

TECHNICAL ANALYSIS

Beaver Creek Coal Company
Trail Mountain #9 Mine
Federal Lease Tract
UTU-64375
ACT/015/009

APR 17 1991

Emery County, Utah
April 15, 1991

R614-301-100 GENERAL CONTENTS (SW)

112. Identification of Interests

Beaver Creek Coal Company is a Delaware corporation. The name and address of the applicant and operator is listed on page 2-1. The names and addresses of the officers, directors and principle shareholders are listed on pages 2-3 and 2-4. The applicant's corporation also operates West Elk Coal Company in Colorado and Thunder Basin Coal Company in Wyoming. Surface and coal ownership are identified on page 2-1. Surface and coal owners are the United States of America, State of Utah and Beaver Creek Coal Company. Ownership contiguous to the permit area is identified on page 2-5. The MSHA identification number is 42-01211. The applicant has no current interest in lands adjacent to the proposed permit area.

113. Violation Information

Neither the applicant nor any affiliate or persons under common control with the applicant has had a state or federal permit revoked. Nor has a performance bond or security been forfeited. A list of all violations in the past three years received by the applicant or under common control with the applicant is found in Appendix 2-2.

114. Right-of-Entry Information

The applicants right to enter and begin coal operations are found on page 2-8 through 2-10. The applicant lists the document, date of execution, and identifies the specific land to which the document pertains. A private mineral estate has not been separated from a private surface estate in this lease application.

115. Status of Unsuitability Claims

The proposed permit area is not within an area designated or under study as unsuitable for coal mining and reclamation operations (page 2-10). Additionally, there are no occupied dwellings within five miles of the permit area.

116. Permit Term

The lease permit will be renewed with the Trail Mountain #9 five-year permit renewal on February 21, 1995.

117. Insurance and Proof of Publication

Proof of publication is found in appendix 2-7. The newspaper advertisement was published January 29, 1991, through February 19, 1991, in the Sun Advocate and Emery County Progress. Insurance Certificate is found in the Trail Mountain #9 Mine permit in appendix 2-7.

140. Maps and Plans

All maps are of an acceptable scale and format. There is no mining related activity in the proposed permit area prior to August 3, 1977.

COMPLIANCE:

The applicant is in compliance with all sections of R614-301-100.

R614-301-200 SOILS (HS)

221. Prime Farmland Investigation

An investigation was conducted by the U.S.D.A./Soil Conservation Service to determine if prime farmland exists within the Federal Lease Tract. Ferris P. Allgood, State Soil Scientist, determined that no prime or important farmlands exist (Appendix 8-1{L}).

COMPLIANCE:

The applicant is in compliance with all sections of R614-301-200.

R614-301-300 BIOLOGY (SW)

320. Environmental Resources

No surface disturbance is associated with the proposed lease tract addition, therefore, reference areas and productivity requirements are not applicable.

A detailed description of fish and wildlife resources is found in Chapter 10 of the Trail Mountain #9 Mine permit. The proposed lease area is critical value deer and elk winter range. The fishery in Straight Canyon, from the junction of Cottonwood Creek up to Joes Valley Reservoir, is classified as a crucial-critical use area. Six Buteo nests and one golden eagles nest is identified in Straight Canyon adjacent to the proposed lease tract (Figure 10-4). The US Forest Service has determined that there are no listed threatened, endangered, or sensitive plants in the lease area (page 9-1). A concurrence letter was sent to the US Fish and Wildlife Service by the Division on April 5, 1991. The proposed lease area vegetative plant communities are delineated on Figure 9-1.

330. Operation Plan

Possible subsidence should be the only potential surface impact related to the lease tract addition. The permit identifies possible surface cracks, diminished spring flow, and escarpment failure. The applicant has committed to mitigate any damage caused by subsidence (page 12-4). The lease boundary along Straight Canyon has been set back from the escarpment in order to reduce the risk of escarpment failure (12-4b) and damage to raptor nests. Subsidence will be monitored as described in Chapter 12.

340. Reclamation Plan

This section does not apply.

350. Performance Standards

This section does not apply.

COMPLIANCE:

The applicant is in compliance with all sections of R614-301-300.

R614-301-400 LAND USE AND AIR QUALITY (SW)

411. Environmental Description

The lease tract is on US Forest Service land. Land use is a horse allotment and Deer Herd unit 35 (Figure 4-3). The US Forest Service manages the area for mining, grazing, recreation, wildlife habitat, and timber harvesting (pages 3-5 and 4-4). Cultural evaluations of historical, archeological and paleontological resources is based

on record and archival examination and surveys of the lease exploration drilling areas (Appendix 5-1{L}). No significant cultural or historic resources within the proposed lease tract are shown in Figure 5-1 (page 3-6). The State Historic Preservation Officer has given clearance for the lease area (personal communication with David Schirer, Utah State History, April 9, 1991).

