institutions
APA
NTIS
clipping files
energy mtgs.
public hearings

Energy
biomass
 surveys and reports
geothermal
 surveys, reports and plans
low head hydroelectric
 surveys and reports
OTEC
wind
solar
 policy review, reports and plans
NEP I&II
Pacific regional team mtgs.
Energy legislation

Planning
National Rural Center files
reports
Iceland and New Zealand program plans
USGS stats
APA material
maps and surveys
EDA industrial profiles
remote sensing material
historic and archeological preservation programs
planning education programs

Environment
farm business material
EA's & EIS's
emission stds. profiles
site specific analyses re geothermal development

3.6 (con't.)

Geothermal Library including:

- state reports
- regional reports
- technical reports
- general reports
- GRC transactions
- handbooks and bibliographies
- legal reports
- assessments
- symposiums
- institutional reports
- planning reports
- all catalogued-over 100 total

Appendix IV

January 27, 1979

UIPA Geothermal Project

re: Primary Status Report

To: Phil Cross

Fr: David A. Larsen

UIPA Geothermal Commercialization Development Plan

Our work will include the assessment of problems, issues and opportunities of potential commercial development of geothermal energy on Indian reservations. The approach will be to initiate development interest with the tribes and to assist them in setting out strategies for geothermal utilization and development.

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I. Overview

1. Objective Statement

One objective of this project has been to identify potential candidate reservations that may pursue geothermal utilization. Throughout the remainder of this project there must be some structure and continuity, there must be elemental standards by which this project may use as guidelines.

2. Standards

First, the resource must be identifiable and located on or near a reservation- preferable within a twenty mile radius. Second, the planning department and/or the tribal council (one or more individuals) must at least be interested in the resource or have expressed a need for understanding the potential applications of the resource. Third, if any economic development project does take place, there must be environmental precepts that are adhered to. This will insure the least amount of impact possible. Prescribed Federal guidelines include the National Environmental Policy Act, the Clean Air Act, the Federal Water Pollution Control Act and others.

These standards will guide both Federal and tribal policy statements and all land development projects. The tribes will implement their own standards of environmental quality control if they pursue any development project.

The tribe may encounter land use conflicts related to development and utilization. Policy statements may serve as guidelines related to land use development.

As an overview then, what we find here is the advocacy planning situation where the resource and strategy are linked together to attain the objective of not only raising consciousness, but of starting a seed that may someday grow into actual geothermal applications on reservation land.

II. UIPA Involvement

1. Description of approach

The commercialization approach is dependant on good research and a hard data base. The potential of the resource can only be realized by identification, geological context and development potential of geothermal energy on each reservation. This in turn leads to a description of each reservation so that the most likely development areas may be located. A site-specific planning approach will be necessary for a tribe to develop a geothermal resource. This task would be performed by the reservation planner.

2. Barriers

Because there are many barriers to geothermal development, the tribal planner will have to be provided with the necessary information so that he can pursue the reservation development of the resource. He will be provided a portfolio which will assist him in accomplishing this task. (See section V for contents of the packet.)

The planner will also be kept abreast of recent legislation or measures under consideration such as the Geothermal Energy Omnibus Bill.

UIPA will be able to assist in creating alternatives, provide information for assessing impacts and assist in achieving

internal consistency in the development plan.

Because of the unknowns related to resource potential, costs for direct application development and environmental and social impact, research will have to be on-going during the development of the resource.

This data may then be used to assist other development projects and provide insights for policy makers so that the maximum potential of geothermal energy may someday be realized in the United States.

III. Commercialization Approach

1. Ultimate Potential of Resource

a. Identification

This segment of the work plan will involve research of all information in print for preliminary data acquisition. If a heat flow point or spring is known by the tribe but not accountable in the existing data, actual ground survey will be made to acquire the data.

b. Geological Context

This segment will define topographic and geological features of the reservation and will indicate ground water features, surface features (including soil types) and locations of known springs, fumerols, hot springs and well sites.

c. Gradients

This is site specific and will indicate temperatures of the fluids, chemical composition of the fluids, gallons per minute flow of fluids and well depths where applicable.

2. Development Potential

a. Reservation context

This will include a summary of the cultural history of the tribe. A description of the existing structures on the reservation will be necessary. This will include community centers, industrial parks, housing conditions, water systems, multi-purpose buildings, commercial centers, administration buildings, farming operations, recreational facilities, tourist complexes, shopping centers, aquaculture operations, existing greenhouse operations and other existing natural resources such as timber. This type of analysis will help define the potential applications of either electrical generation for the structures or for areas of direct application. For example, a tribe may have an existing stand of timber and considered to enter into the timber market but declined to do so due to low sustained yield of timber. A geothermally heated greenhouse could be developed which would increase seedling growth and thereby maximizing sustained growth of the stand.

Geothermal fluids are now being used to heat homes, greenhouses and aquaculture production in other parts of the world. There are also a number of industrial applications currently in use or that are being planned. In all of these applications, the cost of geothermal utilization is below that of comparable fossil fuel energy.

b. Development Applications in Progress

Industry has taken the lead in commercial-scale demonstration plants to generate electricity from geothermal sources. There are currently twenty-three (23) engineering, economic and institutional studies for non-electric utilization of geothermal fluids in

progress or that have been completed. Unless the tribe has existing technical advisors on board, they will have to contract to an engineering firm, a university or some geothermal development group.

An on-going site-specific planning approach will be necessary for the tribe to develop a geothermal resource.

c. Costs-benefits

Field costs for electrical generation are calculated based on resource depth, overlaying rock type and number of production and injection wells required. Plant costs are calculated and the busbar cost is obtained as that value which will give a revenue stream equal in present value to the costs.

Because of the lack of market experience to establish an acceptable pricing mechanism, the true cost/price of direct geothermal application cannot be assessed with acceptable accuracy.

Development will increase the tribe's economic base and will provide jobs for tribal members. New successful geothermal projects by one tribe may mean other tribes will also implement projects on their reservation.

3. Barriers to Development

④ a. Tribal and Planner Awareness

This task will be performed by information dissemination to the tribal council and planners so that they are made aware of the potential applications of geothermal utilization. In a recent survey, (see Larsen- Alternative Energy Survey- UIPA Annual Conference, Minneapolis, 1979) planners and tribal council members stressed their concern for environmental and economic implications

of alternative energy development. These factors will have a direct bearing on tribal ordinances that will have to be adopted before the tribe can pursue any development projects. Copies of related acts and descriptions of the various Federal programs will be provided to the planners and tribal council members so they understand the full implications of a development project.

b. Technical

The technology and hardware related to geothermal-electrical production is developing and becoming more refined. The DOE has identified sixteen barriers to direct thermal commercialization and nineteen Federal actions that may expediate geothermal utilization. This information is still being collected. One key barrier to direct thermal commercialization is the lack of industrial support in this area. DOE has supported twenty-three engineering firms in research and development. This information is still being collected.

c. Economic

Many Federal DOE programs provide financial assistance and incentives to those wishing to implement a geothermal development project. Up coming legislation will improve this situation.

d. Institutional

The Interagency Geothermal Coordinating Council (IGCC) is currently identifying institutional barriers to geothermal energy development and is designing and coordinating means of surmounting these barriers. (See section six,6) Tribes will have to adopt ordinances that will protect their mineral and water rights.

e. Environmental

Hydrogen sulfide (H_2S) emissions, subsidence and waste disposal are the three major environmental concerns related to geothermal production and development. Environmental impact is site specific and therefore leaves some unknowns until actual exploration takes place, e.g., subsurface deposits of heavy metals and Hg. Environmental monitoring is now taking place where actual geothermal production has begun. These baseline studies will be included in the environmental impact statements (EIS) and may fulfill tribal permitting procedures. This data will be used to determine costs for environmental control technology, health and safety standards.

4. Action for Federal Sector to Alleviate Problems and Speed Development

a. Loan Guaranty

This program allows DOE to insure lenders against financial risk associated with commercial geothermal development. The IGCC is recommending that guaranties for 90% of project costs for publicly owned bodies and small business concerns be included in a new Geothermal Energy Omnibus Bill. This bill also authorizes SBA, REA, HUD and FmHA make loan guaranties under PL 93-410. DOC will also be included in this bill as a support for geothermal development as a basis for economic growth.

b. Option to deduct intangible drilling costs

This applies to all wells commenced on or after October 1, 1978, in taxable years ending on or after such date. The taxpayer may elect to capitalize or deduct any costs to which section 263(c)

of the Internal Revenue Code of 1954 applies by reason of the amendments made by this section. The IGCC is also recommending that there be no minimum tax on geothermal intangible drilling costs and that they not be treated as a tax preference item.

c. Geothermal Depletion Allowances
(sec. 403-NEA)

Concurrent with this section of the National Energy Act, the applicable percentage deductions are:

In the case of taxable years beginning in calender years:	The Applicable percentage i
1978, 1979, or 1980	22
1981	20
1982	18
1983	16
1984 and thereafter	15

This includes all geothermal deposits located in the United States and its possessions.

d. Program Oppurtunity Notices (PON)
Costs Shared by DOE

This federally funded program provides funds for demonstration programs using geothermal resources. DOE's primary interest under the last PON was field experiments in space/water heating and cooling for residential and commercial buildings, agricultural and aquacultural uses, and industrial processing applications.

e. Program Research and Development Announcement (PRDA)

The last PRDA was funded to conduct site-specific studies dealing with industrial and agricultural processing, mineral extraction, and space/water heating and cooling for commercial and residential buildings.

Integrated Renewable System

It has come to the realization to some regional planners that, given a set of environmental and resource characteristics, that an integrated system of renewable resource processing and production can take place that could be to the advantage of a population in a given locational and geographical area.

The site location of this integrated renewable system is dependant upon the availability of organic agricultural products and access to a renewable energy source that will be used to process these products. The soil must be to a degree of fertility that will permit intensive yield agriculture over years to insure the use of the agricultural product(s). The site must also be located in a recently active volcanic area so that a geothermal water source may be located and utilized for the processing of these organic agricultural products.

The agricultural products to which I am refering to include: corn, potatoes, sweet potatoes, sugar beets and wheat. In the recently completed report by the American Indian Policy Review Commission, there totaled over 1.5×10^6 acres of Indian land that was utilized for agricultural purposes amongst the tribes. This indicates that there are potential sites for alcohol conversion and distillation to take place.

There are also a number of reservation areas that have geothermal sources on them. A geothermal resource is a hot steam or water source from the earth. Within the earth's core, there is a molten magma at many thousands of degrees centigrade. As one moves out from the core and approaches the exterior surface, the magma cools into a mantle. This results in various plates that cover this magma. Due to various cracks or faults within this mantle, there escapes heat to the surface that can increase temperatures of nearby water sources located under the exterior surface.

This water has many potential uses including both direct and electric applications. As in the case of the geysers area in California, hot steam is utilized to drive turbine generators that are used to create an electrical current. This may serve any area near the generation station.

This geothermal water has many direct applications including: heating homes, soil, greenhousing, food processing, sugar refining, drying of agricultural products and canning, drying of fish and lumber, paper manufacturing and distillation. The most promising aspect of geothermal energy is that it is a renewable source.

Another advantage in using geothermal energy is that the technology related to exploration is finally developing to a point whereby it is profitable to undertake such an endeavor. Many high grade alloys are being developed that withstand bit-wear from drilling in igneous rock and that are also resistant to pitting and scaling. Union oil has recently developed a chemical solution that aids metals in resisting the pitting and scaling from the brine solutions.

Much of the technique used in angular drilling for petroleum exploration is also being applied to geothermal resource location. Most of the major oil companies have already begun or are planning to begin geothermal energy development on land they own or are leasing.

The geothermal resource application, as previously stated, can be utilized in the process of distillation. This suggests the use of geothermal heat source in the process of breaking down vegetable matter for distillation to produce ethyl alcohol.

Each process varies according to which type of vegetable is used. There will have to be more research, development and demonstration projects made before all the technical difficulties are distilled out. Each process does require the use of a hot water source.

This is the following balance during the fermentation reaction:

1 lb. sucrose	+ 5.26 lbs. water yields
alcohol	0.511 lbs.
carbon dioxide	0.492 lbs.
glycerin	0.034 lbs.
succinic acid	0.006 lbs.
fatty matter and cellulose	.013 lbs.

Pasteur

For each pound of sucrose or related sugar derivative, then, it is possible to convert approximately 50% of this solution to ethyl alcohol.

This alcohol can be used in a number of ways including the powering of motor vehicles and farm machinery. Solutions of 90% petroleum gasoline and 10% ethyl alcohol require minimum adjustment to carburetor or spark. Increased alcohol solution require minimum adjustment to vehicles for it to run properly.

Gasohol may also be used in smaller motors used for driving blowers, hydraulic pumps and other power units.

The utilization of ethyl alcohol has both latent and manifest function:

1. stretching home-drilled oil
2. lessening dependence on foreign oil
3. use of a renewable resource-
 - a. agricultural products (corn, wheat, potatoes, sugar beets)
 - b. geothermal energy
4. creating income to reservation farmers

Potential uses of fermentation by-products include bottling CO₂ for sale.

Final data is not available but, recent EPA studies indicate that by using gasohol, HC emissions are comparable to those of 100% gas, and preliminary indications are that emissions of ethanals and aldehydes

are reduced effectively by catalytic exhaust systems. Hence there is less environmental impact.

There are both direct and indirect economic benefits in the use of ethyl alcohol and gasoline blends. First, is the use of an agricultural surplus. Last year, the U.S. sold to Russia 15 million tons of wheat and corn. Metric equivalents are 14.8 million metric tons of grain and corn.

That is: 11.3×10^6 m/tons corn
 3.5×10^6 m/tons wheat

and: 1 metric ton corn = 39.97 bushels
 1 metric ton wheat = 36.74 bushels

Based upon reliable research, it was found that approximately 2.5 gallons of ethyl alcohol are distilled from each bushel of corn and 2.4 gallons of alcohol from each bushel of wheat. After completing the conversions of bushels wheat to gallons of distilled alcohol and bushels corn to gallons of distilled alcohol it is found that the U.S. sold corn to Russia that is equivalent to 1.1122×10^9 gallons of alcohol, and, the wheat sold is equivalent to 3.0862×10^8 gallons of alcohol. In other words, we sold to Russia the equivalent of 1×10^9 gallons of distilled alcohol which is 1,420,000,000 or almost a billion and a half gallons of distilled alcohol. This is nothing to laugh at.

Other conversion factors of bushels to gallons are:

one bushel potatoes yields .69 gallons of 95% pure alcohol

one bushel sweet potatoes yields 0.94 gallons of 95% pure alcohol

one ton sugar beets yields 22.1 gallons of 95% pure alcohol or

1.1 gallons/ 100 lbs. sugar beets

Corn market prices are down, and have been for a while.

given corn market commodity price a \$2.00/ bushel

given one bushel corn yields 2.5 gallons 95% pure alcohol

given 10,000 bushels of corn worth \$20,000, distillation results in 25,000 gallons of 95% pure alcohol
market price is therefore 80 cents/gallon

The point of this demonstration is that even at present market prices, 80 cents/gallon is not totally far-fetched price for a renewable energy resource. It seems to be rather ludicrous that we should sell a non-converted renewable energy source to one country and then turn around and buy petroleum from a second country. What a waste of transportation fuels, when we can produce a reasonable facimile right in the U.S. and support the rural economically deprived areas besides.

It also follows that with some Federal input into developing this method of energy production, that other independant economic agents will invest in like manner, e.g.- industry. The U.S. Federal government, DOE and other agencies could take a role of leader in developing this renewable resource to the benefit of the U.S. public consumer, the environment and the rural farmer.

As an overview then, an inter-agency Federal funding program of regional renewable energy planning could:

1. generate a working structure with the various Indian tribes
2. locate potential reservation development areas
3. could decrease dependance on foreign oil supplies
4. could increase U.S. energy autonomy

This reservation area could be center distribution point of alcohol tp peripheral areas given a supply of agricultural products.

This development will have social and economic impact on the reservation place. The potential effects for a planned development change program to be implemented must be studied on the central reservation place.

This will also generate more data and information that may be of assistance to other tribes that may want to consider various scale-sized integrated energy systems such as this one.

V. Portfolio for planners will include:

- a. a list of consultants
 - engineering firms
 - financial firms
 - government agencies
 - drilling companies
 - institutions
 - instrumentation, hardware & metal co.
 - operators
 - service companies
- b. a map of KGRA and PGRA and reservations
- c. a brief description of development barriers
- d. a copy of the loan guaranty under PL 93-410
 - sec. 402 NEA
 - sec. 403 NEA
 - a PON
 - a PRDA
- e. a library list (geothermal)
- f. related articles by original authors
- g. USGS bidding Stats. by reservation area
- h. related acts and legislation NEPA, Clean Air Act and Federal Water Pollution Control Act.

VI. The Interagency Geothermal Coordinating Council

The IGCC is currently making recommendations that will be sponsored in a Geothermal Energy Omnibus Bill. These recommendations are being made to alleviate institutional barriers related to geothermal development. The recommendations include:

1. amend. to PL 93-410
2. amend. to Geothermal Steam Act
3. amend. to Energy Tax Act of 1978
4. amend. to Natural Gas Policy Act of 1978
5. amend. to Powerplant & Industrial Fuel Use Act of 1978

6. amend. to Public Utility Reg. Policy Act

7. amend. to Nat'l. Energy Conservation Policy Act

The planners and councilmen will have to be up-dated on current legislation so that they may weigh all variables before making any decisions.

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Hydrothermal Electric and Direct Heat Application

Hydrothermal/geothermal resources are reservoirs at moderate depths (usually 500-1500 meters) containing steam and/or hot water under pressure at temperatures up to about 350°C^1 . Steam and hot water that is produced by wells drilled into these resources can be used to generate electricity. Thermal energy from the fluids can be used for space heating, industrial processing and agricultural uses. The predominant number of these hydrothermal resources exist in the western regions of the United States, but, the Atlantic coast is suspected of having low to moderate temperature fluids.

There are two types of fluid systems. One is the vapor dominated reservoir the dry steam type. The other type of system is the liquid dominated- the wet steam/ hot water reservoir. The latter is the predominant type system currently in existence in the United States.

In the vapor type dominated system, the steam is expanded in turbines which drive commercial generators for electricity. Low pressure turbines are utilized and the thermal efficiency is about 10-15 percent in comparison to 40 percent for a fossil fuel plant.

