ENVIRONMENTAL REPORT FACE SHEET

Fillmore District, Bureau of Land Management Report No. 43-030-5-33

Pre Lease Evaluation - Cove Fort-Sulphurdale Geothermal Area

Required by 43 CFR 23 Yes ☐ No ☑

"102 Statement" recommended Yes ☐ No ☑

Technical Examination Team Signatures:

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"102 Statement" recommended Yes [ ] No [✓]

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Pre Lease Evaluation - Cove Fort-Sulphurdale Geothermal Area

Required by 43 CFR 23 Yes [ ] No [✓]

"102 Statement" recommended Yes [ ] No [✓]

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ENVIRONMENTAL ANALYSIS RECORD
COVE FORT - SULPHURDALE GEOTHERMAL AREA

BLM and Forest Service

A. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The proposed action is the leasing under provisions of the Geothermal Steam Act of 1970 of the federally owned geothermal resources in the Cove Fort - Sulphurdale area shown on the map (Appendix 14). With respect to geothermal resource leasing, federal lands in this area fall into two categories: (a) lands that are subject to competitive bidding because of a KGRA created by overlap of applications during one filing period; and (b) lands that can be leased on a non-competitive basis.

This environmental analysis will consider all of the lands shown on the map and includes 46,588 acres of national resource lands managed by the BLM, 32,483 acres of federal lands administered by the USFS, and 25,993 acres of State and privately owned lands. Although the analysis will consider all of the lands in this area for possible environmental impacts, the geothermal resource will be considered as being developed only on the federally owned lands recognizing that any impacts resulting from leasing the federally owned geothermal resource could also have an impact on state and privately owned interests.

The most probable use for a geothermal resource in this area will be for the generation of electricity from a hot water system (See Departmental Statement, Vol. 1 pp.10-13).(1) The issuance of geothermal leases may result in the following general geothermal operating stages:

(A) resource reconnaissance; (B) exploratory test drilling; (C) production testing; (D) field development; (E) powerplant, powerline, and by-product plant construction; and (F) full scale operation. If at any stage further development becomes infeasible because of geologic, engineering, economic or environmental reasons, operations will cease (30 CFR 270.17(b)).

The resource reconnaissance stage involves geologic mapping, field investigations, geochemical investigations, geophysical surveys (gravity, magnetic, seismic, and resistivity), and shallow drilling for temperature gradient and geochemical information.

If the results of the reconnaissance stage appear favorable, some exploratory test wells would be drilled to determine the quantity and quality of the geothermal resource. These wells will be drilled with conventional oilfield drilling rigs and may be drilled to a depth of 5,000 - 10,000 feet.

If a potentially economic resource is discovered, the exploratory well is tested to determine flow rates, recharge characteristics, pressure, and other physical characteristics of the reservoir. Large fluid volumes may be released, and the waste water will have to be stored or disposed of.

Following production testing, additional wells will probably be drilled to furnish steam and/or hot water to the plant. Well spacing may vary considerably depending on the geology and production characteristics of the reservoir.

In addition to the wells, additional roads and pipelines will be required to transport the fluids from the wells to the plants. Because of the nature of geothermal resources, the steam cannot be transported very far due to heat loss. A typical development consists of one 100 MW plant obtaining steam from 1-20 wells from 12-24" in diameter which drains an area of about 1 square mile.

Consideration of alternatives to the proposed leasing program and alternative energy sources are discussed in Vol. 1, Chapter IV of Departmental Impact Statement (1) and will not be repeated here.

Alternatives that relate to this area are mainly that of no leasing or location leasing confined to areas of lowest potential impact.

B. DESCRIPTION OF EXISTING ENVIRONMENT

1. Non-Living Components

a. Air and Climate

The present air quality over the study area is high and is well within the State standards of 20 micrograms per cubic mm of air. Known sources of air pollution are: windblown dust from desert lands and occasionally from the limited agricultural activities, smoke from occasional wildfires, exhaust from traffic associated with I-70 and I-15, and fumes and dust resulting from Sulphurdale mining activity.

The portion of the study area west of the Forest boundary has an annual rainfall of 10.9 inches and a mean annual temperature of 49.4° F.

Precipitation increases to 25 inches on the National Forest at upper elevations. The temperature decreases 3° F. with each increase of 1000 feet rise in elevation.

Sunny skies prevail most of the year. Sunshine ranges from 47% possible sunshine during December to 82% during September. Winds average 7 to 12 miles per hour with strong gusts occurring occasionally, usually associated with storm systems. Prevailing winds are from the southwest modified by topographical features which cause local turbulence. There are no records of tornadoes within the area.

Ten percent or less of the annual precipitation is received during the months of June and July.

Precipitation is influenced by two main seasonal storm patterns. During the winter and early spring months frontal storms from the Pacific Northwest frequent the area. A meteorological phenomenon known as the Nevada or Southern Utah Low also influences the area during the transition period between the winter frontal storms and summer thunderstorms. These high altitude low pressure systems cause vertical movement of air and result in widespread precipitation. The total accumulated precipitation with an increase in altitude under these conditions is less than with winter frontal systems.

Temperatures above 100° F. are not uncommon during summer months at the lower elevations.

Low relative humidity makes these high temperatures more bearable. Temperatures below zero are recorded most years. Prolonged periods of extreme cold are not common as mountain ranges protect the area from the continental arctic air masses.

The area experiences strong insolation during the day and rapid nocturnal cooling. This results in a wide range of daily maximum and minimum temperatures, frequently as much as 40° F. The difference between the mean monthly maximum and minimum temperatures for areas below 6,000 feet is 32.4° F. There are cool nights, even during the hottest part of the summer.

Probable frost-free periods vary from 107 days at Beaver to 156 days at Fillmore. Wide variations in growing seasons may occur in the same valley between the bottom lands and surrounding bench lands or mouths of adjacent canyons.

b. Geology, Lands and Minerals

Paleozoic and Mesozoic sedimentary rocks crop out in the north and northeastern part of the area and consist of limestone, sandstone, shale and dolomite ranging in age from Ordovician to Cretaceous. Also included with the consolidated sedimentary rocks are outcrops of the Sevier River Formation of Tertiary age. The complete stratigraphic section for the consolidated sedimentary rocks is shown in Attachment 1.

In the southeast corner of the study area along the northwestern flank of the Tushar Mtns., the area is completely covered by tertiary volcanic rocks and pyroclastics. The western part of the area is covered by cinder cones and basalt flows of Quaternary age. They are part of a wide zone of recent volcanic rocks that extends from Fillmore to the Utah-Arizona border.

This area is known to contain numerous northeast trending normal faults (See Appendix II) that have formed a series of uplifted fault blocks. The zone of normal faulting from the eastern edge of Dog Valley to south of Sulphurdale along the mountain front reportedly is associated with landslides and thermal springs which indicate that the zone has been active from tertiary up to the present time. A more detailed description of the faulting along the mountain front is found in Rodriguez pp. 27-30. (2)

The faults associated with the recent basalt flows and volcanic activity in the valley center appear to be fairly stable and should present no problem to any geothermal development. In addition to the faulting, some folding is present in the northeastern portion of the study area. This folding is covered in detail by Crosby, 1959. (3)

Most of the economic mineralization in the area occurs along the edge of the Pavant Range and the Tushar Mountains.

The most significant deposits are the sulfur deposits that are found in the area from Sulphurdale to north of Cove Fort. These deposits are thought to be deposited by solfataric thermal springs associated with the faults in the area. The sulfur is deposited by acending solutions that are rich in hydrogen sulfide gas and ferrous iron. The Sulphurdale area is reported to have reserves consisting of over 4 million tons of ore containing over 850,000 tons of sulfur.

Rodriguez pp.31-68 (2) gives a detailed description of the sulfur deposits. Most of the federal lands in this area have been located as mining claims and are under control of Forminco, a Texas Corp. In addition to sulfur, the northeastern portion of the area is also known to contain some minor fluorite mineralization. These occurrences are also located along faults, but they are not extensive and no production has been reported. (Butler 1920). (4)

The volcanic rocks covering the western edge of the Tushar Mountains have a high silica content and many varieties of agate, chalcedony, jasper, and other semi-precious rocks are known to occur. Some mining claims have been staked on this area.

The volcanic cones southwest of Cove Fort have been the source of cinders and lava rock used for building stone.

Production from this area has not been too extensive, and no figures are available. Other mineral products produced in the area include sand and gravel from the alluvial material in the valleys. This material has been used locally for highway construction and maintenance. There is no commercial production from the area at this time.

The area has a slight potential for oil and gas particularly in the northeastern corner where favorable structures for the accumulation of oil and gas are known to exist in the Paleozoic section. Crosby, 1959, indicates that the Coconino sandstone is a potential reservoir with possible structural traps in the Dog Valley Anticline. (3)

The area has a good geothermal potential, and one well drilled in Dog Valley to a depth of 960 ft., produced water that gauged 196° F. at the surface. (3)

c. Water

Surface water is very limited within this area. Precipitation in the upper watershed areas in excess of on-site consumption use reaches the valley by surface and sub-surface flows. It contributes to ground water reservoirs and very limited surface irrigation supplies in the vicinity of Cove Fort. Quality of surface and

sub-surface water supplies vary considerably.

The streams originating from the National Forest portion of the study area are intermittent except for Cove Creek which has a small flow year-round. Snow melt runoff from the upper watershed is usually high in suspended sediments as is the runoff resulting from high intensity thunderstorms. A few intermittent measurements of flow have been made on Cove Creek showing the base flow to be approximately 0.1 c.f.s.

There are no perennial streams which cross the area. The only water impoundments are those constructed for livestock water. Several pipeline projects have been completed to provide water for livestock and wildlife.

There are shallow ground water reservoirs of unknown, but likely limited extent in the valleys of the study area within the landtype Association No. V. (See Appendix 10). Quality and quantity of this water source is unknown. However, potable water has been developed to a limited extent in the vicinity of Cove Fort from shallow wells.

Annual water yield varies from 5 inches at the east edge of the KGRA to 0.1 inches at 6000 feet elevation.

d. Soils

The descriptions of the soils associations within the study area along with a map showing their distribution is found in Appendix I (Staff Reports).

2. Living Components

a. Aquatic Plants

Because water is limited and mostly intermittent in nature, conditions for aquatic plant life are mostly non-existent. Some very small live streams and small stock watering ponds sustain a minimal community of aquatic plant life. They are so minimal that no information as to the types or importance was investigated.

b. Terrestrial Plants

The vegetation covering most of the range in this area is predominately pinyon-juniper and sagebrush. The higher elevations have a large amount of oak with scattered patches of mahogany, aspen and conifers. See Appendix 9.

Understory vegetation includes various species of grasses and forbs. Pinyon pine and juniper are the predominate tree species growing over the Cove Fort Sulphurdale Study area. A minor volume of Douglas fir, White fir and subalpine fir, in combination with

aspen, are found in the extreme southeast corner of the area. These grow at the upper elevations of the Tushar Mountains in the heads of Cove Creek and Little North Creek. Pinyon-juniper ranges over the entire area, varying from small scattered patches to expansive, homogenous stands.

The pinyon-juniper lies on lands ranging from level bottoms and plateaus to steep slideslopes. The majority of the stands are accessible. Several thousand acres have been chained. Large quantities of fence post material and firewood have been harvested. A great abundance of this resource is still available.

Other conifer species and aspen stands in the Tushar Mountains are located on moderate to steep slopes above 9,000 feet. Size classes range from poles to small sawtimber, generally of low quality and volume. Presently, there are no roads near the timber. Access would require several miles of expensive road construction over steep, rocky terrain. A detailed species list is shown on Attachment 2.

Livestock grazing by both cattle and sheep is an important use on this area of land. It is used for winter, spring, summer and fall grazing. Following is a list of grazing allotments, class of livestock, season of use and AUM's of grazing permitted:

Grazing Allotment	Livestock Numbers	Season of Use	AUM's
Sulphurbeds -sheep (FS)	1200	6/11 - 9/30	880
Cove Waters-White Sage sheep (FS)	1344	5/21 - 6/30	358
Grass Creek - cattle (FS)	721	5/21 - 10/15	348**
Twin Peaks (spring unit) sheep	1500	5/1 - 6/15	450
cattle & sheep (BLM) cattle	511	5/1 - 6/15	767
Anderson - sheep (BLM)	620	10/1 - 4/30	868
Kesler - cattle (BLM)	26	5/1 - 9/30	130
Mineral Range (north unit) cattle (BLM)	2462	5/1 - 10/15	3385**
Pine Creek - cattle (BLM)	307	4/16 - 10/15	295*
Pine Creek - cattle (FS)	424	6/1 - 10/31	212**
		TOTAL	7693

* Includes only 25% of total allotment
** Includes only 10% of total allotment

c. Aquatic Animals

There are no known aquatic animals within the study area.

d. Terrestrail Animals

This area supports a wide variety of wildlife species. Attachment 3 is a list of birds, mammals and reptiles that can be found in the area. The list is based on the best information available but is not meant as a complete listing.

The following is a discussion of the species of greatest interest:

(1) Mammals

Four of the mammals listed are game species, Mule deer, Elk, Mountain Lion, and Cottontail rabbits. Mule deer are by far the most abundant of the game species and would likely be the species most effected by geothermal development. Mule deer are also the species that show the highest economic value.

Mule Deer

Deer populations reached their peak in the 1940's. During this period over grazing by deer and livestock caused serious damage to winter ranges. Hundreds of deer died of starvation in the winter and spring months. Beginning in 1951 either sex hunts and other methods of applying hunter pressure has brought deer populations more in line with the capacity of the deer winter range.

The proposed lease area contains portions of two deer herd units, #55 and 56A. Habitat conditions in these two units are very similar. Deer in these units summer on the Pavant Range and the Tushar Mountains. Deer make use of all the proposed lease area to some extent but the most significant use is east of I-15. The lack of winter

range for both units is a major limiting factor. Browse utilization trend studies, pellet group trends, and field observations indicate heavy use on wintering areas. (8), (9), Attachment 4

The winter habitat is a long narrow strip running north and south along the foothills. The east limits are at the 7,000 foot elevation level and the west limits are generally I-15. Only a limited number of deer cross I-15 to winter.

Both of the units are among the most popular hunting areas in the state. Hunting pressure is heavy with a large percent of the hunters from out of state. Attachment 4

Elk

Elk do not generally inhabit this area. There have been periodic reports of elk sightings. One young bull was killed on the highway near Pine Creek in 1973. These elk are believed to be migratory or stray animals from established herds on Cedar Mountain, Mount Dutton or Indian Peaks.

Mountain Lion

Small numbers of mountain lion have been known to be in the Pavant and Tushar Mountains. In the

past year there has been indications that the lion population has increased. Five lion were killed in Deer Herd Unit #55 between November 1973 and April 1974, and for this same period one lion was taken in Deer Herd Unit #56A. This is the highest number of lion taken from Unit #55 on record.

