TECHNICAL ANALYSIS

Southern Utah Fuel Company
Convulsion Canyon Mine
ACT/041/002, Sevier County, Utah

March 12, 1985

Introduction

The Convulsion Canyon Mine is an existing underground mine operated by Southern Utah Fuel Company (Sufco), a subsidiary of Coastal States Energy Company of Houston, Texas. The mine is located approximately 30 miles east of Salina, Utah, with the surface facilities and access portal on U. S. Forest Service (USFS) land in East Spring Canyon, witnin Section 12, Township 22 South, Range 4 East, Salt Lake Baseline and Meridian (see map within this document for specific location).

The mine commenced operation in 1941, mining Federally-owned coal. The applicant currently holds five Federal and one Fee lease, for a total of 7,355 acres, of which 91 percent are Federally-owned. Total surface disturbance for surface facilities is approximately 17 acres, with no additional disturbances planned.

The original mine plan was submitted to the U. S. Geological Survey (USGS) and the Utah Division of Oil, Gas and Mining (DOGM) in 1977. Additional information was submitted, and the mine plan was approved by DOGM pursuant to the Utah Mined Land Reclamation Act on Septebmer 14, 1977. The USGS approved the plan on February 3, 1978. In October of 1979, Sufco submitted additional information to comply with the regulations of the newly implemented Surface Mining Control and Reclamation Act of 1977. The Office of Surface Mining (OSM) sent an Apparent Completeness Review (ACR) to the applicant in May 1980, which Sufco responded to in November 1980. A joint ACR was prepared by DOGM and OSM and sent to the applicant in June of 1981. The applicant reponded to the review and submitted baseline data on a new Federal Lease (U-47080) in September 1981. DOGM submitted requests for additional completeness and technical information in March and June of 1983 to which the operator responded in April and July of 1983. The mine plan application was declared complete on July 18, 1983. Newspaper advertisement of the application has been published in the Salina Sun and Richfield Reaper beginning on August 3, 1983. Copies of the advertisements are attached to the Technical Analysis (TA).

Projected life of the mine is 26 years, with an average annual production of two million tons per year. Coal is being mined from the Upper Hiawatha coal seam. Room and pillar mining is the

predominant mining method, but longwall mining will also be used on Lease U-47080. Coal is moved by underground conveyor from the face to the portal. From there it is shipped by truck to Salina or Levan, where it is further shipped to buyers by truck or rail. Current employment is approximately 300, with three times that number employed in support services in the surrounding area.

Existing Environment

The lease area is in the Wasatch Plateau coal field which underlies a major portion of the Wasatch Plateau, the northeasternmost high plateau in Utah. The major geologic formations of the permit area are the Price River, Blackhawk and North Horn formations. The strata which outcrops within and adjacent to the permit area consists of alternating clays, shales and sandstones which range from upper Cretaceous to Tertiary in age. The Blackhawk Formation is the coal bearing formation with three coal bearing seams present within the lower 200 feet of this formation: (1) the Upper Hiawatha Seam; (2) the Lower Hiawatha Seam; and (3) the Duncan Seam. The Upper Hiawatha Seam is (1) the only seam which is being mined, (2) has an average thickness of 13 feet, and (3) has an average strike and dip of N 45°E 2°NW. The overburden above the Upper Hiawatha Seam ranges from 0 feet at the coal outcrops to approximately 1,500 feet at Little Drum Mountain.

The majority of the area is gentle rolling surface that ends abruptly to the east and the south at steep cliffs cut by Convulsion Canyon and the North Fork of Quitchupah Canyon. Small scale faulting occurs throughout the permit area. Subsidence of the surface above areas that have been mined has occurred and will continue to occur, with no damage to structures or property expected. Tension cracks have also occurred in subsidence areas, but appear to have healed themselves within a year or two.

The mine permit area is in the drainage basin of Muddy Creek and ultimately tributary to the Colorado River. Muddy Creek receives runoff from the lease area by way of Convulsion Canyon and Quitchupah Creek. Several springs, seeps and runoff catchment basins also occur on the permit area. Water is introduced into the mine from faulting and fracturing of formations adjacent to and overlying the coal seam. Mine water is discharged into the North Fork of Quitchupah Creek at a rate of 600,000-750,000 gallons per day. No water treatment facilities are required for this water since water quality is good and meets effluent limitations.

Vegetation community types present include pinyon/juniper, ponderosa pine, fir, aspen, sagebrush/grass, black sagebrush and mountain brush. Surface facilities are located in former pinyon/juniper habitat.

Soils on the Wasatch Plateau are generally very shallow, sand to silty sand in texture, with high percolation rates. These soils are highly susceptible to wind erosion, but only slightly susceptible to water erosion. Mancos shale dominates the canyon bottoms within the permit area.

The majority of the land surface on the Sufco permit area is managed by the USFS under the multiple use concept. Current land uses include livestock grazing, wildlife habitat, timber and recreation.

UMC 817.11 Signs and Markers

Existing Environment and Applicant's Proposal

The applicant has posted and maintained signs and markers as required by this section, and as specifically described below.

The applicant states that three identification signs are placed on the only possible vehicle access routes to the mine surface facilities area, two on a secondary road, the other on the main access road (PAP, Volume 2, p. 19).

Perimeter markers are properly placed in the permit area (PAP, Volume 8, November, 1983, Stipulation Response).

Three stream buffer zones are marked with signs according to the application (PAP, Volume 8, 1983 Compleness Response, p. 28a)--at the north ventilation entries above the North Fork of Quitchupah Creek as well as near the pumphouse and leachfield in East Spring Canyon. The signs identify the areas as buffer zones and prohibit disturbance.

No surface blasting is anticipated for the remainder of the mine life, so no blasting signs or markers are required (PAP, Volume 7, 1981 Completeness Review Response).

No topsoil is stored at the minesite at this time. However, the applicant has committed to mark any future tospoil storage piles with "Topsoil Storage Area" signs (PAP Volume 2, page 19).

Compliance

Applicant complies with this section.

Stipulations

None.

UMC 817.13 Casing and Sealing of Exposed Underground Openings: General

Existing Environment and Applicant's Proposal

Drill holes are plugged from bottom to top with a slurry mixture of 5.2-5.5 gallons of water per bag of cement upon completion of drilling operations.

Seals will be installed in all openings as soon as mining is completed (see UMC 817.15). Inactive openings (ventilation entries) are presently fenced and posted and will be sealed after mining.

Compliance

The plugged drill holes prevent vertical fluid migration.

No acid or other toxic drainage enters surface or subsurface drainage from the mine openings. Fencing and "Danger" signs ensure the safety of people, livestock, fish, wildlife and machinery in the permit area and adjacent area. Upon completion of mining all openings will be sealed.

Stipulations

None.

UMC 817.14 Casing and Sealing of Underground Openings: Temporary

Existing Environment and Applicant's Proposal

Mine entries which are temporary openings are used to facilitate air flow to mine workings. They are protected by locked steel mesh gates and are posted with "Danger" signs. They are periodically inspected by mine personnel to ensure proper maintenance.

No drill holes, shafts or exposed underground openings for underground development waste exist on the property as temporary (or permanent) openings.

Compliance

Mine entries for ventilation purposes are constructed to prevent access into the mine and are identified as hazardous.

Stipulations

None.

UMC 817.15 Casing and Sealing of Underground Openings: Permanent

Existing Environment and Applicant's Proposal

Seals will be installed in all entries as soon as mining is completed and the mine is to be abandoned. The seals will be situated at least 25 feet inside the portal mouth entry. Proximal loose material will be removed prior to installation and the seals will be made of solid concrete blocks and mortar. The construction technique will be to build vertically succeeding layers of blocks in a pattern perpendicular to that of the proceeding row. An interlaced pilaster will be constructed in the center for support. The opening will then be backfilled with noncombustible material and sloped to match the cut slope at the portal entry.

Compliance

Access to the mine workings will be prevented and drainage will be prevented from entering ground or surface waters.

Stipulations

None.

UMC 817.21-.25 Topsoil

Existing Environment and Applicant's Proposal

The soils found in the Sufco permit area were formed from weathering of clay, sandstone and limestone at an elevation of approximately 6,900 to 9,100 feet. The topography is steep V-shaped canyons with horizontal sandstone ledges.

Four soil orders were found to exist in the area. They are Alfisols, Entisols, Inceptisols and Mollisols. Alfisols were formed on side slopes ranging from 15 to 35 percent. Predominant vegetation consists of Douglas fir, spruce, black sagebrush and wildrye. Entisols and Inceptisols were formed on steep slopes of 60 percent or greater. Predominant vegetation is pinyon-juniper, black sagebrush, grasses and mountain mahogany. Mollisols are found on lesser slopes ranging from 0-15 percent. Typical vegetation is ponderosa, aspen, mountain mahogany, rabbitbrush and pinyon- juniper (See Volume 5, pp. 13-35, Map B).

The pH and EC of the soil range from approximately 5.3 to 8.6 and 0.24 to 9.6 millimhos, respectively. Soil textures are from sandy loam to clay. The A horizon ranges from as little as two inches thick in the Alfisols, Entisols and Inceptisols to as deep as 12 inchess thick in the Mollisols (See Volume 5 tables 37-59).

Erosion hazards range from slight to severe for both disturbed and undisturbed soils depending on the degree of slope and the type and extent of disturbance (See Volume 5, pp. 13-35).

The topsoil associated with this disturbance is stockpiled near the sediment pond. Protection measures employed on this stockpile are in compliance.

Although not anticipated should additional disturbance necessitate topsoil stockpiling a plan will be submitted for approval prior to such disturbance (Volume 8, 1983 Completeness Response, page 31).

The area of surface facility disturbance consists of 17 acres of which all but the sedimentation pond occurred prior to the enactment of Public Law 95-87. Due to this fact only topsoil from the sedimentation pond area was removed and stockpiled for use at the time of final reclamation. To supplement the topsoil available on-site, the applicant has proposed to supplement approximately 13,000 cubic (Volume 8, 1983, Completeness Response p. 30) yards of soil material from the present mine facility pad (Volume 8, Draft Stipulation Response 817.21-25, November 1983, Stipulations and Stipulation Responses). Samples of this soil material have been taken and analytical data presented in the PAP, Volume 2, Exhibit 7, give no indication of any toxic substances present.

The soil material will be collected into a pile during the recontouring process and spread to a uniform thickness of approximately six inches. While the supplemental soil material is being collected, samples will be taken to determine if fertilization is needed. This is a standard practice intended to determine precise fertilization requirements at the time of reclamation (Volume 8, Draft Stipulation Response 817.21.-25, November 1983 Stipulations and Stipulation Responses).

Prior to topsoil redistribution, regraded land will be scarified by a ripper-equipped tractor. The surface will be ripped to a depth of 12 inches in order to reduce surface compaction, provide a roughened surface assuring topsoil adherence and to promote vegetational root penetration. After grading, topsoil will be redistributed in a manner that will insure a uniform thickness of six inches. Compaction of redistributed topsoil will be minimized by discing and/or ripping (Volume 8, 1983 Completeness Response, page 18).

Compliance

Applicant complies with these sections.

Stipulations

None.

UMC 817.41 Hydrologic Balance: General Requirements

Existing Environment and Applicant's Proposal

This section gives a brief synopsis of the major proposals to provide protection to surface and groundwaters.

The applicant has proposed in their mine plan methods by which mining activities will be conducted to minimize changes to the hydrologic balance within and adjacent to the mine plan area. Those proposals have been examined for completeness with respect to the established mining regulations throughout this section and the following sections, UMC 817.41-.57 and 822.1-.14. A more detailed discussion of the proposals will be presented in the following hydrologic sections along with a summary of how the proposal complies with the regulation.

The applicant proposes to control surface runoff from disturbed and undisturbed areas by using a combination of diversions, berms, channels, culverts and sedimentation ponds as discussed under Sections UMC 817.43-.46 and 817.49. In most instances, undisturbed area drainage will be separated from disturbed area drainage, except for 25.4 acres on the west slope of the canyon where precipitous slopes make it impractical to utilize diversion structures. Here, the undisturbed area drainage will be routed along with the disturbed area drainage and through the sedimentation pond prior to being discharged from the mine plan area as discussed in Section UMC 817.43 and 817.46.

Surface water monitoring plans have been implemented and will continue to operate to detect any impacts from mining operations on the surface water system as discussed under UMC 817.52.

Impacts to ground water systems have been and will continue to be analyzed through on-going studies. Monitoring and sampling will help the applicant keep impacts to a minimum by detecting changes in water quality or quantity that could result from mining. Plans illustrating the monitoring schedule and tallies showing the quality and quantity of water at sampling sites have been supplied in the mine plan.

The applicant has suggested plans to ensure that receiving streams will be in compliance with applicable State and Federal water quality regulations as discussed in Section UMC 817.46.

Riprap sizing calculations have been performed and submitted to the regulatory authorities for various areas where channel velocities are excessive. Plans to protect stream channels utilizing the calculated size riprap have been implemented.

The applicant has proposed and implemented preventative measures such as chemical testing of water, soil and rock material and utilizing hydrologic structures has and will prevent contamination to the hydrologic system from any acid- or toxic-forming materials.

Compliance

The operator has proposed designs utilizing best technology control practices to minimize changes to the prevailing hydrologic balance in both the permit and adjacent areas. The following sections (UMC 817.42-.57) describe specific design details for the hydrologic facilities proposed.

The applicant's proposals will meet the general requirements for this section when the stipulations in the following sections are met.

Stipulations

None.

UMC 817.42 Water Quality Standards and Effluent Limitations

Existing Environment and Applicant's Proposal

The applicant proposes to meet water quality standards and effluent limitations by routing and treating, in approved treatment facilities (sedimentation ponds, underground sump, silt fences and straw bales), all drainage from the disturbed surface and from the underground workings prior to discharge off the permit area. A two-stage sedimentation system, consisting of a concrete primary settling basin and a large capacity sediment pond, will treat the drainage from 12.7 of the estimated 17 acres (see pages 1 and 5) of disturbed area upon which the surface facilities are located. Alternative sediiment control structures treat drainage for the areas detailed below (approximately 2 acres) and the remainder of the estimated 17 acres are actually undisturbed. The reader is referred to Section UMC 817.46 for more detail. Three small areas for which alternative control measures are implemented are as follows:

Area	Acres	10-Year, 24 Hour Runoff Volume (AF)	10-Year, 24 Hour Peak Flow (cfs)	Alternative Treatment
1. South End of Parking Lot	0.97	0.09	1.10	Silt Fence & Berm

Area	Acres	10-Year, 24 Hour Runoff Volume (AF)	10-Year, 24 Hour Peak Flow (cfs)	Alternative Treatment
2. Main Mine Fan Area	0.23	0.02	0.24	Silt Fence & Straw Bale
3. Substation Pad	0.39	0.03	0.40	Silt Fence & Straw Bale

These data quantify the small runoff volume expected from the 10-year, 24-hour precipitation event (i.e., 0.14 ac-ft). Areas 1 and 2 would require extensive regrading to route the drainage to the pond and area 3 is a very unstable area with a history of slumping which necessitates draining the area rapidly to reduce this potential for failure. Drainage from all three areas will be monitored monthly during the snowmelt runoff season and during major precipitation events to continually demonstrate the effectiveness of the alternate treatment facilities. The applicant has committed to this sampling and reports will be submitted quarterly to the Division for review.

If after review of this data, the Regulatory Authority determines these alternative control measures are not effective, the applicant must submit plans for routing and treating this drainage in a sediment pond.

Due to site constraints, the ponds must be removed and reclaimed prior to the completion of final reclamation. The applicant has proposed a conceptual plan of contour trenches to provide sediment control during reclamation. See discussion under Section UMC 817.56.

Drainage from underground workings is treated prior to discharge using an underground collection and sump system and does not flow to the sedimentation pond system. The mine water is discharged into the North Fork of Quitchupah Creek. The discharges from the sedimentation pond outlet and the mine discharge points are monitored monthly and are currently permitted under NPDES permit number UT-0022918.

