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ENVIRONMENTAL ANALYSIS
RECORD OF
5-M CORPORATION'S
TRAMROAD, TUNNELS, AND
MINE PLANT PERMIT
APPLICATIONS

DATE: OCTOBER 14, 1975



CEDAR CITY DISTRICT
BUREAU OF LAND MANAGEMENT

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CHAPTER I

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

BACKGROUND

5-M Corporation of Hurricane, Utah, has made application for a tunnel and tramroad right-of-way (U-29427) and a special land use permit (U-31066) for the purpose of gaining access to develop and extract coal from a Utah State mineral lease; the processing and handling of this coal on national resource lands (NRL); and the truck haulage of this coal across NRL. See Figure 1.

The right-of-way application includes two seven-entry tunnels in Section 35, T 41 S, R 3 E, SLBM, proposed to be driven through unleased, federally owned coal in order to gain access to coal underlying Section 2, T 42 S, R 3 E, which is included in Utah State coal lease 19359. The lease is owned by the W. L. Rasmussen estate; 5-M is a sub-lessee and has negotiated to operate the lease. The exposed coal along the side of John Henry Canyon on NRL is inferred to continue under the State lease, where it would lie approximately 500 feet below the surface. There has been one exploratory drill hole on Section 2, drilled by a previous leasee, which, according to the applicant, shows mineable thicknesses of coal. The tunnels include a main access and haulage tunnel, 1426 feet long; and an auxiliary tunnel, 2445 feet long. The proposed tunnels would have seven separate entries equally spaced and separated by barrier pillars with crosscuts on 100-foot centers. See Figure 2.

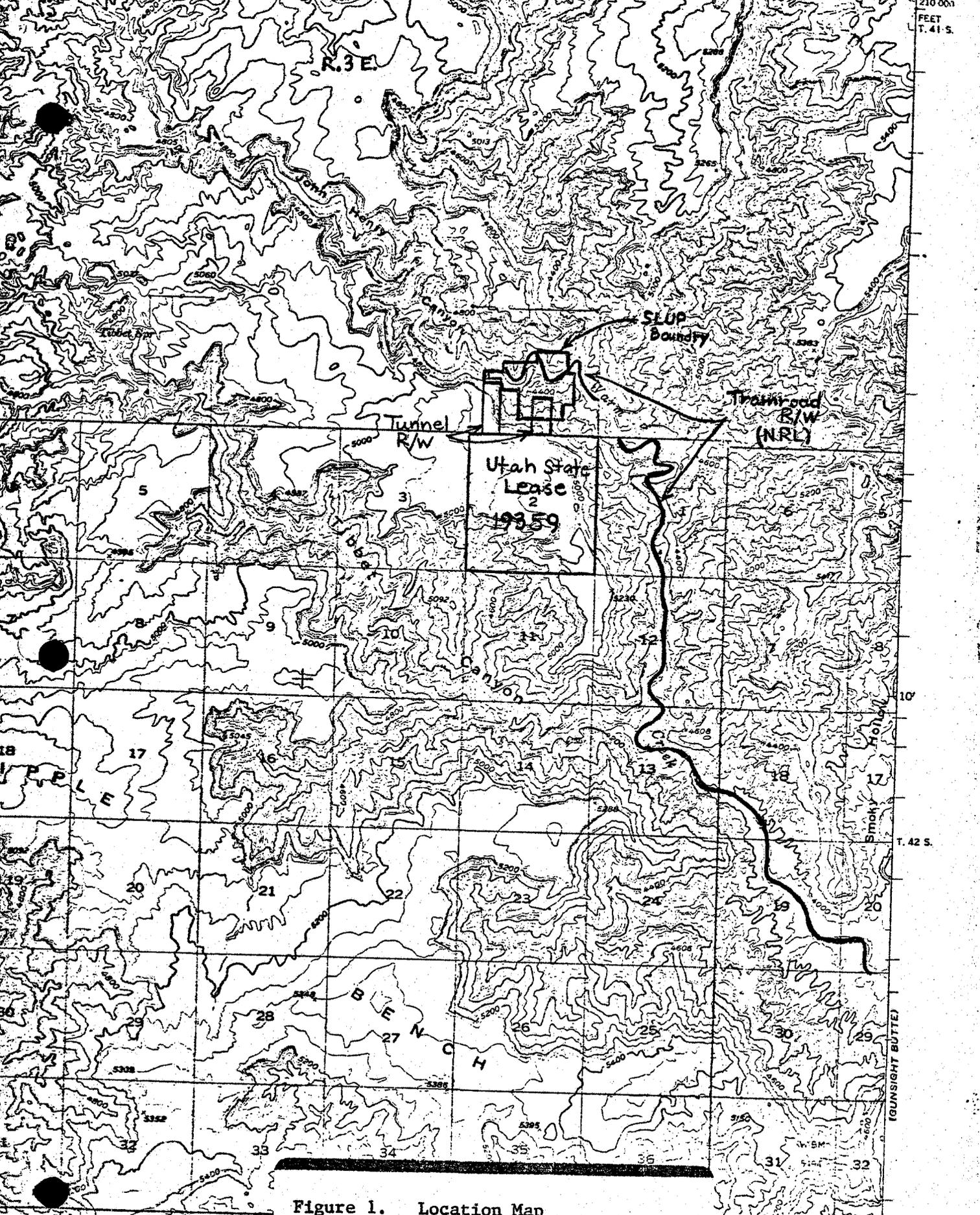
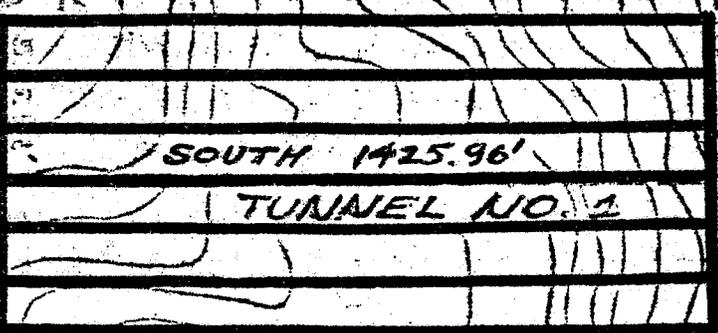
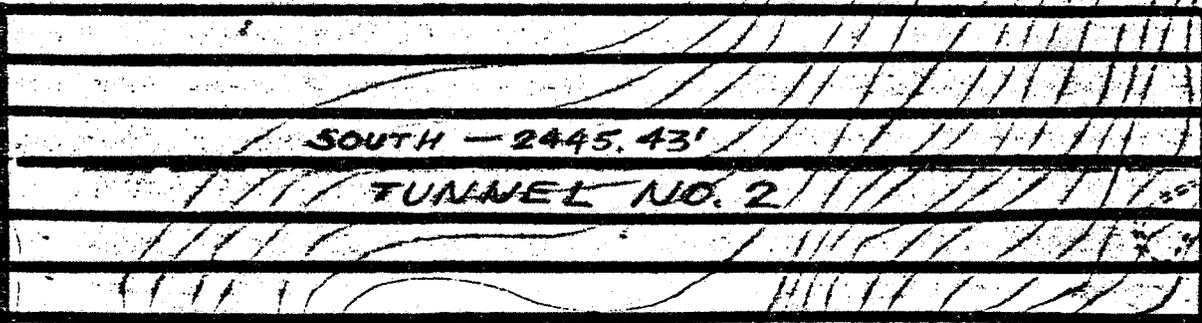
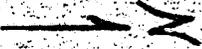


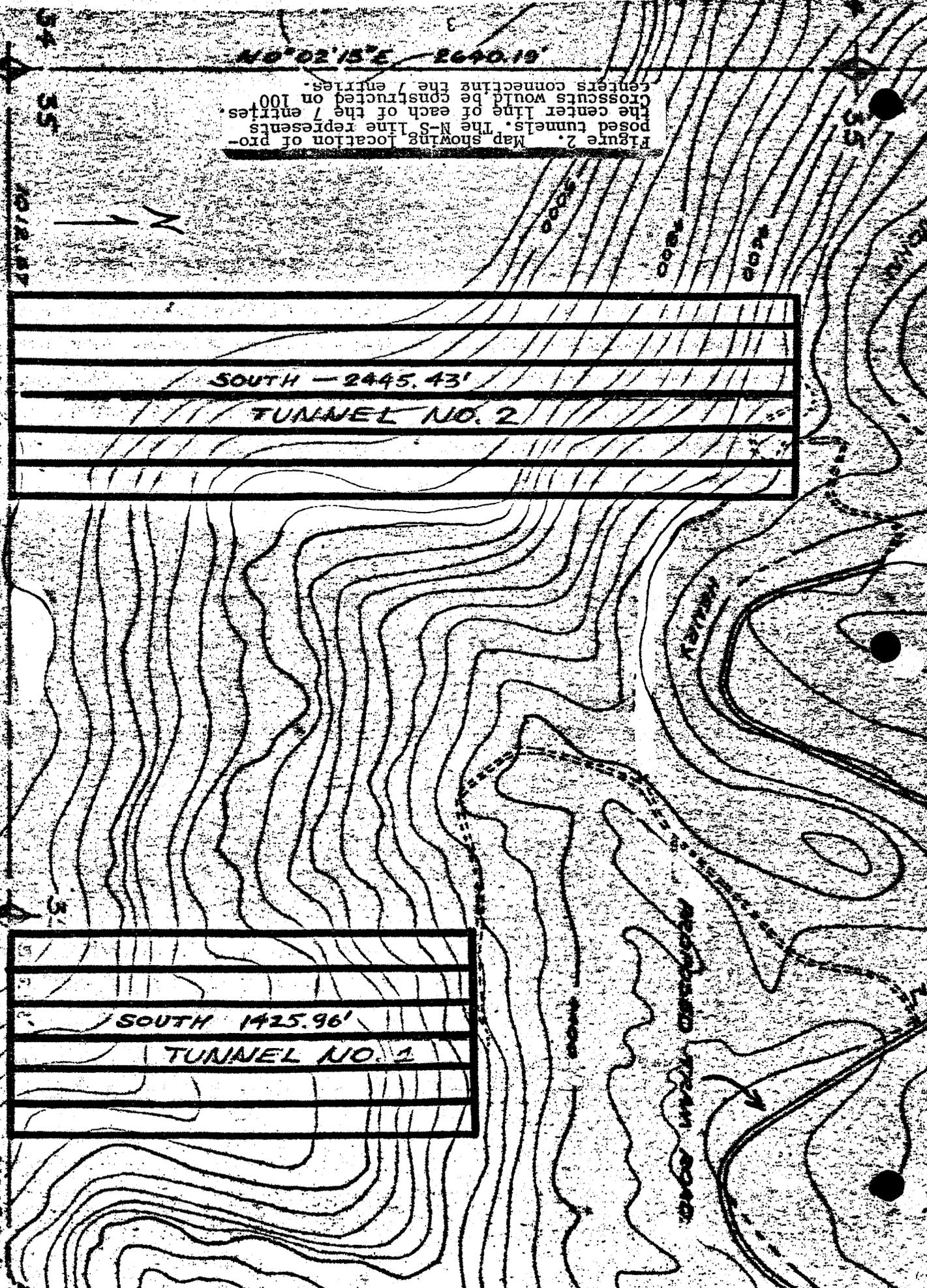
Figure 1. Location Map

N0°02'15"E 2640.19'

Figure 2. Map showing location of proposed tunnels. The N-S line represents the center line of each of the 7 entries. Crosscuts would be constructed on 100 centers connecting the 7 entries.



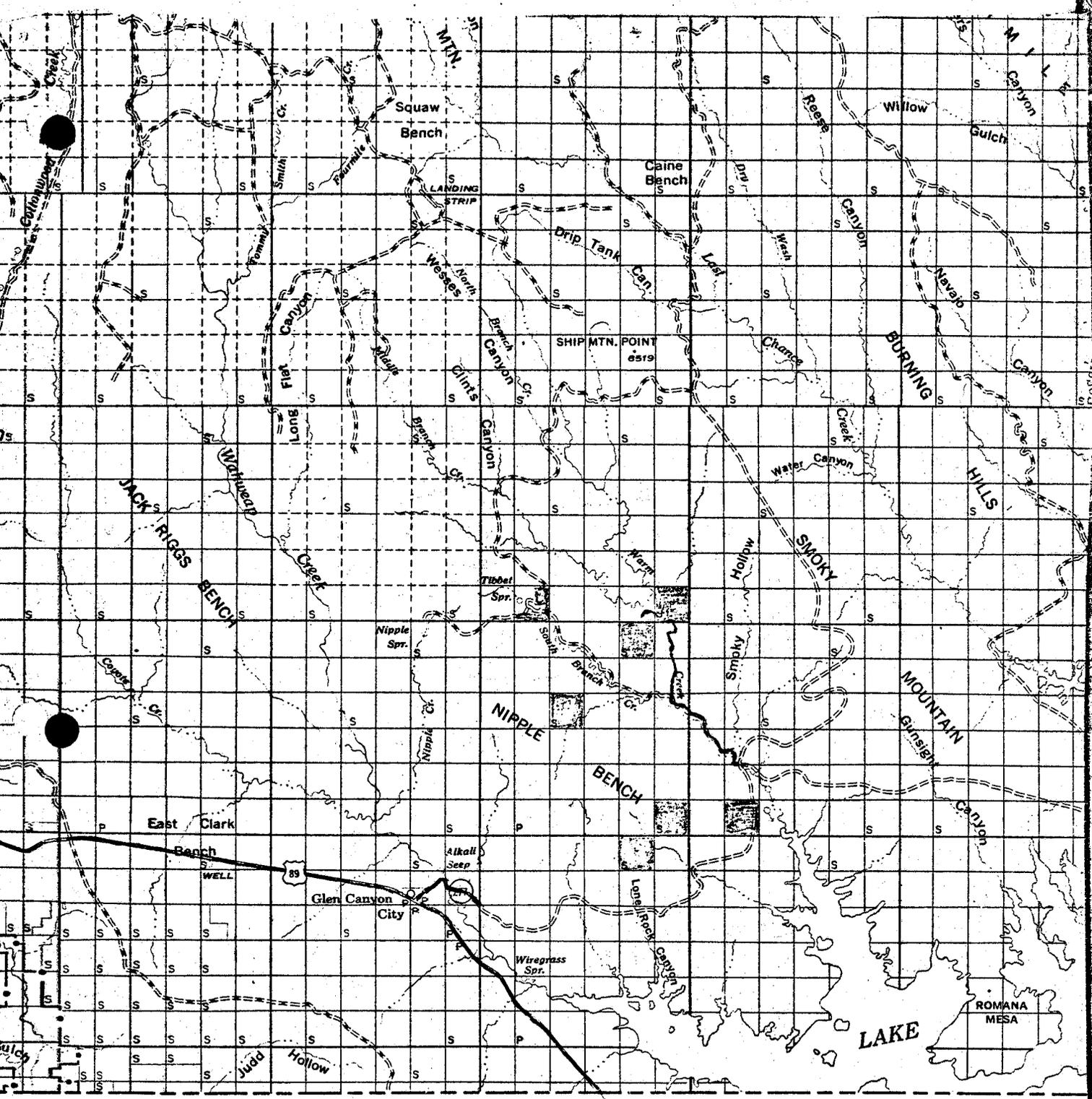
34
35
1012.107
500°52'19"W 2241.22'
630
1
1000°57'01"



Also included in the right-of-way application is a tramroad for the purpose of hauling coal by truck from Section 35 to an existing county-maintained road in Section 29, T 42 S, R 3 E, a distance of about 6.6 miles on NRL and 0.4 miles on State land (in Section 36, T 41 S, R 3 E). Not included in the tramroad application, but included in the haulage route, is about 12 miles of county maintained road within the Glen Canyon National Recreation Area and about two miles of State route 277 from the western boundary of the Recreation Area, through Glen Canyon City to U.S. Highway 89. Highway 89 is a major, paved highway. The road within the Recreation Area and through Glen Canyon City is graded and partially gravelled. The proposed tramroad on NRL is a fair-weather road which runs along or in the Warm Creek stream bed for much of its length and is subject to storm flooding. The tramroad would have to be upgraded and rebuilt to handle heavy trucks. In addition to coal haulage, this route would also be used to haul equipment, materials, fuel, water, rock dusting material, and personnel to the mine plant site. See Figure 3.

The special land use permit application includes 145 acres in Section 35, T 41 S, R 3 E. The proposed use of this land is for the stockpiling and processing of coal mined from the State lease; the disposal of coal waste material; and the location and operation of ancillary facilities needed to develop and mine the coal. See Figure 4.

The right-of-way and permit would be long term authorizations. They would be in effect as long as coal operations involved the proposed tunnels, mine plant site, and haulage route. The State coal lease would



R. 1 E. R. 2 E. R. 3 E. R. 4 E. R. 5 E.

Figure 3. Map showing alignment and maintenance responsibility along the proposed haulage route.

-  State
-  County
-  Tramroad Application
-  State Section

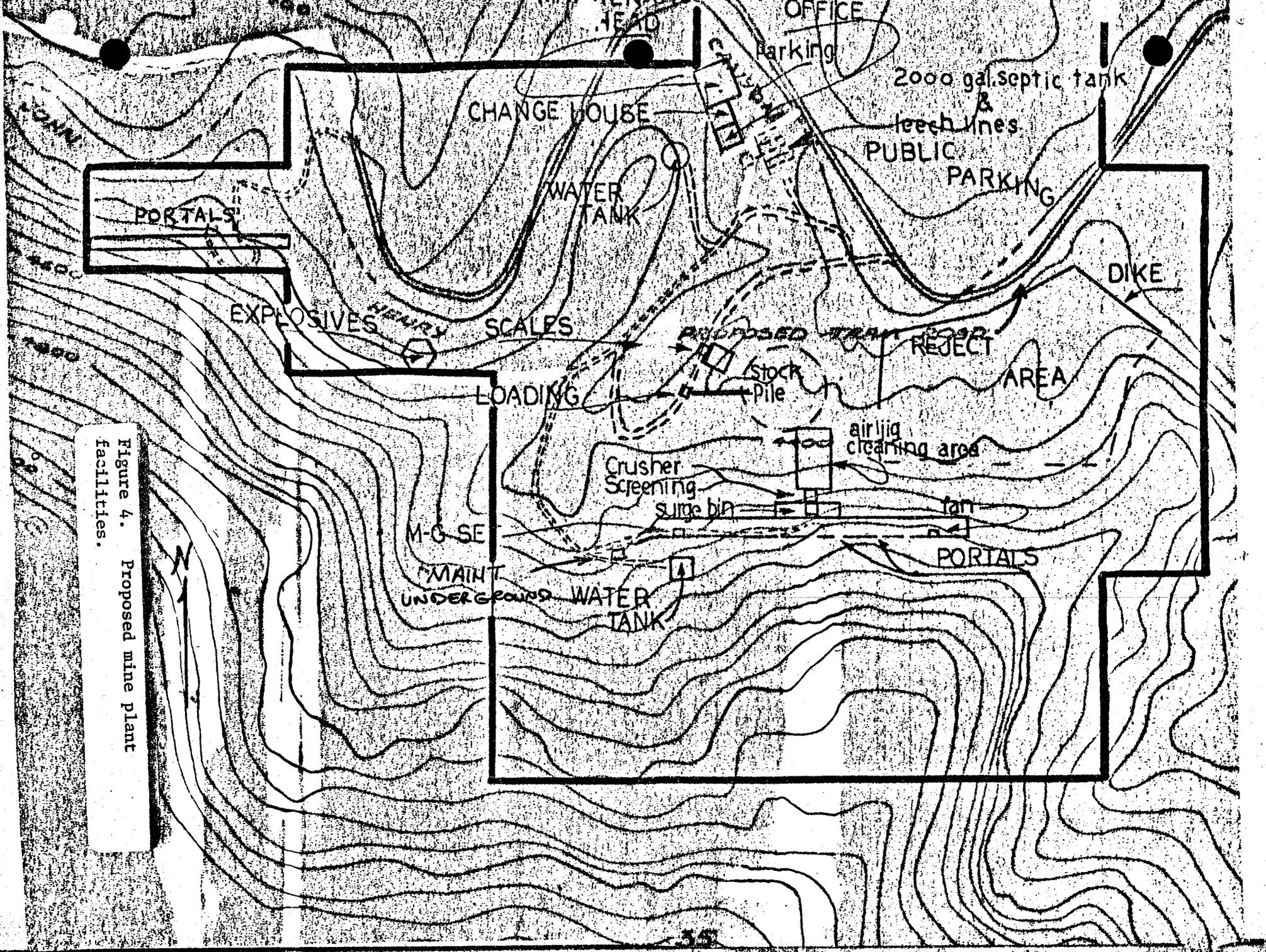


Figure 4. Proposed mine plant facilities.

be in effect as long as commercial quantities of coal are produced and as long as payments are made as required in the lease. Based on 5-M Corporation's estimate of total reserves in Section 2 of 26 million tons (inferred from Resources Co. drilling several miles northwest of the lease) and 5-M's proposed production (about 780,000 tons per year) and 50% recovery, the State lease would produce a total of about 13 million tons over a period of about 16 years. Because such a short project life would probably not amortize the investment, 5-M plans to apply for a lease sale of Federal coal contiguous to the State lease (the State section is surrounded by federally owned coal lands classified as a known coal lease area). Acquisition of the Federal coal is an integral part of 5-M Corporation's overall coal development in the area and the proposed right-of-way and mine plant site is a "first step" in this overall plan. Whether 5-M will be able to acquire additional coal in the future is not known. Under present Federal coal leasing policy, any application for Federal coal would be considered in light of demonstrated need and would have to be bid for on a competitive basis. As the proposal now stands, only State owned coal is involved, except for that Federal coal to be mined for the proposed tunnels.

Production is proposed to reach 2000 tons per day one year after startup and increase to 3000 tons per day (about 780,000 tons per year) after two years. 5-M proposes to sell this coal to various Southern Utah, Southern Nevada, and Southeastern U. S. facilities (power plants, commercial space heating). Truck haulage from mine to market or mine to railhead is proposed. Possible railheads include Flagstaff, Arizona, or Moapa, Nevada. The company envisions the possibility of supplying part of the needs for the proposed near-by Kaiparowits power plant or other

proposed power plants in Southern Utah or Southern Nevada. Any large, long term contracts would more than likely require the acquisition of additional coal in the area. At the present time, 5-M supplies a local commercial market with coal purchased from Salina, Utah.

A brief economic evaluation of the proposal has been made by BLM and is attached as Appendix 1.

ACTIONS REQUIRED BY GOVERNMENT AGENCIES

The Cedar City District Office of BLM is responsible for the evaluation of the environmental impacts which may be caused by the proposed actions and recommending mitigating or enhancing measures (stipulations) and bonding. This is the purpose of this environmental analysis record (EAR). If issued, the district is responsible for compliance checks of stipulations which may be made part of the right-of-way and special land use permits. The right-of-way and special land use permits would be issued by the BLM Utah State Office. The BLM State Office would also appraise all rights involved and determine all appropriate rentals or other fees. The U. S. Geological Survey would be responsible for determining the value of the Federal coal removed in the process of tunnel construction.

PROPOSED ACTION AND ALTERNATIVES

Each element of the proposal as submitted by the applicant is discussed below:

TUNNELS

As shown in Figure 2, two tunnels have been applied for. One main access and haulage tunnel would be constructed initially. Present plans are to eventually construct a second auxiliary tunnel which would be connected to the main tunnel through the mine workings in Section 2. This tunnel would provide an additional escapeway and ventilation. It would not be used to haul coal. The tunnel entries are about 300 feet above the canyon floor. The tunnels, as proposed, would involve seven separate entries, each about 20 feet wide and about 12.5 and 8.5 feet high (the thickness of the exposed coal zone at Site No. 1 and 2, respectively) on 100 foot centers separated by 80 foot wide barrier pillars. Total width of the seven-entry portal would be about 630 feet. The entries would be driven on a north-south line from the south side of John Henry Canyon to the Section .. line which is the boundary of the State lease. Crosscuts would be constructed in the tunnels on 100 foot centers for air, equipment, and man movement.. A preliminary estimate of total Federal coal to be mined in construction of the tunnels is 180,000 tons for Tunnel No. 1 and 220,000 tons for Tunnel No. 2, a total of about 400,000 tons. At this time, a room and pillar mining system is proposed to mine the State coal. The tunnels would be constructed using the same mining equipment contemplated to be used in the proposed mine. Drilling and blasting, continuous mining machines, loaders, conveyors, and shuttle cars are proposed. Raw coal mined from the tunnel would be conveyed from the portal to a processing plant near the portal via a chute and/or conveyor. Processed coal would be conveyed to a stockpile and eventually sold and waste material conveyed to a waste disposal area. A road would be built up the canyon face to the portal site and a flat cut-bank bench

constructed to accomodate equipment, ventilation fans, and personnel.

