

SOUTHERN UTAH FUEL COMPANY

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SUFCO COAL MINE

COASTAL STATES ENERGY COMPANY

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1983

VOLUME 8

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1983 COMPLETENESS REVIEW

1983 COMPLETENESS RESPONSE

1983 APPENDICES

## INTRODUCTION

The material comprising the 1983 (April) update is submitted in response to Apparent Completeness Review/Technical Deficiency Document dated February 2, 1983 as modified and reissued on March 7, 1983 by the Division of Oil, Gas and Mining.

The material is to be integrated into the entire plan in order that all deficiencies discussed in the Apparent completeness Review/Technical Deficiency Document are satisfactorily eliminated from the SUPCo mining and reclamation plan, as revised and amended. A significant portion of the 1983 submittal has been incorporated into Volumes 1 through 7. Response material not incorporated as insert replacement is presented in Volume 8.

An orange-colored sticker on the binder spines indicates that revised material has been incorporated.



STATE OF UTAH  
NATURAL RESOURCES & ENERGY  
Oil, Gas & Mining

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

February 2, 1983

Mr. Vernal Mortensen  
Vice-President, Utah Operations  
Coastal States Energy Company  
411 West 7200 South  
Midvale, Utah 84047

RE: Apparent Completeness Review/  
Technical Deficiency Document  
Convulsion Canyon Mine  
ACT/041/002  
Sevier County, Utah

Dear Mr. Mortensen:

The Division of Oil, Gas and Mining staff has completed a review of Southern Utah Fuel Company's (SUFCO) response to the Apparent Completeness Review (ACR) for the Convulsion Canyon Mining and Reclamation Plan (MRP).

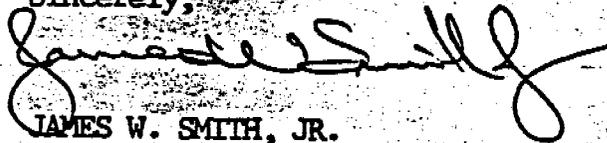
Enclosed is a combined document (Apparent Completeness Review and Technical Deficiencies Section) detailing information that is still needed by the Division before a final determination of completeness can be made for the mine permit application, as well as technical deficiencies that need to be further addressed prior to the Division completing a Technical Analysis document and granting a permit to mine. We hope that compiling both of these reviews into one document will expedite the permitting process.

We request that responses to both of these sections be submitted to this office within 60 days in order that the permitting process can be completed according to the Division's overall long range mine plan review schedule.

Mr. Vernal Mortensen  
ACT/041/002  
February 2, 1983  
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If you have any questions about the enclosed document, or about the permitting process in general, please contact me, Susan Linner or Doug Maier of my staff. We would be more than glad to arrange a meeting to discuss any concerns you may have.

Sincerely,



JAMES W. SMITH, JR.  
COORDINATOR OF MINED  
LAND DEVELOPMENT

JWS/SCL:btb

Enclosures

cc: Allen Klein, OSM, Denver  
Susan Linner, DOGM  
Doug Maier, DOGM



STATE OF UTAH  
NATURAL RESOURCES & ENERGY  
Oil, Gas & Mining

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

March 7, 1983

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

RE: Modified Apparent Completeness  
Review (Hydrology Section)  
Convulsion Canyon Mine  
ACT/041/002  
Folder No. 2  
Sevier County, Utah

Dear Mr. Frame:

I am writing in response to our meeting of February 16, 1983 at the State Office Building. I have reviewed the Apparent Completeness Review (ACR) document and have eliminated some comments based upon the information you presented at that meeting. You will note that most comments on the sediment pond size were left intact and will require response. The decision to pursue this matter was based on the data Southern Utah Fuel Company (SUFCO) provided and some gathered at the State Health Department which showed five (5) instances of Total Suspended Solids (TSS) violations in the last 16 months (1.3 years). Also, a sample of the pond discharge collected by Ken Wyatt a few weeks ago appears to be in violation of the limits for TSS. He reports the pond is continually at or near full capacity and a February 1, 1983 letter from SUFCO to Calvin Sudweeks indicates the pond is flowing at an average discharge of four-five gallons per minute. Additionally, a letter (May 26, 1982) from Calvin Sudweeks, Director of the Bureau of Water Pollution Control, expresses that some improvement may be needed in the sedimentation system.

The Division feels that the pond is not prepared to handle a large precipitation event in this condition and wishes to avert any potential future violations. The information requested in the ACR (especially the requests for data on the discharge [spring?] near the wash house) will hopefully be a step towards working with you to solve this problem.

Mr. Kerry Frame  
ACT/041/002  
March 7, 1983  
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If you have any questions, please call myself or David Darby of the technical staff.

SINCERELY,



RICK SUMMERS  
RECLAMATION HYDROLOGIST

RS/btb

cc: Dave Darby, DOGM  
Jim Smith, DOGM  
Sue Linner, DOGM  
Ken Wyatt, DOGM

APPARENT COMPLETENESS REVIEW  
AND  
TECHNICAL DEFICIENCY DOCUMENT

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

Apparent Completeness Review

UMC 771.23 Permit Application: General Requirements for Format and Contents

(e)(2) The applicant must distinguish those portions in the mine plan area in which underground coal mining activities occurred prior to and after August 3, 1977. Map 1B would adequately supply this information if the five mining phases were depicted separately.

UMC 771.25 Permit Fees

The applicant must provide proof that a \$5.00 permit fee was sent to the Division.

UMC 782.13 Identification of Interests

(e) Contiguous surface and subsurface owners to the mine permit area are not shown on Figure 80-1. Their addresses must also be given.

UMC 782.14 Compliance Information

(c) The applicant should update this section to include all violations issued since September 1981, and the abatement of such violations.

UMC 782.15 Right of Entry and Operation Information

(a) The operator is requested to provide the Division with documents regarding the legal access to lease U-47080.

UMC 782.16 Relationship to Areas Designated Unsuitable to Mining

(a) What is the status of the unsuitability study concerning Township 21 (V. 3, Comment 782.16a)?

UMC 782.18 Personal Injury and Property Damage Insurance Information

The applicant must submit proof that liability insurance is currently in effect as required.

### UMC 783.14 Geology Description

(a)(2)(ii) The depth, classification and geologic structure of the overburden must be described adequately. The operator is requested to:

1. Extend cross-section A-A' to drill hole 79-8, or submit to the Division litologic information from this well;
2. Extend cross-section B-B' across Quitchupah Creek to drill hole 76-29-Y or 76-29-Z (or include both wells);
3. Provide indexes to these cross-sections more legible than what have been received;
4. Submit lithologic logs for drill holes that penetrate areas to be mined according to the five-year plan (Map 80-2);
5. Give depths for coal seams intersected by the drill holes presented on Maps 81-3 and 81-4, as well as the collar elevations.

(a)(2)(iii) Clay content data for the stratum immediately below the coal seam to be mined are requested. This may be included with (4) above.

### 783.19 Vegetation Information

The vegetation map submitted in 1981 should be revised to show the location of all disturbed areas, including the mine facilities area, sedimentation ponds, breakouts and reference areas.

Also in 1981 a preliminary Emergency Lease Area Vegetation map was submitted. This map should be finalized and combined with the vegetation map for the rest of the permit area. Any sites of present or proposed disturbance should be shown.

The Pond Area Vegetation Map (Map C - 1980 submittal) should be revised to show the as-built situation.