Drainage from the undisturbed area west of the surface facilities is not diverted from the disturbed area due to site constraints and results in the mixing of the two flows. These are treated and monitored at the sedimentation pond with quarterly reports submitted to the Division to insure compliance with the limitations of UMC 817.42(a)(7).

Compliance

Although historically there have been instances of discharges from the sedimentation system exceeding limitations, several design changes and improvements in the drainage plan at the minesite have been implemented. These are discussed more completely under UMC 817.46. It is the regulatory authority's opinion that these changes have the potential to eliminate any violation of pollution limitations that were seen in the past. The success of these system modifications can be demonstrated by monitoring of the discharge at the sedimentation system outlet during future snowmelt and precipitation events. Therefore, the applicant's proposal will be in compliance with this section when the stipulation of this section has been met.

Stipulation 817.42-(1-2)-RS/OSM

1. The permittee shall monitor the discharge at the sedimentation system outlet during snowmelt and precipitation events to measure compliance with applicable state and federal water quality standards, and shall provide to the regulatory authority a biannual report of the data collected. If the regulatory authority notifies the permittee that the sedimentation system is not in compliance, the permittee shall submit to the regulatory authority within 30 days of such notice a plan to increase the capacity and/or efficiency of the system, and within 120 days of such notice shall achieve compliance with applicable standards.

2. The permittee shall monitor the drainage from Areas 1, 2 and 3 in order to demonstrate the effectiveness of the alteration sediment treatment measures. The data shall be submitted to the R. A. for review quarterly. If the R. A. notifies the permittee that the alternative controls are not in compliance, the permittee shall submit to the R. A. within 30 days of such notice, a plan for treating these areas in a sedimentation pond, and within 120 days of such notice shall achieve compliance with applicable standards.

UMC 817.43 Diversions and Conveyance of Overland Flow, Shallow Ground-Water Flow and Ephemeral Streams

Existing Environment and Applicant's Proposal

The control of the drainage at the site is achieved using a system of temporary diversions and culverts to divert undisturbed (areas not affected by mining operations) drainage from the disturbed area, a mine yard drainage system which collects surface flow and routes it to the sedimentation system, and two large

culverts that ultimately connect to divert the two major drainages (East Spring Canyon and Mud Spring Hollow) beneath the fill upon which the surface facilities are located. The system is best depicted on Map 83-2 of Volume 8. Basins draining to the respective structures can also be found on Exhibit 9-9 of Volume 2. The predicted peak flow was calculated for each diversion using University of Kentucky's SEDIMOT II computer model. The results of these analyses are summarized below with the values presented by Sufco in the MRP. Output copies from the model are included in Appendix I.

	Drainage Area (ac)		10-year, 24-hour Peak Flow (cfs)		Discharge Capacity of Diversion Ditch) Or Culvert (cfs)
	DOGM	SUFCO	DOGM	SUFCO	
1. Contributing Basin West (CBW)	25.8	25.4	10.8	9.5	Ditch = 15.0 20" pipe = 9.1
2. Contributing Basin East (CBE)	16.1	14.9	4.1	5.5	6.3
3. Substation Pad Undisturbed Ditch	6.9	6.9	1.75	1.44	1.72
4. Substation Pad	0.39	0.19	0.40	0.6	6.3
5. South Parking Lot	0.95	0.97	1.1	1.65	8.81
6. CBW to Pipe #5	11.48	11.5	5.81	8.71	8.2
7. Undisturbed Area North of ATOF to ESC Bypass Culvert	1.8	1.88	0.91	0.91	1.26
8. Undisturbed Area North of ATOF to MSH Bypass Culvert	18.4	18.4	3.78	5.67	5.67
9. Main Mine Fan Diversion to 6" Pipe	0.197	0.23	0.194	0.176	1.26

The capacity for eacn diversion was determined using either USBR culvert nomographs or Manning's Equation at minimum slope. All diversions were sized using a 10-year, 24-hour precipitation design event and include at least 0.3 foot freeboard. There are no proposed permanent diversions at the site. All diversions will be regraded and reclaimed following cessation of operation. From the above table, we can see that in nearly all cases the diversions are overdesigned for capacity. If should be noted that the drainage from CBW does not all drain to the 20 inch pipe or the sediment pond access ditch, but rather a significant amount flows across the yard and is collected in the mine yard drainage system. The apparently underdesigned 20 inch pipe is, therefore, more than adequate to handle the expected flow. The regulatory authority feels the calculation for the substation undisturbed diversion ditch capacity of 1.72 cfs is within acceptable error (two percent).

The second stage of analysis included calculation of maximum expected velocity (or exit velocity for culverts) which occurs at maximum slope for the diversion. From these values a riprap size required can be determined to prevent scour and excessive erosion. The following table summarizes the expected velocities with corresponding riprap sizes required and the proposed sizes by the applicant. Again, the reader is referred to Map 83-2 for location of diversions.

Diversion	Slope (%)	Velocity (fps)		Riprap Size (inches)	
		DOGM	SUFCO	DOGM	SUFCO
1. CBE Road:					
Section A	29	5.5	5.44	5"	5"
Section B	24	5.14	5.06	4"	4"
Section C	6	3.2	3.16	1.5"	1.5"
2. CBW to 20" Culvert	13.8	11.5	11.6	19"	19"
3. Sediment Pond Access:					
Section A	38	4.34	4.25	3"	3"
Section B	38	8.29	8.28	10"	10"
Section C	20	6.31	6.30	6"	6"
4. Pipe #5	15	10.30	9.55	13"	48"
5. Undisturbed Area North of ATOF	4	3.91	3.91	2"	2"

6.	CBE 18" Bypass Culvert	13.5	6.02	6.02	4"	5"
7.	Substation Pad Undisturbed Ditch	2	2.15	2.15	1"	1"
8.	South Parking Lot	20	5.1	5.22	4"	4"
9.	East Road Continuance:					
	Section A	50	10.06	9.98	14"	14"
	Section B	36.5	8.93	8.88	11"	11"
	Section C	15.0	6.17	6.14	5"	5"

The above table shows that the applicant has correctly calculated the expected velocities for each diversion (or section of diversion) and has proposed adequate riprap for scour protection for each diversion.

Compliance

The applicant complies with the requirements of this section.

Stipulations

None.

UMC 817.44 Stream Channel Diversions

Existing Environment and Applicant's Proposal

The placement of the fill upon which the surface facilities are located required the diversion of two intermittent streams. These are the East Spring Canyon Creek (drainage area of 4.8mi^2) to the northeast and Mud Spring Hollow Creek (drainage area of 3.08 mi ^{2}) to the northwest of the minesite. Both are temporary diversions and were sized to pass the 10-year, 24-hour event as required by (b)(2) of this section.

Drainage from these two basins is diverted by means of a culvert system placed in the fill. The East Spring Canyon drainage (ESC) is diverted into a 72-inch CMP culvert. The Mud Spring Hollow (MSH) drainage is collected by a 42-inch culvert which connects to the 72-inch culvert at a distance of 180 feet forming a junction near the washbay. The reader is referred to Map 83-2 for clarification. The 72-inch culvert runs the length of the fill to the top of the fill slope where a transition to a 48-inch culvert occurs. The dramatically increased slope of this culvert (51 percent slope, see Merrick, 1979 Hydraulic Calculations, Vol. 2) results in the necessary capacity to handle the flow from the 72-inch culvert. This 48-inch culvert is located along the slope of fill and beneath

the sedimentation pond and embankment. The discharge velocity of the outlet (25.8 fps) is dissipated by the use of a stilling basin with an embankment of Class I (30-inch) riprap.

The analysis for this system included calculation of this peak runoff from the two basins using SEDIMOT II. Copies of the model output are included in the appendix. The culverts were then checked for capacity with existing headwater depth. The ESC 72-inch culvert was found to be slightly overdesigned with a capacity of approximately 270 cfs at a headwall of 7.1 feet. The applicant's peak flow was calculated to be 247 cfs, while SEDIMOT II predicted 161 cfs. The MSH culvert was determined to have a capacity of 150.5 cfs using a headwater depth of 11.2 feet and paving in the pipe to improve the culvert efficiency. The applicant's peak flow value (147 cfs) was determined to be within nine percent of the SEDIMOT II calculation and, therefore, will be acceptable by the regulatory authority.

Reclamation of the stream channels of both Mud Spring Hollow and East Spring Creek call for the following: 1) regrading the slope of the present fill face and moving some of the fill material to the benches where the shop and office buildings are presently located; 2) removal or plugging of the by-pass culverts depending on location within the fill (where the culverts are located a minimum of five (5) feet below the final grade they will be plugged, otherwise they will be removed.); 3) it is proposed to reestabilish the stream channels with a trapezoidal shape, 3:1 sideslopes, and a bottom width of 20 feet and, because of the steepness of the channel, to install gabion drop-structures to control gradient and velocity; 4) the design capacity of the channel and drop-structures is 1250 CFS; 5) the proposed stream channel profile consists of six sections:

SECTION	LENGTH (FT)	GRADIENT (%)	STRUCTURES/SECTION
1	300	6.0	3
2	235	10.6	5
3	300	8.0	5
4	200	12.5	5
5	350	20.0	14
6	155	37.0	0

6) SUFCO proposes to use gabion drop-structures with a 5 foot drop per structure and a 10% gradient between drop-structures. This will allow passage of the design flow at an acceptable velocity; 7) the gabions will be filled with uniformly graded stone 4 to 6 inches in diameter; 8) due to the high water velocity generated by the steep channel (8 ft/sec), riprap will be placed between the drop-structures to prevent erosion (d50 of 1.0 foot); 9) a geotextile filter cloth is proposed to prevent scour under both the drop-structures and the riprap; 10) section 6 of the channel will be restored on bedrock and

will not require any drop-structure; 11) excessive velocity from section 6 of the restored stream channel will be dissipated in a splash basin before waters are released into the natural channel.

Compliance

Review of the plans for the existing temporary diversions, show that the applicant is in compliance with the requirements of subparagraph b(2) of this section.

The plans to reclaim the stream channels are generally in compliance with the remaining sections of UMC 817.44. Some concern has been raised regarding the stability of the drop wall of the drop-structures. As proposed, a single vertical wall of three foot by three foot gabions stacked three high does not appear to be stable. These gabions are only tied together and are not tied into the earthen face of the fill. Also, the gabions are not stacked in alternating courses. The Division is concerned about the stability of the drop wall of the structures.

Based on these concerns the following stipulation is presented:

Stipulations 817.44-(1)-TS

The applicant shall submit, within 30 days of permit approval, a committment to modify the proposed plans for the drop-structures to include:

1. Modification of the drop wall of the structures so that the wall is laid back at a 1h:6v slope to allow for increased stability against design flows.

2. Modification of the drop wall of the structure so that the courses of the gabions are alternated to provide additional strength and stability.

Following compliance with the above stipulation, the permittee shall be in compliance with this section.

UMC 817.45 Sediment Control Measures

Existing Environment and Applicant's Proposal

The disturbed area drainage will be controlled and treated using a two stage sedimentation system, berms, diversions, silt fences and strawbales. Erosion of ditches and exit points of culverts will be minimized as riprap or channel linings have been proposed for all of these structures. Revegetation by seeding, shrub planting and hydromulching of four disturbed areas, when fully successful, will further minimize sediment contributions to the Quitchupah Creek

drainage system. These four areas include the slope of the facilities fill adjacent to the sediment pond, the slope between the substation road and the surface facilities fill, the coal slide areas and the downstream face of the sediment pond embankment. Undisturbed drainage (i.e., drainage from lands not affected by mining) will be diverted from the disturbed area for all but one area. Site constraints (steep unstable slope) preclude the construction of a diversion to divert the undisturbed slope immediately west of the surface facilities. This slope drainage will flow across the disturbed area and consequently to the sedimentation system which has been designed to include and treat this runoff.

The placement of gravel and a drainage system consisting of two drop inlets and 12 inch culverts at the substation pad will reduce the overland flow length and minimize sediment production at that site.

Compliance

The applicant is utilizing the best technology currently available to meet effluent limitations. The applicant's proposal is sufficient to comply with the requirements of this section.

Stipulations

None

UMC 817.46 Hydrologic Balance: Sedimentation Ponds

Existing Environment and Applicant's Proposal

The sedimentation pond system at the Convulsion Canyon Mine consists of a small concrete primary settling basin in series with a sedimentation pond equipped with a drop inlet primary spillway and a trapezoidal emergency spillway. The sedimentation system designed by Valley Engineering and presented in Volume 6 was implemented at the site. The plan by Merrick and Company presented in Volume 2 was not used and is presumably included in the plan for background calculations utilized by Valley Engineering in their design. Map 83-2 in Volume 8 can also assist the reader with interpretation of this discussion.

The drainage from 12.6 acres of disturbed area and 25.4 acres of undisturbed area is routed to the lower sediment pond located at the base of the suface facilities fill. The 9.8 acres of surface facilities fill and the majority of the 25.4 acres of CBW drainage are also routed to a concrete settling basin at the south end of the fill prior to discharge to the sediment pond. The drainage from that area of the top of fill (ATOF) where the surface facilities are located is collected by a mine yard drainage system consisting of

well spaced drop drains and 10 inch corrugated metal pipe and routed to the concrete settling basin. This system reduces the flow length for the drainage on the fill and will, therefore, minimize erosion and production of sediment from the fill. The concrete settling basin has a capacity of 0.032 ac-ft and has a sloping bottom to facilitate removal of sediment by a front-end loader. Discharge from this basin is through 9 four-inch PVC pipes in connection with a weir which acts as an oil and grease skimmer. The discharge is then routed to the lower sediment pond by a 24 inch CMP for additional detention time treatment.

The drainage from the slope of the fill (SOF) adjacent to the sediment pond and a portion of the undisturbed flow from the CBW is routed to the sediment pond by a ditch along the sediment pond access road. Discussion of the adequacy of this ditch is found under Section UMC 817.43.

The sedimentation pond is an embankment type with the embankment height 22 feet to the top and 18 feet to the crest of the emergency spillway. The pond was cleaned and resurveyed in August 1983. Using these data, the Division developed a Stage-Storage curve for the pond (see Appendix). This curve shows a volume of 1.56 ac-ft to the elevation of the primary spillway, 1.79 ac-ft to the crest of the emergency spillway and 2.29 ac-ft to a point two feet below the top of the embankment.

The pond is equipped with a 12 inch drop inlet (morning glory) spillway at an elevation of 7,417 feet. This discharge structure is equipped with an oil skimmer at the inlet and a decanting valve at an elevation of 7,412 feet which is above the predicted maximum sediment storage volume. A trapezoidal emergency spillway three feet deep with a bottom width of 11 feet and 2:1 slide slopes is located on the east side of the embankment at an elevation of 7,418 feet which results in a 1.0 foot difference between the two spillways. The primary spillway 12 inch pipe discharges directly into this heavily riprapped spillway.

No mine water is routed to the sediment pond, rather it is treated by detention in a separate sump system within the mine and discharged into the drainage basin to the east of the surface facilities.

The top width of the embankment is 12 feet and the combined slopes are 1:5 with the upstream slope 1:3 and the downstream 1:2. Properly designed antiseep cutoff collars are installed on the primary discharge pipe and the East Spring Canyon - Mud Spring Hollow diversion culvert which both extend through the dam embankment. The pond has been certified by a registered professional engineer (M. Cloward, #4522, Utah) and the applicant has committed to quarterly inspections of the pond with reports

submitted to the Division for review in February, May, August and November.

