TECHNICAL ANALYSIS
Tower Resources Inc.
Emergency Lease Modification
ACT/007/019A
Carbon County, Utah

October 28, 1985

Introduction

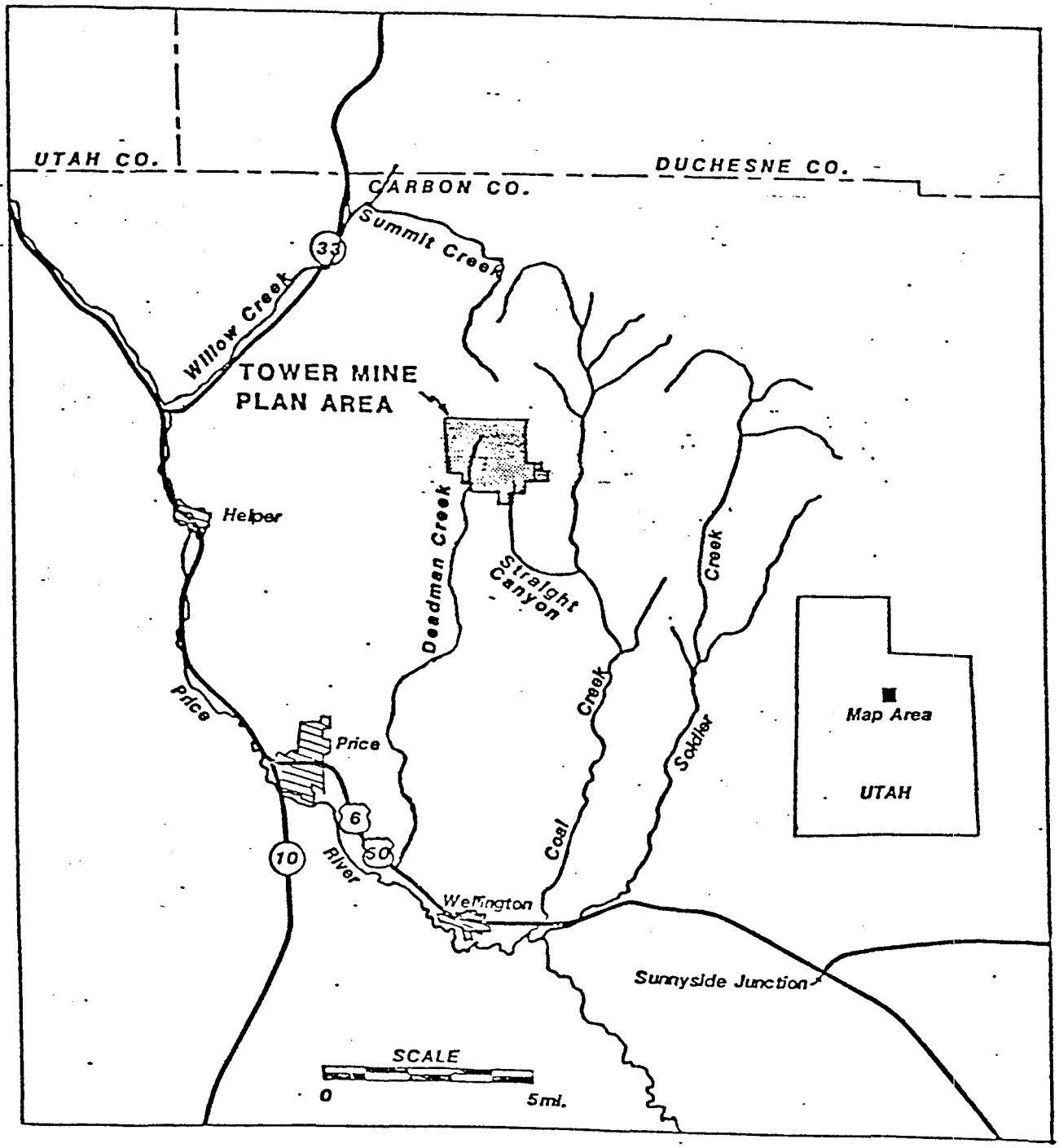
Tower Resources Inc. proposes to add a 120 acre federal emergency lease (#U-52341) to its currently approved permit area for the Centennial Project. All coal and surface lands on this lease are owned by the U. S. Bureau of Land Management.

The Mining and Reclamation Plan (MRP) for the Centennial Project was approved by the Office of Surface Mining in November of 1981 and by the Division of Oil, Gas and Mining in January of 1982. The originally approved MRP consisted of 2,678 acres of private and federal coal leases, controlled by AMCA Coal Leasing, the land acquisition and development branch of Tower Resources.

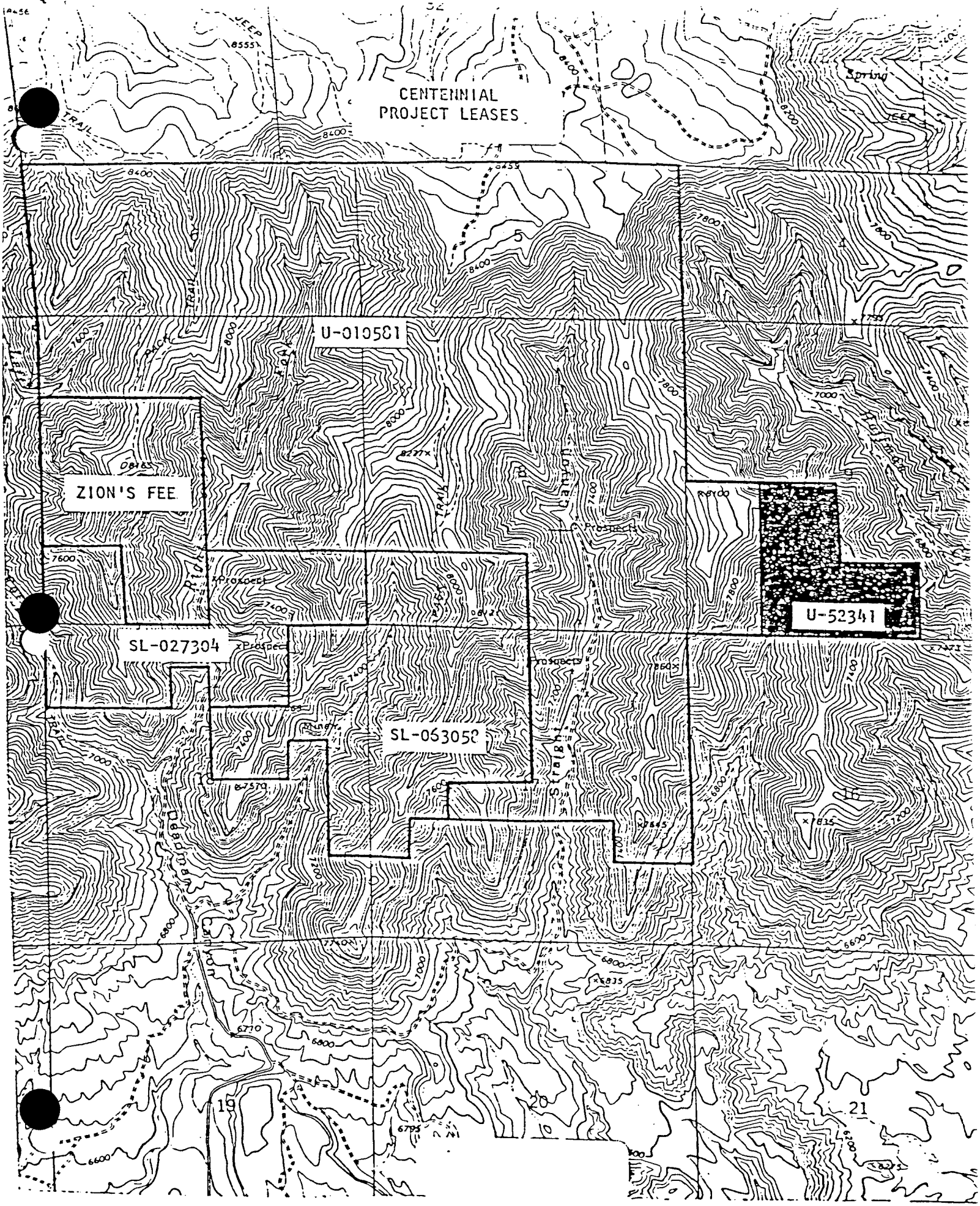
Currently two mines, the Pinnacle and Apex, are operating in the Gilson and Lower Sunnyside seams, respectively. A third mine approved in the original MRP to mine the Aberdeen Seam has not yet been developed. The emergency lease contains approximately 700,000 tons of recoverable coal in the Gilson Seam. These reserves will be mined simply as an underground extension to the Pinnacle Mine. Access, extraction and handling of coal will be through the existing Pinnacle Mine facilities. No additional surface disturbance will be associated with the mining of the Emergency Lease.