MINE PLANT SITE

As shown in Figure 4, an area of 145 acres is proposed to include all mine plant facilities. The purpose of the mine plant facilities is to process, stockpile, and load coal; to dispose of reject material; and to accomodate all facilities, equipment, and operations necessary to construct the tunnels and mine the State coal.

The plan proposes crushing near the portal followed by screening and air cleaning. The processing plant is proposed to be a "Ridge Airjig" capable of processing 7200 tons of coal per 24 hour period. The proposed cleaning plant will use air exclusively, and, therefore, no water needs for cleaning have been identified. Therefore, a washery plant and its attendant settling pond is not proposed. No tests have been made as of this writing on the cleaning characteristics of the coal under State lease and it is not known if air cleaning would be successful. If not, a reliable source of water would be needed and a washery and settling pond would be necessary. This facility would require siteing and acreage which is not part of the present proposal. A washery for the proposed maximum production (3000 tons per day) would require a tailings pond which would occupy an estimated 32 acres. Water needs for such an operation are estimated at 300 gallons per minute or 124 acre-feet per year.

Water needs for dust supression and culinary purposes would approximate 20,000 gallons per day. It is proposed that water would be purchased from an existing private well near Glen Canyon City and trucked to the well site and stored in two 10,000 gallon tanks.

Other major facilities include access roads to the tunnels and other facilities, a coal stockpile area adjacent to the processing plant capable of holding 150,000 tons, and a waste disposal site on a terrace at the base of the south canyon wall capable of holding an estimated 1.3 million tons. Using an average of ten percent coal reject per ton of run-of-mine material, this area would hold the total expected reject from the State lease and tunnels based on a 3000 ton per day operation which would be mined out over a period of about 16 years. If additional coal is acquired and processed on the site, additional coal waste disposal areas would have to be identified. This would require siteing and acreage which is not a part of the present proposal. The applicant has identified a possible future site about 1500 feet southeast of the proposed site outside of the present application area.

The waste material would be dry reject from the air cleaning process consisting of shale, sandstone, clay, and carbonaceous materials. An initial earth dike would be constructed utilizing the alluvial and colluvial materials covering the proposed waste disposal area. According to the applicant, removal of this surficial cover would expose an underlying impervious clay which would act as a natural seal. Reject materials would be hauled to the site by trucks and compacted. As the material builds up, successive benches or terraces would be built each with a dike. A freeboard of 5 to 10 feet on each dike is proposed to contain runoff.

The maintenance shop is proposed to be built underground, adjacent to the portal. Electric power would be generated on site by diesel powered generators. Diesel would be stored in tanker trucks.

All facilities are shown on Figure 4. The largest facilities are the coal stockpile which would cover three acres and the coal waste disposal which would cover ten acres. All other facilities aggregate about 17 acres. Total surface area proposed to be utilized within the SLUP, therefore, is 30 acres.

TRAMROAD

The proposed road involves a 100 foot wide right-of-way. BLM Manual 9110 requires a heavy duty road of this type to be a minimum of 28 feet wide (double lane) and surfaced with six inches of compacted aggregate with grades no greater than 8%. About 20,000 cubic yards of surfacing material would be necessary in addition to rip-rap, culverts, and other road construction materials. The right-of-way is about 35,000 feet long and would involve a total of about 80 acres. Extensive cuts and fills and road bed construction would be necessary throughout most of its length.

The road would be used to haul equipment, materials, and personnel to the site and for truck haulage of coal from the mine plant. A coal haulage fleet of 50 trucks of 25 ton capacity each is proposed. Eighty hauls per 24 hour day would be necessary for 2000 tons per day production and 120 hauls per day for 3000 tons per day production. In addition, several hauls per day would be made by other vehicles involved in hauling diesel fuel, water, mine workers (busses are proposed), rock dusting material, and equipment. Continuous road maintenance would be necessary.

EMPLOYMENT

The applicant states that 30 mining and supervisory personnel would be

utilized during the first 60-90 days which would increase to 125 by the end of the first year. From the end of year one up to the fourth year, a total work force of 300-400 is contemplated. 5-M states that they are working with Consumers Agency Incorporated of Provo, Utah (Dee R. Taylor), to plan and develop housing accommodations on privately owned properties in and near Church Wells and Glen Canyon City, Utah, west of the project area. These lands are within or near one of the proposed Kaiparowits new-town sites on East Clark Bench. Accommodations and facilities for 40 trailer units are now available according to the applicant, and the applicant proposes to construct housing and support facilities as employee demand increases.

ALTERNATIVES

The applicant has not identified any alternatives. BLM has identified four possible alternatives as outlined below. Alternatives one, two, and three would involve possible tramroad permits directly to the State lease. These alternatives would preclude the need for the proposed tunnels and mine plant site SLUP. Coal access entries and the mine plant site would be on the State lease and not involve any BLM authorization. The applicant does not desire to gain access to the coal from the surface of the State lease because of the higher cost involved in sinking a shaft or incline and in moving coal through such a system and because of the increased safety risks involved in this system. Alternative No. 4 would involve the proposed tunnels and mine plant but a different tramroad right-of-way.

Alternative No. 1 (Figure 5)

Alternative No. 1, through Warm Creek and Tibbit Canyon to the surface of the State lease, would involve about 15 miles of right-of-way on NRL. This alternative would involve about 182 acres if the right-of-way is 100 feet wide.

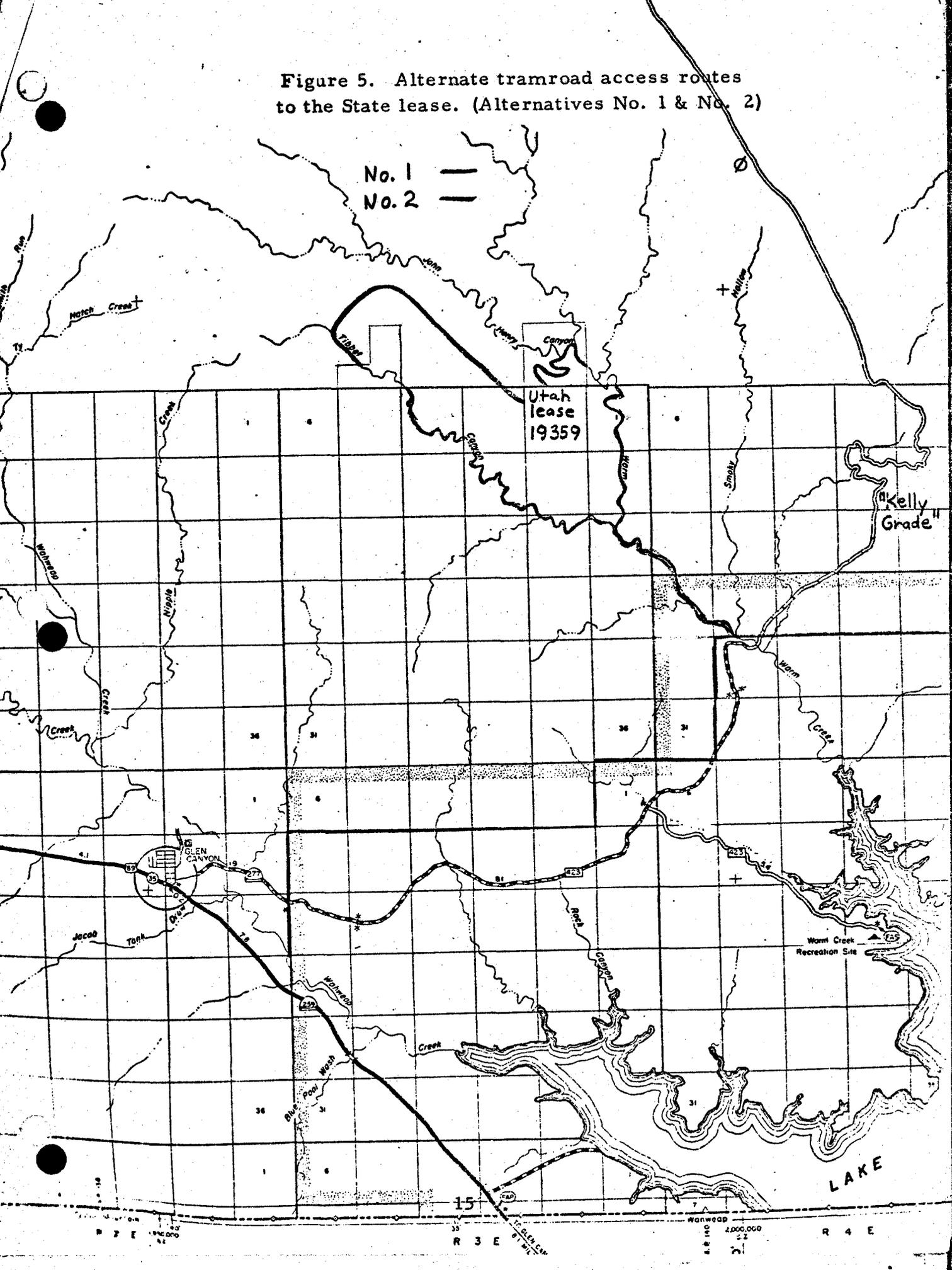
Alternative No. 2 (Figures 5 and 6)

Alternative No. 2 is along the proposed tramroad route to Section 35, where it would include a double switchback road up the south side of John Henry Canyon to reach the State lease. This would involve about eight miles of road on NRL and 97 acres (100 foot wide right-of-way).

Alternative No. 3 (Figure 7)

Alternative No. 3 would involve one of four possible routes (3A through 3D) from the surface of the State lease to one of the proposed Kaiparowits access roads. This alternative would be dependent upon Kaiparowits project approval and could only be implemented after a Kaiparowits access route is approved and built. The Nipple Creek through-highway is the road preferred by local planners, and alternatives 3B or 3C would provide access to this road which runs along the east side of Nipple Bench and bypasses Glen Canyon Recreation Area. Alternatives 3A or 3D would provide access to proposed western access routes through Warm Creek Canyon and Glen Canyon Recreation Area. The proposed western access routes for the Kaiparowits project are not preferred by local planners.

Figure 5. Alternate tramroad access routes to the State lease. (Alternatives No. 1 & No. 2)



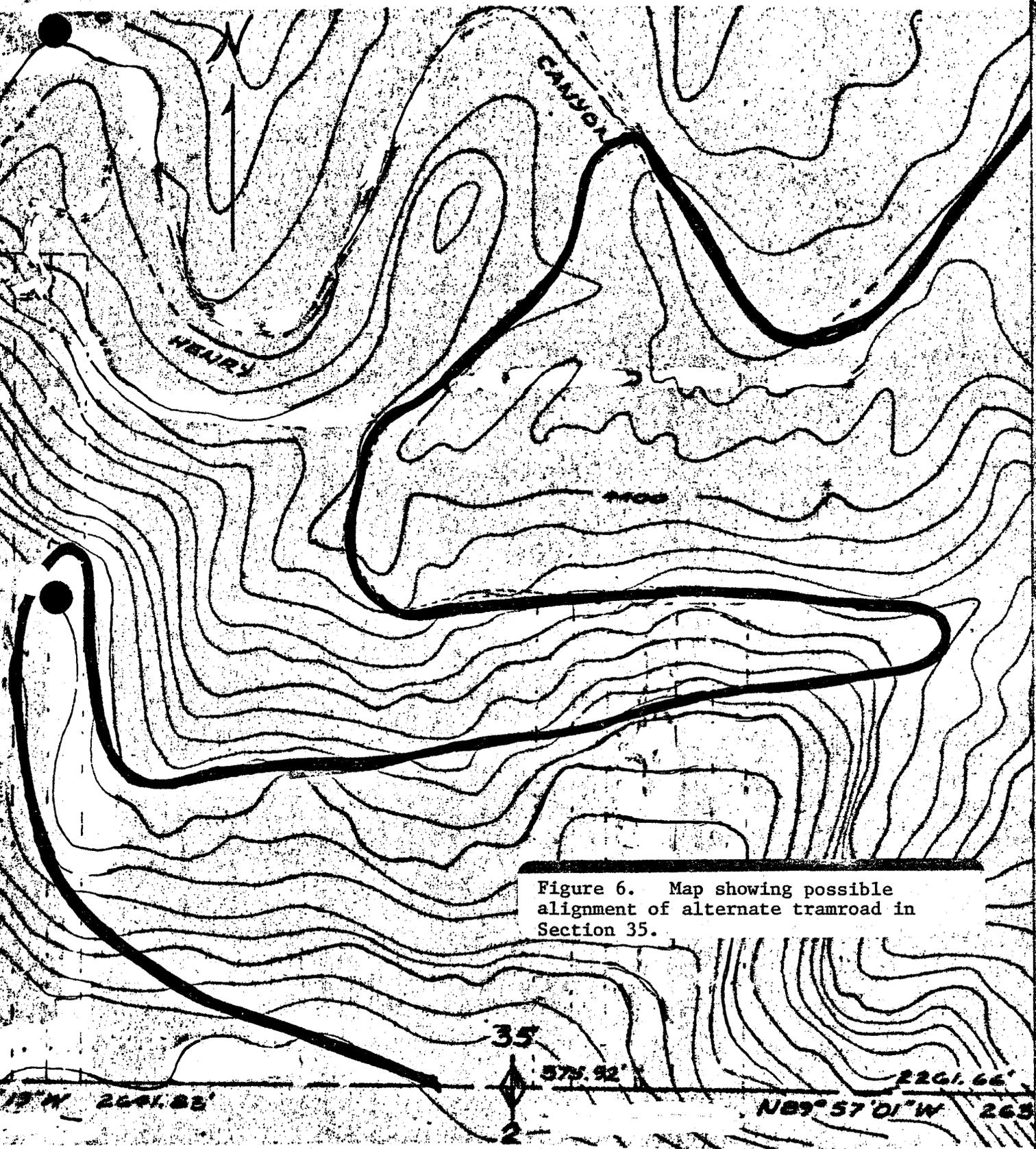
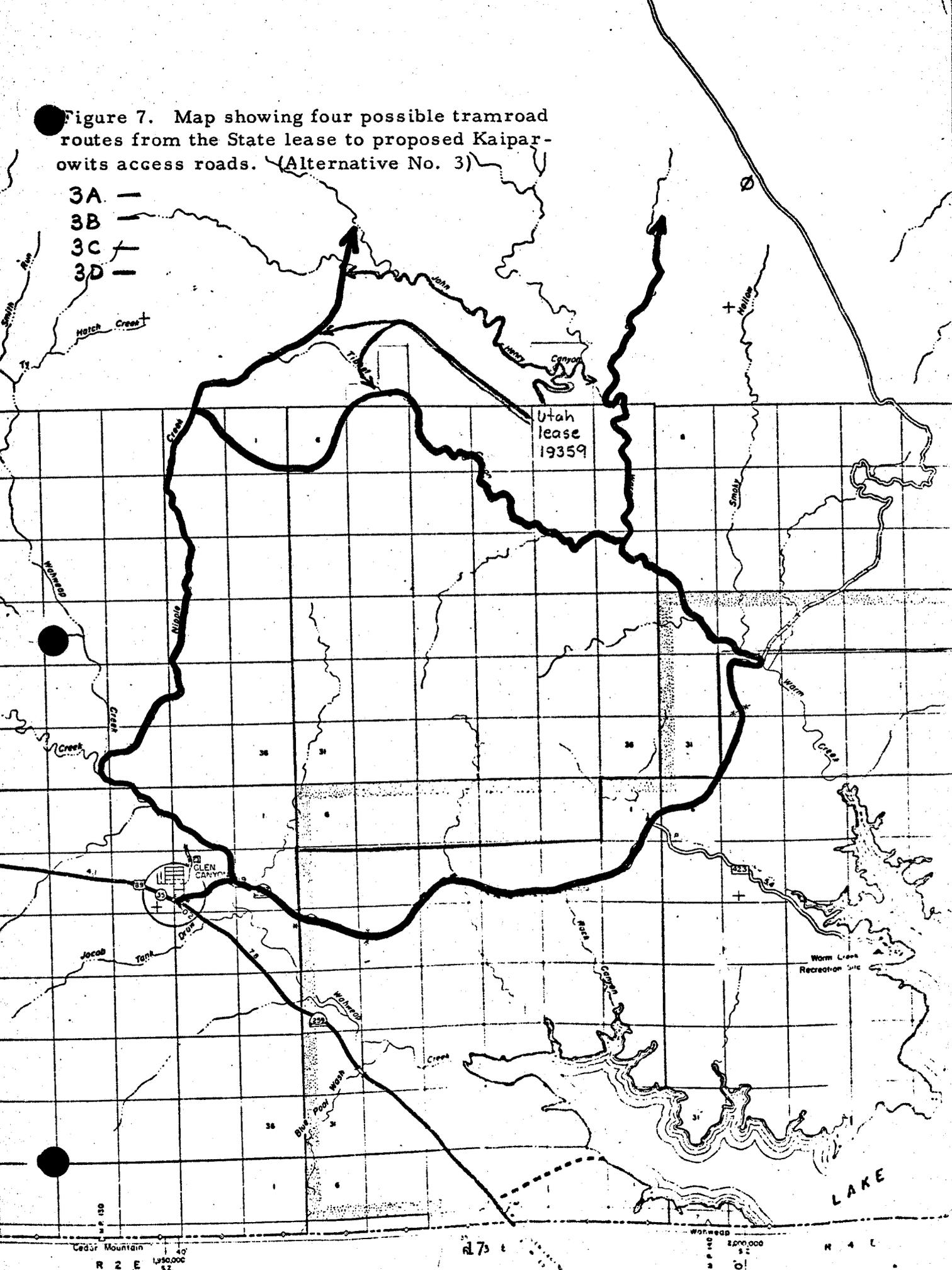


Figure 6. Map showing possible alignment of alternate tramroad in Section 35.

Figure 7. Map showing four possible tramroad routes from the State lease to proposed Kaiparowits access roads. (Alternative No. 3)

- 3A —
- 3B —
- 3C —
- 3D —



Approximate distances and acreages involved are as follows:

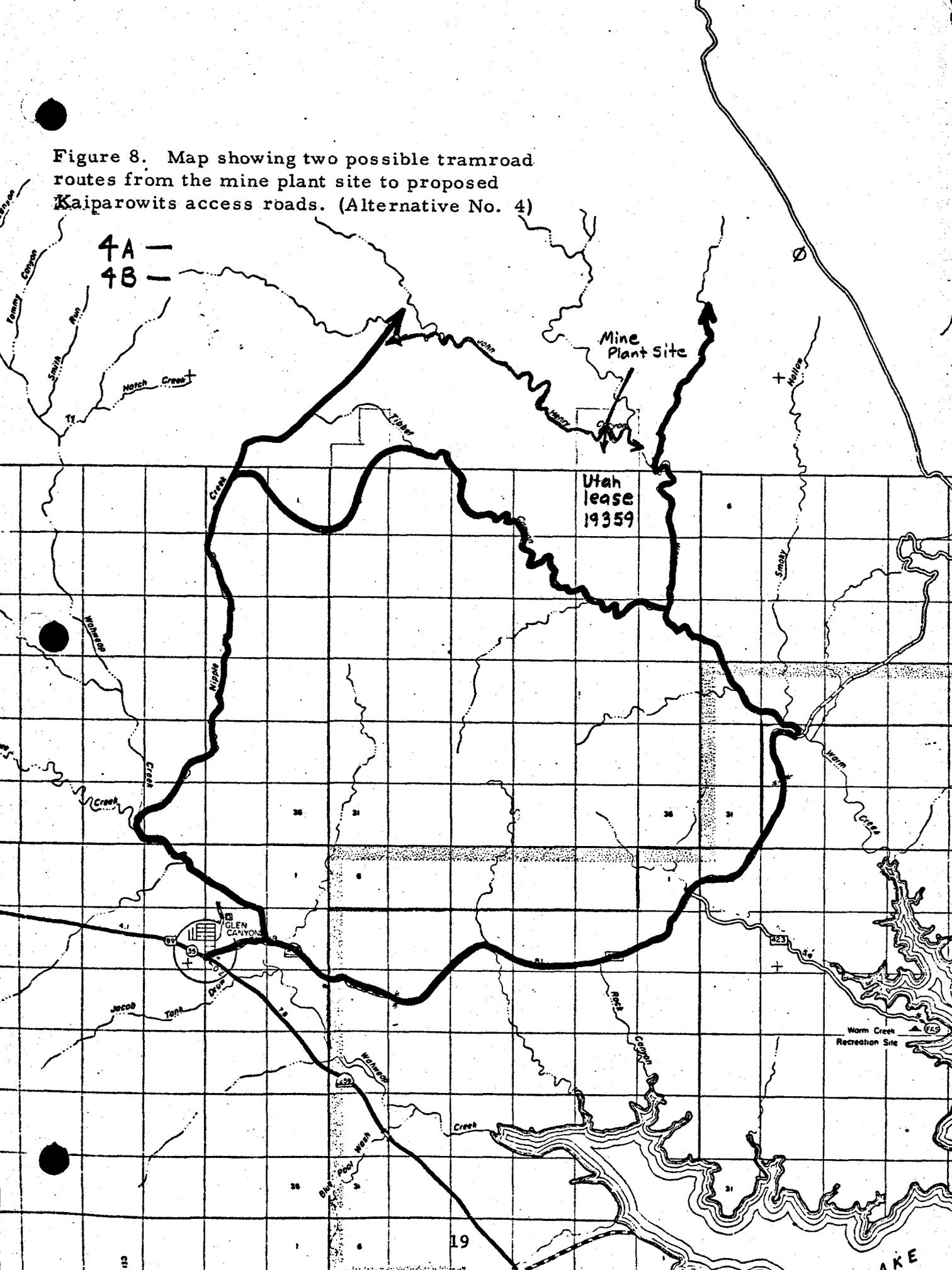
	<u>Miles</u>	<u>Acres (100 foot R/W)</u>
3A	2.5	30
3B	6	73
3C	4.5	55
3D	4.5	55

Alternative No. 4 (Figure 8)

Alternative No. 4 would involve the mine plant SLUP and the tunnels, as proposed, and one of two possible tramroad routes (4A & 4B) to one of the proposed Kaiparowits access roads. As in Alternative No. 3, this alternative would be dependent upon Kaiparowits project approval and could only be implemented after a Kaiparowits access route is approved and built. 4A would allow access to a possible eastern route through Warm Creek and the Recreation Area and 4B would allow access to a possible western route through Nipple Creek Canyon and avoid the Recreation Area. Approximate distances and acreages involved for a 100-foot wide right-of-way would be one mile and 12 acres for 4A and five miles and 61 acres for 4B.