412. Reclamation Plan

Since no surface disturbance is anticipated, the premining land use is the same as the postmining land use.

COMPLIANCE:

The applicant is in compliance with all sections of R614-301-400.

R614-301-500 ENGINEERING (JK)

510. Introduction

The applicant proposes to extend the present mining operation into Federal Lease, UTU-64375. This lease area contains approximately 2,631 acres and lies adjacent to the present mining area on its western and southern borders.

The proposed extension of operations is described in a volume which is separate from the Trail Mountain #9 permit. However, the extension will use the existing Trail Mountain #9 surface facilities and mine portals and will create no additional surface disturbance (see Chapter 1).

512. Certification

All maps which require certification under this and other relevant sections have been certified by a qualified, registered, professional engineer. The certified maps are: Plates 6-4 (Geologic Map--Hiawatha Seam), 6-7 (Hiawatha Seam--Overburden Thickness Map), 7-2 (Location of Seeps and Springs), 7-9 (Water Monitoring Locations), and 7-9A (Underground Water Monitoring Locations). Those maps which are included in the Lease Permit Application but require no certification are 3-10 (Permit Area Map), 4-2 (Surface Ownership Map), 4-3 (Land Use Map), 5-1 (Cultural Resources Survey), and 12--6 (Subsidence Monitoring Plan).

Since the Federal Lease involves no further surface disturbance, there are no plans or engineering designs that require certification.

513. Compliance with MSHA Regulations and MSHA Approval

This section is not applicable. Any and all provisions for sedimentation ponds, refuse piles, closure of entryways, and extinguishing of coal mine waste fires are found in the Trail Mountain #9 permit.

514. Inspections

This section is not applicable. Any and all provisions for the inspection of refuse piles or impoundments are found in the Trail Mountain #9 permit.

515. Reporting and Emergency Procedures

Any time a slide occurs which may have a potential adverse effect on public property, health, safety, or the environment, the applicant will notify the Division by the fastest available means and comply with remedial measures required by the Division (page 3-14).

All provisions for notification and remediation in the case of an impoundment hazard, as well as for temporary cessation of operations, are found in the Trail Mountain #9 permit.

520. Operation Plan

521.110 Previously Mined Areas

Besides the applicant's own operation, there are only two small abandoned mining operations in the vicinity of the Federal Lease: the Oliphant Mine and the Black Diamond Mine. These are located in Straight Canyon, to the south of the Federal Lease Tract. Both are shown on Map 4-2 (Surface Ownership Map).

521.120 Existing Surface and Subsurface Facilities

All existing surface and subsurface facilities and other manmade features are shown in Figure 3-1 (Surface Facilities) in the Trail Mountain #9 permit.

521.130 Landowners and Right of Entry and Public Interest Maps

All boundaries of lands and names of present owners of record of those lands, both surface and subsurface, are shown in Figures 3-10 (Permit Area Map) and 4-2 (Surface Ownership Map). The boundaries of land within the permit area upon which

the applicant has the legal right to enter and carry out coal mining and reclamation operations are shown in Figure 3-1 (Surface Facilities) of the Trail Mountain #9 permit.

521.140 Mine Maps and Permit Area Maps

The boundaries of all areas proposed to be affected over the total life of the operation are shown in Figure 3-10 (Permit Area Map). Underground workings and areas where methods for subsidence prevention or controlled subsidence will be employed are shown in Figure 12--6 (Subsidence Monument Plan).

521.150 Land Surface Configuration Maps

This part is not applicable as no new surface disturbance will be created as a result of the Federal Lease Tract.

521.160 Maps and Cross Sections of the Proposed Features for the Proposed Permit Area

The features, facilities, buildings, etc. mentioned in this part are shown on the Surface Facilities Maps of the Trail Mountain #9 permit.

521.170 Transportation Facilities Maps

Transportation facilities are shown on the Surface Facilities Maps of the Trail Mountain #9 permit.

521.200 Signs and Markers Specifications

This part is not applicable as no new surface disturbance will be created as a result of the Federal Lease Tract.