Seventeen acres was given as the amount of land disturbed in the pinyon-juniper (P-J) community type, but no total acreage of the P-J type on the permit area has been submitted. This should be done along with submittal of total acreage of riparian habitat disturbed by the sedimentation pond, if any was disturbed, and the total acreage of riparian habitat present on the permit area.

Sampling to characterize the P-J reference area is not complete at this time, some determination of productivity of the ground cover layer must be made as well as a determination of the shrub density on the reference area. Table 33 indicates that browse species make up 42 percent of the composition of the ground cover, but no density figures for these species are given in Table 34.

If any riparian habitat was disturbed and the remaining riparian area is to be used as a reference area as indicated in the 1980 vegetation study, data must be collected on ground cover and productivity and shrub density. The size of this reference area should be indicated. The applicant must commit to doing this additional required sampling in the P-J and riparian reference areas during the 1983 field season.

The applicant must also document that the reference area(s) are permanently marked (all 4 corners staked) and will not be disturbed during minelife.

UMC 783.24 Maps: General Requirements and 784.18 Relocation or Use of Public Roads

The location of the P-J reference area cannot be found on any existing vegetation map. Both this location and the location of any riparian reference area should be shown on the revised vegetation map, as discussed under 783.19.

All maps, particularly surface facility maps, that are outdated, should be revised and resubmitted.

(b) The operator is requested to show boundaries of land upon which there is a legal right of entry.

(d) The applicant is requested to show the locations of buildings within 1,000 feet of lease U-47080 (if any).

(e) The applicant is requested to show the locations of surface and subsurface man-made features within, passing through or passing over lease U-47080.

The applicant submitted cross-sections of the East Side Road. A note should be made, however, of the maps and plans general requirements for this submittal (UMC 771.23). Please resubmit.

UMC 783.25 Cross-Sections, Maps and Plans

Cross-sections and maps numbered 5, 6 of Valley Engineering Report (Vol. 6) and Exhibits 9-2, 9-3, 9-4 of the Merrick and Company Report (Vol. 2 Addendum) are not certified as required under Section L.

UMC 784.13 Reclamation Plan: General Requirements and UMC 817.101 Backfilling and Grading

It is suggested that 1 1/2 to 2 pounds PLS of Oryzopsis hymenoides be included in the reclamation seed mix, as it is the most prevalent grass on the reference area. That would bring the total seeding rate to 18 - 18 1/2 lbs per acre, which would be a sufficient quantity for the hydromulching method.

It was also indicated that shrub seedlings would be planted at 3 foot spacing for approximately 5,000 per acre. This is considerably more than the 184 trees per acre indicated in Table 34. The addition of shrub densities should still not bring the figure up anywhere near 5,000. It is strongly suggested that, since wildlife habitat will be a major postmining land use, shrubs be planted in clumps of no more than 1,000 per acre. These clumps should be no more than an acre in size and should cover 33-50 percent of the area to be revegetated. A map showing proposed location of shrub clumps on the area to be finally revegetated should be submitted.

If any riparian habitat has been disturbed, a plan for revegetation of the riparian area, consistent with the existing riparian vegetation, should be submitted. This can be done after the area is more thoroughly characterized during 1983 sampling.

A plan for reclamation of the break-outs should be submitted.

If grazing should prove detrimental to revegetation efforts, a plan for fencing or other protection of the revegetated area must be worked out with the regulatory authority.

Excavation and filling to approximate original contour is mentioned in the reclamation plan and shown in Exhibits 11 and 12. The question arises if the present fill is adequate as depicted on the drawings? The slope stability is mentioned, however, no other details are given. Please be more specific about the heavy equipment for compaction and what will be achieved, i.e., 80 percent compaction, 50 percent compaction, etc.

(b)(2) A revised bond estimate to reflect inflation and any additional disturbances should be included.

UMC 784.16 (a)(1)(1) and 784.23(e) Operation Plan: Maps and Plans

Maps, plans and cross-sections shall be prepared by, or under the direction of and certified by a qualified, professional engineer. The 1980 submittal of technical correspondence is referred to, but was unable to be located. Please resubmit.

The applicant needs to submit operation and maintenance requirements (i.e., sediment disposal plans, operation inspection schedules, etc.) for both sediment ponds.

The results of the geotechnical analysis mentioned on page 1-6, Section 22 of the 1981 submittal (Vol. 6) should also be submitted.

UMC 784.20 Subsidence Control Plan

(a)(i) Map 80-2 shows that nearly full recovery is planned near the southwest rim of Quitcupah Canyon and Map 80-10 indicates that some subsidence will occur on the canyon slopes. However, in Volume 2, Exhibit 3, page 24, it is stated that mining will be limited to room and pillar methods under steep canyon rims, and that 30 to 40 percent recovery is planned. Please clarify.

(a)(2) No maps are given which show the projected subsidence for lease U-47080. Please provide the Division with this information and state whether there will be more than two subsidence monitoring stations for this lease (as shown on Map 80-10).

(b)(3)(v) The applicant is requested to send to the Division copies of subsidence monitoring reports compiled subsequent to the filing of the mine plan application (November 1980) and to regularly submit to DOGM these reports when they are completed.

UMC 784.22 Diversions

The applicant needs to submit descriptions (maps and cross-sections) of existing and proposed diversions. These should probably include the CBE drainage diversion along east road, an indication of diversions along the western boundary of the surface facilities and at the toe of the east slope behind the warehouse and office facilities.

UMC 784.25 Return of Coal Processing Waste to Abandoned Underground Workings

(b) The applicant is requested to provide the Division with information regarding the source and quality of waste that is stored, areas that are backfilled, percent of the mine void that is and will be filled with waste, method of constructing underground retaining walls, influence of the backfilling operation on active underground mine operations and the anticipated occurrence of surface effects following backfilling.

UMC 784.26 Air Pollution Control Plan

(a) Please submit to the Division the final air quality monitoring report that was due in July 1982.

Technical Deficiency Document

UMC 817.11 Signs and Markers

(e) The applicant is requested to address and show where buffer zone markers have been placed in the mine permit area.

UMC 817.14 Casing and Sealing of Underground Openings: Temporary

(a) Each mine entry which is temporarily inactive, but has a further projected useful service under the approved permit application shall be posted with signs to identify the hazardous nature of the opening.

UMC 817.22 Topsoil Substitute

(e) The applicant must provide the source and the total volume of soil material needed to reclaim the total disturbed area. A six inch layer at the least should be spread over all graded and prepared areas. Any and all material that is to be used by the applicant for a topsoil substitute (plant growth medium), must be sampled and subjected to the same chemical and physical analysis as topsoil. This analysis will be used to judge the suitability of the proposed soil material to achieve the proposed postmining land-use.

UMC 817.23 Topsoil Storage

All proposed topsoil substitutes are subject to UMC 817.23. Therefore a plan to fulfill the requirement under this section must be submitted.

UMC 817.24 Topsoil: Redistribution

The applicant must submit a plan for topsoil redistribution. The plan should include the depth of topsoil and the type of equipment that will be used to prepare the topsoil for a proper seedbed.

UMC 817.41 Hydrologic Balance: General

The applicant shall conduct a study to determine the source of the TDS anomaly which contributes to the excess effluent limitations from the sedimentation pond, and provide mitigating methods to bring the discharge into acceptable effluent standards.

The applicant shall provide information (quality and quantity) concerning the spring under the repair shops.

UMC 817.42 Hydrologic Balance: Water Quality Standards and Effluent Limitations

Pursuant to Section (a)(1) of this code, the applicant must pass the drainage from the Coal Slide Area (CSA) through the sediment pond. An exemption may be granted under Section (a)(3)(i) if the applicant can demonstrate by the use of alternate sediment control measures that drainage will meet effluent limitations and meet other sections of this code.