Cottontail

Cottontail are found throughout the area. The population fluctuates over an eight to ten year cycle. At present populations are low. Hunting pressure has been light in this area. Hunting statistics for cottontail can be found in Utah Upland Game Annual Reports. (10)

Predators

The major predator species include coyote and bobcat. These two species are trapped and the pelts sold. In the past few years coyote and bobcat pelts have brought high prices. In the winter of 1972 - 73 the average bobcat pelt in Utah brought $64.00, coyote pelts averaged $25.00. (11)

Calling of coyotes has become an increasing popular sport activity during the past few years.

Several hundred coyotes are killed each year by BSF&W people in Millard and Beaver Counties.

(2) Birds

There are fifty one bird species listed on Attachment #3 of which six are game birds; mourning doves, chukars, sage grouse, band-tailed pigeon, ruffed grouse, and blue grouse. Wildlife Overlay (Appendix 8) shows the areas where each of these species can be found within the study area. Hunting statistics on a county basis can be found in reference 10 for each species.

Mourning Doves are found throughout the entire area during the summer months. They concentrate around cultivated areas and where water is available. Hunting is good in the fall before cold weather causes them to migrate south.

Chukars

One hundred fifty chukars were released in Dog Valley in 1959. From this planting a small population has become established in the valley. It is not known to what extent this population may have expanded into other areas. Some hunting for chukars occurs each year in Dog Valley.

Sage Grouse have historically been found in the area of the cultivated fields near Cove Fort and Sulphurdale. When I-15 was constructed it crossed strutting grounds historically used by the grouse. The year following construction many grouse were killed on the freeway during the strutting period. Since that time sage grouse numbers have remained low for this area. Presently sage grouse can be found in the cultivated fields during the spring through fall months and in the sagebrush areas in the winter. Studies are presently being conducted by Division of Wildlife Resources on sage grouse that should provide more information in the near future.

Band Tailed pigeons have been reported at Cove Fort and Gillies Hill, and near Beaver south of the Study Area. The population is small. No nesting sites have been found in the study area.

Blue Grouse and Ruffed Grouse are fairly numerous in the high elevations in the browse shrub vegetative types. Some nesting areas for both species are known on Gillies Hill south of the study area but none have been identified at lower elevations within the study area.

Raptors

A large number of raptors are listed in Attachment 3 among which are two that are classified as endangered and rare (American Peregrine Falcon and Prairie Falcon). Three raptors are also classified as unique species (Western Burrowing owl, Ferruginous Hawk and Northern Bald Eagle).

The study area provides nesting habitat for nearly all of the species listed except the bald eagle which is found in the area only during the winter months. Nesting for some raptors such as the great horned owl begins as early as late January. Other raptors such as the burrowing owl nest as late as May. Rearing of young for many raptors continues through July.

Raptors prey heavily on rodents in the area and play an important part in keeping the rodent population in check.

(3) Reptiles

Less is known about the reptiles in this area than any other group of wildlife. Reptiles known to occur in the Study area are listed on Attachment 3.

3. Ecological Inter-relationships

The ecological inter-relationships among the various life forms

are undoubtedly complex and little understood. Man's influence on the area has affected the ecosystem and the interdependence among the various ecotones in this region.

a. Predator-Prey Relationships

Of the predators inhabiting the area, the most common is the coyote. This animal feeds on rabbits, squirrels, mice, vegetative material and carrion. Some coyotes feed intermittently on domestic livestock.

Raptors feed primarily on rabbits, ground squirrels, other small mammals (such as mice), and birds. The abundance of food supply might be one reason for the relatively concentrated winter eagle population. Raptors have an indirect effect locally on the vegetation and ecotones of small areas by preying upon animals that have these inter-relationships with the vegetative and faunal resources. Other predator species include the bobcat and mountain lion. Bobcats prey primarily on small mammals, and the new born of larger mammals such as deer.

The mountain lion, although not numerous in the region, inhabits the Tushar and Pavant Mountains and surrounding mountain ranges. His diet will include small mammals, however, he relies on the deer population for a large part of his diet.

Man, for several different reasons, most of them economic or recreational, is predatory on many larger animals including deer, cougars, coyotes and rabbits.

b. Animal-Vegetation Relationships

Domestic livestock and mule deer depend on grasses, forbs, and browse for food. There is considerable competition for food between cattle and deer on both summer and winter ranges, but it is most critical on deer winter range. The area has historically been heavily grazed. All grazing tends to change the plant composition as it favors unpalatable plants such as the rabbitbrushes, big sagebrush, and pinon and juniper trees. It also reduces total vegetal material available for energy conversion. Man's direct use of vegetative resources is not significant to cause noticeable composition changes.

Mule deer, cougars and other animals depend upon trees and shrubs for cover and tend to concentrate in the more heavily vegetated areas. Birds inhabit all vegetative types, but some are closely associated with a particular type such as pinon-juniper. Birds use the trees and shrubs for nesting sites and nesting cover. No concentrated nesting sites are known, but nests are probably scattered throughout the vegetative zones depending on other factors of influence such as water, wind and inter-specie relationships. The food and cover requirements of present animal populations are adequately being met, but the food supply is limiting to population

growth of mule deer, sage grouse and perhaps other species.

c. Animal - Water Relationships

Water requirements for desert animals in general is low. Some animals require frequent water to maintain life. Some of these would be mule deer, coyotes and various birds such as mourning doves. To some extent the lack of water in some areas is a major limiting factor in wildlife numbers. Others (generally the ones of lesser mobility) such as snakes, lizards, mice or jack rabbits do not need to drink water. Others are in an intermediate condition and drink during hot, dry weather conditions. Man has created several water sources from springs, pipelines and reservoirs which supply water for both livestock and wildlife.

The vegetative and animal communities in the proposed action area have reached a degree of balance with man and his uses. Changes are taking place, but are very slow and preceivable only by close observation over a period of years.

Natural cycles of animal populations, or annual plant growth affected by moisture conditions can create rapidly changing balances and temporary inbalances from year to year or season to season.

The plants and animals are adapted to a harsh environment and population numbers are not maximum. Disturbance of soil will

result in invasions of different plant species and recession of seral stages on the disturbed area. Animals are not directly dependent on the soil medium, and it requires considerable vegetative change to effect most animals because they can generally move into an adjacent undisturbed habitat.

Halogeton, Russian thistle and cheatgrass are annual plants that readily invade areas of disturbed soil or where perennial vegetation competition has been reduced.

4. Human Values

a. Landscape

The Cove Fort - Sulphurdale area is part of the cold desert biome as described by the Department Environmental Statement.(1)

The study area is located on the eastern margin of the Basin and Range Physiographic Province. The eastern and northern portions of the area contain the Pavant Range and the Tushar Mountains which rise to an elevation between 10,000 and 12,000 feet. The maximum elevation attained in these mountains in the study area is 9800 feet in the extreme southeast corner. The Pavant Range and the Tushar Mountains are separated by a low pass east of Cove Fort. The valley in which Cove Fort is located occupies the central part of the study area and has an average elevation of 6000 feet. The monotony of the valley is interrupted by low hills resulting from lava flows and volcanic cones the largest of which raises over 1,000 feet above the level of the valley.

b. Socio Cultural Interest

Anywhere from 8,000 to 11,000 years of cultural deposition may be represented in the study area as evidenced from lithic finds such as Clovis and Folsum fluted projectile points located in Central Utah. More recently the Desert culture developed based on a pattern of adaptations which arose in the arid regions of the American West during post glacial times and persisted to historically documented peoples. The dominate culture within the study area was the Fremont for which three hypotheses for their origin is a point of controversy - one advocates migration from the northwestern plains, one which pictures the Fremont as a "Puebloid" people having migrated from the Anasazi base further south and probably the best supported is the third idea that the Fremont developed as a continuum of the "Desert Culture". The Fremont composed of five phases, occupied the area from 900 A.D., or earlier to approximately 1300 A.D. (See Map, Attachment 5) outlining this culture).

Historically the Utes traversed the area and representative sites may occur.

Site Types and Distribution

The following provides a brief description of the types of sites known to exist within the study area (See Appendix 6). Heaviest concentrations occur east of Interstate 15 along the mountain slopes.

As evidenced by the attached inventory forms, Appendix I (Team Report), lithic, limited activity sites predominate. The main cultural activity appears to be nomadic hunting and pinon-nut gathering sites which occur along the drainage systems, game trails and around springs. Of the sites noted all appear to be rather insignificant lithic scatter sites with no apparent depth to deposits. Cultural affiliation is unknown. Their significance is such that all sites provide information to the total cultural picture of an area and to the total Utah prehistory.

Historic Anglo Resources

One of the earliest anglo infiltrations into the study area occurred in 1826 and 27 by Jedediah Smith (see Appendix I (Team Report). John C. Fremont followed approximately the same course through the area in 1844.

To protect the early settlers of Millard and Beaver Counties as well as the stage, freight, and telegraph facilities in the area.Cove Fort was established in 1867. Listed as a National Historic and designated Utah Historic Site the fort remains intact and privately maintained and operated.

Sulphur was discovered in 1870 at the present site of Sulphurdale just south of Cove Fort. Sulphur was used in earlier years for gun powder, sugar refining and medicines. Operating sporadically, mining still continues. Some original buildings remain.

Wildlife

The two major areas of human values as related to wildlife are in the recreation provided by hunting and general observation of wildlife behavior. The hunting aspect has previously been discussed in the Living Components section. Mule deer are the species most observed in as much as they concentrate in large numbers on their wintering areas along the highway where they are easily seen.

Recreation

Most of the activities within this area are limited to big game hunting (deer), driving for pleasure, viewing scenery, and visiting historic sites. Deer hunting takes place over the entire area, except for the alluvial bottoms where farm and ranch land has been developed. Driving for pleasure and viewing scenery is generally related to the major and rural routes and visiting historic sites at the Old Cove Fort.

Socio - Economic

The proposed lease area is located in an unpopulated portion of Millard and Beaver Counties. Interstate 15 traverses the study area from north to south and Interstate 70 junctions with I-15 at Cove Fort in the central portion of the study area.

The nearest population centers are Fillmore (pop. 1800) located 35 miles north of Cove Fort, Beaver (pop. 1453) 23 miles

south of Cove Fort and Richfield (4,471) located approximately 45 miles northeast of Cove Fort.

There is a family or two that are presently residing at Cove Fort, apparently employed in farming and operation of a Service Station. The Utah State Department of Highways maintains a maintenance yard at Cove Fort.

In recent months there has been considerable activity in the Sulphurdale properties, now owned by a Texas Corporation operating under the name of Forminco. From all indications it appears that they are planning to go into production in the near future. There is no information available as to the size of operation, number of employees, or any other pertinent data concerning this potential mining operation located within the proposed geothermal lease area.

Little is really known as to the actual number of employees that would be involved in the exploration, development and operation phases of this potential geothermal resource. It is estimated that there would be 16 employees associated with each drilling rig. Some 25 to 50 persons would be employed during the construction of generating plant facilities. It would require four employees per shift to properly operate each generating plant. Service companies involved would probably employ an additional 4 -5 people.

The present available housing, schools, water, sewage or commercial facilities at Fillmore and Beaver could probably accommodate the estimated increased population. The number of long term permanent employees resulting from this proposed action would be approximately 10 - 15 people per plant. If we use an average figure of 4 persons per employee's family, the permanent increase in population would range from 40 to 60 people per generating plant. It is very likely that these people would probably locate in Beaver and Fillmore and possibly a few in Richfield.

The well drilling crews and the construction crews would probably for the most part have trailer houses and would only be in the area for a period of one to three years. There is a potential for 50 to 75 employees and their families residing in or near the project site during the exploration and construction period. This would result in a temporary increase in population of 200 to 300 people. This impact may cause some hardships on the communities involved and some construction and establishment of additional housing and commercial facilities would result.

Most of the people who will be involved in the exploration, development and operation of a geothermal power plant will be in a relatively high income bracket. Many of the jobs

will require specialists trained in the specific skills required for this relatively new and specialized industry. Oil and gas well drilling rigs and crews will probably be used in carrying out the exploration phase of the development.

A large number of high paying jobs available could seriously affect local labor supply for existing employers in agriculture, small industry and commercial services. This would probably be most seriously felt in agriculture where low wages, long hours and seasonal work prevail.

A large influx of people of various religions and social background and political philosophies will upset the present predominate Mormon social structure and conservative political regime in both Beaver and Fillmore. This is an adverse impact from the viewpoint of most of the existing population and may meet with some resistance.

There will be beneficial impacts from this potential industry in that the tax base will increase, new job opportunities will be made available that will encourage young people to stay in the area, per capita income will rise and real estate value will be increased.

The potential impacts resulting from the development of the geothermal resource in this lease area, should in themselves, not seriously impact on the socio make-up of the communities

involved or the economic structure of these communities. These impacts, however, coupled with those anticipated from other potential developments in Beaver County, specifically the Roosevelt KGRA and the Alunite Mine and Milling Operations, will result in serious socio-economic impact on Beaver County.

To avoid these problems, city and county officials should be well informed of the potential developments so that they can plan for them and try to adequately provide the needed services that would be required. Methods of financing increased services such as enlarging sewage facilities, police protection, fire protection, hospital and other medical services, etc., during the period, when the tax base is not sufficient to cover these increased costs should be explored.

The study presently being financed by Earth Sciences, Inc. (Socio-Economic) may provide us with some possible solutions to these anticipated economic problems that Beaver County may encounter if the indicated potential industries become realities. (see statistics (Attachment 7-8)

C. ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

1. Environmental Impacts

a. Anticipated Impacts

A comprehensive discussion of potential environmental impacts associated with the development and use of geothermal resources is included in Volume 1, Chapter III, Section B of the Final Environmental Statement for the Geothermal Leasing Program. (1) This discussion will not be repeated here except as it relates to specific impacts in the Cove Fort - Sulphurdale Area.

Disturbance of surface soil and vegetation by surface disturbing activities such as vehicle travel, road construction, drilling pad, yarding areas, construction of pipelines and any other areas where the vegetative cover will be removed will increase the amounts of dust matter in the air. These particles can be stirred up by vehicle travel, equipment operation and from gusty winds.

Air temperature will be increased in local areas by the construction of roads, drilling pads, yarding areas, parking lots, pipelines, power plants, cooling towers, etc. The operations of vehicles and stationary engines will emit carbon monoxide and additional hydro-carbons into the air.

Soil depth is adversely affected by construction of ponds, drilling pads, road construction and other activities. Soil structure is broken down on any areas of heavy equipment travel and parking areas. Unpleasant odors

may result from sewage and garbage disposal sites.

The humidity in the air will be increased due to evaporation from cooling towers, settling ponds, reservoirs and lagoons.

The erodibility of the soil is greatly increased by the removal of the vegetative cover and any action that concentrates water.

Subsidence may occur if large quantities of water are extracted from ground water reservoirs and not returned. This area is highly active seismically at the present time and mining of water could serve to increase the occurrence and severity of seismic activity.

Contamination of surface waters by increased sediment load and other sources is likely.

Shallow ground water can be contaminated by leachate from ponds and lagoons. There is a possibility that deep ground water could be contaminated by the recycling of water.