Tower Resources was granted emergency lease #U-52341 in November of 1983 due to the possibility of by-pass of coal in the forseeable future. In April of 1984, Tower Resources submitted an addendum to the approved MRP for the emergency lease to the regulatory authorities. Deficiency letters were sent to the company on August 3, 1984, January 28, 1985 and February 25, 1985. The company submitted responses on August 17, 1984 and April 29, 1985. The plan was determined complete on May 21, 1985.

The following technical sections are identified by specific regulation and/or performance standard. It is the Division's opinion that these sections differ significantly from the mining and reclamation practices and procedures which were approved in the original Mining and Reclamation Plan (MRP) permit application. Those sections or regulations not outlined were determined to be in compliance pursuant to the previously approved MRP.



Location of the Tower mine plan area.


CENTENNIAL
PROJECT LEASES
U-010581
ZION'S FEE
SL-027304
SL-063058
U-52341
Canyon
Straight
Prospect
Spring
JEEP
TRAIL
5
4
16
19
20
21

UMC 817.48 Acid-Forming and Toxic Forming Materials - DD

Applicant's Proposal

The applicant plans to extend the Pinnacle Mine by developing coal resources in a new lease area (Lease #U-52341). The coal will be mined from the Gilson Seam, the only mineable coal seam on the new lease.

No refuse will be developed and stored on the surface. No acid or toxic-forming materials will have to be controlled, because all raw coal is hauled from the mine site (Addendum B, 784.11, page 6).

Compliance

The applicant's proposal will comply with this section.

Stipulations

None.

UMC 817.50 Underground Mine Entry and Access Discharge - DC

Applicant's Proposal

The applicant has stated that very little water has been encountered in the existing Pinnacle Mine. Water that is encountered will be stored and used within the mine. No mine water has been discharged nor is any water expected to be discharged in the future (addendum to Tower Resources Approval, Mining and Reclamation Plan for the addition of Emergency Lease #U-52341, Appendix B, page 16).

Compliance

In 1983, Tower Resources encountered ground water in an area of burned coal adjacent to the Emergency Lease. The trapped ground-water was able to flow downgradient into the mine and was discharged outside the mine according to Tower Resources' approved request (Addendum to Tower Resources' Approved Mining and Reclamation Plan for the Addition of Emergency Lease #U-52341, Hydrology of Emergency Lease #U-52341, page 8).

Therefore, Tower Resources' statement that no ground water will be discharged should be modified to provide information on how underground mine effluent will be treated in accordance with UMC 817.50 in the event that larger quantities of ground water are encountered than can be utilized underground.

Stipulation 817.50-(1)-DC

1. Within 30 days of permit approval for Emergency Lease #U-52341 the applicant must submit a plan for approval to the Division of Oil, Gas and Mining and the Division of Environmental Health for holding and treating of all mine water discharges. The plan must contain:

   A. Sampling of the discharge to demonstrate compliance with the effluent limitations of UMC 817.42.

   B. The discharge must be monitored for discharge rate and duration.

   C. The monitoring results must be submitted with the existing monitoring data under the currently approved sampling and reporting schedule.

   D. The applicant must obtain an NPDES Permit from the Utah Division of Environmental Health

UMC 817.52 Surface and Ground Water Monitoring - DC

Applicant's Proposal

Tower Resources is expanding its existing surface and ground-water monitoring plan to include Emergency Lease #U-52341. The existing monitoring plan was approved by the Division in January of 1982.

Baseline monitoring of surface and ground water was initiated in the fall and winter of 1980-81. Ground water samples were monitored in two existing water wells near the portal area and from a spring approximately one-half mile south of the portal area. The baseline information indicated that there is a wide seasonal variation in water quality from the spring and that the general trend for the quality for the ground water in the area was that the highest quality of water occurs at the highest elevations.

Operational monitoring was initiated in January of 1983. Sampling has been performed quarterly and data collected up to December of 1984 has been forwarded to the Division. Monitoring will be continued postmining and results submitted to the Division until the reclamation effort is approved by the Division (Addendum to Tower Resources' Approved Mining and Reclamation Plan for the Addition of Emergency Lease #U-52341, Appendix B).

Baseline surface water quality data were collected from four stock water ponds north of the mine plan area, a station at the mouth of Clearwater Creek and on Coal Creek east of the mine plan area. The general trend of the baseline data follows the strong regional trend for water quality to significantly deteriorate as the water flows down over the shales present in the area (Addendum to Tower Resources' Approved Mining and Reclamation Plan for the Addition of Emergency Lease #U-52341, Appendix B, page 33).

The applicant has surface water monitoring stations above and below the surface facilities on the right fork of Deadman Canyon. Additional surface monitoring stations are located on the small drainage basin just east of the right fork of Deadman Canyon, on the left fork of Deadman Canyon, and in Straight Canyon. All of the surface monitoring stations are located on ephemeral drainages. Sampling has been performed quarterly and data up to December 1984 has been forwarded to the Division. Surface water monitoring will continue on a quarterly basis, when accessible, during postmining operations and until the reclamation effort is approved by the regulatory agency (Addendum to Tower Resources' Approved Mining and Reclamation Plan for the addition of Emergency Lease #U-52341, Appendix B, page 42).

The hydrology for the Emergency Lease is essentially identical to that of the remainder of Tower's permit area and of the Book Cliffs region in general. Proposed mining of the Emergency Lease will have no significant impacts on the quality or quantity of either surface or ground water in the area. All proposed operations will be underground and confined to a limited area (Addendum to Tower Resources' Approved Mining and Reclamation Plan for the Addition of Emergency Lease #U-52341, Hydrology for Emergency Lease #U-53421, page 1).