The sediment pond was technically analyzed by the Division as described in the following narrative. The peak flows for the 10-year, 24-hour and 25-year, 24-hour precipitation events were calculated for the three areas draining to the sediment pond using the SEDIMOT II computer model. Copies of the output results are included in the appendix. The capacity of the primary and emergency spillways were calculated using the minimum value for weir, orifice and pipe flow equations and broad crested spillway hydraulics, respectively. The procedure followed was outlined by Haan, 1981. The following table summarizes the results:

	10-year, 24-hour Peak Flow (cfs)		25-year, 24-hour Peak Flow (cfs)		Primary[1] Spillway Capacity (cfs)	Emergency[2] Spillway Capacity (cfs)
	DOGM	SUFCO	DOGM	SUFCO		
ATOF	8.1	9.2	10.9	13.6	NA	NA
SOF	2.2	1.9	3.0	2.8	NA	NA
CBW	10.8	9.5	16.5	15.8	NA	NA
TOTAL	21.1	20.6	30.4	32.2	3.78	96.04

[1] At water elevation 7,418 feet (or one foot head). Calculated as described in text.

[2] At water elevation 7,420 feet (or two feet head).

As can be seen from the above table, the combined primary and emergency spillways are significantly overdesigned to handle the 25-year, 24-hour event. The applicant has presented calculations that predict the 10-year, 24-hour event runoff to be 1.10 ac-ft. The capacity of the pond at the inlet of the primary spillways is 1.58 ac-ft and 60 percent of the maximum sediment storage is 0.408 ac-ft. Therefore, at such time when the 60 percent sediment level is reached, the pond capacity is still sufficient to contain the predicted runoff (1.58 AF - 0.41 AF = 1.17 AF) and preclude outflow through the emergency spillway as required under subsection (g). The applicant has installed sediment level markers to indicate this level and has committed to clean out as required under subsection (h).

The applicant proposes a sediment storage volume of 0.035 ac-ft for each acre of disturbed area that passes through the concrete settling basin and 0.1 ac-ft per acre of disturbed area that does not pass through this additional sediment control measure. This basin facilitates the settling of the larger particles and easy removal for disposal. The applicant proposes to mix the accumulated sediment (consisting primarily of coal fines) with coal for shipment and sale. The applicant has committed to cleaning the pond prior to sediment level reaching the maximum capacity allowed. As required by subsection (b)(2) of UMC 817.46, the applicant has provided empirical data to demonstrate the ability of the concrete sedimentation basin to reduce the sediment delivered to the lower main sediment pond by 90 percent. The regulation requires that the reduction in sediment volume required be from 0.1 acre-foot per acre to 0.035 acre-foot per acre or 65 percent.

The data provided were acquired by cleaning the sediment pond of accumulated sediment after 32 months of pond operation. This volume of sediment removed was 0.125 acre-foot. We can conservatively estimate the reduction of sediment volume as the result of the concrete basin by assuming all the sediment is from the 12 acres of disturbed area (surface facilities) and not attempt to partition the sediment removed into contributions by the Contributing Basin West (CBW) and slope of fill (SOF). We also assume an equal time baseline for each the 0.1 AF/acre and 0.125 AF values by dividing by 32 months:

Required by regulation:

$$\frac{(0.1 \text{ AF/acre})}{(32 \text{ Months})} (12 \text{ acres}) \frac{(12 \text{ months})}{(\text{year})} = 0.45 \text{ AF/year}$$

Actual sediment volume delivered:

$$\frac{(0.125 \text{ acre-feet})}{(32 \text{ months})} \frac{(12 \text{ months})}{(\text{year})} = 0.0469 \text{ AF/year}$$

Thus, the percent reduction in sediment volume is:

$$100\% - \frac{(0.0469 \text{ AF/year}}{(0.45 \text{ AF/year})} \times 100 = 89.58\%$$

Compliance

The sedimentation system at the Convulsion Canyon Mine has had a history of failure with several samples exceeding effluent limitations in the past. During the course of this review, however, several changes have been made to upgrade the system. These changes are:

1. Increasing the elevation of the primary spillway from an elevation of 7,411 feet to 7,417 feet. This has increased the storage capacity of the pond nearly one ac-ft and will accordingly increase the detention time in the pond before outflow begins.

2. Routing nearly 32 acres of undisturbed drainage away from the disturbed area and sediment system that previously contributed to the pond which was not designed to contain that drainage. With the flow from these areas (calculated at 0.45 ac-ft) contributing to the pond, the pond was certain not to perform as expected.

3. Treating three small areas with alternative sediment control measures which reduce the disturbed area drainage the pond must treat. These areas are discussed under Section UMC 817.42.

It is the regulatory authority's opinion that these changes have the potential to reduce the problems of discharge samples exceeding limitations that have been seen in the past. The only demonstration that these changes will succeed, however, is demonstration of the performance and efficient function of the system in the future. It is the opinion of the hydrologist that performed the technical analysis for the system that the calculations for predicted runoff submitted by the applicant, although calculated by acceptable techniques, are in the lower range of acceptability. Again, the burden of proof of acceptability of the system lies on the performance of the pond during the future. If the system fails to meet the standards and function correctly, expansion of the capacity of the system (or other techniques to increase detention time) must be done. This must be accomplished within 30 days following Regulatory Agency notification of non-compliance (see section 817.42).

Stipulations

None. See Stipulation 817.42-(1)-RS.

UMC 817.47 Hydrologic Balance: Discharge Structures

Existing Environment and Applicant's Proposal

All diversions at the minesite were fully discussed under Section UMC 817.43. Discharges for the sedimentation system are controlled by energy dissipators, stilling basins or riprapped channels. Velocities were calculated using Manning's Equation for open channel flow using the slope of the structure just prior to the discharge point. The following table summarizes the expected

maximum velocities and the proposed energy dissipator for these structures. The reader is referred to Sheet 2, Volume 6, Valley Engineering report for location of these discharge points.

Structure	Velocity (fps)	Required Riprap Size	Proposed Riprap Size or Structure
1. Emergency Spillway Stilling basin and 30 inch riprap with filter layer.		10.44	14 inches
2. Primary Spillway 30 inch riprap.		9.3	12 inches
3. 24 inch CMP from Eight foot boulder Concrete Basin energy dissipator.		28.4	greater than 48 inches
4. ESC-MSH 48 inch Stilling basin and Diversion Culvert 30 inch riprap with filter layer.		25.8	greater than 48 inches

The values in the above table demonstrates the applicant has overdesigned in all cases and adequate scour protection is provided.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.48 Acid-forming and Toxic-forming Materials

Existing Environment and Applicant's Proposal

The applicant has collected samples of soils, stratigraphic units above, below and within the coal seam, monitored and sampled springs, streams and point source discharge sites. The samples were analyzed for toxic- and acid-forming materials. These analyses have

been submitted to the regulatory authority and have shown that a low potential exists for contamination due to acid- or toxic-forming materials from natural sources during and after mining.

To avoid any unforeseen instances, the applicant is utilizing diversions, slope shaping and impoundments which will direct water flow. Water samples will be taken in accordance with the proposed monitoring program (see TA, section UMC 817.42) at all point source discharge outlets to insure that effluent limitations will be met. Results of chemical analyses for overburden and coal samples are presented on pages 68 through 147, Section I, Volume 3 of the MRP.

Water sample analyses for underground and surface monitoring sites are shown on page 73 of the Hydrometrics Report in Volume 4 of the MRP and Exhibit 9 - 1979, Volume 2.

Compliance

The applicant has submitted roof, floor and coal samples chemically analyzed which would indicate a low potential for contamination problems due to acid- or toxic-forming materials.

The applicant has submitted chemical analyses from underground discharge sites in accordance with NPDES permit requirements. These analyses show the discharged water to be of high quality, much better than the receiving streams.

The applicant has complied with this section.

Stipulations

None.

UMC 817.49 Hydrologic Balance: Permanent and Temporary Impoundments

Existing Environment and Applicant's Proposal

The sedimentation pond at the site is considered a temporary impoundment and will be removed during reclamation. There will be no permanent impoundments left at the site. The sediment pond has been discussed under Section UMC 817.46 for compliance. The certification report required by subsection (h) is complete and found in Volume 8, page 51b.

Compliance

The applicant's proposal is sufficient for compliance with UMC 817.49.

Stipulations

None.

UMC 817.50 Underground Mine Entry and Access Discharge

Existing Environment and Applicant's Proposal

The applicant submits (page 51c, Volume 8) that no ground-water discharge is anticipated during postmining operations. All entries and breakouts are located on the up-dip side of the mine and will be sealed to prevent gravity drainage.

In the unlikely event that some discharge should occur, it would be similar to a natural spring due to the settling effect of underground ponding and the good quality of the water will be maintained.

At present, some 600 to 750 gallons per minute (gpm) of water is intercepted in the mining area and is being discharged via gravity flow from the Quitchupah breakouts (NPDES discharge point 003) after being pumped to a higher elevation than the elevation of the breakouts and allowed to flow through a settling pond constructed in old underground mine workings. At the cessation of mining, water will no longer be pumped to the underground settling pond. Instead, the water will fill the lower workings. It is not anticipated that the water level in the mine will reach either the breakouts or the entry ways. After the ground-water fills the voids to its natural hydrostatic head, normal ground-water movement will continue.

Compliance

The applicant has submitted plans which illustrate how the breakouts and mine entrances will be sealed (Volume 8, 1983 Completeness Response, p. 19d). Also, the applicant has shown that the quality of water intercepted in the mine is of good quality to meet effluent limitations (see Volume 1, 1977 Mine Plan, p. 55) in the unforeseen event that discharge should occur.

Stipulations

None.

UMC 817.52 Surface and Ground-Water Monitoring

Existing Environment and Applicant's Proposal

Sufco has provided water quantity and quality data for surface and ground- water sites on and adjacent to the mine permit area which are above and below the mining operation.

Monitoring for springs and streams was initiated in July of 1975. Since then, monitoring has continued on an annual and semi-annual basis at several locations. Discharge and field data (pH, specific conductivity and temperature) were obtained at several sites during this time period.

Sites were selected for collection of baseline surface water quality. A limited number of water quality samples were collected at other sites characterized by field measurements.

During the 1983 year, a water monitoring program was implemented to establish seasonal variations on springs and streams. Measurements began as early as conditions permitted and continued at two week intervals through August and then on a monthly basis through September. The measurements and chemical analyses have been submitted to the regulatory authority.

Water quality parameters shall continue to be evaluated seasonally, June, August and October with a list of constituents to remain as outlined in Volume 4, 1981 Submittal, Table 4. Conductance, turbidity, pH and water temperature will continue to be measured with each flow determination.

Flow measurements will be a combination of continuous recorders where conditions permit and field measurements at those locations that have a history of gaging station washouts.

A NPDES permit has been applied for and issued to Sufco, #UT-0022918, for the discharges from the sedimentation pond and mine effluent.

On examination of baseline water quality data collected at and adjacent to the minesite, it can be seen that water quality in the area is generally of fair to good quality, is a calcium- magnesium, bicarbonate type, usually meets Federal primary and secondary drinking water standards--except at one site where iron and magnesium concentrations are higher--downstream water becomes progressively poorer with increasing total dissolved solids. No significant adverse mining related impacts to water quality of the mine plan and adjacent area have been observed.

Ground water samples were collected and analyzed for seven sites (East Spring [site 001], pumphouse effluent [site 047], mine discharge [site 021] and selected underground workings) to establish ground water quality above, below and within the coal seam. No water quality information was collected at any of the seven monitoring wells that were established because of the contamination caused by drilling fluids. Water levels have been established from the monitoring wells.

Compliance

Sufco has presented monitoring information sufficient to establish the characteristics and type of water within and adjacent to the mine area. The applicant has also submitted water quality information for point source discharge sites on a monthly basis as required in their monitoring schedule for NPDES discharges.

The applicant has supplied sufficient information to establish seasonal trends in water quality and quantity at selected monitoring sites. The sampling referenced in the mine plan is sufficient for interpretation to establish baseline data so that significant impacts or charges can be determined.

It is the regulatory authority's opinion that sufficient information has been established to define baseline characteristics of surface and ground water. However, to observe with greater accuracy the influence mining will have, if any, on the underground water system during future mining Sufco should develop a more detailed underground water monitoring plan indicating areas where there is inflow to the mine through faults, fractures, seeps and bolt holes. Quantities should be collected on a quarterly basis to establish flow patterns and aquifer depletion patterns. Water quality should be taken at selected areas to establish any future changes.

Stipulation 817.52-(1)-DD

1. The applicant will be required to develop an underground monitoring plan which will consist of measuring inflows to the mine on a quarterly basis and measuring water quality on a semi-annual basis at selected points. This information shall be submitted to the regulatory authority on an annual basis. This stipulation is to be implemented 120 days after approval of the mine permit.

UMC 817.53 Transfer of Wells

Existing Environment and Applicant's Proposal

There are no developed water wells on the mine property. The applicant plans to use the observation wells on the mine plan property to monitor groundwater levels during mining operations. These wells are not developed for water production. The applicant has no plans to transfer these wells in the future. Upon cessation of operation and monitoring requirements, the wells will be plugged or transferred according to the applicable State and Federal regulations.

Compliance

The applicant's proposal complies with the requirements of this section.

Stipulations

None.

UMC 817.54 Water Rights and Replacement

Existing Environment and Applicant's Proposal

The applicant has implemented drainage and sediment controls, provided stability analyses for subsidence control, provided plans to ensure protection to stream channels which will be undermined and provided alternate water supply plans (page 52, Volume 4, Hydrometrics Report) in the event that the spring in East Spring Canyon is permanently disrupted.

Mining activities prior to 1977 disrupted flow to a small intermittent spring near the entrance of the mine in East Spring Canyon. During the mining process, a fault was mined through which was evidently interconnected with the spring recharge source. The water that recharged the spring now seeps from the fault into the mine. There was no water rights filed for the spring water.

The applicant has also committed to provide alternate water supplies in the unforeseen event that any present water supplies are disrupted.

Compliance

The applicant's plan will comply with the general requirements of this section when the following stipulation is met.

Stipulations

None.

UMC 817.55 Discharge of Water Into An Underground Mine

Existing Environment and Applicant's Proposal

The applicant has not or plans to divert or discharge water from the surface or other underground mines into the present mine working. The applicant has provided plans to divert all surface runoff away from all mine workings.

Compliance

The applicant's proposal complies with this section.

Stipulations

None.

UMC 817.56 Postmining Rehabilitation of Sedimentation Ponds, Diversions, Impoundments and Treatment Facilities

Existing Environment and Applicant's Proposal

Upon cessation of mining, all utilities and coal handling structures will be removed from the site. Structures which cannot be sold will be disposed of in private and municipal landfills. Concrete foundations that will not interfere with final grading will be buried on-site.

Other than the access road to the minesite, all structures will be dismantled and reclaimed along with the mining pad, which is intended to be excavated and filled to approximate original contour. Pipes and culverts will be removed except for the main stream channel which will be plugged on both ends with cement, filled with compacted sand to prevent collapse and buried at least four feet.

To return the present mine pad to approximate original contour after cessation of mining operations, the existing large sedimentation pond below the mining pad will be abandoned, filled and contoured, and the smaller cement settling pond will be removed along with the other mining facilities.

The East Spring Canyon and Mud Spring Hollow stream channels will be restored in accordance with UMC 817.44 (d). See discussion and condition under UMC 817.44 of this document.

Compliance

In recontouring the mine pad, all exposed hydrologic structures will be reclaimed.

The plans submitted by the applicant contain a practical solution for reclaiming the fill area, since the currently used sedimentation structures would interfere with the final recontoured grade. It was determined by the regulatory authority that implementation of these plans could effectively control erosion of the recontoured fill area and prevent sediment reaching the stream channel from the disturbed area. It is assumed that effective revegetative growth should occur within a three-year period after

reclamation starts. Grazing controls will have to be established so that plant growth can take hold and so that the trenches and diversions remain inteact.

The applicant will comply with this section when more detailed information is submitted as outlined in the stipulation section for UMC 817.44.

Stipulations

None.

UMC 817.57 Stream Buffer Zones

Existing Environment and Applicant's Proposal

The North Fork of Quitchupah Creek and Quitchupah Creek contain at the least the biologic community outlined in paragraph (c) of UMC 817.57, and, therefore, must be protected and a buffer zone established.