Geothermal exploration and development activities will cause localized changes in land uses from such extensive uses as livestock grazing. The increased activity of vehicle travel, drilling operation and machinery noise

will be a source of harrassment to the livestock and wildlife. They may be chased away briefly from preferred grazing areas and their normal grazing habits could be interrupted or changed.

The mud pits associated with the test hole drilling operations are a possible hazard to livestock and wildlife. If the slopes of these pits are too steep for them to climb out and if the pit was full of water they would drown.

The vehicles and equipment needed for the exploration operation will be going through many of the fences as they traverse the area. It is possible that crossings will be needed at places other than cattleguards and gates, which will require cutting the fence. The chances of gates being left open will increase. This could lead to livestock grazing the wrong areas and trespass problems. Range improvements could be damaged by equipment and vehicles during the operation. A certain amount of vegetation will be inundated and taken out of forage production by clearing for drill rigs and possible new road construction. The extent of the impact will be dependent, of course, on the number of holes drilled and the number of new roads needed. This impact will be significant, particularly if the sites are located

on the revegetated areas. Increased soil disturbance will provide an opportunity for undesirable plant species, such as Halogeton, to become established. This will increase the chance of livestock being poisoned from this plant.

Water will be needed during the drilling operation. It is possible that the water could come from existing on site developments, such as pipelines, wells and reservoirs or the live streams of Little North Creek, Pine Creek or Cove Creek. This water is presently used by the livestock and any water used for the drilling operations could have an impact on livestock use.

Test drilling and production testing of geothermal steam resources in the area could have varied impacts upon wildlife. Most would occur on or adjacent to well sites, although water quality impacts could potentially have farther reaching influences. The magnitude of particular impacts would depend upon the extent and duration of the overall geothermal development activities and the effectiveness of impact control measures.

As a specific development proceeds through test drilling and production testing, physical land modification and commotion would occur. These activities would include

such things as construction of roads, ponds, drill pads and drilling of wells. This could result in loss of wildlife values within the area of influence. The land modification could physically alter or remove existing wildlife habitat, and permanence of these effects would be dependent upon the size of the area involved, the nature of the particular construction or operational activity, and the adequacy and completeness of control measures.

All stages of the proposed action conducted in the proximity of the sulfur mining operations could conflict with the sulfur mining interest in the Sulphurdale area. However, almost every stage of developing the geothermal resource will serve to enhance the understanding of the geology and other mineral resources of the area. See letter of November 14, 1974, describing possible mining conflicts on the Cove Fort - Sulphurdale proposed lease area. (Attachment 9)

A chemical analysis of water taken from Sulphurdale indicates that the water is acid and contains an appreciable amount of dissolved matter including sulfur. (Attachment 6) It is likely that any deep drilling could encounter similar waters that could have a deleterious effect on surface and ground waters in the area. These waters

would have to be disposed of (possibly by reinjection) to avoid this contamination.

If these waters are disposed of by reinjection, a potential earthquake hazard would form due to a change in fluid pressure or lubrication of existing faults. This problem is discussed in greater detail by David Evans of the Colorado School of Mines. (7)

Any surface disturbing activities (drill pad construction, roads, etc.) in the area from Sulphurdale south to Beaver canyon may cause landslides, gullying, etc., in the relatively unstable material on the areas of steeper terrain.

The operation stage of development may have insignificant impacts resulting from the possible release of hydrogen sulfide gas into the atmosphere, landslides due to developments, and earthquakes and possible contamination of water resources due to disposal of waste fluids. Also, the acidic nature of the water in the Sulphurdale area would probably have a very corrosive effect on pipelines, etc., and a potential danger of leakage exists.

In some instances the revegetated areas could provide better wildlife habitat for some species than previously existed. In addition to land modification, the noise and human activity could have displacement effects upon animals in the

site vicinity. The degree and permanence of displacement or disturbance likewise would depend upon the scope and type of activity.

Most areas adjacent to drilling and test operations, but outside of the immediate zones of physical modification and noise, would retain most or all of their wildlife populations and habitat.

Potentially significant impacts upon wildlife could result from improperly planned or executed handling of geothermal fluids. If uncontrolled releases, spills, seepage or well blowouts were to result in significant additions of toxic geothermal water into the drainages, adverse impacts could result.

It is difficult to define the specific impacts resulting from this type of operation without more specifically knowing the acreage involved in drilling and support activity, the location of well sites and drilling methods in relation to important wildlife habitats.

Mourning doves and band-tailed pigeons are most often found near water. If non-toxic water is ponded during the exploration or development stages, habitat would be improved, however, ponds of toxic substance could cause death to these birds. Some habitat for nesting and rearing of young

will likely be lost with the removal of native vegetation. The greatest impact will be during the spring months when the presence of men and equipment will disturb nesting birds. Some nest abandonment could be expected.

As sagebrush is destroyed by exploration and development activities sage grouse habitat will be destroyed. Noise during the spring nesting period and toxic water in ponds will have much the same effect as indicated for doves. It is possible that geothermal development activities in this area may eliminate sage grouse use of this area completely. It is not likely there will be any aspects of geothermal resource development that will be beneficial to sage grouse.

Blue grouse and Ruffed grouse habitat will not likely be directly effected since their habitat is at higher elevations and in rough terrain. The impact on these two species will likely be from heavier hunting pressure with increased human population.

Removal of extensive areas of pinyon-juniper cover would likely destroy areas used by raptors for nesting and roosting.

The wildlife species most noticeably effected will be

mule deer on their crucial winter range. It is quite likely the noise and general activities of exploration, development and plant operation will cause deer to withdraw from at least part if not all of the area, causing heavier use on other parts of the deer winter range.

If deer concentrations become too great it may become necessary to reduce the deer population. Some habitat will be lost where vegetation is removed or destroyed during prospecting and development stages. Other areas deer will not likely use because of the noise from machinery and presence of man. Stress will be the greatest in late winter and early spring months when deer are weak from the hardships of winter and heavy with fawn.

Some mammals such as the mountain lion will leave the area entirely with the increased activity of man. Behavioral patterns of some species will likely be changed upon completion of geothermal plants. For example, small mammals and birds may be attracted to the warm steam pipes during the cold winter months. The concentration of prey species will attract predators such as coyotes and eagles. To what extent this might affect population densities is not known.

The information on reptiles in this area is very limited. Without a doubt there will be some reptile habitat lost

in the exploration and development of geothermal resources. The reptile communities are among the least understood complexes in North America and therefore it is difficult to predict what the impacts might be.

Porcupine deaths have been reported in the Sulphurdale area in T. 25 S., R. 6 W., Sec. 20, 21, 28, 29, which are believed to have been from hydrogen sulfide gas. (3) Appendix 4. Geothermal activity in this area could result in more release of hydrogen sulfide gas which would be a safety hazard to human and wildlife.

It is obvious that if no mitigating measures are undertaken within the proposed geothermal lease area that the cultural values will be heavily damaged or destroyed. Destruction will not only occur from the impact of operations such as plant sites, roads, utilies, etc., but also from increased visitor use from personnel recreating and impacting the area.

Cumulative impacts resulting from accumulative effects of increased industrial activities and population growth and their respective impacts cannot be avoided. All have an adverse impact on the natural setting, and scientific nature in respect to historic or prehistoric cultural values.

b. Possible Mitigating or Enhancing Measures

1. Mitigation of most of the potential adverse impacts of the geothermal resource develop in this area can be accomplished by enforcement of existing state laws and federal regulations. General provisions of applicable laws and regulations are described in detail in Volume I, Chapter III, Section C of The Departmental Environmental Statement. (1)

2. A number of legislative acts providing for preservation of archaeological resources are referenced in the archaeology staff report. Appendix I.

3. Intensive surveys could be conducted for all highly impacted drilling, plant site locations and on areas where road and utility lines are constructed to discover and protect archaeological values from destruction.

4. If full development takes place, shade trees could be provided at parking lots and other areas where air temperature would be increased.

5. Graveling or surfacing permanent roads, parking lots, or yarding areas that will be used regularly would help to reduce dust and erosion from the area.

6. Closing and reseeding work roads when roads are no longer needed will help reduce erosion and speed vegetative recovery of the areas.

7. Sewage, garbage and other unpleasant odors should be disposed of in an approved manner in accordance with State sanitation standards.

8. Top soil could be stockpiled and redistributed after an area is no longer needed. The top soil would aid in re-establishment of vegetation on the disturbed areas.

9. Areas could be ripped where soil has been compacted to hasten recovery of structure. Ripped areas could be seeded to re-establish vegetative cover.

10. Vegetative cover could be re-established on all disturbed areas. This will help reduce dust problems and help protect the area from erosion.

11. Activities could be avoided on any slump areas which could cause slump such as road cuts, ponds, or reservoirs.

12. Shallow ground water can be contaminated by leachate from ponds and lagoons. All ponds, pits, and lagoons should be lined or sealed if there is any

possibility that the leachate could be harmful to the ground water reservoir.

13. There is a possibility that deep ground water could be contaminated by the recycling of water. Recycling is recommended to reduce the possibility of subsidence; however, if degradation could occur it should be considered carefully and measures taken to prevent contamination.

14. The exploration activities could be carried out during the period of time livestock are not grazing in a particular area; such as on the summer range during the fall and spring, and on the winter range during the summer season.

15. Mud pits could be fenced if livestock and wildlife are grazing the area at time of drilling, and one side of the pit could be sloped so they could walk out.

16. Where frequently used roads cross fences, cattleguards, could be installed. Gates that are easy to close could be installed at less frequently used crossings.

17. Drill sites could be located off from reseedings and preferred grazing areas.

18. Land ununded for drill sites could be kept to a minimum and all disturbed areas revegetated.

19. Access to drill sites and other exploration activities could be confined to existing roads and new ones constructed only when absolutely necessary.

20. Limited water within the area should be reserved for livestock and wildlife use first, before any is used for drilling purposes. Water could be hauled in from more ample sources for the drilling operation.

21. Geothermal activities could be conducted during seasons of the year that would minimize disturbance on wildlife. The most critical season will be during spring months.

22. All survey monuments, witness corners, reference monuments and bearing trees, can be protected by locating and marking them so that they will not be destroyed, obliterated or damaged during construction activities.

23. Major conflicts with raptor nesting and roosting habitat as well as deer winter range can be avoided or at least reduced by concentrating construction of building, roads, etc., in open areas not used for nesting or cover.

24. In order to minimize mortality of eagles, hawks and other birds power distribution lines could be designed and constructed in accordance with REA Bulletin 61-10. (6)

25. Mud pits and sumps containing any additives toxic to wildlife could be protected from entry by birds and other wildlife.

26. Noise levels could be kept to a minimum not to exceed 65 decibels at a distance of 1500 feet from its source to help minimize harassment of wildlife from introduced noise sources.

27. No clearing of ground cover for power transmission lines should be allowed excep for tower or pole pads.

28. Directional drilling for development operations could be employed where determined reasonable to protect the surface resource in a particular site.

29. The use of wide-tire or balloon tire vehicles and of helicopters could be required where necessary to protect the soil and resources.

30. Any conflicts with the sulfur mining interest can be avoided by insuring that the lessee respect

the rights of the mining claimants and work to obtain a cooperative relationship.

31. Precautions should be taken during any drilling operation in the eastern portion of the area to insure that no noxious gases (hydrogen sulfide) are released to the atmosphere. This could possibly be accomplished by insuring that adequate shut-off valves are included on every hole drilled. Also, weather monitoring studies could be made to determine the probability of temperature inversions which could concentrate any noxious gases or fumes.

32. The possibility of earthquakes due to the disposal of waste fluids can be retarded in part by locating the reinjection wells away from the existing faults. The foundation characteristics of the rocks in any potential reinjection sites should be determined before any disposal by reinjection is attempted.

c. Recommendations for Mitigation or Enhancement of Environmental Impacts

1. To protect archaeological and historical resources from destruction, intensive surveys should be conducted for all highly impacted areas and plant site

locations with a one-half mile buffer zone around all. In addition all ancillary facilities such as roads, utilities, etc., should be intensively surveyed with a quarter mile buffer. The total lease area should be investigated through random intensive surveys of potential cultural environments, based on geographical desirability. Highly scientific sites should be evaluated through testing and/or excavation if necessary. Within the lease area complete inventory of all areas should be undertaken by a reputable institution, subject to BLM and Forest Service approval. Recommendations should be made by the institution conducting the inventory, as to the necessary needs for salvage of values, i.e., testing or complete excavation. This will also be subject to BLM and FS review and approval. All costs could be borne by the lessee.

The results of all investigations will be published. Also in the event that buried cultural resources are located during construction, that phase of the construction will be halted until such time as qualified experts have examined the resource and adequately mitigated any impact.

2. If full development takes place, provide shade trees at parking lots and other areas where air temperature would be increased.

3. Close, drain, and reseed work roads when the roads are no longer needed.

4. Dispose of sewage, garbage and unpleasant odors in an approved manner in accordance with State sanitation standards.

5. Stock pile removed top soil and redistribute soil after an area is no longer needed.

6. Re-establish a vegetative cover on all disturbed areas.

7. Avoid unstable areas with activities which could cause slumping such as road cuts, ponds, or reservoirs.

8. Use methods which would recycle water to the underground reservoir if it can be done without degradation of water quality or other resource damages.

9. Line or seal ponds, reservoirs, pits and lagoons, etc., from which leachate could contaminate any water source.

10. Fence mud pits if livestock or wildlife are in area during drilling operations.

11. Fill and solidify mud pit when drilling has been completed.

12. Install cattleguards on roads at frequently used fence crossings.

13. Do not allow drill sites to be located adjacent to livestock watering places.

14. Immediately repair any damage to any range improvement.

15. Confine all exploration activities to existing roads as much as possible. Allow new road construction only when absolutely necessary.

16. Do not allow any use of water that is needed for consumptive use by livestock.

17. Waste fluids should not be allowed to accumulate on or flow from the lease area, but should be reinjected into the earth through wells at depths and at locations specified by Geothermal Supervisor USGS in a manner that will not pollute useable sub-surface water or cause other adverse impacts.

18. All survey monuments, witness corners, reference monuments and bearing trees will be located by the lessee in advance of surface disturbance and protected against destruction, obliteration or damage. Any accidentally damaged or obliterated markers must be reestablished in accordance with instructions of the

responsible agency at the expense of the lessee.

19. All power and transmission lines will be designed to minimize loss of raptors and other large birds by electrocution. Design and construction could be in accordance with REA Bulletin 61-10 (Powerline Contacts by Eagles and Other Large Birds). (6)

20. Mud pits and sumps containing any additives toxic to wildlife will be protected from entry by birds and other wildlife.

21. No clearing of ground cover for power transmission lines, except for tower or pole pads shall be allowed.

22. On critical deer wintering areas (Appendix 8) any pre-development work, such as drilling and its associated activities should be allowed only during the months of May through November, and no activities should be allowed during December through April.

23. The use of wide tire or balloon tire vehicles and of helicopters may be required by the lessor in off-road areas where such use is necessary to protect the soil and resources.

24. The lessee will not disturb or destroy mining claim location monuments, pits, or improvements without

written permission from the claimant.