The emergency lease is drained by ephemeral streams which run for the most part in a southerly direction. A major portion of the Emergency Lease is drained by Hoffman Creek, an ephemeral stream typical of the region. Hoffman Creek flows into Coal Creek which is a tributary of the Price River. Samples will be taken from Hoffman Creek on a quarterly basis when sufficient flow occurs. Hoffman Creek, however, normally flows only in direct response to snowmelt. Snowmelt runoff usually begins in early May. Results will be forwarded to the Division at such time that analyses are obtained (Addendum to Tower Resources' Approved Mining and Reclamation Plan for the Addition of Emergency Lease #U-52341, Hydrology of the Emergency Lease, page 14).

During field investigations of the Emergency Lease area, a spring was encountered at the mouth of Hoffman Canyon. Samples were taken from this source and have been forwarded to the Division. Samples will continue to be collected from this source on a quarterly basis as part of Tower's overall ground-water monitoring program (Addendum to Tower Resources' Approved Mining and Reclamation Plan for the Addition of Emergency Lease #U-52341, Hydrology for the Emergency Lease #U-52341, page 11).

Compliance

The applicant's plan to include one surface water station and one spring in Hoffman Canyon as part of the overall ground and surface water monitoring plan will be adequate to identify significant changes or impacts to the existing hydrologic balance due to mining activities in the emergency lease.

Stipulations

None.

UMC 817.54 Hydrologic Balance: Water Rights and Replacement and
UMC 817.97 Protection of Fish, Wildlife and Related Environmental Values

Applicant's Proposal

The applicant states that there will be no diminution or interference with the water supply of any owner due to the mining of the Emergency Lease (MRP Addendum, page 42). A spring (S-25) was found at the mouth of Hoffman Canyon during field investigations of the Emergency Lease area. Samples will be taken from this spring on a quarterly basis as part of Tower's overall ground-water monitoring program (MRP Addendum, "Hydrology of Emergency Lease #U-52341," page 11). No water rights have been filed on this spring.

Compliance

The applicant has shown that there will be no loss of water supply to any owner of water due to mining of the emergency lease. However, the U. S. Fish and Wildlife Service has raised the concern that loss of surface waters could negatively impact wildlife (See June 17, 1985 letter attached to TA). Since both pre- and postmining land use of the permit area is grazing, wildlife habitat and recreation, the applicant should commit to the following stipulation to insure that wildlife habitat values are not diminished.

Stipulation 817.97-(1)-SCL

1. Within 30 days of approval of this modification, the applicant must commit to replace or mitigate loss of surface waters due to mining activity in the emergency lease and submit a plan for approval outlining how this will be done.

UMC 817.71 Disposal of Underground Development Waste

Applicant's Proposal

The applicant states that no waste rock will leave the mine (Addendum B, page 6). All rock waste generated will be stored underground (Addendum B, page 9). Therefore, no surface treatment of waste will be necessary.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.121 Subsidence Control

Applicant's Proposal

The applicant plans to mine only the Gilson Seam in the proposed lease area. Room and pillar design mining will be employed with pillar extraction on retreat. There are no structures, streams or springs present on the lease area. However, there is a spring just off the lease area (see Section UMC 817.54). The land is presently used for grazing and wildlife habitat and does not constitute a renewable resource area. Two subsidence monitoring stations are established on the lease area to measure subsidence (Plate IV, Addendum for addition of lease #U-52341).

Subsidence monitors will consist of lengths of appropriately sized rebar, cemented into the ground on 500 foot centers over an area of pillar extraction. The rebar will be situated such that an appropriate length protrudes above the surface. The elevations of the protruding rebar can then be surveyed periodically from established control points. Thus, any subsidence which may occur can be measured. These stations will be measured twice each year

for two years after extraction has been completed. The accuracy of measurement will be to one inch horizontal and vertical (Addendum B, page 9).

Compliance

The applicant has established that no material damage will occur to structures, streams or springs. However, mining under and near escarpments has resulted in large extension fractures and caving along escarpments where secondary mining has been conducted near escarpments at other mines in the area. To ensure that this type of damage is not significant, the applicant should submit the information that is requested under the following stipulation.

Stipulation 817.121-(1)-DD

1. The applicant shall submit the following information within 30 days of permit approval.

   A. An isopach map of the overburden above the Gilson coal seam for the mining area.

   B. An outline of mitigating measures to be taken to insure no subsidence occurs along escarpments.

TECHNICAL ANALYSIS

Andalex Resources, Inc.
Centennial Project
Underground Lease Additions
ACT/007/019
Carbon County, Utah

May 5, 1989

UMC 817.48 Hydrologic Balance: Acid-Forming and Toxic-Forming Materials - JSL

Existing Environment and Applicant's Proposal

The primary potential effects to the hydrologic system from the Lease Modification or the New Lease areas will come from potential leaching from the roof, floor, or unrecovered coal in the mined areas. To determine the potential for this to occur, samples have been collected and analyzed. Data was received August 29, and November 14, 1988.

Compliance

The Mining and Reclamation Plan (MRP) does not adequately address the requirements of this section. The analysis received is not accurate. In accordance with the "Guidelines for Management of Topsoil and Overburden" (April 1988) roof, floor, and mid-seam must, at a minimum, be corrrectly analyzed according to the referenced procedures, or other procedures if equilavent or otherwise approved by the Division, for the parameters listed in Table 6. The November analysis represented total boron, not available boron as requested. The data indicates that high levels of boron may exist. Boron should be analyzed by either hot water or saturation extract procedure.

Stipulation UMC 817.48-(1) - JSL

1. The operator must commit, within 60 days of permit approval, to monitor the roof, floor, and mid-seam according to Table 6 of the "Guidelines for the Management of Topsoil and Overburden" (April 1988) for possible toxic contaminants. Monitoring shall be conducted on an annual basis or more if the general location of the mining operations change and this change affects the quality of the floor, roof, or mid-seam. Results of the analysis are to be reported in the annual report.

UMC 817.52 Hydrologic Balance: Surface and Groundwater Monitoring - RPS/DD

Surface Water

Existing Environment and Applicant's Proposal

A surface monitoring plan is described in section 3.1-1.2 and the monitoring locations are depicted on Figure IV-11 of Chapter 4. Monitoring site 25-2 is established in the Hoffman Creek drainage, sites 7-1, 18-2, 18-3, and 18-4 have been established in the Deadman Canyon drainage, and 8-1 has been established in the Straight Canyon drainage. Sites 18-3, and 18-4 will monitor the Right and Left Forks of Deadman Canyon and site 18-2 will monitor the unnamed north fork tributary to Deadman Canyon down gradient from the lease areas. Sites 7-1 and 8-1 will monitor the Right Fork of Deadman Canyon and Straight Canyon respectively near the headwaters of the streams.