522. Coal Recovery

The applicant estimates that there are 48,800,000 tons of coal in place in the Federal Lease Tract and 13,200,000 tons are recoverable (page 3-3, Table 3-1). The applicant maintains that this rather low rate of recovery is justified because of the necessity of leaving 12 to 18 inches of top coal to prevent air slacking of the roof. Nevertheless, the applicant has a Resource Recovery and Protection Plan approved by the Bureau of Land Management to attain maximum economic recovery of the coal resource (page 3-4).

523. Mining Method

The method of mining in the Federal Lease Tract will be the same as that employed presently in the Trail Mountain #9 Mine: room-and-pillar mining with continuous mining machinery. Panels will be driven to the property boundaries and pillar extraction will then be carried out as roof and other conditions dictate. Sixty-foot barrier pillars will be left between panels. The applicant expects to increase annual production from the present level of 450,000 tons to a maximum of 1,200,000 tons (pages 3-1 to 3-2).

524. Blasting and Explosives

This section is not applicable. There will be no surface blasting in connection with the Federal Lease Tract.

525. Subsidence (JK/DD)

The applicant has conducted a survey of the surface area above the proposed lease. Timber, wildlife, grazing areas and water seeps are the renewable resources which occur in this area. There are no oil and gas wells, pipelines, utility structures, power transmission lines, or other buildings in the area (see pages 12-2 to 12-3).

The renewable resources in the area are not likely to be adversely affected by subsidence. The seeps that are present are surficial in nature. They are fed by precipitation and are dry most of the summer. In the event that roads, trails, or land surfaces are damaged appreciably by subsidence, the applicant will repair them and restore them to presubsidence usefulness (see page 2-3).

The applicant is committed to using practices which will control and minimize subsidence. Room-and-pillar methods with pillar extraction will be used in the mine. 100-foot barrier pillars will be left between development panels and the main entry pillars will have dimensions of 80 feet by 80 feet. In order to prevent subsidence-induced spalling of rock escarpments, the applicant will mine only to that distance from escarpments which is dictated by the projected 15° angle of draw (see pages 12-1 to 12-4a).

The applicant plans to extend the subsidence monitoring system presently used at the Trail Mountain #9 Mine to include the proposed lease addition. As at the existing Trail Mountain #9 Mine, subsidence will be monitored by conventional surveying of monuments. There will be 52 new monuments, which will be designated "9-1-S" through "9-52-S". Monuments will be placed over the center and ends of each panel except for monuments 9-45-S through 9-52-S, which will be placed over

escarpments and elsewhere outside of the mining area. All monuments will be surveyed and a subsidence reconnaissance survey conducted once a year. All of the information from the combined survey will be submitted to the Division in the Annual Report (see pages 12-5 to 12-5a and Figure 12-6).

Six months prior to mining, the applicant will send to all surface owners who may be affected by subsidence a mining schedule which will detail the area in which mining is to take place and the planned date of that mining activity. Appendix, 12-1(L) contains copies of the letters of notification (see page 12-4b and Appendix 12-1{L}).

The applicant intends to protect perennial streams (page 7-18a) by identifying which drainages are perennial and restricting mining activities to first-mining (development only). The area of mining restriction will be determined by projecting the angle-of-draw from a point 50 feet on each side of the stream down to the coal seam.

526. Mine Facilities

This section is not applicable. The locations and other details of all surface facilities are contained in the Trail Mountain #9 permit.

527. Transportation Facilities

This section is not applicable. Details of all road and conveyors are contained in the Trail Mountain #9 permit.

528. Handling and Disposal of Coal, Overburden, Excess Spoil, and Coal Mine Waste

This section is not applicable. What little spoil and coal mine waste produced in the proposed lease tract addition will be handled as described in the Trail Mountain #9 permit.

529. Management of Mine Openings

This section is not applicable. There will be no additional mine openings as a result of the proposed lease tract addition.

530. Operational Design Criteria and Plans

532. Sediment Control

This section is not applicable. Sediment control measures are described in the Trail Mountain #9 permit.

533. Impoundments

This section is not applicable. Designs, specifications, maintenance and inspection procedures, and other details of impoundments are contained in the Trail Mountain #9 permit.

534. Roads

This section is not applicable. Road designs and other details are contained in the Trail Mountain #9 permit.

535. Spoil

This section is not applicable. Spoil produced in the proposed lease tract addition will be handled as described in the existing Trail Mountain #9 MRP.

536. Coal Mine Waste

This section is not applicable. Coal mine waste produced by the proposed lease tract addition will be disposed of as described in the Trail Mountain #9 permit.

537. Regraded Slopes

This section is not applicable. Regrading of slopes and fills is described in the Trail Mountain #9 permit.