The applicant needs to provide a map showing the location of the CSA and other disturbed areas outside the surface facilities map (Exhibit 9-2, Vol. 2, Addendum).

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow, Shallow Ground Water Flow and Ephemeral Streams

The applicant must delineate all diversions (refer to comments of UMC 784.22) and present evidence they will pass the 10-year, 24-hour event with a design freeboard of no less than 0.3 feet. The information should include the area each diversion is draining and method and assumptions of calculating the design flow (e.g., curve number analysis).

The applicant should indicate the riprap size used in lining diversions and the design velocity calculations and assumptions used to determine that size.

UMC 817.45 Hydrologic Balance: Sediment Control Measures

The Division recommends that the applicant consider diverting the runoff draining the undisturbed contributing basin west (if, in fact, it is undisturbed) from the slope of fill area and the sedimentation pond.

UMC 817.46 Hydrologic Balance: Sediment Ponds

The applicant must state in the mine reclamation plan which sedimentation system (Merrick and Company or Valley Engineering Alternate #1) has been implemented.

The review of the sediment volume required that follows is based upon the assumption stated under the Division's comments found under UMC 817.46(c-g) conclusion #3.

The calculated 65 percent reduction in the area top of fill sediment volume required (1.2 acre-feet) due to the use of the concrete basin cannot be used due to the lack of available sediment storage volume in the concrete basin:

$$(1.2 \text{ ac-ft}) (0.65) = 0.78 \text{ ac-ft required}$$

Volume available in pond:

$$(1,400 \text{ ft}^3 / [43,560 \text{ ft}^3 / \text{ac-ft}]) = 0.032 \text{ ac-ft}$$

Deficit:

$$0.78 - 0.032 = 0.748 \text{ ac-ft lacking}$$

The maximum that SUFCO will be allowed to reduce the required sediment volume will correspond to the available storage in the concrete basin or:

$$(0.032 \text{ ac-ft} / 1.2 \text{ ac-ft}) = 2.69\%$$

The applicant has not included any predicted sediment volume from the CBW area.

#### Sediment Volume Conculsions

As design is proposed:

1. SUFCO has not provided for any sediment storage from the contributing basin west (CBW).
2. The 65 percent reduction in sediment storage required from the area top of fill (ATOF) is not valid as the concrete basin does not have this storage volume available.
3. SUFCO must provide for total sediment storage volume calculated and not reduce that value by proposing to remove 50 percent sediment volume by cleaning as cleaning is required under Section (h) of this code.
4. Because the primary discharge structure is at 7,411; the maximum storage volume for sediment at 7,411 feet-3 feet = 7,408 feet elevation (State Health requirement) is 0.328 ac-ft. This is inadequate for predicted sediment volume provided.
5. Although the settling assumption of page 11 (Valley Engineering Report) was not reviewed in great depth, it was noted that a typographical error exists as particles larger than 58 microns not 0.58 microns as stated are removed according to Stoke's Law. The application should be corrected.
6. The applicant must provide data including location map, discharge rates and planned diversion of the spring located near the washroom on the ATOF. This discharge must be included in the design of the sediment pond if this discharge is to be passed through the sedimentation system.

#### Runoff Volume Review

The Division feels that a curve number of 80 used in the SCS methodology for the 10-year, 24-hour runoff calculation is in error. Using the Site Plan Map (Exhibit 9-2, Volume II, Mine Plan Addendum), the proportion of ATOF area in different categories was digitized and the following table developed:

Runoff Volume

ATOF	% Area	CN	CN Reference	Q <sup>1</sup>	Q ac-ft
Concrete	.067	98	Dunn 1978 <sup>2</sup>	1.655"	0.131
Roads, Pads, Parking	.163	91	Dunn 1978 <sup>3</sup>	1.059	0.203
Hillslopes	.283	85	Branson 1981 <sup>4</sup>	0.708	0.236
Dirt Compacted Fill	<u>.487</u>	89	NEH-4 <sup>5</sup>	<u>0.929</u>	<u>0.531</u>
	1.00			0.936"	1.101

<sup>1</sup>Q calculated using a design precipitation of 1.88".

<sup>2</sup>Table 10.8; concrete and pavement, all CN = 98.

<sup>3</sup>Table 10.8; gravel roads, soil group D.

<sup>4</sup>Table 11-10; annual grass, 50% cover, soil group C.

<sup>5</sup>Table 9.1; roads, dirt, hydrologic group D.

Adding in the slope of fill (SOF) and contributing basin west (CBW) values, we find:

Runoff Volume

	Area	CN	CN Reference	<u>DOGM Calculation</u> Q ac-ft	<u>Valley Engineering</u> <u>Calculation</u> Q ac-ft
ATOF	*	*	*	1.10	0.49
SOF	12.0	85	Branson 1981 <sup>4</sup> **	0.15	0.25
CBW	25.4	79	NEH-4 <sup>6</sup>	<u>0.96</u>	<u>0.51</u>
				2.21	1.25

\*See prior Table.

\*\*See prior Table's footnotes.

<sup>6</sup>Table 9.1; rangeland, fair condition, soil group C.

Note: Determination of soil group is result of analysis of soil type sites 24 and 22: "60 percent steep colluvium and residuum, 30 percent rock outcrop, 30-60 percent rock fragments." (Soils W, O, T)

Conclusions:

1. SUFCO has not justified the use of the chosen CN values (80 for disturbed and 72 for undisturbed). What AMC conditions, hydrologic soil groups and hydrologic conditions were used in the determination?
2. SUFCO needs to provide current drainage map (i.e., Exhibit 9-9, Merrick Report not valid) identifying drainage to sediment pond(s), particularly CBW drainage boundaries.
3. The Division assumes that SUFCO has chosen to demonstrate that effluent limitations will be achieved using a total detention of the sediment and runoff volume from a 10-year, 24-hour precipitation event (Valley Engineering Report 1980, page 1). A review of the adequacy of the sedimentation system to provide this storage resulted in the conclusion that the system is undersized and inadequate. The following points were used to reach this conclusion:
  - A. Runoff volume was under-estimated (see prior justification).
  - B. Sediment volume cannot be reduced by 76 percent using settling assumption and proposed cleaning (see prior justification).
  - C. Sediment storage volume available in lower pond was over-estimated because the primary discharge conduit is not equipped with a valve or gate, the volume available for storage before outflow occurs is less than that calculated for an elevation of 7,418 feet. In order to provide total containment of the 10-year, 24-hour event, sediment storage volume must be calculated at an elevation of three feet below the top of the discharge structure (State Health requirement). This value is only 0.328 ac-ft.
  - D. Predicted sediment volume from CBW was not included in design.
  - E. The total storage volume available in lower pond was over-estimated. Again, due to the lack of value on the primary discharge structure, total storage volume available before outflow begins must be calculated at stage 7,411 feet. This value is 0.596 ac-ft. When combined with the volume available in the concrete basin, this total storage becomes 0.628 ac-ft.

(e) The applicant must "design, construct and maintain sedimentation ponds to prevent short-circuiting to the extent possible." Using an EPA 1976 methodology outlined by Haan (1978), both ponds were checked for potential short-circuiting as follows:

L:W ratio = L/We

Where: L = length of flow path

EPA recommends the L:W ratio be greater than 2.0 to minimize short-circuiting.