Compliance

The drainages in the lease areas are all reported to be ephemeral in nature (Appendix L, Vaughn Hansen and Assoc. Report, MRP). The applicant states that the above referenced sites will be monitored as access permits on a quarterly basis. The applicant's water quality data submitted in Appendix L indicates that very few (usually only one or two) samples have been collected for each site since 1981. The Division feels that the existing monitoring plan is not fulfilling the requirements of this regulation. In addition, the permit is not enforceable for missed samples if a runoff event occurs. Stipulation UMC 817.52-(1) - RPS is necessary for approval.

Stipulation UMC 817.52-(1) - RPS

1. Within 30 days of permit approval, the applicant must submit an approvable revised surface water monitoring plan. The plan must include a commitment to maintain a rain gauge at the site and keep daily records of precipitation events or nonoccurence of events. The plan must commit to collection of at least one sample per quarter for a two year period for the surface water monitoring sites with analysis as per the Division's Baseline parameter list. The plan must commit to the same schedule with analysis as per the Division's Operational parameter list for the remainder of the permit term. The plan may state that a sample will not be collected due to a lack of precipitation events in that quarter as documented by the rain gauge records. The plan must commit to retaining the precipitation records at the minesite to be available for inspection upon request by Division staff.

Ground Water

Existing Environment and Applicant's Proposal

The applicant describes the geologic characteristics in the vicinity of the mine area in Chapter III, 3.3-1, and in Appendices E and L.

Ground water inventories were conducted over lease U-05067 and the SUNEDCO fee lease during the fall of 1980. Figure 5 shows the location of all springs and wells on and adjacent to the mine plan area. The applicant commits to identifying and monitoring any significant ground water inflows to the mine, should they occur.

The applicant has presented a new ground water monitoring program in Chapter IV, Part 1, Section 3.1. These changes will decrease the number of parameters currently monitored and conform to operational guidelines suggested by DOGM.

Ground water hydrology is discussed in Appendix L, page 114. Ground water monitoring sites are depicted on Figure IV-11, page 118 and include Well #1, springs S18-1 and S25-1. Data from these selected sites are given in Appendix H.

The information presented in the Mining and Reclamation Plan by Andalex is sufficient to define the ground water system in the vicinity of the mine for the next 5-year permit term. The ground water hydrology for the Aberdeen seam is essentially identical to that of the remainder of the permit area.

There are no springs located in the initial field survey on the Aberdeen mine plan area. Two springs lie outside the mine plan area. The Blackhawk in the vicinity of the mine is very lenticular and unfractured. Neither of these springs issue from the Blackhawk Formation. A few small perched aquifers exist over the mine plan area.

Two wells have been drilled on the property. Well #1 is 150 feet deep and Well #2 is 155 feet deep. These wells supply small amounts of water for mine use. Very little water is encountered in the mines. What water has been encountered has been stored and used in the mine.

The applicant plans to monitor the two wells and Spring S18-1.

Compliance

The applicant has complied with the requirements of this section. The ephemeral nature of Hoffman Creek indicates that there are not significant springs in the canyon to sustain a flow to the creek. Hence, there would be essentially no impacts to perched ground water sources.

Current ground water monitoring data appears incomplete with respect to the proposed (old permit submitted) permit monitoring frequency. The data that is presented should be summarized and presented in an organized manner.

Stipulation UMC 817.52-(2) - DD

2. The applicant must summarize all water monitoring data in a logical order. Data should be plotted to show sequence and concentration of sample. This information should be organized for insertion into the Mining and Reclamation Plan and submitted within 30 days of permit approval.

UMC 817.59 Coal Recovery - JRH

Existing Environment and Applicant's Proposal

The underground permit application submitted by Andalex proposes to add new lease areas to their current permit area. The new lease area consists of 758 acres of federal leases and 240 acres of fee. Total lease area for the approved and proposed permitted area is as follows:

LEASE	TOTAL	ADDITIONAL	CURRENT
ZION FEE	200	0	200
SL-027304	236	116	120
SL-063058	400	160	240
U-010581	1,842	162	1680
U-52341	120	0	120
U-05067	320	320	0
SUNEDCO FEE	240	240	0
TOTAL ACREAGE	3358	998	2360

Locations for the leases and lease modifications can be identified in the plan on Plate 4. Development and production from these new and modified leases will be from the existing adjacent facilities. No new surface disturbance or additional surface facilities will be required in conjunction with the utilization of these new leases.

Mining methodology for the new areas is similar to that of the existing permit for Andalex. Mining will be conventional room and pillar methods with utilization of continuous miners. No longwall mining is anticipated for the project.

Coal contours and layout for mining of the three coal seams is found on plates 29-31 of the proposal.

Andalex indicates that there are approximately 52.5 million tons of reserves in the entire mine plan area, of which 34.5 million tons are considered to be recoverable. To date, Andalex has mined approximately 3.5 million tons. Coal reserves include three mineable seams, the Lower Sunnyside, the Gilson, and the Aberdeen. Portals are proposed to be driven for each of the three seams. Only the Aberdeen seam is yet to be developed. Mine facilities for the other two seams are currently in existence.

Mining will be accomplished in all three seams utilizing standard room and pillar methods with continuous miners. The operator has submitted for approval and/or has received approval for roof control, ventilation and mining sequence plans from the BLM and MSHA.

Production from the mining facilities, which requires the simultaneous mining of all three seams is expected to gradually increase to 1.5 million tons per year in 1990 and remain constant throughout the life of the mining operations. The estimated life of the mine is approximately 20 years.

Sequence and timing of the mining operation is provided by the operator on plates 29, 30 and 31. Existing and abandoned mine workings are also provided on these drawings. Details of the current mine workings and the ventilation plan are provided on plates 32 and 33. No mining of the Aberdeen seam has yet occurred by the operator.

Compliance

This section of the regulations is considered to be complete and technically adequate. The operator has detailed the timing and the sequence of the mining operation for the permit term and has indicated the extent of mining throughout the projected life of the mine.

Lease modification and new lease information has been included and incorporated into the MRP.

Stipulations

None.

UMC 817.71 Disposal of Excess Spoil and Underground Development Waste: General Requirements - JRH

Existing Environment and Applicant's Proposal

The applicant has addressed information regarding the requirements of this section on pages 190-192 of the MRP.

The applicant indicates in part UMC 784.19 that there has been no development waste or excess spoil and there will be none. The applicant further states that raw coal (run-of-mine coal) is the only product from the mine and that there are no coal processing waste facilities within the permit area.

The applicant states that the only spoil material which will be developed at the minesite will be sediment pond waste. Waste material developed underground is anticipated to remain underground or will be placed in an area which will report to a sediment pond.

Compliance

All facilities regarding the storage, treatment and disposal of excess spoils and mine development waste have been reviewed within the existing permit except for the proposed construction of the sediment pond and portions of those facilities located on BLM Right-of-Way Permit U-62045. No new surface facilities are proposed within the new coal lease areas.

The applicant complies with this section.

Stipulations

None.

UMC 817.121-.126 Subsidence Control Plan - DD

Existing Environmental and Applicant's Proposal

The subsidence control plan is outlined in Chapter IV, page 177 of the Mining and Reclamation Plan. More information on mining methods is presented in Chapter IV, page 73.

Mining in the Aberdeen Seam over the remainder of the 5-year permit term will be only developmental. There are no plans to pull pillars and cause conditions for subsidence. This information is shown on mining development maps, Plates 29, 30 and 31.