In order to reach coal reserves on the north side of Quitchupah Creek, Sufco has established entry ways under the creek where overburden above the coal seam varies from 50 to 100 feet thick.

In implementing the stream crossing Sufco supplied plans in a letter dated August 31, 1982 (see Volume 8, page 54) containing a map, typical cross- sections of the crossing and pillar strength calculations. Caving or angle of draw as planned to intercept at 12° angles outside the 100 foot buffer zones. The applicant committed to no secondary mining beneath the stream buffer zone. This plan was approved by the Division via correspondence dated November 4, 1982 (see Volume 8, page 54). In addition, Sufco has committed to replace surface water which may be lost from this stream as the result of subsidence (see TA Section UMC 817.97).

The buffer zone markers have been placed at the north ventilation portal entries at Quitchupah Creek and will be placed at the pump station and leachfield area by July 15, 1983.

The sign dimensions are 12 inches X 18 inches. The wording used is "Stream Buffer Zone - No Disturbing Beyond This Point."

Compliance

The applicant has complied with this section.

Stipulations

None.

UMC 817.59 Coal Recovery

Existing Environment and Applicant's Proposal

Coal recovery will be maximized by the utilization of continuous and conventional (standby) mining machinery, as well as longwall equipment (anticipated for Lease U-47080) where conditions allow. Maximum extraction of coal will be nearly full within pillar panels and 30-40 percent under steep canyon rims.

Compliance

The coal resource will be conserved while using the best technology available for mining and maintaining environmental integrity. The area under Quitchupah Creek had mains driven. (From a stability analysis, the safety factor for the pillar strength was 5.5, described in a letter from Sufco to DOGM dated August 31, 1982.)

Stipulations

None.

UMC 817.61 Use of Explosives: General Requirements

Existing Environment and Applicant's Proposal

Surface blasting is not expected for the remaining life of the mine. However, a blasting plan will be submitted by the applicant to the proper authorities for approval prior to using explosives, should blasting become necessary.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.62-.68 Use of Explosives

See UMC 817.61.

UMC 817.71-.74 Disposal of Underground Development Waste and Excess Spoil and Nonacid- and Nontoxic-forming Coal Processing Waste

Existing Environment and Applicant's Proposal

The applicant returns the underground development waste and excess spoil to underground workings. The waste rock (i.e., top

rock that is intentionally brought down or comes down--shales, slates and some sandstones) will be left in the mine.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.81-.88 Coal Processing Waste Banks

Not applicable.

UMC 817.89 Disposal of Noncoal Wastes

Existing Environment and Applicant's Proposal

The trash from the operation is stored in a protected temporary storage area, protected from the wind by highwalls on three sides (access to the area is sloped inward to prevent water runoff from the pile). When enough waste is accumulated (about two weeks), the trash is loaded and hauled to the Salina City Municipal Sanitary Landfill 30 miles away, an approved landfill. Sufco has a cooperative agreement with the city to use the disposal area on a set fee-per-ton basis that was signed July 10, 1977.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.91-.93 Coal Processing Waste: Dams and Embankments

This section is not applicable since there is no coal processing done at this mine.

UMC 817.95 Air Resources Protection

Existing Environment and Applicant's Proposal

The following control practices are employed by the applicant to limit air pollution which may result from the operation: paving the haulage road; busing employees (reducing vehicular traffic); applying water to the loadout area; covered conveyor belts, lifts and drop points, protecting drop points from the prevailing wind

direction; limiting the loading of temporarily stored material by front-end loader; using scrubbers on diesel equipment; watering and dusting within the mine (to limit that dust which is exhausted into the atmosphere); oiling stoker coal; and, cleaning the haulage road (PAP Volume 2, 1979 Submittal, pp. 48-50, Exhibit 3, p. 10).

The air monitoring program was conducted by Radian Corporation from September 1, 1980 to August 31, 1981 in order to gather representative samples of total suspended particulates and meteorological data (See report, PAP, Volume 6).

Compliance

The control practices proposed at the mine to supress dust are adequate.

Stipulations

None.

UMC 817.97 Fish, Wildlife and Related Environmental Values

Existing Environment and Applicant's Proposal

The permit area is comprised of a variety of habitat types (see Section UMC 817.111-.117) and, therefore, supports a wide variety of wildlife species. Economically important and high interest species include elk, mule deer, black bear, coyote, mountain lion, mountain cottontail and several furbearing species. Bird species of high interest that are present in the area include the golden eagle, blue grouse, ruffed grouse, western bluebird and Grace's warbler. Golden eagle, prairie falcon and Cooper's hawk nests have been found on or near the permit area.

None of the surface waters in the mine plan area support game fish, due either to small size, intermittent flows or poor habitat and water quality. A three-year study to characterize the aquatic macroinvertebrate populations of the mine area surface waters has been done. These data were correlated with physical and chemical characteristics of the streams to determine potential of these waters to support a fishery. It was concluded that due to natural factors, water quality and quantity are not suitable for a fishery (see Aquatic Resources Section, Volume 6, Sufco MRP). Stream buffer zones have been implemented at the north ventilation entries above the North fork of Quitchupah Creek and in the pumphouse-leachfield area at the bottom of East Spring Canyon, where disturbance approaches stream channels. The north ventilation entries are approximately 100 feet from the creek, while the buffer zone at the leachfield is 75 feet wide (see Division approval letter of August 4, 1983, Attached to TA).

Elk utilize portions of the lease area on a seasonal basis. The area is mainly used for winter range, but elk calving areas also occur on Duncan Mountain. However, since surface facilities have existed for approximately 40 years and no additional disturbances are planned in critical elk wintering or calving areas, disturbance due to mining should be minimal.

None of the raptor nests located by Sufco's consultants or by the U. S. Fish & Wildlife Serivce (UFWS) are located near surface facilities, so no impacts to breeding birds are anticipated.

During the summer, mule deer utilize habitats near watering areas away from the surface facilities, but with the onset of winter they move lower into sage and pinyon-juniper areas in the vicinity of the mine haul and access road, which makes them susceptible to traffic mortality. The mine operation and facilities pose no barriers to these movements (MRP, Volume 2, page 44). Other potential impacts to wildlife include human harrassment and poaching, and potential effects of subsidence on surface waters. The applicant has already initiated a program to monitor surface-flowing water to determine diminished flows resulting from mine-related subsidence. Samples are taken in June, late July and October, representing high, medium and low flow conditions. The applicant has committed to replace waters diverted from the surface and several methods have been proposed to replace these waters (MRP Volume 4, pages 52-54). The method to be used would depend on the specific circumstances involved.

No species officially designated as threatened or endangered have been found to reside in the mine plan area (see Finding #15). Bald eagles may pass through the area during their annual migrations, but none nest or winter in the permit area.

The applicant has submitted a plan as follows to mitigate the adverse effects of the project on wildlife (pages 58c and d, Volume 8, MRP). To reduce the chance of deer-vehicle collisions, the applicant has posted the access road with appropriate speed limits and implemented employee commuter buses to minimize highway traffic. All power poles on the minesite were modified for raptor protection in accordance with REA Bulletin 61-10, Powerline Contacts by Eagles and Other Large Birds, in 1981. Sufco restricts use of firearms by company personnel and has implemented an employee education program on wildlife values put together by the Utah Division of Wildlife Resources. Revegetation of the surface facilities area will be accomplished using a diverse variety of native grasses, forbs and shrubs (see seed mix, Volume 8, page 12-o). Since the original habitat type of this area was pinyon-juniper, reclamation should enhance the area for wildlife utilization by providing a ground cover of palatable grasses and

forbs. Rubber rabbitbrush, juniper, pinyon and bitterbrush seedlings will also be planted in clumps of 200. The clumps will serve to create an edge between the seedlings and the grass-forb ground cover, which is attractive to wildlife. The species to be planted have wildlife value as food or cover.

Compliance

The applicant has shown compliance with Section UMC 817.97.

Stipulations

None.

UMC 817.99 Slides and Other Damage

Existing Environment and Applicant's Proposal

The applicant has committed in the text of the mine permit application that the Sufco mine general manager or his designated representative will promptly notify DOGM within 15 days of the occurrence of a slide which has potential for adverse effect on public property, health, safety or the environment as defined by this regulation. The applicant will comply with remedial measures required by the regulatory authorities to reduce or eliminate the potential adverse effect of such a slide.

Compliance

Applicant complies with this section.

Stipulations

None.

UMC 817.101 Backfilling and Grading

Existing Environment and Applicant's Proposal

Backfilling operations utilizing dozers, scrapers, front-end loaders and dump trucks will be conducted after the removal of structures. The present fill material will be used to reduce the slope of cut faces and the fill face. The compaction will be 75 percent to 80 percent (using the modified Procter Mehtod) wuntil the fill reaches a foot fo final grade (Volume 8, 1983 Completeness Response, page 18).

Prior to topsoil redistribution, regraded land will be scarified by a ripper-equipped tractor about a foot deep. Topsoil redistribution will ensure an approximate uniform thickness of six

inches and be done at a time of year suitable for seeding permanent revegetation (i.e. October). To minimize compaction of the topsoil following redistribution, travel on reclamation areas will be limited only to essential reclamation equipment. The applicant will exercise care to guard against erosion during and after application of topsoil and will employ matting, mulching and surface roughing techniques to ensure the stability of topsoil on graded slopes (Volume 8, 1983 Completeness Response, Page 18).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.103 Covering of Acid- and Toxic-forming Materials

Existing Environment and Applicant's Proposal

There is no coal processing done at this mine permit area. All waste rock from the roof and floor of the mine are disposed of underground (Volume 2, MRP 1979 page 29).

No single underground area will be used exclusively for waste. The underground waste disposal usually involves placing noncombustible rock waste material in unused crosscuts between entries to the current mining areas. Underground waste disposal will be conducted in accordance with 30 CFR 75.400 such that the waste storage will not contain more than the maximum allowed combustible material. It is in the operator's best interest to avoid wasting material with potential heat content since this material can be sold as product. Disposal will be placed such that it: (1) is conveneient with regards to cost; (2) does not obstruct ventilation; (3) does not obstruct current mining; and (4) will not be a hazard or impede future retreat mining.

Compliance

The applicant is in compliance with this section.

Stipulations

None.

UMC 817.106 Regrading or Stabilizing Rills and Gullies

Existing Environment and Applicant's Proposal

The applicant will fill, regrade or otherwise stabilize any

rills or gillies deeper than nine (9) inches which form in areas which have been regraded and topsoiled. The areas adjacent to any rills or gullies which have been filled, regraded or otherwsie stabilized, will be reseeded or stabilized according to the revegetation plan (Volume 8, 1983 Completeness Response page 61).

Compliance

The applicant is in compliance with this section.

Stipulations

None.

UMC 817.100, 817.111-.117 Revegetation

Existing Environment and Applicant's Proposal

Vegetation habitat types contained within the Sufco properties and adjacent areas include the pinyon-juniper, ponderosa pine, fir and aspen types of the boreal forest biome and the sagebrush/grass, black sagebrush and mountain brush types of the desert shrub biome.

The surface facilities for the mine occur in an area which was formerly of the pinyon-juniper type and cover approximately 17 acres. The pinyon-juniper type occupies about 26 percent of the lease area, or 1,611 acres. This type occurs mostly on steep canyon slopes, between 7,000 and 9,000 foot elevation.

Three ventilation breakouts were punched out from the inside into the steep canyon walls above the North Fork of Quitchupah Creek in 1982. Total disturbance of each breakout in less than one acre. They occur within the pinyon-juniper and fir habitat types.

The pinyon-juniper habitat type was sampled for total cover, cover by species, shrub density, productivity and characteristics of the tree-component, including density, average height and average diameter. Adequate sampling as per DOGM's vegetation information guidelines was achieved for percent cover and shrub density data. The sampling method used was the modified reference area method for mines with existing (pre-Law) disturbance, whereby a reference area is set up and fully characterized in a community type thought to be as similar as possible to the natural one in the area previously disturbed. A permanent reference area has been staked and will be used to judge the adequacy of revegetation efforts.

No plant species federally listed as Threatened or Endangered (T&E) has been found to occur on the permit area, nor has a literature survey indicated the potential for any such occurrences. The USFWS has determined that this mining operation will not affect

any species protected by the Endangered Species Act (see Findings Document, #15).

The applicant has submitted a complete reclamation plan for both the surface facilities and breakout sites (PAP Volume 8 February 1984 Stipulation Response). This plan addresses timing of revegetation, revegetation species and seeding and stocking rates, tillage and mulching practices, fertilization, irrigation and grazing management. The seed mix consists of a diverse mixture of native grasses, forbs, shrubs and one introduced species, yellow sweet clover. This species meets the requiremnts of UMC 817.112 in stabilizing the area, yet allowing diverse permanent cover to be established. It was used on the sedimentation pond dam at the Convulsion Canyon mine in 1981 for interim reclamation. By 1984 all the sweet clover had died out and native grasses had become established (PAP, Vol. 8, February Stipulation Response). A mixture of native shrubs will be seeded and also planted in random clumps of 200 with at least 5 clumps per acre on the surface facilities area. This planting program is designed to enhance postmining land-use of wildlife habitat and follows recommendations made by the Utah Division of Wildlife Resources (see October 24, 1983 letter attached to TA). Breakout areas will be regraded, covered with soil and seeded with the same seed mix as the surface facilities area. No shrubs will be planted on these small areas. Any reclamation work done prior to final reclamation will be accomplished similarly to final reclamation with the exception that no shrubs will be planted.

An adequate plan for monitoring the success of revegetated areas has also been submitted (PAP Volume 8, February 1984 Stipulation Response).

Feasibility of Reclamation

The Convulsion Canyon Mine site receives 12-16 inches of precipitation annually. There are no other mines in the area that have implemented reclamation procedures; however, the USFS has set up successful revegetation test plots in the Emery Coal Field approximately 10 miles east of the minesite. This area receives less precipitation than the minesite does.

Compliance

The applicant has adequately addressed all the requirements of a complete reclamation plan.

Stipulations

None.

UMC 817.121 Subsidence Control: General Requirements and UMC 817.124 Subsidence Control: Surface Owner Protection

Existing Environment and Applicant's Proposal

The effect of underground mining on surface use, primarily cattle grazing and big game hunting (there is also some snowmobiling and timber cutting of over-mature ponderosas), will be infinitesimal. Subsidence will be gradual and eventually uniform over most of the lease, too imperceptible to affect general land-use.

The property is divided into two zones, the first zone where supportive pillars are left to provide surface stability and the second where pillars are extracted to allow surface subsidence. The first mining zone forms a band contiguous to the southerly Convulsion and easterly Quitchupah canyon rims where subsidence is not expected and erosion will not be facilitated. Subsidence above the second mining zone is planned to be systematic and gradual, to be restricted to the interior of the leases and away from outcrops. An uneven arching effect is expected over "full" extraction areas during mining operations, which will stabilize in uniform subsidence once the entire area is mined.

Subsidence is monitored at six month intervals by mine personnel with survey points located where settling is anticipated. A semi-annual report is currently and shall in the future be provided to State and Federal authorities, which tabulates horizontal and vertical displacements at each of the monitoring stations (vol. 8, 1983 ACR Response, p. 22).