Liquid dominated systems at temperatures high enough for electrical generation are probably ten to fifteen times more common as compared to the dry steam type reservoir. The hot fluids, though under pressure, do remain liquid in the reservoir but flash into steam as the pressure drops when the fluid is withdrawn through the production wells. The steam is usually flashed in tanks and used to generate the electricity while the remaining fluids are reinjected into the reservoir. At the lower end of the

working temperature fluids (150°C), binary systems utilize a low boiling point heat transfer fluid, a heat exchanger and turbine. These systems are considered to be the most efficient.

Lower temperature system fluids, (25° - 150°C .) are now being utilized for industrial process heat, space heating and cooling, drying of certain agricultural products and distillation and in aquaculture operations.

Present status of electrical generation

Electrical generation has proven to be profitable in California since 1960 and in Larderello, Italy since 1904 where power generation from geothermal fluids was first accomplished. These systems are vapor dominated. Electrical generation has been accomplished from wet steam systems since 1963 in New Zealand. Japan, Mexico, Nicaragua, El Salvador, Phillipines and Iceland have all been generating electrical power from wet steam systems since the 1960's. Approximately one-third of the electrical generation systems are the wet steam types, the remaining are the more easily exploited vapor dominated type reservoirs.

The low to moderate salinity, high temperature geothermal fluids have been proven to be technically utilizable for electrical generation. High temperature, high salinity fluids are as of yet not feasible for economic operation given the available technology. There are problems associated with pitting and scaling of the hardware during fluid transfer. Union Oil has recently developed a fluid stream additive called "Unisteam" which substantially reduces

problems of corrosion. Field tests were expected to be completed in 1978.

There are approximately 1400 MWT of electrical power being generated from geothermal fluids in the world today.

Present Status of Direct Heat Applications

There is approximately 7,000 MWt of thermal heat used in the world for heating and cooling, for agricultural and aquacultural production and for industrial processing. There are major applications of these types using direct thermal fluids in Hungary, Iceland, Italy, New Zealand, Japan and the USSR. One advantage in using direct thermal fluids is that lower temperature resources can be utilized. Other advantages include higher utilization efficiency and the development time is usually shorter. Costs of geothermal direct fluid utilization are, in most instances, below that of comparable fossil fuel energy.

Technical feasibility for geothermal direct utilization has been proven worldwide except for the United States. There are a few greenhouse, aquaculture, commercial building heating and one milk pasteurizing operation in the United States.

Environmental Acceptability

There are no state or Federal environmental standards that are specifically designed for geothermal utilization at this time.² The National Conference of State Legislatures is currently working with Hawaii, New Mexico and Nevada in drafting statutes and policy statements. For a more detailed analysis of geothermal energy see: State

Policies for Geothermal Development, National Conference of State Legislatures, Douglas M. Sacarto. The text includes material on features of the resource, exploration and development, taxation, state geothermal leasing and development regulations and also discusses P.L. 91-581, the Federal Geothermal Steam Act and P.L. 93-410, the Federal Geothermal Energy Research, Development, and Demonstration Act of 1974. The Department of Energy- Division of Geothermal Energy is currently working on a Geothermal Energy Omnibus Bill which, if passed, will provide increased tax incentives for development (amendments to Energy Tax Act of 1978), amendments to P.L. 93-410, amendments to Natural Gas Policy Act of 1978, amendments to Powerplant and Industrial Fuel Use Act of 1978, amendments to Public Utility Regulatory Policies Act, and amendments to National Energy Conservation Policy Act.

According to the commercial strategy report, DOE, p.9, these are the potential environmental hazards associated with geothermal development. They are:

1. airborne effluents (particularly H_2S)
2. geothermal fluid disposal with amounts of dissolved solids
3. noise levels during drilling and field operation
4. subsidence due to fluid with drawl
5. induced seismicity due to withdrawal or re-injection
6. cooling of fluids
7. land use conflicts
8. water use conflicts 3'

Hazards related to the environment are less likely in direct applications because fluids tend to be in the lower temperature range and usually have less dissolved solids.

Airborne effluents

There are a number of compounds that may be found in hydrothermal fluids including CO_2 , NH_3 , As, H_2S , CH_4 , Rn, Hg, and B, (carbon dioxide, arsenic, hydrogen sulfide, radon, mercury and boron).⁴ These chemicals and salts may be released into the atmosphere through the cooling towers. This may have an impact on the local ecology and health of the local residents.

There currently is no efficient technology available to abate H_2S in the Geysers area in California. New systems with improved abatement control are just now approaching the demonstration phase. Accumulation and effects of mercury, arsenic and hydrogen sulfide are not known. Environmental baseline studies are just beginning and will not have sufficient data for impact analysis for at least another year.

Waterborne effluents

The environmental concerns related to the release of waterborne effluents deal with cooling tower blowdown and spent geothermal fluids. Care must be taken so that spent fluids which contain high concentrations of dissolved solids will not be reinjected into cleaner water systems. Another concern related to reinjection is that salts, if in existence, are removed previous to reinjection so that there is no plugging of the reservoir matrix. Pre-treatment will then be required for disposal of the residues. To date, there has been no demonstration of safe disposal of high saline fluids that are under pressure. More research and demonstration will be needed in this area.

It is suspected that there may be significant delay in certain development areas if high content saline fluids cannot be treated properly. The Environmental Protection Agency (EPA) presently has standards to protect drinking water, see (Safe Drinking Water Act). The Resource Conservation and Recovery Act may inhibit the ponding of these type of fluids.

Noise

Adequate noise abatement technologies for drilling and well flow testing have not been developed. A moderate impact on wildlife habitat can be expected. The available muffler systems are moderately successful but require high investment costs.

If economical and reliable systems for noise can be developed, there should be minimal impact to wildlife habitats. 5-

Subsidence

Removal of large quantities of hydrothermal fluids can result in subsidence. Impact of subsidence could be significant where areas of agricultural land overlay geothermal development areas (which happens to be the case in Imperial Valley, California).

One method of mitigating subsidence calls for injecting fluids into different strata from where the fluid is withdrawn. Prevention and control of subsidence is not presently that well understood. Costs related to salvage of subsided areas will probably be quite high. Subsidence prevention by injection of fluids has not been demonstrated. This may create delays for development areas in the

Imperial Valley and other locations.

Enhanced seismicity

It is suspected that the withdrawal and/or reinjection of hydrothermal fluids may increase the frequency or magnitude of seismic events. Evidence already exists of seismic activity due to reinjection at the Rocky Mountain Arsenal, Colorado.

Seismic activity due to low pressure injection is suspected as being very low. More data is needed for various geological formations and long-term high flow rates of injection.

It is suspected that reservoir cool-down that results from fluid withdrawal may induce micro-seismic activity. This may be beneficial by reducing pressure and thereby preclude any large seismic event.

The DOE does not expect any geothermal development delays due to seismic activity. DOE has now begun seismic baseline studies and will monitor seismic activity on or near geothermal development areas. Studies will be conducted on both electric and non-electric activities.

Water use

Many of the proposed methods for utilizing geothermal fluids will require outside sources of water for the cooling of the fluids. Because many prospective geothermal development areas are located in semi-arid regions, conflicts may incur concerning the most beneficial uses of the scarce water resources. Much of the water extracted during geothermal energy production will have to be reinjected to control subsidence. Therefore, alternate sources of water will have to be located and developed.

In certain areas, it may be possible to utilize agricultural waste water, as in the case of the Imperial Valley. The general case is that most alternate water sources have not been located in or near any of the known geothermal resource areas (KGRA).

As in the case of the Imperial Valley, local regulations mandate that equal volumes of fluid be reinjected equivalent to that quantity extracted. Local and state regulations for other KGRA's will probably follow the same equivalency reinjection levels.

It is anticipated that there may be substantial developmental delay unless, alternate water sources are located, and the problems incurred from utilization are mitigated for those parties concerned.

Land Use

The potential exists for some geothermal developments to conflict with already existing land uses. Development may impact:

- a. pristine wildlife areas
- b. habitats of endangered or threatened species
- c. agricultural or recreational areas⁶

To date, there is insufficient baseline data for most KGRA's and what impact development might have on indigenous endangered species. There already exists some disturbance of raptor (falcons) nesting areas in both the Geyser and Raft River area of Idaho. These are being studied (1978).

It is anticipated that designated areas for geothermal development will have alternative existing land uses removed, terminated, left idle or be permitted to coexist if there are minimal conflicts.

Well sites and associated resource technologies will impact agriculture, wild game hunting, recreation, placement of lodges and other human resources.

During development phases, there will be social and economic impact due to the increase of individuals in the area associated with the work project. There will be an increased need for food, water, sanitation services, habitat lion areas, recreational areas and transportation.

Hinterland areas will not be able to provide all of these goods and services. Adverse impact may be felt where a boomtown situation would incur from a sharp increase in local population numbers.

Previous to development, it is necessary then, that local planners plan to provide the needed goods and services to the area to preclude any type boomtown situation.

FIGURE 4.5

ENVIRONMENTAL STUDIES AND CONTROL TECHNOLOGY DEVELOPMENT

Appendix VI

August, 1978

Draft

UIPA 3rd Annual Conference
Minneapolis, Minn.

Energy Survey

The target population in this stratified sample are all reservations that may need, use ^{develop} ~~order~~ an alternative energy source to increase autonomy, and ~~for~~ self-sufficiency. Direct and indirect benefits can ^{Potentially} ~~probably~~ be derived from this development or use by creating a cash flow income, creation of jobs for tribal members and a potential tax base through leasing and construction of processing and manufacturing facilities on the reservation lands.

Direct and indirect costs could include the ^{Con} ~~assumption~~ of a non-renewable resource, potential ^{Co} ~~envi~~ronmental hazards and impact and, ^E ~~alt~~ernative energy development could use land that may potentially be developed for ~~other~~ resources, e.g. agriculture or timber.

The sample population in this survey was all attendees at the Third Annual United Indian Planners Association conference held in Minneapolis, Minnesota from August 20-24, 1978.

One hundred (100) energy questionnaires were xeroxed and of those, ³ ~~35~~ were completed and returned. At the time of this writing (Aug. 31), forty-one (41) questionnaires are still unaccounted for.

I have divided the responses into two categories-those that are employed by a tribe ^{or} ~~of~~ reservation, and those that are not. Of the 33 ~~respon~~ees, eight (8) were not employed by a tribe or reservation and twenty-five (25) were.

Of those twenty-five (25) employed by a tribe, eighteen are planners, two are council members, one from BIA, one from fiscal control (Planning Office), one from resources, one administration/treasurer and two no responses. One ~~respondee~~ was a planner and council member and one was a housing coordinator and council member.

The second question ^{asked} ~~directed~~ was, ^{whether} ~~they~~ felt there was a need for alternative energy Development on their reservation. Of those twenty-five (25) ~~respondee~~s employed by a tribe, twenty-four (24) responded positively

and felt there was need for development. One responded negatively. Of the eight not employed, all responded positively.

This indicates that 96.1 % of the planners and those either elected or employed by a tribal government feel there is a need for alternative energy development on their reservation.

The next question was reservation specific, in that, each individual was to respond to that type of alternative energy Development that might be of interest to him or his tribe. Those choices included biomass, gasohol, geothermal, lowhead, hydropower, direct solar application, tidalpower, wave-power and wind power.

In rank order from most to least importance, that each respondee needed to learn more about were:

	# of responses
direct solar application	20
wind power	18
geothermal	15
biomass	8
gasohol	8
lowhead hydro	5
wave power	2
tidal power	2

Because certain types of energy resources are reservation specific (lowhead hydro, wave and tidal power) responses are low because the resource is only available on certain reservations.

Rank order for those not employed by a tribal government

	# of responses
direct solar application	8
geothermal	5
biomass	4
wind	4
gasohol	2
lowhead hydro	1
tidal power	1
wave	0

Page three

If an alternative energy form is developed on a reservation, there will be both cost and benefits that must be weighed before this venture may take place.

Each responsee was to rank order those concerns that the tribal councilman and planners must deal with while weighing potential alternative energy development for their reservation.

I weighted each response and placed by mean hierarchical rank.

Planners councilman and tribal employees valued these concerns from most to least;

- environmental
- economic
- cultural
- social
- political-legal

Rank order value judgement by those not employed by a tribe were very similiar to those that were-from most to least in importance.

- environmental
- cultural
- economic
- social
- political-legal

It is too early to judge the reason for the different value and importance placed economic and cultural aspect between the two ^a sample groups. I suspect the attitude toward educational training and values of the non-employed may be a consideration why more ^hempasises is placed on culture rather than economic development.

It also maybe that, those planners have had an education away from the reservation and then returned. Hence haveing perceived the world away from the reservation have returned and relinquished tribal cultural values for those of economic concerns for the group.

This may also create tension within the tribe because of the clash of values between those trained off of the reservation and those that have remained there.

The next question was directed to planners and tribal officials and asked whether the reservation had been approached by any industry, utility company, economic development firm, consultant group or government agency specifically concerned with energy development. Of the twenty-five employed by a tribe, twenty-one state that they have been approached, three state negatively so and one gave no answer.

The type of group or company that approached the tribal governments are ranked by number from most to least. A tribe may have been approached by more than one organization.

	# of responses
development firm	9
consultant	9
industry	5
government agencies	4
utility company	2

Those not employed responded in this way. One stated that the tribe was approached, six negatively so and one no answer.

The next question asked whether or not their tribe had approached any of a number of departments or agencies for assistance in alternative energy development. Seventeen responded positively so, seven in the negative and one did not answer. In rank order by response.

	# of responses
BIA	10
DOE	8
EDA	8
USGS	6
HUD	1
DOI	1
DOA	1
BLM	0
NSF	0

There were two respondents to "other." One tribe had approached the Nat'l. Center Technology and another the State of California.

Appropriate

Those not employed by a tribe responded as follows:

	Yes--2	No--2	Don't Know--4
in rank order			# of responses
2 EDA			2
DOE			2
HUD			1
DOI			1
BIA			1
BOA			0
BLM			0
USGS			0
NSF			0

One responded to "other" with private Foundations.

The next question^{presented} dealt with whether or not the individual or tribe was on the UIPA mailing list. Eighteen planners responded that they were and seven were not. Of those not employed by a tribe, five stated they were on the list and three were not.

When asked whether or not their reservation or tribe would be interested in reviewing^{C.V.} any type of assistance from UIPA; those planners and councilmen responded that twenty-two of them would like assistance from UIPA and one stated no, there were two ^{possibilities} ~~maybes~~.

The types of assistance ranked by need of the tribal ^{planners + councilmen} ~~people~~ were:

	# of responses
information	19
consultant	12
technical	8
liaison	6
other ----- (to Lobby) -----	1

The last question was: Do you feel this administration is responsive

enough to Indian needs in alternative energy development?

Why or why not?

Planners and councilmen responded

	# of responses
yes	2
no	13
no answer	10

The yes responses were:

"Administration concerned with amount of resources available"

more concerned with amount resources on tribal land ~~own~~^{or res.}

The no responses were:

1. "... no special effort can be det^{ec}ted, though Indians use programs available to general population."
2. (admin) not aware of unique situation of tribes.
3. not sensitive to Indian needs and requests
4. more concern with exploiting renewable rather than assisting development of renewable resources; relationship between agencies and tribes resists changes, and emphasize traditional means of resource use. Not enough volunteer development of conservation programs.
5. movement to slow
6. lowhead^{hydro} power more feasible for more tribes than geothermal. Technology cheaper. (UIPA) should respond to this.
7. no direction formulated
8. more surveys needed, data, in foundation, explanations, cost and benefits.
9. too much anti-Indian legislation; President could relieve this (pressure and tension) through proper influence.
10. Bureaucracy (bureau-crazy) is tied up in itself.
11. unaware
12. lack of response to all Indians needs, problems and opportunities.

One planner responded - "What administration are you talking about? The tribes will definitely have to take^a good hard look into this "new" energy phenomenon."

UIPA must provide information for planners and councilmen, should be able to provide technical assistance in construction and development of

alternative energy resources and remain in a consultant status for the tribes.

Benefit-cost analysis could also provide assistance for the tribes if the reservation so decides to potentially develop a resource. Prospective developing nations models could assist in goal orientation. Rural economic autonomy could be one benefit from a reservation developing an alternative energy resource.

A central reservation place could provide complete needs for the reservation inhabitants.

These are major concerns related to land management and land use planning including energy development as expressed by the participants of the First Annual American Indian Agricultural Conference which was held in Albuquerque on February 7th and 8th.

Geothermal energy development was discussed informally with a number of tribal planners and leaders.

Forestry

Cutting plans to maintain recreation area and not disturb hunting and fishing must practice wise multiple use. 4.20

Securing skilled Indian personnel for management of all forest resources 3.70

Problem of D-2 Legislation on Alaska lands 2.70

Ranching and Livestock

Agricultural land use planning grant funds are needed for: A) individual Indian landowners; B) Tribes; C) Cattle Associations; D) Tribal Enterprises; E) Indian land leasees 4.46

Encourage Tribes to include water use in their long-range planning strategies, and to issue water permits. 4.23

Tribal Farming

Federal agencies regulate land use often resulting in no consideration for the tribe or individual Indians. Inadequate BIA staff to manage Indian lands. 4.64

Moratorium on loan funds through Indian financing Act. Because of inconsistent policies on delinquent loans, program not properly funded. 4.36

Checker Board declaration of land creates efficiency for operations and consolidation. 4.36

Heirship policy creates problem in financing, leasing, probate rules (including non-Indian Heirs) and regulations. 4.36

Individual Farming

We recommend the land acquisition funding of FmHA should be extended to individual Indians. Within Tribes, purchases to continue or place in trust on former trust land to be placed in trust, extend to include fee land, provided further that individuals purchasing or selling reservation land should have approval of the tribal government. This may require new legislation. 3.23

Need allocation of water for future development of farm land with more research on development of energy efficient irrigation systems. We recommend a needs assessment for Individual and tribal farming. 3.15

Acquaculture

Improved Land Management 4.15

Insufficient law enforcement for natural resources 4.00

Improvement in water quality and availability 3.85

Horticulture

Volume and Quality of Water are not always adequate 4.00

Farming methods and techniques are destroying farmland 4.00

Appendix VII

Coso

Naval Weapons Center

The Naval Weapons Center (NWC) comprises two-thirds of the Coso Known Geothermal Resource Area (Coso KGRA), China Lake, California. Of the approximately 106,000 acres in the KGRA, 72,000 acres are located within the NWC boundaries. The geologic and geophysical research that has been completed on the KGRA indicate that the highest geothermal potential lies within NWC land. For a more detailed analysis see Geology and Alteration of the Coso Geothermal Area, Inyo County, California, Jeffery Hulun, Low Altitude Aeromagnetic Survey of a Portion of the Coso KGRA, Inyo County, California, Richard Fox, Dipole-Dipole Resistivity Survey of a Portion of the Coso KGRA, Inyo County, California, Richard Fox, and Geological and Geophysical Analysis of Coso Geothermal Exploration Hole No. 1 (CGEH-1), Coso KGRA California, Robert Galbraith. All published by Earth Science Laboratory, University of Utah Research Institute, Salt Lake City, Utah.