The applicant states that no structures or surface features which would be affected by subsidence exist over the new lease areas. Subsidence monitoring locations are referenced to Plate 25 and 32 as required under 30 CFR. Subsidence monitoring will take place upon retreat.

Compliance

A review of this section reveals that no adverse impacts will occur from subsidence during the current 5-year permit term from mining in the Aberdeen Seam. The applicant has addressed the concerns of these regulations.

In recognition of the potential of mining multiple seams and low cover in the SUNEDCO lease area the applicant will collect baseline information before mining of the area. Map 32 was not included in the submittal. Subsidence stations were found on Map 25.

Stipulations

None.

WPOB79

TOWER RESOURCES, INC.
CENTENNIAL PROJECT

TECHNICAL ANALYSIS

Tower Resources is a corporation organized and existing under the laws of Delaware and qualified to do business in Utah. The Centennial Project involves both fee and federal coal leases. The project is located approximately 10 miles north, northeast of Price, Utah, in Carbon County, Township 13 South, Range 11 East. The property contains approximately 2,240 acres. Two hundred acres is fee surface and coal leased from the Zions Security Corporation. The remaining 2,040 acres is federal lease. This property includes Deadman Canyon, Starpoint Canyon and Straight Canyon with coal outcropping along the cliffs between 7,000 and 7,700 feet elevation. The topography is very rugged, the Book Cliffs being dissected by box canyons created by ephemeral streams. Large sandstone boulders eroded from the cliffs are scattered along the sides of the canyon. The land is undeveloped, used primarily for grazing. There are no perennial streams or bodies of water on the property.

Historically, coal mining has been the only industry in the permit area and there are several abandoned mines located on the property.

Estimated coal reserves in the three beds of a mineable thickness totals 50 million tons, with recoverable coal estimated at 29 million tons. Production schedules project an increase from 200,000 tons the first year to full production of about 1,200,000 tons in the fourth and fifth years. At this rate, the life of the mine is estimated to be about 30 years, with theoretical life of about 40 years due to the existence of additional unleased federal coal economically accessible only through Tower's operation.

The initial mining method being employed is pillar development utilizing one continuous miner section of equipment with final pillar extraction planned. An additional five mining units will be added according to production schedule, with mining development occurring simultaneously in each of the three seams. Longwall mining may be introduced later if conditions prove acceptable; however, the basic overall mine plan will not be changed.

Tower Resources is currently operating the Pinnacle Mine which began on October 3, 1980. The Pinnacle Mine is located and operating on Zions fee lease. The mine plans call for advancement of operations onto federal leases contained within the proposed mine plan area and the simultaneous operation of a mine in each of three mineable coal seams present; the lower Sunnyside Seam, the Gilson Seam and the Aberdeen Seam, current mining activities occurring in the Gilson Seam. The coal is classified as high volatile B bituminous in both the lower Sunnyside and Gilson seams and as high volatile A bituminous in the Aberdeen Seam.

The Mining and Reclamation Plan for the Pinnacle Mine was given final approval on September 5, 1980, under the interim program. The submittal for the remaining part of the Centennial Project was received by the Division on January 19, 1981. This submittal has since been modified and addendums supplemented. The application was deemed complete on September 28, 1981.

Existing Environment and Operations

The permit area is in the Book Cliffs which is the major physiographic feature in the region. The Cliffs rise from a base at approximately 5,500 feet in elevation to over 8,500 feet. Numerous canyons dissect the Book Cliffs. The permit area exhibits extreme topographic relief and is mountainous with steep cliffs and deeply incised drainages.

Mountain brush, desert shrub, pinyon-juniper woodland, sagebrush-grass, conifer-aspen and minor stream side vegetative types cover the total mine plan area. Most of the area is covered by a mountain brush type while the pinyon-juniper woodland type is predominant in the mine mouth area as well as the access routes and utility corridors. There have been no known threatened or endangered species observed in the lease area.

There are no perennial streams or bodies of water on the property. The reader is referred to a final draft Environmental Statement, Site Specific Analysis, Part 2, prepared by the Department of the Interior, 1979.

Summary of Compliance

817.11 Signs & Markers

Applicant's Proposal

Signs used on permit area are of a uniform design, placed to be easily seen, made of durable material and conform to local laws and regulations.

Identification signs showing the company name, business address, telephone number and the identification number of the current regulatory program permit authorizing the underground mining activities have been placed at all access points to the permit area.

The perimeters of all areas affected by surface operations will be clearly marked.

There are no perennial streams or a stream with a biological community on the permit area, therefore, no buffer zone markers will be necessary.

No surface blasting will be conducted by the applicant with the exception of highwall construction. When blasting does occur, signs and flagging will be posted as required under UMC 817.11(e)(f).

Compliance

Applicant will comply with this section.

817.13-.15 Casing and Sealing of Exposed Underground Openings

Applicant's Proposal

All exploratory drill holes were cemented above and below the coal seams for a minimum of 20 feet, including a concrete surface plug. The remainder of the hole is filled with drill cuttings. In the case of a shallow hole, the entire length is cemented.

Water wells have been cased with steel casing and will be maintained. After mining is completed, casings will be removed when possible and holes sealed as above.

Portal seals will be constructed of solid concrete blocks with mortared joints, double walled construction. The seals will be located far enough back from the surface so that reclamation efforts will not have an adverse effect on the seals. An illustration of proposed portal seals is shown in 9-10-81 plans.

Stipulations

None.

Compliance

Applicant complies with sections 817.13-.15.

817.21-.25 Topsoil

Applicant's Proposal

Topsoil has been removed from approximately five acres and includes poorly developed soils. Using dozer and front end loaders, the soil was scraped from the surface and dumped at a site on facility location. The topsoil storage area is shown on Plate VII of the MRP. The topsoil was removed as a separate operation from areas to be disturbed by surface installations such as roads and areas upon which support facilities are sited. Topsoil has been segregated, stockpiled and protected from wind and water erosion and contaminants through revegetation. Disturbed areas no longer required for the conduct of mining operations have been graded and revegetated. Once the topsoil was removed, the canyon bottom was leveled and culverts installed to prepare the area for building construction.

Upon reclamation, topsoil will be hauled to the area by end dump trucks, piled and spread using a grader. Where possible, soil will be distributed along the contour. The thickness of the re-established soil will be consistent with soils in the vicinity and will be sufficient to support the vegetation equal to or superior to premining history. No topsoil substitute has been proposed. If additional topsoil is needed, it will be hauled into the minesite.

A letter from Theron B. Hutchings, Utah State Soil Scientist, indicating a negative determination of Prime Farmland has been provided.

817.21-.25 Topsoil (continued)

Stipulations

817.22 Applicant must provide to the Regulatory Authority within 60 days of permit approval prior to disturbance of area the methods to be used for topsoil removal, the depth of topsoil to be removed and the volume of topsoil and subsoil to be removed.

Before applicant uses any substitute material as a topsoil, adequate chemical and physical analyses proving suitability must be performed on the proposed soil material and data submitted and approved by to the Division.

817.23 Applicant must submit to the Division within 60 days of permit approval and prior to disturbance of area plans for storage and protection of topsoil removed from future disturbances. If possible, the length of storage for each topsoil should be included.