25. Provide measures to protect human and wildlife from hydrogen sulfide gas which is already a hazard in the study area.

26. No open burning of waste materials should be permitted.

27. The lessee will submit for approval, complete site plans and operating plans for all activities involving resource disturbance (including access roads) prior to starting work.

d. Residual Impact

A review of possible residual impacts is contained in Chapter III of Final Environmental Statement (1) which are applicable to this area. Some of the impacts will be elaborated on as they occur on this area.

The disturbed sites in the lower elevation ranges may be difficult to revegetate. If they are not revegetated with desirable plant species, undesirable plant species will become established, such as Halogeton and cheatgrass, and it will take many years for these sites to heal under natural plant succession.

The noise levels generated from the operation of the plant

will be well above the natural levels of the area. This situation will continue to exist for as long as the plant is operating. It may be possible for the livestock and wildlife to become accustomed to the noise and activity so that it will not detrimentally affect them, but this is presently not known.

It is anticipated that the development and operation of a Geothermal plant will reduce the existing and potential grazing value of the land.

Many of the impacts of this proposal on watershed values can be mitigated to some extent. There are some, however, for which there will be little that can be done to lessen their effect.

The effect upon temperature and inversion are somewhat unknown and may or may not be slight but there is very little that can be done to lessen the effect.

Soil structure will improve naturally on some impacted areas but on others such as construction sites, parking and yarding areas and roads the soil structure will be affected as long as the facilities exist.

Erodibility of the soil will remain affected negatively as long as the vegetative cover is destroyed. The effects of the proposal on water can be largely

mitigated by following the recommendations previously given.

The effects on the hydrologic cycle for the most part cannot be mitigated.

Residual impacts could include loss of several hundred hunter and recreation days use associated with wildlife resources. The addition of several hundred people in this area associated with geothermal activities will create a greater demand for wildlife than already exists. Poaching possibly could become a greater problem than now exists.

2. Relationship Between Short-Term Use and Long-Term Productivity

The use of the lands for geothermal resource development will involve commitment of geothermal, land and water resources on the areas involved for as long as the project is in existence.

An assessment of possible environmental impacts have been previously described in this report and will occur mainly in the short term uses, during exploration and plant construction, in the event a plant is constructed.

If a geothermal field were developed in this area only time and experience would determine how long the operation would be productive and economically feasible to operate. It is

presumed continued production would not be everlasting. (1) However, to date no geothermal fields are known to have been depleted. Some have been in operation for over 50 years.

After all operations were halted and with proper rehabilitation measures taken any impacts left on the surface would be healed in a relatively short time.

Adverse environmental impacts would also be of a short duration. By including proper stipulations on the proposed actions and by enforcement of adequate protective measures no serious or long term adverse impacts are expected.

It is apparent that if exploration and development is undertaken in this area that a large body of information will be revealed and available for addition to the knowledge base. The acquisition, collection and analyzation of information are gains to immediate improvement of the sciences and provide a fund of information for various kinds of study in the future.

3. Irreversible and Irretrievable Commitments of Resources

If proper stipulations are included, State Laws and Federal regulations enforced, there will be no irreversible and irretrievable commitments of surface resources by the proposed action.

Possible irreversible and irretrievable sub-surface commitments are discussed in the departmental environmental statement Volume I, Chapter III, Page 92. (1)

D. PERSONS, GROUPS AND GOVERNMENT AGENCIES CONSULTED

1. U.S. Forest Service - Fillmore and Beaver Ranger Districts. Supervisor, Fishlake National Forest, Richfield, Utah.

2. Division of Wildlife Resources - Bill Moyes, Othello Riley, Grant Jensen, Allan Boss, Rodney John.

3. U.S. Fish & Wildlife Service - Bob Oppenheimer.

4. USGS - Jack Smedley.

5. See Letter (Attachment 10)

Gordon Harmstom, Chief
Department of Natural Resources
Utah State Capitol Building
Salt Lake City, Utah

Division of State Land
Utah State Capitol Building 105
Salt Lake City, Utah

Division of Water Resources
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H. F. Ritzma
Ut. Geological and Mineral Survey
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Utah Oil & Gas Conservation Div.
1588 West North Temple
Salt Lake City, Utah

E. INTENSITY OF PUBLIC INTEREST

Team members made various contacts with individuals on the street, some expressed little concern one way or another regarding the proposal possibily because they were not very well informed of the situation or because the proposed site is not in the near vicinity of their communities. One comment made by one rancher-farmer was that he hoped the operation did not affect his operation by importing a great number of people into the area. Generally comments appeared in favor of the action especially with the prospect that it may give their respective communities an economic boost.

It was expressed that conservationists, archaeologists and historians would be completely against the proposal if it was not planned to protect, salvage or stabilize all historical sites as necessary.

F. PARTICIPATING STAFF

A joint team approach was used in preparation of this report between BLM and the Forest Service. Individuals from each agency had specific resource assignments.

One day was spent viewing a slide presentation of geothermal activities, discussing the Cove Fort-Sulphurdale situation and in making a field trip over the study area. Individual team members made additional field trips as they felt necessary in order to report their individual responsibilities.

Written reports were submitted by the following team members which are included in Appendix I.

Watershed	Dee Thomas	U.S. Forest Service
Recreation	Brent Hanchett	U.S. Forest Service
Wildlife	Ervin Larsen	BLM
Range	Larry Gass & Ron Wilson	U.S. Forest Service
Minerals	Jim Kohler	BLM
Forestry	Wayne Foltz	U.S. Forest Service
Scoi-economic	Don Burt	BLM
Archaeological	Richard Fike	BLM

G. RECOMMENDATION ON ENVIRONMENTAL STATEMENT

Little concern was expressed from the public regarding this proposed action. Interest would be expected to increase if actual exploration and development work begins.

F. PARTICIPATING AGENCIES

No irreversible and irretrievable commitments of surface resources are anticipated. It is possible that some sub-surface resources may be affected which could be considered long term commitments (1), however, it will not be known to what extent these will be until the

actual situation is encountered.

The use on the area at the present time is not intensive. The area is used mainly for livestock grazing, hunting, a slight tourist attraction at Cove Fort and intermittent mining activities at Sulphurdale.

There are no established communities within the study area boundaries. Cove Fort and Sulphurdale consist of one-two family dwelling with a transient work force.

In view of the comments included in the staff reports with consideration given to all of the anticipated environmental impact that may occur if development takes place, it is recommended that an environmental impact statement not be prepared.

H. SIGNATURES

Team Leader — 1-6-75 Date

Team Leader — 12-24-1974 Date

Approved:by:

Fillmore District Environment Coordinator — 1-6-75 Date

Fillmore District Manager — 1/21/75 Date

Forest Supervisor — 12-30-74 Date

References

(1) U.S. Department of the Interior, Final Environmental Statement for the Geothermal Leasing Program, Volume I of IV, 1973.

(2) Rodriguez, E. L., 1960, Economic Geology of the Sulphur Deposits at Sulphurdale, Utah, unpublished M.S. Thesis, University of Utah.

(3) Crosby, G. W., 1959, Geology of the South Pavant Range, BYU Research Studies, Geol. Series, V.6, No. 3.

(4) Butler, B.S., et al., 1920, Ore Deposits of Utah, U.S.G.S. Prof. Paper 111, p 106.

(5) Power Contacts by Eagles and Other Large Birds.

(6) REA Bulletin 61-10 (Powerline Contacts by Eagles and Other Large Birds).

(7) Evans, D.M., 1967, Man-made Earthquakes, a Progress Report, Geotimes, July-August 1967, pp 19-20.

(8) Utah Big Game Investigations and Management Recommendations, 1974. Publication Number 74-5, Utah Division of Wildlife Resources.

(9) Utah Big Game Harvest 1973. Publication Number 74-4, Utah Division of Wildlife Resources.

(10) Utah Upland Game Annual Report, Utah Division of Wildlife Resources.

(11) Warm Springs URA.

Attachment I

Stratigraphy of Cove Fort Area

Quaternary

Aluvium
Basalt

Tertiary

Volcanic flows and pyroclastics
Sevier River Formation

Mesozioc

Price River Conglomerate
Navajo Sandstone
Chinle Formation - sandstone and shale
Shinarump Formation - sandstone
Moenkopi formation - Siltstone and sandstone

Paleozoic

Kiabab Limestone
Coconino sandstone
Pakoon limestone
Oquirrh formation - limestone, dolomite, sandstone, shale
Redwall limestone
Sevy Dolomite
Ordovician - Silurian Dolomites undifferentiated

Following is a list of plant species that can be found on this area:

Grasses or grasslike

Genus	species	Common name
Agropyron	smithii	Western wheatgrass
Agropyron	spicatum	Bluebunch wheatgrass
Agropyron	cristatum	Crested wheatgrass
Agropyron	trachycaulum	Slender wheatgrass
Aristida	divaniceter	Poverty three-awn
Aristida	fendleriana	Fendler three-awn
Blepyaroneuron	tricholepsis	Pine dropseed
Boutelona	gracilis	Blue grama
Bromus	anomalus	Nodding brome
Bromus	carinattis	Mountain brome
Bromus	caliatus	Fringed brome
Bromus	inermis	Smooth brome
Bromus	tectorum	Cheatgrass brome
Deschampsia	caespitosa	Tufted hair grass
Distichlis	stricta	Desert salt grass
Elymus	cinereus	Great basin woldeye
Elymus	junceus	Russian wildeye
Festuca	thurberi	Thurber fescue
Hilaria	jamesii	Galleta
Hordeum	jubatum	Foxtail barley
Hordeum	pusillum	Little barley
Koreria	cristata	June grass
Muhlenbergia	montana	mountain muhly
Oryzopsis	hymenoides	Indian rice grass
Poa	feudleriana	Mutton blue grass
Poa	protensis	Kentucky bluegrass
Poa	secunda	Sandberg bluegrass
Sitanion	hystrix	Squirreltail
Sporobolus	airoides	Alkali sacaton
Sporobolus	cryptandrus	Sand dropseed
Stipa	comata	Needle-and-thread
Stipa	lettermani	Letterman needlegrass
Stipa	columbiana	Subalpine needlegrass
Trisetum	spicatum	Spike trisetum
Carex	spp.	sedge
Juncus	Spp.	Rush, wiregrass

Forbs

Achillea	lanulosa	Western yarrow
Agoseris	glauca	Pale agoseris
Ambrosia	spp.	Ragweed
Antennaria	parvifolia	Littleleaf pussytoes

Argemone	hispida	Prickly poppy
Arnica	cordefolia	Heartleaf arnica
Aster	Spp.	Daisy
Astragalus	Spp.	Loco weed
Balsamorhiza	sagittata	Arrowleaf Balsamroot
Brassica	nigra	Black mustard
Calochortus	nuttallii	Sego lily
Castilleja	angustifolia	Indian paint brush
Chaenactis	spp.	----
Chenopodium	spp.	Pigweed
Cirsium	arvense	Canada thistle
Cleome	serrulata	Bee plant
Crepia	spp.	Hawksbeard
Delphinium	bicolor	Little larkspur
Delphinium	nelsoni	Low larkspur
Equisetum	spp.	Horsetail
Erigeron	spp.	Fleabane. daisy
Eriogonum	caespitosum	Nat eriogonum
Eriogonum	heraculoides	Wild buckwheat
Gilia	spp.	Gilia
Halogeton	glomeratus	Halogeton
Haplopappus	spp.	Goldenweed
Hydrophyllum	spp.	Waterleaf
Iva	axillaris	Poverty weed
Lappula	redowskii	Annual stickseed
Lathyrus	utahensis	Utah peavine
Lepidium	peroliatum	Pepperwood
Lupinus	spp.	Lupine
Lygodesmia	spinosa	Skeleton weed
Melilotus	officinalis	Yellow sweetclover
Mertensia	spp.	Blue bell
Pentemon	esteni	Eaton pentemon
Pentemon	spp.	Pentemon
Phlox	noodii	Hood phlox
Phlox	longifolia	Longleaf phlox
Potentilla	spp.	Cinque foil
Rumex	spp.	Dock
Salsola	kali	Russian thistle
Senecio	serva	Butterweed gramdsel
Spharalcea	ambigua	Desert glovesmallow
Taraxacum	officinale	Dandlion
Verbascum	spp.	mullein
zigadenus	paniculatus	Death camas

Shrubs

Amelanchier	alnifolia	Serviceberry
Artemisia	arbuscula	Low sagebrush
Artimisia	nova	Black sagebrush
Artemisia	spinescens	Bud sagebrush

Artemesia	tridentata	Big sagebrush
Atriplex	canesceus	Fourwing saltbush
Atriplex	confertifolia	Shadscale
Atriplex	nuttallii	Nuttall saltbush
Cercocarpus	ledifolias	Curlleaf Mountain mahogany
Cercocarpus	montanus	Birchleaf mahogany
Chrysothamnus	nauseosus	Rubber rabbitbrush
Chrysothamnus	viscidiflorus	Douglas rabbitbrush
Ephedra	nevadensis	Neveda ephelra
Eriogonum	microthecum	Shrubby buckwheat
Eurotia	lavata	Winterfat
Gutierezia	sarothrae	Broom snakeweed
Haplopappus	spp.	Goldenweed
Kocid	americana	Green-molly
Opuntia	spp.	Prickly-pear
Pruners	virginiana	Chokecherry
Purshia	tridentata	Antelope bitterbrush
Rhus	tribobata	squawbrush
Ribes	spp.	Currant
Sambucus	spp.	Elderberry
Sarcobatus	vermiculatus	Greasewood
Symphoricarpos	spp.	Snowberry
Tetradymia	spinosa	Shortspine horsebrush

Trees

Abies	concolor	White fir
Abies	lasiocarpa	Subalpine fir
Acer	glabrum	Rocky mountain maple
Alnus	tenifolia	Alder
Betula	occidentalis	Water birch
Juniperus	osteosperma	Utah juniper
Picea	engelmannii	Engleman spruce
Pinus	edulis	Pinyon Pine
Pseudotsuga	menziesii	Douglas fir
Populus	tremuloider	Quaking aspen
Populus	spp.	Cottonwood
Quercus	gambelii	Gambel oak
Salix	spp.	Willow