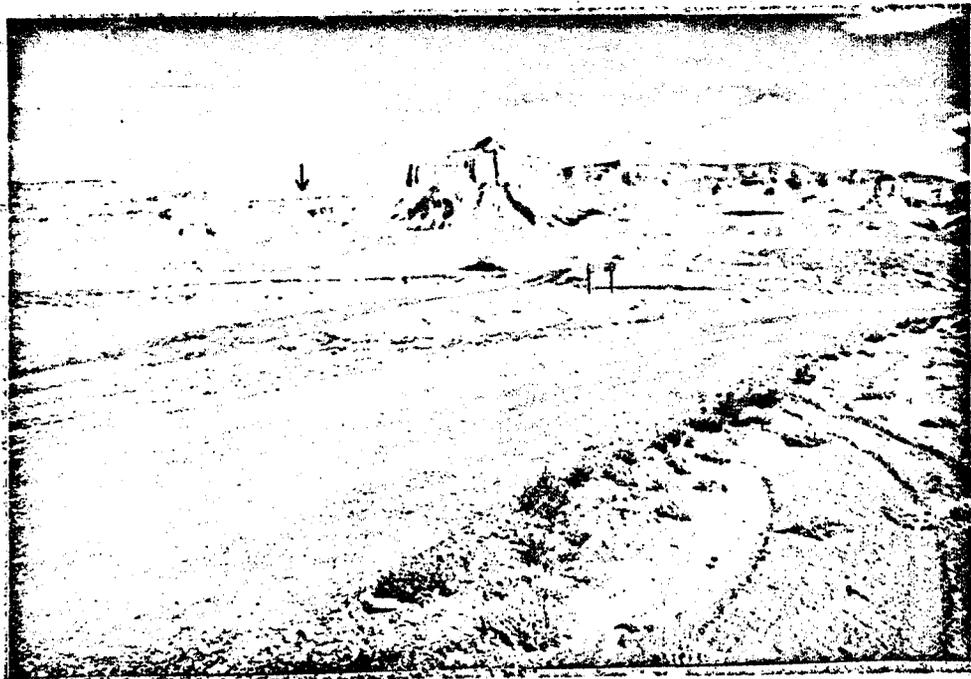
The alternative of issuing the tramroad right-of-way through Warm Creek on a temporary basis subject to cancellation, if and when a western route through Nipple Creek (which would avoid the Recreation Area) were approved and built for the Kaiparowits project, is mentioned here, but appears to be not viable. This alternative would require the applicant to expend money on road building only to have to abandon the road and apply for and build another. Once built, the applicant would perhaps acquire a right on the Warm Creek alignment which the government could not cancel except for non-compliance or other similar infraction.

Figure 8. Map showing two possible tramroad routes from the mine plant site to proposed Kaiparowits access roads. (Alternative No. 4)



If the tramroad and tunnel right-of-way and special land use permit or one of the alternate tramroad permits were not issued, the applicant would not be able to gain access to the State lease to develop and mine the coal.

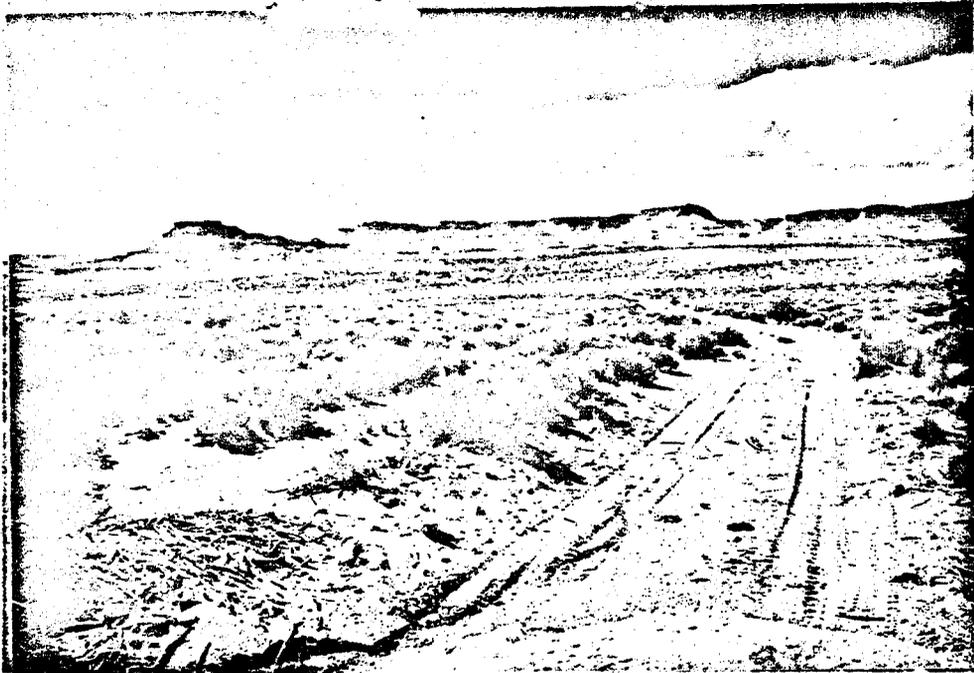
Although not actually alternatives, this analysis will consider the possibility that additional water could be needed at a future date if the dry coal processing as proposed does not prove out. Also, the possibility of having to eventually bring in electrical power, instead of diesel powered generators as proposed, will be considered. Electricity could come from a tie-in with an existing Garkane Power Association power line in Glen Canyon City and follow the proposed haulage route and tramroad right-of-way up Warm Creek Canyon to the mine plant site. Additional water could come from a well on or off the mine plant site and conveyed via a pipeline. It is not known if surface water would be available. Details are not known because they are not part of the applicant's proposal.



Road junction in section 29, T 42 S, R 4 E within the
Glen Canyon National Recreation Area, looking north.
Road to left goes to Warm Creek Canyon (arrow) and road
to right goes to the "Kelly Grade."



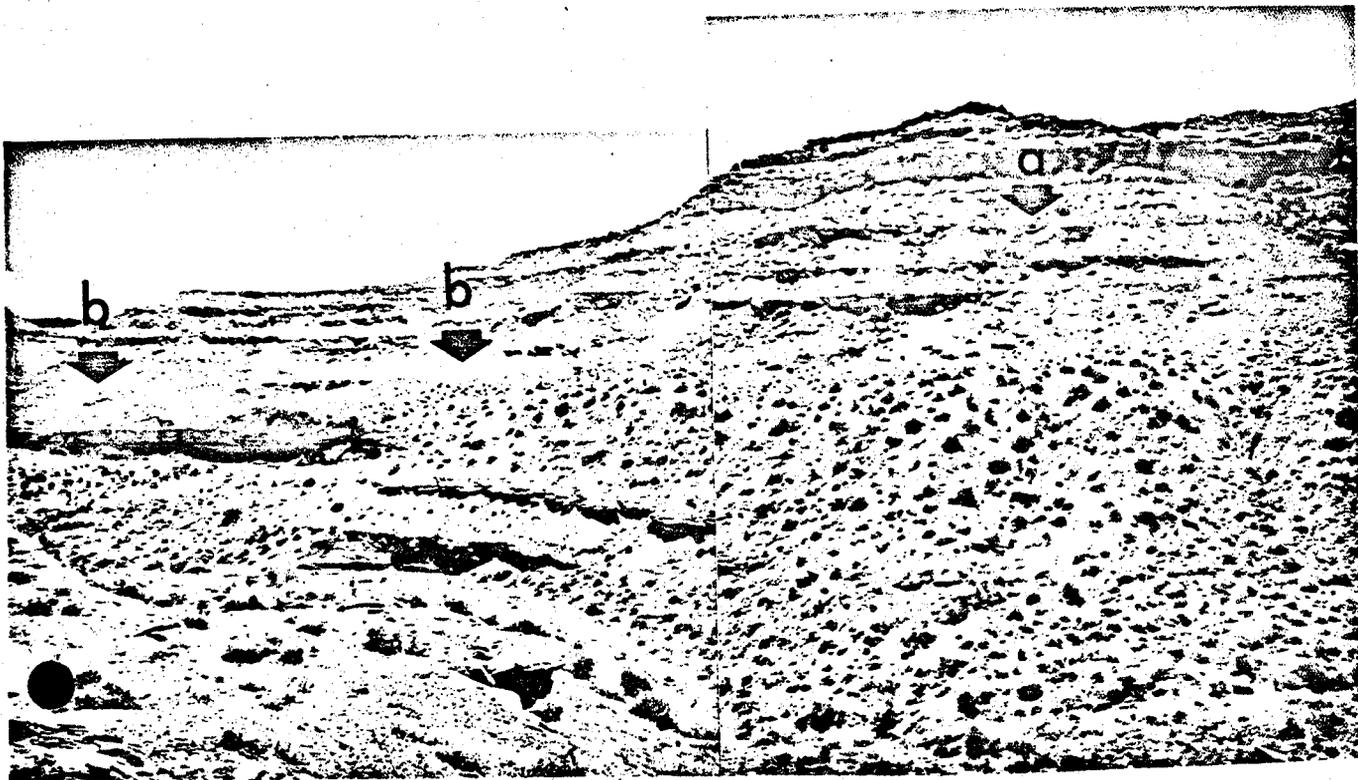
Junction of Tibbet and Warm Creek Canyons, looking north.
Section 13, T 42 S, R 3 E.



Road on bench top in section 34, T 41 S, R 3 E, looking west. This road was built to a BYU study site in section 34.



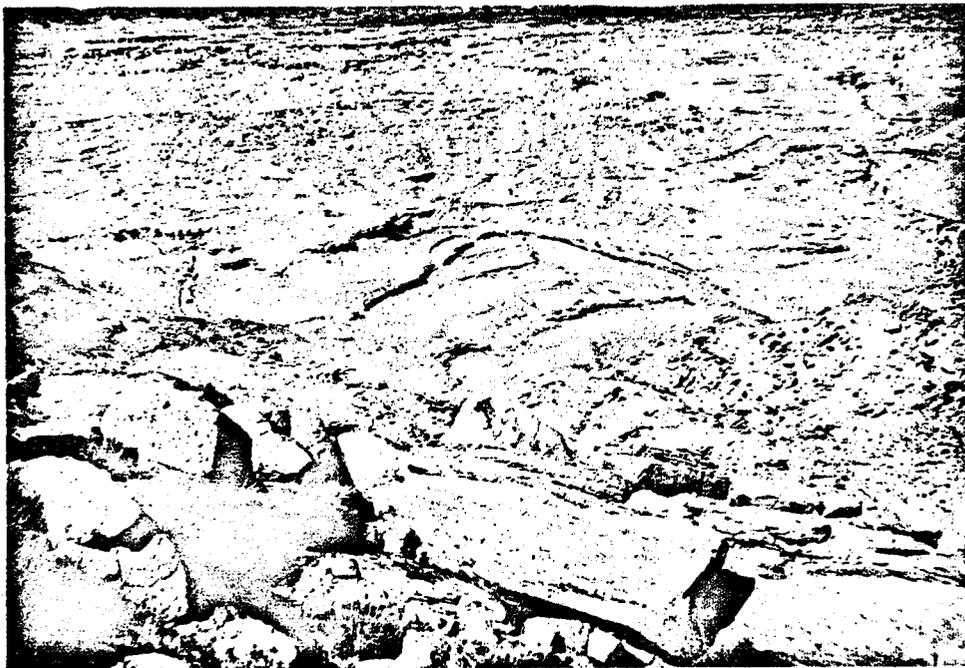
Utah State Lease 19359, section 2, T 42 S, R 3 E, looking northeast toward John Henry Canyon. The men are standing near the north $\frac{1}{4}$ corner of section 2.



View taken on the proposed mine plant site looking southeast. "a" is the approximate centerline of Tunnel No. 1, and "b" is the terrace where the waste disposal site is proposed.



View taken on the proposed mine plant site looking southwest. The arrow is the approximate location of the center line of Tunnel No. 2



View of the proposed mine plant site from the south rim of John Henry Canyon. Compare with the mine plant site map (figure 4) for location of facilities.

CHAPTER II

DESCRIPTION OF EXISTING ENVIRONMENT

NON-LIVING COMPONENTS

CLIMATE AND AIR QUALITY

Climate

Climate of the area is semi-arid, characterized by light precipitation, low humidity, and clear days. Annual precipitation averages six inches along Warm Creek and seven inches on Nipple Bench. Precipitation generally occurs as rain, although snow occasionally falls on Nipple Bench. Winter storms originate in the Pacific Ocean, while summer thunderstorms are generally from the Gulf of Mexico. Heaviest precipitation occurs during summer and early fall.

Prevailing winds are from the west to southwest and attain their greatest velocities during spring and summer.

Average monthly temperature is about 30° in January and 82° in July.

Air Quality

Air quality in the area is generally excellent with average visibility exceeding 70 miles. Dust is the greatest source of air pollution being most noticeable during the spring months. Other types of suspended particles and gases plus trace elements are generally near or below the minimum detectable concentration. Small towns south of the application area have minimal effects on the air quality of the area. The Kaiparowits

power plant proposed to be built adjacent to the application area on either Fourmile Bench or Nipple Bench and the Navajo power plant under construction at Page, Arizona, could conceivably lower air quality in the Lake Powell area when in operation.

LAND

Geology/Geologic Structure

The southern Kaiparowits Plateau area consists of nearly horizontal strata (dips rarely exceed two degrees) of Cretaceous age and aluvium, colluvium, terrace gravels, and landslide deposits.

The Tropic Shale, a gray shale with thin siltstone and sandstone beds near the top and bottom is exposed in the lower parts of Warm Creek Canyon. Landslides are common on its slopes. Overlying the Tropic is the Straight Cliffs Formation, predominately a sandstone with subordinate shales which form the canyon walls of Warm Creek, Tibbet, and John Henry Canyons. The Straight Cliffs Formation is divided into four members which are from lowest to highest: the Tibbet Canyon, the Smoky Hollow, the John Henry, and the Drip Tank Members. The John Henry Member is the major coal bearing unit in the Kaiparowits Plateau. Four coal zones are generally recognized (the Lower, Christensen, Rees, and Alvey) within this member. These coal zones crop out at various locations along the canyon walls several hundred feet above the canyon bottoms. The Drip Tank Member is the uppermost unit and forms the caprock of the plateau.

Surficial deposits include landslide deposits, terrace gravels, colluvium, and alluvial silt, sand, and gravel along the sides and in the bottom of the canyons. Some of the alluvial sand and gravel is suitable for road surfacing material.

Published data (Waldrop and Sutton, 1967, "Preliminary geologic map and coal deposits of the northeast quarter of the Nipple Butte quadrangle, Kane Co. Utah": UGMS Map 24A and Doelling and Graham, 1972, "Southwestern Utah Coal Fields": UGMS Monograph Series No. 1, page 191 - 197) indicates that coal beds in this general area are as much as 17.3 feet thick and average 2.7 feet thick. Individual beds are lenticular and few can be traced further than a mile. Well defined zones are difficult to identify; although, it is thought that the bulk of the mineable coal lies within the Christensen zone. Doelling has identified only the Christensen zone in section 35, the area of the proposed tunnel entries. The applicant has identified four other coal zones in the area, both above and below the Christensen and proposes to drive tunnels in the Christensen zone on Federal land and eventually mine the Christensen and, if possible, the other zones under the State lease. A coal bed, identified as Christensen, about 12.5 feet thick is exposed at the location of the centerline of the proposed No. 1 tunnel entry. The exposed coal thickness at the location of the proposed No. 2 tunnel is 8.6 feet thick. The Christensen zone is inferred to lie about 500 feet below the surface of section 2.

One coal drill hole was completed on the 5-M State lease by a previous lessee. The applicant states that mineable coal was indicated although detailed information is not available.

Analyses from 67 drill holes in the surrounding area has been published by Doelling (p. 197). The approximate analysis is as follows:

	<u>Range (%)</u>	<u>Average (%)</u>
Moisture, as-received	6.7-14.4	9.0
Volatile matter, dry	37.2-45.8	42.4
Fixed carbon, dry	41.2-55.5	48.7
Ash, dry	3.6-18.9	8.5
Sulfur, dry	0.27-1.54	0.-3
Btu/lb, dry	11,683-13,746	12,668

Because of the lack of drilling in this area, coal distribution is uncertain, and reserves and quality of coal can only be inferred.

5-M has estimated reserves on their State coal lease, inferred from Resources Company's drilling several miles northwest, as 26 million tons of coal or 13 million tons recoverable based on 50% recovery.

The amount of Federal coal proposed to be mined within the tunnel rights-of-way is roughly estimated as 180,000 tons for tunnel No. 1 and 220,000 tons for tunnel No. 2 based on the 12.5 and 8.6 foot thick coal outcrops in section 35. Total coal within the tunnel rights-of-way is estimated at 450,000 tons and 550,000 tons for tunnels No. 1 and No. 2 respectively.

Topography

This area consists of deeply incised canyons along the southern margin of the Kaiparowits Plateau. The canyons involved - Warm Creek and its two main tributary canyons, Tibbet and John Henry - are major erosional features which form the eastern boundary of Nipple Bench. The bench, including the area covered by the State lease, has little relief except for a few small isolated buttes and mesas.

Depth of the canyons vary along their lengths. At the junction of Tibbet and Warm Creek Canyons, the canyon bottom lies about 1200 feet below the bench. In section 35, the John Henry Canyon bottom is about 900 feet below the canyon rim. The canyon sides are intricately dissected by small tributary canyons. They exhibit a terraced effect caused by differential erosion of the Straight Cliffs Formation.

The canyon widths vary from about $\frac{1}{2}$ mile near the mouth of Warm Creek Canyon to several hundred feet along the upper reaches of Tibbet and Warm Creek Canyons. The canyon bottom topography varies from relatively wide flat areas to narrow restricted areas.

Tibbet Canyon is more intricately dissected and narrower than Warm Creek Canyon.

The proposed mine plant site is located east of the confluence of John Henry and Warm Creek Canyons where the canyon is about $\frac{1}{4}$ mile wide. The proposed facilities would be located on a gently sloping terrace

composed of sandstone, shales, colluvium, and alluvium at the base of the canyon wall. The terrace is cut by an intermittent stream channel which is tributary to the main John Henry drainage channel which runs through the northern part of the plant site.

Soils

Soils in this area are represented by shallow lithosols, badland-rockland, and alluvium. The lithosols occur on nearly level to steep slopes on upland mesas and plateaus. The soils are shallow to moderately deep, light-colored loams or silts, mildly to moderately alkaline, underlain at 10 to 20 inches by fractured bedrock. These soils are well-drained with moderate to slow permeability and are highly erodible.

The badland-rockland association occurs on benches and mesas along steep canyons. The soils are shallow to very shallow, light-colored loams overlying sandstone or shale. Runoff is rapid to very rapid with high sediment production.

The alluvial soils occur on flood plains of the drainages in the area. These soils are deep, brown or reddish-brown loams, moderately to mildly alkaline. They are well-drained with slow to moderately rapid permeability.

The dominant types of erosion are sheet and gully erosion, yielding from 0.1 to 1.5 acre feet of soil per square mile annually. Thunderstorms are the source of most erosion, but wind is also a cause of soil movement. Low vegetative cover over much of the area contributes to the problem.

Land Uses By Man

Livestock. The area under application is within the Upper Warm Creek Allotment of the Paria Planning Unit. This allotment is used yearly from November 1 to May 31 by three operators. The total allotment consists of approximately 76,000 acres and is licensed for 547 AUMs (an AUM is an animal unit month which is the amount of forage needed to feed a cow for 30 days).

Recreation. Nearby scenic and rugged lands, developed recreation areas, and national parks offer a tremendous amount of recreational facilities. However, recreational use in the immediate area is mostly confined to the Glen Canyon National Recreation Area (Lake Powell). During the months of April through August of 1975, an estimated 4610 visitor days (overnight use) were utilized at the Warm Creek Recreation Site at Warm Creek Bay of Lake Powell. Access to this site is gained along the portion of the proposed haul route from Glen Canyon City through the Recreation Area to the Crosby Canyon turnoff, a distance of about eight miles (see Figure 5). Four-wheel drive access to this site is also possible down Warm Creek Canyon. In addition to the 4610 overnight visitors, an estimated 1150 day-use visitors utilized the Warm Creek Site during the same period.

The road from Glen Canyon City, east to "Kelly Grade" is used occasionally as a sightseeing route from Highway 89 north to Escalante, Utah. Motor bike riders occasionally explore the side canyons of Warm Creek and Tibbet Canyons.

The State of Utah has proposed a scenic highway from Glen Canyon City to Bullfrog Basin to follow a portion of that proposed haul route within the Recreation Area.

Woodland Products. The area is located within the shadscale - semi-desert shrub type. No commercial woodland products are present in this zone, but P-J forest surrounds the area to the north.

Mineral Development. There is no mineral development within the area under application. However, the area is within the Kaiparowits Plateau which is a major coal basin estimated to contain about four billion tons of recoverable coal (Doelling and Graham, 1972. "Southwest Utah Coalfields", UGMS Monography Series No. 1, page 102). At the present time, 370 square miles of the 1600 square mile plateau is under Federal coal lease or permit or State coal lease. Several projects involving the utilization of Kaiparowits coal have been proposed including four coal mines on Resources Company leases about five miles north of the proposed 5-M mine plant site which would produce about 12 million tons of coal annually to supply a 3000 megawatt plant (the Kaiparowits project). One of the two possible power plant sites is about three miles west of the State lease. This and the relationship between the 5-M proposal area and nearby coal leases and permits is shown in Figure 9. The proposed tramroad crosses portions of the Hiko Bell and Resources Company leases in Warm Creek Canyon. The tramroad is in portions of these leases where the coal has been eroded and, therefore, does not overlie areas of potential underground coal mining. There are no present proposals to

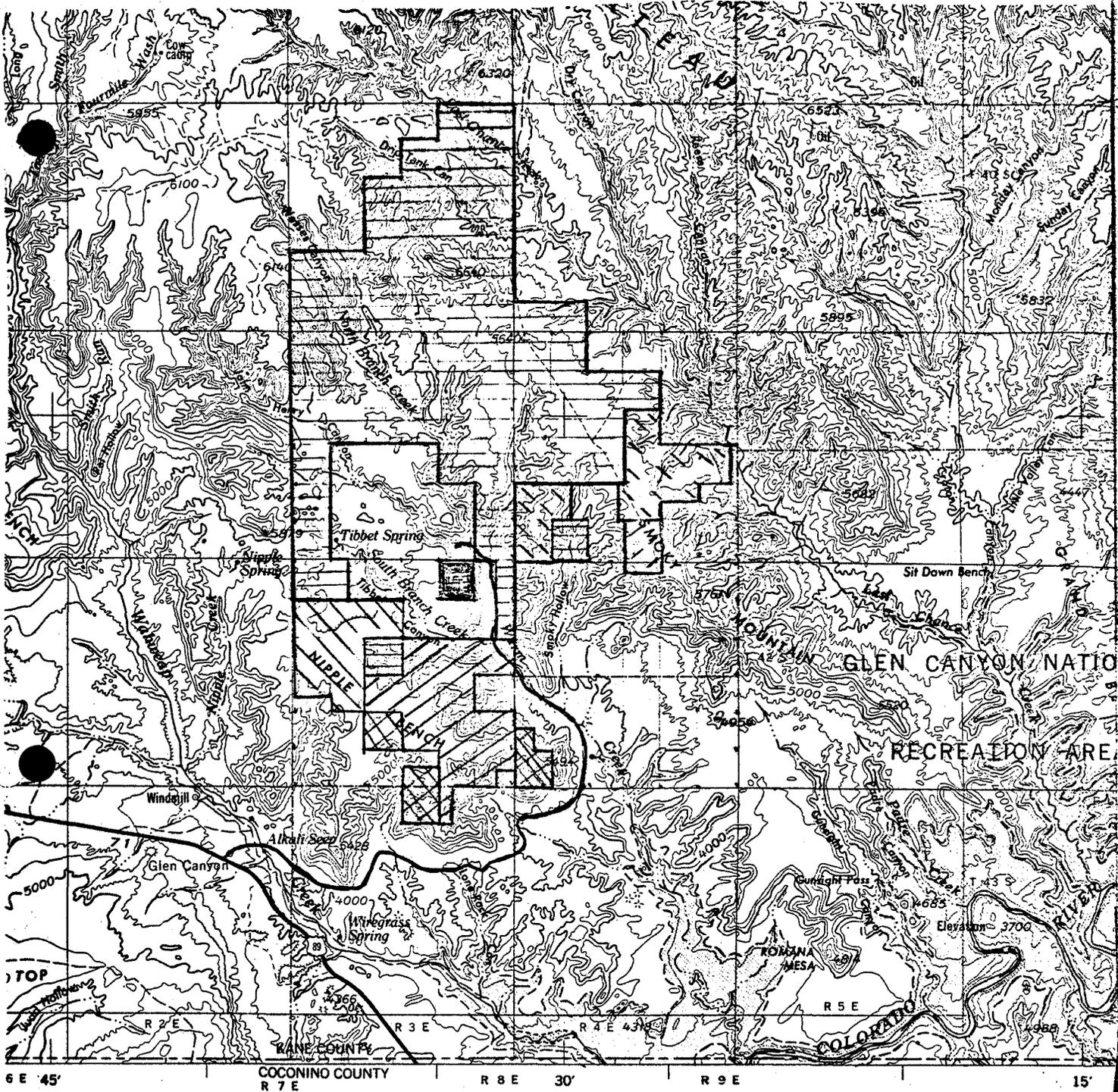


FIGURE 9.
RELATIONSHIP OF PROPOSAL TO COAL
PROPERTIES IN THE AREA

- Unleased (Known Coal Lease Area)
- Utah State Lease 19359
- Resources Co., et. al. leases
- Hiko Bell Mining & Oil Co. leases
- Hiko Bell Mining Oil Co. permits
- Peabody Coal Co. leases
- S. H. West leases
- Proposed 5-M haul route
- Proposed Kaiparowits Power Plant Site on Nipple Bench



develop the Hiko Bell lease. It is not known if and when this portion of the Resources Company lease will be mined. Most of the coal in this portion of their lease has been eroded away.