540. Reclamation Plan

542. Narratives, Maps and Plans

This section is not applicable. Maps and plans having to do with all phases of reclamation, including reclamation costs, are contained in the Trail Mountain #9 permit.

550. Reclamation Design Criteria and Plans

551. Casing and Sealing of Underground Openings

This section is not applicable. During reclamation, underground openings, of which there will be none additional as a result of the proposed lease tract addition, will be sealed and backfilled as described in the Trail Mountain #9 permit.

552. Permanent Features

This section is not applicable. Any features which are to remain after final reclamation are described in the Trail Mountain #9 permit.

553. Backfilling and Grading

This section is not applicable. All plans, maps and specifications for backfilling and grading are described in the Trail Mountain #9 permit.

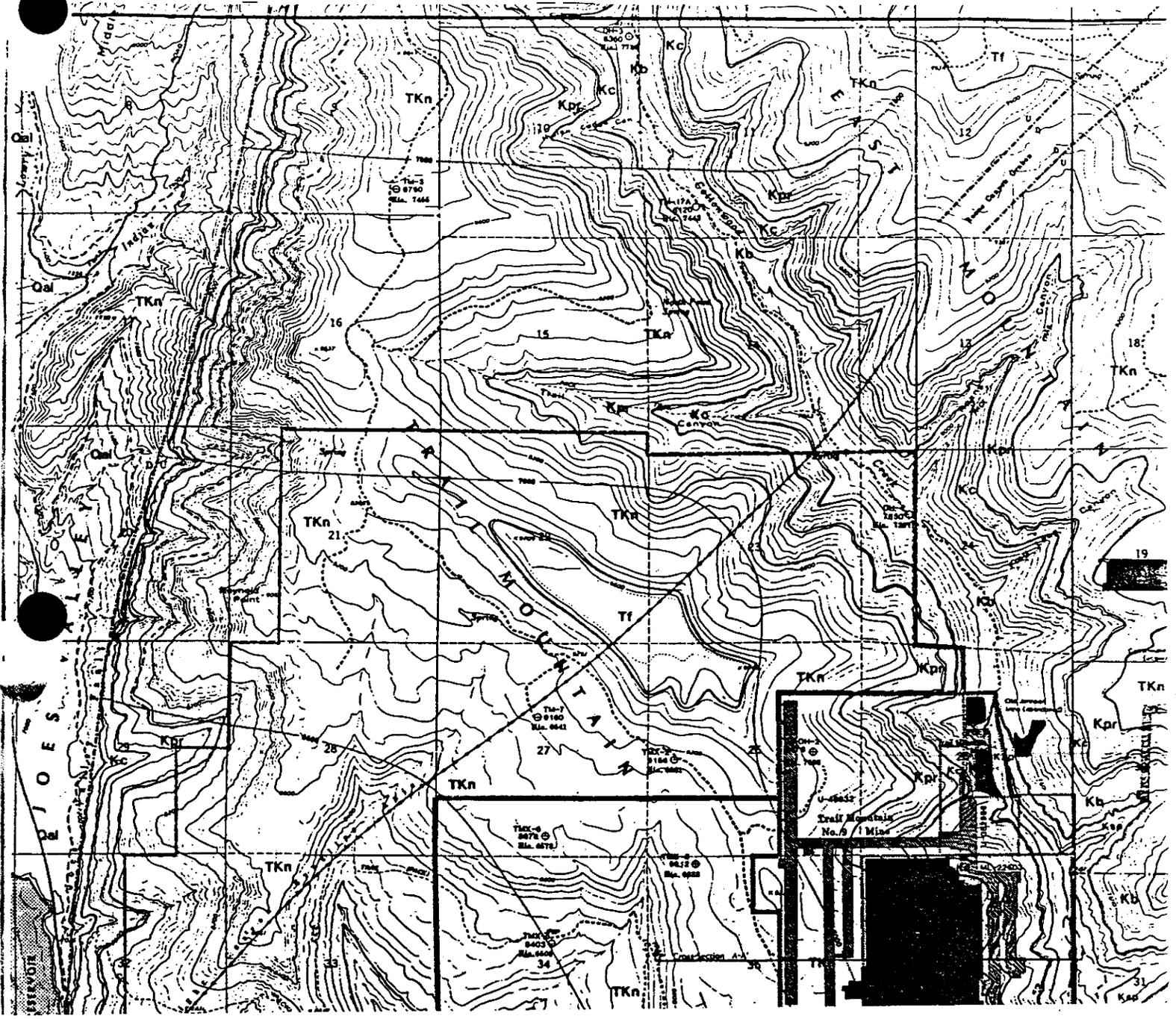
COMPLIANCE:

The applicant is in compliance with all sections of R614-301-500.