Attachment # 3

LIST OF WILDLIFE

Birds

Mourning Dove	Zenaidura macroura
Golden eagle	Aquita chrysaetos
Bald eagle	Haliaeetus leucocephalus
Black-billed magpie	Pica pica
Common raven	Carvus corax
Pine jay	Gymnortinus cyanocephala
Great horned owl	Bubl virginianus
Long-eared owl	Asio otus
Turkey vulture	Cathartes aura
Meadow lark (western)	Stuvnella neglecta
Chukar partridge	Alectoris grasca
Sharp-shinned hawk	Accipiter striatus
Cooper's hawk	Accipiter copperii
Red-tailed hawk	Buteo jamaicensis
Swainson's hawk	Buteo swainsoni
Rough-legged hawk	Buteo lagopus
Ferruginous hawk	Buteo regalis
Marsh hawk	Circus cyaneus
Prairie falcon	Falco mexicanus
Peregrine falcon	Falco peregrinus
Pigeon hawk	Falco columbarius
Sparrow hawk	Falco sparverius
Burrowing owl	Speotyto cunicularia
Poor-will	Phalaenoptilus nattallii
Common night hawk	Chordeiles minor
Lesser night hawk	Chordeiles acutipennis
Western kingbird	Tyrannus verticalis
Horned lark	Eremophela alpestris utahensis
Violet-green swallow	Tachycineta thalassina
Rough-winged swallow	Stelgidopteryx ruficollis
Barn swallow	Hirundo rustica
Mountain chickadee	Parus gambeli
White-breasted nuthatch	Sitta carolinensis
Long-billed marsh wren	Telmatodytes palustris
Rock wren	Salpinctes obsoletus
Mocking bird	Mimus polyglottos
Le Conte's thrasher	Toxostoma lecontei
Sage thrasher	Oreoscoptes montanus
Robin	Turdus migratorius
Western bluebird	Sialia mexicana
Mountain bluebird	Sialia cuvrucoides
Loggerhead Shrike	Lanius ludovicianus
Starling	Sturnus vulgaris
Yellow warbler	Dendroica petechia
Anderson's Warbler	Dendroica auduboni
Vesper sparrow	Pooecetes gramineus
Black-throated sparrow	Amphispiza bilineata
Sage grouse	Centrocercus urophasianus

Attachment # 3 continued

Birds - continued

Band-tailed pigeon	Columba fasciata
Ruffed grouse	Bonasa umbellus
Blue Grouse	Dendragapus obscurus

Reptiles

Gopher snake	Pituophis melanoieucus
Desert horned lizard	Phrynosoma platyrhenos platyrhenos
Great basin rattlesnake	Crotalus vieidis lutosus
Great basin spadefoot	Scaphiopus intermountanus
Woodhouse's toad	Bufo woodhousei
Great Plans Toad	Bufo cognatus
Leopard lizard	Crotaphytus wistizenii
Collared lizard	Crotaphytus collarus
Western fence lizard	Sceloporus occidentalis
Sagebrush lizard	Sceloporus graciosus
Side-Blotched lizard	Uta stansburiana
Short horned lizard	Phrynosoma douglassi
Desert horned lizard	Phrynosoma platyrhinos
Western skunk	Eumeces skiltonianus

Mammals

Badger	Taxidea taxus
Coyote	Canis latrans
Kit Fox	Vulpes velox
Bob cat	Lynx rufus
Longtail weasel	Mustela frenata
Mule deer	Odocoileus hamionus
Blacktail jackrabbit	Lepus californicus
Porcupine	Erethizon dorsatum
Wood rat	Neotoma Spp
Kangaroo rat	Dipodomys Spp
Whitetail antelope squirrel	Ammospermophilus leucurus
Gopher	Spp
Striped skunk	Mephitis mephitis
Packrat mouse	Perognathus Spp
Deer mouse	Peromyscus Spp
Mountain lion	Felis concolor
Cottontail rabbit	Sylvilagus nattallii
Spotted skunk	Spilogate putorius
Muskrat	Ondatra zibethica
Pallid bat	Antrozous pallidus
Hoary bat	Lasiurus cinereus
Longtail weasel	Mustela frenata
Gray fox	Urocyon cinereogrgenteus
Red fox	Velpes fulva
Rock squirrel	Citellus variegatus

Attachment # 3 continued

Mammals - continued

Townsend ground squirrel	Citellus townsendii
Valley pocket gopher	Thomonrys bottae
Canyon mouse	Peronyocus crinitus
Pinyon mouse	Peromyscus truei
Grasshopper mouse	Onychomys leucogaster
Elk	Cervus canadensis

Attachment # 4

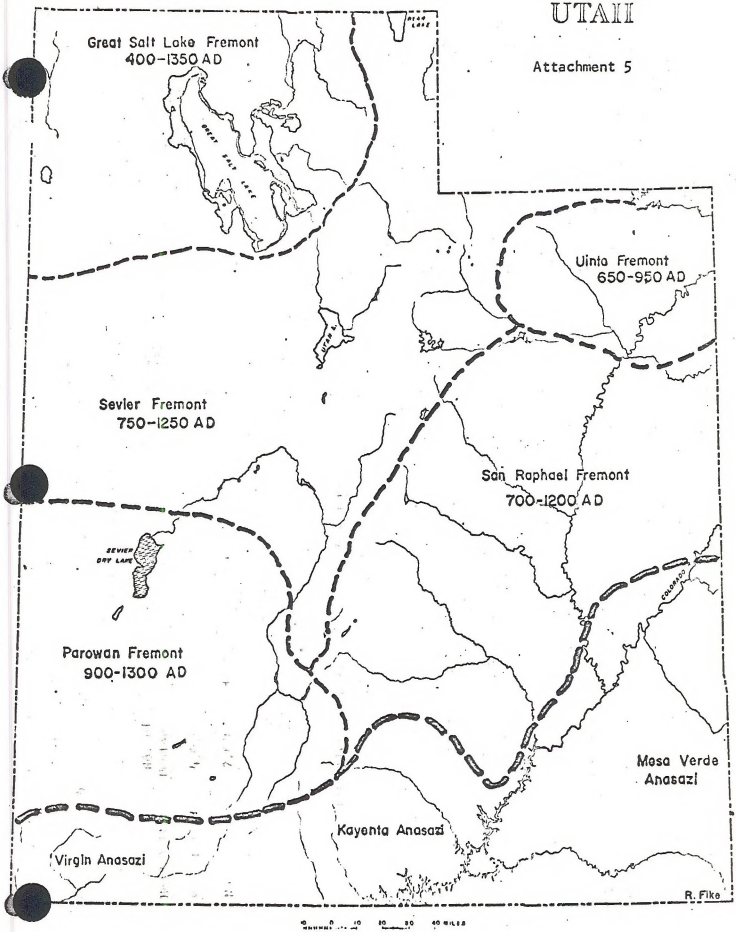
Five Year Average 1969 to 1973

Herd Units	No. of Hunters	Total Kill	% Non-Resident Hunters	Browse Trends % Utilization	Pellet Group Trends % Utilization	Fawn/100 Does
Kanosh # 55	4,678	2,945	43.8%	71.2% (Dog Valley)	70.0% (Dog Valley)	64.2
North Beaver #56A	2,036	1,216	62.4%	57.2% (Brush Creek)	38% (Baker Canyon) 21% (Brush Creek)	77.2

Statistics taken from References 4/and 5/.

UTAH

Attachment 5



Attachment 6

ANALYSIS OF WATER FROM SULPHURDALE, UTAH

	ppm
Dissolved solids at 180° C	8,816
" " " 130° C.	10,810
Suspended matter	52
Silica (SiO_2)	124
Ferrous oxide	560
Ferric oxide	802
Aluminum	0
Calcium	158
Magnesium	232
Sodium	1
Potassium	144
Carbonate radical	0
Bicarbonate radical	0
Sulphate radical	7,602
Free sulphuric acid	4,523
Chlorine	79
Nitrate radical	1.7
Free sulphur	3.6

(W. M. Barr, 1905, U.S.G.S.)

Attachment 7

Selected Statistics for Millard and Beaver Counties.

TABLE

BEAVER COUNTY	1970	1971	1972	1973	1972-73 Percent Change
Population (Estimate)	3850	3800	4100	4200	2.4
Average Labor Force (Estimate)	1630	1730	1790	1790[a]	0.0
Average non-agricultural employment	929	994	1040	[illegible]	2.9
Av. monthly non-ag wage (Dollar)	408	425	472	484[a]	2.5
Annual non-ag payroll ($000)	4549	5068	5884	6240[a]	6.1
No. of new car & truck sales	204	187	234	263	12.4
No. of new dwelling units[b]	10	15	37	42	13.5
Residential construction ($000)[b]	160	156	624	803	28.7
Non-residential construction ($000)[b]	5	394	432	658	52.3
Total construction ($000)[b]	194	911	1084	1462	34.9
Total personal income ($000)	10000	10735	12945	13728[a]	6.0
MILLARD COUNTY					
Population (Estimate)	7050	7200	7700	7800	1.3
Average Labor Force (Estimate)	2970	3120	3050	2960[a]	-3.0
Average non-ag employment	1531	1683	1737	1670[a]	-3.9
Average monthly non-ag wage (Dollar)	376	403	420	435[a]	3.6
Annual non-ag payroll ($000)	6899	8132	8764	8725[a]	-0.4
No. of new car & truck sales	341	481	544	547	0.6
Total personal income ($000) (Est.)	18475	19874	21735	21638[a]	-0.4

[a]Preliminary

[b]Reporting areas only - See Utah Construction Report

SOURCE: Selected Business Statistics - Utah Counties, University of Utah, Bureau of Economic and Business Research, March, 1974.

The largest employers in the two counties along with services/products, location and number of employees are shown on the following table.

Attachment 8

TABLE

BEAVER COUNTY

Non-manufacturing:

Firm Name	City	Service/Product	No. of Employees
Union Pacific Railroad	Milford	Railroad Products	125
Beaver School District	Beaver/ Milford	Education	107
Milford Valley Hospital	Milford	Health Care	40
Federal, State and County Offices	Countywide	Government	150

Manufacturing or Mining:

Far West Manufacturing	Beaver	Sports Clothing	85
Essex International	Milford	Copper Ore	117
John Powell Mfg.	Beaver	Ladies Jackets	16
Wiseman REady Mix	Milford	Concrete	6

MILLARD COUNTY

Non-manufacturing:

Firm Name	City	Service/Product	No. of Employees
Millard School District	Countywide	Education	300
Union Pacific Railroad	Countywide	Transportation	65
Federal, State & County Offices	Countywide	Government	200
West Millard Hospital	Delta	Health Care	30

Manufacturing or Mining:

Review Apparel	Scipio, Fillmore	Women's apparel	120
Brush Wellman Corp.	Delta	Beryllium Concentrate	90
Duke Manufacturing	Hinkley	Clothing	50
Delta Jetliner Trailers	Delta	House Trailer	15

Number of Manufacturing Plants in Region 20.

Attachment 9

3200
U-030
November 14, 1974

State Director (U-910)

District Manager - Fillmore

Possible Mining Conflicts in the Cove Fort-Sulphurdale Geothermal Lease Area

In view of the claims filed by Melvin Bradshaw in connection with our Roosevelt Geothermal Leasing Program, we are concerned about a similar potential in the Cove Fort-Sulphurdale Lease Area. The Sulphurdale area is an old mining district located mainly within the Forest, but also having claims on the NRL. This then presents the potential for pre-PL 167 unpatented mining claims. This possibility then gives rise to the following questions:

1. Would we have to make a PL 167 determination in order to provide access across an unpatented mining claim filed prior to 1955?

2. Are there any conflicts regarding the recovery of leaseable minerals on a pre-1955 unpatented mining claim, specifically the drilling for geothermal steam?

3. What is our obligation to the claimant and/or the lessee in such cases?

4. What is our position regarding this same area so far as PL 585 is concerned?

Because of the origin of the sulphur deposits in this area, there is a possibility that the claimants may file a protest to our leasing for geothermal steam. It would seem prudent for us to be prepared to answer any such charges. To date we have had no communications from any of the mining claimants in that area, but it would seem advisable to be prepared to answer any such claim and at least research both PL 585 and PL 467 regarding our proposed leasing program in this area.

As stated above, my main concern is the possibility of a pre-1955 claim blocking access into certain areas covered by geothermal lease. Also, this could present a problem in the future regarding the possibility of collection systems, pipelines, etc., associated with the development of a geothermal field and the production of electricity.

Any help or enlightenment you can give us in this regard would be greatly appreciated. It should be noted that any problems in this regard will undoubtedly come on NRL because this area of the Forest has had a PL 167 determination, thereby eliminating the potential for similar problems on the National Forest lands.

LMF:cbf

Attachment 10

3200

Fillmore, Utah 84631

November 1, 1974

Dear Sir:

We are presently working on the Cove Fort-Sulphurdale Environmental Analysis Record on geothermal activities in which we request any comments you may have regarding the proposal.

The proposed action is to make available under lease an unknown number of tracts in the Cove Fort-Sulphurdale Known Geothermal Resource Area for exploration and development of geothermal resources pursuant to the Geothermal Steam Act of 1970. A map is enclosed outlining the study area.

We plan to have the Environmental Analysis in final draft within the next two weeks. We will appreciate any comments you may have regarding the proposal to be included in the final report.

If you have any questions or need more information, contact Don Jones, Area Manager, Fillmore District.

Sincerely yours,

Kenneth A. Satterfield
Acting District Manager

Enclosure

DEJ:cbf

Sent to: See attached mailing list

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENVIRONMENTAL ANALYSIS WORKSHEET

1. Action To make available under lease an unknown number of tracts in the Cove Fort-Sulphurdale KGRA for exploration and development of geothermal resources pursuant to the Geothermal Steam Act of 1970.

2. Stages of implementation

Exploration

3. DISCRETE OPERATIONS

4. COMPONENTS, SUBCOMPONENTS, AND ELEMENTS IMPACTED	5. ANTICIPATED IMPACTS: Seismic Exploration	Shallow Test Drilling	Roads, Holding ponds, Mud pits, drill pad	Deep Test Well Drilling		6. REMARKS
I. NONLIVING COMPONENTS						
A. AIR						
Temperature	0	0	-L	0		Ground surface temp would be increased due to removal of vegetation.
Particulate Matter	-L	0	-L	0		Increased dust would result from vehicles on the cleared ground.
Carbon Monoxide	-X	-X	-X	-X		From engine exhaust & road dust.
Hydro carbons	-X	-X	-X	-X		From engines exhaust.
Nitrogen Oxides	-X	-X	-X	-X		From engines exhaust.
Sulfur Oxides	-X	-L	-0	-h		From engine exhaust.
B. LAND						
Soil depth	0	-X	-L	-X		Soil depth would be reduced and limited to area affected by activity.
Soil structure	0	0	-M	-L		Compaction would reduce infiltration capacity limited to area affected by activity.
Soil erosion	-L	0	-L	0		Increased erodibility result. from decrease in veg. cover limit. to area.
Geologic Structure	+L	+L	0	+L		Will enhance knowledge of geologic structure of area.
Land Use Compatibility	0	0	0	0		Can be restored on immediate area of work.
Geologic Hazards "Landsliding"	0	0	-M	-L		
Earthquakes	0	0	0	-M		
C. WATER						
Hydrologic Cycle	0	-L	-M	-L		Activities could change evaporation and transportation rates, infiltration rates and runoff pattern.
Sediment Load	0	0	-M	0		Surface water quality would be reduced due to increased sediment.
Oisolved solids	0	-L	0	-L		
Chemicals & Toxic Substances	0	-L	0	-L		
Ground water contamination	0	X	0	X		
II. LIVING COMPONENTS						
A. PLANTS *(Aquatic)*						
Vascular plants						No significant value

(Continued on reverse)

UNITED STATES

DISCRETE OPERATIONS

COMPONENTS, SUBCOMPONENTS, AND ELEMENTS IMPACTED		Seismic Exploration	Shallow Test Drilling	Roads, Holding Ponds, Mud pits, drill pad	Deep Test Well Drilling		REMARKS
		ANTICIPATED IMPACTS					
II. LIVING COMPONENTS (Con.)	B. PLANTS *(Terrestrial)*						
	Lichens & Mosses	0	0	-L	0		Limited to area of immediate activity.
	Grasses	-L	-L	-H	-M		" "
	Forbs	-L	-L	-H	-M		" "
	Shrubs	-L	-L	-H	-M		" "
	Broadleaf & Conifers	-L	-L	-H	-M		" "
	C. ANIMALS *(Aquatic)*						
	D. ANIMALS *(Terrestrial)*						
	Mammals	-M	-M	-M	-M		
	Birds	-M	-M	-M	-M		
	Reptiles	-L	-L	-L	-L		
III. INTERRELATIONSHIPS	A. ECOLOGICAL PROCESSES						
	Succession	0	0	0	-X		Activities alter seral character only on immediate site of activity.
IV. HUMAN VALUES	A. LANDSCAPE CHARACTER						
	Harmonious	-X	-X	-M	-M		Exploration should follow existing roads.
	B. SOCIOCULTURAL INTERESTS						
	Education / Scientific	+h	+h	0	+h		
	Social Welfare	0	0	+X	0		Roads provide timber access.
	Recreation	-L	-L	-M	-L		Worse if in visual zone or duri[ng] Fall hunting season.