Resources Company has used and maintained this road in the past to gain access to their experimental mine (now closed) in the N $\frac{1}{2}$ N $\frac{1}{2}$ section 36, T 41 S, R 3 E.

Several possible routes have been proposed to gain access to the plateau for development of the Kaiparowits coal. One is along Warm Creek Canyon. The preferred route is along the east side of Nipple Bench, along Nipple Creek Canyon. See maps and discussion under the "Alternatives" section of Chapter I. A proposed Kaiparowits project water pipeline crosses the haul route in section 12, T 43 S, R 3 E and section 7, T 43 S, R 4 E within the Recreation Area.

Past coal development in the area includes one abandoned mine along Warm Creek Canyon and two in Tibbet Canyon and the Resources Company experimental mine. The Resources mine is proposed to be used as a training mine for the Kaiparowits project. It was mined in 1971-2 to test mining conditions of the coal in the area. The other three mines have been abandoned for many years and are thought to have produced a total of only a few hundred tons. The area is nearly covered with oil and gas leases. However, there has been no oil and gas drilling in the area. The area was prospected for uranium in the 1950's; however, no known valuable deposits of uranium are known in the area. There is active sand and gravel mining near Glen Canyon City; production is about 5000 cubic yards per year.

Utilities and Transportation. The mine plant area would be located approximately 20 miles from Glen Canyon City, Utah. This town is a collection of trailer houses lacking recreation facilities, lawns, sidewalks or paved streets. The town does not have a sewer system and all sewage disposal is with septic tanks and leach fields. Solid waste disposal for Glen Canyon City has created both a nuisance and health hazard in the past. Waste disposal is a landfill type, but is sometimes left uncovered and is allowed to burn. Electricity is provided by Garkane Power Company and water by local wells. Glen Canyon City has, for the most part, neglected service needs.

..
If the Kaiparowits project is constructed, a town of approximately 15,000 people is proposed to be built between Glen Canyon City and Church Wells, located eight miles west. Church Wells consists of a trailer community smaller than Glen Canyon City, and like Glen Canyon City, contains inadequate facilities.

Page, Arizona is located 17 miles east of Glen Canyon City. Services and facilities available at Page include: airport, cemetery, fire department, hospital, library, parks and recreation, police department, refuse collection and disposal, sewage system and maintenance, planning and zoning.

Glen Canyon City is located adjacent to U.S. Highway 89, the main north-south travel route from Salt Lake City to Phoenix. An improved, partially graveled and graded road extends from U.S. 89 to within about seven miles of the mine plant area where an unimproved fair-weather road leads to

the mine plant area. Two miles of the improved route is maintained by the Utah State Highway Department and twelve miles by Kane County. The seven miles to the mine plant area is on NRL except for less than one-half mile on a State school section. This seven miles receives little maintenance and is under the jurisdiction of BLM; it is partially on existing coal leases (see "Mineral Development"). This route is a proposed alternate access route for the Kaiparowits project. Other routes have been proposed which would give through-access from Glen Canyon City to towns in eastern Garfield County to the north. See "Alternatives" section of Chapter I. At the present time, main access to the Kaiparowits Plateau from the south is by a graded switch-back road east of Warm Creek road, which is locally called the "Kelly Grade."

WATER RESOURCES

Surface Water

No perennial streams occur in the area. However, several of the drainages flow intermittently and all have water during periods of thunderstorm activity. Flooding is common in Warm Creek Canyon during thunderstorms. Mean annual runoff from Warm Creek is estimated at about 1000 acre-feet. Several springs and seeps which issue from the Straight Cliffs sandstone in the area are also a source of water in the intermittent streams.

Total dissolved solids in the waters of the area vary from about 600 milligram per liter to over 4000 milligrams per liter. The waters are slightly alkaline with a pH of 7.7 to 8.0. Sediment loads of drainages are light except during the late summer thunderstorm season when loads are quite large.

Subsurface Water

Subsurface freshwater aquifers occur in the Straight Cliffs sandstones and the underlying Entrada and Navajo sandstones and in the alluvium of Warm Creek. The water table underlies the application area at a depth ranging from about 100 feet in the alluvium along Warm Creek to over 1000 feet at Nipple Bench. Also, perched aquifers occur in the Drip Tank Member of the Straight Cliffs Formation, perhaps several hundred feet below some of the higher benches such as Nipple Bench. Water yields vary from less than one gallon per minute in the Straight Cliffs sandstone to over 1000 gallons per minute in the Navajo sandstone. Ground water in the application area is classified as slightly alkaline (1,000-3,000 milligrams per liter dissolved solids) and is suitable for some industrial uses such as dust control and road construction, but exceeds the U.S. Public Health Service quality standards for potable water.

LIVING COMPONENTS

VEGETATION

There are two major vegetation types in the area. The salt desert shrub type occurs on the lower slopes along Warm Creek and its tributaries, and is dominated by shadscale, mat saltbush, Russian thistle, and galleta grass. This type is found on poorly drained, alkaline soils, and has a coverage of about 10 percent.

The mixed desert shrub type is found on the benches of the area and is dominated by blackbrush, spiny hopsage, little rabbitbrush, broom snakeweed,

Brigham tea, galleta grass, and Indian ricegrass. This type occurs on well-drained, shallow to moderately deep, mildly alkaline soils.

Coverage varies from about 10 to 30 percent depending on soil depth and effective precipitation.

A riparian community occurs along Warm Creek and its tributaries in the vicinity of seeps and springs. This community is characterized by phreatophytes such as willow, salt cedar, Fremont Cottonwood, and rushes.

WILDLIFE

A variety of wildlife species are found on the area, but the population densities of most species are low. Common mammals include ground squirrels, mice, rabbits, and coyotes. Mule deer occur on the area in small numbers during the winter months. Several species of birds are found in the area, the majority being migrants or winter visitors. Common raptors include golden eagles, red-tailed hawks, rough-legged hawks (winter), and American kestrels. Approximately 15 species of reptiles and amphibians inhabit the application area, but the majority are seldom observed.

No rare or endangered species are known to occur on the application area.

ECOLOGICAL INTERRELATIONSHIPS

All vegetative types on the area have been altered to some extent by livestock grazing and human disturbances and are no longer in their climax condition. Vegetation was altered by directly eliminating some plants and reducing the coverage of others, thus increasing the availability of space, soil moisture, and nutrients for the remaining species. Reduced

vegetative cover allowed soil erosion to increase, resulting in a loss of nutrients and soil holding capacity, and a further alteration of the surface microclimate.

All animals rely on vegetation for their survival, but are often found within several vegetative types. The only species within the application area that are dependent on one habitat for their survival are the amphibians which require water for reproduction.

HUMAN VALUES

LANDSCAPE CHARACTER

The Kaiparowits Plateau lies within the Canyonlands section of the Colorado Plateau. The area is characterized by terraced plateaus, vertical cliffs, cliff-bound benches and deep canyons. Compared to other areas in the district such as Escalante River Canyon, Fifty Mile Mountain, and the Paria Primitive Area, the scenic quality within the impact area is quite low.

HISTORICAL, PALEONTOLOGICAL, AND ARCHAEOLOGICAL

No historical sites have been identified in this immediate area. Two historic town sites, Paria and Adairville, occur approximately 20 miles west of Glen Canyon City.

Thin beds of fossil shells consisting mostly of pelecypods, which are bivalved mollusks akin to oysters and clams, occur throughout the Straight Cliffs and Tropic Formations in this area. These shells were deposited along a Cretaceous-age beach where wave action has broken many of them into

unidentifiable fragments. However, occasional unbroken shells and shell impressions can be found. Small sharks' teeth have also been identified among the shell fragments. Fossil leaf impressions occur in some sandstone beds that overlie coal seams.

The fossils are not of any particular significance except as an aid in identifying the depositional environment and age of the rocks.

Archaeological sites are common within this portion of the State and include the artifacts of several Indian cultures. An archaeological inventory has not been performed in the immediate area of mine plant or tramroad. However, this would be a requirement prior to any construction work.

SOCIAL WELFARE

The proposed mine plant site and tramroad would be located in southeastern Kane County and would have its major effect on that county. A possible through-highway to the northern Kaiparowits Plateau which is part of the Kaiparowits project would also make the project area readily accessible to eastern Garfield County towns and could thereby affect Garfield County.

Garfield and Kane County populations have been declining for the past several years. From 1940 to 1971, the population declined by 30 percent, but began to stabilize in 1971. Since 1971, the populations of Kane and Garfield Counties have increased by 32 and 3 percent, respectively, with most of the increase being attributed to increased tourism in the area and construction of the Navajo power generating plant at Page, Arizona.

Density is only 0.6 persons per square mile compared to the State average of 12.9 persons per square mile. Age distribution of Kane and Garfield Counties is 40 percent in the 0 to 16 age group, 20 percent in the 17 to 34 age group, and 40 percent in the 35 to older age group. The low percentage in the 17 to 34 age group is reflective of the fact that a large number of young people move from this area to larger cities after completing high school. Racial distribution of the area is 99 percent white and 1 percent Indian.

Population projections for Kane and Garfield Counties are dependent on future employment opportunities in this area. Employment in recreational services is likely to increase over the next few years. However, the greatest potential for employment opportunities is the proposed construction and operation of the Kaiparowits power plant which could result in a new town of approximately 10-15,000 persons in Kane County.

Approximately 75 percent of the labor force in Kane and Garfield Counties are employed in non-agricultural work and 25 percent are employed in agricultural work. The primary employment is in tourism and recreational services, government, lumber, and agriculture. The labor force in 1973 totaled 2765 individuals. This was broken down as follows:

1. Agriculture	150
2. Government	580
3. Services and Misc.	450
4. Trade	460
5. Other Industry	685
6. Unemployment	<u>440</u>

Total 2,765

Lumber mills, using timber supplied from Dixie and Kaibab National Forests, are located at Panguitch, Escalante, and Fredonia, Arizona. Total employment at these mills varies from 450 to 550 individuals. Agriculture in 1974 provided jobs for 7 percent of the labor force. The sale of livestock and livestock products accounted for 71 percent of all agricultural production. Crop production is restricted almost entirely to hay, grain, and irrigated pasture. Unemployment in 1973 averaged about 11 percent in Kane County and 20 percent in Garfield County. Garfield County is classified as economically depressed by the office of EDO. Employment in the area is highly seasonal, being highest during the summer tourist season and lowest during the winter months.

Employment opportunities will improve greatly if the Kaiparowits power plant is constructed. Employment at this facility would include 2,560 miners and 510 at the power plant.

Per capita income for Kane and Garfield Counties in 1973 (\$2,921) was 27 percent below the State average of \$4,054. Total personal income has increased at a rate of 5 to 15 percent annually since 1965. Total income of the area accounts for less than $\frac{1}{2}$ of 1 percent of the total State income. Agriculture contributes about 5 percent of the total personal income in the area.

ATTITUDES AND EXPECTATION

The Bureau of Government and Opinion Research at Utah State University was commissioned by the Bureau of Land Management to conduct a public

opinion survey concerning the impact of the proposed Kaiparowits project. The Kaiparowits project would be located several miles west of the proposed mine plant. The results of this study are made part of this report because they indicate the attitude of residents in the area concerning new development moving into the area. The following is a brief summary of the highlights of this survey.

Polling results suggest that a majority of the citizens favor the Kaiparowits project, but when detailed questions are asked, some reservations are expressed. Some communities want growth more than others and some are more willing to pay for the costs of growth.

About three out of four residents of the southern Utah communities favored a population increase; however, some reservation was expressed because of the inadequacy of water and sewage facilities.

Even if taxes were to rise "slightly", a majority of residents in the southern Utah towns said they would favor a population increase; but differences among communities were apparent. Approximately two-thirds of the residents would oppose an increase in population in their communities if it would cause local taxes to rise "substantially."

Four out of five persons approved of outside interests investing money in their community. Reservations were expressed by some who said they would favor outside investment if the money was used to benefit the community or if the investors were "the proper kind of people."

Even though there may be substantial community growth, about three out of four people in southern Utah did not plan on changing their employment.

Higher proportions of younger people planned to alter employment than older people. While three-fourths of the people in professional and business occupations did not foresee a potential change in their employment status, only half of the people in manual occupations felt the same.

Residents of southern Utah communities generally felt that economic development is more important in their area than environmental conservation. This view was expressed by six out of every ten individuals. Two in ten stated they are equally important, and one in ten claimed that environmental conservation is the most important. Differing opinions among occupational groups were apparent.

Discussion with local residents at the public meeting concerning this proposal revealed that the vast majority favor the 5-M proposal and that their attitudes toward this proposal as well as the Kaiparowits project and other coal-related development in the area is favorable. They expect increased local income and jobs.

LOCAL REGULATORY STRUCTURES

A county master plan has been prepared for the lands (public, State, county and private) in Kane County. This master plan was not meant to be specific in terms of project proposals, but rather to guide land use patterns in the county. The local zoning ordinance is the enforcement mechanism of the master plan.

The 5-M application area is located in an area zoned for "forest recreation" uses and are shown as "open rangeland" on the 1971 Kane County Master Plan. County zoning describes the "forest recreation" classification as permitting

necessary exploitation of the area for grazing, forestry, mining, recreation, and other activities to the extent compatible with the protection of the natural and scenic resources of the area for the benefit of present and future generations.

The BLM management framework plan for the Paria Planning Unit states that coal should be made available on a managed and controlled basis, consistent with national energy policies and related demands and to insure that environmental and other resource damage is minimized, fair market value is received, and development is orderly and timely.

The Five-County Association of Governments, which includes Kane, Garfield, Iron, Washington, and Beaver Counties, is one of seven such associations in Utah designed to expedite county governmental cooperation in dealing with regional programs. They meet on a regular basis to consider proposals which could have a regional effect.

CHAPTER III

ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

ANTICIPATED IMPACTS

NON-LIVING COMPONENTS

Climate

No impacts identified

Air Quality

The most significant impact on air quality would be from fugitive dust.

Dust would arise during the construction of the tramroad and the construction of the mine plant site and a powerline and water pipeline if built.

Dust would also arise from vehicle travel along access roads to the mine.

Dust would arise in the mine, at sites where coal and waste is handled and processed and during conveyance. The health of mine workers could be threatened by coal dust, carbon monoxide, and other gases released during construction of the tunnel and other mining activities. Coal crushing and cleaning by the proposed air cleaning method would create dust of an undetermined magnitude. A wet cleaning process would create less dust.

Dust would be mostly a localized impact confined to the canyon bottom.

However, down-canyon winds could carry some dust south into the Warm Creek Bay area.

Carbon monoxide and hydrocarbon emissions would occur from vehicles and equipment.

Coal fires or explosions which could occur in the coal mine, coal storage pile, or waste disposal site would release smoke, carbon monoxide, and other gases into the atmosphere.

Increased dust and hydrocarbon and carbon monoxide emissions would occur in the Glen Canyon City and Kaiparowits Plateau areas as a result of increased vehicular travel by people associated with the mine development. The greatest amount of travel would probably involve travel to and from the plant site and recreational activities in the area.

Impacts on air quality resulting from the development of the mine would end when mining operations cease and the area has been rehabilitated. However minor dust problems could be created by equipment used during the rehabilitation of disturbed sites.

Alternative proposals involving the mine plant site on the surface of the State lease would probably result in a more rapid dispersal of dust and emissions by winds cross the plateau surface. Alternate haul routes longer than the proposed route would result in more dust and emissions and shorter routes, less dust and emissions.

Land and Land Uses

Geology/Geologic Structure and Topography. An estimated 400,000 tons of coal would be mined in the construction of the two tunnels an estimated 13 million tons of coal could possibly be mined from the state lease, and

a like amount would be left in place as pillars or in unmineable seams and would be lost to ultimate recovery (assuming 50% recovery). Coal extraction could result in some form of ground subsidence on the state lease. The type of ground failure that would be expected is not known and cannot be determined until mine development actually takes place. Subsidence could consist of small cracks, large depressions or a combination of these disturbances. Any mining plan involved on the state lease would be the responsibility of the State of Utah Division of Oil, Gas, and Mining.

Construction of roads and mine plant facilities and possibly powerline or pipeline would result in alteration of land forms in the area. The tram-road construction would result in road cuts and fills along most of the canyon bottoms and sides. Some canyon side slopes are unstable and could subject the road to periodic landslides or movement. Mine plant construction would involve some land clearing and reshaping of the surface. The waste disposal area as proposed would be built up and terraced through time creating an artificial topographic feature covering about 10 acres at the canyon base.

Excavation sites for aggregate, rip-rap, and other construction materials would occur along the road construction route.

Tunnels would not be involved if an alternative allowing direct access to the State lease was implemented. An alternative involving a mine plant site on the bench top (on the State lease) would result in somewhat less topographic alteration because the bench area is relatively flat and unconfined. Topographic alteration caused by an alternate route would be

dependent upon the length and location of the alternate tramroad. The alternate route through Tibbitt would involve the most construction work because of the rugged and narrow nature of the canyon.

Soils. Soil compaction would occur from the construction and use of access roads; during construction of the mine plant site; on coal storage and waste disposal sites; and during construction of a possible powerline and water pipeline. Soil compaction would reduce the infiltration rate of precipitation resulting in an increase in surface runoff and increased soil erosion. The removal of vegetation near roads and on other cleared sites would leave the soils on those sites vulnerable to wind and water erosion. Productivity on disturbed and eroded sites would be lowered by the loss or destruction of topsoil, soil nutrients, and soil bacteria. Soils could be contaminated by sterile coal waste materials and coal slack in the waste disposal and coal stockpile areas. Improper design and placement could cause these materials to contaminate nearby soils or enter nearby drainages. The influx of people associated with mining activities would have some impacts on soils throughout the Kaiparowits Plateau and Glen Canyon City areas as a result of increased human activities, primarily recreation.

The rehabilitation of disturbed sites after mining operations cease should reduce soil loss. However, rehabilitation of some sites could take several years, particularly on steeper slopes or on sites where large quantities of soil are lost. Those sites would remain susceptible to soil erosion.

The amount of soil that would be lost by the construction of the tramroad and mining facilities is unknown. The proposal involves direct surface

disturbance of about 110 acres.

All alternatives would involve impacts on soils. Impacts would vary depending upon the total surface disturbance involved in the alternative.

Livestock. If the proposed right-of-way and SLUP areas are fenced to prohibit cattle, approximately 110 acres of the 76,000-acre allotment in the area would be removed from grazing. This would involve about 3 AUM's of the 1,547 AUM's in the allotment. If the fence were erected near the mouth of Warm Creek Canyon to keep cattle entirely out of the area, about 450 acres would be removed from grazing or about 9 AUM's.

A plant site on the State lease would eliminate about 8 AUM's, 5 more than if the plant site were in John Henry Canyon because forage production is greater on the bench.

Other alternatives would result in from 3 to 9 AUM's lost depending upon placement of fences, the tramroad route and the mine plant location.

Movement of trucks and equipment in the area could be a direct threat to the life of some cattle and would alter their movement and grazing habits

Impacts on grazing would be relatively small, over all, because most of the cattle graze elsewhere on the plateau when forage production is greater.

Recreation. The most significant impact to recreational use would be the visual and noise intrusion and safety hazard of coal haulage trucks, water trucks, fuel trucks, and other heavy equipment encountered along the 8 mile stretch of road from Glen Canyon City to the Warm Creek Bay turnoff.

A possible powerline along this route would detract from the present unobstructed view. If a scenic highway from Glen Canyon City to Bullfrog is built, this conflict would be more pronounced. Highway 89 users would also encounter this heavy truck traffic.

The feeling of solitude that exists in this area would be impacted by the sites, sounds and smells associated with the mining operations and vehicular traffic.

An increased population in the area would subsequently increase recreational use in nearby areas. This increased recreational use would be in the form of off-road vehicles, rock hounding, and sightseeing.

Increased access and more people would result in an increase of illegal gathering or destruction of archaeological artifacts in the southern Kaiparowits area.

The alternative involving a route from the mine plant site to Glen Canyon City by way of Nipple Creek Canyon along the west side of Nipple Bench would eliminate heavy traffic within the Recreation Area. However, trucks and equipment would still be encountered by recreationists near Glen Canyon City and along highway 89.

Woodland Products. A minor secondary impact of the proposed action would be the increase in population and increased use of firewood and Christmas trees from surrounding areas. Timber would also probably be utilized from some off site area for use in the mine.

Mineral Development. The proposal could result in a significant coal mining operation involving production up to 3000 tons per day (780,000 tons per year) if the applicant realizes his markets. The proposed tramroad or an alternative would be essential to the development of the State lease.

Possible conflicts in road usage and maintenance could occur along Warm Creek Canyon where Resources Company holds a coal lease. Resources' operators have used this access route in the past, mostly to gain access to their experimental mine, and it is likely that they will use it in the future. Kaiser Engineers is the present operator on the Resources Company leases. Any tramroad right-of-way issued before the placement of major Kaiparowits Project access roads are known could possibly conflict with future road placement and design. However, a delay on the applicant's proposal would delay the development and mining of the State lease.

The proposed haul road crosses the proposed Kaiparowits Project water pipeline in section 12, T. 43 S., R. 3 E. and section 7, T. 43 S., R. 4 E., within the Recreation Area. Heavy truck traffic on this road would affect design and construction of this crossing.

The proposed tunnels in section 35 would be a legal and physical incumbrance to future federal coal leasing of section 35.

Aggregate material, rip-rap and other construction materials would be mined along the right-of-way and within the SLUP for use as road surfacing and for road maintenance. From 20,000 to over 50,000 cubic yards of material would be mined depending upon design standards and tramroad routing.

Oil and gas drilling would be inhibited in the area of coal mining.

Development of the State lease could encourage similar development of isolated State-leased coal sections in the Kaiparowits Plateau. A successful mining operation on the lease could eventually result in applications for and leasing of presently unleased federal coal surrounding the State lease. Although it is primarily for the benefit of the applicant, a tramroad would be beneficial to mineral development by others in the area.

Utilities and Transportation. Utility systems at Glen Canyon City and Church Wells are presently inadequate to supply services for the proposed maximum population growth (300 to 400 workers plus their families). Utility services would have to be upgraded. Cost to upgrade utility systems could place a hardship on local governments to finance improvements. Page, Arizona would be able to handle this population growth with proper planning. The proposed new Kaiparowits town on East Clark Bench, if built, could handle this growth if the applicant works with local planners to provide for this additional population influx. Housing development by the applicant could conflict with new town planning if not coordinated.

Increased road maintenance and some rebuilding by the state and county would be necessary along the proposed haul road from Glen Canyon City to the proposed tramroad. Once built, the tramroad would require continual maintenance by the applicant and subsequent users.

Any tramroad designed and built before approval of a Kaiparowits access road (see "Alternatives" Chapter I) could conflict with the design and placement of a possible Kaiparowits access road depending upon which Kaiparowits route is selected.