The geothermal development area is a $3\frac{1}{2}$ square mile portion of a $4\frac{1}{2}$ square mile Navy fee-acquired land within the KGRA.

The NWC, China Lake, California is the principal Naval research, development, test and evaluation center for air warfare systems and missile weapon systems. The NWC is the largest installation for ordnance research, development, test and evaluation. The site is a research area for weapon systems and weapon component testing.

The NWC is located in the upper Mojave Desert approximately 120 miles north of Los Angeles, comprising more than one million acres of land and lying within Kern, San Bernadino and Inyo counties. About 90% of the available land is used for testing and evaluation of the weapons.

There are many types of testing performed at the NWC for both the Navy and the Department of Defense. The testing programs include air, ground, tracking or captive, propulsion and warhead type testing. To perform these functions the NWC operates test ranges and facilities and has instruments and support systems. Due to the various types of air missile operations, there is a dependance on optical instrument tracking systems and therefore, the need for good visibility for the data to be acquired.

Geothermal Development Project

The proposed contract is between the Navy and a private industrial developer. There will be no capital investment and the development is to take place on fee-acquired land within the KGRA. The objective is to provide energy self-sufficiency to the NWC. Initial power production is to be a minimum of 10 electric megawatts to be delivered to the NWC.

The geothermal electric generation system will be integrated with the commercial power grid and surplus power that is generated will be distributed to DOD operations on the west coast. The proposed contract will address the following develop-

ment phases:

- a. field investigation and research
- b. field exploration
- c. field development and power plant construction
- d. power production and field operation
- e. field closure ⁷

The geothermal development program (GDP) will be implemented by the developers own expenses. The land or geothermal resource will at no time be conveyed to the developer.

The field investigation research will include airborne exploration, surface surveys and subsurface investigations. For a look at similar types of analyses see: Geology of Roosevelt Hot Springs KGRA, Beaver County, Utah, Earth Science Lab; Radon Emanometry as a Geothermal Exploration Technique, Earth Science Lab; An Appraisal Study of the Geothermal Resources of Arizona and Adjacent Areas in New Mexico and Utah and their Values for Desalination and Other Uses, New Mexico Energy Institute; and Three Dimensional Magnetotelluric Modeling, University of Utah.

Given a favourable prognosis that would be based on the evaluation of the research data, an exploration program will be designed by the developer which will identify selected site locations for exploratory well drilling to take place. The well pad sizes may vary from three (3) to five (5) acres and is dependant on topography and power supply. Roads in existence on the NWC may need repair or new roads may have to be constructed

to provide access to the site(s).

At the field development and construction phase the developer will have collected sufficient data and information to decide upon whether or not to begin construction. Field development will consist of road refurbishing and construction, construction of the pads, well drilling, laying of pipelines, power plant construction and installation of the transmission lines and disposal systems.

It is at this point where noticable environmental impact may effect the flora, fauna, ecology, air or water quality of the area. There is currently one endangered species of rodentia that has been observed in the area, it is the citellus mohave-nis- a sub-species of the ground squirrel. There are also six (6) indigenous mammals protected by law observed in the area, twelve (12) avian species protected by law that are indigenous, two (2) non-native mammals that are protected, one protected indigenous turtle.⁸

At this stage of development, both during well venting and drilling there are high levels of noise as a consequence of these activities. The noise levels can approach 105-110 dB(A)⁹.

The impact of this type of development on indigenous fauna and floral species is not known due to the newness of this type of electrical generation. There has been no research conducted on animal behavior and their ability to adapt to continuous and intermittent noise levels of this type. The noise

levels may interfere with communication between individuals. Noise associated with well venting and drilling may directly effect nesting and denning habits, may cause behavioral changes and may cause fauna species to seek other areas of habitat.

One method of mitigating these problems would be to conduct well venting and drilling during times when fauna species are not active or are not present in the area.

Socioeconomics 10

The study area consists of census tract 12 (area 4) and all of census tracts seventeen (17) and eighteen (18). See attached figure. The study area is totally rural and there are population concentrations in Pearsonville, Little Lake, Cartago, Dunmovin, Grant and Olancho. Data excerpted from Bureau of Census, 1970.

25% of the county's (Inyo) population is under the age of 18, while elderly, over the age of 66, comprise 15.4% of the total population. Comparable figures in the study area are 23.2% and 16.4% respectively. This indicates the dependency level for the study area is lower than the county level.

For the county as a whole, there is some transient population due primarily to logging and summer recreational activities. The study area has little or no transient population.

The total population for the study area is 809, of which 94.2% are white and 5.8% are Indian and other minorities. For the county, total population figures are 17,967, of which, 15,868

(88.3%) are white and 2,099 (11.7%) are Indian and other.

Of the total 6,490,200 acres (10,141 sq. mi.) of Inyo county, less than 5% of its land area is taxable and about 1.9% is privately owned. The city of Los Angeles owns nearly 250,000 acres in the county. Of the non-taxable land in Inyo county, the Department of Interior owns 72.0% or 4,673,887 acres including the Death Valley National Monument, Inyo National Forest, BLM public land and a portion of the NWC. The remaining non-taxable land is owned, by rank-size order by Department of Agriculture, DOD, State of California, city of L.A., Inyo county and three school districts.

As of 1970, the major occupational areas for Inyo county were agriculture, mining, construction, transportation, manufacturing, health services, education, trade, government and the unemployed. Trade, government, services and mining are the major areas of employment and comprise 54.3% of the total working force. Unemployment was 5.4% in 1970.

Of the three tracts in the study area, there are 480 single family and mobile homes of which 25.2% are vacant or unused. Also in the area are a number of occasional occupied mining claims abandoned mines and homesteads. Some of these homes are fit for human occupation whereas others are not comparable housing units due to remote location, lack of sanitation facilities, electrical power and water availability.

Land Use

The land on the NWC, as described previously, include test areas for large caliber guns, laser test operations and weapon impact areas. Much of the Coso KGRA is undisturbed desert habitat that is partially disturbed by graded roads, one paved road and a number of structures. There also exist mines, steam wells, mud pits, graves and other abandoned structures.

Due to the type of testing activities that take place at NWC, there are required areas for safety and security zones. The geothermal development project is planned to take place in one of these zones.

There are four parcels of land that are fee acquired that are located on the boundaries of the NWC. Two of these parcels are used as safety zones, one is a safety zone and used for cattle grazing and the last parcel, due to its proximity to the test range, is frequently subject to over flight and is impacted by a number of these tests.

Unofficial uses of the Coso Hot Springs portion of the NWC range include educational field trips, cattle grazing, visits by Indians and an ongoing environmental data gathering project funded by the Department of Interior.

These fee acquired lands are a consequence of lands purchased under condemnation 311NB, filed March 17, 1945 and 3472H, filed Feb. 24, 1944.

Previous to these parcels ownership by the NWC and BLM, Indian tribes had utilized the springs for spiritual and medicinal reasons. According to Helen Archelleeta, elder, Lone Pine

Reservation:

Prior to 1940, many families used Coso for medicinal purposes. Our people used the springs all their lives...

To my knowledge, there were no white men until 1921, although I was told that a stage-coach used to run through Coso. The white people told the Indians to move out of the springs area as some whites stayed for months. They then said they owned the springs (had papers); Indians were tricked because they didn't understand. It's the same today. The white man told the Indians to move out of the pine-nut areas because the white man said he owned the land. Indians believed him and moved away.¹¹

This statement is similiar to that of eight other Indians that have lived in the Owens Valley area north of the hot springs. Indians have considered the Coso area as being a significant part of their cultural history since time began. There is also reference by Earl Lent, Chairman, Owens Valley Paiute-Shoshone Band of Indians, in a letter dated 11/4/77 to Captain R.B. Wilson, Public Works Officer, NWC, that Coso " is a place of healing, and perhaps most important, it is a crucial link between our people and the Way and culture of our ancestors." ¹²

This indicates that the Coso Hot Springs area has played a very significant cultural role to the indigenous populations at least since early contact, if not before and up to the 1940's.

According to the DEIS- Existing Environment, p.8:

The most sensitive resources of the general region are prehistoric. While no formal archaeological survey has been conducted in the area, field reconnaissance reveals open campsites, chipping or flaking sites (stations), and rock shelters. Tools, chipping detritus, (debitage), and other materials are scattered throughout the area.

Judging from this statement, it is evident that the Coso Hot Springs area has played an important role in the pre-history of the region and was culturally significant to the indigenous populations previous to contact. The area should be viewed as having played an important role to the indigenous populations in a time continuum possibly going back thousands of years. This is significant.

Though no formal excavations have as of yet taken place, for the record, it will be necessary that any site that is developed for geothermal electrical generation be excavated down to sterile soil so that all cultural material is salvaged. This will be done to comply with guidelines as prescribed in the National Historic Preservation Act of 1966 (80 Stat. 915, 16 USC 470 et.seq.), Historic Sites Act of 1935 (49 Stat. 666, 16 USC 461 et.seq.) and the Antiquities Act of 1906 (34 Stat. 225 16 USC 431 et.seq.) and the Archeological and Historic Preservation Act (88 Stat. 174, 16 USC 469 et.seq.) See appendix.

Another conflict already exists on the NWC concerning access rights to the springs area. The Owens Valley tribes still wish to perform religious ceremonies at the springs area.

It is quite a lengthy procedure for anyone to gain access

to the NWC due to the types of testing that take place there regarding National security. The Navy is willing to cooperate with the tribes, but, have only recently begun negotiations with those interested parties. There are some estimates that at least 300 Indians per year would visit the springs area. Those parties involved in the negotiations include the NWC, the Owens Valley Tribes and the Native American Heritage Commission.

The Bureau of Land Management is currently conducting field archeological analyses to locate areas of cultural and historical significance. The findings of this research group are not yet prepared for release. It is hoped that culturally significant areas, (e.g. burials) are located and preserved from development impact.

Conclusions

Geothermal energy utilization is a new field of development for industry and the Federal government (DOE). Not all of the environmental impacts of geothermal development are that well understood. The National Environmental Policy Act and the EPA can and will provide guidelines for development and utilization of these precious resources.

Concerns for air and water quality, land and water use, historic, cultural and archeological preservation and social and economic impact should and will be monitored so that future projects will be the most beneficial for all involved. Laws and regulations will have to be written and rewritten. Development groups will have to mitigate impact, keeping in mind the

function of the resource while maintaining the quality of these sensitive land areas and gearing the project for compatability to the area.

Energy, environment and economics are inextricably related to themselves, to our generation and to future generations. May man's knowledge, wisdom and foresight guide development and utilization for the benefit of every individual in the United States.

Footnotes

1. Commercialization Strategy Report, p.1
2. *ibid*, p.9
3. *ibid*, p.9
4. Environmental Readiness Document, p.13
5. *ibid*. p.15
6. *ibid*. p.16
7. DEIS, p.21
8. *ibid.*, vol.2,pp93-108
9. *ibid.*, vol. 1, p.212
10. Bureau of Census, 1970
11. personal statement, Helen Archelletta, Elder,Lone Pine Res.
12. Letter from Earl Lent to NWC

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Appendix

Location of the Naval Weapons Center With Respect to Population Centers. CLC = China Lake Complex, RWC = Mojave "B"/Randsburg Wash Complex.

Topographical Map of Area.

Census Tracts 12, 17, and 18.

General Location of Geothermal Activity Within the China Lake Complex.

↑
N
J

ARPA PROJECT HEAT-FLOW HOLES

HEAT FLOW MEASUREMENTS
FROM: OPERATIONS PLAN COSO GEOTHERMAL
EXPLORATORY HOLE N° 1 (CGEH-1)

PRESIDENTIAL DOCUMENTS

Title 3 - The President
EXECUTIVE ORDER 11593
Protection and Enhancement of the Cultural Environment

By virtue of the authority vested in me as President of the United States and in furtherance of the purposes and policies of the National Environmental Policy Act of 1969 (83 Stat. 852, 42 U.S.C. 4321 et seq.), the National Historic Preservation Act of 1966 (80 Stat. 915, 16 U.S.C. 470 et seq.), the Historic Sites Act of 1935 (49 Stat. 666, 16 U.S.C. 461 et seq.), and the Antiquities Act of 1906 (34 Stat. 225, 16 U.S.C. 431 et seq.), it is ordered as follows:

Section 1. Policy. The Federal Government shall provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation. Agencies of the executive branch of the Government (hereinafter referred to as "Federal agencies") shall (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, (2) initiate measures necessary to direct their policies, plans and programs in such a way that federally owned sites, structures, and objects of historical, architectural or archaeological significance are preserved, restored and maintained for the inspiration and benefit of the people, and (3), in consultation with the Advisory Council on Historic Preservation (16 U.S.C. 470i), institute procedures to assure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures and objects of historical, architectural or archaeological significance.

Sec. 2. Responsibilities of Federal agencies. Consonant with the provisions of the acts cited in the first paragraph of this order, the heads of Federal agencies shall:

(a) no later than July 1, 1973, with the advice of the Secretary of the Interior, and in cooperation with the liaison officer for historic preservation for the State or territory involved, locate, inventory, and nominate to the Secretary of the Interior all sites, buildings, districts, and objects under their jurisdiction or control that appear to qualify for listing on the National Register of Historic Places.

(b) exercise caution during the interim period until inventories and evaluations required by subsection (a) are completed to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished or substantially altered. The agency head shall refer any questionable actions to the Secretary of the Interior for an opinion, respecting the property's eligibility for inclusion on the National Register of Historic Places. The Secretary shall consult with the liaison officer for historic preservation for the State or territory involved in arriving at his opinion. Where, after a reasonable period in which to review and evaluate the property, the Secretary determines that the property is likely to meet the criteria prescribed for listing on the National Register of Historic Places, the Federal agency head shall reconsider the proposal in light of national environmental and preservation policy. Where, after such reconsideration, the Federal agency head proposes to transfer, sell, demolish or substantially alter the property, he shall not act with respect to the property until the Advisory Council on Historic Preservation shall have been provided an opportunity to comment on the proposal.

(c) initiate measures to assure that where as a result of Federal action or assistance a property listed on the National Register of Historic Places is to be substantially altered or demolished, timely steps be taken to make or have made records, including measured drawings, photographs and maps, of the property, and that copy of such records then be deposited in the Library of Congress as part of the Historic American Buildings Survey or Historic American Engineering Record for future use and reference. Agencies may call on the Department of the Interior for advice and technical assistance in the completion of the above records.

(d) initiate measures and procedures to provide for the maintenance, through preservation, rehabilitation, or restoration, of federally owned and registered sites at professional standards prescribed by the Secretary of the Interior.

(e) submit procedures required pursuant to subsection (d) to the Secretary of the Interior and to the Advisory Council on Historic Preservation no later than January 1, 1972, and annually thereafter, for review and comment.

(f) cooperate with purchasers and transferees of a property listed on the National Register of Historic Places in the development of viable plans to use such property in a manner compatible with preservation objectives and which does not result in an unreasonable economic burden to public or private interests.

Sec. 3. Responsibilities of the Secretary of the Interior. The Secretary of the Interior shall:

(a) encourage State and local historic preservation officials to evaluate and survey federally owned historic properties, and, where appropriate, to nominate such properties for listing on the National Register of Historic Places.

(b) develop criteria and procedures to be applied by Federal agencies in the reviews and nominations required by section 2 (a). Such criteria and procedures shall be developed in consultation with the affected agencies.

(c) expedite action upon nominations to the National Register of Historic Places concerning federally owned properties proposed for sale, transfer, demolition or substantial alteration.

(d) encourage State and Territorial liaison officers for historic preservation to furnish information upon request to Federal agencies regarding their properties which have been evaluated with respect to historic, architectural or archaeological significance and which as a result of such evaluations have not been found suitable for listing on the National Register of Historic Places.

(e) develop and make available to Federal agencies and State and local governments information concerning professional methods and techniques for preserving, improving, restoring and maintaining historic properties.

(f) advise Federal agencies in the evaluation, identification, preservation, improvement, restoration and maintenance of historic properties.

(g) review and evaluate the plans of transferees of surplus Federal properties transferred for historic monument purposes to assure that the historic character of such properties is preserved in rehabilitation, restoration, improvement, maintenance and repair of such properties.

(h) review and comment upon Federal agency procedures submitted pursuant to section 2 (e) of this order.

(Signed) Richard Nixon

The White House
May 13, 1971

(FR Doc. 71-6951 Filed 5-14-71; 12:18 pm)

Note: For the text of a Presidential statement issued in connection with E.O. 11593 above, see Weekly Comp. of Pres. Docs., Vol. 7, issue of May 17, 1971.

FEDERAL REGISTER, VOL. 36, NO. 95 - SATURDAY, MAY 15, 1971

Copy by California Department of Parks and Recreation

NATIONAL HISTORIC PRESERVATION ACT OF 1966

AN ACT to Establish a Program for the Preservation of Additional Historic Properties throughout the Nation, and for Other Purposes, Approved October 15, 1966 (Public Law 89-665; 80 STAT. 915; 16 U.S.C. 470) as amended by Public Law 91-243, Public Law 93-54, Public Law 94-422, and Public Law 94-458.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Congress finds and declares—

(a) That the spirit and direction of the Nation are founded upon and reflected in its historic past;

(b) That the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people;

(c) That, in the face of ever-increasing extensions of urban centers, highways, and residential, commercial, and industrial developments, the present governmental and nongovernmental historic preservation programs and activities are inadequate to insure future generations a genuine opportunity to appreciate and enjoy the rich heritage of our Nation; and

(d) That, although the major burdens of historic preservation have been borne and major efforts initiated by private agencies and individuals, and both should continue to play a vital role it is nevertheless necessary and appropriate for the Federal Government to accelerate its historic preservation programs and activities, to give maximum encouragement to agencies and individuals undertaking preservation by private means, and to assist State and local governments and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities.