Enough subsidence data has been acquired to develope subsidence profiles and determine the 12 degree angle of draw and subsidence characteristics for the permit area. None-the-less, additional data from other ongoing company monitored subsidence studies are currently and shall in the future be integrated with subsidence reports in order to determine more precisely the overall effects of subsidence--(1) surveys to verify the 12° angle of draw under varying overburden depths, (2) a complete subsidence study being conducted by Woodward-Clyde Consultants (sponsored by the Department of Energy), (3) surveys to determine maximum subsidence with varying overburden depths, and (4) surveys to locate the exact prositions of tension cracks in relation to underground workings (see vol. 5, Subsidence, p. 3-6)

If spring 001 (East Spring Canyon) is disrupted by mining subsidence, alternatives to supplying the stock water which it supports are proposed, including: (1) drilling a water well into abandoned mine workings; (2) constructing a surface water impoundment north of the spring; (3) developing ground-water from upper Duncan Draw. If necessary, the third option given appears to

be the most feasible because a spring present in section 26 supplies three stock water ponds on a year round basis in Duncan Draw. Consultation with U. S. Forest Service personnel at Fishlake National Forest in 1978 resulted in an agreement that a plastic pipeline connecting upper Duncan Draw to spring 001 would be a feasible alternative water supply (for more details see vol. 4, Hydrology, p. 53-54).

On fee property full-extraction mining techniques have been planned and are being implemented. Consequently, Sufco has obtained written permission from the owners of the fee property in regards to full-extraction methods which may result in subsidence (Volume 8, Stipulation Response Revision, December 9, 1983).

Canyon rims and portions of Quitchupah Canyon which are on Federal leases shall be protected by support pillars and Sufco has committed to restrict mining in these areas to first mining only (Volume 2, Exhibit 5-1979, pages 21-24). A 30-40 percent recovery rate is planned for mining under canyon rims (Volume 2, Exhibit 5, 1979, page 24) and the minimum pillar dimensions have been commited to and determined to be 45 X 45 feet. These minimum pillar dimensions are determined on a worst case basis, i.e., maximum overburden encountered and compressive strenth of coal based on laboratory tests and are determined using the same calculation as that were used for support pillars under Quitchupah Creek. They are considered to be adequate when the angle of draw and overburden lithology and thicknesses are taken into consideration for the protection of the canyon rims.

Compliance

A. The applicant has committed to planning and conducting underground coal mining activities using measures consistent with known technology in order to prevent subsidence from causing material damage to the surface, to the extent technologically and economically feasible, and maintain the value and reasonable forseeable use of surface land except in those areas where mining technology requires planned subsidence in a predicatable manner (all terms are as defined by this regulation).

B. The applicant shall and is complying with all provisions of the subsidence control plan pursuant to UMC 784.20 and approved by the Division.

C. The applicant has a $1,000,000 (per each occurrance) property damage insurance policy. No lessening of surface property values is anticipated and should damage occur, owners will be notified.

D. Plans to mitigate subsidence effects for spring 001 have been proposed, agreed upon, and their feasibility have been determined.

Stipulations

None.

UMC 817.122 Subsidence Control: Public Notice

Existing Environment and Applicant's Proposal

Other than 640 acres owned by the applicant, surface lands within the permit area are owned by the U.S. Government and are either parts of the Fishlake or Mante - La Sal National Forests. Maps showing the projected sequence and dates of projected mining activities for the operation which could potentially affect the surface through subsidence caused by underground coal mining have been mailed to a respective forest supervisors.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.124 Subsidence Control: Surface Owner Protection

Existing Environment and Applicant's Proposal

The applicant has submitted complete subsidence control plans to the regulatory authority and forest supervisors which will utilize the best technology available and provide controlled subsidence. The applicant has cooperated with forest and regulatory officials to protect areas along escarpments and the North Fork of Quitchupah Creek so that no subsidence will take place. No secondary mining will take place in the vicinity of springs.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.126 Subsidence Control: Buffer Zones

Existing Environment and Applicant's Proposal

The North Mains mining section passed beneath Quitchupah Creek as an accessway to reserves on the northeast side of the property. Overburden in this crossing varies between 50 to 100 feet, consisting of interbedded siltstone, sandstone and shale. Full roof support is planned by the use of minimum-size 66 X 100 foot pillars. A 100-foot buffer zone, where there will be no second (full extraction) mining, will be maintained on either side of Quitchupah Creek. Tri-annual hydrologic monitoring for changes in flow is conducted both on the surface and underground. Should subsidence from planned underground mining interrupt or diminish it's flow the nature of the problem will be investigated by the operator and measures to correct the damamge and to prevent addition subsidence will be determined through consultation with the regulatory authority to the extent technologically and economically feasible (as defined by this regulation).

Compliance

The Division approved Sufco's Quitchupah Creek crossing on November 4, 1982 (see UMC 817.57). Sufco has not only commited to adopt measures determined through consultation with the Division to correct damage as a result of subsidence through mining practices, but has also, committed to replace any surface water associated with this creek lost as the result of subsidence and to use the highest level of economically feasible technology to provide protection to the stream crossing at the time of abandonment. The applicant will contact the regulatory authority within a 24 hour period if catastrophic subsidence (collapse of the stream channel) should occur.

Stipulations

None.

UMC 817.131-.132 Cessation of Operations

Not applicable at this time.

UMC 817.133 Postmining Land-Use

Existing Environment and Applicant's Proposal

The Sufco lease area is predominantly U. S. Forest Service land managed under multiple use and sustained yield concepts. Present management emphasizes livestock grazing, wildlife, timber and watershed development.

The majority of the mine area is within the Old Woman Management Area, Salina Planning Unit, Fishlake National Forest. Current grazing intensity averages seven acres per AUM (animal unit month) for combined sheep and cattle grazing.

Selective timber harvesting of ponderosa pine occurs on and around the lease area. Other timber uses include posts and poles from aspen and Christmas-tree cutting.

Hunting is a major recreational use of the area, with the majority of hunter-use days for big game hunting. Other recreational uses of the area include dispersed camping, winter sports and fishing.

No other mining operations occur in the immediate vicinity. Some oil and gas exploration occurs in the area, but there are currently no producing wells.

A land-use map for the permit area (Map 80-3, Volume 3, MRP) has been provided.

Land uses will continue to be the same, under USFS management, after mining ends. Final reclamation activities will be completed so as to provide land uses consistent with those required by USFS land use plans. Grasses to be seeded during reclamation will provide forage for livestock and wildlife. Shrubs to be seeded and planted will provide browse and cover for wildlife. Pinyon and juniper seedlings will also be planted which will eventually restore forestry use. All mining structures and facilities will be removed or reclaimed following the closure of operations. The main access road (a county road) will remain open.

Compliance

Applicant complies with this section.

Stipulations

None.

UMC 817.150-.176 Roads

Existing Environment and Applicant's Proposal

There are three roads that will be used in connection with the applicant's mine facilities: Mine Access Road; East Side Road; and the Old Woman Plateau Road. The main Mine Access Road is a paved Sevier County Road (Class B) which extends from Interstate Highway 70 to the minesite. Sufco is responsible for the maintenance of the

road on the permit area which is 350 feet from the guard shack north to the surface facilities area. Runoff water from this unpaved section is routed into the disturbed surface facilities area and through the main sediment control structures. The gradient of the road is 1.2 percent from the permit boundary down the disturbed area. A berm on the downhill side of the road channels water flow to the sedimentation pond.

The East Side Road existed prior to mining activities for the purpose of providing access from the bottom of Convulsion Canyon to the upper plateau for herding livestock. Sufco uses the road for access to the mining operation's electrical and water supply systems. No relocation of the road is planned. Mining activities are conducted within 100 feet of the right-of-way line and the road is shown on the Sevier County Class D System as a public road. The activities include the underground entry system underneath the road. The mains will not be pulled and no further mining will occur and therefore no impact to the road should occur. Sufco will ensure that no subsidence or caving operations will be conducted as to affect any portion of the right-of-way. Surface activities will be conducted in a manner which will not block the road. The grade of the road averages between 7.7 percent to 13 percent. Sufco has constructed water bars in the road approximately every 200 feet from Convulsion Canyon to the water tank.

The Old Woman Plateau Road is an unpaved Sevier County Class D road. There are no surface activities planned which will relocate or disrupt the public use of this road. As part of the subsidence monitoring program, the roads will be inspected by Sufco personnel on a quarterly basis to look for tension cracks and, if such damage is evident, the road will be repaired by Sufco.

A pre-existing USFS access road that is about 1,000 feet long exists on the lease at the mine. The company does not plan on closing the road or revegetating it, since it could be used for driving livestock or fighting forest fires. At the time of abandonment, the road will be closed, depending on USFS wishes. The county access road will be left at the conclusion of mining.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.180 Other Transportation Facilities

Existing Environment and Applicant's Proposal

Conveyors are used to transport coal from the mine to the

crusher and from the crusher to storage sites. These structures will be razed and removed from the site during reclamation. All coal is truck hauled from the site to a railroad siding near Levan, Utah. There are no public utility corridors crossing the mine property. These facilities prevent damage to fish, wildlife, and related environmental values (in UMC 817.97 of the TA) is well as prevent additional contributions of suspended solids to streamflow or runoff outside the permit area (UMC 817.41-.49 of the TA).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.181 Support Facilities and Utility Installations

Existing Environment and Applicant's Proposal

The central facilities are shown on map ID include the mine office building, coal crushing and handling facility, truck loadout facility, the maintenance shops and warehouse and the yard area. The power is received from Utah Power & Light Company (shown on Map 80-4A, 4B, 4C). These facilities prevent damage to fish, wildlife, and related environmental values (UMC 817.97 of the TA) as well as prevent additional contributions of suspended solids to streamflow (UMC 817.41-.49 of the TA).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 822.1-.14 Alluvial Valley Floors

Existing Environment and Applicant's Proposal

The applicant has examined the mine plan and adjacent areas for potential Alluvial Valley Floors (AVF). Interpretation of the studies conclude that there is or will be no adverse effects to potential AVF's caused by mining activities.

The area within and adjacent the mine permit area consists of plateaus and precipitous canyons as shown on topographic map submitted in the mine plan (Plate H-II).

Unconsolidated standard deposits are present in the following drainages.

Within the Mine Plan Area:

1. North Fork Quitchupah Creek. This drainage is deep and very steep and is narrow at the bottom. Streamlaid deposits are present only in small, discontinuous narrow patches. Bedrock is exposed in much of the canyon bottom and the stream cascades over exposed bedrock outcrops.

2. East Spring Canyon. Characteristics of unconsolidated alluvium are the same as in North Fork Quitchupah Canyon.

3. Duncan Draw. This drainage within the permit boundary is narrow and steep with a few small (less than one acre) patches of alluvium present. Bedrock is exposed in much of the drainage.

4. Unnamed tributary to Duncan Draw. (T. 21 S., R. 5 E., Sec 31 31/2). This drainage is steep, but contains narrow patches of unconsolidated alluvium. This drainage has not been investigated in detail, but areas underlain by unconsolidated alluvium are estimated to aggregate a few acres in size.

5. Unnamed tributaries to East Spring Canyon. These small drainages are east of Sec. 1, T. 22 S., R. 4 E., and are tributaries to East Spring Canyon (Plate H-II). These drainages are narrow and steep, but have a few scattered patches of unconsolidated alluvium. No detailed investigation of these drainages has been made, but areas underlain by unconsolidated alluvium are estimated to aggregate only a few acres in size.

Adjacent Area:

1. North Fork Quitchupah Creek downstream from mine permit area. While the canyon is steep and narrow, there are unconsolidated alluvial deposits toward the lower end. Similarly, in the adjacent area at the upper end of North Fork Quitchupah Canyon and its South Fork tributary there are small narrow areas underlain by consolidated alluvium. None of these deposits have been mapped in detail.

2. Duncan Draw and Mud Springs Hollow. The segments of Duncan Draw and Mud Spring Hollow in the adjacent area contain some small area underlain by unconsolidated alluvium. Both these canyons are narrow and steep, and probably there are

no areas in the canyon where unconsolidated alluvium underlies more than 10 acres.

3. Convulsion Canyon and Quitchupah Creek. These drainages contain narrow deposits of unconsolidated alluvium. The canyon bottoms are narrow, but alluvium may be as much as 75 feet thick. Streams are deeply incised into the alluvium creating steep banks with a narrow stream channel in the bottoms. These unconsolidated deposits have not been mapped in detail.

There is no flood irriation in the mine plan area or the adjacent area, and no evidence of historical use of flood irrigation.

Due to small size, steepness, water availability, land ownership and short growing season, these areas are not practical for flood irrigation. In this region, flood irrigation is not practiced in such high mountain drainages.

No historic farming or flood irrigation has occurred in the area except for two areas. These areas lie outside the adjacent area several miles downstream from the mine where no disturbance has taken place. Approximately 110 acres where flood irrigation is practiced and another approximately 25 acres that may have been irrigated in the past. The areas are along Quitchupah Creek from which they would receive their irrigation water. Quitchupah Creek in this segment is deeply incised into the alluvium creating steep banks with a narrow stream channel. Thickness of the alluvium is unknown, but probably is greater than 50 feet.

During mining activities, additional water will be supplied to the streams from mine discharge that meets State and Federal water quality guidelines. When mining activities cease, streams will once again flow at their natural rates.

Compliance

The applicant has sufficiently described the area and potential AVF potential.

It is the Division's opinion that the potential for an AVF does not exist in or adjacent to the mine plan area and that there is no potential for adverse effects for irrigated lands downstream.

Stipulations

None.

0159R

March 7, 1985

SUFCO RECLAMATION ESTIMATE
(Summary)

A.	Concrete		
	Foundation Removal	950 cy @ 14.00/cy	$ 13,300
B.	Building Removal		
	Assume Demolition Crew B-8		
	1. Shop	220,000 cf @ $.16/cy	$ 35,200
	2. Warehouse	135,000 cf @ $.16/cy	$ 21,600
	3. Offices	180,000 cf @ $.16/cy	$ 28,800
	4. Garage	9,280 cf @ $.16/cy	$ 1,485
	5. Storage Shed	40,000 cf @ $.16/cy	$ 6,400
	6. Misc. Structures	75,000 cf @ $.16/cy	$ 12,000
			$ 105,485
C.	Coal Handling Structure Removal	50,000 cf @ $.15/cy	$ 7,500
D.	Asphalt Removal	1,700 sy @ $1.38/sy	$ 2,456
E.	Backfilling & Grading	169,479 cy @ $1.65/cy	$ 279,640
F.	Riprap and Drop Structures (see attached)		$ 407,695
G.	Portal Sealing 9-18' x 9' @ $3,500* (from AML costs)		$ 31,500
H.	Ripping Crew B-10B Assume Rip - 12" Using D-7 (200 Hp dozer)		$ 5,924
I.	Topsoil Redistribution Crew B-10B 1. 270 Hp dozer 2. Trucks (2 - 10cy) 3. Loader (3 1/2 cy bucket)		$ 33,911

J.	Fertilization	$ 364/acre x 20.88 acres	$ 7,600
K.	Seeding**	$1,428/acre x 20.88 acres	$ 29,817
L.	Seedling Costs**	$2,000/acre x 20.88 acres	$ 41,760
M.	Moisture Retention	$1,024/acre x 20.88 acres	$ 21,381
N.	Monitoring & Maintenance		
	1. Hydrologic - $4,200/year annual costs		$ 4,200
	2. Vegetative - $1,000/year 4 days @ $250/day		1,000
	3. Erosional Crew B-10D @ $1,071.20/day x 3 days		3,213
			$ 8,413
			$ 996,382
		10% contingency	99,638
		1984 dollars	$1,096,020

Indexing and inflation to 1990 Dollars:

1985$- $1,106,092
1986$- $1,148,013
1987$- $1,191,522
1988$- $1,236,681
1989$- $1,283,149
1990$- $1,332,198

TOTAL BOND AMOUNT REQUIRED IN 1990$ - $ 1,332,198

The estimates are based on Means Site Cost Data (1985) unless otherwise indicated.

* The Abandoned Mined Land Reclamation Actual Costs at the State of Utah, Division of Oil, Gas and Mining.

** Seed Costs based on Native Plant Costs.

1984$ indexed to 1984$ using Means Cost index.

Inflation factor = 3.79% (from the Means Historical Costs Index Salt Lake City area). [Average for January 1983 to January 1985.]