R614-301-600 GEOLOGY (DD)

The geology for the mine permit and adjacent area is discussed in Section 6 of the Lease Application Package. The applicant has presented a geologic description of the permit and adjacent area. A geologic map, Figure 6-4 identifies that mining will take place in the Hiawatha coal seam. The attitude of the coal seam is indicated to strike northwest and dip from 3 to 4.5 degrees to the southwest. An overburden isopach map (Figure 6-7) identifies a thickness over the mine plan area to be over 1000 feet. This lease area was established with the overburden thickness in mind. The proposed mining is designed to take place inside the limits of the escarpment to help ensure against escarpment failure, slumping and rockfalls. About one-third of Section 6 along Cottonwood Canyon, which is administered by the BLM, allows mining under lower cover (overburden), beyond the escarpment. However, mining is restricted to a maximum of fifty percent recovery. This is in conformance with the previous mining practices for earlier Trail Mountain leases.

The applicant has collected coal, roof and floor quality data. The results indicate very low pyritic sulfur and high neutralizing potentials. Monitoring will continue at intervals not to exceed 2000 feet intervals.



In a conference held with Ken Fleck on April 4, 1991 information and data was presented identifying coal resources, thickness, quality and minability. The information was reviewed separate from the mine plan because the operator had requested confidentiality and non-disclosure in accordance with Title 40-10-10, Utah Code Annotated and R614-300-124.300 of the Utah Coal Mining and Reclamation Regulations. Ken presented a structure contour map of the Hiawatha coal seam, cross-section B-B', coal isopach map of the Hiawatha coal seam, the coal quality and geology study and analysis workbook, a geologic conditions map (Figure 5.4), minable reserves estimates and geophysical studies for ground water conditions.

The applicant has accumulated data from 10 explorations drill holes, as well as drilling data that is public domain from monitoring wells developed by U.S. Geological Survey for a hydrologic study (Lines, 1985). Surveys of the property from the surface and adjacent mines indicate that there is no large scale faulting and fracturing over the lease area. The axis of the Straight Canyon Syncline runs diagonally from northeast to southwest along the northwest corner of the lease area. A geophysical study by the applicant indicates that no structural displacement occurs that presents an anomalous ground water zone or adversely affects mining operations.

COMPLIANCE:

The applicant is in compliance with all sections of R614-301-600.

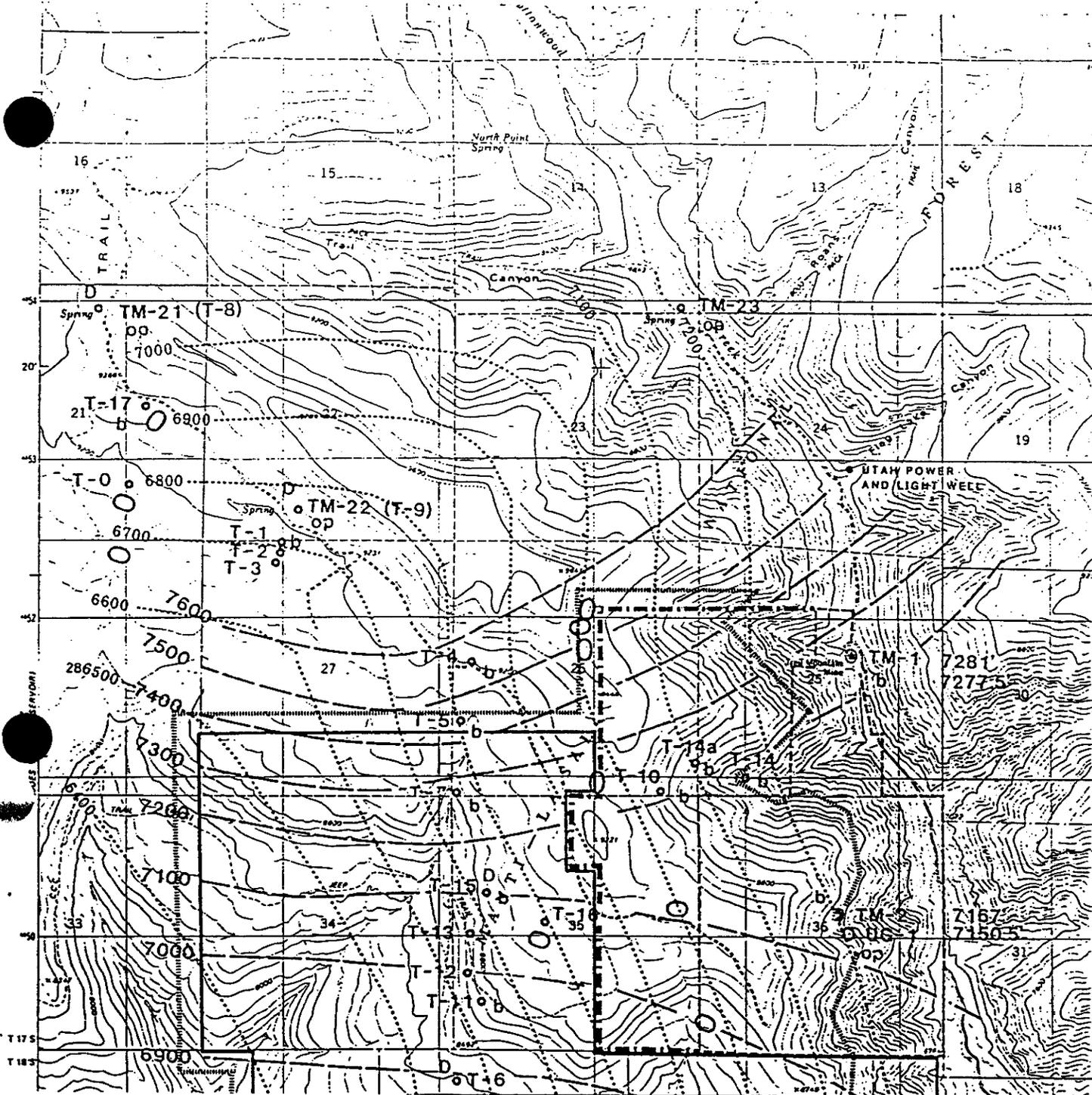
R614-301-700 HYDROLOGY (TM/DD)