INSTRUCTIONS

1. *Action* — Enter action being taken, analytic step for which worksheet is being used, environmental viewpoint of impact, and any assumptions relating to impact.
   a. Worksheet is normally used to analyze *"Anticipated Impacts"* of action; *however,* it may be used to analyze *"Residual Impacts."* Worksheets may also be used to compare impacts before and after mitigating measures are applied.
   b. State viewpoint that best describes environmental impact. For example, a fence viewed down the fence line has greater impact than the same fence viewed over an entire allotment. Generally, narrow viewpoints better illustrate specific impacts than will broad viewpoints.
   c. Assumptions may be made to establish a base for analysis *(e.g. estimated time periods, season of year, etc.).*

2. *[St]ages of Implementation* — Identify different phases of proposed project *(e.g. a road project consists of survey, construction, use, and maintenance stages).*

3. *Discrete Operations* — Identify separate actions comprising a particular stage of implementation *(e.g. the construction stage of the road project has the discrete operations of clearing, grading, and surfacing).*

4. *Elements Impacted* — Enter under appropriate heading all environmental elements susceptible to impact from action and alternatives. Relevant elements not contained in the digest should also be entered. See BLM Manual 1791, Appendix 2, Environmental Digest.

5. *Anticipated Impact* — Evaluate anticipated impact on each element and place an entry in the appropriate square indicating degree of impact as low (L), medium (M), high (H), no impact (O), or unknown or negligable (X). Preceed each entry by a plus (+) or minus (−) sign indicating a beneficial or adverse type of impact. If type of impact reflects a matter of opinion or is not known, *do not* preceed with a sign. For example, construction of a wind mill on open range has a definite visual impact; *however,* to some people the effect is detrimental while to others it is an improvement. By not entering a plus (+) or minus (−) sign the worksheet is kept factual and unbiased. If both degree and type of impact are unknown, place an (x) in the appropriate square.
   a. The measures of impact *(e.g. low, medium, and high)* are relative and their meaning may vary slightly from action to action. The term *"low"* should not be applied to impacts of a negligible nature. For example, we know that a pickup truck driving down a proposed fence line laying wire has some impact on air quality. However, the significance of this impact is not normally great enough to warrant even a *"low"* rating. In cases like this, the impact will usually be marked "O" or the element left off the worksheet.
   b. It is recognized that some environmental elements may defy accurate measurement or in-depth analysis within current Bureau capabilities or expertise. The nature of the action as well as type and degree of impact should guide in the decision to seek outside expertise or assistance.

6. *Remarks* — Enter clarifying information.

☆U.S. GOVERNMENT PRINTING OFFICE 1974 — 781-866

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENVIRONMENTAL ANALYSIS WORKSHEET

1. Action To make available under lease an unknown number of tracts in the Cove Fort-Sulphurdale KGRA for exploration and development of geothermal resource pursuant to the Geothermal Steam Act of 1970.

2. Stages of implementation

Development (Construction)

3. DISCRETE OPERATIONS

4. COMPONENTS, SUBCOMPONENTS, AND ELEMENTS IMPACTED		Production Wells	Road system Pipeline	Utility corridors, telephone power access road	Generating Plant, Cullinary water sewage & garbage	Disposal of Fluids	6. REMARKS
		5. ANTICIPATED IMPACTS					
I. NONLIVING COMPONENTS	A. AIR						Vegetative removal will cause
	Temperature	0	-L	0	-L	0	increased air temperature
	Particulate Matter	0	-L	0	-L	0	Increased dust from vehicle and equipment use on cleared areas
	Hydrogen Sulphide	-M	0	0	0	0	Odors may result from improper disposal of sewage and garbage
	B. LAND						Soil depth will be reduced by
	Soil Depth	0	-L	-L	-M	0	clearing
	Soil Structure	-L	-H	-L	-H	0	Compaction by vehicles will reduce infiltration rates on immed.area of activity
	Soil Pollvtants	X	0	-X	X	X	
	Soil Erosion	0	-L	-L	-L	0	
	Geologic Structure	0	0	0	0	-L	
	Land Use Capability	0	+X	+X	X	-L	
	Geologic Hazard (1) Land slides	-M	-M	0	0	-M	
	(2) earthquake	-M	0	0	0	-L	
	C. WATER						Activity will change E.T. rate infiltration rate and runnoff
	Hydrologic Cycle	-M	-L	-M	-M	-L	characteristics.
	Sediment load	-0	-L	-L	-L	0	Surface water quality reduced due to increased sediments.
	Dissolved solids	-M	0	0	0	?	
	Chemical-Metals & Toxic Subs.	-M	0	0	0	-L	
	Temperature	0	0	0	0	X	
II. LIVING COMPONENTS	A. PLANTS *(Aquatic)*						
	Vascular Plants						Not significant - they appear in small amounts and are widely scattered.

(Continued on reverse)

Form 1790-3 (June 1974)

	DISCRETE OPERATIONS	Production Wells	Road System Pipeline	Utility Corridors Telephone power, access rds.	Generating plant, Culinary water, sewage and garbage	Disposal of fluids	
	COMPONENTS, SUBCOMPONENTS, AND ELEMENTS IMPACTED	ANTICIPATED IMPACTS					REMARKS
II. NG COMPONENTS (Con.)	B. PLANTS *(Terrestrial)*						
	Grass	-L	-H	-H	-H	-M	On immediate activity area.
	Forbs	-L	-H	-H	-H	-M	" " " "
	Shrubs	-L	-H	-H	-H	-M	" " " "
	Conifers	-L	-H	-H	-H	-M	" " " "
	Broadleaf trees	-L	-H	-H	-H	-M	" " " "
	C. ANIMALS *(Aquatic)*						
	D. ANIMALS *(Terrestrial)*						
	Mammals	-M	-M	-M	-M	-M	
	Birds	-M	-M	-M	-M	-M	
	Reptiles	-M	-M	-M	-M	-M	
III. INTERRELATIONSHIPS	A. ECOLOGICAL PROCESSES						
	Succession	-L	0	0	-X	-X	Seral stage may be affected.
IV. HUMAN VALUES	A. LANDSCAPE CHARACTER						
	Harmonious	-M	-H	-H	H	-M	Major impact when located close to interstate system.
	B. SOCIOCULTURAL INTERESTS						
	Education/Scientific	+L	+L	+L	+L	+L	
	Social Welfare	+L	+L	+L	+L	+L	
	Recreation	-M	-H	-H	-H	-L	These facilities preclude recreat

INSTRUCTIONS

1. *Action* – Enter action being taken, analytic step for which worksheet is being used, environmental viewpoint of impact, and any assumptions relating to impact.
   a. Worksheet is normally used to analyze *"Anticipated Impacts"* of action; *however*, it may be used to analyze *"Residual Impacts."* Worksheets may also be used to compare impacts before and after mitigating measures are applied.
   b. State viewpoint that best describes environmental impact. For example, a fence viewed down the fence line has greater impact than the same fence viewed over an entire allotment. Generally, narrow viewpoints better illustrate specific impacts than will broad viewpoints.
   c. Assumptions may be made to establish a base for analysis *(e.g. estimated time periods, season of year, etc.)*.

2. *ages of Implementation* – Identify different phases of proposed project *(e.g. a road project consists of survey, construction, use, and maintenance stages)*.

3. *Discrete Operations* – Identify separate actions comprising a particular stage of implementation *(e.g. the construction stage of the road project has the discrete operations of clearing, grading, and surfacing)*.

4. *Elements Impacted* – Enter under appropriate heading all environmental elements susceptible to impact from action and alternatives. Relevant elements not contained in the digest should also be entered. See BLM Manual 1791, Appendix 2, Environmental Digest.

5. *Anticipated Impact* – Evaluate anticipated impact on each element and place an entry in the appropriate square indicating degree of impact as low (L), medium (M), high (H), no impact (O), or unknown or negligable (X). Preceed each entry by a plus (+) or minus (–) sign indicating a beneficial or adverse type of impact. If type of impact reflects a matter of opinion or is not known, *do not* preceed with a sign. For example, construction of a wind mill on open range has a definite visual impact; *however*, to some people the effect is detrimental while to others it is an improvement. By not entering a plus (+) or minus (–) sign the worksheet is kept factual and unbiased. If both degree and type of impact are unknown, place an (x) in the appropriate square.
   a. The measures of impact *(e.g. low, medium, and high)* are relative and their meaning may vary slightly from action to action. The term *"low"* should not be applied to impacts of a negligible nature. For example, we know that a pickup truck driving down a proposed fence line laying wire has some impact on air quality. However, the significance of this impact is not normally great enough to warrant even a *"low"* rating. In cases like this, the impact will usually be marked "O" or the element left off the worksheet.
   b. It is recognized that some environmental elements may defy accurate measurement or in-depth analysis within current Bureau capabilities or expertise. The nature of the action as well as type and degree of impact should guide in the decision to seek outside expertise or assistance.

6. *Remarks* – Enter clarifying information.

U.S. GOVERNMENT PRINTING OFFICE 1974 — 781-866

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENVIRONMENTAL ANALYSIS WORKSHEET

1. Action: To make available under lease an unknown number of tracts in the Cove Fort-Sulphurdale KGRA for exploration and development of geothermal resources pursuant to the Geothermal Steam Act of 1970.

2. Stages of implementation: Operation

3. DISCRETE OPERATIONS	Transportation, construction, disposal of fluids	Water-				
4. COMPONENTS, SUBCOMPONENTS, AND ELEMENTS IMPACTED	**5. ANTICIPATED IMPACTS**					**6. REMARKS**
I. NONLIVING COMPONENTS						
A. AIR						Cooling towers will increase relative humidity and temp. Buildings and structures will increase temp.
Temperature	-L	0				
Particulate Matter	-L	0				Increased dust will result from vehicles and equipment on cleared areas.
Carbon Monoxide	-X	0				
Hydrocarbons	-X	0				
Hydrogen Sulphide	-L	-L				Odors may result from improper disposal of sewage or garbage.
Inversions	-L	-L				
Steam	-L	-L				
B. LAND						
Soil pollutants	X	X				
Soil Erosion	0	-X				
Geologic Structure	-L	-H				Mining of water could cause collapse and increase seismic activity.
C. WATER						
Hydrologic cycle	-L	-L				ET rate, infiltration rate, temp, RH and runoff characteristics will be changed.
Sediment load	-L	-L				Surface water quality could be degraded by disposal of fluids (erosion). Potential for contamination of ground water to occur, depending on system.
Dissolved Solids	-L	-L				
Chmicals, toxic substances	-L	-M				
Temperature	-L	-L				
II. LIVING COMPONENTS						
A. PLANTS (*Aquatic*)						
Vascular Plants	X	X				Of no significant value. It is possible that some aquatic plants could be enhanced by the possible holding ponds created by the proposal.

(Continued on reverse)

DISCRETE OPERATIONS	Plant operation, water-storage reservoir	Diversion of Water			
COMPONENTS, SUBCOMPONENTS, AND ELEMENTS IMPACTED	ANTICIPATED IMPACTS				REMARKS
II. BIO COMPONENTS (Cont.)					
B. PLANTS (*Terrestrial*)					Damage to vegetation done during earlier stages of exploration and construction may have some beneficial results from steam and increased moisture and temp.
Lichens & Mosses	+L	+L			
Grass	X	X			
Forbs	X	X			
Shrubs	X	X			
Trees	X	X			
C. ANIMALS (*Aquatic*)					
D. ANIMALS (*Terrestrial*)					
Mammals	-M	-M	-L		
Birds	-L	-L	-L		
Reptiles	-X	-L	X		
III. INTERRELATIONSHIPS					
A. ECOLOGICAL PROCESSES	X	X			Damage done during exploration and construction. Steam may benefit the ecological processes.
IV. HUMAN VALUES					
A. LANDSCAPE CHARACTER					
Harmonious	-L	-L	0		Only when in visual zones.
B. SOCIOCULTURAL INTERESTS					
Education/Scientific	+M	+L	X		
Social Welfare	+H	+L	-L		
Recreation	-H	-M	-H		They preclude recreation.

INSTRUCTIONS

1. *Action* – Enter action being taken, analytic step for which worksheet is being used, environmental viewpoint of impact, and any assumptions relating to impact.
   a. Worksheet is normally used to analyze *"Anticipated Impacts"* of action; however, it may be used to analyze *"Residual Impacts."* Worksheets may also be used to compare impacts before and after mitigating measures are applied.
   b. State viewpoint that best describes environmental impact. For example, a fence viewed down the fence line has greater impact than the same fence viewed over an entire allotment. Generally, narrow viewpoints better illustrate specific impacts than will broad viewpoints.
   c. Assumptions may be made to establish a base for analysis (*e.g. estimated time periods, season of year, etc.*).
2. *Stages of Implementation* – Identify different phases of proposed project (*e.g. a road project consists of survey, construction, use, and maintenance stages*).
3. *Discrete Operations* – Identify separate actions comprising a particular stage of implementation (*e.g. the construction stage of the road project has the discrete operations of clearing, grading, and surfacing*).
4. *Elements Impacted* – Enter under appropriate heading all environmental elements susceptible to impact from action and alternatives. Relevant elements not contained in the digest should also be entered. See BLM Manual 1791, Appendix 2, Environmental Digest.
5. *Anticipated Impact* – Evaluate anticipated impact on each element and place an entry in the appropriate square indicating degree of impact as low (L), medium (M), high (H), no impact (O), or unknown or negligible (X). Precede each entry by a plus (+) or minus (-) sign indicating a beneficial or adverse type of impact. If type of impact reflects a matter of opinion or is not known, *do not* proceed with a sign. For example, construction of a wind mill on open range has a definite visual impact; however, to some people the effect is detrimental while to others it is an improvement. By not entering a plus (+) or minus (-) sign the worksheet is kept factual and unbiased. If both degree and type of impact are unknown, place an (x) in the appropriate square.
   a. The measures of impact (*e.g. low, medium, and high*) are relative and their meaning may vary slightly from action to action. The term *"low"* should not be applied to impacts of a negligible nature. For example, we know that a pickup truck driving down a proposed fence line every year has some impact on air quality. However, the significance of this impact is not normally great enough to warrant even a *"low"* rating. In cases like this, the impact will usually be marked *"O"* or the element left off the worksheet.
   b. It is recognized that some environmental elements may defy accurate measurement or in depth analysis within current Bureau capabilities or expertise. The nature of the action as well as type and degree of impact should guide in the decision to seek outside expertise or assistance.
6. *Remarks* – Enter clarifying information.