The proposed tramroad through Warm Creek Canyon would be beneficial to both the applicant and the Resource Company lease operators (Kaiser Engineers). However, use and maintenance conflict between these parties could arise along this portion of the road where Resource Company holds a lease. Coal haulage and related traffic along the Recreation Area portion of the proposed land route could present a safety hazard to recreational and other users along this route.

An alternative tramroad involving a tie-in with a proposed eastern route would avoid the Recreation Area and Resource Company leases.

Water Resources

Surface Water. Sediment loads in surface drainages could increase as a result of increased soil erosion on disturbed sites along the tramroad right-of-way and on the SLUP area. Water encountered in the mine and runoff from the coal storage pile or the waste disposal site could contaminate surface drainages with sterile impurities unless structure design and water disposal is adequate. Improper garbage and sanitary facilities could contaminate surface water. Springs and seeps along the tramroad right-of-way could be contaminated with sediment and coal dust from vehicles using the tramroad. If surface water is used at a future date for a possible coal washery, this water would be unavailable for other uses. Rehabilitation of disturbed sites would reduce soil erosion, thus improving the quality of flow in surface drainages. However site disturbances caused by contouring and seeding during rehabilitation operations may temporarily increase sediment loads in surface drainages.

Increased human activities throughout the Kairparowits Plateau area resulting from the influx of people associated with this coal mining would have an impact on soils and vegetation and could result in increased soil erosion. Increased erosion would cause greater sediment loads in drainages throughout the area.

The alternatives would all involve impacts similar to those outlined above. A mine plant site on the bench (on the State lease) would have a somewhat reduced impact on surface water because of its isolation from major surface drainages.

Subsurface Water. Construction of the mine access tunnels and coal mining operations may disrupt the ground water hydrology, allowing water to flow into the mine and creating water disposal problems. Subsidence could result in the drainage of perched aquifers. If coal waste disposal, coal storage sites, and sanitary facilities are not adequately lined or constructed, waste water and toxic materials could seep into and contaminate ground water aquifers. Ground water used for dust suppression and culinary use as proposed or for a possible washery would not be available for other uses.

All alternatives would result in similar impacts.

LIVING COMPONENTS

Vegetation

There would be a loss of vegetation along the tramroad right-of-way and on areas occupied by structures and roads in the mine plant area and along a possible water pipeline or powerline. Total vegetation removal would

depend on whether the proposal on an alternate is implemented and whether a pipeline, powerline, or washery is needed. In any case vegetation loss would be small because of the sparse vegetation in the area. The greatest impacts on vegetation may result from increased human activities in the Glen Canyon City and Kaiparowits Plateau areas as a result of the greater influx of people associated with these mining activities.

Rehabilitation of disturbed and occupied sites after mining is completed would allow many native species to be re-established on those sites. However, the probability of successfully revegetating most sites is low, possibly less than 3 out of 10 years. This would include disturbed sites on steep slopes, and the waste disposal site. Even after rehabilitation, the vegetative productivity of some sites could remain below the level acquired prior to disturbance.

Wildlife

Many animals, particularly slower and less mobile species, would be destroyed during the clearing or construction of roads and the mine plant and other facilities. The loss of habitat on these sites would be small but could affect several species of wildlife. Species with small home ranges such as rodents would be most vulnerable to loss of habitat and displacement. Displaced individuals are often unable to locate new habitat, usually because adjacent areas are either unsuitable or are already occupied to capacity. Improperly constructed power line poles if built could electrocute raptors.

Disturbances from mining activities and coal haulage and from increased human activities including hunting pressure and poaching in the Glen

Canyon City area may have the greatest impact on wildlife. The larger, more conspicuous species like mule deer, coyotes, and raptors, and those species that cannot tolerate disturbances would be most vulnerable to people and activities in the area which could force these species to move to less accessible areas.

ECOLOGICAL INTERRELATIONSHIPS

Plant succession would be set back on all disturbed sites with the degree of recession dependent on the severity of the disturbance. On sites where soil is lost through erosion particularly on sites with shallow soils, the composition of plant communities could be permanently changed. Certain invader species may continue to expand their ranges by invading disturbed sites.

Stabilization of disturbed sites through rehabilitation should allow plant succession to progress toward the climax state, although the climax condition may not be reached until all disturbances are eliminated.

HUMAN VALUES

Landscape Character

Clearing, grading, site preparation and construction of structures and roads would result in landscape modification of land. The changes in line, form, texture and color created by these modifications would not be harmonious with the natural environment and consequently would create an unnatural visual effect. Most of the area that would be modified by the proposed development is classified as low in scenic value and is visited by few people.

Noise and dust from operating equipment and coal haul trucks would disturb the clear air and natural low volume sounds in the area. This would be primarily an impact on recreationists utilizing the Warm Creek Bay area of Lake Powell or travelling the county road into the Recreation Area.

Increased human activities would result from the influx of workers and their families into the area. The visual environment could be marred by the tramping of vegetation, the development of new tracks or trails by off-road vehicles, accumulation of trash and litter, increased man-started fires, and vandalism acts which could mar or destroy scenic values in the area.

Ground subsidence could change the landscape character above the mined area. It is possible that subsidence would have no effect on landscape features or it could result in destruction or alteration of some land features.

An alternative involving a haul route along Nipple Creek Canyon to Glen Canyon City would avoid the visual and noise impacts of coal truck traffic through the Recreation Area.

Historical, Paleontological, and Archaeological

Archaeological sites not recovered, protected, or interpreted prior to any surface disturbance could be destroyed or their scientific value lost. Better access into the area and an increased population could result in increased vandalism and pilfering of sites. Archaeological surveys done prior to surface disturbing activities would add to the knowledge of archaeology in the area.

Fossils could be destroyed by excavation in rock or possibly by subsidence. Excavation could make previously inaccessible fossils available for scientific interpretation and collection.

Social Welfare

A major social and economic impact would be the in-migration of people and the need for investment of capital to provide services. Glen Canyon City, Church Wells and possibly Page would experience the impact in terms of a possible significant population increase and thus the demand for housing, utilities, schools, health care and other community services. Page is the only town with these basic services available at this time. The proposed project could benefit from the goods, services, and housing provided by a townsite on East Clark Bench if properly planned for and coordinated.

It is estimated that 300-400 workers would be required if the mine reaches its full proposed production. The resulting total population (mine workers and their families and supporting population) could be over 2,000 people and require an estimated 700 units. If this population was reached before the building of a new town, or if the new town was not built or unable to accommodate these people, the economic base of the area in terms of goods and services could be severely taxed. Except for Page, the services sector is minimal and the area is isolated from major metropolitan markets.

The proposed mine development would provide employment opportunities in the county, which had one of the highest unemployment rates in the state in 1973. Mine development and production would help stabilize the seasonal employment rate. Tax revenues, rentals, and royalties would all benefit the local economy.

Because of the lack of trained miners in the area, many workers may have to be imported from other areas. Also, 5-M Corporation may have to compete with Kaiser Engineers (mining operators for the Kaiparowits Project) in hiring mine workers. Kaiser plans on hiring 100 coal miners for initial construction and over 2000 when in full production within seven years of start-up.

There would be injuries, accidents, and possible loss of life associated with the project.

Attitudes and Expectations

Whether the favorable attitude by the present local residents in the area toward this project would remain after development starts would depend on how well they plan for, accommodate, and assimilate the influx of new workers and whether they are able to acquire new jobs and make beneficial use of the increased revenue from the project.

Local Regulatory Structures

Local regulatory structures would have to change in order to control the anticipated population increase associated with the proposal. Local governments are doing considerable planning in anticipation of the proposed Kaiparowits Project. By working with the applicant, this planning should be able to accommodate the applicant's mining and housing proposals.

POSSIBLE MITIGATING OR ENHANCING MEASURES

INTRODUCTION

There are numerous possible measures to reduce or eliminate the anticipated adverse impacts on environmental and other resource values. Appropriate mitigating measures have been recommended as stipulations to be attached to the special land use and right-of-way permits as part of the terms and conditions of the permits (see "Recommendations for Mitigation or Enhancement"). Some of the possible mitigating measures outlined below may be implemented only by other Federal agencies or State or local governments and are presented here for their consideration. Many of the possible mitigating measures are required by existing State and Federal laws and regulations and are implicit in the proposed action. All possible mitigating measures listed would apply to the proposed action. Some or all of the possible mitigating measures would also apply to the alternatives depending upon which alternative is considered.

AIR QUALITY

Compliance with Federal and State air quality laws and regulations would be required. Fugitive dust along the haul road, at construction sites, at coal storage and waste disposal sites, and other areas where dust is generated should be suppressed by the use of water or a non-toxic chemical.

Coal dust in the mine and tunnels must be suppressed by the application of rock dust and water in accordance with Federal and State mine health and safety laws.

To reduce the possibility of fires in the coal storage and waste disposal piles, stored coal should be layered and compacted with gentle side slopes. Waste material with a high coal content should be spread and compacted, covered with soil and compacted again. All unauthorized burning should be prohibited.

GEOLOGY/GEOLOGIC STRUCTURE AND TOPOGRAPHY

Surface developments should be placed as much as possible in areas where alteration of the natural topography is minimized. Mitigation of subsidence on the mined area would be the responsibility of appropriate Utah State agencies.

SOILS

Roads should be constructed according to proper standards as outlined or approved by BLM and maintained to reduce the possibility of soil erosion. All vehicular travel should be on the constructed roads. All disturbed sites should be rehabilitated after operations on those sites are completed. Rehabilitation would include the removal of all surface structures, contouring sites to their former shape, and revegetating with species that are adapted to the site. Seedings should be fenced where possible to prevent livestock grazing until the seedings are established. The amount of pollutants that are added to the soil could be reduced by lining the waste disposal site with an impermeable material and locating the waste disposal site in an area where it would be least susceptible to runoff. The walls of the waste disposal site should be of adequate height and thickness to eliminate the possibility of the walls breaking and

contaminating soils and surface drainages with coal waste material. Drainage structures should be built, if necessary, to divert possible flood waters from the coal waste and stockpile areas.

LIVESTOCK

Fences and cattleguards should be installed as appropriate to allow for the protection of livestock from heavy traffic use along the proposed haul route and from activities and facilities on the mine plant site. Water should not be pumped from livestock ponds or other stock water developments. All disturbed areas which are no longer needed for active operations should be seeded.

RECREATION

Conflicts between recreational users and heavy truck traffic utilizing the Recreation Area road could not be entirely mitigated. The road may have to be widened, marked, signed, and perhaps surfaced to make it safer and reduce dust. This would be the responsibility of those presently maintaining this road - the Utah State Highway Department and Kane County in conjunction with the surface land management agency - the U.S. Park Service.

MINERAL DEVELOPMENT

The tramroad would be subject to any prior existing rights of mineral lessees. Environmental considerations involved in the removal of mineral materials under the Materials Sale Act would be addressed by procedures outlined in 43 CFR Part 23.

UTILITIES AND TRANSPORTATION

Utilities systems in the Glen Canyon City and Church Wells area would have to be upgraded to accomodate the mine workers and their families. This would be the responsibility of the local governments. Road upgrading and increased maintenance would be necessary along the Recreation Area road (see "Recreation" above).

WATER RESOURCES

Compliance with Federal and State water quality laws and regulations would be required. Drainages should not be blocked. The coal waste material should be covered with topsoil and seeded when no longer being added to in order to reduce the possibility of the material eroding into and contaminating surface drainages. All possible mitigating measures listed under "Soils" would reduce sediment loads in surface drainages and possible contamination of ground water. The walls of the mine tunnel should be sealed, if necessary, to reduce water leakage into the mine and to reduce the possibility of contaminating ground water and surface waters. Mine water, if any, should be collected and used for dust suppression or other mining activities. This would reduce the amount of water that would be required from another source. Any mine water discharged must exceed State or Federal water quality standards.

VEGETATION

Possible mitigating measures listed under "Soils" and "Water Resources" would also apply to vegetation.

WILDLIFE

Vehicle travel should be confined to constructed roads to avoid unnecessary disturbances to wildlife and wildlife habitat. Power poles should be made "raptor proof". Compliance with Federal and State wildlife laws and regulations will be required.

ECOLOGICAL INTERRELATIONSHIPS

Possible mitigating measures listed under "Soil", "Water Resources", and "Wildlife" would all apply to ecological interrelationships.

LANDSCAPE CHARACTER

Where possible, roads and other linear developments should follow curved courses so that their visual impact is minimized as much as possible. Surface developments should be screened from view as much as practical. Structures should be painted "earth-tone" colors to blend with existing scenery. Ventilation fans located below the ground surface would reduce noise levels.

HISTORICAL, PALEONTOLOGICAL AND ARCHAEOLOGICAL

The permittee would be required to comply with all existing State and Federal laws pertaining to the protection of cultural and paleontological values (the Federal Antiquities Act of 1906, Archaeological Preservation Act of 1974, Historic Preservation Act of 1966 and others). Prior to any surface disturbing activity, a survey would be completed by an approved qualified archaeologist and if necessary, steps taken to preserve or avoid destruction of antiquities.

SOCIAL WELFARE AND LOCAL REGULATORY STRUCTURES

The socio-economic impacts could be mitigated through proper local planning, zoning, and development. The first obvious mitigating measure would be to move the new employees and their families into the area gradually, so that the impacts would not be felt all at once. In order to effectively reduce the magnitude of the socio-economic impacts, expansion should be accomplished before any significant population growth occurs.

Funding should be made available from some source to encourage necessary expansion. Plans are needed for sewage and solid waste facilities and an expanded water system. Medical facilities may be needed. Schools should be built if necessary. New roads may be needed to accommodate new residential areas. Additional fire and police protection may have to be supplied. Social and cultural facilities could be established. New commercial establishments, especially banks, may be necessary. These plans are being formulated for the proposed new town which, if built, could accommodate the 5-M employees and their families.

There are a myriad of Federal and State health and safety laws and regulations pertaining to industrial development and mining that, if complied with, would mitigate most safety and health hazards.

RECOMMENDATIONS FOR MITIGATION OR ENHANCEMENT

All possible mitigating measures are recommended. Those that can be made part of the permits' terms and conditions are written in the form of stipulations and are attached as Appendix II and III.

Also included in the stipulations are bonding recommendations. These recommended stipulations and bonds are for the tramroad and tunnel right-of-way and the special land use permit as applied for by the applicant. These would also be applicable to the alternatives but would have to be adjusted or deleted according to the alternative considered.

For example, an alternative involving access directly to the State lease would not involve the tunnels part of the right-of-way or the mine plant SLUP; a shorter less costly alternate tramroad would require a lesser bond. See "Bonding Recommendations."

RESIDUAL IMPACTS

Residual impacts are the impacts that would remain if all mitigating measures are successfully implemented. All residual impacts listed would apply to the proposed action; they would also apply to the alternatives, depending on which alternative is considered.

AIR QUALITY

All sources of dust could not be completely mitigated. Dust would arise during the construction of the tramroad and mine plant; during processing and other operations incident to the mine plant operation; and from vehicle travel along the haul road and access roads to the mine and during rehabilitation. Carbon monoxide and hydrocarbon emissions would occur from mine related equipment and vehicles. Impacts on air quality that would result from the release of smoke and gases should a fire occur, could be only partially mitigated by a fire-fighting or mine sealing plan. Increased dust and vehicle emissions would occur throughout the Glen Canyon City and southern Kaiparowits Plateau areas as a result of the activities of people associated with the proposed project; this would be from increased personal vehicle use, off-road vehicle activities, etc.

GEOLOGY/GEOLOGIC STRUCTURE AND TOPOGRAPHY

Modification of topographic features and drainage patterns caused by construction are unavoidable. Subsidence, although controlled as much as possible, could leave some permanent scars on the landscape. About 13 million tons of coal would be left in place and not available for future recovery (assuming 50% recovery).

SOILS

There would be some impacts on soils regardless of the mitigating measures used to control them. Soil compaction would occur from the construction and use of a tramroad and other access roads on the mine plant site, the construction of structures on the mine plant site, and on the coal storage and waste disposal sites. Soil erosion would occur at sites where the soil is disturbed or the vegetation is removed. Productivity of the disturbed sites would be lowered by the loss of soil, soil nutrients, and soil bacteria.

Some erosion of soils would occur throughout the southern Kaiparowits Plateau and Glen Canyon City areas as a result of the influx of people and their activities.

LIVESTOCK

There would be a loss of about three to nine AUM's depending upon the alternative considered and the final placement of fences and cattleguards. The present movements and habits of livestock in the area would be altered. Some cattle loss due to vehicle collisions may be unavoidable.

RECREATION

"Backcountry" recreation would be lost in the areas of development.

However, the Warm Creek Canyon area would be more accessible for other types of recreation, such as hunting, sightseeing, rockhounding and off-road vehicle use.

There would be a visual and noise intrusion and safety hazard to recreational users along that portion of the proposed haul route within and leading up to the Recreation Area. An alternate route along the east side of Nipple Bench (along Nipple Creek) would avoid the Recreation Area, but these impacts would remain near Glen Canyon City and along Highway 89.

There would be increased recreational use in the area due to the increase of people associated with the proposed action.

MINERAL DEVELOPMENT

The proposal could result in a significant coal mining operation producing up to 3000 ton per day (780,000 tons per year). Aggregate, rip-rap and other minerals would be mined to support the proposal. The tramroad would be a benefit to both the applicant and other mineral developers in the southern Kaiparowits Plateau. Any tramroad build before the placement of major Kaiparowits project roads are known could possibly conflict with this future road placement and design. The alternative of delaying until future road placement is known would avoid any conflict but would delay the applicant's development and mining of the State lease.

UTILITIES AND TRANSPORTATION

Utilities would have to be upgraded to accomodate the proposed population increase involved with the project. The existing road from Glen Canyon City through the Recreation Area to the tramroad would probably need upgrading along all or part of its length. The alternative to tie in a tramroad with a Kaiparowits access route, when known, would allow utilization of this system and, if along Nipple Creek as expected, would avoid the Recreation Area as a haul road.

WATER RESOURCES

Increased sediment loads could be expected along drainages as a result of soil erosion on disturbed sites and increased human activities. Water used for mining and culinary purposes would be lost to other uses.

VEGETATION

Some vegetation would be lost along the tramroad and access roads on the mine plant site, on the coal storage and waste disposal sites, and on sites occupied by mine plant structures. Additional vegetation would be lost throughout the southern Kaiparowits Plateau area as a result of increased human activities, such as off-road vehicle use. Productivity of some disturbed sites could remain below the level acquired prior to disturbance.

WILDLIFE

Some wildlife and wildlife habitat would be lost during the construction of roads, the mine plant site, and by off-road vehicle travel. Disturbances by people, vehicles, and machinery would cause some animals to move to less accessible areas. Increased human disturbances, hunting pressure, poaching, and indiscriminate shooting could be expected throughout the Glen Canyon City and southern Kaiparowits Plateau areas.

ECOLOGICAL INTERRELATIONSHIPS

Plant succession would be set back on disturbed sites. The composition of plant communities on some sites could be permanently changed through the loss of soils or by the invasion of other species.

LANDSCAPE CHARACTER

Clearing, grading, and development of structures, roads, dump sites, etc, would change the color, form, line and texture of the natural landscape.

Littering, vandalism, land disturbance by recreational off-road vehicle use, and man-caused fires would increase with the increased population in the area.

HISTORICAL, PALEONTOLOGICAL, AND ARCHAEOLOGICAL

Archaeological sites would be disturbed in areas of construction or other development. However, an archaeological survey before disturbance would inventory and interpret the values present and take appropriate measures to protect them. These surveys would add to the knowledge of archaeology in the area.

Better access and increased population in the area would result in increased vandalism and pilfering of archaeological sites.

Fossils could be destroyed by excavations or in some cases exposed to interpretation and collection.

SOCIAL WELFARE

There would be increased jobs and revenue. The population could increase by 2,000 or more at maximum mine production. Schools, health, welfare, public safety and other community services would have to be ungraded.

There would be accidents, injuries, and possible loss of life associated with the project.

LOCAL REGULATORY STRUCTURES

Local planning and zoning regulations would have to be implemented and enforced to successfully accommodate the expected population increase associated with the proposed project.

RELATIONSHIP BETWEEN SHORT TERM USE AND LONG TERM PRODUCTIVITY

Short term is the time frame in which the tramroad, tunnels, and mine plant site are constructed and utilized, a period of from 16 to 35 years or more depending upon whether the applicant realizes his markets and if additional coal is acquired contiguous to the State lease. Long term is a more indeterminate time frame following termination of the project in which effects of the project would still impact the environment.

In the short term, coal would help meet the various market demands for space heating and electrical generation as identified by the applicant. Use of coal which is in abundant supply and for which energy technology is well established would reduce the use of other, less abundant, energy sources such as petroleum and natural gas. Use of coal could help provide additional lead time for the development of alternate energy sources.

Mining coal under present technology (about 50% recovery) would result in coal being left in place and unrecoverable over the long term. Other minerals and materials utilized in support of the project would be unavailable for other uses over the long term.

During the early stages of development and mining, the Glen Canyon City - Church Wells area could experience a "boom town" effect. In time, the community would experience economic growth and perhaps full employment. Many of the residents would be employed in some relation to the mine or trade and services to accommodate the mine workers and families. Housing, services, and utility and transportation systems would lag behind development for several years, but eventually catch up. The workers would be absorbed into the new town if it was built.

In the long term, after termination of this project, improved housing, services, and utility and transportation systems would have made the Glen Canyon City - Church Wells area (or the new town) a likely location for workers involved in other coal or industrial projects in the southern Kaiparowits Plateau. As long as such developments continue, the area would remain a viable community. However, when the Kaiparowits coal is mined-out and if no other developments fill this void, most of the population would leave and the community would stagnate in the long term.

Roads, cuts, and fills and other construction scars would remain as long term effects on the topography and landscape character after the project terminates. Any cracks or depressions caused by subsidence would be long term effects. Subsidence could occur after mining ceases.

Impacts on air quality would be mostly localized and short term except for cleared areas which would be a source of wind-blown dust until they are successfully revegetated after termination of the project. Long term loss of soil productivity would occur on sites where soils are compacted, eroded, or contaminated by toxic substances.

There would be a short term loss of livestock forage. After termination of the project, successful revegetation and natural succession should result in a return to the original forage production over the long term. Any loss of stock watering sources, such as springs or seeps, would be a long term loss.

There would be a visual and noise intrusion caused by coal haul trucks and other equipment along that portion of the proposed haul route within the

Recreation Area. This would be a short-term impact which would occur throughout the life of the project unless an alternate route is utilized. During the short term, or as long as there is a substantial population in the area, there would be increased recreational use in the area.

The long term productivity of some springs could be altered by the reduction or loss of water that could result from mining activities or subsidence. The water used in mining and associated activities would be a loss for other uses during the life of the mine. Water used for culinary purposes would be lost for other uses as long as the population stays in the area. Water quality would be lowered for an indeterminate length of time if mining and associated activities should result in the contamination of ground or surface waters.

Productivity of vegetation on sites disturbed during the development of the project would remain below its predisturbance quantity until the sites are rehabilitated. Rehabilitation of some sites could take many years, particularly on those sites where the soils are shallow or the topography is steep. Some sites, such as the tramroad, may not be rehabilitated.

The populations of some animal species could be reduced for many years on areas where suitable habitat is altered or eliminated. Some species could be displaced from certain areas as long as mining activities take place. This could be a permanent loss if mining or subsidence eliminates spring or surface flows in those areas. There are no rare or endangered species which could be lost.

Total productivity (biomass) of sites disturbed during the development of the project would remain below the level acquired prior to development for many years after the sites are rehabilitated.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The major permanent commitment of resources would be the mining and consumption of possibly 13 million tons of coal over the life of the State lease and an equal amount of coal which would be left in place because of technological or safety constraints and lost to future recovery. An unknown amount of other minerals and materials (aggregate, limestone, timber) would be irretrievably committed to the project.

There would be a permanent loss of an unknown amount of soil through erosion. Any loss of stream flow, springs, or underground aquifers by subsidence or mining could be irretrievable. The excavation and in some cases destruction or vandalism of archaeological and paleontological values would be irreversible. The natural landscape would be irreversibly altered by various developments and increased human activities and habitation in the area.