SUFCO PLANT LISTS*

Shrubs and Trees (1,000 Seedlings Per Acre $2,000/acre planted)

Bitterbrush	(40%)
Rocky Mountain Juniper	(15%)
Pinyon	(15%)
Mountain Snowberry	(15%)
Birch-leaf Mountain Mahogany	(15%)

Planned Species and Amounts

	Cost PLS Per lb	lbs/Acre	Total
Grasses (seed)			
Bluebunch Wheatgrass	$ 7.50	2	$ 15.00
Western Wheatgrass	2.40	2	4.80
Basin Wildrye	9.20	2	18.40
Salina Wildrye	53.00	2	106.00
Forbs (seed)			
Yellow Sweet Clover (in accordance with UMC 817.112)	.68	1	.68
American Vetch	45.40	2	90.80
Lewis Flax	15.00	2	30.00
Palmer Beardtongue	35.00	2	70.00
Hoary Aster	50.00	2	100.00
Shrubs (seed)			
Rubber Rabbit Brush	68.00	1	68.00
Big Sagebrush	35.00	1	35.00
		TOTAL	$ 538.68

*Native Plant Incorporated Costs

RECLAMATION COSTS TO RECLAIM ONE ACRE

Fertilization:

Labor	8 hrs x $20/hr	$ 160
Equipment	8 hrs x $20/hr	160
Material		44
		$ 364/Acre

Seeding:

Labor	8 hrs x $20/hr	$ 160
Equipment	8 hrs x $60/hr	480
Material	$529/acre (seeds)	539
		$1,415/Acre

Seedling:

Material & Labor $2/plant @ 1000 seedlings per acre	$2,000/Acre

Moisture Rentention:

Labor	40 x $15/hr	$ 600
Material:		424
		$1,024/Acre

Riprap and Gabion Drop Stuctures Cost Estimate

1. Drop Structures

Estimate per Structure:

3' x 3' Gabions - 52 cy/structure @ $62/cy =	$ 3,224
3' x 3/4' Revet Matts - 372 sy/structure @ $23/sy =	$ 8,556
Filter Blanket - 250 sy/structure @ $1/sy = (As per AMR construction costs)	$ 250
SUBTOTAL -	$12,030

TOTAL 32 Drop Structures Required x $12,082 = $384,960

2. Riprap Channel Lining:

Estimate per lineal yard:

Overall riprap width - 62 feet

Riprap Depth - 1.5 feet

Volume of riprap per lineal yard = 6.89 cy/yd.

Total channel length is 1600 feet, less 160 feet in rock outcrop, less 1060 feet for the 32 drop structures; leaving 380 feet of riprap lined channel or 127 yards.

Unit cost for machine placed riprap in channel to a depth of 18 inches is $20/cy.

Cost for riprap lining of channel:

127 yd x 6.89 cy/yd x $20/cy = $ 17,500

Estimated cost for sand and filter material palcement is $2/sy.

Cost for sand bedding and filter material:

380' x 62' x $2/sy / 9'/sy = $ 5,235

TOTAL estimated cost for riprap lined channel = $ 22,735

TOTAL ESTIMATED COST FOR RIPRAP MATERIAL INSTALLATION $407,695

SUPPORTING DOCUMENTATION

1. Sign-off letters from SHPO to DOGM dated January 13, 1982 and January 19, 1984.

2. Report of telephone conversation between Don Henne, OSM, and Bob Burton, USFWS, March 7, 1983.

3. Notices of newspaper publication of the Mining and Reclamation Plan from the Salina Sun and Richfield Reaper.

4. Letter from Sufco to DOGM regarding pillar strength--August 31, 1982.

5. Letter from UDWR to DOGM dated October 24, 1983

6. Drainfield modification plans submitted by Sufco, July 27, 1983.

7. Approval letter from DOGM to Sufco dated August 4, 1983.

8. Letter from Fishlake National Forest to OSM dated February 10, 1984.

9. Letter from Manti-LaSal National Forest dated November 15, 1984.

SCOTT M. MATHESON
GOVERNOR

STATE OF UTAH
DEPARTMENT OF COMMUNITY & ECONOMIC DEVELOPMENT

Division of
State History
UTAH STATE HISTORICAL SOCIETY

MELVIN T. SMITH, DIRECTOR
300 R. L. BRANDE
SALT LAKE CITY, UTAH 84101
TELEPHONE 801 533-5755

FILED

January 13, 1982

Division of Oil, Gas & Mining
Mr. Gilbert L. Hunt
1588 North West Temple
Salt Lake City, Utah 84116

RE: Review of Mine Plan, Southern Utah Fuel Company - Convulsion Canyon Mine, ACT/041/002, Addendum, Sevier County, Utah

Dear Mr. Hunt:

The staff of the Utah State Historic Preservation Officer has received the addendum information concerning cultural resources for the Convulsion Canyon Mine, owned and operated by Southern Utah Fuel Company.

Our staff has reviewed the information. The addendums furnished by the contractor for Southern Utah Fuel Company meet all questions that were originally brought forth by the Office of Surface Mining. Therefore, the documentation appears to be complete enough to satisfy the Office of Surface Mining.

Our office has one observation concerning site (42Su1435). This site has been recommended for excavation by the cultural resource contractor, however, the site has been badly vandalized. Therefore, if there is no direct impact by the mining operation on the site, there would be no effect on this site. This information may be used by Oil, Gas, & Mining in determining, with the Office of Surface Mining, whether excavation is essential or not.

If you have any questions or concerns, please contact this office at 533-7039.

Sincerely,

Melvin T. Smith
Director and
State Historic Preservation Officer

JLD:jr:D829/1844c

SCOTT M. MATHESON
GOVERNOR

STATE OF UTAH
DEPARTMENT OF COMMUNITY AND
ECONOMIC DEVELOPMENT

Division of
State History
(UTAH STATE HISTORICAL SOCIETY)

MELVIN T. SMITH, DIRECTOR
300 RIO GRANDE
SALT LAKE CITY, UTAH 84101
TELEPHONE 801/533-5755

January 19, 1984

Rex L. Wilson
Chief Archeologist
Office of Surface Mining
Reclamation and Enforcement
Brooks Towers
1020 15th Street
Denver, Colorado 80202

RE: Convulsion Canyon Mine

In Reply Refer To: G368

Dear Mr. Wilson:

The Utah Preservation Office has received for consideration your letter of January 3, 1984, requesting concurrance of no effect concerning site 42Sv984. After review of the material provided, our office concurs with that determination of no effect, as outlined by 36 CFR 800.

The above is provided on request as information or assistance. We make no regulatory requirement, since that responsibility rests with the federal agency official. However, if you have questions or need additional assistance, please let us know. Contact Jim Dykman at 533-7039.

Sincerely,

Wilson G. Martin
Deputy State Historic
Preservation Officer

JLD:jrc:G368/0015V

State History Board • [illegible] • Theron H. Luke • Terry Warner • Elizabeth Montague • Thomas G. Alexander

DEPARTMENT OF THE INTERIOR
OFFICE OF SURFACE MINING

CONFIRMATION/REPORT OF TELEPHONE CONVERSATION

Name: Don Henne	FROM	Name: Bob Benton	
Office: Tech Support - WTC		Office: Endangered Species USFWS	
Location: Denver, CO		Location: Salt Lake City UT	
Telephone Number: 327-2451		Telephone Number: 588-4430	

Purpose of Call:

Bob called to give me the USFWS determination regarding potential impacts of the SUFCO Convulsion Canyon on any listed T & E species.

After checking their files Bob said that the mine would have no effect on T & E species.

I told Bob I would document this in a phone memo and that this would serve as sign-off from the USFWS.

Explanatory Remarks:

Therefore we have T & E clearance from the USFWS on the SUFCO, Convulsion Canyon Mine.

3/7/83
(Date)

D. R Henne
(Signature)

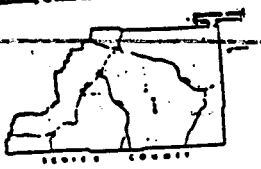
CONFIRMATION COPY

PUBLIC NOTICES
"BECAUSE THE PEOPLE MUST KNOW"

Protests and Grandstanding Notices
Consult Clerk of District Court or the respective signers for further information.

PUBLIC NOTICE

Pursuant to Utah Mining Code Part UMC 788, Notice is hereby given that Coastal States Energy Company, Nine Greenway Plaza Houston, Texas 77046, has submitted a Mining and Reclamation Plan and permit application for the Southern Utah Fuel Company Mine located approximately 20 miles east of Salina, Utah on Sevier County, Utah.



The proposed permit area is comprised of the following lands:

1. Federal Coal Lease U-28297 T21S, R5E, SLM, Utah Sec 32: Lots 1-4, N½ S½; Sec 33: Lot 1, NW¼SW¼.

T22S, R5E, SLM, Utah Sec 4: Lot 4, SW¼NW¼, W½SW¼; Sec 9: All; Sec 7: S½NE¼, E½SW¼, SE¼; Sec 8: All; Sec 17: NE¼, N½NW¼; Sec 18: NE¼, E½NW¼.

2. Federal Coal Lease U-063462 T21S, R5E, SLM Utah Sec 28: SW¼SW¼; Sec 29: SE¼SE¼; Sec 32: N½; Sec 33: W½NW¼.

3. Federal Coal Lease U-61630 T22S, R4E, SLM, Utah Sec 12: NE¼ and N½SE¼.

4. Federal Coal Lease SL-063063 T21S, R4E, SLM, Utah Sec 30: S½. T21S, R5E, SLM, Utah Sec 31: All. T22S, R4E, SLM, Utah Sec 1: Lots 1 to 4, S½N½, S½; Sec 12: NW¼. T22S, R5E, SLM, Utah Sec 6: All; Sec 7: N½NE¼, E½NW¼.

5. Federal Coal Lease U-47080 T21S, R4E, SLM, Utah Sec 28: All; Sec 30: N½. T21S, R5E, SLM, Utah Sec 30: Lots 3-4, W½SE¼.

6. Coal lands owned in fee by Coastal States Energy Company T21S, R5E, SLM, Utah Sec 29: NW¼, SW¼, W½NE¼, W½SE¼: Sec. 30: S½NE¼, E½SE¼

7. Special Use Permit from U.S. Forest Service effective February 1, 1983 covering 9.2 acres in Section 12, T22S, R4E, SLM, Utah.

The described areas are contained on the follwoign U.S. Geological Survey 7½ minute quadrangle maps: Accord, Utah and Emery West, Utah.

A copy of the Mining and Reclamation Plan and permit application is available for public inspection at the Office of the Recorder of Sevier County, Sevier County Court House, Richfield, Utah 84701. Written comments, objections or requests for informal conference should be forwarded to:

The State of Utah Natural Resources and Energy
Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, Utah 84114.

Published in the Salina Sun, Aug. 4, 11, 18, 25, 1983.

"Because The People Must Know"
Protests and Grandstanding Notices
Consult Clerk of District Court or the respective signers for further information.

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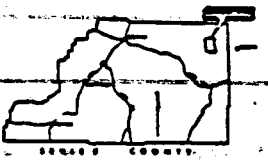

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4. Federal Coal Lease SL-063063 T21S, R4E, SLM, Utah Sec 30: S½. T21S, R5E, SLM, Utah Sec 31: All. T22S, R4E, SLM, Utah Sec 1: Lots 1 to 4, S½N½, S½; Sec 12: NW¼. T22S, R5E, SLM, Utah Sec 6: All; Sec 7: N½NE¼, E½NW¼.

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The State of Utah Natural Resources and Energy
Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, Utah 84114.

Published in The Richfield Reaper, Aug. 3, 10, 17 and 24, 1983.

Fuel Company
P.O. Box P
Salina, Utah 84654
(801) 529-7428
(801) 637-4880 (Mine)

Coastal States Energy Company

Dave D.
w/map

August 31, 1982

RECEIVED
SEP 07 1982
DIVISION OF
OIL, GAS & MINING

Mr. James W. Smith
Coordinator of Mined Land Development
State of Utah Natural Resources and Energy
Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, Utah 84114

Dear Mr. Smith:

Southern Utah Fuel Company's North Mains mining section is scheduled to cross beneath Quitchupah Creek within the next two months. In your August 4th letter, you had concerns about the depth of mining activity below the creek, the amount and type of overburden and the pillar strength. Attached to this letter are a map, typical cross sections, and pillar strength calculations illustrating the future mining beneath the creek.

The actual creek crossing will be located in Section 29, Township 21S, Range 5E. The attached map shows projected entry locations, pillar sizes, and overburden contours in the creek channel. As shown on the map, the 4E Mains will cross the creek where the overburden varies from 50 to 100 feet thick. Full roof support is planned for this entire area.

The typical cross sections illustrate the overburden above the coal seam and mining activity below the creek. A 100 foot buffer zone, where no second mining will occur, will be maintained on each side of the creek. Where second mining occurs adjacent to the buffer zone, full recovery will be halted so that a 12° caving angle will intercept the outside of the buffer zone (cross section B-B'). The 12° caving angle, or angle of draw, has been determined from subsidence measurements and has been included in previous subsidence report submittals. Where the overburden depth is less than 50 feet, no mining will occur within the buffer zone (cross section A-A').

The attached sheet showing pillar strength calculations uses 300 feet of overburden and a pillar size of 66 x 100 feet. The maximum overburden depth which will be encountered within the buffer zone will be about 300 feet and the smallest pillar developed for at least the next three years will be 66 x 100 feet.

If you require further information on this subject, please call.