817.25 Applicant must submit to the Division topsoil analyses data providing information on the pH, soil content of N, P, K and trace elements prior to topsoil redistribution.

Compliance

Applicant will comply with these sections when these stipulations are met.

817.41-.57 Hydrologic Balance

Applicant's Proposal

Tower Resources' Centennial Project will be comprised of three mines located closely together in Deadman Canyon. The Pinnacle Mine is presently in operation mining the Gilson Seam. The other two mines will be the Apex Mine in the lower Sunnyside Seam and the Aberdeen in the A Seam. The Centennial Project is to be located in the Right Fork of Deadman Canyon. This is an ephemeral drainage flowing in response to direct runoff and eventually reaching the Price River some 12 miles to the south. The projected minesite will have a disturbed area of 24.25 acres and an undisturbed watershed area of 805.50 acres. Surface runoff from the disturbed area is controlled by five separate sedimentation ponds. The Pinnacle Mine is controlled by Ponds A and B. The Apex and Aberdeen mines will be controlled by ponds C, D and E. Berms will be placed on the lower edge of all disturbed areas to prevent runoff from reaching natural drainages before it has passed through the sedimentation ponds. The main canyon undisturbed drainage will be routed through a 42-inch culvert located beneath the minesite. The location of all diversion structures and sedimentation ponds are included in MRP--Plate I.

Diversion and Conveyance of Overland Flow

The major undisturbed drainage in the minesite area will be routed under the site through large culverts. All culvert diversions are designed to carry the runoff from a 50-year, 24-hour precipitation event in the area. The actual culvert sizes Tower Resources will use are sufficient to carry the runoff from a 100-year, 24-hour storm in Price, Utah. Culverts will be placed

817.41-.57 Hydrologic Balance (continued)

to drain on a minimum slope of 0.0556 percent (1 foot/18 feet). Each culvert will be fitted with a trash rack at the inlet to help prevent plugging and will discharge onto a protected surface (i.e., riprap, conveyor belting, flexible downspouts, etc.) to prevent scouring and erosion. The use of energy dissipators will be employed as necessary to reduce velocities and prevent erosion from culvert discharges. Culverts shall be inspected regularly and cleaned as necessary to provide for passage of designed flows. Inlets and outlets shall be maintained so as to prevent plugging or undue restriction of water flow.

Diversion ditch locations and direction of flow are shown in MRP--Plate I. A diversion ditch typical sheet is included in MRP--Appendix P. All diversion ditches are designed to carry the runoff from a 100-year, 24-hour precipitation event in the area. Diversions along the upslope side of the road will be as per specifications on the haul road design. All diversions will be maintained so as to pass the volumes of water for which they were designed. Sloughage will be cleaned out along with regular road maintenance procedures and any blockage will be removed as soon as practical after occurrence. Velocities will be controlled as needed to prevent excessive scouring.

All diversions are temporary and will be removed upon final reclamation.

Sedimentation Ponds

The proposed sedimentation ponds have been designed to fully contain the expected runoff and sediment load from a 10-year, 24-hour precipitation event in the area. In addition, each pond has an overflow capacity in excess of that required for a 25-year, 6-hour event. Each pond has been designed and will be constructed under the supervision of a qualified, registered professional engineer. All pond structures will be regularly inspected by a licensed individual as required by law. Measuring devices will be installed to determine when the ponds have filled with sediment to the clean out level. Ponds will be cleaned at a minimum when sediment load reaches 20 percent of pond volume. Sediment removed shall be disposed of at the Carbon County Sanitary landfill. Carbon County has consented in writing to this action (MRP--Appendix M). Water monitoring stations will be established at the outlet of the ponds. Sample parameters and frequencies shall be as per specifications of the NPDES permit.

Sedimentation ponds will be constructed with principal spillways three feet below and emergency spillways two feet below the top of the embankments. The top width of the embankment shall not be less than (H + 35)/5; H is the height of the embankment. The embankment upstream and downstream side slopes will not be steeper than 2.0 h:1v. Native material will be used for embankments where practial. Fill will be placed in lifts not to exceed 15 inches and compacted prior to placement of the next lift. Compaction of all fill material for embankment slopes shall be at least 95 percent. Riprap will consist of substantial (nonslacking) rock material of six inches or greater size. The top and external slopes of the embankment shall be planted with an approved seed mix to prevent erosion and promote stability.

817.41-.57 Hydrologic Balance (continued)

Prior to construction, the areas of pond construction shall be examined for topsoil, and if present in removable quantities, such soil shall be removed separately and stored in an approved topsoil storage location.

Stipulations

817.43(f)(1) Channel linings shall be incorporated should the flow velocity in the diversion ditch exceed five fps. Riprap used for linings (excluding sand and gravel) shall comply with the requirements of Section 817.72(b)(1)(iv).

Compliance

Applicant will comply with these sections when these stipulations are met.

817.59 Coal Recovery

Applicant's Proposal

Room and pillar design will be employed with development extraction estimated at 35 percent of the reserve. Once development is completed, pillar extraction will commence. Final pillar extraction will result in a total recovery rate of approximately 65 percent. Development work will be done by a continuous miner unit.

The longwall mining method will be looked at during initial mine development and production. Longwall mining would be installed should any seams prove adaptable to longwall mining.

There are three economic seams present on the property and mining plans are based on simultaneously operating a mine in each seam. Plates V-R, VI-R, and VII-R show the mine plans of underground workings.

Stipulations

None.

817.59 Coal Recovery (continued)

Compliance

Applicant complies with Section 817.59.

817.61-.68 Explosives

Applicant's Proposal

All blasting performed underground will conform to both State and Federal regulations governing explosives and blasting in underground coal mines.

All blasting operations will be conducted by persons who possess a valid certificate as required by Title 30 of the Code of Federal Regulations.

Surface blasting, consisting of highwall preparation for portal facilities, would be done in compliance with Chapter VIII, 817.61-.68 of Title 30 of the Code of Federal Regulations.

Explosives are stored in the area shown on the Surface Facilities Map (8-31-81). The magazine is a small concrete block structure.

Stipulation

The location of the explosive magazine shall comply with regulations regarding distances from power lines, fuel tanks, storage areas or other possible sources of fire.

Compliance

Applicant will comply with these sections when this stipulation is met.

817.71-.74 Disposal of Underground Development Waste and Excess Spoil

Applicant's Proposal

Rock waste which is developed will consist of roof rock shot down in the construction of ventilation overcasts. This rock will be sloped away from the outside of the overcast and placed in such a manner to prevent sterilization of any coal reserve. The applicant's mine has no faults nor are any anticipated. In the unlikely event that a rock problem (a fault) is encountered, the applicant will consult with USGS to determine the best underground storage for the waste. Storage of waste would most likely be in every other cross-cut to maintain access to the pillars for final extraction. (Add. C-D p.3)

Stipulation

In the event a rock waste problem is encountered, the applicant shall consult with regulatory agencies concerning disposal areas.

817.71-.74 Disposal of Underground Development Waste and Excess Spoil (continued)

Compliance

Applicant will comply with these sections when this stipulation is met.