There would be loss of life caused by accidents related to coal development and mining activities and increased human activities.

CHAPTER IV

PERSONS, GROUPS AND GOVERNMENT AGENCIES CONSULTED

Thirty individuals, groups, or government agencies were notified by letter on August 29, 1975, concerning this proposal. A press release was issued in three Southern Utah newspapers during the week of September 15-19, 1975, and a BLM sponsored public meeting was held at the Kanab BLM Office on Tuesday, September 23, 1975. Forty-three persons attended the meeting. Those individuals, groups, or agencies contacted by letter and those at the meeting are shown on the following lists. All written responses to BLM concerning the proposal and the EAR are reproduced in Chapter V, "Intensity of Public Interest."



Public meeting on 5-M Corporation coal mine

The Kane County Chapter of the American National Red Cross wants to thank all who aided in the Blood drive on 9 September. Although the number of donors was small we have to express our gratitude to all those who GAVE to help others. Thank you so much.

A special mention must be made of the volunteers who helped in making all feel comfortable: Mrs. Evelyn Mace, Blood Chairman, and the special work she did; Mrs. Ida Riggs, with her experience in Red Cross and concern, the young volunteers, Miss Katherine Beesley, Miss Carol Brown, Mrs. Andrew Schmutz, and especially Mr. Mark Plute. Also, we must thank Dr. Aiken and Mr. Larry Turpen, Mr. Lee and all the ladies who spent hours helping in the drive.

A sincere thanks and appreciation to all of Kanab.

Sgd. Frances L. Jacobs,
Kane County Chairman
The American National Red Cross.

A public meeting will be held Tuesday, September 23, in the Kanab BLM Office at 7:30 p.m. The purpose of the meeting is to obtain public input to aid in the assessment of the environmental impacts of proposed mining operation.

The 5-M Corporation of Hurricane, Utah, proposes to acquire rights-of-way and special land use permits on national resource land to support a proposed coal mining operation on an isolated State coal lease on the southern Kaiparowits Plateau.

This proposal may have far reaching impacts when combined with the proposed Kaiparowits Project which would be located in the same area. The public is encouraged to attend.

NOTE OF THANKS

Our thanks to the people of Kanab for the kindness shown to us in the recent loss of our husband and father.

Mrs. Billie McCormick,
Connie, Kay and Bill

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W. Spencer
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Southern Utah
18, 25, Oct. 2,

KANAB NEWS NOTES

Mr. and Mrs. Marlin Brown and most of their family went to Salt Lake City Friday to take his mother, Mrs. Alga Brown, into the LDS Mission Home. While there they enjoyed the Holiday on Ice performance Saturday night. Alga will be leaving today (Thursday) for her mission in Florida.



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Southern Utah
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Democratic Party
Convention for
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FOR SALE

FOR SALE Two bedroom home, 6 rooms, completely fenced yard, 643-2794. \$18-25c

FOR SALE Fish bait. Over 100 red wrigglers at \$1.00 a box, at Beesleys. 644-5037. \$31c

SEEDS

Bulk, Farm, Garden, Lawn 644-5116

HAMBLIN FEED
FOR SALE Pick-up tool box and gas tank combo. H&I. \$225., 648-2416.

FOR SALE Grazing permits for 45 cattle, Aug. - June, near Glen Canyon City, also State lease and well water right adjacent to Highway 89. Write P.O. Box 605, Richfield, Utah 84701, or call 895-5411. \$11-25c

FOR SALE Five bedroom older home, excellent location, 644-5922. \$11c

FOR SALE 55 gal. drums, clean and painted \$12.00 each. 643-2416. \$18c

FOR SALE 1967 Olds 88, steel-belted front tires, power and air, \$450. Call 644-2222. \$11-25c

FOR RENT Two-bedroom apartment available October 1, for couple or single. all 644-5523. \$11. 3c

FOR RENT OR SALE 12 x 63 mobile home, call 644-2992. \$11-25c

FOR RENT 3-bedroom house, carpeted, 2 baths, refrigerator-freezer, range, dishwasher, disposal and utility room. Nice yards and storage shed. See at 143 W. 3rd N. or contact M.W. Bear. Ph. 644-2723 or 644-2687. \$11c

FOR RENT Trailer space in Fredonia, 644-5052. A14c

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5-M EAR Meeting Kanab, Utah Sept. 23, 1975 7:30 PM

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Jerry Glacier	5M, INC	Long Beach, CA
AARON Rasmussen	5 M INC	HURRICANE, UT.
ELROY WULFENSTEIN	5 M INC	Ureyo UT.
RAY PETTIT	5M INC	3t george ut
GRANT C. TALKER	5M INC	HURRICANE, UT
Kimball Young	Sen. Jake Garn	Carbon City, Utah
John Eotsher	5 M INC.	SLC UT
Gordon Whitney	USGS	libby, Mont.
Bill ELLWANGER	EPERC	SLC
DAVID LARSON	EPNG	Page AZ.
Tim Carroll	BLM	El PASO, Tex.
RONALD W. DANIELS	UTAH DIV OIL, GAS, MINING	Kanab
Patrick Driscoll	" " " "	SLC Ut.
Kerry Bradshaw	5 M	S.L.C. ut.
Laron W Hall	5 M	Hurricane, Ut.
Bill Supermough	Glen Canyon NPA	Hurricane, Ut.
John Nelson	Kane County	Page Az
Phyllis Howard		Kanab
Margaret L. Hark		Church Wells
Day R. Taylor	Consumers Agency	Churchwells
Don Robertson	PROVO, UTAH	1325 E. ONYX RD
	Western Engineering	PROVO, UTAH
		894 N. State
		Orem #2

CHAPTER V

INTENSITY OF PUBLIC INTEREST

Letters received concerning the proposal are reproduced on the following pages. Below is a summary of the public input.

Public and governmental interest in the proposal is high. As in the case with the Kaiparowits proposal and other proposed coal development in the area, local governments and citizens have expressed almost unanimous support for the 5-M proposal. This was expressed verbally at the public meeting as well as by petition and letters to BLM. On the other hand, the Superintendent of the Glen Canyon National Recreation Area and a local environmental group are concerned about the Warm Creek road within the Recreation Area.

The State of Utah Division of Oil, Gas, and Mining, who would regulate operations on the coal lease, have expressed a strong desire for early issuance of the rights-of-way and special land use permit as proposed by the applicant so that the lease can be developed. They state that access to any claim, lease, or right within the public domain cannot be denied, and that the proposal as defined by the applicant would not have a significant effect on the quality of the environment. The Utah State Division of Lands, who issued the lease, have expressed a similar feeling.

The Kane County Planning Commission is favorable toward the project and is presently working with the applicant on zoning changes to accommodate the housing proposals.

The Superintendent of the Glen Canyon National Recreation Area has expressed "grave concern" over the potential interaction between recreational visitors using the Warm Creek road and commercial hauling of coal from the 5-M mine. He suggests that a Nipple Creek access road (which is part of the Kaiparowits project proposal) would equally suit the 5-M project and at the same time avoid the Recreation Area. Janet Gordon of Cedar City, Utah, who represents the Council on Utah's Resources, an environmental coalition, expressed a similar feeling concerning the proposed haul route through the Recreation Area.

Kaiser Engineers and Resources Company have expressed concern over possible use and maintenance conflicts with the applicant concerning the tramroad right-of-way along Warm Creek Canyon.

LETTERS RECEIVED

CONCERNING THE PROPOSED ACTION

LVIN L. RAMPTON
Governor



OIL, GAS, AND MINING BOARD

DON ARMSTRON
Executive Director,
NATURAL RESOURCES

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING
1588 West North Temple
Salt Lake City, Utah 84116

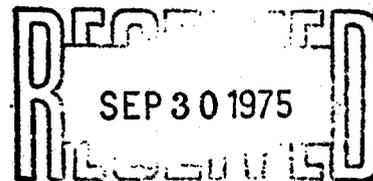
GUY N. CARDON
Chairman

CHARLES R. HENDERSON
ROBERT R. NORMAN
JAMES P. COWLEY
HYRUM L. LEE

LEON B. FEIGHT
Director

DEPT. OF THE INTERIOR

September 26, 1975



BUR. OF LAND MANAGEMENT
KANAB, UTAH

Mr. Richard Fagan, Area Manager
Bureau of Land Management
320 North First East
Kanab, Utah 84741

Dear Mr. Fagan;

Following are this Divisions comments on the 5-M Corporation's proposal to acquire rights-of-way, and permits for ancillary facilities near the existing state coal lease, on Sec. 2, T. 42 S., R. 3 E.

The Utah 1975 Mined Land Reclamation Act (U.C.A. 40-8, 1953 as amended gives the Division of Oil, Gas and Mining authority to regulate mined land reclamation in the State, and requires all operators to file with the Division before commencing mining operations. The Act assigns an environmental responsibility to all persons attempting mining operations, to prevent conditions detrimental to the general safety and welfare of the citizens of the state of Utah.

5-M Corporation has been working closely with the Division in the development of its mining plan and we feel it is in accordance with the Act. An environmental assessment of the 5-M Corporation mining proposal on the State section itself, was prepared and circulated to the Governor's Environmental Coordinating Committee on August 5, 1975. No adverse comments were received from this group. Naturally, this assessment did not address the effects of the proposed rights-of-way and ancillary facilities.

Specific comments addressing concerns brought forth at the Sept. 23, 1975 public meeting, are addressed below:

1. Access to Land Alienated in the Public Domain.
It has been historically established, that access to any claim, lease, or right, within the Public domain, cannot be denied.
2. Alternatives to 5-M Corporation's Proposal.
The safety of mining the coal resource of sections 2, via vertical shafts along with the expense of mining in this manner, make either alternative nonacceptable (vertical shafts are necessitated by both alternative road routes).

3. Loss of Grazing.

It is our feeling that loss of grazing in this seasonal desert range, is important, but minimal when considering overall land uses.

4. Housing Facilities.

Facilities, local planning for Housing of workers, and the demand for services by said workers is a local governmental concern.

5. On-Site and Road Dust.

Dust due to the mine working and transportation of coal, will create an impact which must be mitigated. When conditions are severe, roads should be sprinkled for dust control.

6. Retention of Reject Area.

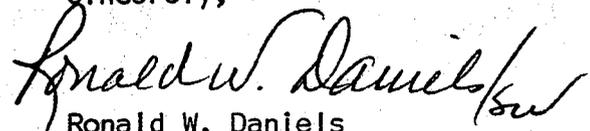
Drainage into 9 Acre reject area, originates from only 11 acres of watershed. In maintaining 10 feet of dike freeboard over the reject material, the possibility of a flash flood should be practically nil. Should water levels in the reject area approach dangerous proportions after several storms, contingency plans could call for installation of a diversion trench above the area.

7. Archeological Survey.

If needed, a survey by the B.L.M. archeologists should be made, at little or no cost to the operator, to preserve archeological remains.

The Division of Oil, Gas and Mining, is in favor of the 5-M Corporation's proposal for rights-of-way, and ancillary facilities as shown on the company's original plan. The alternative roads are not viable alternatives. The proposed rights-of-way and ancillary facilities should not be deemed to have a significant effect on the quality of the environment in this area and should be approved for operation.

Sincerely,



Ronald W. Daniels
Coordinator of Mined Land
Reclamation

RWD/lc

cc: file

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RECEIVED
OCT 9 1975

BUR. OF LAND MANAGEMENT
KANAB, UTAH

GREATER KANE COUNTY AREA CHAMBER OF COMMERCE

P.O. Box 369 KANAB, UTAH 84741 644-5033

October 8, 1975

Mr. Richard Fagan
Bureau of Land Management
Kanab, Utah

Dear Mr. Fagan

The Kane County Area Chamber of Commerce would like to express their opinion in the matter of the roads up into John Henry Canyon.

We feel that these roads should be approved. The 5-M Company needs these roads to transport the coal. We also feel that the BLM should establish an area that the 5-M Company can put their equipment on.

Sincerely yours,

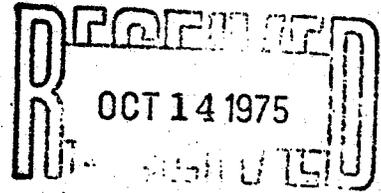
H. Bernell Lewis

H. Bernell Lewis

tt

**KANE COUNTY
PLANNING COMMISSION
Kanab, Utah 84741**

DEPT. OF THE INTERIOR



BUR. OF LAND MANAGEMENT
KANAB, UTAH

October 7, 1975

Bureau of Land Management
Kanab, Utah 84741

Subject: 5-M Mining Co. R/W Application

Gentlemen:

The Kane County Planning Commission requests that you approve the right-of-way application which would allow the construction and operation of the proposed coal mine north of Glen Canyon City by the 5-M Company. We also request that the approval be granted for the proposed route via the existing County Road serving that area rather than causing unnecessary delays and additional economic burdens by requiring an alternate route.

The 5-M Company has supplied all of their plans to the County and is currently working with this Commission on plans to provide housing and services for their employees on existing private land so as to prevent detrimental effects upon the existing County population and services.

The employment opportunities and potential tax base which will be provided by this industrial development have long been needed in this County. This proposal has also been reviewed in respect to the proposed Kaiparowits Power Project and it is our opinion that it will be compatible with that project when it becomes a reality.

This Commission supports the 5-M Company proposal and urges your agency to approve the requested actions as soon as possible.

Very truly yours,

Kane County Planning Commission

by James H. Carrico
Chairman

United States Senate
 WASHINGTON, D.C. 20510

August 1, 1975

Mr. Morgan Jensen, District Manager
Bureau of Land Management
154 North Main Street
Cedar City, UT 84720

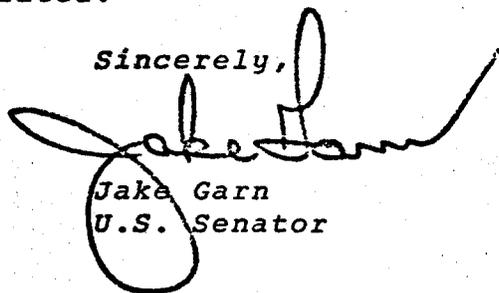
Dear Mr. Jensen:

I was pleased to learn recently of the Bureau of Land Management's effort to conduct environmental assessments by September 1 in regard to 5M Incorporated requests for tunnel rights of way on BLM land.

As I am sure you are aware, 5M Incorporated is anxious and prepared to begin its operation on state land as soon as possible. Principals of the company have assured me of their desire to harmoniously expedite BLM environmental assessment activities.

Your efforts in behalf of 5M and the general public are appreciated.

Sincerely,



Jake Garn
U.S. Senator

JG:kyc

cc Mr. Paul Howard
 Mr. Jerry Glazier

	AUG 7 1975	ACTION	INITIALS
Dist. Mgt.			
Nat. Res. Spec. (Mgmt. & Oper.)			
Nat. Res. Spec.			
Engineer			
Plan. Coord.			
Realty Spec.			
Cedar Res. Area Mgr.			
Wildlife Spec.			
Rec. Spec.			
Dixie Res. Area Mgt.			
Adm. Officer			
Clerks			
Other			



United States Department of the Interior

Ca at City Utah

RECD

NATIONAL PARK SERVICE
Glen Canyon National Recreation Area
Box 1507

Page, Arizona 86040

September 30, 1975

DEPT. OF THE INTERIOR

PROCESSED
OCT 9 1975

BUR. OF LAND MANAGEMENT
KANAB, UTAH

Section	Action	Info.	Initial
DIA			<i>[Handwritten initials]</i>
ADM		1	<i>[Handwritten initials]</i>
AO			
PLN		2	<i>[Handwritten initials]</i>
CR			
CO			
RAM D			
RAM B			
RAM P			
RAM V			
RAM E			
EIS			
AMP			

IN REPLY REFER TO:
L7619

Memorandum

To: District Manager, BLM, Cedar City, Utah

From: Superintendent, Glen Canyon

Subject: Environmental Assessment -- 5-M Coal Project

OCT 2 1975

We offer the following comments in response to your request for written input following the public workshop held in Kanab on September 23, for the purpose of discussing 5-M Corporation's proposed coal operation.

The National Park Service is gravely concerned over the potential interaction between the recreational visitor using the Warm Creek road and commercial hauling of coal from the 5-M mine. We understand that if the mine were operating at a 3,000 ton per day level, it would necessitate 120 round trips each 24-hour period. This would be in addition to, as we understand, water tankers, fuel trucks, and other ancillary service vehicles. We feel that this traffic when combined with other vehicular traffic associated with the Kaiparowits and other resource development projects in the area, will have a collective detrimental impact on the recreational use of this portion of the National Recreation Area. The staff at Glen Canyon NRA suggests that additional studies be undertaken towards identifying alternative routes of access. It comes to mind that the primary access identified for the Kaiparowits Project, should it be located on Nipple Bench, is to force a road up Nipple Creek onto the bench. We would suggest that this route would be equally suitable to 5-M's project and that a cross tie road across Nipple Bench could serve their proposed mine site.

We also express concern over the possible impacts of a dry-wash coal facility serving 5-M's project and the possible deleterious effects which could arise should either the coal stock pile or waste area be subjected to the flooding conditions experienced in a 100-year storm



which conceivably could wash this carbonaceous material to within the boundaries of Glen Canyon NRA.

In response to a request by Mr. Jeff Steele of your office, we submit the following public use figures for the Warm Creek public use area:

<u>Month</u>	<u>Camper Units</u>	<u>Camper Days*</u>
April	275	753
May	350	1,085
June	400	1,240
July	300	930
August	200	620

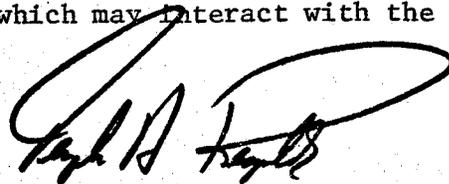
*Camper days are computed on the basis of 3.1 persons per vehicle.

The preceding use figures do not take into consideration day-use visitation for the purposes of fishing, hiking and driving for pleasure.

We would hope that the Bureau of Land Management will explore further the impact of this operation on interrelated projects also under consideration for the region. This would include, of course, the Kaiparowits project's waterline and powerline between Lake Powell and the plant site which crosses the Warm Creek road, the tram road permit which would be required for Resources Company for access to their mine, and future roads and interior circulation routes which have been proposed by the State of Utah, Kane County and the principals in Kaiparowits for public access, construction access, and through traffic.

We would also raise the question as to whether the impacts of added traffic upon the Last Chance and Upper Warm Creek cattle allotments, adjacent to the Warm Creek road has been assessed.

We appreciate the opportunity to take part in the public meeting portion of your planning process and will look forward to continued participation in this and other planning efforts which may interact with the Glen Canyon NRA.



Temple A. Reynolds

cc: Richard Fagan, Paria Planning Unit, BLM, Kanab
Asst. to Reg. Dir., Utah

October 3rd, 1975

DEPT. OF THE INTERIOR
RECEIVED
OCT 8 1975
BUR. OF LAND MANAGEMENT
KANAB, UTAH

To: Morgan Jensen, Area Manager, BLM, Kanab, Utah
From: Janet Gordon, Council on Utah's Resources

Dear Mr. Jensen,

This letter is regarding the 5M Company request for special use permits in the Kaiparowits Area. We appreciated the opportunity to attend the briefing in Kanab on Sept. 23rd. Your staff was obviously under a great deal of pressure at that meeting and we would like to commend them for the way they handled the situation.

We support the 5M Project if vigorous enforcement of environmental standards is practiced. Potential problems are apparent and we feel the project can be justified only if these problems are dealt with and high environmental standards are maintained.

One such problem, and the only one which we wish to discuss here, concerns the alignment of an industrial access road through the Glen Canyon National Recreation Area. Industrial traffic past Warm Creek Bay, a major development of the Recreation Area means problems -- e.g. road maintainence, congestion, aesthetic degradation. Mixing ever increasing numbers of recreational vehicles & boats with 25 ton coal trucks (up to 3,000 tons per day) plus miners driving to work translates into a hazardous situation.

We recommend that a new assessment be made and that an adequate industrial road be planned away from recreation areas. Kane County or the Utah Highway Department might have to be responsible if the 5M Company isn't capable of doing an adequate job.

In summary, our position is that the granting of Special Use Permits for the 5M Project be contingent on enforcement of environmental standards, and that an industrial access road which includes the Glen Canyon National Recreation Area be avoided.

Janet Gordon

Janet Gordon
Council on Utah's Resources

RFD # 141
Cedar City Utah



COUNCIL ON UTAH RESOURCES

8 Broadway, Suite 610 Salt Lake City, Utah, 84111

Phone 801-533-0591

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OCT 6 1975
BUREAU OF LAND MANAGEMENT
KANSAS, UTAH

MEMBER ORGANIZATIONS: Audubon Society - Concerned Citizens for a Clean Summit County - Escalante Wilderness Committee - Environment Center of Ogden - Humane Society of Utah - Isaak Walton League - ISSUE - Salt Lake Grotto, National Speleological Society - Save Our Canyons Committee - Save Our Rivers Committee - Tiger Lillies - Uinta Chapter of the Sierra Club - University of Utah Ecology Club - Utah CLEAR - Utah Environment Center - Utah Nature Study Society - UTE Alpine Club - Wasatch Mountain Club - Waste River Guides Association - Wilderness Society - Zero Population Growth

CHAPTER VI

PARTICIPATING STAFF

CEDAR CITY DISTRICT

William Dalness

Richard Fagan

Daryl Trotter

Steven Hedges

Jeff Steele

Team Leader

Paria Area Manager

Range Conservationist

Wildlife Biologist

Realty Specialist

CHAPTER VII

SUMMARY

5-M Corporation of Hurricane, Utah, has applied for a tramroad and tunnel right-of-way and a special land use permit for the purpose of gaining underground access through unleased Federally owned coal to develop and mine a Utah State coal lease and to process this coal on adjacent national resource lands and to construct and utilize a truck haulage road across NRL.

The State lease is located in section 2, T 42 S, R 3 E, in the northeastern Nipple Bench area of the southern Kaiparowits Plateau, Kane County, Utah. The proposal would involve two seven-entry tunnels, 1426 and 2445 feet long, a mine plant site of 145 acres, and a tramroad across NRL approximately 6.6 miles long. The haul road would continue along an existing county maintained road for about 12 miles within the Warm Creek Bay area of the Glen Canyon National Recreation Area and then for two miles through Glen Canyon City, Utah, to U.S. Highway 89.

The applicant has a number of proposed markets for this coal. He plans on applying for presently unleased Federal coal contiguous to the State lease in order to sustain a viable operation. The proposal as it now stands involves only State coal except for that Federal coal mined in tunnel construction. Proposed ultimate production is 3000 tons per day, which would involve 120 50-ton trucks per 24-hour day along the proposed haul route and ultimately 300-400 workers and their families to be housed on private lands in the Glen Canyon City - Church Wells area. The mine

plant would utilize an air cleaning process to upgrade the coal, and reject would be placed on a 10 acre site adjacent to the processing plant. Expansion of the plant is possible if additional coal is acquired at some future date. Estimated reserves on the State lease would last about 16 years at maximum production.

Significant identified anticipated impacts would be:

1. Noise, safety, and visual impacts of coal haul trucks and other equipment on recreationists utilizing the county-maintained road within the Recreation Area to gain access to the Warm Creek recreation site.
2. Dust arising from processing and waste disposal and along the haulage route.
3. Possible degradation of waters which drain from the proposed plant site into the Warm Creek Bay of the Glen Canyon National Recreation Area.
4. Use and maintenance conflicts with other coal operators over whose leases parts of the tramroad would be constructed.
5. Problems in providing adequate housing, utilities, and services for the workers and their families.