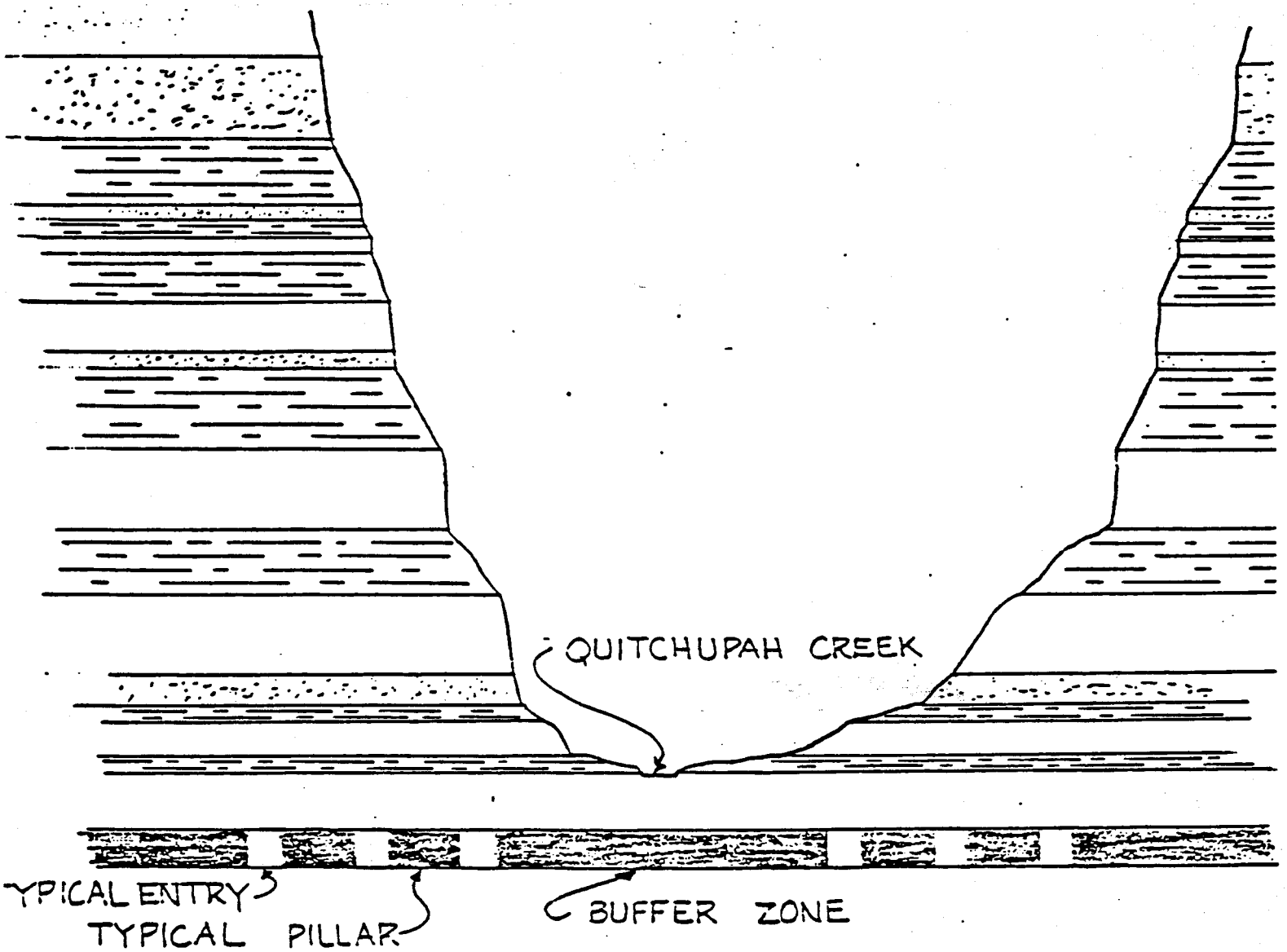
Yours very truly,

Kerry A. Frame

Kerry A. Frame
Chief Engineer

ADD:dlj

Enclosures



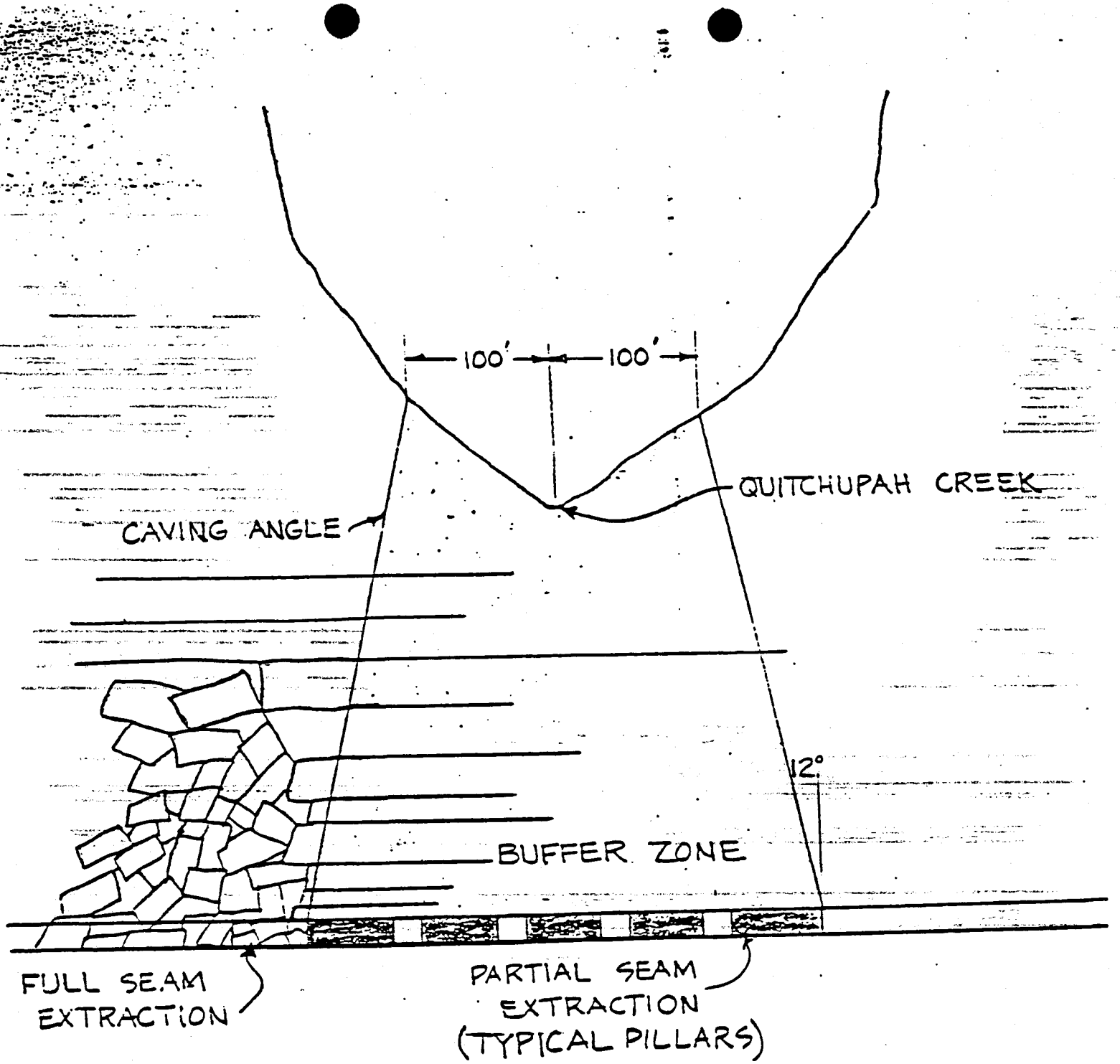
LEGEND

- SILTSTONE
- SANDSTONE
- SHALE
- COAL

SCALE:

1" = 100' HORIZ

1" = 50' VERT



SCALE:

1" = 100' HORIZ.

1" = 50' VERT.

PILLAR STRENGTH

Overburden Weight - 160 lbs./cu. ft.

Overburden Depth - 300 feet

Pillar Size -
Center to Center - 66' x 100'
Actual - 48' x 82'

Compressive Strength of Coal - 3,090 psi (avg. of laboratory test)

$$\text{Load on Pillar} - \frac{66' \times 100' \times 300' \times 160 \text{ lbs./cu. ft.}}{48' \times 82' \times 144 \text{ sq. in./sq.ft.}} = 559 \text{ psi}$$

$$\text{Safety Factor} - \frac{3{,}090 \text{ psi}}{559 \text{ psi}} = 5.5$$

Wildlife Resources
1596 West North Temple • Salt Lake City, UT 84116 • 801-533-9333

Douglas [illegible] Division Director

Copy to Sue
for
filing

October 24, 1983

Mr. James W. Smith, Jr.
Coordinator of Mined Land Development
Division of Oil, Gas & Mining
4241 State Office Building
Salt Lake City, Utah 84114

JIM

NOV 0 I 198.

ATTENTION: Sue Linner

Dear Mr. Smith,

We appreciate the opportunity to review the revised vegetation study and revegetation plan submitted by Southern Utah Fuel Company.

My first impression of the revision is that a minimum of effort was made to complete the shortcomings that were outlined in Sue Linner's letters dated September 13,1983. I hope the actual reclamation process is not done in this same tone.

The seed mixture for the portal yard includes a fair diversity of plant species; however, it should be improved with the inclusion of 2-3 additional species of forbes, e.g., goldeneye, Pacific aster or penstemon (1-2 lbs. per acre). Also, it seems that the planting rate for both rabbitbrush and sagebrush is high; one half to one pound of seed per acre would be adequate. Furthermore, rabbitbrush could be eliminated from the list of seedlings and replaced by one or two deciduous species, e.g., serviceberry, golden currant or sumac.

The amount of seedlings to be planted seems to be adequate; however, the proportion of each species should be defined. A possible mixture would include 40% bitterbrush, and 15% each of serviceberry, golden current, juniper and pinyon pine, otherwise an undesirable proportion may occur.

It should be remembered that the chances of successful reclamation generally increases if a larger number of plant taxa are included.

The actual planting of seeds and seedlings should be considered in all factors which could determine success or failure, i.e., soil moisture, species competition, improper planting, wildlife depredation, distribution, seedbed preparation, soil erosion, etc. Are we to assume that all such factors will be considered? I don't remember but, possibly these items were discussed in the M & RP.

I hope these comments have been constructive. Thanks again.

Sincerely,

F. Clair Jensen
Regional Supervisor

Board/Warren T. Harward, Chairman • L. S. Skaggs • Lewis C. Smith • Jack T. World • Roy L. Young
an equal opportunity employer • please recycle paper

Fik ACT/041/012
copy to Sue

Southern Utah Fuel Company
P.O. Box P
Salina. Utah 84654
(801) 529-7428
(801) 637-4880 (Mine)

Subsidiary of
Coastal States
Energy Compar.

July 27, 1983

Ms. Susan C. Linner
Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, Utah 84114

Dear Ms. Linner:

Southern Utah Fuel Company requested State Health approval of the drainfield on June 30, 1983, and plans to install the drainfield only after their approval. No disturbance is planned within 75 feet of the stream bed by either the new drainfield or the relocated jeep road.

SUFCo plans to strip the topsoil from the new drainfield area during construction and redistribute it across the new drainfield area during the revegetation process which will take place before January 1, 1984. Topsoil from the adjacent borrow area will be used to reclaim the old drainfield and the borrow area. The seed mixture used for revegetation will be the mixture specified by the Forest Service consisting of:

Crested Wheat	4 lbs
Clover	4 lbs
Timothy	4 lbs
Smooth Brome	4 lbs
Slender Wheat	4 lbs
	20 lbs/acre

The borrow area is shown on the attached map. The total borrow material is expected to be about 900 cubic yards. This borrow material will come from an area roughly 50'x100' immediately west of the present drainfield installation.

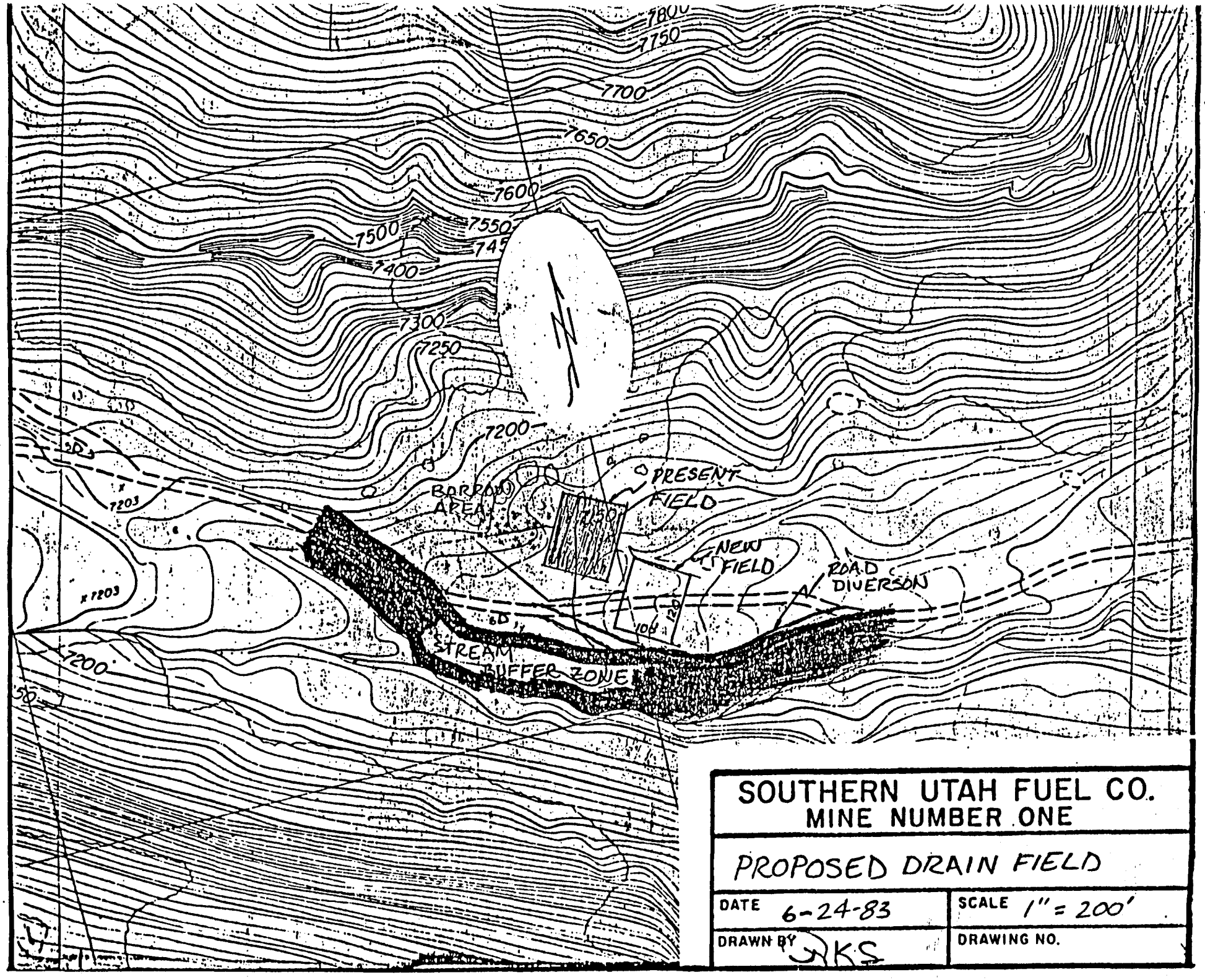
We request that your review for compliance with the appropriate regulations be undertaken as soon as possible.

Yours very truly,
SOUTHERN UTAH FUEL COMPANY

Kerry A. Frame
Chief Engineer

WKS:dlj

Enclosure



SOUTHERN UTAH FUEL CO.
MINE NUMBER ONE

PROPOSED DRAIN FIELD

DATE 6-24-83	SCALE 1" = 200'
DRAWN BY JKS	DRAWING NO.

STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dr. G. A. (Jim) Shirazi, Division Director

August 4, 1983

Mr. Kerry A. Frame
Chief Engineer
Southern Utah Fuel Company
P.O. Box P
Salina, Utah 84654

RE: Leachfield Modification
Approval
Convulsion Canyon Mine
ACT/041/002, Folders #3 & #4
Sevier County, Utah

Dear Mr. Frame:

Your letter of July 27, 1983, adequately addresed all of the concerns outlined in the Division's July 22, 1983 letter regarding the sanitary drainfield modification. Therefore, SUFCO's plans to construct the new leachfield are approved with no further comment.

Also, enclosed is a copy of Ken Payne's July 15, 1983 letter regarding sediment control.

Sincerely,

Susan Linner

SUSAN LINNER
RECLAMATION BIOLOGIST

SL:gl

Enclosure

cc: Sandy Pruitt, DOGM
Dave Darby, DOGM

Copy to Sue Dave D.

United States Department of Agriculture

Forest Service

Fishlake National Forest

Supervisor's Office
115 East 900 North
Richfield, Utah 84701

2820 - 4

Reply to: Southern Utah Fuel Co. Mine
Convulsion Canyon, Sevier Co
Utah

Date: February 10, 1984

Office of Surface Mining
Reclamation and Enforcement
Attn: Mr. Louis Hamm
Brooks Towers
1020 15th Street
Denver, Colorado 80202

RECEIVED
DIVISION OF
OIL, GAS & MINING

Dear Lou:

This is in follow-up to our telephone responses given earlier for each of the "OSM Transmittal Sheets" listed below. We have reviewed the material addressed by each sheet and find it adequately covers our concerns. The Transmittal Sheets, by date and description of material are:

1) December 27, 1983 - 9/26/83 revisions regarding the 1983 Vegetation Study;

2) December 27, 1983 - 12/9/83 revisions regarding six stipulations of Mining and Reclamation Plan; and

3) January 10, 1984 - 12/6/83 revisions regarding 14 stipulations in 10/25 Technical Analysis Document.

Also, your January 10, 1984 response to our August 18, 1983 letter, adequately resolves the six issues of concern we expressed regarding the Convulsion Canyon permit application package. We are not aware of any remaining deficiencies regarding the Convulsion Canyon mine permit application.