We = surface area/L

Concrete basin: surface area = 1,068.78 ft<sup>2</sup>. For ratio of 2.0, find L:  $L = (2.0A)^{1/2} = [(2.0)(1069)] = 46.24$  ft.

Since pond has nine discharge pipes, find the discharge pipe such that distance from inflow point is greater than 46.3 ft (Pythagorean Theorem):

Distance = D =  $(a^2 - b^2)^{1/2}$ , D =  $[(46.3)^2 - (225)^2]^{1/2}$ , D = 40.5 feet.

Thus, L:W ratio is less than two and short-circuiting likely for discharge pipes 1-7.

Sediment pond: Area = 97.5 ft<sup>2</sup>. L:W = 82.4 ft/(97.5 ft<sup>2</sup>/82.4 ft) = 0.70.

#### Conclusions:

1. Both ponds are not designed to minimize short-circuiting.
2. The Division recommends that any future major construction or modification to these ponds incorporate (to the extent possible) designs to help minimize the potential short-circuiting (i.e., install baffles, relocate inflow point, etc.).

(g) SUFCO must provide evidence that ensures "no outflow through emergency spillway during . . . 10-year, 24-hour event . . ." using flood routing techniques if pond is not modified for total containment of the 10-year, 24-hour runoff and sediment volume.

(h) SUFCO must provide a plan for sediment disposal cleaned out of both the concrete and the lower sedimentation ponds.

It will be helpful for further review if SUFCO will indicate the frequency of cleaning for each pond experienced in the past.

(i) Refer to estimation of point rainfall (Merrick Report, Vol. II, Addendum). The section titled "conversion factor for areal correction for entire basin" is mislabeled. It should read "conversion factor for correction of partial duration series to annual series data."

Applicant needs to supply method and calculation for the determination of the following (Merrick Report, Appendix: Runoff) for the 10- and 25-year, 24-hour storms:

1. Time of concentration (Tc).
2. Velocity.
3.  $q_p$  (discharge peak).
4. Method of peak flow determination for ATOF, SOF and CBW. If equation 16.6 (NEH-4) was used:  $q = 484AQ/T_p$ , value for and determination of  $T_p$  must be presented.

(c) Refer to Valley Engineering Report, Vol. 6, page 5. It appears that the peak flow of 62.4 cfs was taken from Merrick and Company and includes peaks from the CSA and ATTP. Do these areas drain to ponds? Please clarify.

(k) SUFCO has not indicated if a five percent increase in design height was accounted for during construction. If not, statements on all affected drawings noting a five percent decrease for all relevant measurements will bring plan into compliance.

The Manning Equation check assumes a rectangular spillway, whereas the constructed spillway is trapezoidal in shape. This results in an under-estimation of two and, therefore, will be acceptable, but a comment should be included in MRP in order to improve readability of this section.

Refer to page 6, Valley Engineering Report (Pond Outlet). Again, applicant must provide information outlined under q(b) comments of this section for  $Q_{10}$  and  $Q_{25}$ .

The value for  $Q_{10}$  appears to include peak flow values from CBW, ATOF and SOF, while the value for  $Q_{25}$  appears to also include the CSA and ATTP areas. The calculation of  $Q_{25} = 72 + .15 + .85 + .07$  appears to also include ATTP and possibly CSA areas. Again, please clarify the ATTP and CSA drainage and correct these calculations for consistency.

The design peak of  $Q_{25}$  calculated by dividing the predicted runoff volume in ac-ft by 24 hours is in error. Peak flows are dependent on several factors including timing of rainfall and rainfall excess and characteristics of the drainage catchment. If the applicant is not designing for the total containment of the 10-year, 24-hour precipitation event as stated in the narrative of this report, the peak flow for the 10-year storm must be calculated by accepted methods and routed through the sediment system using flood routing techniques to find the design size for the primary discharge in order to comply with Section (g) of UMC 817.46.

Using the equation for orifice controlled flow:

$$Q = C_o A (2 g H)^{0.5} \quad (\text{reference: Haan 1978})$$

A = area of pipe ft<sup>2</sup>  
H = design head  
C<sub>o</sub> = Coefficient based upon type of structure.

We find the 12-inch pipe design flow is:

$$Q = (0.61) (0.785 \text{ ft}^2) [(64.4 \text{ ft/sec}^2)(7.0 \text{ ft})]^{0.5} = 10.2 \text{ cfs}$$

The applicant must show that this is sufficient for the expected peak flow.

The reference to Table 20-17 Seelye should be complete or Table 20-17 should be provided (preferably include both).

(r) The applicant must provide certification of the constructed pond by a registered, professional engineer.

(s) The applicant must provide details on the extent of embankment stabilization. The 1981 submittal in Sections 18, 19 and 20 mentions several times the areas to be stabilized by vegetation, etc., will be shown on plans, yet no plans of this nature were found.

(t) The pond must be examined for structural weakness, erosion and other hazardous conditions and reports submitted to the Division four times per year. A commitment in the plan and proposed schedule for examination must be included.

#### UMC 817.47 Hydrologic Balance: Discharge Structures

"Discharge shall be controlled by energy dissipators . . . riprap channels . . . designed according to standard engineering procedures." SUFCO must provide:

1. Riprap size around eight foot boulder at end of 24-inch culvert (Sheet 5).
2. Clarification of emergency spillway design. Sheet 4 section c-c' shows spillway as bank of embankment, whereas Sheet 3 D-D' shows spillway partially cut into natural ground.

Cross section D-D' on Sheet 3 of the Valley Engineering Report shows the emergency spillway built partially on natural ground and partially on dam fill. Has any problem concerning differential settling developed at spillway crest?

3. Spillway riprap size and velocity calculation.
4. Class of riprap size used on energy dissipator depicted on Sheet 5.

5. Clarification of design flow. A design flow of 23.2 cfs was reported in Valley Engineering Report on page 7 for use in page 9 calculation of energy dissipator size. This value appears to have been taken from Table 6 of Merrick which includes Q peak from CSA and ATTP. This value should be supported with all design calculations and assumptions. CSA and ATTP areas are not designed to pass through concrete pond.

See comments concerning peak flow calculations and design of discharge structures under UMC 817.46(g) comments.

A discrepancy exists between the Merrick and Company and Valley Engineering reports. Runoff for  $Q_{10}$  for SOF is given as 0.25 ac-ft, on page 4 of the Valley report and 0.10 ac-ft in the Merrick report. It appears the Valley Engineering Report is in error. Please clarify.

UMC 817.52 Hydrologic Balance: Surface and Ground Water Monitoring

The applicant will be required to submit surface and ground water monitoring information to depict the seasonal variation. The procedures, frequency and parameters to define the seasonal variation has been submitted to Dave Winget of SUFCO.

UMC 817.57 Hydrologic Balance: Stream Buffer Zone

(a) Since the North Fork of Quitchupah Creek and Quitchupah Creek have been determined to contain a biological community (Vol. 6, Environmental Consultants Report), a 100-foot stream buffer zone shall be in effect. The applicant must address the proximity of all disturbances to the stream, especially breakouts planned and/or completed to date.

The applicant should supply information which details long-term protection to the stream channel, where mining has accrued under the stream.

UMC 817.59 Coal Recovery

What is the current status of the southern portion of lease U-28297 regarding coal recovery?

Will the Duncan seam be mined on the Convulsion Canyon property?

817.97 Protection of Fish, Wildlife and Related Environmental Values

(b) The applicant must commit to promptly notify the Division of the presence in the permit area of any critical habitat of a threatened or endangered species, any plant or animal listed as threatened or endangered, or any Bald or Golden eagle, which has not been previously reported.