722. Cross-Sections and Maps

722.100 Location and Content of Surface Water. The applicant has provided sufficient drillhole information to document that significant subsurface water was not encountered, therefore, this requirement is waived. See data presented in Appendix 7-15(L).

722.200 The locations of surface water bodies such as streams, lakes, ponds and springs within the permit area and adjacent area are shown on Figure 7-9.

722.300 The locations of monitoring stations used to gather baseline data on water quality and quantity is shown in Figure 7-9. The water monitoring program is discussed in Appendix 7-1(L).



722.400 One monitoring well, TM-1 located near the portal is monitored quarterly and shown on Figure 7-9. This well is used strictly for water monitoring (see page 7-9).

724. Baseline Information

724.100 Ground Water Information

The location and ownership for the permit area and adjacent areas of existing wells, springs, and other ground water sources is shown on Figure 7-9. The seasonal quality and quantity is collected on selected springs, wells, and surface water sources according to the schedule identified in Appendix 7-1(L).

The applicant has submitted information to describe the ground water regime to the extent as could be evaluated from the hydrologic studies that have been conducted adjacent to the area and from information and data collected by the applicant (i.e., occurrence and geologic framework).

Through an extensive drilling program no extensive ground water aquifers were shown to exist and therefore the ground water that does exist is most probably isolated and perched in nature and would be potentially impacted by mining. Since no regional aquifers appear to exist based on drilling data found in Appendix 7-15(L), no data on approximate rates of discharge or usage and depth to the water in the coal seam, and each water bearing stratum above and potentially impacted stratum below the coal seam was requested from the applicant. This assessment was based on the data submitted to date.

Spring inventories were conducted during the spring seasons of 1981 and 1985. Most springs were located in the North Horn Formation which is interbedded with sands, siltstones and mudstones. The applicant attributes the majority of springs in the area to perched aquifers that exist several hundred feet above the coal seam, and anticipates that mining will not have an influence or effect on their flow. The applicant has committed to conducting another spring study during the summer of 1991.

Information describing the ground water in the Blackhawk Formation and Star Point Sandstone Formations was derived from Lines (1985) hydrologic report. Hydraulic conductivity of the sandstones and shales, and the rapid change in facies in the Blackhawk severely restrict the flow of ground water through the formation.

The applicant identifies a potentiometric surface in the Star Point Sandstone (page 7-6). Figure 7-2 illustrates the potentiometric surface of the Blackhawk-Star Point aquifer at the level of the Hiawatha Coal Seam, which ranges from the 6400 feet

elevation at the southwest part of the lease area to 7200 feet elevation along the escarpment of the Cottonwood Creek.