Significant mitigating measures, including those which are recommended as stipulations to be made part of the permits are:

1. All Federal and State air and water quality standards must be met.

2. The applicant would be required to submit a plan showing the design specifications of all structures within the SLUP area. This would include design standards for the coal waste and stockpile areas showing the means by which contamination of surface and subsurface waters by coal and waste materials will be prevented. This design must be adequate to prevent contamination by both seepage and breakage. Also included would be the design standards of the proposed coal cleaning process and its expected dust levels.
3. The applicant would submit a plan to the U.S.G.S. and the BLM for underground development involving Federally owned coal.
4. The tramroad must be constructed to standards and specifications adequate to support the anticipated use in accordance with the appropriate portions of BLM Manual 9110 as approved or set by the authorized officer.
5. The tramroad would be subject to all prior existing rights including coal lessees rights over whose leases parts of the proposed tramroad would be built.
6. The tramroad would be a non-exclusive license to construct and use roads located upon lands of the United States.
7. An archaeological survey would be required prior to any surface disturbing activities.
8. The Kane County Planning Commission is presently working with the applicant concerning housing proposals.

9. The interaction between recreational users and coal haul trucks and other equipment along that part of the proposed haul road within the Glen Canyon National Recreation Area cannot be mitigated unless an alternate route is utilized.

Alternate routes directly to the lease that would preclude tunnels and a mine plant on NRL have been identified. These are not desired by the applicant because of the higher cost to drive a shaft and handle coal on the State lease (coal lies about 500 feet below the surface of the State lease) and the higher safety risks involved in such a system. Another alternative would involve delaying a decision of the applications until a decision is made on the alignment of the Kaiparowits project access roads and then issuing a tramroad tie-in with this system. If the Nipple Creek road along the west side of Nipple Creek is selected (which is the preferred route at this time), the applicant could tie-in with this road and utilize it for haulage. This route would avoid the Glen Canyon National Recreation Area and mitigate the adverse interaction of recreational users and coal haul trucks within the recreation area. It would also assure compatibility with Kaiparowits project planning. However, this alternative would delay development of the State coal lease.

CHAPTER VIII

BONDING RECOMMENDATIONS

Bonding recommendations for the applications as applied for are outlined below. They would have to be adjusted for the alternatives depending upon which alternative is considered. For example, an alternative involving access directly to the State lease would not involve the tunnels part of the R/W or the mine plant SLUP; a shorter, less costly alternate tramroad would require a lesser bond.

Bonding recommendations for tramroad and tunnels right-of-way U 29427:

Tramroad:	\$2500 per mile or fraction thereof x 7 miles	\$17,500
Tunnels:	\$2500 per mile or fraction thereof x 1 mile	<u>2,500</u>
	Total Bond	<u>\$20,000</u>

Bonding recommendations for the mine plant special land use permit U 31066:

\$500 per acre disturbed x 30 acres \$15,000

Total bond for both applications as proposed: \$35,000

These recommendations are based on the following factors:

The tramroad, as proposed, would involve considerable earth moving, grading, cuts and fills, drainage structures such as culverts and ditches, and other improvements such as fences and cattleguards as well as

continual maintenance. The Cedar City District Engineer's preliminary estimate of the cost of construction is about \$100,000 per mile. 43 CFR Subpart 2811.0-3 states that the authorized officer may require an applicant for a tramroad right-of-way to execute a bond in an amount not less than \$500 per mile or fraction thereof.

The proposed tunnels would require the mining of Federal coal utilizing conventional coal mining techniques, the removal of this coal, the maintenance of the tunnels and portal entryways, and possible abandonment and rehabilitation at some future date. Seven entry ways, each about 20 feet wide and averaging 10.5 feet high, would be involved in the two tunnels over a total length of about 3870 feet. 43 CFR Subpart 2811.0-3 would also apply.

The mine plant site, as proposed, would involve total surface disturbance of about 30 acres. Involved would be roads, waste disposal area, stockpile area, processing plant and lesser ancillary facilities. Upon abandonment, rehabilitation would involve mostly reshaping the disturbed surface areas to a natural contour, removal of structures, reseeding, and stabilization of the waste disposal site. This would involve the use of heavy earth-moving equipment.

SIGNATURES

10-14-75

Date

William M. Palm

Team Leader

10-17-75

Date

F. Hunter & Woiler

Environmental Coordinator

10-23-75

Date

M. A. Jensen

District Manager

APPENDIX

The following is part of a report by Lyman Moore, Mineral Specialist,
Division of Resources, BLM Utah State Office, dated July 30, 1975.

COAL SHIPPING

Shipping coal to market will be a major undertaking and will constitute up to three-fourths of the total expense. Trucking is necessary to reach potential customers in St. George, Utah (160 miles) and rail loading points at Flagstaff, Arizona (161 miles), or Moapa, Nevada (246 miles). It is hoped that eventually coal can be sold to the Resources Power Plant about 12 miles south. A haulage fleet of fifty trucks of 25 ton capacity is proposed for haulage to Flagstaff.

A new haulage road will have to be constructed for 1.0 miles along John Henry and Warm Creek Canyons to an existing unimproved dirt road and the dirt road rebuilt for seven miles to its intersection with a county dirt road which continues 12 miles to Glen Canyon City. The county road will also require rebuilding. From Glen Canyon City the remaining travel will be over excellent federal highways.

Road construction will be moderately difficult. The road must be kept out of washes to avoid periodic flooding. The road will have to cross the wash in four or five places using large culverts. Present plans provide for a dirt road using sprinkling to settle dust and encourage compaction. The poor surface may result in excessive tire wear and maintenance expense. No detailed cost estimate has been made. Cost could be \$100,000 per mile through the canyons and \$50,000 per mile for rebuilding the existing dirt road in open areas.

ESTIMATED OPERATING COST

The unusually long truck haul and somewhat isolated location of the mine indicate high, possibly marginal production costs. Hence a study of costs and markets was made.

Five M estimate capital cost of a 2,000 ton per day mine and the haulage road, but not including trucks, at \$2.5 million dollars. USGS estimates capital costs for mine in Utah is \$10 to \$15 per annual ton of capacity or \$5 to \$7.5 million dollars without the road. Bureau of Mines estimates are a little higher, about \$17 per annual ton for a mine of this size. Recent published industry estimates are from \$20 to \$30. Following is a cost estimate based on Bureau of Mines studies for a mine of 3,000 tons of clean coal per day, the production 5M plans to reach in two years.

Capital Cost of 3,000 Tpy cleaned
Coal (3,330 tons run-of-mine coal) Mine and Plant

Plant

Basic Mine Facilities	\$13,620,000
Cleaning Plant (Air)	470,000
Development in coal (same cost as value of coal)	0
Rock inclines to lower coal seam	130,000
Road 7.0 mi. canyon 13.0 mi. open	<u>1,350,000</u>
Total	\$15,570,000

Truck Haulage

50 Trucks 25 ton equipment-grader, water truck, dozer	\$4,000,000
Road maintenance	200,000
Shop and equipment	450,000
Inventory parts and tires	<u>500,000</u>
Total	\$4,850,000 5,150,000 WS

Operating Cost of 750,000 Tpy Cleaned
Coal Mine and Plant (837,000 tons run-of-mine coal)

Labor and Supervision	\$1,860,000
Payroll overhead (taxes, fringe benefits, etc.)	705,000
Supplies	1,330,000
Power (Generated on site)	860,000
Union Royalty 1.55/ton	1,160,000
Taxes and Ins. 2% capital	310,000
Depreciation (12 year average life)	<u>1,300,000</u>
Total	<u>\$7,525,000</u>
Per ton	\$10.03
15% return on capital	3.06
Royalty 4% @\$12.00/ton value	<u>0.48</u>
Total	<u>\$13.57</u>

Estimated Marketability of Coal
from Proposed 5M Mine

<u>Cost or Price Item</u>	<u>Resources Inc.</u>	<u>St. George Utah</u>	<u>Charlotte North Carolina</u>	<u>Dallas Texas</u>	<u>Los Angeles California</u>
Cost					
Mining and Cleaning	\$13.57	\$13.57	\$13.57	\$13.57	\$13.57
Trucking	0.90	8.60	8.65	8.65	11.90
Rail Haulage	<u>0</u>	<u>0</u>	<u>23.00</u>	<u>8.50</u>	<u>3.50</u>
Total Cost	\$14.47	\$22.17	\$45.22	\$30.72	\$28.97
Present selling price or estimated value of coal of 5M mine analysis	\$10.00	\$21.00	\$44.50	\$26.00	\$20.00

The high value of 5M coal in Charlotte, North Carolina is due to its low sulfur content which allows blending with medium sulfur low cost coal from Southeastern U.S. coal fields.

As shown above, costs of mining and shipping coal as proposed by 5M is too high to allow supplying the proposed Resources power plant. Much larger and more conveniently located mines can supply coal at low cost. Costs for supplying coal to an electrical generating plant in St. George and to other Southwestern Utah users are somewhat higher than the cost of supplying them from mines in the southern portion of the Wasatch Plateau Field. In any case, only a small market exists in the southwestern section of the state, 100,000 tons per year would be optimistic. The coal production and shipping

costs from 5M to Southeastern states is similar to present prices. This condition should continue as long as low sulfur coal commands a high premium and until competition develops from other low sulfur coal producers. Mines in many Western coal fields, including Utah fields, could supply coal to Eastern and Southern utilities much cheaper than 5M. Texas users can be supplied at lower cost from Wyoming mines. The Pacific Coast market can be more economically supplied from mines in the Wasatch Plateau and Book Cliff fields because of their proximity to rail transportation.

Lyman Moore

STIPULATIONS

The following stipulations are recommended to be included as terms for right-of-way permit U-29427.

DEFINITION

The authorized officer shall mean the District Manager, Bureau of Land Management or his designated representative.

NOTIFICATION

(1) The permittee will notify the authorized officer at least 30 days in advance of his intent to commence any field operations associated with this right-of-way. In addition, the permittee will notify the USGS regional mining supervisor at least 30 days in advance of his intent to commence any tunnel construction which would involve federally owned coal. This permit may be cancelled pursuant to 43 CFR 2802.2-3 or 43 CFR 2812.8-1.

TRAMROADS

(1) This permit is a non-exclusive license to construct and use roads located upon lands of the United States. Such roads are to be constructed to standards and specifications adequate to support the anticipated use to be made of such roads in accordance with the appropriate portions of BLM Manual 9110 as approved or set by the authorized officer, located as described, and used for the purposes that are set forth herein. This permit is subject to all valid prior existing rights within the right-of-way including but not limited to the rights acquired under the Mineral Leasing Act of 1920 by coal leases U096508 (Resource Co., et al) and U0118366 (Hiko Bell Mining & Oil Co.) for the mining and disposal of coal, access, and construction as may be necessary. The Bureau of Land Management may issue other permits for the use of the roads constructed and used pursuant to this permit subject to such reasonable rules and conditions as the authorized officer may determine to be appropriate. Pro rata road and subsequent permittees must have the written approval of the authorized officer.

(2) The location of the road shall be consistent with Bureau plans and management goals. Revisions in requested locations shall be made where it is determined by the authorized officer that such revisions are necessary to meet the requirements.

(3) The permittee shall not restrict the use of the road for public access to lands administered by the United States for recreational and wildlife purposes or any other lawful purposes as long as such use does not unreasonably interfere with the use by the permittee.

(4) The permittee will maintain said road in a condition satisfactory to the authorized officer. In the event of third party use, the permittee will submit to the authorized officer for approval a written maintenance agreement, including, but not limited to, reasonable maintenance fees, maintenance work, or materials furnished in lieu thereof and the designation of the party that is responsible for maintaining the road.

(5) All vehicles operating upon the right-of-way granted herein, shall be maintained in a good and safe operating condition and shall be operated in compliance with all State motor vehicle regulations.

(6) Any deviation from the original approved road standards, design, and location must be subject to the written approval of the authorized officer.

(7) Safety, warning, or traffic speed signs, fences, cattle guards, or other protective measures where appropriate shall be installed to minimize hazards to the general public and livestock.

(8) Upon the expiration or other termination of the permittee's rights, the land involved in this permit will be restored by the permittee as nearly as possible to its original condition. Prior to release of the performance bond, such restoration must receive approval in writing by the authorized officer. Such restoration may be waived by the authorized officer upon his determination that the road is necessary for public access or for use by the United States. In the absence of an agreement to the contrary, the permittee will be allowed 6 months in which to remove or otherwise dispose of all his property or improvements on the right-of-way, other than the road and usable improvements to the road. If not removed within this period, all such property and improvements shall become the property of the United States.

TUNNELS

(1) Before any underground development involving federally owned coal commences, a development plan must be submitted to and approved by the USGS regional mining supervisor and the authorized officer.

(2) Any deviation from the approved plan or any other subsequent use of this grant is subject to the written approval of the authorized officer.

(3) The exercise of this right-of-way will not unduly interfere with the management, administration, or disposal by the United States of the land affected thereby.

(4) The United States, its grantees, permittees, or lessees may occupy any part of the right-of-way not actually occupied or required by the project for the full and safe utilization thereof, for necessary operations incident to such management, administration, or disposal.

(5) The tunnel entries shall be adequately fenced or posted or other protective measures installed to minimize hazards and prevent access to the general public, livestock and wildlife.

(6) The tunnels, after cessation of coal mining operations, will be abandoned or left in useable condition as prescribed by the Secretary of Interior through his agent.

GENERAL

Water Quality

(1) The permittee will comply with all applicable state and federal laws and regulations pertaining to water quality. Present water quality shall be maintained at present levels or to standards which meet or exceed state and federal requirements, whichever is greater. The permittee shall not permit toxic chemicals, metals, pesticide, untreated human and animal waste, thermal pollution or permit excessive sedimentation and floating debris to enter the cause degradation of water quality. Pollution, channeling or any erosion or degradation of lands, water quality, streams, lakes, or domestic livestock resource will not be allowed. Any excess water encountered in underground operations must meet or exceed state and federal requirements before it is discharged.

(2) Solid and liquid wastes containing either injurious, deleterious materials or other potential contaminants shall be disposed of in a manner that will not cause degradation of surface or ground water. The permittee shall take such measures and precautions deemed necessary by the authorized officer to assure the safe containment and disposal of such materials.

(3) Stockpiles and disposal sites incident to this right-of-way shall be selected and prepared so as to avoid downward percolation of pollutants into aquifers and prevent surface runoff from disposal sites from entering the drainage system.

(4) All surface damages which would result in accelerated soil movement and potential air and water degradation shall be corrected. Those areas not required for the continued operation of the permit shall be reclaimed upon termination of the construction activities or the surface use of any part of a site. The permittee shall employ such practices as deemed necessary by the authorized officer to prevent the loss of soil and the sedimentation of drainages.

(5) Disturbance of drainage ways and high erosion hazard areas shall be avoided. Surface construction or land disturbance activities shall not occur within any floodplain or channel of any water course except at drainage crossings designated in an approved plan. Drainages shall not be blocked nor shall the permittee cause, through his operations, the siltation or accumulation or accumulation of debris in the drainage channels. All damages to drainages resulting from the operations of the permittee shall be corrected to the satisfaction of the authorized officer.

(6) The permittee will comply with any applicable county, state and federal laws and regulations concerning the use of poisonous substances, including insecticides, herbicides, fungicides, rodenticides and other similar substances. Prior to the use of such substances the permittee will obtain from the authorized officer, approval of a written plan for such use. The plan shall state the type and quantity of material to be used, the animal or plant to be controlled, the method of application and such other information as may be required. All use of such substances shall be in accordance with the approved plan. If the use of a chemical is prohibited by

the Secretary of the Interior, it shall not be used. If use of a chemical is limited by the Secretary of the Interior, it shall be used only in accordance with the limitation.

(7) The permittee shall conduct his operations in such a manner so as not to affect the surface water flow or the availability of such waters for surface use. Loss of surface waters due to the permittee's operations shall be prevented or the situation corrected to the satisfaction of the authorized officer.

Air Quality

(1) The permittee will comply with all applicable state and federal laws and regulations pertaining to air quality. The air quality will maintain at an acceptable level that does not degrade the aesthetics, cause environmental deterioration or create health and safety hazards. The permittee will be required to employ such practices or to follow such procedures as determined necessary to maintain air quality standards and control all potential air pollutants resulting from the operation of the permit.

(2) The permittee shall provide the necessary dust control measures to suppress air pollutants resulting from the construction or operation of the right-of-way and other actions or functions that could cause degradation of air quality.

(3) Burning is permissible only by prior written consent of the authorized officer, and in compliance with state and federal air quality standards and laws. All vegetative and other material cut, uprooted or otherwise accumulated will be disposed of as specified by the authorized officer.

Sanitation, Health, and Safety

(1) All garbage and foreign debris will be removed to an authorized dump site at least weekly or as otherwise specified. Sanitary facilities for all solid and liquid waste disposal will meet all state, federal, and local codes and regulations. Disposal of all vegetative and other material cut, uprooted or otherwise accumulated will be disposed of as specified by the authorized officer. All areas of use will be kept clean and free of debris. The right-of-way shall be maintained in a neat appearing condition at all times, consistent with the operation of the right-of-way.

(2) In all actions under this permit, the permittee shall comply with all applicable State and Federal health and safety laws, regulations, and standards.

Miscellaneous

(1) All existing improvements including but not limited to fences, gates, cattle guards, roads, trails, pipelines, bridges, water developments, campgrounds or other improvements placed on the national resource lands shall not be disturbed unless authorized by the authorized officer. Where disturbance or use is made of such facilities, they shall be left in their original or better condition. Damaged or destroyed improvements shall be replaced, restored or appropriately compensated for at the discretion of the authorized officer.

(2) Proper precautions will be taken at all times to prevent and suppress fires. The permittee will be held responsible for suppression and rehabilitation costs for any fires on the national resource lands caused by the negligence of his operators, employees, contractors or sub-contractors.

(3) The permit area shall be available for other public uses including but not limited to livestock grazing, unless specifically prohibited or restricted by the authorized officer.

(4) All survey monuments, witness corners, reference monuments and bearing trees must be protected against destruction, obliteration or damage. Any damaged or obliterated markers must be re-established at the permittee's expense, in accordance with accepted BLM survey practices as set forth in the Manual of Surveying Instructions. A complete record of the monumentation and the methods used in re-establishment will be furnished to the Chief, Branch of Cadastral Survey at the appropriate State Director's Office, BLM.

(5) The clearing of timber, stumps, and snags will be kept to a minimum and due care will be used to avoid unnecessary scarring or removal of ground vegetative cover.

(6) No explosives may be used without prior written consent of the authorized officer.

(7) The permittee will comply with all existing state or federal laws pertaining to the protection of cultural and paleontological values, specifically the Historic Preservation Act of 1966. Prior to entry upon the land or disturbance of the surface thereof, a complete inventory of all archaeological, paleontological and historical values will be made. The survey will be completed by either a qualified archaeologist approved by the BLM or a qualified BLM archeologist, if available; the results and information of a non-government survey will be provided to the authorized officer. The authorized officer may inspect the sites and make a determination of their significance and appropriate protective action necessary. The permittee may be required to take such steps necessary to preserve or avoid destruction of antiquities such as relocation of proposed facilities, salvage of artifacts or other measures deemed necessary by the authorized officer to facilitate protection. Any costs of a non-government survey and any salvage of artifacts will be borne by the permittee and all objects of antiquity salvaged from the federal land surface will remain the property of the U.S. Government.

(8) The permittee shall ensure that full compliance with the stipulations is made by all persons acting in his behalf, including operators, and by all employees, agents, contractors, sub-contractors and employees of contractors or sub-contractors. Copies of the stipulations attached to the permit will be available at operating sites and will be made known to all on-the-ground construction and operating personnel.

Bonding

A bond of \$20,000 is required for the construction, use, and restoration of the tramroad and tunnels right-of-way under an approved plan and to satisfy all other terms and conditions of the permit. Any deviation from the proposed plan will subject the bond to possible adjustment to satisfy any changes in construction, use, or restoration.

The following stipulations are recommended to be included as terms for special land use permit number U-31066.

Definition

The authorized officer shall mean the District Manager, Bureau of Land Management or his designated representative.

General

(1) The permittee will notify the authorized officer at least 30 days in advance of his intent to commence any field operations associated with this special land use permit. This permit may be cancelled pursuant to 43 CFR 2920.3.

(2) All work or development on the permit area will be authorized only under an approved plan. The plan will show (on a suitable map) the location and use of all facilities and structures within the permit area. The plan will include the design standards for the coal waste disposal and stock pile areas showing the means by which contamination of the surface and subsurface waters in the area by waste and coal materials will be prevented. The design should be adequate to prevent possible contamination by both seepage or breakage of these structures. The plan will also include the design standards and specifications for the proposed coal air cleaning process and detail the expected fugitive dust levels involved in its operation. Final approval of the plan as to the adequacy of the surface use, environmental protection and reclamation aspects and orders for subsequent remedial actions are the responsibility of the authorized officer.

(3) Prior to any deviation from the approved plan, the permittee must notify the authorized officer in advance and any change will be subject to additional stipulations, conditions of approval or modification of proposed plans as deemed necessary by the authorized officer to protect the surface resources and environment including the restoration and reclamation of the lands under permit. If subsequent activities of the permittee are found to create irreparable or extensive damages to the lands under permit, they may be suspended until either the plan is modified, mitigating measures are provided or alternatives to the plan are agreed upon.

(4) The permittee shall ensure that full compliance with the stipulations is made by all persons acting in his behalf, including operators, and by all employees, agents, contractors, sub-contractors and employees of contractors or sub-contractors. Copies of the stipulations attached to the permit will be available at operating sites and will be made known to all on-the-ground construction and operating personnel.

Surface Uses and Facilities

(1) The location of all facilities shall be presented on an approved plan. The permittee may be required to relocate such facilities to prevent unnecessary disruption of surface resources and in consideration of rehabilitation potential, public health and safety. Approved surface facilities shall not be used for purposes other than those stated and approved in the plan. The permittee shall not permit other uses to emanate or evolve from such facilities unless specifically approved by the authorized officer.

(2) All support facilities, structures, equipment and similar developments will be removed from the permit area within one year after the final termination of use of such facilities. Areas occupied by such facilities will be rehabilitated in accordance with an approved reclamation plan to a productive land use or to a state approximating former conditions as specified by the authorized officer. (See Reclamation)

(3) All operations will be conducted to protect aesthetic and scenic values. Site selection will be carefully considered to reduce adverse visual impacts. All alterations in vegetative cover will be designed to achieve the same effect as natural-occurring openings within the characteristic landscape. Necessary modifications of existing land forms will reflect the surrounding land forms and the natural landscape. Where alternatives are available, the alternative involving the least damage to scenery and other resources will be selected as determined by the authorized officer. Permanent structures and facilities will be designed to be architecturally compatible with the surrounding landscape. Construction material and color will harmonize with the natural landscape.

(4) The permittee will comply with all existing state or federal laws pertaining to the protection of cultural and paleontological values, specifically the Historic Preservation Act of 1966. Prior to entry upon the land or disturbance of the surface thereof, a complete inventory of all archaeological, paleontological and historical values will be made. The survey will be completed by either a qualified archaeologist approved by the BLM or a qualified BLM archeologist, if available; the results and information of a non-government survey will be provided to the authorized officer. The authorized officer may inspect the sites and make a determination of their significance and appropriate protective action necessary. The permittee may be required to take such steps necessary to preserve or avoid destruction of antiquities such as relocation of proposed facilities, salvage of artifacts or other measures deemed necessary by the authorized officer to facilitate protection. Any costs of a non-government survey and any salvage of artifacts will be borne by the permittee and all objects of antiquity salvaged from the federal land surface will remain the property of the U.S. Government.

Roads

(1) No roads shall be used or constructed within the permit area that are not contained in the approved plan. The location and route of each road is subject to the approval of the authorized officer. The permittee may be required to use alternate routes if the proposed road location is excessively disruptive to the surface resources, difficult to maintain or represents a safety hazard.

(2) Activities employing wheeled or tracked vehicles will be conducted to minimize surface damages. Temporary access roads may not require construction to provide adequate access. The authorized officer shall determine when the construction of such roads is necessary, construction standards to be employed and final disposition of such roads.

(3) All roads and trails shall be constructed and maintained in such a condition so as to control and minimize channeling and other erosion problems. All roads shall be constructed to standards and

specifications adequate to support the anticipated use to be made of such roads in accordance with appropriate portions of BLM Manual 9110 as approved or set by the authorized officer. The authorized officer may approve or set such standards that are deemed necessary to minimize disruption of the surface resources and/or maintain the reclamation potential.