(c) The applicant must reply to the Division's February 26, 1982, letter regarding raptor protection on power lines. Two options were listed for poles constructed prior to 1977: Sufco must choose and pursue one of these. Plans for pole modification should be approved in advance by the Division.

(d)(5) Any Riparian vegetation disturbed must be restored. Sampling of the remaining riparian vegetation must be done as outlined under section 783.19.

(d)(6) An aquatic resources study, with stations to be monitored for a period of three years, was begun in 1980. Only the preliminary report was submitted. Please submit yearly reports for 1981 and 1982.

(d)(7) The applicant must commit to not use persistent pesticides on the mine area. Any pesticide program must be approved by the Division prior to implementation.

(d)(9) Since the postmining land use is wildlife habitat, shrubs should be grouped and distributed in a manner which optimizes edge effect, cover, and other benefits for wildlife.

The applicant must develop and commit to a specific wildlife mitigation plan prior to permit approval being granted. This can be done in conjunction with the U. S. Forest Service and Division of Wildlife Resources. There are several suggested mitigation measures in the Wildlife and Aquatic Resources Studies which could form the nucleus of such a plan.

#### UMC 817.99 Slides and Other Damage

A commitment by SUFCO is needed so that any time a slide occurs which may have a potential adverse effect on public property, health, safety or the environment, SUFCO shall notify the Division by the fastest available means and comply with any remedial measures required by the Division.

#### UMC 817.100 Contemporaneous Reclamation

Applicant should file a plan for contemporaneous (interim) reclamation, including seeding and other land stabilization techniques.

#### UMC 817.106 Rills and Gullies

Applicant must include in the backfilling and grading plan, methods that will be used to fill, grade or otherwise stabilize rills and gullies should they occur.

#### UMC 817.122 Subsidence Control: Public Notice

The mining schedule shall be distributed by mail to all owners of property and residents within the area above the underground workings and adjacent areas that would be affected by subsidence if it occurred.

LITERATURE CITED

- Branson, F. A., Gifford, G. F., Renard, K. G., and Hadley, R. F. 1981. Rangeland Hydrology. Society for Range Management, Range Science Series No. 1, second edition. Kendall/Hurt Publishing Co., Dubuque, Iowa. 340 pp.
- Dume, T., and Leopold L. B. 1978. Water in Environmental Planning. W. H. Freeman and Company, San Francisco, California 818 pp.
- Haan, C. T., and Barfield, B. J. 1978. Hydrology and Sedimentology of Surface Mined Lands. University of Kentucky, Lexington, Kentucky. 286 pp.
- U. S. Soil Conservation Service. 1972. National Engineering Handbook. Sec. 4, Hydrology. U. S. Department of Agriculture, Soil Conservation Service, Washington, D. C.

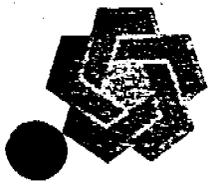
## INTRODUCTION

The material comprising the 1983 (April) update is submitted in response to Apparent Completeness Review/Technical Deficiency Document dated February 2, 1983 as modified and reissued on March 7, 1983 by the Division of Oil, Gas and Mining.

The material is to be integrated into the entire plan in order that all deficiencies discussed in the Apparent Completeness Review/Technical Deficiency Document are satisfactorily eliminated from the SUFCo mining and reclamation plan, as revised and amended. A significant portion of the 1983 submittal has been incorporated into Volumes 1 through 7. Response material not incorporated as insert replacement is presented in Volume 8.

On June 14, 1983, the Division of Oil, Gas and Mining completed a Determination of Completeness and Technical Deficiency (DOC/TD) review for the SUFCo Mining and Reclamation Plan, as amended. The Applicant has prepared additional materials in response to the DOC/TD review. The additional materials have been incorporated into the previously filed 1983 Completeness Response.

A red-colored sticker on the binder spines indicate that revised material (through the DOC/TD-July, 1983 addendum) has been incorporated.



STATE OF UTAH  
NATURAL RESOURCES  
Oil, Gas & Mining

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

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

June 14, 1983

Mr. Vernal Mortensen  
Southern Utah Fuel Company  
P. O. Box P  
Salina, Utah 84654

RE: Determination of Completeness  
Southern Utah Fuel Company  
Convulsion Canyon Mine  
ACT/041/002  
Folder No. 2  
Sevier County, Utah

Dear Mr. Mortensen:

The Division of Oil, Gas and Mining (DOGM) technical staff has completed an in-depth review of Southern Utah Fuel Company's (SUFCO) Mining and Reclamation Plan (MRP) submitted in response to the Division's March 7, 1983 Apparent Completeness Review (ACR). Enclosed please find the Division's combined Determination of Completeness (DOC) and Technical Deficiency (TD) review documents for the Convulsion Canyon Mine.

In the DOC portion of the review, requirements pertaining to the UMC 700 regulations which have not been adequately addressed in SUFCO's revised MRP are stated as they originally appeared in the ACR, including the concerns or deficiencies which have not been adequately answered in the ACR response and outlining what is required to complete the MRP. During the review, some sections which were not addressed by the Division in the ACR were found to be incomplete. These are added at the end of the DOC section.

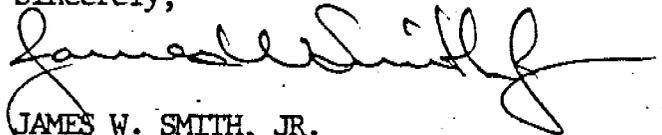
The TD section of the review relates to the UMC 800 regulations and those concerns or deficiencies which must be addressed by SUFCO in order for the Division to proceed with the Technical Analysis (TA). Technical deficiencies not previously addressed are added at the end of the TD section.

Mr. Vernal Mortensen  
ACT/041/002  
June 14, 1983  
Page 2

It must be emphasized that a timely and adequate response to those deficiencies or concerns listed under the DOC (UMC 700 regulations) should be of immediate priority. This is necessary for the MRP to be determined "complete" so that the Division can then notify all federal, state and local agencies and other interested parties that a complete plan has been received. A determination of completeness by the Division allows the operator to publish the consecutive four week notice in a local newspaper as required by UMC 786.11. Upon submission of the information requested in the TD, the Division will proceed with the Technical Analysis (TA) portion of the mine plan review. SUFCO's response to the TD must be received by the Division no later than July 8, 1983. An earlier response would be appreciated. Final approval of the Convulsion Canyon Mine permit application is scheduled for September 23, 1983.

If you have any questions regarding the enclosed documents, or about the review schedule, please contact me or Susan Linner of my staff.

Sincerely,



JAMES W. SMITH, JR.  
COORDINATOR OF MINED  
LAND DEVELOPMENT

JWS/SCL:btb

Enclosures

cc: Allen Klein, OSM, Denver  
S. Linner, DOGM  
D. Maier, DOGM  
R. Summers, DOGM  
D. Darby, DOGM

DETERMINATION OF COMPLETENESS  
AND  
TECHNICAL DEFICIENCIES

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

June 14, 1983

## DETERMINATION OF COMPLETENESS

### UMC 782.13 Identification of Interests

(e) Contiguous surface and subsurface owners to the mine permit area are not shown on Figure 80-1. Their addresses must also be given.

#### DETERMINATION OF COMPLETENESS

Contiguous surface and subsurface owners to the mine permit area are not shown on Figure 80-1 (as revised, March 1983). The status of Lease U-47080 has not been updated on this map. Addresses of owners contiguous to (adjoining) the permit area must be given.