Sincerely,

Ronald K. Tew

For J. KENT TAYLOR
Forest Supervisor

Copy to Sue Linner

File ACT/041/002

Folder #2, 4

United States Department of Agriculture
Forest Service
Manti-LaSal National Forest
599 West Price River Drive
Price, Utah 84501

Reply to: 2820

Date: November 15, 1984

Allen Klein, Administrator
OSM - Reclamation and Enforcement
Brooks Towers - 1020 15th Street
Denver, Colorado 80202

Dear Mr. Klein:

Two letters sent to the OSM Office in Denver by the Manti-LaSal National Forest dated January 11, 1984 and January 26, 1984, discussed concerns with the Convulsion Canyon Mine development on Federal Coal Leases U-062453 and U-28297. The concerns identified were: (1) the integrity of Quitchupah Creek be maintained downstream from the private property where undermining of the creek has taken place, (2) the escarpments be protected in such a manner that failure resulting from mining activities does not occur, and (3) that Southern Utah Fuel Company establish a subsidence monitoring plan that meets the need of the Forest Service and the intent of the regulations. The Forest Service has been and is willing and available to work with Southern Utah Fuel Company to develop such a subsidence monitoring plan.

To continue our cooperative efforts, I will consent for the Manti-LaSal National Forest to the Convulsion Canyon Mining and Reclamation Plan subject to the Forest receiving satisfactory responses to the above mentioned concerns.

Sincerely,

Reed C Christensen

REED C. CHRISTENSEN
Forest Supervisor

RECEIVED
DEC 13 1984
DIVISION OF
OIL, GAS & MINING

APPENDIX I

HYDROLOGY MODEL OUTPUT

Substation Pad

*** DEFAULT INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDRO
1	6.90	73.00	.117	0.000	0.000	0.00	0.0

*** SCS VALUES FOR INDIVIDUAL WATERSHEDS ***

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	1.75	.24

NOTE: FLOWS DO NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

***** SUMMARY TABLE FOR TOTAL WATERSHED *****

RUNOFF VOLUME	=	.1400	ACRE-FT
PEAK DISCHARGE	=	1.7549	CFS
AREA	=	6.9000	ACRES
TIME OF PEAK DISCHARGE	=	12.00	HRS

* * * * * * * * * * * *
NULL STRUCTURE
* * * * * * * * * * * *

Area South of [illegible]
Inverted to Type #5
10yr - 24hr event

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
  FUNCTION   1   BRANCH   1   STRUCTURE   1
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER  AREA   CURVE   TC     TT    ROUTING COEFFICIENTS   UNIT
SHED   ACRES  NUMBER  HR     HR        K-HRS              HYDRO
-----------------------------------------------------------------
 1     11.48   79.00  .121   0.000   0.000     0.00        0.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

          WATERSHED   PEAK FLOW   RUNOFF
                        CFS*      (INCHES)
          ---------------------------------
              1         5.31        .45

NOTE:  SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

***** SUMMARY TABLE FOR TOTAL WATERSHED *****
-------------------------------------------

RUNOFF VOLUME                    =    .4341   ACRE-FT /
PEAK DISCHARGE                   =   5.8127   CFS
AREA                             =  11.4800   ACRES
TIME OF PEAK DISCHARGE           =   12.00    HRS
```

*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDRO
1	16.07	72.00	.121	0.000	0.000	0.00	0.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	4.09	.24

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

***** SUMMARY TABLE FOR TOTAL WATERSHED *****

RUNOFF VOLUME	=	.3260	ACRE-FT
PEAK DISCHARGE	=	4.0872	CFS
AREA	=	16.0700	ACRES
TIME OF PEAK DISCHARGE	=	12.00	HRS

* * * * * * * * * * * *
NULL STRUCTURE
* * * * * * * * * * * *

East Spring Flow

JUNCTION 1, BRANCH 1, STRUCTURE 1

* *

*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDRO
1	******	72.00	1.824	0.000	0.000	0.00	1.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	161.22	.24

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

***** SUMMARY TABLE FOR TOTAL WATERSHED *****

RUNOFF VOLUME	=	62.8326	ACRE-FT
PEAK DISCHARGE	=	161.2236	CFS
AREA	=	3097.6000	ACRES
TIME OF PEAK DISCHARGE	=	13.30	HRS

* * * * * * * * * * *

NULL STRUCTURE

Mud Spring Hollow

*** - DEFAULT DATA USED FOR SUBWATERSHED ***

WATER SHED	AREA ACRES	SCS CURVE NUMBER	TP HR	TC HR	ROUTING COEFFICIENTS X-HRS		UNIT HYDRO
*	******	72.00	.310	0.000	0.000	0.00	1.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	161.91	.24

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

***** SUMMARY TABLE FOR TOTAL WATERSHED *****

RUNOFF VOLUME	=	33.3505	ACRE-FT
PEAK DISCHARGE	=	161.9032	CFS
AREA	=	1915.3000	ACRES
TIME OF PEAK DISCHARGE	=	12.50	HRS

* * * * * * * * * * *
NULL STRUCTURE
* * * * * * * * * * *

SMECO : Mine Fan SME

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	.24	.99

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

***** SUMMARY TABLE FOR TOTAL WATERSHED *****

RUNOFF VOLUME	=	.0190	ACRE-FT
PEAK DISCHARGE	=	.2352	CFS
AREA	=	.2300	ACRES
TIME OF PEAK DISCHARGE	=	12.00	HRS

***** GENERATED DATA FOR INPUT INTO STRUCTURE 1 *****

*** HYDROGRAPH AND SEDIMENT GRAPH ***
(TWO CONSECUTIVE VALUES PER LINE)

TIME (HR)	DISCHARGE (CFS)	TIME (HR)	DISCHARGE (CFS)
0.00	0.000	.10	0.000

WATERSHED IDENTIFICATION CODE

SINGLE WATERSHED PEAK FLOW BATCH FILE

****

* *

JUNCTION 1 BRANCH 1 STRUCTURE 1

* *

*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDRO
1	9.90	86.00	.090	0.000	0.000	0.00	0.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	10.39	1.04

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

WATERSHED IDENTIFICATION CODE

SINGLE WATERSHED PEAK FLOW BATCH FILE

****

* *
JUNCTION 1. BRANCH 1. STRUCTURE 1
* *

*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDRO
1	9.90	36.00	.090	0.000	0.000	0.00	0.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	3.09	.76

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO S

WATERSHED IDENTIFICATION CODE

SINGLE WATERSHED PEAK FLOW BATCH FILE

****

* *
JUNCTION 1. BRANCH 1. STRUCTURE 1
* *

*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDRO
1	2.90	85.00	.060	0.000	0.000	0.00	0.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	3.03	.98

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

10 yr - 24 hr Peak Flow Event

WATERSHED IDENTIFICATION CODE

SINGLE WATERSHED PEAK FLOW BATCH FILE

****

1

* *

JUNCTION 1, BRANCH 1, STRUCTURE 1

* *

*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDRO
1	2.90	85.00	.060	0.000	0.000	0.00	0.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	2.23	.71

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

Contributing Basin West

JUNCTION · BRANCH · STRUCTURE

* *

*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDRO
1	25.40	79.00	.143	0.000	0.000	0.00	1.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	10.82	.45

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RATIO 2

***** SUMMARY TABLE FOR TOTAL WATERSHED *****

RUNOFF VOLUME	=	.9605	ACRE-FT
PEAK DISCHARGE	=	10.8228	CFS
AREA	=	25.4000	ACRES
TIME OF PEAK DISCHARGE	=	12.10	HRS

* * * * * * * * * * * * *

NULL STRUCTURE

Contributing Basin West 25 yr. [illegible]
Bank Flow

WATERSHED IDENTIFICATION CODE

SINGLE WATERSHED PEAK FLOW BATCH FILE

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1

* *

JUNCTION 1 BRANCH 1 STRUCTURE 1

* *

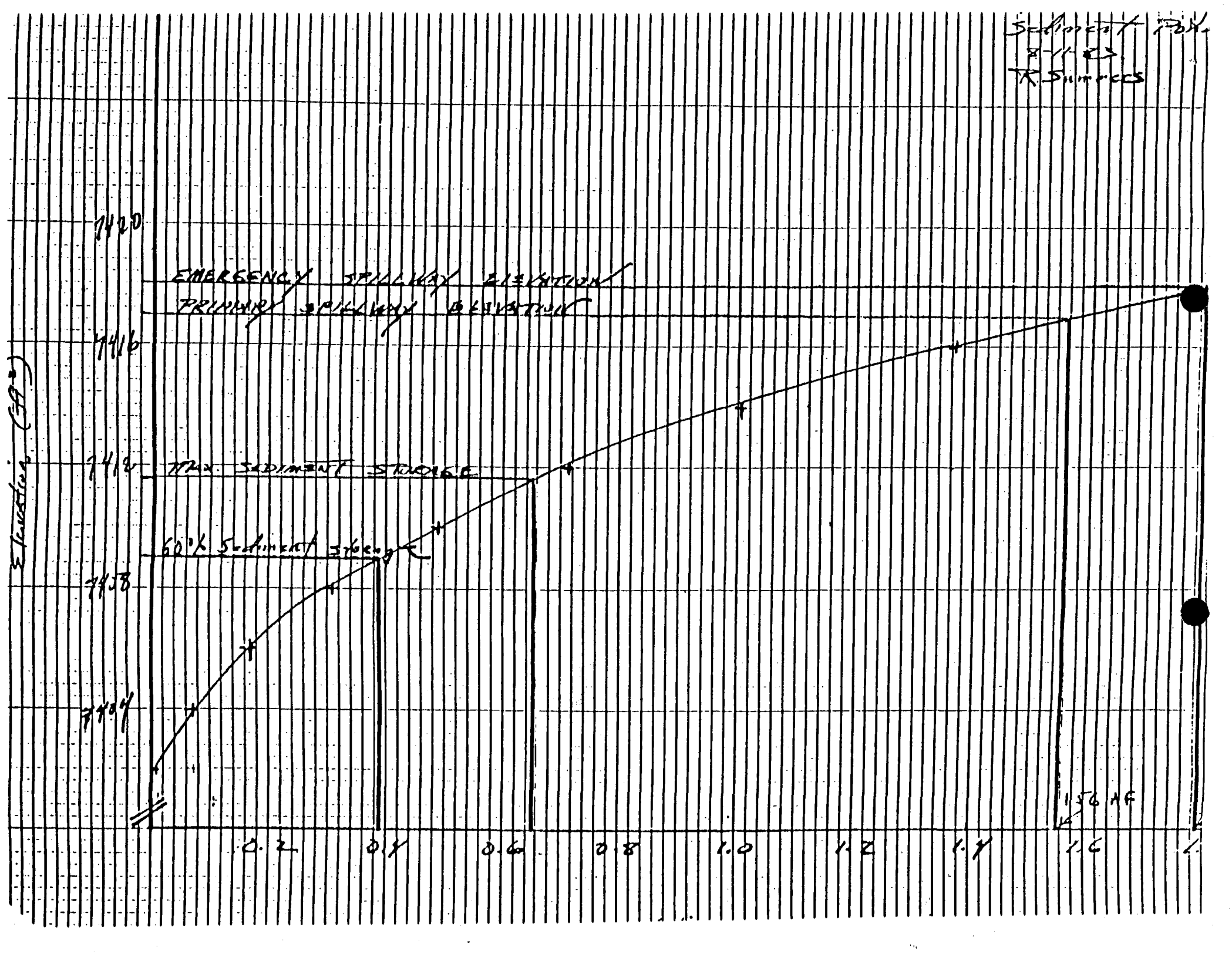
*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDRO
1	25.40	79.00	.143	0.000	0.000	0.00	1.0

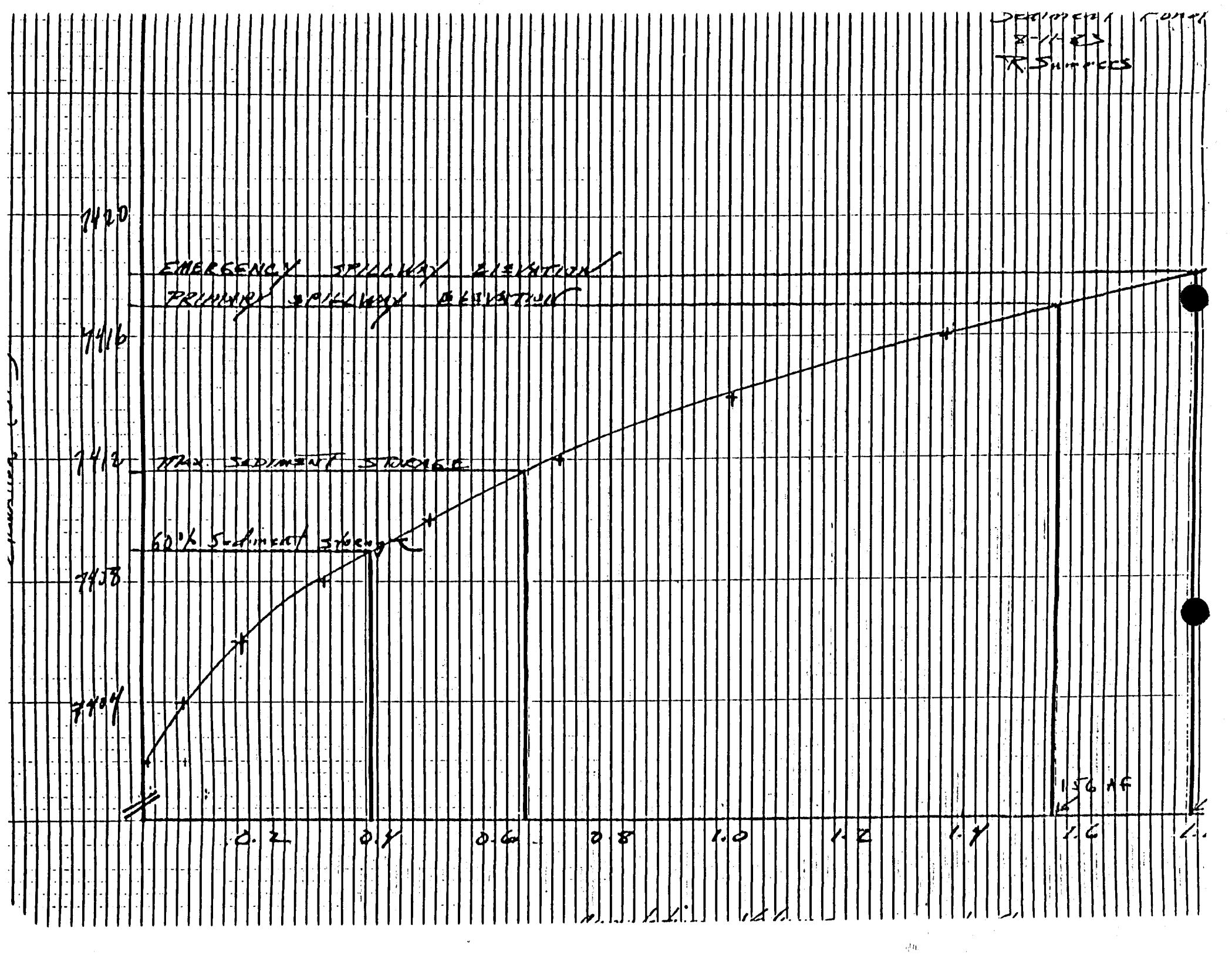
* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	16.47	.87

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION & DELIVERY RATIO 2



Sediment Pond
8-11-83
R. Summers
EMERGENCY SPILLWAY ELEVATION
PRIMARY SPILLWAY ELEVATION
MAX. SEDIMENT STORAGE
60% Sediment storage
Elevation (ft²)
7420
7416
7412
7408
7404
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.56 AF


1420
EMERGENCY SPILLWAY ELEVATION
PRIMARY SPILLWAY ELEVATION
1416
1412
MAX. SEDIMENT STORAGE
60% SEDIMENT STORAGE
1408
1404
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.56 AF