817.81-.83 Coal Processing Waste Banks

Applicant's Proposal

At the present time, there will be no coal processing waste. All raw coal is hauled from the area. If, in the future, it is decided that a processing facility is to be incorporated, waste or reject will be taken to an approved refuse disposal site. There will be no return of waste to underground workings (pages 30-39).

Compliance

Applicant complies with sections 817.81-.83.

817.89 Disposal of Noncoal Waste

Applicant's Proposal

All combustible material will be collected in trash containers and disposed of at the county landfill. Oil and grease generated at the minesite will be stored in barrels in an area covered by the applicant's SSCP plan and disposed of at the landfill.

Approval from Carbon County granting permission to dispose at the county landfill is included in MRP as Appendix M.

Compliance

Applicant will comply with this section.

817.95 Air Resources Protection

Applicant's Proposal

Fugitive dust control measures have been planned for access road dust and exhaust mine dust. The following control methods will be implemented at the mine: water spray systems, chemical stabilization and enclosure of coal conveyor systems.

Emission estimates are included (Exhibit III-E) in the form of an emission inventory. This inventory has been reviewed and approved by the Utah Bureau of Air Quality and the EPA.

At the present, no air quality monitoring program is proposed.

Stipulations

817.95(b) Applicant shall implement the following additional fugitive dust control measures:

(5) Restricting vehicle speed.

(6) Stabilization of the surface of areas adjoining roads.

(7) Restricting the travel of unauthorized vehicles.

817.95(c) Applicant shall implement a water spray program during operations involving topsoil removal and stockpiling.

Compliance

Application will comply with this section when these stipulations are met.

817.97 Fish and Wildlife

Applicant's Proposal

The mine plan area is located in the West Tavaputs Plateau, an area which supports about 360 vertebrate species of wildlife. The main game species in the mine plan area are mule deer, mountain lion, black bear, elk and cottontail rabbits, with mule deer being the most important wildlife resource in the area. No known threatened or endangered species have been found on or near the lease area. Two golden eagle nests have been found within the lease area, but neither are in areas currently proposed for disturbance. There are no aquatic habitats in the mine plan area.

817.97 Fish and Wildlife (continued)

The entire area is high priority winter range for mule deer and elk. Tower Resources has committed to make every possible effort to minimize disturbance to wildlife habitat and to enhance habitat during reclamation. However, the applicant has not made a firm commitment to species, density and grouping of the shrubs that will be used for enhancement. Riparian habitats along the banks of ephemeral streams have been and will be disturbed by mining activity. Tower Resources has committed to restore these areas and has submitted a revegetation seed mix recommended by the BLM. The existing transmission line has been determined to be raptor-proof by the Utah Division of Wildlife Resources. Transmission lines to proposed facilities will be constructed according to the same specifications and pole design.

Stipulation

817.97(d)(9) Within 180 days of permit approval, the applicant must submit to the Division of Oil, Gas, and Mining and the Office of Surface Mining (OSM) for approval, a plan detailing species of shrub seedlings to be planted for wildlife enhancement, including density, diversity, and groupings of plantings for wildlife.

Applicant will comply with this section when this stipulation is met.

817.99 Slides

The applicant has included no information on the possibility of slide damage at the minesite.

Compliance

Applicant will comply with this section.

817.100 Contemporaneous Reclamation

All disturbed areas no longer required for the conduct of mining operations were immediately revegetated. In the future, any area no longer required for operations will also be immediately reclaimed and revegetated (Page 46, Volume I, MRP).

817.100 Contemporaneous Reclamation (continued)

Stipulations

None.

Compliance

Applicant complies with section 817.100

817.101-.106 Backfilling and Grading

Applicant's Proposal

All disturbed surface areas will be backfilled and graded in accordance with the reclamation time-table--Chapter III, Part E. All areas will be graded and restored to a contour approximate to the original contour--capable of supporting the approved postmining land-use (Section III-E, 3.4). Final reclamation contours are indicated on Plates V and II.

There will be no acid or toxic-forming materials deposited or stored in the mine area (Section III-B,10.3)

Stipulation

817.101(b)(5)(iii) Applicant shall reduce all highwalls to achieve a minimum static safety factor of 1.3 after reclamation.

Compliance

Applicant will comply with this section when this stipulation is met.

817.111-.117 Revegetation

Applicant's Proposal

Tower Resources, Inc., chose to use the range site method in collecting baseline vegetation data. This method has been tentatively approved by the Office of Surface Mining (OSM) "as an alternative standard for measuring revegetation success" pending assurance by Division of Oil, Gas and Mining that the technical guides relied upon "in measuring success and the techniques actually utilized are ones acceptable to Office of Surface Mining" (letter from Office of Surface Mining to Division of Oil, Gas and Mining, September 4, 1981).

Two range sites occur in potential disturbed areas, with areas of an additional site making up less than 1/10 of an acre in total area.

817.111 - .117 Revegetation (continued)

The mountain stony loam (oak) type occurs on alluvial fans at an elevation around 2,165 m (7,100 ft). Slopes are 15 to 25 percent and east facing. Average annual precipitation is 30 to 41 cm (12 to 16 inches). Dominant plant vegetative cover averages 58 percent, with a total annual production of 785 pounds per acre, air dry. There are 2,530 individuals of woody species per acre.

The upland stony loam (pinyon-juniper) woodland type occurs on alluvial fans and steep mountain slopes at elevations ranging from 2,160 to 2,225 m (7,100 to 7,300 ft). Slopes are 15 to 65 percent and east, south and north facing. Average annual precipitation is from 30 to 41 cm (12 to 16 inches). Total vegetative cover averages 20 percent, with 1,252 pounds per acre total annual production, air dry. Density of woody species is 716 individuals per acre.

The applicant has indicated that temporary contemporaneous reclamation and seeding will be done following completion of construction in a season that gives promise of optimum conditions for establishment of vegetation, normally late fall. Final reclamation will begin after mining activities cease and surface structures are removed. The applicant has submitted a revegetation plan, including recommendations from the Bureau of Land Management (surface owner) for a revegetation seeding mix and plans for seeding, mulching and fencing revegetated areas. (MRP pages 92-93).

Stipulation

780.81 (b)(5) Within 180 days of permit approval, the applicant must submit to the Division of Oil, Gas and Mining and the Office of Surface Mining (OSM) and BLM for approval, a specific revegetation plan, detailing species and amount (in pure live seed) to be used, seeding methods and seedbed preparation, mulching and weed control techniques, management practices and monitoring programs to be used in revegetation. This plan shall be submitted to the Regulatory Authority for approval before permanent revegetation begins and must provide for establishment of a permanent, effective and diverse cover.

Applicant will comply with these sections when this stipulation is met.

817.121 - .126 Subsidence

Applicant's Proposal

There are no structures or perennial streams on the land to be undermined.

Tower plans for 12 subsidence monitoring stations to be established, eventually, as mining progresses. Each station will be set up prior to removal of any pillars near a particular station. These stations will be set up for easy monitoring from an established survey point making it possible to detect both vertical and horizontal movement. The stations will be set up on a grid system over and outside the permit area.

817.121-.126 Subsidence (continued)

Stipulation

Surface owners should be notified six months prior to mining under their property. The notification should include:

1. Identification of specific areas in which mining will take place.

2. Dates of the underground operations that could cause subsidence.

3. Meaures to be taken to prevent or control adverse surface effects, if any occur

Compliance

Applicant will comply with these sections when this stipulation is met.