### 783.19 Vegetation Information

The vegetation map submitted in 1981 should be revised to show the location of all disturbed areas, including the mine facilities area, sedimentation ponds, breakouts and reference areas.

#### DETERMINATION OF COMPLETENESS

The revised vegetation map (Map A) shows that not only the piñon-juniper community, but also the fir, sage-grassland and mountain brush communities have been disturbed by development. Disturbed acreages must be submitted for all disturbed communities.

Seventeen acres was given as the amount of land disturbed in the piñon-juniper (P-J) community type, but no total acreage of the P-J type on the permit area has been submitted. This should be done along with submittal of total acreage of riparian habitat disturbed by the sedimentation pond, if any was disturbed, and the total acreage of riparian habitat present on the permit area.

#### DETERMINATION OF COMPLETENESS

The applicant had originally indicated that there were only 17 acres of disturbance to be reclaimed. However, the response to UMC 784.13(b)(2) shows a total disturbed acreage of 27.79 acres. A table must be submitted breaking down this acreage into each type of disturbance (i.e., surface facilities, sediment pond, breakouts) and listing the vegetation type disturbed in each area. A reclamation plan must be submitted for each vegetation community for which there is one acre or more of disturbance. This table must be submitted prior to 1983 vegetation sampling to determine sampling requirements.

Sampling to characterize the P-J reference area is not complete at this time, some determination of productivity of the ground cover layer must be made as well as a determination of the shrub density on the reference area. Table 33 indicates that browse species make up 42 percent of the composition of the ground cover, but no density figures for these species are given in Table 34.

DETERMINATION OF COMPLETENESS

The applicant has indicated that additional vegetation sampling as required will be done in the 1983 field season. The permitting process will continue while these data are being collected; however, the applicant must commit in writing at this time to meet with DOGM representatives and the applicant's consultant prior to initiation of any further studies to insure that all necessary information is collected as expediently as possible.

The applicant must also document that the reference area(s) are permanently marked (all 4 corners staked) and will not be disturbed during minelife.

DETERMINATION OF COMPLETENESS

A commitment has been made to permanently mark reference areas; however, the applicant must still ensure that reference areas will not be disturbed during mine life.

UMC 784.13 Reclamation Plan: General Requirements and UMC 817.101  
Backfilling and Grading

It is suggested that 1 1/2 to 2 pounds PLS of Oryzopsis hymenoides be included in the reclamation seed mix, as it is the most prevalent grass on the reference area. That would bring the total seeding rate to 18 - 18 1/2 lbs per acre, which would be a sufficient quantity for the hydromulching method.

DETERMINATION OF COMPLETENESS

The paragraph concerning the use of Oryzopsis hymenoides in reclamation was not addressed. Please do so.

A plan for reclamation of the break-outs should be submitted.

DETERMINATION OF COMPLETENESS

The applicant must submit detailed reclamation plans for all disturbed areas (including the sediment pond and breakouts). For all vegetation types for which one or more acres have been disturbed, revegetation plans must be submitted following 1983 sampling (see discussion under Section UMC 783.19).

UMC 784.16 (a)(1)(1) and 784.23(e) Operation Plan: Maps and Plans

The applicant needs to submit operation and maintenance requirements (i.e., sediment disposal plans, operation inspection schedules, etc.) for both sediment ponds.

DETERMINATION OF COMPLETENESS

The applicant still needs to submit sediment disposal techniques, disposal area and frequency of clean out and volume of expected sediment to be removed at maximum level for the sediment pond and the concrete settling basin.

UMC 784.20 Subsidence Control Plan

(a)(i) Map 80-2 shows that nearly full recovery is planned near the southwest rim of Quitcupah Canyon and Map 80-10 indicates that some subsidence will occur on the canyon slopes. However, in Volume 2, Exhibit 3, page 24, it is stated that mining will be limited to room and pillar methods under steep canyon rims, and that 30 to 40 percent recovery is planned. Please clarify.

DETERMINATION OF COMPLETENESS

Map 80-2 (as revised, April 1983) must be resubmitted to the Division in a more legible form (i.e., the legend and other fine print on the map cannot be read).

UMC 784.22 Diversions

The applicant needs to submit descriptions (maps and cross-sections) of existing and proposed diversions. These should probably include the CBE drainage diversion along east road, an indication of diversions along the western boundary of the surface facilities and at the toe of the east slope behind the warehouse and office facilities.

DETERMINATION OF COMPLETENESS

The cross-references and descriptions for the diversions included in the Response to the ACR, Vol. 8, are not adequate. UMC 771.23 - Permit Applications, Section (b) states "Information set forth in the mine plan shall be current, presented clearly and concisely and supported by appropriate references to technical and other written material available to the Division."

The diversions should be outlined on a single map to facilitate the review process. This will serve a two-fold purpose: (1) allow the reader to readily assess the intended drainage pattern at the minesite; (2) insure that all areas of the site are drained properly. Resubmittal of outdated maps such as Exhibits 9-1 and 9-2 of Volume 2 will only generate more confusion as people unfamiliar with the site read the plan and will undoubtedly result in delay of the permit review.

The following diversions and/or descriptions of areas requiring drainage should be depicted. This list may not be inclusive of all the diversions and the operator should include any that are not specified. Cross-sections must be submitted for #3, 8 and 9 showing the dimensions of the diversions, including any required riprap layer. The diversions are:

1. CBE drainage along road.
2. CBE bypass culvert.
3. CBE continuance.
4. South parking lot diversion to silt fence and ditch downslope from fence showing fate of drainage.
5. Mine yard drainage system (incorporate June 21, 1982 submittal, if current).
6. Ditch and any berms used to direct flow from substation pad to CBE ditch.
7. Main mine fan diversion: page 40 of Vol. 8 states a six inch pipe is used whereas page 25 states drainage is through ESC bypass culvert. Please clarify.
8. CBW diversion: depict all drainage to pipe #5 (Exhibit 9-2 of Vol. 2) and pattern of drainage along road into mine from corner located approximately 1/3 mile from minesite.
9. Undisturbed area north of the ATOF and warehouse.
10. Pipe #5 found on Exhibit 9-2.
11. Sediment pond access diversion.

ADDITIONAL INFORMATION REQUIRED FOR COMPLETENESS DETERMINATION

UMC 784.11 Operation Plan: General Requirements

(b) The applicant shall supply plans and a narrative explaining maintenance and removal of dams, impoundments, berms, diversions, culverts, treatment facilities and other water pollution control structures.

Plans and a narrative should be submitted explaining how disturbed runoff will be routed past the sedimentation pond and how sediment control will be achieved as required under UMC 817.46(u). Please show how sediment ponds will be left in place while the pad is reclaimed and what alternative sediment control will be installed during postmining operations and reclamation period.

UMC 784.13 Reclamation Plan: General Requirements

The applicant shall provide a detailed timetable for the completion of each major step in the reclamation process.

The applicant shall explain the measures to be taken after cessation of mining activities to ensure protection to the quality and quantity of surface and ground water. A narrative should be included describing the regional flow directions of ground water and how mining and subsidence has and will effect the regional flow.

UMC 784.14 Protection of Hydrologic Balance

(d) The applicant should submit plans and describe how portal seals will be constructed to provide for the control or discharge of ground water that is presently being discharged via gravity flow through the breakouts.

UMC 784.16 Ponds, Impoundments, Banks, Dams and Embankments

(a)(3)(iv) The applicant must provide details, a timetable and plans to remove the sedimentation pond. See related comments under UMC 784.11.