TITLE I

Section 101

(a) The Secretary of the Interior is authorized—

(1) to expand and maintain a national register of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, and culture, hereinafter referred to as the National Register, and to grant funds to States for the purpose of preparing comprehensive statewide historic surveys and plans, in accordance with criteria established by the Secretary, for the preservation, acquisition, and development of such properties;

(2) to establish a program of matching grants-in-aid to States for projects having as their purpose the preservation for public benefit of properties that are significant in American history, architecture, archeology, and culture; and

(3) to establish a program of matching grant-in-aid to the National Trust for Historic Preservation in the United States, chartered by act of Congress approved October 26, 1949 (63 Stat. 927), as amended, for the purpose of carrying out the responsibilities of the National Trust.

(4) to withhold from disclosure to the public information relating to the location of sites or objects listed on the National Register whenever he determines that the disclosure of specific information would create a risk of destruction or harm to such sites or objects.

(b) As used in this Act—

(1) The term "State" includes, in addition to the several States of the Union, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Trust Territory of the Pacific Islands.

(2) The term "project" means programs of State and local governments and other public bodies and private organizations and individuals for the acquisition of title or interests in, and for the development of, any district, site, building, structure, or object that is significant in American history, architecture, archeology, and culture, or property used in connection therewith, and for its development in order to assure the preservation for public benefit of any such historical properties.

(3) The term "historic preservation" includes the protection, rehabilitation, restoration, and reconstruction of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, or culture.

(4) The term "Secretary" means the Secretary of the Interior.

Section 102

(a) No grant may be made under this Act—

(1) unless application therefor is submitted to the Secretary in accordance with regulations and procedures prescribed by him;

(2) unless the application is in accordance with the comprehensive statewide historic preservation plan which has been approved by the Secretary after considering its relationship to the comprehensive statewide outdoor recreation plan prepared pursuant to the Land and Water Conservation Fund Act of 1955 (78 Stat. 897);

(3) for more than 50 per centum of the total cost involved, as determined by the Secretary and his determination shall be final;

(4) unless the grantee has agreed to make such reports, in such form and containing such information as the Secretary may from time to time require;

(5) unless the grantee has agreed to assume, after completion of the project, the total cost of the continued maintenance, repair, and administration of the property in a manner satisfactory to the Secretary; and

(6) until the grantee has complied with such further terms and conditions as the Secretary may deem necessary or advisable.

(b) The Secretary may in his discretion waive the requirements of subsection (a), paragraphs (2) and (5) of this section for any grant under this Act to the National Trust for Historic Preservation in the United States, in which case a grant to the National Trust may include funds for the maintenance, repair, and administration of the property in a manner satisfactory to the Secretary.

(c) The Secretary may in his discretion waive the requirements of paragraph (3) of subsection (a) of this section for the purposes of making grants for the preparation of statewide historic preservation plans and surveys and project plans. Any grant made pursuant to this subsection may not exceed 70 per centum of the cost of a project, and the total of such grants made pursuant to this subsection in any one fiscal year may not exceed one-half of the funds appropriated for that fiscal year pursuant to section 108 of this Act.

(a) No State shall be permitted to utilize the value of real property obtained before the date of approval of this Act in meeting the remaining cost of a project for which a grant is made under this Act.

Section 103

(a) The amounts appropriated and made available for grants to the State for comprehensive statewide historic surveys and plans under this Act shall be apportioned among the States by the Secretary on the basis of needs as determined by him.

(b) The amounts appropriated and made available for grants to the States for projects under this Act for each fiscal year shall be apportioned among the States by the Secretary in accordance with needs as disclosed in approved statewide historic preservation plans.

The Secretary shall notify each State of its apportionment, and the amounts thereof shall be available thereafter for payment to such State for projects in accordance with the provisions of this Act. Any amount of any apportionment that has not been paid or obligated by the Secretary during the fiscal year in which such notification is given, and for two fiscal years thereafter, shall be reapportioned by the Secretary in accordance with this subsection.

Section 104

(a) No grant may be made by the Secretary for or on account of any survey or project under this Act with respect to which financial assistance has been given or promised under any other Federal program or activity, and no financial assistance may be given under any other Federal program or activity for or on account of any survey or project with respect to which assistance has been given or promised under this Act.

(b) In order to assure consistency in policies and actions under this Act with other related Federal programs and activities, and to assure coordination of the planning, acquisition, and development assistance to States under this Act with other related Federal programs and ac-

regulations with respect thereto as he deems desirable, and such assistance may be provided only in accordance with such regulations.

Section 105

The beneficiary of assistance under this Act shall keep such records as the Secretary shall prescribe, including records which fully disclose the disposition by the beneficiary of the proceeds of such assistance, the total cost of the project or undertaking in connection with which such assistance is given or used, and the amount and nature of that portion of the cost of the project or undertaking supplied by other sources, and such other records as will facilitate an effective audit.

Section 106

The head of any Federal Agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking.

Section 107

Nothing in this Act shall be construed to be applicable to the White House and its grounds, the Supreme Court building and its grounds, or the United States Capitol and its related buildings and grounds.

Section 108

To carry out the provisions of this Act, there is hereby established the Historic Preservation Fund (hereafter referred to as the "fund") in the Treasury of the United States.

There shall be covered into such fund \$24,000,000 for fiscal year 1977, \$100,000,000 for fiscal year 1978, \$100,000,000 for fiscal year 1979, \$150,000,000 for fiscal year 1980, and \$150,000,000 for fiscal year 1981, from revenues due and payable to the United States under the Outer Continental Shelf Lands Act (67 Stat. 462, 469) as amended (43 U.S.C. 338), and/or under the Act of June 4, 1920 (41 Stat. 813) as amended (30 U.S.C. 191), notwithstanding any provision of law that such proceeds shall be credited to miscellaneous receipts of the Treasury. Such moneys shall be used only to carry out the purposes of this Act and shall be available for expenditure only when appropriated by the Congress. Any moneys not appropriated shall remain available in the fund until appropriated for said purposes. *Provided*, that appropriations made pursuant to this paragraph may be

TITLE II

Section 201

(a) There is established an Advisory Council on Historic Preservation (hereinafter referred to as the "Council") which shall be composed of twenty-nine members as follows:

- (1) The Secretary of the Interior;
- (2) The Secretary of Housing and Urban Development;
- (3) The Secretary of Commerce;
- (4) The Administrator of the General Services Administration;
- (5) The Secretary of the Treasury;
- (6) The Attorney General;
- (7) The Secretary of Agriculture;
- (8) The Secretary of Transportation;
- (9) The Secretary of State;
- (10) The Secretary of Defense;
- (11) The Secretary of Health, Education, and Welfare;
- (12) The Chairman of the Council on Environmental Quality;
- (13) The Chairman of the Federal Council on the Arts and Humanities;
- (14) The Architect of the Capitol;
- (15) The Secretary of the Smithsonian Institution;
- (16) The Chairman of the National Trust for Historic Preservation;
- (17) The President of the National Conference of State Historic Preservation Officers; and
- (18) Twelve appointed by the President from outside the Federal Government. In making these appointments, the President shall give due consideration to the selection of officers of State and local governments and individuals who are significantly interested and experienced in the matters to be considered by the Council.

(b) Each member of the Council specified in paragraphs (1) through (17) of subsection (a) may designate another officer of his department, agency, or organization to serve on the Council in his stead.

(c) Each member of the Council appointed under paragraph (18) of subsection (a) shall serve for a term of five years from the expiration of his predecessor's term; except that the members first appointed under that paragraph shall serve for terms of from one to five years, as designated by the President at the time of appointment, in such manner as to insure that the terms of not less than one nor more than two of them will expire in any one year.

(d) A vacancy in the Council shall not affect its powers, but shall be filled in the same manner as the original appointment (and for the balance of the unexpired term).

(e) The Chairman and the Vice Chairman of the Council shall be designated by the President. During the absence or disability of the Chairman or when the office is vacant, the Vice Chairman shall act in the place of the Chairman.

(f) Fifteen members of the Council shall constitute a quorum.

(g) The Council shall continue in existence until December 31, 1985.

Section 202

(a) The Council shall—

(1) advise the President and the Congress on matters relating to historic preservation; recommend measures to coordinate activities of Federal, State, and local agencies and private institutions and individuals relating to historic preservation; and advise on the dissemination of information pertaining to such activities;

(2) encourage, in cooperation with the National Trust for Historic Preservation and appropriate private agencies, public interest and participation in historic preservation;

(3) recommend the conduct of studies in such areas as the adequacy of legislative and administrative statutes and regulations pertaining to historic preservation activities of State and local governments and the effects of tax policies at all levels of government on historic preservation;

(4) advise as to guidelines for the assistance of State and local governments in drafting legislation relating to historic preservation; and

(5) encourage, in cooperation with appropriate public and private agencies and institutions, training and education in the field of historic preservation.

(b) The Council shall submit annually a comprehensive report of its activities and the results of its studies to the President and the Congress and shall from time to time submit such additional and special reports as it deems advisable. Each report shall propose such legislative enactments and other actions as, in the judgment of the Council, are necessary and appropriate to carry out its recommendations.

Section 203

The Council is authorized to secure directly from any department, bureau, agency, board, commission, office, independent establishment or instrumentality of the executive branch of the Federal Government information, suggestions, estimates, and statistics for the purpose of this title; and each such department, bureau, agency, board, commission, office, independent establishment or instrumentality is authorized to furnish such information, suggestions, estimates, and statistics to the extent permitted by law and within available funds.

Section 204

The members of the Council specified in paragraphs (1) through (17) of section 201 (a) shall serve without additional compensation. The members of the Council appointed under paragraph (18) of section 201(a) shall receive \$100 per diem when engaged in the performances of the duties of the Council. All members of the Council shall receive reimbursement for necessary traveling and subsistence expenses incurred by them in the performance of the duties of the Council.

Section 205

(a) There shall be an Executive Director of the Council who shall be appointed in the competitive service by the Chairman with the concurrence of the Council. The Executive Director shall report directly to the Council and perform such functions and duties as the Council may prescribe.

(b) The Council shall have a General Counsel, who shall be appointed by the Executive Director. The General Counsel shall report directly to the Executive Director and serve as the Council's legal advisor. The Executive Director shall appoint such other attorneys as may be necessary to assist the General Counsel, represent the Council in courts of law whenever appropriate, assist the Department of Justice in handling litigation concerning the Council in courts of law, and perform such other legal duties and functions as the Executive Director and the Council may direct.

(c) The Executive Director of the Council may appoint and fix the compensation of such officers and employees in the competitive service as are necessary to perform the functions of the Council at rates not to exceed that now or hereafter prescribed for the highest rate for grade 15 of the General Schedule under section 5332 of title 5, United States Code. *Provided, however, That the Executive Director, with the concurrence of the Chairman, may appoint and fix the compensation of not to exceed five employees in the competitive service at rates not to exceed that now or hereafter prescribed for the highest rate of grade 17 of the General Schedule under section 5332 of title 5, United States Code.*

(d) The Executive Director shall have power to appoint and fix the compensation of such additional personnel as may be necessary to carry out its duties, without regard to the provisions of the civil service laws and the Classification Act of 1949.

(e) The Executive Director of the Council is authorized to procure expert and consultant services in accordance with the provisions of section 3109 of title 5, United States Code.

(f) Financial and administrative services (including those related to budgeting, accounting, financial reporting, personnel and procurement) shall be provided the Council by the Department of the Interior, for which payments shall be made in advance, or by reimbursement, from funds of the Council in such amounts as may be agreed upon by the Chairman of the Council and the Secretary of the Interior; *Provided, That the regulations of the Department of the Interior for the collection of indebtedness of personnel resulting from erroneous payments (5 U.S.C. 45e) shall apply to the collection of erroneous payments made to or on behalf of a Council employee, and regulations of said Secretary for the administrative control of funds (31 U.S.C. 635(g)) shall apply to appropriations of the Council. And provided further, That the Council shall not be required to prescribe such regulations.*

(g) The members of the Council specified in paragraphs (1) through (16) of section 201(a) shall provide the Council, with or without reimbursement as may be agreed upon by the Chairman and the members, with such funds, personnel, facilities, and services under their jurisdiction and control as may be needed by the Council to carry out its duties, to the extent that such funds, personnel, facilities, and services are requested by the Council and are otherwise available for that purpose. To the extent of available appropriations, the Council may obtain, by purchase, rental, donation, or otherwise, such additional property, facilities, and services as may be needed to carry out its duties.

Section 206

(a) The participation of the United States as a member in the International Centre for the Study of the Preservation and Restoration of Cultural Property is hereby authorized.

(b) The Council shall recommend to the Secretary of State, after consultation with the Smithsonian Institution and other public and private organizations concerned with the technical problems of preservation, the members of the official delegation which will participate in the activities of the Centre on behalf of the United States. The Secretary of State shall appoint the members of the official delegation from the persons recommended to him by the Council.

(c) For the purposes of this section there are authorized to be appropriated not more than \$175,000 per year for fiscal years 1977, 1978, and 1979; *Provided, That no appropriation is authorized and no payment shall be made to the Centre in excess of 25 per centum of the total annual assessment of such organization.*

Section 207

So much of the personnel, property, records, and unexpended balances of appropriations, allocations, and other funds employed, held, used, programed, or available or to be made available by the Department of the Interior in connection with the functions of the Council, as the Director of the Office of Management and Budget shall determine, shall be transferred from the Department to the Council within 60 days of the effective date of this Act.

Section 208

Any employee in the competitive service of the United States transferred to the Council under the provisions of this section shall retain all the rights, benefits, and privileges pertaining thereto held prior to such transfer.

Section 209

The Council is exempt from the provisions of the Federal Advisory Committee Act (85 Stat. 770), and the provisions of the Administrative Procedure Act (89 Stat. 391) shall govern the operations of the Council.

Section 210

Whenever the Council transmits any legislative recommendations, or testimony, or comments on legislation to the President or the Office of Management and Budget, it shall concurrently transmit copies thereof to the House Committee on Interior and Insular Affairs and the Senate Committee on Interior and Insular Affairs. No officer or agency of the United States shall have any authority to require the Council to submit its legislative recommendations, or testimony, or comments on legislation to any officer or agency of the United States for approval, comments, or review, prior to the submission of such recommendations, testimony, or comments to the Congress. In instances in which the Council voluntarily seeks to obtain the comments or review of any officer or agency of the United States, the Council shall include a description of such actions in its legislative recommendations, testimony, or comments on legislation which it transmits to the Congress.

Section 211

The Council is authorized to promulgate such rules and regulations as it deems necessary to govern the implementation of section 105 of this Act.

Section 212

(a) The Council shall submit its budget annually as a related agency of the Department of the Interior. To carry out the provisions of this title, there are authorized to be appropriated not more than \$1,500,000 in fiscal year 1977, \$1,750,000 in fiscal year 1978, and \$2,000,000 in fiscal year 1979.

(b) Whenever the Council submits any budget estimate or request to the President of the Office of Management and Budget, it shall concurrently transmit copies of that estimate or request to the House and Senate Appropriations Committees and the House Committee on Interior and Insular Affairs and the Senate Committee on Interior and Insular Affairs.

terior to expand and maintain a National Register of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, and culture. Previously, the National Register included only nationally significant properties that were historical or archeological units of the National Park System, or that had been declared eligible for designation as national historic landmarks. Because they must meet exacting criteria of national significance, such properties are few in number. The National Historic Preservation Act of 1966 provides a means for States to nominate properties of State and local significance, regardless of location within the State and whether publicly or privately owned, for placement in the National Register.

(b) The National Register is an authoritative guide to be used by Federal, State, and local governments, private groups, and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment. It is also the legal instrument to insure that registered properties affected by undertakings that are executed, licensed, or financially assisted by the Federal Government will be the subject of review and comment in accordance with section 108 of the Act. Such review and comment is the function of the Advisory Council on Historic Preservation. The Advisory Council has adopted procedures concerning, inter alia, their commenting responsibility in 36 CFR Part 800.

(c) The National Register was designed to be and is administered as a planning tool without restraint upon private property interests. Federal agencies undertaking a project having an effect on a listed property must provide the Advisory Council on Historic Preservation a reasonable opportunity to comment pursuant to 36 CFR Part 800. Having complied with this procedural requirement the Federal agency may adopt any course of action it may feel appropriate. While the Advisory Council comments must be taken into account and integrated into the decisionmaking process, the program decision rests with the agency implementing the undertaking. No requirements of any kind are imposed upon private initiative.

(d) The National Register is enlarged by:

(1) Acts of Congress and Executive orders which create areas of the National Park System administered by the National Park Service, all or portions of which may be determined to be of historic significance consistent with the intent of Congress;

(2) Properties declared by the Secretary of the Interior as eligible for designation as national historic landmarks;

(3) Nominations prepared by the States and approved by the National Park Service; and,

(4) Nominations of Federal properties prepared by Federal agencies as directed by Executive Order 11593 and approved by the National Park Service.

§ 60.3 Grants for historic preservation.

The National Historic Preservation Act also authorizes 50 percent matching grants-in-aid to the States and the National Trust for Historic Preservation. Grants to the States are authorized for comprehensive statewide historic site surveys and preservation plans and for preservation projects in accordance with approved statewide plans. With the exception of grants to the National Trust for Historic Preservation, all grants are made through the States. The State Historic Preservation Officer may then distribute the funds to other approved public and private recipients. Funds may be used for acquisition, protection, rehabilitation, restoration, and reconstruction of properties included in the National Register. For further information relating to the historic preservation grants-in-aid program, consult Chief, Division of Grants, National Park Service, U.S. Department of the Interior, Washington, D.C. 20240.

§ 60.4 Federal nominations pursuant to Executive Order 11593, "Protection and Enhancement of the Cultural Environment," May 13, 1971 (36 FR 8921, see 16 U.S.C. 470).