U.S. GOVERNMENT PRINTING OFFICE 1979 — 281-848

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENVIRONMENTAL ANALYSIS WORKSHEET

1. tion To make available under lease an unknown number of tracts in the Cove Fort-Sulphurdale KGRA for exploration and development of geothermal resources pursuant to the Geothermal Steam Act of 1970.

2. Stages of implementation

Continue Exploration and Development

	3. DISCRETE OPERATIONS	Drilling	Additional Plants				6. REMARKS
4. COMPONENTS, SUBCOMPONENTS, AND ELEMENTS IMPACTED		5. ANTICIPATED IMPACTS					
I. NONLIVING COMPONENTS	A. AIR	X	X				It is not known exactly what the impact will be because it is not known how extensive any future development will be. The impact will depend on the extent of any future development and will correspond with the impacts as shown under exploration, development and operation stages.
	B. LAND	X	X				Same as above
	C. WATER	X	X				Same as above
II. LIVING COMPONENTS	A. PLANTS *(Aquatic)*	X	X				Same as above

(Continued on reverse)

DISCRETE OPERATIONS	Drilling	Additional Plants			
COMPONENTS, SUBCOMPONENTS, AND ELEMENTS IMPACTED	ANTICIPATED IMPACTS				REMARKS
III. IMPACTING COMPONENTS (Cont.)					
B. PLANTS (*Terrestrial*)	X	X			Same as above
C. ANIMALS (*Aquatic*)	X	X			Same as above
D. ANIMALS (*Terrestrial*)	X	X			Same as above
III. INTERESTS AFFECTED					
A. ECOLOGICAL PROCESSES	X	X			Same as above
IV. HUMAN VALUES					
A. LANDSCAPE CHARACTER	X	X			Same as above
B. SOCIOCULTURAL INTERESTS	X	X			Same as above

INSTRUCTIONS

1. *Action* – Enter action being taken, analytic step for which worksheet is being used, environmental viewpoint of impact, and any assumptions relating to impact.
   a. Worksheet is normally used to analyze *"Anticipated Impacts"* of actions, however, it may be used to analyze *"Residual Impacts."* Worksheets may also be used to compare impacts before and after mitigating measures are applied.
   b. State viewpoint that best describes environmental interest. For example, a fence viewed down the fence line has greater impact than the same fence viewed across the entire allotment. Generally, narrow viewpoints better illustrate specific impacts then will broad viewpoints.
   c. Assumptions may be made to establish a base for analysis (*e.g., estimated time periods, erosion rates, etc.*).
   d. *Type of Implementation* – Identify different phases of proposed project (*e.g. a road project consists of survey, construction, use, and maintenance stages*).
2. *Discrete Operations* – Identify separate actions comprising a particular stage of implementation (*e.g. the construction stage of the road project has the discrete operations of clearing, grading, and surfacing*).
3. *Elements Impacted* – Enter under appropriate heading all environmental elements susceptible to impact from action and alternatives. Relevent elements not contained in the digest should also be entered. See DLM Manual 1791, Appendix 2, Environmental Digest.
4. *Anticipated Impact* – Evaluate anticipated impact on each element and place an entry in the appropriate square indicating degree of impact as low (L), medium (M), high (H), no impact (O), or unknown or negligable (X). Precede each entry by a plus (+) or minus (–) sign indicating a beneficial or adverse type of impact. If type of impact reflects a matter of opinion, or is not known, do not proceed with a sign. For example, construction of a wind mill on open range has a definate visual impact, however, to some people the effect is detrimental while to others it is an improvement. By not entering a plus (+) or minus (–) sign the worksheet is kept factual and unbiased. If both degree and type of impact are unknown, place an (x) in the appropriate square.
   a. The measures of impact (*e.g. low, medium, and high*) are relative and their meaning may vary slightly from action to action. The term *"low"* should not be applied to impacts of a negligible nature. For example, we know that a pickup truck driving down a proposed fence line laying wire has some impact on our quality. However, the significance of this impact is not normally great enough to warrant even a *"low"* rating. In cases like this, the impact will usually be marked "O" in the element left of the worksheet.
   b. It is recognized that some environmental elements may defy accurate measurement or in-depth analysis within current Bureau capabilities or expertise. The nature of the action as well as type and degree of impact should guide in the decision to seek outside expertise or assistance.
5. *Remarks* – Enter clarifying information.

U.S. GOVERNMENT PRINTING OFFICE 1974 — 761 886

THE STATE OF UTAH

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF STATE LANDS
105 STATE CAPITOL BUILDING
SALT LAKE CITY, UTAH 84114

IARLES R. HANSEN
Director

November 5, 1974

Bureau of Land Management
Fillmore, Utah 84631

ATTENTION Kenneth A. Satterfield, Acting District Manager

Gentlemen:

In reply to your letter of November 1, 1974, concerning the preparation of the Cove Fort-Sulphurdale Environmental Analysis on geothermal activities on that area, please be advised that we have no comments concerning the preparation of this analysis; but there are two points we would like to call to your attention.

The first being that if the Federal lands in this area are eventually leased for geothermal steam, any access across State lands must be by a formal Right of Way through this office; and this office would request that you supply us with a copy of your environmental analysis as soon as this is complete.

Yours very truly,

Donald G. Prince

DONALD G. PRINCE
ASSISTANT DIRECTOR

DGP/vlb

Bureau of Land Management
RECEIVED
Employee Rtg. Init. Act.
District Mgr.
Chief, Res. Mgt.
Branch of Oper.
Adm. Officer
NOV 8 1974
Fillmore Area Mgr.
Milford Area Mgr.
Delta Area Mgr.
Plann. Coord.

...U L. RAMPTON
...overnor

...GORDON E. HARMSTON
— Executive Director,
...TURAL RESOURCES

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL & GAS CONSERVATION

1588 WEST NORTH TEMPLE
SALT LAKE CITY, UTAH 84116
328-5771

November 8, 1974

U.S. Department of the Interior
Bureau of Land Management
Fillmore, Utah 84631

ATTENTION: Kenneth A. Satterfield, Acting District Manager

Dear Mr. Satterfield:

Thank you for your letter of November 1, 1974, and for the opportunity of allowing this office to comment on the Cove Fort-Sulphurdale Geothermal Resource Area.

We would strongly recommend that before leases are granted for exploration and development of geothermal resources in this area, the individuals and/or companies involved be forwarned of the known subsurface pockets of hydrogen sulfide gas found in the Sulphurdale area. If one were unaware of the presence of this flammable, poisonous gas, it could be very dangerous drilling in the vicinity without the necessary precautions being taken.

Very truly yours,

DIVISION OF OIL & GAS CONSERVATION

Cleon B. Feight

CLEON B. FEIGHT
DIRECTOR

CBF:sw

UTAH GEOLOGICAL AND MINERAL SURVEY
Donald T. McMillan, Director

103 UGS Bldg., University of Utah
Salt Lake City, Utah 84112
(801) 581-6831

Calvin L. Rampton
Governor
Gordon E. Harmston
Executive Director,
Department of Natural Resources

Bureau of Land Management
RECEIVED
Rte. Ltr. Actn.
District Mgr. _____
Chief, Res. Mgt. _____
Branch of Oper. _____
Adm. Officer _____
NOV 21 1974
Fillmore Area Mgr. _____
Milford Area Mgr. _____
Delta Area Mgr. _____
Plann. Coord. _____

November 19, 1974

Mr. Don Jones
Area Manager
U. S. Bureau of Land Management
Fillmore, Utah 84631

Re: Your reference #3200

Dear Sir:

We are in receipt of a letter (Satterfield to Ritzma, 11-1) asking for comments on a proposal to make available under lease an unknown number of tracts in the Cove Fort-Sulphurdale Known Geothermal Resource Area for exploration and development of geothermal resources pursuant to the Geothermal Steam Set of 1970. Attached to the letter was a map with about 200,000 acres outlined in ink apparently showing the area. As far as I can ascertain there was no proposal attached.

In general, the Utah Geological and Mineral Survey is favorably inclined toward development of all of the state's mineral and energy resources with, of course, proper regard for protection of the land and environment.

In this case, before we can comment, we would have to know more about what specifically is proposed.

Very truly yours,

Howard R. Ritzma
Assistant Director

HRR:jp

state of utah

DIVISION OF WILDLIFE RESOURCES

JOHN E. PHELPS
Director

1596 West North Temple / Salt Lake City, Utah 84116 / 801-328-5081

Bureau of Land Management
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Employee Rte. Act.
District Mgr.
Chief, Res. Mgt.
Branch of Oper.
Adm. Officer
NOV 27 1974
Fillmore Area Mgr.
Milford Area Mgr.
Delta Area Mgr.
Plann. Coord.

November 25, 1974

Mr. Kenneth A. Satterfield
Acting District Manager
Bureau of Land Management
Fillmore, Utah 84631

Dear Mr. Satterfield:

SUBJECT: Cove Fort-Suphurdale Geothermal Leasing Proposal.

We have reviewed the above proposal and have the following comments.

BIG GAME

Deer: The enclosed map outlines important deer winter range within the study area. More than half the total area is winter range and at least one-third is very important range for deer of both herd Unit 55 and 56-A.

Elk: The area east of I-15 and south of I-70 is within a proposed elk transplant area and would very likely be important winter range for these animals. An occasional elk has been seen in the Pine Creek Area.

SMALL GAME

Sage Grouse: These birds have been seen in the area east and south of the Cove Fort and a known strutting ground is located approximately five miles west of the study area near the county line.

OTHER WILDLIFE

The study area is not known to be critical habitat for any other species, although bald and golden eagles are known to use the area. Also using the area are cougar, bobcat, coyotes and cottontail rabbits.

RECOMMENDATIONS:

Because of the importance of this area to wintering deer, we recommend that any pre-development work, such as drilling and its associated activities and surveying, be allowed only during the months of May through November and that no activities be allowed during the December-April period. Our two greatest concerns, however, are: (1) ultimate development, should any materialize, would result in habitat degradation and people disturbance which usually accompany these projects and; (2) the actual noise associated with steam generation for power on a limited critical deer winter range may have significant adverse impact on all wildlife in the area. This could negate all the range rehabilitation done on winter ranges in this vicinity.

We hope the above will be of value to you in your Environmental Analysis Record and if further information is needed, please advise.

Sincerely,

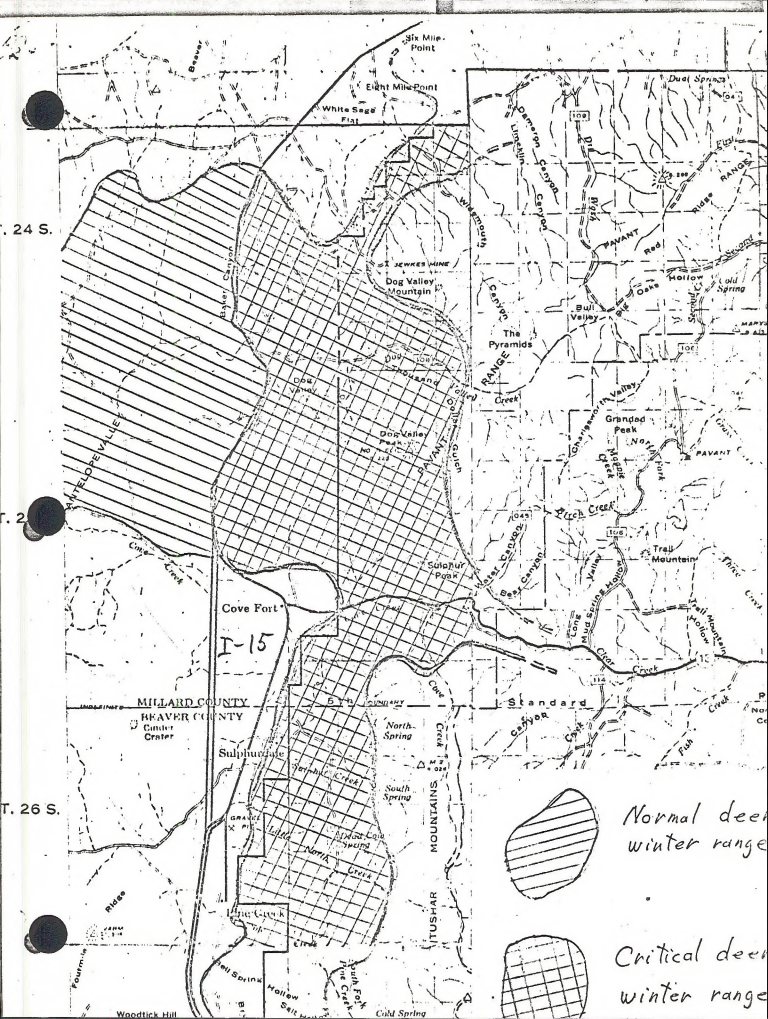
John E. Phelps, Director

Earl Sparks

Earl A. Sparks
Environmental Specialist

EAS/jm

Enclosure


T. 24 S.
T. 2
T. 26 S.
Six Mile Point
Eight Mile Point
White Sage Flat
Dog Valley Mountain
Dog Valley Peak
Dog Valley
Antelope Valley
Cove Fort
I-15
Sulphurdale
Sulphur Peak
Cove Creek
MILLARD COUNTY
BEAVER COUNTY
Cinder Crater
North Spring
South Spring
Pine Creek
Pine Creek Pass
Woodtick Hill
Cold Spring
MOUNTAINS
TUSHAR
The Pyramids
Bull Valley
Granddad Peak
Trail Mountain
Standard
Canyon
Dual Springs
Normal deer winter range
Critical deer winter range

state of utah

DIVISION OF WILDLIFE RESOURCES

JOHN E. PHELPS
Director

1596 West North Temple / Salt Lake City, Utah 84116 / 801-328-5081

Bureau of Land Management
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District Mgr. .....
Chief, Res. Mgt. .....
Branch of Ops. .....
Admin. Officer .....
DEC 11 1974
Fillmore Area Mgr. .....
Milford Area Mgr. .....
Delta Area Mgr. .....
Plann. Coord. .....

Div. of Res. Mgmt. & Oper.
Rec. Init. Act.
Lands .....
Minerals .....
Range .....
Wildlife .....
Watershed .....
Forestry .....
Recreation .....