UMC 784.23 Operation Plan: Maps and Plans

(b)(6) The map provided as requested under comments for UMC 784.22 of this document will also be sufficient for this section.

The applicant must submit maps and plans locating and detailing the current domestic water collection system and the septic treatment system including sewage lines.

TECHNICAL DEFICIENCIES.

UMC 817.11 Signs and Markers

(e) The applicant is requested to address and show where buffer zone markers have been placed in the mine permit area.

DEFICIENCIES

The applicant must indicate when buffer zone signs will be placed at the sites identified in the ACR Response. A diagram of the signs, showing wording to be used should also be submitted.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow, Shallow Ground Water Flow and Ephemeral Streams

The applicant must delineate all diversions (refer to comments of UMC 784.22) and present evidence they will pass the 10-year, 24-hour event with a design freeboard of no less than 0.3 feet. The information should include the area each diversion is draining and method and assumptions of calculating the design flow (e.g., curve number analysis).

The applicant should indicate the riprap size used in lining diversions and the design velocity calculations and assumptions used to determine that size.

DEFICIENCIES

The operator must submit design plans for diversions #5, 6, 9 and 10 as labeled under comments for UMC 784.22. Additionally, the following items should be address or corrected:

1. The CBE diversion has not been designed for 0.3 feet freeboard. The ditch is depicted in Vol. 2 as 0.6 feet deep with no freeboard.
2. Although peak flows cannot be calculated by using proportions as was done in the 1983 ACR Response, the value calculated for the south parking lot diversion was found to be adequate. The operator should clarify the size of ditch to be used as the diagram on page 38, Vol. 8 shows one foot width by one foot depth and the calculation on page 34 shows X and W to be .2 foot and 1.4 feet. Please clarify and define these values. The operator should also calculate the design velocity and present size of riprap for ditch beyond the silt fence and down the dirt road depicted on Exhibit 9-2.
3. Although Vol. 2 contains calculations for the peak flows for CBE, the operator must present plans for the east road continuance diversion. These plans must include size of channel, slope, velocity calculation and riprap size. Also indicate that discharge is directed on an existing boulder for an energy dissipator.

4. The applicant should submit culvert sizes and drop drain structures with calculations for the mine yard drainage system.
5. The applicant should be aware that calculation of peak flows for small areas of a larger basin cannot simply be done by ratio methods. Review during technical analysis may show the calculations for diversions #2, 9 and 10 to be inaccurate and redesign of the diversion may be needed.
6. The operator must indicate the size of riprap used in each diversion and present corresponding velocity value used in determination of that size (including source of calculation by volume and page).
7. The drainage from the CBW needs clarification. Does drainage from pipe #5 (Exhibit 9-2) south to the corner of the road leading into the mine drain north or south? It appears from Exhibit 9-9 that the drainage would be north and page 48 of Vol. 8 states this area currently drains to pond. If this is the case, the area delineated as CBW should encompass that drainage.
8. The undisturbed drainage from the area directly north of the ATOF (warehouse) should be diverted to the ESC or MSH culvert using a diversion ditch around the fill perimeter. The operator should address this area and present plans and calculations for any existing or proposed diversions.
9. The branch from the bypass substation culvert extending in a northeast direction (see Exhibit 9.1, Vol. 2) should be explained and detailed in the plan and calculations if this is in fact a proposed culvert or diversion.

UMC 817.46 Hydrologic Balance: Sediment Ponds

Sediment Volume Conculsions

As design is proposed:

2. The 65 percent reduction in sediment storage required from the area top of fill (ATOF) is not valid as the concrete basin does not have this storage volume available.
3. SUFCO must provide for total sediment storage volume calculated and not reduce that value by proposing to remove 50 percent sediment volume by cleaning as cleaning is required under Section (h) of this code.
4. Because the primary discharge structure is at 7,411; the maximum storage volume for sediment at 7,411 feet-3 feet = 7,408 feet elevation (State Health requirement) is 0.328 ac-ft. This is inadequate for predicted sediment volume provided.

5. Although the settling assumption of page 11 (Valley Engineering Report) was not reviewed in great depth, it was noted that a typographical error exists as particles larger than 58 microns not 0.58 microns as stated are removed according to Stoke's Law. The application should be corrected.
6. The applicant must provide data including location map, discharge rates and planned diversion of the spring located near the washroom on the ATOF. This discharge must be included in the design of the sediment pond if this discharge is to be passed through the sedimentation system.

Conclusions:

3. The Division assumes that SUFCO has chosen to demonstrate that effluent limitations will be achieved using a total detention of the sediment and runoff volume from a 10-year, 24-hour precipitation event (Valley Engineering Report 1980, page 1). A review of the adequacy of the sedimentation system to provide this storage resulted in the conclusion that the system is undersized and inadequate. The following points were used to reach this conclusion:
    - A. Runoff volume was under-estimated.
    - B. Sediment volume cannot be reduced by 76 percent using settling assumption and proposed cleaning (see prior justification).
    - C. Sediment storage volume available in lower pond was over-estimated because the primary discharge conduit is not equipped with a valve or gate, the volume available for storage before outflow occurs is less than that calculated for an elevation of 7,418 feet. In order to provide total containment of the 10-year, 24-hour event, sediment storage volume must be calculated at an elevation of three feet below the top of the discharge structure (State Health requirement). This value is only 0.328 ac-ft.
    - E. The total storage volume available in lower pond was over-estimated. Again, due to the lack of value on the primary discharge structure, total storage volume available before outflow begins must be calculated at stage 7,411 feet. This value is 0.596 ac-ft. When combined with the volume available in the concrete basin, this total storage becomes 0.628 ac-ft.
- (e) The applicant must "design, construct and maintain sedimentation ponds to prevent short-circuiting to the extent possible." Using an EPA 1976 methodology outlined by Haan (1978), both ponds were checked for potential short-circuiting as follows:

L:W ratio =  $L/W_e$                       Where: L = length of flow path

EPA recommends the L:W ratio be greater than 2.0 to minimize short-circuiting.

We = surface area/L

Concrete basin: surface area = 1,068.78 ft<sup>2</sup>. For ratio of 2.0, find L:  $L = (2.0A)^{1/2} = [(2.0)(1069)] = 46.24$  ft.

Since pond has nine discharge pipes, find the discharge pipe such that distance from inflow point is greater than 46.3 ft (Pythagorean Theorem):

Distance = D =  $(a^2 - b^2)^{1/2}$ ,  $D = [(46.3)^2 - (225)^2]^{1/2}$ , D = 40.5 feet.

Thus, L:W ratio is less than two and short-circuiting likely for discharge pipes 1-7.

Sediment pond: Area = 97.5 ft<sup>2</sup>. L:W = 82.4 ft/(97.5 ft<sup>2</sup>/82.4 ft) = 0.70.

Conclusions:

1. Both ponds are not designed to minimize short-circuiting.
2. The Division recommends that any future major construction or modification to these ponds incorporate (to the extent possible) designs to help minimize the potential short-circuiting (i.e., install baffles, relocate inflow point, etc.).

(g) SUFCO must provide evidence that ensures "no outflow through emergency spillway during . . . 10-year, 24-hour event . . ." using flood routing techniques if pond is not modified for total containment of the 10-year, 24-hour runoff and sediment volume.

(h) SUFCO must provide a plan for sediment disposal cleaned out of both the concrete and the lower sedimentation ponds.

It will be helpful for further review if SUFCO will indicate the frequency of cleaning for each pond experienced in the past.