817.131 Cessation of Operations: Temporary

The applicant has not addressed this section.

Stipulation

The applicant must address this section, and comply with this regulation should temporary abandonment take place.

Compliance

Applicant will comply with this section when this stipulation is met.

817.133 Postmining Land-Use

Upon completion of Tower Resources' mining operation, the land will continue to be used for grazing and hunting. The limited resources, both physical and scenic will dictate no further change in the land status. All disturbed areas shall be restored in a timely manner to conditions that are capable of supporting the uses which they were capable of supporting before any mining.

Stipulations

None.

Compliance

Applicant complies with section 817.133

817.150 - .180 Roads/Transporation Facilities

Applicant's Proposal

The access/haul road to the minesite was an existing county road and has been upgraded with new surface gravel, culverts and drainage ditches. The applicant has submitted a letter from Carbon County granting permission to use the road and acknowledgment from the county that mining activities will be taking place within 100 feet of said road (Appendix M).

The grade of this road ranges from less than one percent to approximately five percent in the canyon areas. The road never exceeds ten percent grade (see Profile of Access Road, August 26, 1981). Cut slopes are designed to be 1.5 horizontal to 1.0 vertical. A diversion ditch will be constructed running parallel to the road opposite the cut slope. The road surface is sloped three percent toward the ditch.

The road will be constantly maintained and all repairs done in a timely manner. The gravel surface is chemically treated with a magnesium chloride solution to control dust.

Upon completion of mining, the road will be graded and the terrain re-established as near as possible to the original contour.

Compliance

Applicant complies with section 817.150 - .180

817.181 Support Facilities and Utility Installations

Applicants' Proposal

Surface facilities for the Pinnacle Mine have been constructed (May 1980 - February 1981) with minor modifications presently being approved. The existing facilities are shown on Plate I and listed in MRP III-B-1. Additional support facilities to be constructed for the remaining mines are shown on Plate I. Previous construction and any future construction has been or will be located and carried out so as to prevent and control erosion, siltation, water pollution, and prevent damage to wildlife and related environmental values.

Compliance

Applicant will comply with this section.

Cultural Resources
(Pinnacle) Tower Resources, Inc.
TEA

Part A. Description of Existing Environment

Two cultural resources surveys have been conducted over portions of the (Pinnacle) Tower Resources Mine Plan area. The first survey (Walker 1976) was conducted over approximately the northern one-half of the canyon bottom of the Right Fork of Deadman Canyon. During these investigations two historic mines were apparently observed but not recorded. These mines were later recorded adequately by the Hawkins and Seward 1980 investigations which surveyed approximately the southern one-half of the canyon bottom of the Right Fork of Deadman Canyon. These two mines are the Zion Mine (42Cb178) and the Rio Grande Mine (42Cb178). The Zion Mine was a coal mine which was active from 1925 to 1948.
The Rio Grande mine was also a coal mine and was active for a short period of time from 1940 to 1956.

Neither site is considered to be eligible for listing in the National Register of Historic Places. The significance of these mines is contained in the spatial arrangment of their surface structures and in the building construction styles employed there. These aspects have been documented.

Part B. Description of Applicant's Proposal

The applicant has caused to be identified and described the cultural resources located within the canyon bottom of the Right Fork of Deadman Canyon where all surface disturbing activities have or will take place. The company has not however, considered the potential adverse effects of subsidence on any other cultural resources which may be located outside of the canyon bottom.

The applicant has not provided measures to be used to minimize or prevent impacts to the two mine sites as they are not considered to be signficant/eligible.

Part C. Evaluation of Compliance

As previously described under Part A, two cultural resources surveys were conducted which located, identified and evaluated the significance of all cultural resources located. However, further research is necessary to completely document both sites. In accordance with Section 106 of the Historic Preservation Act of 1966 and the Advisory Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800) OSM has consulted with the Utah State Historic Preservation Officer and sought a determination of "No Effect." The SHPO has not responded as yet, however, a response is forthcoming. Discussions with the SHPO staff indicate that they are in agreement with OSM opinion that the two sites are not eligible and thus a "No Effect" determination is appropriate. As soon as OSM receives this documentation OSM will be in compliance. Tower Resources will be in compliance if they adhere to the proposed stipulations (See Section F).

Part D. Revisions to Applicant's Proposal (None)

Part E. Reevaluation of Compliance (None)

Part F. Proposed Special Stipulations

1. If during the course of mining operations previously unidentified cultural resources are discovered the applicant shall ensure that the site(s) is not disturbed and shall notify the regulatory authority. The operator shall ensure that the resource(s) is properly evaluated in terms of National Register Eligibility (36 CFR 60.6). Should a resource be found eligible for listing in consultation with the regulatory authority, the land managing agency (if the site is located on Federal lands) and the SHPO, the operator shall confer with and obtain the approval of these agencies concerning the development and implementation of mitigation measures.

Justification: To ensure (pursuant to 36 CFR 800.7) that sites are not inadvertently destroyed.

2. Within 90 days of acceptance of approval, the company will submit to the regulatory authority and the Utah State Historic Preservation Officer, the completed research documentation on the Zion and Rio Grande Mines which should document the function of the structures located at these mines. This research can be submitted as a brief addendum to the existing site forms.

Justification:

To insure that the two sites have been completely and accurately recorded because of their emminent destruction.

Part G. Summary of Compliance

If the company complies with the proposed special stipulations the company will be in compliance with the regulations and OSM will be in compliance with pertinent cultural resources legislation. OSM will have fulfilled its responsibility under the Executive Order 11593, the National Historic Preservation Act of 1966 and the Advisory Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800).

Part H. Proposed Departmental Action

Approve Plan With Proposed Stipulations

There are no sites within the area of direct impact (canyon bottom) which are listed on eligible for listing in the National Register of Historic Places. Thus the adverse impact resulting from their destruction is not "significant" as to require mitigation.

Part I. Residual Impacts of Proposed Departmental Action

Both sites within the canyon bottom area will be completely destroyed. Although these sites do not meet the criteria for nomination to the National Register they may be valued by the local residents and it is possible that local museums or historical groups may be interested in the sites for obtaining "salvagable" items of historical interest. These sites may in the future have been deemed "significant" even though not presently considered so. Sites which are not mitigated or avoided will be permanently lost. Cultural resources are a nonrenewable resource, and once lost there is an irretrievable loss of scientific information.

Part J. Alternatives to the Proposed Action

Prohibit mining of the areas where the sites exist. However, this does not appear to be reasonable or feasible.

References Cited

Hawkins, Bruce and Gregory L. Seward
1980 An Archaeological Survey of Portions of Fiasco Canyon, Starpoint Canyon and Straight Canyon near Price, Utah. Unpublished ms., prepared for Tower Resources - Amca Coal Company. Available from the Utah Division of State History, Salt Lake City, Utah.

Walker, J. Terry
1976 Archaeological Reconnaissance in Deadman Canyon, Carbon County, Utah. Unpublished ms., prepared for Centennial Development Company. Available from the Department of Anthropology and Archaeology, Brigham Young University, Provo, Utah.