724.200 Surface Water Information

The baseline water quality and quantity information is sufficient to demonstrate seasonal variation and water usage which is found in Chapter 7 of the Trail Mountain #9 Mine permit.

No wells are known to exist within or adjacent to the new lease. Water is produced in mine development from roof leaks, roof bolt holes and tension cracks. The current mine workings in Cottonwood Canyon are producing about 75 gallons per minute in the form of discharge. It is expected that expansion of the mine workings will increase mine water production proportionately. The applicant has committed to monitoring significant mine inflows.

725. Baseline Cumulative Impact Area Information

The necessary baseline hydrologic and geologic information has been submitted to assess the probable cumulative hydrologic impacts of the mining operations on surface and ground water.

Data from the applicant's drilling program has been submitted, as well as baseline data on existing surface and ground water monitoring points as shown on Figure 7-9 and in Appendix 7-15(L).

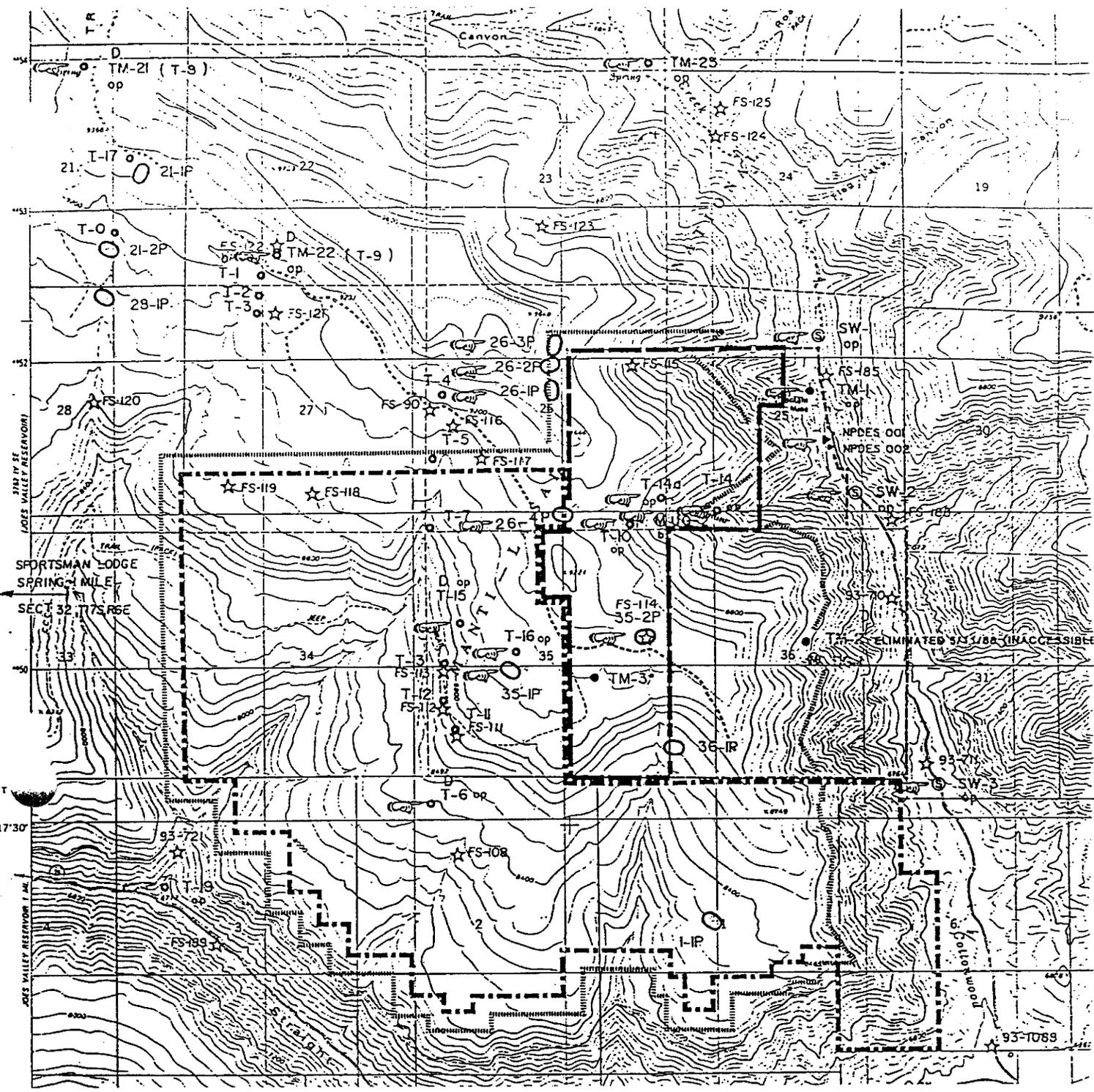
727. Alternative Water Source Information

The available source of water, if needed, would come from 20 shares of Cottonwood Creek Water owned by the applicant, Beaver Creek Coal Company. Beaver Creek Coal Company also owns 800 shares of the Huntington-Cleveland Water Rights (page 7-15).