December 6, 1974

Bureau of Land Management
15 East 500 North
Fillmore, Utah 84631

Gentlemen:

Since our letter of November 25, 1974, concerning geothermal development in Beaver County, we have talked to a representative of the U.S. Fish and Wildlife Service who has had considerable experience with geothermal operations in California. The discussion brought out some points which we feel are important from a general and wildlife point of view. We strongly urge that the following stipulations be made in all leases for geothermal operations:

1. Require the installation of mufflers for noise abatement.
2. All pipes and pipelines required for an operation be buried.
3. Arrangements be made to study and monitor ecological factors which might be affected by any geothermal operation.
4. Look for possible enhancement features resulting from the operation for wildlife such as water stations, etc., away from the actual operation.

We also believe that uniformity in regulations for all interested agencies should be achieved so that different agencies do not recommend different regulations. We ask that this uniformity be achieved between the Bureau of Land Management, Fish and Wildlife Service and our Southern Regional Office in Cedar City, Utah.

It is our desire to work closely with all concerned agencies in order to have geothermal development with minimum environmental problems.

Sincerely,

John E. Phelps
Director

cc: Robert Thoesen, Fish and Wildlife Service

DM Fillmore

IN REPLY REFER TO

3200
(U-943)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
UTAH STATE OFFICE
Post Office Box No. 11505
Salt Lake City, Utah 84111

RECEIVED
DEC 9 1974
Land Management
Rte. Acft.
Branch of Oper.
Adm. Officer

	Rte.	Init.	Act.
Lands			
Minerals			
Range			
Wildlife			
Watershed			
Forestry			
Recreation			

Fillmore Area Mgr.
Milford Area Mgr.
Delta Area Mgr.
Reno. Coord.

DEC 6 1974

Memorandum

To: Director

From: State Director, Utah

Subject: Possible Conflicts Between Mining Claims and Geothermal Resource Leasing

We have found that most of the lands included in the proposed Cove Fort-Sulphurdale - Monroe competitive geothermal steam lease offering are covered by old mining claims. Sulphur has been produced on these lands periodically since 1855. It is in an old mining district, mostly within a national forest.

We recognize the possibility of problems between the mining claimants and BLM or its geothermal steam lessees. Some questions that come to our minds are:

1. Although there appeared to be little interest in developing geothermal energy prior to the passage of the Geothermal Steam Act of 1970, we believe mining claimants had the authority to develop and produce geothermal energy if they so desired. Is this true?

2. Even if no geothermal discovery was made prior to the passage of the "Act" a prior mining claimant would still have the right to the geothermal energy on his claim even though the "Act" made geothermal energy subject to leasing. Are we right in this assumption?

3. As long as access to a geothermal development does not interfere with the mining operation on the claim, would the geothermal lessee have the right to cross the mining claim?

4. Would the situation described in item (3) be the same whether the claim was located before or after PL 167 on July 23, 1955?

5. We currently issue oil and gas leases without any consideration as to whether there are mining claims on the land. We understand that if a mining claimant protested issuance of an oil and

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

gas lease, and his mining claim proved to be valid, we would have to cancel the oil and gas lease. This being the case, could we also issue geothermal steam leases on this same basis?

6. If the answer to question No. 5 is "yes", should we proceed to issue geothermal steam leases on lands which are producing sulphur?

7. Even though a mining claimant failed to timely file an application to convert his mining claim to a geothermal lease under 43 CFR 3230.3-1, such failure would have no effect on validity of his claim. See copy of enclosed Bureau decision to Melvin and Drucilla Bradshaw dated July 30, 1974, and approved by the Acting Assistant Secretary. How does this affect this problem?

8. Does Public Law 585 afford any relief?

These questions were discussed briefly on December 5 in a telephone conversation by Ed Cox of my staff with Roy Olson and Bob Pavlovich of your staff, with no definite conclusion. We would appreciate your response as soon as possible as the lease offering is scheduled for February 18, 1975. We anticipate that the mining claimants may file protests to our leasing proposal, so it seems prudent that we be prepared. As yet we haven't examined the claims or made a validity determination, or even ascertained the extent of the claims.

Paul L. Howard

Enclosure
cc: Regional Solicitor
DM, Fillmore

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

3200
(U-943)

JUL 30 1974

DECISION

Melvin and Drucilla Bradshaw

Geothermal Lease Sale
Roosevelt Hot Springs KGRA

Protest Dismissed

On July 1, 1974, Melvin and Drucilla Bradshaw filed a protest dated June 28, 1974, against a proposed geothermal lease sale in the Roosevelt Hot Springs Known Geothermal Resources Area scheduled for July 30. Section 4 of the Geothermal Steam Act of 1970 (84 Stat. 1566; 30 U.S.C. 1001-1025), approved December 24, 1970, provides that "at any time within one hundred and eighty days following the effective date of this Act: (a) with respect to all lands which were on September 7, 1965, subject to * * * existing mining claims located on or prior to September 7, 1965, the * * * claimants or their successors in interest who are qualified to hold geothermal leases shall have the right to convert such * * * claims to geothermal leases covering the same lands." The Department's regulations provide that "A person seeking to convert * * * a mining claim to a geothermal lease or application must have filed a written application on or before June 22, 1971." See 43 CFR 3230.31(a). Notice of this requirement was published at 36 F.R. 623 on January 15, 1971: "Applications must be received by the appropriate land office of the Bureau of Land Management on or before June 22, 1971, which is the 180th day following December 24, 1970, the effective date of [the] Act." (All of the above underscoring supplied.)

Your notice of "granddaddy" rights was not filed timely. Accordingly, we cannot consider your mining claims for conversion to a preference right geothermal lease or application. Therefore, your protest against the proposed geothermal lease sale is dismissed.

This decision does not address itself to the validity of your mining claims and in no way affects these claims for the purpose for which they were filed; nor does it preclude your filing bids for the privilege of acquiring a geothermal lease at the July 30 lease sale.

No appeal, protest, or petition for reconsideration will be entertained from this decision as it constitutes the final administrative action . . by this Department.

Associate Director
Bureau of Land Management

Approved: JUL 30 1974

Acting Secretary of the Interior

GSA TELETYPE
Jul 30 8 09 AM '74
SALT LAKE CITY
UTAH

Gordon E. Harmston
Executive Director
Dept. of Natural Resources

Calvin L. Rampton
Governor

DIVISION OF WATER RESOURCES

435 State Capitol
SALT LAKE CITY, UTAH 84114
Tel: 328-5401

Daniel F. Lawrence
Director

December 12, 1974

Mr. Kenneth A. Satterfield
Acting District Manager
U. S. Department of the Interior
Bureau of Land Management
Fillmore, Utah 84631

Dear Mr. Satterfield:

We have reviewed the information sent to us concerning the Cove Fort-Sulphurdale Environmental Analysis Record on geothermal activities (Reference No. 3200).

Our main concern is that water produced from steam should be recharged to the ground water aquifers to protect ground water rights; however, if the Total Dissolved Solids (TDS) is too high, treatment may be required before artificial recharge is done or the company may have to prove they are recharging high salinity water into an aquifer of similar quality.

We believe this would be a real problem and want to advise you of our concerns.

Sincerely,

Daniel F. Lawrence
Director

PLG/dj

United States Department of the Interior

GEOLOGICAL SURVEY
Conservation Division
8422 Federal Building
Salt Lake City, Utah 84138

January 10, 1975

Memorandum

To: Fillmore District Manager, Bureau of Land Management

From: Geologist, Salt Lake City, Utah

Subject: Cove Fort-Sulphurdale EAR

The few comments which I have to make on the report are noted on the appropriate paginal margins. Some you might consider superfluous. The ones which need clarification are briefly discussed below.

> p. 7 "Surface" water is so qualified because very little is known about the ground water conditions (quantity and quality)--according to personnel in our Water Resources Division here in Salt Lake City. One objective of any exploratory drilling is to acquire this information.
>
> p. 26 The statement relating to "harrassment" is qualified because it is not always the case. Some oil and gas operators have reported that cattle, deer, and antelope sometimes congregate around the drill rigs while in full operation--possibly partly out of curosity. One example is the Upper Valley producing oil and gas field near Escalante. There, the cattle have moved into the field to graze on the reseeded areas which represent the best forage on the mountain. What might be the adverse effect is the lack of drinking water for the livestock. To prevent the cattle from being attracted too far from water the cattlemen have requested that the reseeded areas on top of the mountain be fenced off.

I presume that all of the "attachments" referred to in the text will be with the final copy. Also, if it hasn't already been considered I would recommend that the geologic map of the area be included with the "attachments".

/Jack E. Smedley

Enclosures

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Fishlake N.F.

January 10, 1974

Lloyd H. Ferguson
District Manager
Bureau of Land Management
Fillmore, Utah 84631

Dear Lloyd:

I have reviewed the suggested Special Stipulations and conditions for the Cove Fort - Geothermal Lease sale area.

I believe that these stipulations and conditions along with USGS regulation 30CFR 270.34 requiring an approved operating plan for each specific project site will adequately cover our land management requirements.

RALPH C. CISCO
Forest Supervisor

Bureau of Land Management
RECEIVED
Employee Rtn. Ref.
District Mgr.
Chief, Res. Mgt.
Branch of Oper.
Adm. Officer
JAN 14 1975
Fillmore Area Mgr.
Milford Area Mgr.
Delta Area Mgr.
Plann. Coord.

6200-11 (1/69)

Lloyd Fillgeman

COVE FORT-SULPHURDALE KGRA

Leasing Unit #1 2,459.19 acres

T. 24 S., R. 6 W., SL Mer., Utah
Sec. 32, Lots 1 to 4 incl., N½N½, N½S½, SE¼SE¼;
Sec. 33, Lots 1 to 4 incl., N½, N½S½.

T. 25 S., R. 6 W., SL Mer., Utah
Secs. 5 and 8, All.

Leasing Unit #2 2,560.00 acres

T. 24 S., R. 7 W., SL Mer., Utah
Sec. 35, All.

T. 25 S., R. 7 W., SL Mer., Utah
Secs. 10, 11, 14, All.

Leasing Unit #3 2,560.00 acres

T. 25 S., R. 7 W., SL Mer., Utah
Secs. 21, 22, 23 and 27, All.

Leasing Unit #4 1,553.09 acres

T. 25 S., R. 6 W., SL Mer., Utah
Sec. 19, Lots 3,4,5,7,8,9,10, NE¼SW¼, W½SE¼;
Sec. 29, Lots 1,2,3, SE¼NE¼, W½NE¼, NW¼, N½SW¼, NW¼SE¼;
Sec. 30, Lots 1,2,3,5,6,7, W½NE¼, SE¼NE¼, E½SW¼, SE¼;

T. 25 S., R. 7 W.,
Sec. 24, Lots 7 to 11 incl., SW¼NE¼, NE¼SW¼.

Leasing Unit #5 2,366.28 acres

T. 25 S., R. 6 W., SL Mer., Utah
Sec. 17, Lots 1 to 6 incl., E½, N½NW¼, SE¼SW¼;
Sec. 20, Lots 1 to 5 incl., N½NE¼, SW¼NE¼, NW¼, E½SW¼, W½SE¼;
Sec. 21, All (excluding mining claims);
Sec. 28, N½, E½SW¼, SW¼SW¼, SE¼.

Leasing Unit #6 2,033.04 acres

T. 25 S., R. 6 W., SL Mer., Utah
Sec. 31, E½SW¼, SE¼;
Sec. 32, NE¼, S½NW¼, S½;
Sec. 33, All.

T. 26 S., R. 6 W., SL Mer., Utah
Sec. 5, All.

Leasing Unit #7 1,403.64 acres

T. 25 S., R. 7 W., SL Mer., Utah
Sec. 35, All.

T. 26 S., R. 6 W., SL Mer., Utah
Sec. 6, All.

T. 26 S., R. 7 W., SL Mer., Utah
Sec. 1, Lot 4, SW¼NW¼, SE¼SE¼;
Sec. 2, Lots 2, 3, SW¼NE¼, SE¼NW¼.

Leasing Unit #8 2,333.95 acres

T. 26 S., R. 7 W., SL Mer., Utah
Secs. 9, 10, All;
Sec. 11, W½NE¼, SE¼NE¼, W½, SE¼;
Sec. 12, Lots 1,2,3,5,7,8,9,10, SE¼NW¼, NE¼.

Leasing Unit #9 2,140.42 acres

T. 26 S., R. 6 W., SL Mer., Utah
Sec. 7, Lots 1,2, E½, E½W½;
Sec. 8, All;
Sec. 17, Lots 1,2,3, N½NE¼, E½NW¼, SW¼NW¼, S½;
Sec. 18, All.

Leasing Unit #10 1,650.38 acres

T. 26 S., R. 6 W., SL Mer., Utah
Sec. 19, All.

T. 26 S., R. 7 W., SL Mer., Utah
Sec. 13, Lots 1,2,3,6 to 11 incl., 14,15,16;
Sec. 23, SE¼NE¼;
Sec. 24, Lots 1 to 4 incl., W½E½, E½W½, SW¼NW¼, W½SW¼.

TOTAL ACREAGE 21,059.99 acres

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Conservation Division
345 Middlefield Road
Menlo Park, California 94025

January 13, 1975

Memorandum

To: District Manager, Bureau of Land Management
Fillmore, Utah

From: Area Geothermal Supervisor

Subject: Proposed stipulations for the Cove Fort - Sulphurdale KGRA, Utah
Re: 3200

We have reviewed the subject proposed stipulations and our recommendations are:

1. The preamble and proposed stipulations numbered 1 through 4, inclusive, No. 6 and No. 7 are acceptable as is.

2. Revise proposed stipulation No. 5 concerning temporary fencing to read as follows: "If considered necessary by either the Supervisor or the Authorized Officer, the Supervisor may require temporary fencing of areas to alleviate hazards to humans, livestock or wildlife or to allow seedlings on rehabilitated areas to become established."

3. Delete proposed stipulations No. 8, 9 and 10.

Livestock watering sites, critical deer winter grazing areas and protection from the hazards of hydrogen-sulfide emissions, whether natural or man-induced, are subjects that are best addressed during joint USGS-BLM consideration of a lessee's proposed plan of operation. Additionally, mitigating measures in regard to such subjects would be proposed by the Geothermal Environmental Advisory Panel (GEAP).

Reid T. Stone

IN REPLY REFER TO

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Fillmore, Utah 84631

1790

January 17, 1975

Melvin T. Smith, Director
Utah State Historical Society
603 East South Temple
Salt Lake Coty, Utah 84102

Dear Mr. Smith:

Enclosed for your review is a copy of the Cove Fort-Sulphurdale Environmental Analysis Report for proposed leasing of geothermal resources. A map of the area is also attached.

If you have questions regarding the proposal, you may contact Mr. Richard Fike of our State Office. (Bureau of Land Management, 125 South State, Salt Lake City, Utah).

We are nearing completion of the study and the proposed deadline for lease sale is set for the first part of February 1975. Therefore, may we have your written comments or concurrence returned to this office by January 24, 1975.

We will greatly appreciate your prompt attention to this matter.

Sincerely yours,

Lloyd H. Ferguson
District Manager

Enclosures:

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!