(a) The Executive order states that the Federal Government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation. Federal agencies are directed to administer cultural properties under their control in a spirit of stewardship and trusteeship for future generations and to initiate measures to direct their activities in such a way that federally owned properties of historical, architectural, or archeological significance are preserved, restored, and maintained for the inspiration and benefit of the people.

(b) Section 2(a) of Executive Order 11593 provides that Federal agencies shall locate, inventory, and nominate to the Secretary of the Interior all sites, buildings, districts, and objects under their jurisdiction or control that appear to qualify for listing on the National Register of Historic Places.

(c) Additional responsibilities of Federal agencies are detailed in Executive Order 11593, the National Historic Preservation Act of 1966, the National Environmental Policy Act of 1969, the Archeology and Historic Preservation Act of 1974, procedures developed pursuant to these authorities, and other related legislation. Detailed administrative procedures for the further implementation of Executive Order 11593 are being developed to set forth inter alia criteria and procedures to be applied by Federal agencies in the review and nomination required by section 2(a).

§ 60.5 Appointment and responsibilities of the State Historic Preservation Officer.

(a) Implementation of the National Historic Preservation Act of 1966 is accomplished primarily by the State Historic Preservation Officers (formerly known as State Liaison Officers), who are responsible for administering the Na-

tional Register program within their jurisdictions. These officers are appointed by the Governors of the 50 States, Guam, American Samoa, the Commonwealth of Puerto Rico, the Virgin Islands, the Trust Territory of the Pacific Islands, and the Mayor of the District of Columbia.

(b) The State Historic Preservation Officer is responsible for the development and implementation of a comprehensive State historic preservation plan, based clearly on the State's history and established in conformance with local, State, and Federal legislation and mechanisms, and approved by the Secretary of the Interior. The State Historic Preservation Officer supervises a professional staff in conducting a statewide survey of historic resources addressed to every aspect of the State's history. From this continuing inventory of historic resources, an integral part of the State historic preservation plan, the State Historic Preservation Officer should nominate properties for inclusion in the National Register. The nominated properties which are approved by the National Park Service are entered in the National Register by the Director, Office of Archeology and Historic Preservation, National Park Service.

(c) The State Historic Preservation Officer has been requested to assume certain responsibilities for compliance under section 106 of the National Historic Preservation Act as outlined by the Advisory Council on Historic Preservation in "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800).

(d) The following officials have been designated by their Governors to act as State Historic Preservation Officers responsible for State activities under the National Historic Preservation Act:

STATE HISTORIC PRESERVATION OFFICERS

ALABAMA

Chairman, Alabama Historical Commission, Alabama Department of Archives and History, Archives and History Building, Montgomery, Alabama 36104.

ALASKA

Director, Department of Natural Resources, Division of Parks, 323 East Fourth Avenue, Anchorage, Alaska 99501.

ARIZONA

Director, State Parks Board, 1828 West Adams, Phoenix, Arizona 85007.

ARKANSAS

Director, Department of Natural and Cultural Heritage, The Old State House, 309 West Markham, Little Rock, Arkansas 72201.

CALIFORNIA

Director, Department of Parks and Recreation, State Resources Agency, P.O. Box 2390, Sacramento, California 95811.

COLORADO

Chairman, State Historical Society, Colorado State Museum, 260 14th Avenue, Denver, Colorado 80203.

CONNECTICUT

Director, Connecticut Historical Commission, 59 South Prospect Street, Hartford, Connecticut 06103.

(2) Completed nominations are submitted to the appropriate State Historic Preservation Officer for review and comment regarding the significance of the property and its eligibility for the National Register.

(3) After receiving the comments of the State Historic Preservation Officer, or if there has been no response within 45 days, the Federal Representative may approve the nomination and forward it to the Keeper, National Register, National Park Service, Washington, D.C. 20240. The comments of the State Historic Preservation Officer are appended to the nomination, or, if there are no comments, an explanation is attached. Concurrent nominations cannot be submitted, however, until the nomination has been approved by the State in accord with § 60.11, supra. Comments received by the State concerning concurrent nominations must be submitted with the nomination.

(4) Notice will be provided in the Federal Register that the nominated property is being considered for listing in the National Register of Historic Places and comments will be received whenever possible concerning the significance of the property. Copies of these written comments will be supplied to the Federal representative and to the State Historic Preservation Officer.

(5) Nominations are reviewed by the Office of Archeology and Historic Preservation to determine technical and professional sufficiency and conformance to the National Register criteria for evaluation and comments are considered.

(6) Nominations found to be technically and professionally sufficient and in conformance with the National Register criteria for evaluation will be approved by the Director, Office of Archeology and Historic Preservation, and entered in the National Register. Nominations found technically or professionally inadequate will be returned for correction and resubmission. When a property does not appear to meet the National Register criteria for evaluation, the nomination will be returned with an explanatory letter.

§ 60.16 Changes and revisions to properties listed in the National Register.

(a) Boundary changes. (1) A boundary alteration should be handled as a new property nomination supplanting the old nomination form. All forms, criteria, and procedures used in nominating a property to the National Register must be used at both the State and Federal levels. A professionally justified recommendation by the State Historic Preservation Officer or Federal Representative must be presented to the National Park Service. During this process, the property is not taken off the National Register. If the National Park Service finds the recommendation in accordance with the National Register criteria for evaluation, the change will be accepted. If the boundary change is not accepted, the old boundaries will remain.

(2) Two justifications exist for altering a boundary: Professional error

in the initial nomination or loss of historic integrity. In some cases, accretion of additional significance may also be reason for altering property boundaries. No enlargement of a boundary should be recommended unless the additional area possesses previously unrecognized significance in American history, architecture, archeology, or culture. No diminution of a boundary should be recommended unless the properties being removed have lost the characteristics that endowed them with such significance and qualified them for the initial nomination. Any proposal to alter a boundary has to be documented in detail in order to avoid the necessity of an onsite inspection by National Park Service personnel. Specifically, the structures or other historic resources falling between the existing boundary and the other proposed boundary should be photographed.

(3) Attention should be given to the "Criteria for Effect," promulgated by the Advisory Council on Historic Preservation in "Procedures for the Protection of Historic and Cultural Properties" (38 CFR Part 800), for use in the application of section 106 of the National Historic Preservation Act. According to these criteria a project need not fall within the boundaries of a National Register property for an effect to exist.

(b) Relocating properties listed in the National Register. (1) Properties listed in the National Register should be moved only when there is no feasible alternative for preservation. When a property is moved, every effort should be made to reestablish its historic orientation, immediate setting, and general environment.

(2) If it is proposed that a structure listed in the National Register be moved and the State or Federal agency wishes the property to remain in the National Register during and after the move, the State or Federal agency must submit documentation prior to the move which should discuss:

- (i) The reasons for the move;
- (ii) The effect on the property's historical integrity; and
- (iii) The new setting and general environment of the proposed site, including evidence that the proposed site does not possess historical significance that would be adversely affected by the intrusion of the structure.

In addition, photographs showing the proposed location must be sent along with the documentation. Any such proposal submitted by a State must be approved by the State review board and will continue to follow normal review procedures.

(3) If the National Park Service approves the proposal, the property will remain on the National Register during and after the move unless the integrity of the property is, in some unforeseen manner, destroyed. If the National Park Service does not approve the proposal, the property will be automatically deleted from the National Register when moved. If the State or Federal agency has proof that previously unrecognized significance exists, or has accrued, the

State or Federal agency may resubmit a nomination for the property as outlined below.

(4) In the event that a structure is moved, deletion from the National Register will be automatic unless the above procedures are followed prior to the move. If the property has already been moved, it is the State or Federal agency's responsibility to notify the National Register. Assuming that the State or Federal agency wishes to have the structure reentered in the National Register, it must be nominated again on new forms which should discuss:

- (i) The reasons for the move;
- (ii) The effect on the property's historical integrity; and
- (iii) The new setting and general environment, including evidence that the new site does not possess historical significance that would be adversely affected by the intrusion of the site.

In addition, new photographs showing the structure at its new location must be sent along with the revised nomination. Any such nomination submitted by a State must be approved by the State review board.

(5) Properties moved in a manner consistent with the comments of the Advisory Council on Historic Preservation, in accord with its procedures (38 CFR Part 800), are granted an exception to § 60.16 (b). Moving of properties in accord with the Advisory Council's procedures should be dealt with individually in each memorandum of agreement.

§ 60.17 Removing properties from the National Register.

(a) Properties nominated by the States or Federal agencies will be removed from the National Register only when they have ceased to meet the criteria for the National Register: when the qualities which caused them originally to be nominated have been lost or destroyed; upon proof that an error in professional judgment has been made; or, for failure to follow the procedures set forth herein. Information concerning the loss of integrity, error in judgement, or procedural error should be submitted through the appropriate State Historic Preservation Officer or Federal representative to the Keeper, National Register, National Park Service, Washington, D.C. 20240.

Dated: January 5, 1976.

GARY EVERHARDT,
Director, National Park Service.
[FR Doc. 76-785 Filed 1-8-76; 8:45 am]

Title 35—Parks, Forests, and Public Property

CHAPTER VIII—ADVISORY COUNCIL ON HISTORIC PRESERVATION

PART 800—PROCEDURES FOR THE PROTECTION OF HISTORIC AND CULTURAL PROPERTIES

* Pursuant to the National Historic Preservation Act of 1956 (80 Stat. 515, 16 U.S.C. 470) and Executive Order 11593, May 13, 1971, "Protection and Enhancement of the Cultural Environment" (38 FR 8921, 16 U.S.C. 470), the Advisory Council on Historic Preservation has established Procedures for Compliance, set forth in the FEDERAL REGISTER of February 28, 1973 (38 FR 5335), to implement the purposes of those authorities. Proposed revisions to those procedures were published in the FEDERAL REGISTER of November 5, 1973 (38 FR 30354) and 30 days were allowed for public comment. Federal agencies were also solicited to consult with the Advisory Council with regard to the development of procedures for the protection of non-federally owned historic and cultural properties as required by section 1(3) of Executive Order 11593.

In response to comments received by the Advisory Council and in consultation with Federal agencies, the proposed procedures have been revised to incorporate suggestions from Federal and State agencies and private citizens. It is the purpose of this notice, through publication of revised "Procedures for the Protection of Historic and Cultural Properties," to apprise the public as well as government agencies, associations, and all other organizations and individuals interested in historic preservation, that the following procedures are hereby adopted as set forth below. The procedures will appear in the Code of Federal Regulations in Title 35, Chapter 8 at Part 800. The procedures are being codified because they affect State and local governmental agencies, private organizations, and individuals, in addition to Federal agencies, to which they are specifically directed, and because of the resultant need to make them widely and readily available.

Federal agencies are advised that the procedures set forth certain steps for agencies to follow to fulfill their obligations pursuant to section 1(3) of Executive Order 11593 and to use as a guide in the development of their required internal procedures in consultation with the Council. The Advisory Council reiterates its solicitation of Federal agencies to consult with the Council on the development of those procedures. Inquiries regarding such consultation, as well as inquiries regarding the substance of and compliance with the procedures in general, should be directed to the Executive Secretary, Advisory Council on Historic Preservation, Suite 430, 1522 K Street NW., Washington, D.C. 20005.

Effective date: January 23, 1974.

ROBERT B. GARVEY, Jr.,
Executive Director, Advisory
Council on Historic Preservation.

A new Chapter VIII, Advisory Council on Historic Preservation, containing Part 800, Procedures for the Protection of Historic and Cultural Properties, is added to title 35, CFR, reading as set forth below.

Sec.	
800.1	Purpose and authorities.
800.2	Coordination with agency requirements under the National Environmental Policy Act.
800.3	Deductions.
800.4	Agency procedures.
800.5	Consultation process.
800.6	Council procedures.
800.7	Other powers of the Council.
800.8	Criteria of effect.
800.9	Criteria of adverse effect.
800.10	National Register criteria.

AUTHORITY: Pub. L. 85-625, 80 Stat. 515, (16 U.S.C. 470); E.O. 11593, 3 CFR 1971 Comp., p. 154.

§ 800.1 Purpose and authorities.

(a) The National Historic Preservation Act of 1956 created the Advisory Council on Historic Preservation, an independent agency of the Executive branch of the Federal Government, to advise the President and Congress on matters involving historic preservation. Its members are the Secretary of the Interior, the Secretary of Housing and Urban Development, the Secretary of the Treasury, the Secretary of Commerce, the Attorney General, the Secretary of Transportation, the Secretary of Agriculture, the Administrator of the General Services Administration, the Secretary of the Smithsonian Institution, the Chairman of the National Trust for Historic Preservation, and 10 citizen members appointed by the President on the basis of their outstanding service in the field of historic preservation.

(b) The Council reviews Federal, federally assisted, and federally licensed undertakings affecting cultural properties as defined herein in accordance with the following authorities:

(1) Section 105 of the National Historic Preservation Act. Section 105 requires that Federal, federally assisted, and federally licensed undertakings affecting properties included in the National Register of Historic Places be submitted to the Council for review and comment prior to the approval of any such undertaking by the Federal agency.

(2) Section 1(3) of Executive Order 11593, May 13, 1971, "Protection and Enhancement of the Cultural Environment." Section 1(3) requires that Federal agencies, in consultation with the Council, establish procedures regarding the preservation and enhancement of non-federally owned historic and cultural properties in the execution of their plans and programs. After soliciting consultation with the Federal agencies, the Advisory Council has adopted procedures, set forth in §§ 800.3 through 800.10, to achieve this objective and Federal agencies should fulfill their responsibilities under section 1(3) by following these procedures. The Council further recommends that Federal agencies use these procedures as a guide in the development, in consultation with the Council, of their required internal procedures.

(3) Section 2(b) of Executive Order 11593, May 13, 1971, "Protection and Enhancement of the Cultural Environment." Federal agencies are required, by section 2(a) of the Executive Order, to locate, inventory, and nominate properties under their jurisdiction or control to the National Register. Until such processes are complete, Federal agencies must submit proposals for the transfer, sale, demolition, or substantial alteration of federally owned properties eligible for inclusion in the National Register to the Council for review and comment. Federal agencies must continue to comply with section 2(b) review requirements, even after the initial inventory is complete, when they obtain jurisdiction or control over additional properties that are eligible for inclusion in the National Register or when properties under their jurisdiction or control are found to be eligible for inclusion in the National Register subsequent to the initial inventory.

§ 800.2 Coordination with agency requirements under the National Environmental Policy Act.

Section 101(b) (4) of the National Environmental Policy Act (NEPA) declares that one objective of the national environmental policy is to "preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice." In order to meet this objective, the Advisory Council instructs Federal agencies to coordinate NEPA compliance with the separate responsibilities of the National Historic Preservation Act and Executive Order 11593 to ensure that historic and cultural resources are given proper consideration in the preparation of environmental impact statements. Agency obligations pursuant to the National Historic Preservation Act and Executive Order 11593 are independent from NEPA and must be complied with even when an environmental impact statement is not required. However, where both NEPA and the National Historic Preservation Act or Executive Order 11593 are applicable, the Council on Environmental Quality, in its Guidelines for the Preparation of Environmental Impact Statements (40 CFR Part 1500), directs that compliance with section 102(2)(C) of NEPA should, to the extent possible, be combined with other statutory obligations—such as the National Historic Preservation Act and Executive Order 11593—to yield a single document which meets all applicable requirements. To achieve this objective, Federal agencies should undertake, to the fullest extent possible, compliance with the procedures set forth below whenever properties included in or eligible for inclusion in the National Register are involved in a project to ensure that obligations under the National Historic Preservation Act and Executive Order 11593 are fulfilled during the preparation of a draft environmental impact statement required under section 102(2)(C) of NEPA. The Advisory Council recommends that compliance with these procedures be undertaken at the earliest

stages of the environmental impact statement process to expedite review of the statement. Statements on projects affecting properties included in or eligible for inclusion in the National Register should be sent directly to the Advisory Council for review. All statements involving historic, architectural, archaeological, or cultural resources, whether or not included in or eligible for inclusion in the National Register, should be submitted to the Department of Interior for review.

§ 800.3 Definitions.

As used in these procedures:

(a) "National Historic Preservation Act" means Public Law 89-665, approved October 13, 1966, an "Act to establish a program for the preservation of additional historic properties throughout the Nation and for other purposes," 30 Stat. 913, 16 U.S.C. 470, as amended, 34 Stat. 204 (1970) and 37 Stat. 139 (1973) hereinafter referred to as "the Act."

(b) "Executive Order" means Executive Order 11593, May 13, 1971, "Protection and Enhancement of the Cultural Environment," 36 FR 8921, 16 U.S.C. 470.

(c) "Undertaking" means any Federal action, activity, or program, or the approval, sanction, assistance, or support of any other action, activity or program, including but not limited to:

(1) Recommendations or favorable reports relating to legislation, including requests for appropriations. The requirement for following these procedures applies to both: Agency recommendations on their own proposals for legislation and agency reports on legislation initiated elsewhere. In the latter case only the agency which has primary responsibility for the subject matter involved will comply with these procedures.

(2) New and continuing projects and program activities: directly undertaken by Federal agencies; or supported in whole or in part through Federal contracts, grants, subsidies, loans; or other forms of funding assistance; or involving a Federal lease, permit, license, certificate, or other entitlement for use.

(3) The making, modification, or establishment of regulations, rules, procedures, and policy.

(d) "National Register" means the National Register of Historic Places, which is a register of districts, sites, buildings, structures, and objects, significant in American history, architecture, archeology, and culture, maintained by the Secretary of the Interior under authority of section 2(b) of the Historic Sites Act of 1935 (49 Stat. 658, 16 U.S.C. 481) and section 101(a)(1) of the National Historic Preservation Act. The National Register is published in its entirety in the Federal Register each year in February. Addenda are published on the first Tuesday of each month.

(e) "National Register property" means a district, site, building, structure, or object included in the National Register.

(f) "Property eligible for inclusion in the National Register" means any dis-

trict, site, building, structure, or object which the Secretary of the Interior determines is likely to meet the National Register Criteria. As these determinations are made, a listing is published in the Federal Register on the first Tuesday of each month, as a supplement to the National Register.

(g) "Decision" means the exercise of agency authority at any stage of an undertaking where alterations might be made in the undertaking to modify its impact upon historic and cultural properties.

(h) "Agency Official" means the head of the Federal agency having responsibility for the undertaking or a subordinate employee of the Federal agency to whom such authority has been delegated.