A commitment for the repair or replacement of water rights affected by mining is found on pages 7-14 and 7-15.

728. Probable Hydrologic Consequences (PHC) Determination

The determination of the PHC is found in Section 7.1.5 of the PHC. There has been no indication of increased ground water occurrence from recent drilling in the Federal Lease Tract. There have been no documented impacts from mining on surface water resources. Adequate mitigation plans have been presented in the event



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JOES VALLEY RESERVOIR

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large amounts of ground water are encountered or surface water resources are impacted from subsidence. Current projections of 72.62 gallons per minute of water being produced within the mine is based on estimates of the amount of water discharged during 1990 as documented on page 7-11e of the PAP. The overall occurrence of ground water being encountered within the mine falls in line with the theory that inflows are localized and not of a regional, large aquifer.

731.200 Water Monitoring

731.210 Ground Water Monitoring

The permit application contains a monitoring plan for ground water in Appendix 7-1(L). A commitment has been made to monitoring any water sources not previously identified at the completion of the 1991 water survey. This commitment is found on page 7-13 of the PAP.

However, the applicant needs to submit information to completely identify impacts to deep ground water sources, effects of mining on the Star Point aquifer. Information presented by the applicant indicates that the Star Point aquifer will be contacted during the mining process. A positive hydrostatic head will likely be contacted as the working extend west. Monitoring of the Star Point aquifer should take place to detect any changes in water quality and to identify the any impacts. Monitoring information is needed to identify the cumulative hydrologic impacts for the Star Point aquifer as ground water moves from the mine to locations off site. Therefore, special condition R614-301-731.200 must be addressed for the applicant to be in compliance.

731.220 Surface Water Monitoring

The surface water monitoring plan is presented in Appendix 7-1(L). This plan is in compliance with Division guidelines regarding parameters and frequency of monitoring. Any new surface water sources identified in 1991 water survey will be added to the monitoring plan.

Special Condition, R614-301-731.200 Water Monitoring

The applicant must monitor quality and quantity of the Star Point aquifer at a point where the flow in the aquifer leaves the permit area. The most likely place to develop this monitoring site is in the area near DH-5 (Figure 6-4). The applicant will be required to develop a well to monitor aquifer parameters, seasonal fluctuation, mining influence and hydrologic tests. The applicant will be required to construct the monitoring well within 90 days of permit approval. This information is requested in

accordance with the requirements for water monitoring regulations R614-301-731.200 through R614-301-731.215.

731.300 Acid- and Toxic-Forming Materials (HS)

The permittee has committed to regularly sample roof and floor material to determine its acid- and toxic-forming potential. Analysis will include taking samples at intervals not to exceed 2000' along the main entries and in at least one panel entry. Samples will be bagged and analyzed in accordance with the Division Guidelines for the Management of Topsoil and Overburden, Table 6 (page 6-12).

Previous analysis of roof, floor and midseam material may be located in Tables 6-2, 6-3 and in Appendix 6-2. Results indicate (2nd Left-Floor) an acid-forming potential of -81.7 Tons CaCO_3 /1000 Tons Material. This is unacceptable when compared with Division criteria for acid forming potential (i.e., -5 Tons CaCO_3 /1000 Tons Material, Division Guidelines for the Management of Topsoil and Overburden, Table 2). Underground waste rock material will be backstowed in the mine or trucked to the Castle Valley Spur Loadout Facility (Refer to C.V. Spur PAP). Backstowed material emanating from areas having acid- and/or toxic-forming roof and floor material, will be sampled further to determine its acid- and/or toxic-forming potentials.

The acid-forming floor material (Hiawatha Bed) will be closely monitored in the future. Continued roof and floor analysis and in mine water monitoring must proceed to determine the extent and impact of this material on the ground water resource.

COMPLIANCE:

The applicant is in compliance with sections of R614-301-700, except R614-301-731.200 through R614-301-731.215 (Special Condition).

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