(4) The permittee may be required at any time during the life of the permit to upgrade, modify or abandon any road constructed or used for the operation of the permit if the road does not adequately support the present use, proves to be excessively disruptive to the surface resources, represents a safety hazard or is no longer required for the operation of the permit.

(5) Maintenance of all roads used within the permit area shall be the responsibility of the permittee. The authorized officer may approve or set such standards that are deemed necessary to minimize disruption of the surface resources and/or maintain the reclamation potential such as, but not limited to, ditching, draining, culverts, graveling, or capping of the road beds.

(6) Final dispossession and conditions of abandonment of all roads shall be approved by the authorized office. The permittee may be required to employ such practices as deemed necessary to effect proper abandonment of all roads used within the permit area.

Water Quality

(1) The permittee will comply with all applicable state and federal laws and regulations pertaining to water quality. Present water quality shall be maintained at present levels or to standards which meet or exceed state and federal requirements, whichever is greater. The permittee shall not permit toxic chemicals, metals, pesticide, untreated human and animal waste, thermal pollution or permit excessive sedimentation and floating debris to enter and cause degradation of water quality. Pollution, channeling or any erosion or degradation of lands, water quality, streams, lakes, or domestic livestock resource will not be allowed.

(2) Solid and liquid wastes containing either injurious, deleterious materials or other potential contaminants shall be disposed of in a manner that will not cause degradation of surface or ground water. The permittee shall take such measures and precautions deemed necessary by the authorized officer to assure the safe containment and disposal of such materials.

(3) Stockpiles and disposal sites shall be selected and prepared so as to avoid downward percolation of pollutants into aquifers and prevent surface runoff from disposal sites from entering the drainage system.

(4) All surface damages which would result in accelerated soil movement and potential air and water degradation shall be corrected. Those areas not required for the continued operation of the permit shall be reclaimed upon termination of the construction activities or the surface use of any part of a site. The permittee shall employ such practices as deemed necessary by the authorized officer to prevent the loss of soil and the sedimentation of drainages.

(5) Disturbance of drainage ways and high erosion hazard areas shall not occur within any floodplain or channel of any water course except at drainage crossings designated in an approved plan.

Drainages shall not be blocked nor shall the permittee cause, through his operations, the siltation or accumulation of debris in drainage channels. All damages to drainages resulting from the operations of the permit shall be corrected to the satisfaction of the authorized officer.

(6) The permittee will comply with any applicable county, state and federal laws and regulations concerning the use of poisonous substances, including insecticides, herbicides, fungicides, rodenticides and other similar substances. Prior to the use of such substances the permittee will obtain from the authorized officer, approval of a written plan for such use. The plan shall state the type and quantity of material to be used, the animal or plant to be controlled, the method of application and such other information as may be required. All use of such substances shall be in accordance with the approved plan. If the use of a chemical is prohibited by the Secretary of the Interior, it shall not be used. If use of a chemical is limited by the Secretary of the Interior, it shall be used only in accordance with that limitation.

(7) The permittee shall conduct his operations in such a manner so as not to affect the surface water flow or the availability of such waters for surface use. Loss of surface water due to the permittees operations shall be prevented or the situation corrected to the satisfaction of the authorized officer.

(8) Casual accumulations of water on waste piles shall be avoided, and, where necessary, surface waters shall be directed around the piles.

Air Quality

(1) The permittee will comply with all applicable state and federal laws and regulations pertaining to air quality. The air quality will maintain at an acceptable level that does not degrade the aesthetics, cause environmental deterioration or create health and safety hazards. The permittee will be required to employ such practices or to follow such procedures as determined necessary to maintain air quality standards and control all potential air pollutants resulting from the operation of the permit.

(2) The permittee shall provide the necessary dust control measures to suppress air pollutants resulting from the construction or operation of roads, work areas, processing operations and other actions or functions that could cause degradation of air quality.

(3) Burning is permissible only by prior written consent of the authorized officer, and in compliance with state and federal air quality standards and laws. All vegetative and other material cut, uprooted or otherwise accumulated will be disposed of as specified by the authorized officer.

Sanitation, Health and Safety

(1) All garbage and foreign debris will be removed to an authorized dump site at least weekly or as otherwise specified. Sanitary facilities for all solid and liquid waste disposal will meet all state, federal, and local codes and regulations. Disposal of all

vegetative and other material cut, uprooted or otherwise accumulated will be disposed of as specified by the authorized officer. All areas of use will be kept clean and free of debris. The permittee area shall be maintained in a neat appearing condition at all times, consistent with the operations on the permit area.

(2) All access routes and areas of use within the permit are will be kept clean of all garbage and foreign debris.

(3) In all actions under this permit, the permittee shall comply with all applicable State and Federal health and safety laws, regulations, and standards.

(4) All hazardous areas including but not limited to those areas used for materials processing and loading and movement of heavy trucks and equipment and those areas used for the containment of coal and waste materials shall be adequately fenced, posted, covered, or other protective measures installed to minimize hazards and prevent access to the general public, livestock, and wildlife to the satisfaction of the authorized officer.

Reclamation

(1) The permittee shall submit a reclamation plan to the authorized officer prior to the cessation of all or any part of the permit surface.

(2) Upon cessation of the use of all or any part of the permit surface for construction or operations including all or part of waste piles, roads, storage yards, etc. and all other disturbed areas will be reclaimed to a productive land use or to a state approximating former condition as determined by the authorized officer of the surface management agency in accordance with an approved reclamation plan.

(3) The authorized officer shall approve or may prescribe such construction and rehabilitation methods and practices as determined to achieve desired reclamation results. Reclamation is critically site specific; therefore, such prescription as issued by the authorized officer may include determination of the final topography, drainage system, revegetation methods, seed mixtures, soil treatments and amendments, stockpiling of topsoil, segregation of spoil materials, surface manipulations, waste disposal and other practices deemed necessary to rehabilitate disturbed areas.

(4) Final grading of backfill areas, waste piles and other unconsolidated materials shall be so performed so as to present a surface susceptible to revegetation and to a desired land form.

(5) Except for solid rock faces, bench faces, and excavations used for improvement of water, those surface areas of the permit area disturbed by operations conducted by the permittee shall be graded to a natural contour and revegetated when their use is no longer required by the operator in accordance with an approved reclamation plan.

Miscellaneous

(1) All existing improvements including but not limited to fences, gates, cattle guards, roads, trails, pipelines, bridges, water developments, campgrounds or other improvements placed on the national resource lands shall not be disturbed unless authorized by the authorized officer. Where disturbance or use is made of such

facilities, they shall be left in their original or better condition. Damaged or destroyed improvements shall be replaced, restored or appropriately compensated for at the discretion of the authorized officer.

(2) Proper precautions will be taken at all times to prevent and suppress fires. The permittee will be held responsible for suppression and rehabilitation costs for any fires on the national resource lands caused by the negligence of his operators, employees, contractors or sub-contractors.

(3) The permit area shall be available for other public uses including but not limited to livestock grazing, unless specifically prohibited or restricted by the authorized officer.

(4) All survey monuments, witness corners, reference monuments and bearing trees must be protected against destruction, obliteration or damage. Any damaged or obliterated markers must be re-established at the permittee's expense, in accordance with accepted BLM survey practices as set forth in the Manual of Surveying Instructions. A complete record of the monumentation and the methods used in re-establishment will be furnished to the Chief, Branch of Cadastral Survey at the appropriate State Director's Office, BLM.

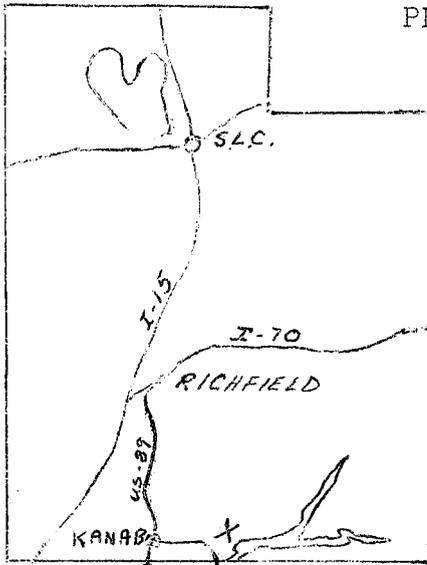
(5) The clearing of timber, stumps, and snags will be kept to a minimum and due care will be used to avoid unnecessary scarring or removal of ground vegetative cover.

(6) No explosives may be used without prior written consent of the authorized officer.

Bonding

A bond of \$ 15,000 is required for the construction, use, and restoration of facilities under this permit and all other terms and conditions of the permit. Any deviation from the proposed plan will subject the bond to possible adjustment to satisfy any changes in construction, use, or restoration.

ENVIRONMENTAL ASSESSMENT OF
 THE JOHN HENRY COAL MINE
 PROPOSAL - STATE LEASE #19359



Location: Kaiparowitz Coal
 Field, Kane County,
 Utah.

Section 2, T. 42 S.,
 R. 3 E. SLBM

Anticipated Cost: \$2 1/2 Million

- (1). GENERAL: The Lessee proposes to mine coal by underground methods from the above-mentioned State Section. Surface disturbance, because of accessibility to the section, will be entirely on the Public Domain. Tunneling into the coal seam from outside the State section is proposed. A right-of-way across the B.L.M. administered land has been applied for by the applicant.

An environmental assessment for the right-of-way impacts is now being performed by the Kanab District of the Bureau of Land Management. Public hearings will be included in the assessment assembly process. The assessment will be completed in mid-September.

Attached is the assessment of impacts to the State section and a general overview of the mining proposal.

(2). DESCRIPTION OF LANDS TO BE MINED

- a. State lands, comprising 675 acres have been leased by 5M Corporation of Hurricane, Utah, for the purpose of developing underlying coal reserves.

This lease is located in Section 2, Township 42 South, Range 3 East, SLBM. However, access roads, access tunnels, and disposal sites are to be located on the Public Domain.

b. Present Land Use

Present land uses fall into three major categories: Livestock grazing, recreational uses, and natural habitat for flora and fauna. Livestock grazing is through BLM and State Land Board permits and utilizes native vegetation for limited cattle feeding operations.

Recreational activities are primarily back country camping, hiking sightseeing, hunting, and general exploring. The remoteness of the area and the limited road system, encourages the use of off-road vehicles.

The land serves as a natural habitat for native flora and fauna.

c. Access Roads

The John Henry Canyon, on the north boundary, makes possible a natural approach to the horizontal coal seams on the south side of the canyon wall. The approach to these seams will require the grading of a road bed from the canyon floor to the John Henry Mine entrance some 300 feet above. The natural contours from erosion of the canyon walls in this area are readily adapted to construction of a road access, together with the necessary benching at the mine adit. The roadway at the bottom of the John Henry Canyon will require extensive repairs, and in many areas complete rebuilding, in order to move machinery and equipment into the mine area.

(3). GEOLOGY

The coal seams having economical values are contained in the Cretaceous formations. These seams are exposed in several areas indicating massive horizontal beddings. The five major coal zones all lie beneath the mesa cap, Drip Tank Formation:

- (1) The first seam, approximately 400 feet beneath the mesa capping, is called the Alvey Zone with an economical thickness sometimes running from 3 to 6 feet.
- (2) Approximately 75 feet below the Alvie Zone another commercial coal seam generally occurs known as the Rees Coal Zone. This coal zone at times reaches 5 feet in thickness.
- (3) The third and most important commercial coal zone is called the Christensen (John Henry) Formation, occurring at times with two or more beddings, and with thickness of up to 25 feet. As found in Section TWO, these beddings average 5 feet and 12.5 feet respectively.
- (4) Under the Christensen coal zone lies the Smoky Hollow Member with occasional commercial seams from 3 to 5 feet in thickness.
- (5) At the bottom of the John Henry Canyon a fifth coal zone is exposed showing Triplic Shale coal having a potential thickness of 10 to 12 feet, and which may have massive thickness extending into the lower Dakota Formation. The quality and quantity of this potential zone has yet to be economically established.

(4). MINING PLAN

Coal seams at the Kaiparowits Plateau are shown to be lenticular, and within certain formations the beddings may lens out, while close by another bedding will lens in. The nature of such occurrences are such as to make the conventional Room-and-Pillar mining plan to be the most feasible mining method during the first phase operations. Eventually, Longwalling methods were acceptable by the Bureau of Mines and stratigraphically feasible, may be used. Various engineering studies show different pillar size requirements and heading centers, but a safe and practical approach will be an 80 foot square pillar with 20 foot headings and breakthroughs on 100 foot centers.

With average seam thickness ranging from 5 to 6 feet, continuous miners, loaders, transfer conveyors and shuttle cars will be the most economical approach for mining equipment. The first priority operations will commence in the Christensen Coal Zone at a thickness of 12.5 feet. The main entry will be located near the north 1/4 corner on the North Section Line of Section TWO, Township 42 South, Range 3 East, Salt Lake Meridian, and extending south into Section TWO.

Roof bolting as approved by the Bureau of Mines will be employed to keep timbering at a minimum. Blocking will be made in all crossways to facilitate air accessibility to working faces in those areas requiring overpasses. The construction of overpasses and roof control will be used at all times. Additional support structures will also be used whenever and wherever needed in the interests of safety and good mining practice.

Ventilating systems will be installed using the prescribed equipment, brattice cloth, suction fans, etc., to accord with Bureau of Mines' regulations and practices. The mining area is particularly agreeable to ventilation control, particularly through heading entires extending through, and opening into, Tibbet Canyon on the south and Warm Creek Canyon on the east. Air blocks are to be constructed of cinder block and mortar with a 3' x 3' metal check-door installed at every fourth air block section. Expansion materials will be used where needed; bridges constructed where nexessary; and air restriction doors installed whenever required.

With head and tail entries and cross-ventilation travelling the main throughs, control of gasses and fresh air will be maximized. This provision also complements the facilities for emergency escape. Hazards may further be reduced by employing rock dusting techniques.

(5). WATER DEVELOPMENT:

Water requirements for dust control and mining operations will be hauled initially by tankers from the Glen Canyon City area.

(6). TOPOGRAPHY AND SOILS:

- a. Topographically, the Kaiparowits Plateau is an undulating surface deeply incised by steep-walled canyons. The region is characterized by terraced plateaus, vertical cliffs, cliff-bound benches and deep canyons (see exhibit A).

Elevations range between 3,000 and 8,600 feet above mean sea level, the Northern part of the plateau is higher than the Southern part. Elevation at the mine portals is about 4,440 feet.

Drainage is provided in the Northern part of the plateau by tributaries of the Escalante and Paria Rivers and in the Southern part by drainages leading directly to Lake Powell, and the right-of-way soils on the State section are medium textured with an effective root depth of 4" to 9" and are classified as moderate in erosion hazard.

(7). FLORA AND FAUNA:

- a. Vegetation: The low rainfall combined with a warm summer temperature and high evapo-transpiration rates make the Kaiparowits Region a relatively harsh environment for plant growth and survival. Rabbitbrush, sagebrush, tamarack, ephedra, and other plants typical of the mixed desert shrub type are the dominant vegetation in these canyon bottom areas.

- b. Animals and Birds: Small rodents and birds must be assumed to inhabit warm creek draws. Seasonal movements through the area by muledeer and predators are also probable. No raptors were observed in the mine or right-of-way area, but they must inhabit the area at times.

No live streams are present in the immediate area of section two.

(8). PROBABLE IMPACTS OF THE PROPOSED ACTION TO THE ENVIRONMENT:
(Section TWO)

a. Physical Impacts:

1. Remote possibility of surface subsidence on section two.
2. Surface disturbance due to coring of section two is possible should the applicant decide to further delineate the coal seams.
3. Numerous off-site impacts to Public Domain.
4. Local dust and noise pollution.

b. Biological Impacts:

1. Should coring be performed from the surface of section two, vegetation and wildlife will be disturbed for a short period of time during coring.

c. Socio-Economic Impacts:

1. Other small mines may be developed by other operators as a result of this action.
2. Adjoining coal leases may be purchased by the operator for further production.
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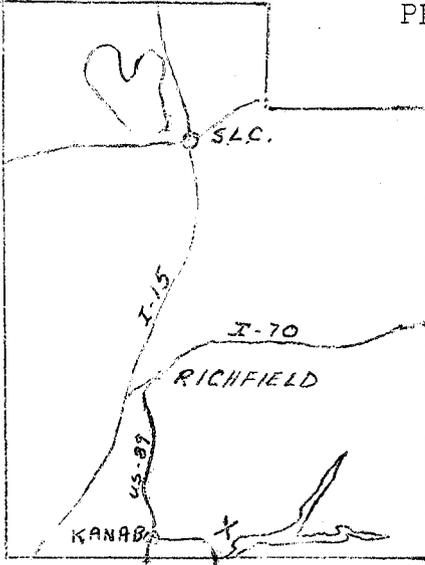
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ENVIRONMENTAL ASSESSMENT OF
 THE JOHN HENRY COAL MINE
 PROPOSAL - STATE LEASE #19359



Location: Kaiparowitz Coal
 Field, Kane County,
 Utah.

Section 2, T. 42 S.,
 R. 3 E. SLBM

Anticipated Cost: \$2 1/2 Million

- (1). GENERAL: The Lessee proposes to mine coal by underground methods from the above-mentioned State Section. Surface disturbance, because of accessibility to the section, will be entirely on the Public Domain. Tunneling into the coal seam from outside the State section is proposed. A right-of-way across the B.L.M. administered land has been applied for by the applicant.

An environmental assessment for the right-of-way impacts is now being performed by the Kanab District of the Bureau of Land Management. Public hearings will be included in the assessment assembly process. The assessment will be completed in mid-September.

Attached is the assessment of impacts to the State section and a general overview of the mining proposal.

(2). DESCRIPTION OF LANDS TO BE MINED

- a. State lands, comprising 675 acres have been leased by 5M Corporation of Hurricane, Utah, for the purpose of developing underlying coal reserves.

This lease is located in Section 2, Township 42 South, Range 3 East, SLBM. However, access roads, access tunnels, and disposal sites are to be located on the Public Domain.

b. Present Land Use

Present land uses fall into three major categories: Livestock grazing, recreational uses, and natural habitat for flora and fauna. Livestock grazing is through BLM and State Land Board permits and utilizes native vegetation for limited cattle feeding operations.

Recreational activities are primarily back country camping, hiking sightseeing, hunting, and general exploring. The remoteness of the area and the limited road system, encourages the use of off-road vehicles.

The land serves as a natural habitat for native flora and fauna.

c. Access Roads

The John Henry Canyon, on the north boundary, makes possible a natural approach to the horizontal coal seams on the south side of the canyon wall. The approach to these seams will require the grading of a road bed from the canyon floor to the John Henry Mine entrance some 300 feet above. The natural contours from erosion of the canyon walls in this area are readily adapted to construction of a road access, together with the necessary benching at the mine adit. The roadway at the bottom of the John Henry Canyon will require extensive repairs, and in many areas complete rebuilding, in order to move machinery and equipment into the mine area.

(3). GEOLOGY

The coal seams having economical values are contained in the Cretaceous formations. These seams are exposed in several areas indicating massive horizontal beddings. The five major coal zones all lie beneath the mesa cap, Drip Tank Formation:

- (1) The first seam, approximately 400 feet beneath the mesa capping, is called the Alvey Zone with an economical thickness sometimes running from 3 to 6 feet.
- (2) Approximately 75 feet below the Alvie Zone another commercial coal seam generally occurs known as the Rees Coal Zone. This coal zone at times reaches 5 feet in thickness.
- (3) The third and most important commercial coal zone is called the Christensen (John Henry) Formation, occurring at times with two or more beddings, and with thickness of up to 25 feet. As found in Section TWO, these beddings average 5 feet and 12.5 feet respectively.
- (4) Under the Christensen coal zone lies the Smoky Hollow Member with occasional commercial seams from 3 to 5 feet in thickness.
- (5) At the bottom of the John Henry Canyon a fifth coal zone is exposed showing Tripic Shale coal having a potential thickness of 10 to 12 feet, and which may have massive thickness extending into the lower Dakota Formation. The quality and quantity of this potential zone has yet to be economically established.

(4). MINING PLAN

Coal seams at the Kaiparowits Plateau are shown to be lenticular, and within certain formations the beddings may lens out, while close by another bedding will lens in. The nature of such occurrences are such as to make the conventional Room-and-Pillar mining plan to be the most feasible mining method during the first phase operations. Eventually, Longwalling methods were acceptable by the Bureau of Mines and strategraphically feasible, may be used. Various engineering studies show different pillar size requirements and heading centers, but a safe and practical approach will be an 80 foot square pillar with 20 foot headings and breakthroughs on 100 foot centers.

With average seam thickness ranging from 5 to 6 feet, continuous miners, loaders, transfer conveyors and shuttle cars will be the most economical approach for mining equipment. The first priority operations will commence in the Christensen Coal Zone at a thickness of 12.5 feet. The main entry will be located near the north 1/4 corner on the North Section Line of Section TWO, Township 42 South, Range 3 East, Salt Lake Meridian, and extending south into Section TWO.

Roof bolting as approved by the Bureau of Mines will be employed to keep timbering at a minimum. Blocking will be made in all crossways to facilitate air accessibility to working faces in those areas requiring overpasses. The construction of overpasses and roof control will be used at all times. Additional support structures will also be used whenever and wherever needed in the interests of safety and good mining practice.

Ventilating systems will be installed using the prescribed equipment, brattice cloth, suction fans, etc., to accord with Bureau of Mines' regulations and practices. The mining area is particularly agreeable to ventilation control, particularly through heading entires extending through, and opening into, Tibbet Canyon on the south and Warm Creek Canyon on the east. Air blocks are to be constructed of cinder block and mortar with a 3' x 3' metal check-door installed at every fourth air block section. Expansion materials will be used where needed; bridges constructed where necessary; and air restriction doors installed whenever required.

With head and tail entries and cross-ventilation travelling the main throughs, control of gasses and fresh air will be maximized. This provision also complements the facilities for emergency escape. Hazards may further be reduced by employing rock dusting techniques.

(5). WATER DEVELOPMENT:

Water requirements for dust control and mining operations will be hauled initially by tankers from the Glen Canyon City area.

(6). TOPOGRAPHY AND SOILS:

- a. Topographically, the Kaiparowits Plateau is an undulating surface deeply incised by steep-walled canyons. The region is characterized by terraced plateaus, vertical cliffs, cliff-bound benches and deep canyons (see exhibit A).

Elevations range between 3,000 and 8,600 feet above mean sea level, the Northern part of the plateau is higher than the Southern part. Elevation at the mine portals is about 4,440 feet.

Drainage is provided in the Northern part of the plateau by tributaries of the Escalante and Paria Rivers and in the Southern part by drainages leading directly to Lake Powell, and the right-of-way soils on the State section are medium textured with an effective root depth of 4" to 9" and are classified as moderate in erosion hazard.

(7). FLORA AND FAUNA:

- a. Vegetation: The low rainfall combined with a warm summer temperature and high evapo-transpiration rates make the Kaiparowits Region a relatively harsh environment for plant growth and survival. Rabbitbrush, sagebrush, tamarack, ephedra, and other plants typical of the mixed desert shrub type are the dominant vegetation in these canyon bottom areas.

- b. Animals and Birds: Small rodents and birds must be assumed to inhabit warm creek draws. Seasonal movements through the area by muledeer and predators are also probable. No raptors were observed in the mine or right-of-way area, but they must inhabit the area at times.

No live streams are present in the immediate area of section two.

(8). PROBABLE IMPACTS OF THE PROPOSED ACTION TO THE ENVIRONMENT:
(Section TWO)

a. Physical Impacts:

1. Remote possibility of surface subsidence on section two.
2. Surface disturbance due to coring of section two is possible should the applicant decide to further delineate the coal seams.
3. Numerous off-site impacts to Public Domain.
4. Local dust and noise pollution.

b. Biological Impacts:

1. Should coring be performed from the surface of section two, vegetation and wildlife will be disturbed for a short period of time during coring.

c. Socio-Economic Impacts:

1. Other small mines may be developed by other operators as a result of this action.
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