(i) "Chairman" means the Chairman of the Advisory Council on Historic Preservation, or such member designated to act in his stead.

(j) "Executive Director" means the Executive Director of the Advisory Council on Historic Preservation established by Section 205 of the Act, or his designated representative.

(k) "State Historic Preservation Officer" means the official within each State, authorized by the State at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the Act, or his designated representative.

(l) "Secretary" means the Secretary of the Interior, or his designee authorized to carry out the responsibilities of the Secretary of the Interior under Executive Order 11593.

§ 800.4 Agency procedures.

At the earliest stage of planning or consideration of a proposed undertaking, including comprehensive or area-wide planning in which provision may be made for an undertaking or an undertaking may be proposed, the Agency Official shall take the following steps to comply with the requirements of section 106 of the National Historic Preservation Act and sections 1(3) and 2(b) of Executive Order 11593.

(a) Identification of resources. As early as possible and in all cases prior to agency decision concerning an undertaking, the Agency Official shall identify properties located within the area of the undertaking's potential environmental impact that are included in or eligible for inclusion in the National Register.

(1) To identify properties included in the National Register, the Agency Official shall consult the National Register, including monthly supplements.

(2) To identify properties eligible for inclusion in the National Register, the Agency Official shall, in consultation with the appropriate State Historic Preservation Officer, apply the National Register Criteria, set forth in Section 800.10, to all properties possessing historical, architectural, archeological, or cultural value located within the area of the undertaking's potential environmental impact. If the Agency Official determines that a property appears to meet the Criteria, or if it is questionable

whether the Criteria are met, the Agency Official shall request, in writing, an opinion from the Secretary of the Interior respecting the property's eligibility for inclusion in the National Register. The Secretary of the Interior's opinion respecting the eligibility of a property for inclusion in the National Register shall be conclusive for the purposes of these procedures.

(b) Determination of effect. For each property included in or eligible for inclusion in the National Register that is located within the area of the undertaking's potential environmental impact, the Agency Official, in consultation with the State Historic Preservation Officer, shall apply the Criteria of Effect, set forth in Section 800.8, to determine whether the undertaking has an effect upon the property. Upon applying the Criteria and finding no effect, the undertaking may proceed. The Agency Official shall keep adequate documentation of a determination of no effect.

(c) Effect established. Upon finding that the undertaking will have any effect upon a property included in or eligible for inclusion in the National Register, the Agency Official, in consultation with the State Historic Preservation Officer, shall apply the Criteria of Adverse Effect, set forth in §800.9, to determine whether the effect of the undertaking is adverse.

(d) Finding of no adverse effect. Upon finding the effect not to be adverse, the Agency Official shall forward adequate documentation of the determination, including evidence of the views of the State Historic Preservation Officer, to the Executive Director for review. Unless the Executive Director notes an objection to the determination within 45 days after receipt of adequate documentation, the Agency Official may proceed with the undertaking.

(e) Finding of adverse effect. Upon finding the effect to be adverse or upon notification that the Executive Director does not accept a determination of no adverse effect, the Agency Official shall:

(1) Request, in writing, the comments of the Advisory Council; (2) notify the State Historic Preservation Officer of this request; (3) prepare a preliminary case report; and (4) proceed with the consultation process set forth in Section 800.5.

(f) Preliminary case report. Upon requesting the comments of the Advisory Council, the Agency Official shall provide the Executive Director and the State Historic Preservation Officer with a preliminary case report, containing all relevant information concerning the undertaking. The Agency Official shall obtain such information and material from any applicant, grantee, or other beneficiary involved in the undertaking as may be required for the proper evaluation of the undertaking, its effects, and alternate courses of action.

§ 800.5 Consultation process.

(a) Response to request for comments. Upon receipt of a request for Advisory Council comments pursuant to Section 800.4(e), the Executive Director shall ac-

knowledge the request and shall initiate the consultation process.

(b) *On-site inspection.* At the request of the Agency Official, the State Historic Preservation Officer, or the Executive Director, the Agency Official shall conduct an on-site inspection with the Executive Director, the State Historic Preservation Officer and such other representatives of national, State, or local units of government and public and private organizations that the consulting parties deem appropriate.

(c) *Public information meeting.* At the request of the Agency Official, the State Historic Preservation Officer, or the Executive Director, the Executive Director shall conduct a meeting open to the public, where representatives of national, State, or local units of government, representatives of public or private organizations, and interested citizens can receive information and express their views on the undertaking, its effects on historic and cultural properties, and alternate courses of action. The Agency Official shall provide adequate facilities for the meeting and shall afford appropriate notice to the public in advance of the meeting.

(d) *Consideration of alternatives.* Upon review of the pending case and subsequent to any on-site inspection and any public information meeting, the Executive Director shall consult with the Agency Official and State Historic Preservation Officer to determine whether there is a feasible and prudent alternative to avoid or satisfactorily mitigate any adverse effect.

(e) *Avoidance of adverse effect.* If the Agency Official, the State Historic Preservation Officer, and the Executive Director select and unanimously agree upon a feasible and prudent alternative to avoid the adverse effect of the undertaking, they shall execute a Memorandum of Agreement acknowledging avoidance of adverse effect. This document shall be forwarded to the Chairman for review pursuant to Section 800.5(a).

(f) *Mitigation of adverse effect.* If the consulting parties are unable to unanimously agree upon a feasible and prudent alternative to avoid any adverse effect, the Executive Director shall consult with the Agency Official and the State Historic Preservation Officer to determine whether there is a feasible and prudent alternative to satisfactorily mitigate the adverse effect of the undertaking. Upon finding and unanimously agreeing to such an alternative, they shall execute a Memorandum of Agreement acknowledging satisfactory mitigation of adverse effect. This document shall be forwarded to the Chairman for review pursuant to Section 800.6(a).

(g) *Memorandum of Agreement.* It shall be the responsibility of the Executive Director to prepare each Memorandum of Agreement required under these procedures. In preparation of such a document the Executive Director may request the Agency Official to prepare a proposal for inclusion in the Memorandum, detailing actions to be taken to avoid or mitigate the adverse effect.

(h) *Failure to avoid or mitigate adverse effect.* Upon the failure of consulting parties to find and unanimously agree upon a feasible and prudent alternative to avoid or satisfactorily mitigate the adverse effect, the Executive Director shall request the Chairman to schedule the undertaking for consideration at the next Council meeting and notify the Agency Official of the request. Upon notification of the request, the Agency Official shall delay further processing of the undertaking until the Council has transmitted its comments or the Chairman has given notice that the undertaking will not be considered at a Council meeting.

§ 800.6. Council procedures.

(a) *Review of Memorandum of Agreement.* Upon receipt of a Memorandum of Agreement acknowledging avoidance of adverse effect or satisfactory mitigation of adverse effect, the Chairman shall institute a 30-day review period. Unless the Chairman shall notify the Agency Official that the matter has been placed on the agenda for consideration at a Council meeting, the memorandum shall become final: (1) Upon the expiration of the 30-day review period with no action taken; or (2) when signed by the Chairman. Memoranda duly executed in accordance with these procedures shall constitute the comments of the Advisory Council. Notice of executed Memoranda of Agreement shall be published in the *Federal Register* monthly.

(b) *Response to request for consideration at Council meeting.* Upon receipt of a request from the Executive Director for consideration of the proposed undertaking at a Council meeting, the Chairman shall determine whether or not the undertaking will be considered and notify the Agency Official of his decision. To assist the Chairman in this determination, the Agency Official and the State Historic Preservation Officer shall provide such reports and information as may be required. If the Chairman decides against consideration at a Council meeting, he will submit a written summary of the undertaking and his decision to each member of the Council. If any member of the Council notes an objection to the decision within 15 days of the Chairman's decision, the undertaking will be scheduled for consideration at a Council meeting. If the Council members have no objection, the Chairman shall notify the Agency Official at the end of the 15-day period that the undertaking may proceed.

(c) *Decision to consider the undertaking.* Upon determination that the Council will consider an undertaking, the Chairman shall: (1) Schedule the matter for consideration at a regular meeting no less than 60 days from the date the request was received, or in exceptional cases, schedule the matter for consideration in an unassembled or special meeting; (2) notify the Agency Official and the State Historic Preservation Officer of the date on which comments will be considered; and (3) authorize the Executive Director to prepare a case report.

(d) *Content of the case report.* For

purposes of arriving at comments, the Advisory Council prescribes that certain reports be made available to it and accepts reports and statements from other interested parties. Specific informational requirements are enumerated below. Generally, the requirements represent an explication or elaboration of principles contained in the Criteria of Effect and in the Criteria of Adverse Effect. The Council notes, however, that the Act recognizes historical and cultural resources should be preserved "as a living part of our community life and development." Consequently, in arriving at final comments, the Council considers those elements in an undertaking that have relevance beyond historical and cultural concerns. To assist it in weighing the public interest, the Council welcomes information not only bearing upon physical, sensory, or esthetic effects but also information concerning economic, social, and other benefits or detriments that will result from the undertaking.

(e) *Elements of the case report.* The report on which the Council relies for comment shall consist of:

(1) A report from the Executive Director to include a verification of the legal and historical status of the property; an assessment of the historical, architectural, archeological, or cultural significance of the property; a statement indicating the special value of features to be most affected by the undertaking; an evaluation of the total effect of the undertaking upon the property; a critical review of any known feasible and prudent alternatives and recommendations to remove or mitigate the adverse effect;

(2) A report from the Agency Official requesting comment to include a general discussion and chronology of the proposed undertaking; when appropriate, an account of the steps taken to comply with section 102(2)(A) of the National Environmental Policy Act of 1969 (93 Stat. 852, 42 U.S.C. 4321); an evaluation of the effect of the undertaking upon the property, with particular reference to the impact on the historic, architectural, archeological and cultural values; steps taken or proposed by the agency to take into account, avoid, or mitigate adverse effects of the undertaking; a thorough discussion of alternate courses of action; and, if applicable and available, a copy of the draft environmental statement prepared in compliance with section 102(2)(C) of the National Environmental Policy Act of 1969;

(3) A report from any other Federal agency having under consideration an undertaking that will concurrently or ultimately affect the property, including a general description and chronology of that undertaking and discussion of the relation between that undertaking and the undertaking being considered by the Council;

(4) A report from the State Historic Preservation Officer to include an assessment of the significance of the property; an identification of features of special value; an evaluation of the effect of the undertaking upon the property and its specific components; an evaluation of

known alternate courses of action; a discussion of present or proposed participation of State and local agencies or organizations in preserving or assisting in preserving the property; an indication of the support or opposition of units of government and public and private agencies and organizations within the State; and the recommendations of his office;

(5) A report by any applicant or potential recipient when the Council considers comments upon an application for a contract, grant, subsidy, loan, or other form of funding assistance, or an application for a Federal lease, permit, license, certificate, or other entitlement for use. Arrangements for the submission and presentation of reports by applicants or potential recipients shall be made through the Agency Official having jurisdiction in the matter; and

(6) Other pertinent reports, statements, correspondence, transcripts, minutes, and documents received by the Council from any and all parties, public or private. Reports submitted pursuant to this section should be received by the Council at least two weeks prior to a Council meeting.

(f) *Coordination of case reports and statements.* In considerations involving more than one Federal department, either directly or indirectly, the Agency Official requesting comment shall act as a coordinator in arranging for a full assessment and discussion of all interdepartmental facets of the problem and prepare a record of such coordination to be made available to the Council. At the request of the Council, the State Historic Preservation Officer shall notify appropriate governmental units and public and private organizations within the State of the pending consideration of the undertaking by the Council, and coordinate the presentation of written statements to the Council.

(g) *Council meetings.* The Council does not hold formal hearings to consider comments under these procedures. Two weeks notice shall be given, by publication in the *Federal Register*, of all meetings involving Council review of Federal undertakings in accordance with these procedures. Reports and statements will be presented to the Council in open session in accordance with a prearranged agenda. Regular meetings of the Council generally occur on the first Wednesday and Thursday of February, May, August and November.

(h) *Oral statements to the Council.* A schedule shall provide for oral statements from the Executive Director; the referring Agency Official presently or potentially involved; the applicant or potential recipient, when appropriate; the State Historic Preservation Officer; and representatives of national, State, or local units of government and public and private organizations. Parties wishing to make oral remarks shall submit written statements of position in advance to the Executive Director.

(i) *Comments by the Council.* The comments of the Council, issued after consideration of an undertaking at a

Council meeting, shall take the form of a three-part statement, including an introduction, findings, and a conclusion. The statement shall include notice to the Agency Official of the report required under section 800.6(j) of these procedures. Comments shall be made to the head of the Federal Agency requesting comment or having responsibility for the undertaking. Immediately thereafter, the comments of the Council will be forwarded to the President and the Congress as a special report under authority of section 202(b) of the Act and published as soon as possible in the *Federal Register*. Comment shall be available to the public upon receipt of the comments by the head of the Federal agency.

(j) *Report of agency action in response to Council comments.* When a final decision on the undertaking is reached by the Federal Agency, the Agency Official shall submit a written report to the Council containing a description of actions taken by the Federal Agency subsequent to the Council's comments; a description of actions taken by other parties pursuant to the actions of the Federal Agency; and the ultimate effect of such actions on the property involved. The Council may request supplementary reports if the nature of the undertaking requires them.

(k) *Records of the Council.* The records of the Council shall consist of a record of the proceedings at each meeting, the case report prepared by the Executive Director, and all other reports, statements, transcripts, correspondence, and documents received.

(l) *Continuing review jurisdiction.* When the Council has commented upon an undertaking pursuant to Section 800.6 such as a comprehensive or area-wide plan that by its nature requires subsequent action by the Federal Agency, the Council will consider its comments or approval to extend only to the undertaking as reviewed. The Agency Official shall ensure that subsequent action related to the undertaking is submitted to the Council for review in accordance with § 309.4(e) of these procedures when that action is found to have an adverse effect on a property included in or eligible for inclusion in the National Register.

§ 800.7 Other powers of the Council.

(a) *Comment or report upon non-Federal undertaking.* The Council will exercise the broader advisory powers, vested by section 202(a) (1) of the Act, to recommend measures concerning a non-Federal undertaking that will adversely affect a property included in or eligible for inclusion in the National Register: (1) upon request from the President of the United States, the President of the U.S. Senate, or the Speaker of the House of Representatives, or (2) when agreed upon by a majority vote of the members of the Council.

(b) *Comment or report upon Federal undertaking in special circumstances.* The Council will exercise its authority to comment to Federal agencies in certain special situations even though written notice that an undertaking will have an

effect has not been received. For example, the Council may choose to comment in situations where an objection is made to a Federal agency finding of "no effect."

§ 800.8 Criteria of effect.

A Federal, federally assisted, or federally licensed undertaking shall be considered to have an effect on a National Register property or property eligible for inclusion in the National Register (districts, sites, buildings, structures, and objects, including their settings) when any condition of the undertaking causes or may cause any change, beneficial or adverse, in the quality of the historical, architectural, archeological, or cultural character that qualifies the property under the National Register Criteria:

§ 800.9 Criteria of adverse effect.

Generally, adverse effects occur under conditions which include but are not limited to:

- (a) Destruction or alteration of all or part of a property;
- (b) Isolation from or alteration of its surrounding environment;
- (c) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- (d) Transfer or sale of a federally owned property without adequate conditions or restrictions regarding preservation, maintenance, or use; and
- (e) Neglect of a property resulting in its deterioration or destruction.

§ 800.10 National Register criteria.

(a) "National Register Criteria" means the following criteria established by the Secretary of the Interior for use in evaluating and determining the eligibility of properties for listing in the National Register: The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association and:

- (1) That are associated with events that have made a significant contribution to the broad patterns of our history; or
- (2) That are associated with the lives of persons significant in our past; or
- (3) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(4) That have yielded, or may be likely to yield, information important in prehistory or history.

(b) *Criteria considerations.* Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in na-

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ture, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

(1) A religious property deriving primary significance from architectural or artistic distinction or historical importance;

(2) A building or structure removed from its original location but which is

the surviving structure most importantly associated with a historic person or event;

(3) A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life;

(4) A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events;

(5) A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived;

(6) A property primarily commemorative in intent if design, age tradition, or symbolic value has invested it with its own historical significance; or

(7) A property achieving significance within the past 50 years if it is of exceptional importance.

[FR Doc. 74-1934 Filed 1-24-74; 2:45 a.m.]

The following properties were listed on the National Register of Historic Places as of December 15, 1975. National Historic Landmarks are designated by NHL; properties recorded by Historic American Buildings Survey are designated by HABS; properties recorded by Historic American Engineering Record are designated by HAER.

Interagency Archeological Services
Office of Archeology and Historic Preservation
National Park Service
U.S. Department of the Interior
Washington, D.C. 20240
[202-523-5293]

Archeological and Historic Preservation Act

Public Law 93-291
93rd Congress, S. 514
May 24, 1974

AN ACT

88 STAT. 174

To amend the Act of June 27, 1960 (74 Stat. 220), relating to the preservation of historical and archeological data.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act entitled "An Act to provide for the preservation of historical and archeological data (including relics and specimens) which might otherwise be lost as the result of the construction of a dam", approved June 27, 1960 (74 Stat. 220; 16 U.S.C. 469), is amended as follows: "That it is the purpose of this Act to further the policy set forth in the Act entitled 'An Act to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance, and for other purposes', approved August 21, 1935 (16 U.S.C. 461-467), by specifically providing for the preservation of historical, and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of (1) flooding, the building of access roads, the erection of workmen's communities, the relocation of railroads and highways, and other alterations of the terrain caused by the construction of a dam by any agency or (2) any alteration of the terrain caused as a result of any Federal construction project or federally licensed activity or program.

Historical and
archeological
data, preserva-
tion.

Extension to
Federal or fed-
erally assisted
projects.
16 USC 469a.

Sec. 2. Before any agency of the United States shall undertake the construction of a dam, or issue a license to any private individual or corporation for the construction of a dam it shall give written notice to the Secretary of the Interior (hereafter referred to as the "Secretary") setting forth the site of the proposed dam and the approximate area to be flooded and otherwise changed if such construction is undertaken: Provided, That with respect to any floodwater retarding dam which provides less than five thousand acre-feet of detention capacity and with respect to any other type of dam which creates a reservoir of less than forty surface acres the provisions of this section shall apply only when the constructing agency, in its preliminary surveys, finds, or is presented with evidence that historical, or archeological materials exist or may be present in the proposed reservoir area.

Sec. 3. (a) Whenever any Federal agency finds, or is notified, in writing, by an appropriate historical or archeological authority, that its activities in connection with any Federal construction project or federally licensed project, activity, or program may cause irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data, such agency shall notify the Secretary, in writing, and shall provide the Secretary with appropriate information concerning the project, program, or activity. Such agency may request the Secretary to undertake the recovery, protection, and preservation of such data (including preliminary survey, or other investigation as needed, and analysis and publication of the reports resulting from such investigation), or it may, with funds appropriated for such project, program, or activity, undertake such activities. Copies of reports of any investigations made pursuant to this section shall be submitted to the Secretary, who shall make them available to the public for inspection and review.

(b) Whenever any Federal agency provides financial assistance by loan, grant, or otherwise to any private person, association, or public entity, the Secretary, if he determines that significant scientific, prehistorical, historical, or archeological data might be irrevocably lost or destroyed, may with funds appropriated expressly for this purpose conduct, with the consent of all persons, associations or public entities having a legal interest in the property involved, a survey of the affected site and undertake the recovery, protection, and preservation of such data (including analysis and publication). The Secretary shall, unless otherwise mutually agreed to in writing, compensate any person, association, or public entity damaged as a result of delays in construction or as a result of the temporary loss of the use of private or any non-federally owned lands.

Sec. 4. (a) The Secretary, upon notification, in writing, by any Federal or State agency or appropriate historical or archeological authority that scientific, prehistorical, historical, or archeological data is being or may be irrevocably lost or destroyed by any Federal or federally assisted or licensed project, activity, or program, shall, if he determines that such data is significant and is being or may be irrevocably lost or destroyed and after reasonable notice to the agency responsible for funding or licensing such project, activity, or program, conduct or cause to be conducted a survey and other investigation of the areas which are or may be affected and recover and preserve such data (including analysis and publication) which, in his opinion,

16 USC 469a-1.

Notification.

Data recovery,
agency requests.

Reports, copies;
availability.

Survey.

Construction de-
lays, compensa-
tion.

16 USC 469a-2.

are not being, but should be, recovered and preserved in the public interest.

(b) No survey or recovery work shall be required pursuant to this section which, in the determination of the head of the responsible agency, would impede Federal or federally assisted or licensed projects or activities undertaken in connection with any emergency, including projects or activities undertaken in anticipation of, or as a result of, a natural disaster.

Emergency projects.

(c) The Secretary shall initiate the survey or recovery effort within sixty days after notification to him pursuant to subsection (a) of this section or within such time as may be agreed upon with the head of the agency responsible for funding or licensing the project, activity, or program in all other cases.

Initiation.

(d) The Secretary shall, unless otherwise mutually agreed to in writing, compensate any person, association, or public entity damaged as a result of delays in construction or as a result of the temporary loss of the use of private or non-federally owned lands.

Construction delays, compensation.

Sec. 5. (a) The Secretary shall keep the agency responsible for funding or licensing the project notified at all times of the progress of any survey made under this Act, or of any work undertaken as a result of such survey, in order that there will be as little disruption or delay as possible in the carrying out of the functions of such agency and the survey and recovery programs shall terminate at a time mutually agreed upon by the Secretary and the head of such agency unless extended by mutual agreement.

74 Stat. 220.
16 USC 469a.
16 USC 469a-3.

(b) The Secretary shall consult with any interested Federal and State agencies, educational and scientific organizations, and private institutions and qualified individuals, with a view to determining the ownership of and the most appropriate repository for any relics and specimens recovered as a result of any work performed as provided for in this section.

(c) The Secretary shall coordinate all Federal Survey and recovery activities authorized under this Act and shall submit an annual report at the end of each fiscal year to the Interior and Insular Affairs Committees of the United States Congress indicating the scope and effectiveness of the program, the specific projects surveyed and the results produced, and the costs incurred by the Federal Government as a result thereof.

Coordination.
Annual report to congressional committees.

Sec. 6. In the administration of this Act, the Secretary may--

16 USC 469b.

(1) enter into contracts or make cooperative agreements with any Federal or State agency, any educational or

scientific organization, or any institution, corporation, association, or qualified individual; and

(2) obtain the services of experts and consultants or organizations thereof in accordance with section 3109 of title 5, United States Code; and

(3) accept and utilize funds made available for salvage archeological purposes by any private person or corporation or transferred to him by any Federal agency.

Sec. 7. (a) To carry out the purposes of this Act, any Federal agency responsible for a construction project may assist the Secretary and/or it may transfer to him such funds as may be agreed upon, but not more than 1 per centum of the total amount authorized to be appropriated for such project, except that the 1 per centum limitation of this section shall not apply in the event that the project involves \$50,000 or less: Provided, That the costs of such survey, recovery, analysis, and publication shall be considered nonreimbursable project costs.

(b) For the purposes of subsection 3(b), there are authorized to be appropriated such sums as may be necessary, but not more than \$500,000 in fiscal year 1974; \$1,000,000 in fiscal year 1975; \$1,500,000 in fiscal year 1976; \$1,500,000 in fiscal year 1977; and \$1,500,000 in fiscal year 1978.

(c) For the purposes of subsection 4(a) there are authorized to be appropriated not more than \$2,000,000 in fiscal year 1974; \$2,000,000 in fiscal year 1975; \$3,000,000 in fiscal year 1976; \$3,000,000 in fiscal year 1977; and \$3,000,000 in fiscal year 1978.

Approved May 24, 1974

Experts and
consultants.
80 Stat. 416
Funds,
acceptance.

Funds,
transfer,
16 USC 469c.

Appropriation.

88 STAT. 176

LEGISLATIVE HISTORY:

HOUSE REPORT No. 93-992 accompanying H.R. 296 (Comm. on Interior and Insular Affairs).

SENATE REPORT No. 93-163 (Comm. on Interior and Insular Affairs).

CONGRESSIONAL RECORD:

Vol. 119 (1973): May 22, considered and passed Senate.

Vol. 120 (1974): May 6, considered and passed House,
amended, in lieu of H.R. 296.

May 9, Senate agreed to House amendments.

Appendix VIII

District Heating Systems

Daivd A. Larsen

Definitions excerpted from the State of Utah policy-plan
and enacted by the legislature in law.

- a. Geothermal area means the general land area which is underlain or reasonably appears to be underlain by geothermal resources.
- b. Geothermal fluid means water and steam naturally present in a geothermal system.
- c. Geothermal resource means (1) the natural heat of the earth at temperatures greater than 120 degrees centigrade. (2) the energy, in whatever form, present in, resulting from, created by or which may be extracted from that natural heat, including pressure, (3) the material medium containing the energy, and (4) all minerals, gases or other substances in solution with or obtained from the material medium but excluding oil, hydrocarbon gas and other hydrocarbon substances.
- d. Geothermal system means any strata, pool, reservoir or other geologic formation containing geothermal resources.
- e. Material medium means geothermal fluids, or water and other substances specifically introduced into a geothermal system to serve as a heat transfer medium.
- f. Operator means any person drilling, maintaining, operating, producing or in control of any well.
- g. Owner means any person who has the right to drill into, produce and make use of the geothermal resource.
- h. Person means any individual, business entity (corporate or otherwise) or political subdivision of this or any other state.
- i. Waste means any inefficient, excessive or improper production, use of or dissipation of geothermal resources. Wasteful practices in-

clude but are not limited to:

1. transporting or storage methods that cause or tend to cause unnecessary surface loss of geothermal resources.
2. locating, spacing, constructing, equipping, operating, producing or venting of any well in a manner that results or tends to result in unnecessary surface loss or in reducing the ultimate economic recovery of geothermal resources.

j. Well means any well drilled, converted or reactivated for the discovery, testing, production or subsurface injection of geothermal resources.

There are currently at least five villages and cities in the western United States that are either retrofitting existing housing structures or are building new structures that utilize geothermal energy as a heating source. These include, City of Desert Hot Springs, Desert Hot Springs Ca., Clear Lake region, Lake County, Ca., Klamath Falls, Oregon, Reno, Nevada, El Centro, Ca. and others. Research is currently underway in Portland, Oregon, San Carlos Indian reservation, Cheyenne River reservation and in other areas.

Geothermal direct applications comprise approximately 7,000 Mwt of thermal heat used in the world for heating and cooling, for agricultural and aquaculture production and for industrial process heat. Major application areas using direct thermal fluids include Hungary, Iceland, Italy, New Zealand, Japan and the USSR. One

advantage in using direct thermal heat fluids is that lower temperature resources can be utilized. Another advantage includes higher utilization efficiency and development time is usually short. Costs of direct geothermal fluid utilization are, in most instances, below that of comparable fossil fuel energy.

There are a number of statutory, economic and environmental barriers to geothermal utilization. California currently has well defined statutes pertaining to geothermal energy. Seven other states are in the process of designing statutes regulating geothermal energy and are currently working with the National Conference of State Legislatures to overcome problems of resource definition, resource ownership, land use and regulatory delays. The states are Delaware, Virginia, Oregon, New Mexico, Utah, Hawaii and Alaska.

According to a recent Overview of Technology Commercialization Assessment published by DOE, energy costs for both electric and direct use applications are 1) site specific, and 2) competitive with conventional coal with scrubbers (control technologies include Stretford Process, iron catalyst process, EIC process, Dow Oxygenation Process, wastewater treatment and disposal technologies.)

Environmental impacts from geothermal resource development include airborne effluents, waterborne effluents, subsidence, water use conflicts, noise, enhanced seismicity, land use conflicts, socio-economic impact and system safety and occupational health.

Compounds that can be found in geothermal fluids include CO_2 , NH_3 , As, H_2S , CH_4 , Rn, Hg, and B. These chemicals and salts can be released into the atmosphere and may impact local ecology and the

health of nearby residents.

Care must be taken so that spent fluids which contain high concentrations of dissolved solids will not be reinjected into cleaner water systems. New regulations are currently proposed for under the Underground Injection Control (UIC). It is suspected that there may be significant delay in certain development areas if high content saline fluids cannot be treated properly. The Environmental Protection Agency (EPA) has standards to protect drinking water (see Safe Drinking Water Act).

Removal of large quantities of geothermal fluids can result in subsidence. Significant impact could result in subsidence where areas of withdrawal are located near residential districts that use thermal energy for heating and cooling purposes.

Noise can be a problem during geothermal well drilling and well venting operations and can attain 110dB. This may impact nearby residential districts during this time.

It is suspected that the withdrawal and/or reinjection of geothermal fluids may increase the frequency or magnitude of seismic events. It is also suspected that reservoir cool-down from fluid withdrawal may induce micro-seismic activity. This could then relieve and reduce pressure and thereby preclude any large seismic event. DOE is conducting seismic baseline studies to monitor these types of activities in geothermal development areas.

Water use conflicts may arise in semi-arid and arid regions concerning ownership and the most beneficial use of the scarce water resources. Alternate sources of water will have to be located and de-

veloped in some areas where water is scarce.

Land use conflicts may arise in areas where new housing developments take place. This may be a result of surface space rights for fluid transfer that may impinge on agricultural or recreational land areas. This problem should be mitigated previous to development.

A very important issue relating to geothermal heating use in homes will be that of local ordinance design and that of conditional use permits in residential neighborhoods. Existing local ordinances may not permit the use of geothermal energy due to surface changes and hardware related to development.

The ordinances should:

1. reduce public hazard from air and water pollutants and not endanger public health, safety and welfare.
2. protect adjoining property owners from waste contamination, subsidence, and groundwater impact.
3. maintain water quality
4. reduce future costs by insuring minimal environmental degradation

The ordinances should be designed to refocus land-use controls to maintain the natural processes of these sensitive areas. This is contrary to design ating the specific type of land-use, and is geared to performance of the land processes rather than restricting the development project. The planning department should identify the positive features of the land it needs to preserve and provide greater flexibility for the development project by fitting within this framework the decisions it will make.

Creation of district heating systems utilizing geothermal energy is a very promising use of the resource, especially considering the potential of displacing a heavy dependence on oil and gas for space heating and cooling. Some estimates are that 40% of all U.S. energy consumption is in oil and gas for heating homes, (see Sucarto, State Policies for Geothermal Development.).

New district heating legislation could form an excellent basis for establishing geothermal heating districts in the various states with geothermal fluids. District heating legislation has a number of options available including requiring that existing wells be incorporated into geothermal heating districts; determine what compensation is due, if any, to any owner with an existing well whose supply is depleted by heating district formation; grant eminent domain authority to heating districts.

There are also a number of incentives available to state governments that they may use to stimulate the utilization of geothermal energy. Local, county and state governments could provide tax exemptions for new housing developments that utilize geothermal resources for space heating and cooling. State governments could extend or initiate loan programs for residential geothermal energy facilities to residents to a limit of \$3,000. The state governments could also issue bonds for an energy fund. The creation of inter-state coordinating committees may also expediate the development of geothermal energy.

Along with these measures, the Interagency Geothermal Coordinating Council (IGCC) and the DOE are currently drafting a geothermal energy omnibus bill. Under this new bill, changes are being made to three geothermal resource acts and to five acts under the National Energy

Act.

Under P.L.93-410, the geothermal loan guaranty program, authorization for loan guaranties will also go to SBA, REA, HUD and FmHA to make loan guaranties for up to 90% of project costs. Under the revised Geothermal Steam Act, authorization for free use of small scale direct use applications will be made. Under the Energy Tax Act of 1978, there will be authorization to eliminate minimum tax on Geothermal Intangible Drilling Costs. Sen. Frank Church's staff is currently drafting a bill that would provide up to 90% guaranteed costs for reservoir confirmation. This bill is still in the drafting stages. Under the proposed amendments to the National Energy Conservation Policy Act, there would include geothermal space heating in grants, secondary financing and loan insurance programs. It would include geothermal in programs for grants to hospitals, schools, government buildings and public care facilities. It would also include geothermal in Federal buildings programs and authorize increase in HUD and FmHA loan limits for geothermal heating and cooling equipment.

To overcome the various statutory barriers to geothermal development it will be necessary for state government to define the resource (as in the case of Utah) so a flexible user-owner relationship can develop which will expediate the development process and minimize conflicts over ownership and utilization. Low temperature fluids may require minimal state regulation and jurisdiction.

States may develop and implement loan and grant programs to expediate the development by providing working capital to local governments and other interested development parties. This will follow similar programs that are being developed at the Federal level which will

provided by the Federal regional offices through DOE, Department of Agriculture and HUD.

Due to the lack of experience with geothermal utilization in many areas in the U.S. where the resource does exist, it may be necessary for Federal regional offices and state programs to provide educational workshops and seminars as an outreach program to the local public. This type of program should develop significant interest to motivate the private consumer, keeping in mind that geothermal energy is a renewable resource. Investment, though high initially, can be amortized over years and can provide a free heating source after initial costs are recovered.

Environmental considerations may be a major impediment to geothermal development. The greatest impacts may be due to H_2S emissions, water use conflicts and subsidence.

Sulfur (H_2S) emissions can be a problem in areas such as the Geysers area in Ca. and may be encountered in other development areas. Toxic chemicals such as arsenic and mercury will have to be monitored and strictly regulated to insure minimal impact to local residents for health reasons.

Water is an important necessity to everyone and ownership and utilization rights will have to be defined to permit a maximum utilization level.

Subsidence has been encountered in New Zealand and Colorado and will have to be monitored and regulated by local officials to minimize impact to local resident populations. This can be a significant problem if encountered in residential areas for damage to housing structures may result. Emergency plans for local resident evacuation should be

written previous to geothermal development so that families will be inconvenienced as minimally as possible. Emergency shelters for families will have to be designated. State aid through emergency grants and loans should be available in the event of subsidence in a residential district. This will expediate the rebuilding of the structure(s) if the problem does arise.

Concerning the issue of local ordinance design- a maximum feasible participation will be necessary so that local residential concerns are examined, understood and reflected in the ordinances. This type of ordinance design approach will minimize local conflicts so that a maximum level of utilization and efficiency may be approached.

Figure 12.—Map showing geologic provinces of the Western United States (modified from the physiographic provinces of Fenneman, 1946). Dots indicate locations of identified hydrothermal convection systems with reservoir temperatures 290°C . G = The Geysers; V = Valles Caldera.

tribution of identified geothermal systems. The provinces and subprovinces are shown in figure 12, and the identified and undiscovered components of the accessible resource base for each province are given in table 8.

In the preparation of the estimates summarized in table 8, the undiscovered component

usually is estimated to be 1, 2, 5, 10 or 20 times the identified accessible resource base for each geologic province considered. In provinces where substantial information is available on the hydrothermal convection systems, the estimate is based primarily on the size of the area that appears favorable for the occurrence

\$10 Million District Heating Project

<u>Occupational Distribution and Skills</u>	<u>Design & Construction Phase</u>		<u>Operation Phase</u>
	<u>Months</u>	<u>Man Years</u>	
<u>Managerial:</u>			
Project Manager	12	1	1
<u>Engineering:</u>			
(6 listed @ 6 mo)	6		
	6		
	6		
	6	3 (office)	1
	6		
	6		
Construction Engineer	12	2 (site)	1
Construction Clerk	12		
Technicians (3)	12 (site)		
	6 (office)	6	
Blue collar (38)	12		
Unskilled (20)	12	58	4

The number of man years for this particular space heating project can be calculated as follows for (1) Construction management, (2) Design and Engineering, and (3) Construction labor. Construction management is displayed in the above table. Design and engineering manhours (MH) are computed by rule of thumb as follows:

Design & Engineering Manhours = (0.06) (\$10 million) = \$600,000

MH = $\frac{\$600,000}{\$25/\text{MH}}$ = 24,000 MH = 139 man months
= 12 man years

Construction Labor manhours are computed as:

Construction Labor $\approx$ (0.3) (Capital Cost) = (0.03)(\$10 million)
= \$3 million

MH = $\frac{\$3 \text{ million}}{\$25/\text{MH}}$ = 120,000 MH = 694 man months
= 58 man years

CONCEPTUAL DESIGN Forced air-duct geothermal heating system - electric blower thermostat control

tin duct in floorboard with vent(s)
tin .20-.24 ga. cowl off tank

Principle: evapotranspiration

Standards: conditional use permits
to comply with building and housing
codes in residentially zoned districts

Other considerations:

- slope of fluid in-take & out-take
- slope of fluid tank
- pitting & scaling of ducts depends
on fluid chemical content, surface
treatment may be necessary
- Condensation on ducts-drip catch
spout at base of vent - $\frac{1}{2}$ " I.D.
Copper tube drainage under
floor back to tank
- tank must be well sealed with
butyl or other caulk to prevent
seepage which may fracture
and crack foundation
- enclosed surface blower cage
protect from elements
- surface shut-off valves for summer
months
- humidity will remain high during
dry winter months
- filter over cowl may trap air
borne particulates

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Appendix IX

April, 1979

Examples of Draft Reservation Profiles

Fort Hall
San Carlos
San Xavier
Yakima Industrial Park

Compiled by:

David Larsen

others in progress

ROUGH DRAFT

Fort Hall

On the southeast border of the Fort Hall reservation is located the city of Pocatello with a population of 40,036. The city is served by air, rail, and highway transportation. The Union Pacific Railway headquarters are located in Pocatello. There is an airport in the city with service highways including Interstate Highways 15 and 15 West, and U.S. Highways 191, 91 and 30.

There are approximately 50 manufacturing plants operating in Pocatello. The range of products include phosphate fertilizer, elemental phosphorous, dairy products, steel fabrication, lithographed supplies, grain products, cement products, beverages, machinery and pre-fabricated homes. Potatoe processing and farming are the major hinterland industries. ✓

Located on the north border of the reservation is the town of Fort Hall with a population of 9,000. The population exceeds 100,000 within a twenty-five mile radius of Fort Hall.

The cities are served by gas, electric, telephone and water.

History

Previous to the treaty of 1863, the Shoshone-Bannocks had occupied land in Oregon, Montana, Nevada, Utah, Wyoming and Idaho. Much of this land was disposed of through public laws, conversion to national forests or through acquisition for public use.

The Fort Hall reservation was established on the Snake River as a result of the Fort Bridger Treaty of July 3, 1868.

The original treaty was made with the Shoshone Tribe who were closely related to the Shoshone at Wind River. Many of the Shoshone groups were split up by the government after the Bannock wars. Some went to Fort Hall, others to Owyhee and Warm Springs. The Lembi on Fort Hall are Northern Shoshone. There are also Bannock Creek on the Washakie. Paid allotment who are closely related to the Goshute Utes.

The Shoshone are adaptive to the dominant white culture and have retained many of their cultural beliefs and practices.

They have achieved in education, continuous productive employment, and self-employed business type ventures. Local leaders and the general population must be credited for their progressiveness and determination.

Population figures were expected to rise over 3,000 by 1975 (most current available statistics).

type of employment	# employed
Non-Commercial, Industrial and tourism (jewelry, bead-work, etc.)	220
Government	191
Agricultural	144
Mining	69

Employment fluctuates due to the seasonality of certain jobs - agriculture, tourism and mining.

Physical Features

Fort Hall reservation totals 523,104 acres in area and lies in

Bannock, Birgham, Caribou and Power counties. The topography varies by elevation and climate and has several distinct areas that include: The Bottoms, The Gibson Flats, Michale Flats, Putnam Mountain area, Bucksin basin, Ross Fort, Bannock creek, Blackfoot river headwaters, and the Portnewf river drainage area. ✓

The Bottoms area is a flat, grassy plain with numerous creeks. Winder grazing and hay occupy the area with numerous natural grasses. ✓

Gibson Flats, Buchskin Basin and Michael Flats are irrigated farmland areas with extensive water and land resources. The foothill region is peripheral to these areas. Here we find intensive dry farming, open grassy slops and dense Aspen thickets in the ravines. ✓
Putnam mountain area is highest in elevation and support small stands of Dougals Fir, Balsam and Lodgepole Pine.

The soils vary by drainage, texture and type as indicated by the attached map.

The major crop grown on the reservation is potatoes. There is also some alfalfa grown on tribal owned and allotted land.

There are currently problems related to land use, land ownership and non-Indina rental of allotted lands. The checkerboard nature of allotted, tribal owned and non-Indian leased land on the reservation resuts in inefficient or low capital returns of agricultural production. This often time compels other allottees to lease their land thereby diminishing economic return to the individuals and/or the tribe.

Wind and water erosion are also another major problem on reservation lands. This is amplified even more when the land is left fallow because surface area increases and there is little vegetative matter (except weeds) available to impede the erosion process. Improper crop rotation and cultural practices are leading to much of the erosion of the tribe's land resources. ✓

There are currently over ten (10) identified geothermal springs within twenty miles of the reservation boundaries and also at least five geothermal wells within the vicinity. ✓

Temperatures are within low thermal gradients (under 50°C - 122°F) but, most of the wells are shallow - under 500 feet. With deeper exploration wells, increased thermal gradients may very well approach temperatures that are utilizable in direct applications, as is already done in some nearby areas. ✓

The Fort Hall reservation is located directly over the projected Mendocino fracture (see - Geothermal Resources of Idaho, Mono M. Warner, compiled by David Anderson and L.H. Axtell) Regional and local geology indicate that Idaho does have high geothermal potential. ✓

In a recent conversation with Bill Langely, the economic planner for Fort Hall reservation, he indicated that the tribal council is very seriously considering two or three geothermal exploration wells on the

reservation.

Due to the availability of potatoe products on the reservation the tribal council has considered distilling alcohol to be used in a tribal gasoline station located on one of the major interstate highways.

I have sent to Bill a number of related acts addresses of contact people, maps, bidding stats. and other relevant material related to the distillation process.

The tribe will be kept abreast of recent legislation and program monies that are available.

SOIL ASSOCIATION LEGEND

- ☐ Soils of Bottomland & Stream Terraces
 1. Snake - Woodhall - Peteetneet
 2. Zundell
 3. Baldock - Parehat - Hardy
 4. Parehat - McDole

- ☐ Soils of Well Drained Alluvial Terraces & Fans
 5. Panioque - Declo - Schiller
 6. Panioque - Broncho
 7. Neibaur - Cencove - Galtham
 8. Rupert - Feltham
 9. Tahquats - Dranyon

- ☐ Soils of Coarse Textured Aeolian
 10. Quincy - Feltham

- ☐ Soils of Loess Uplands
 11. Pocatello - Portneuf - Wheeler
 12. Neeley - Tetonville
 13. Lanark - Bancroft

- ☐ Soils of Loessal & Mountainous Uplands
 14. Neeley - Hondohe
 15. Lanark - Bancroft - Nagitsy
 16. Buckskin - Robin - Moohoo

- ☐ Soils of Mountains
 17. Wahtigup - Sheege - Highams
 18. Riogecrest - Pavahroo
 19. Nagitsy - Neilsen - Moohoo - Drawyon

FORT HALL INDIAN RESERVATION
IDAHO

ROUGH DRAFT

San Carlos

San Carlos has a fifty (50) acre industrial park located on the reservation seven (7) miles east of Globe, Arizona, 96 miles east of Phoenix and 106 miles northeast of Tuscon.

The park has access to air, rail and highway transportation and is served by electrical power, gas, water, sewerage system and telephone.

In a recent conversation with Jim Cutter, the San Carlos community planner, he stated the reservation has four known hot springs. There are no known ordinances governing geothermal energy on reservation lands.

The tribe also timber located on the reservation. The reservation occupies 2,584 square miles (1,826,541 acres) and is bounded on the north by Fort Apache Indian Reservation, on the west by Tonto national forest and BLM land and the south by Coronado National Forest and Bureau of Land Management and on the east by Apache National Forest.

Major marketing centers are at Phoenix, 112 miles to the west and at Tuscon, 123 miles to the south. Mining is the major industry of the area to the west.

Mining, agriculture and some small industries comprise the economy of the area to the south of the reservation.

As of March, 1973, available labor force totaled 1,147. Of this total, 599 were permanently employed, 108 temporarily employed and 440 unemployed. Of the total unemployed 125 were listed as actively seeking work.

The principle economic activities are based largely on production of livestock, timber and sawmill operations, copper mining and recreational development activities. The copper mine is the number one employer of reservation inhabitants. Western Pines, a timber and sawmill operation, is the next largest reservation employer.

The tribe also has four (4) training centers, a tourism facility that includes store, restaurant, picnic areas and boating facilities and a recreation area facility that includes a marina, boat ramp, restaurant, picnic and camping areas, roads and related improvements.

The tribe has completed a tree thinning program on the existing stand, has improved sewer and water facilities and a dam.

There are four surface springs located on the reservation all of which are over 30°C in temperature (86°F.) There are at least three springs (not all on reservation) within twenty miles of the industrial park. I would rate the probability of locating geothermal sources by drilling as medium to high. Actual surface investigation would be necessary.

Potential application areas would include geothermal tree seedling greenhouses, geothermal space heating of facilities, bathynology at the tourist areas, geothermal aquaculture operations for stocking lakes and ponds. Improved fishing areas could substantially increase the tourist business.

Problems related to pitting and scaling are site specific dependant upon water mineral content. At least one spring on the reservation has arsenic in the fluids, therefore extreme

caution must be used if the fluids are utilized for any purpose.

I am not aware of any existent arsenic control technology.

Consulting engineers would be required if development at this site were to be considered.

A - indicates nonthermal spring > 30°C.

★ - indicates industrial park

SAN CARLOS APACHE-GLOBE INDUSTRIAL PARK

San Carlos Indian Reservation
Cutter, Arizona

SOUTHERN

PACIFIC

RAILROAD

LOBE

HIGHWAY 70

TO SAN CARLOS

GLOBE MUNICIPAL AIRPORT

SAN CARLOS INDUSTRIAL PARK

Location - In Eastern Arizona,
7 miles east of Globe, Arizona,
96 miles east of Phoenix, on
the San Carlos Reservation,
and 106 miles northeast of
Tucson.

Size - 50 acres

San Carlos Reservation -
Indian labor force is 1,147
of whom 38% are unemployed.
Globe trade area population is
22,500.

Transportation

Air - Eight major airlines at
Phoenix; 4900' paved strip
nearby

Rail - Southern Pacific spur
line adjacent to park

Highway - On U.S. 70

Utilities

Electric - Arizona Public
Service

Gas - Arizona Public Service

Water - Park system

Sewage - Lagoons in park

Telephone - Mountain State Telephone

Two hours east of Phoenix.
Complete utilities, large
labor force, excellent
transportation.

For further information, provided in confidence, please call
or write:

Director, Industrial Development Office
Indian Desk - Room 7312
Economic Development Administration
U.S. Department of Commerce
Washington, D.C. 20230
(202) 967-5321

Rough Draft

San Xavier

San Xavier Indain Reservation has a 33 acre industrial park located seven miles southeast of downtown Tuscon, adjacent to Toscon International Airport.

The park has access to rail, air and highway transportation. The park is served bu electric, gas, water, sewerage and telephone .

The park is located in a SMSA of Tuscon, Arizona, whose population is 297,500 anda labor force of 99,500. San Xavier reservation popula-tion is 732 individuals witha labor force of 313. Papago labor force, male and female combined, ages 18-45, totals 7,538. Of that, 6,047 are employed leaving an unemployment rate of 20%.

There are currently four businesses located on the park. They are J.B. Brown and Co.- a wholesale grocery, Harry Dillon Co.-retail cig-arettes, J.Wise corp.- excavation contracting and Empire Machinery co.- a caterpillar machine company.

The tribe owns a copper mine whihc they are presently leasing to two firms. There is no timber but, as of 1977, the tribe cultivates 2200 acres of land and grows barley, cotton, milo maize, wheat and alfalfa. The tribe also raises cattle.

The eastern half of the San Xavier reservation is designated by the Burewau of Geology and Mineral Technology, Geological Survey Branch, University of Arizona as having high heat flows. The SE $\frac{1}{4}$ of the re-servation is known to have geothermal wells with temperatures gradients greater than 55°C. (131°F.) Eight (8) miles east of the reservation there is a well with temperatures of 147°C(296°F) at a depth of 3.83km (2.38 mi.) This indicates that high fluid temperatures may be located beneath the park if actual exploration does take place.

Given the location of the resource, that would be 150°C+, a binary system, utilizing a low boiling point working fluid, a heat exchanger and turbine could be utilized for generating electricity that could service the Tuscon SMSA.

Other potential applications include alfalfa pelletizing through dehydration, cotton drying, barley, corn and wheat distillation for alcohol production to be used in motor vehicles.

Given the fact that there is a large national forest east of the reservation, the Coronado National Forest and the Coconino National Forest to the northeast, the potential is there to supply geothermal greenhouse seedlings to the area manager of the forests. National forest are generally allowed so many board feet/yr. Public law distates that after harvest, the forest be replenished so the stand may continue.

Important control technologies will have to be utilized here so that air emissions, water quality, and subsidence are kept at a minimum. and comply with Federal regulatory standards.

Other conflicts such as water use and land use will have to be minimized before actual production does take place.

The cost of one greenhouse, 30ft. wide by 100ft. long, plus equipment and site preparation total out in 1977 dollars at about \$20,400. Other cost considerations include operation and maintenance of the greenhouses and labor related to care of the seedlings.

SOUTH CENTRAL PLANNING AREA

Northwest P/A

PAI I-10-TUCSON INDUSTRIAL PARK

Location - On San Xavier Indian Reservation seven miles south-east of downtown Tucson, Arizona, adjacent to Tucson Int'l Airport.

Size - 33 acres

Tucson, Arizona - Metropolitan area is 297,500; labor force is 99,500. San Xavier Reservation population is 732; labor force is 313. Mobile homes are being manufactured on the park.

Transportation

Rail - Southern Pacific adjacent to park

Air - Six major airlines serve Tucson Int'l Airport, adjacent to park

Highway - Near I-10 & I-19.

Adjacent to State 93 & U.S. 89

Utilities

Electric - Tucson Gas & Electric

Gas - Tucson Gas & Electric

Water - City of Tucson

Sewage - City of Tucson

Telephone - Mountain Bell

Convenient location next to international airport.
Complete utility service.

For further information, provided in confidence, please call or write:

Director, Industrial Development Office
Indian Desk - Room 7312
Economic Development Administration
U.S. Department of Commerce
Washington, D.C. 20230
(202) 967-5321

May 1974

ROUGH DRAFT

Yakima Industrial Park

The Yakima reservation has one industrial park that is one hundred and fourteen acres (114) in size and has a total labor force of almost 2,000 individuals. Major industries presently on the reservation include lumber, furniture manufacturing and food processing.

The industrial park has access to rail, highway and air transportation. Park service utilities include electric, gas, sewerage treatment, water and telephone.

Firms already in existence on the industrial park include the Celilo Seafood which process the fish on the site. Geothermal fluid could be applied in the fish preparation process. This would require on site analysis and investigation.

The tribe also has 489,080 acres of timber whose species include ponderosa, pine fir and mixed conifer. If the tribe considered entering the timber market, a geothermal greenhouse could maximize yield of the stand. 1977 costs for geothermal greenhouse and equipment average out at \$4.80/sq.ft. or \$43,200 for three 3,000 sq.ft. greenhouses.

Actual market competitiveness is dependant on other existing regional operation sales price levels and costs of investment for the new operation. The cost may decrease with input from EDA and/or DOE dollars given the availability of the renewable resource.

Temperatures for geothermal seedling greenhouses should be kept between 68° and 75° F. during the night and between 75° and 85° F. during the day. British thermal units per hour requirements for the three greenhouses would be 1,350,000 Btuh.

Problems related to corrosion, pitting and scaling of hardware is site specific and dependant upon the mineral content of the fluid. This would require on-site investigation.

other costs related to drilling and hardware would have to be calculated using accessibility to the geothermal fluid and depth of the resource as dependant variables. Costs for drilling range from \$60-120 dollars per foot and is dependant upon overlaying rock structure and the depth to which must be drilled to locate the resource.

The tribe also has 154,000 acres under cultivation whose major crops include sugar beets, hops, mint, apples and wheat. Another potential geothermal direct application would be sugar refining of the beets.

According to Howard W. Hjort, Director of Economics, Policy Analysis and Budget, the sugar situation is critical in the United States. World sugar prices are depressed and remain below production costs for even the most efficient producers. One major cost for production is labor wages. 14% of product cost is attributable to fuel costs also.

The beet-sugar refining industry requires relatively large quantities of low pressure process steam which geothermal energy resources can provide.

The Utah-Idaho sugar industry is currently located in Toppenish and does refine sugar at that plant. They might consider a joint venture processing contract on the reservation due to the accessibility of the geothermal fluids on that reservation. This would require further on-site investigation.

The tribe also grows wheat on the reservation. A geothermal distillery used to produce ethyl alcohol could provide fuel supplies for the reservation inhabitants. Scale of operation is dependant upon quantity of wheat available on the reservation. Wood by-products can also be used in distillation for alcohol.

An integrated system of sugar beet refining, greenhouse tree seedling production and alcohol distillation using cascading temperatures

is a project potential that could provide income and jobs for tribal members.

Surface temperatures of springs located on or near the reservation (within twenty miles) range from 19°-61° C (66-141° F.) Drilling below the surface could locate much higher temperatures. This would require tribal permission for on-site exploration to take place.

Data excerpted from:

EDA Industrial Development Fact Sheet
Total Energy Recovery System for Agribusiness-International Eng. Co.
Use of Geothermal Heat for Sugar Refining- TRW
Geo-Heat Utilization Center-quarterly Bulletin
USDA News
USGS Circular 726
ERDA Indian Geothermal Printout

...KIMA INDUSTRIAL PARK

Location - On the Yakima Indian Reservation just north of Wapato, Washington and 11 miles south of Yakima, Washington.

Size - 114 acres

Yakima Indian Reservation - present reservation population is 6,300 with a labor force of 1,950. The city of Yakima, 4 miles north of the reservation, has a population of some 50,000. Major industries on the reservation include lumber and furniture manufacturing and food processing.

Transportation

Rail - Burlington Northern Railroad serves park, with Union Pacific freight lines two miles from park offering additional services.

Highway - Interstate 82 will run along northeastern border of reservation. Major north-west motor freight lines serve area.

Air - Commercial service is available from Yakima.

Utilities

Electric - Pacific Power & Light Co.

Gas - Cascade Natural Gas Co.

Sewage - City of Wapato

Water - City of Wapato

Telephone - United Telephone Co.

Road, rail and air transportation, and complete utility system in place at park and a labor force of over 2,000.

For further information, provided in confidence, please call or write:

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