(i) Refer to estimation of point rainfall (Merrick Report, Vol. II, Addendum). The section titled "conversion factor for areal correction for entire basin" is mislabeled. It should read "conversion factor for correction of partial duration series to annual series data."

Applicant needs to supply method and calculation for the determination of the following (Merrick Report, Appendix: Runoff) for the 10- and 25-year, 24-hour storms:

1. Time of concentration (Tc).
2. Velocity.

3.  $q_p$  (discharge peak).

4. Method of peak flow determination for ATOF, SOF and CBW. If equation 16.6 (NEH-4) was used:  $q = 484AQ/T_p$ , value for and determination of  $T_p$  must be presented.

Refer to Valley Engineering Report, Vol. 6, page 5. It appears that the peak flow of 62.4 cfs was taken from Merrick and Company and includes peaks from the CSA and ATTP. Do these areas drain to ponds? Please clarify.

The Manning Equation check assumes a rectangular spillway, whereas the constructed spillway is trapezoidal in shape. This results in an under-estimation of two and, therefore, will be acceptable, but a comment should be included in MRP in order to improve readability of this section.

Refer to page 6, Valley Engineering Report (Pond Outlet). Again, applicant must provide information outlined under comments of section (i) for  $Q_{10}$  and  $Q_{25}$  peak flow calculations.

The value for  $Q_{10}$  appears to include peak flow values from CBW, ATOF and SOF, while the value for  $Q_{25}$  appears to also include the CSA and ATTP areas. The calculation of  $Q_{25} = 72 + .15 + .85 + .07$  appears to also include ATTP and possibly CSA areas. Again, please clarify the ATTP and CSA drainage and correct these calculations for consistency.

The design peak of  $Q_{25}$  calculated by dividing the predicted runoff volume in ac-ft by 24 hours is in error. Peak flows are dependent on several factors including timing of rainfall and rainfall excess and characteristics of the drainage catchment. If the applicant is not designing for the total containment of the 10-year, 24-hour precipitation event as stated in the narrative of this report, the peak flow for the 10-year storm must be calculated by accepted methods and routed through the sediment system using flood routing techniques to find the design size for the primary discharge in order to comply with Section (g) of UMC 817.46.

Using the equation for orifice controlled flow:

$$Q = C_o A (2 g H)^{0.5} \quad (\text{reference: Haan 1978})$$

A = area of pipe  $\text{ft}^2$

H = design head

$C_o$  = Coefficient based upon type of structure.

We find the 12-inch pipe design flow is:

$$Q = (0.61) (0.785 \text{ ft}^2) [(64.4 \text{ ft/sec}^2)(7.0 \text{ ft})]^{0.5} = 10.2 \text{ cfs}$$

The applicant must show that this is sufficient for the expected peak flow.

The reference to Table 20-17 Seelye should be complete or Table 20-17 should be provided (preferably include both).

(r) The applicant must provide certification of the constructed pond by a registered, professional engineer.

(s) The applicant must provide details on the extent of embankment stabilization. The 1981 submittal in Sections 18, 19 and 20 mentions several times the areas to be stabilized by vegetation, etc., will be shown on plans, yet no plans of this nature were found.

#### DEFICIENCIES

The applicant has not included the above sections found on pages 8-13 in the Division's ACR, in the Volume 8 response. These comments should be included and responded to as appropriate.

If the applicant desires to conduct an experimental practice concerning the concrete settling basin as indicated on page 45 of Vol. 8, complete plans including study objective, methods and monitoring must be submitted to the Division. This plan must comply with the requirements of UMC 785.17. This plan must be approved by the Division, the Office of Surface Mining and ultimately the Secretary of the Interior and, therefore, 13 copies of the plan must be submitted for review.

#### UMC 817.47 Hydrologic Balance: Discharge Structures

"Discharge shall be controlled by energy dissipators . . . riprap channels . . . designed according to standard engineering procedures." SUFCO must provide:

3. Spillway riprap size and velocity calculation.

#### DEFICIENCIES

The use of a value for Q of 670 cfs as taken from Valley Engineering (page 50, Vol. 8) is in error. This value of Q was derived from the calculation of the expected velocity of the given spillway size and is not the expected peak discharge from the pond. The correct value (from the application) to use would be 62.4 cfs (although this value has not been technically reviewed) which indicates the spillway is probably adequately sized. This will be determined during the technical analysis stage of the permit review.

#### 817.97 Protection of Fish, Wildlife and Related Environmental Values

(c) The applicant must reply to the Division's February 26, 1982, letter regarding raptor protection on power lines. Two options were listed for poles constructed prior to 1977: Sufco must choose and pursue one of these. Plans for pole modification should be approved in advance by the Division.

DEFICIENCIES

SUFCO's response to this concern is inadequate. The attached memo deals with the Skyline Mine and is inapplicable here. If the poles have been modified, a map of all poles on the permit area, showing which have been modified, and a design drawing of the modifications should be included in the mine plan. The U. S. Fish & Wildlife Service (USFWS) must make a determination that the poles are safe for raptors. A USFWS representative should be at the minesite in the near future to examine the power poles.

The applicant must develop and commit to a specific wildlife mitigation plan prior to permit approval being granted. This can be done in conjunction with the U. S. Forest Service and Division of Wildlife Resources. There are several suggested mitigation measures in the Wildlife and Aquatic Resources Studies which could form the nucleus of such a plan.

DEFICIENCIES

The applicant references a mitigation plan in the 1980 submittal, page 54-56 of the Wildlife Report. This is not a mitigation plan, but rather recommendations from the applicant's wildlife consultant as to what should go into a mitigation plan. The applicant should use those recommendations, along with the recommendations made by the Utah Division of Wildlife Resources and the U. S. Forest Service to make a definitive reclamation plan. (Example: SUFCO will implement an employee education program, will improve wildlife habitat in areas adjacent to the minesite, will provide additional watering sources, etc.).

ADDITIONAL TECHNICAL INFORMATION REQUIRED FOR THE TA

UMC 817.41 Hydrologic Balance: General Requirements

The operator should submit information concerning the water rights permit required for intercepting and discharging water from the mine.

The operator shall submit an updated map along with a narrative explaining the mine dewatering system. Included in the map shall be the underground dam, directions of flow and discharge points.

UMC 817.42 Hydrologic Balance: Water Quality Standards and Effluent Limitations

(a)(2) The reclamation plan requested under UMC 784.11 should include plans to leave sediment pond and underground workings treatment facilities following reclamation until effluent limits and water quality standards are met as required by this section.

(a)(3)(i) The three areas for which the operator has requested small area exemption status in the 1983 ACR Response (Volume 8) must have alternate sediment control facilities. Additionally, the operator is required to demonstrate that the drainage will meet effluent limitations. The south end parking lot area has a proposed silt fence treatment facility. The substation pad and the main mine fan area must also have alternate sediment control measures. The applicant must also commit to a plan for sampling the drainage from these areas during runoff events to demonstrate effluent limitation compliance. Reports of the sample analysis must be submitted to the Division until the sample size is determined to be adequate.

UMC 817.44 Hydrologic Balance: Stream Channel Diversions

The operator shall provide information detailing how and when reclamation of the stream channel culvert will take place. Designs and calculations for erosion control structures such as channel lining structures, retention basins and/or artificial channel roughness structures, which prevent additional contributions of suspended solids, will need to be submitted to the Division.

UMC 817.49 Hydrologic Balance: Permanent and Temporary Impoundments

(h) The applicant must submit a certification report by a registered professional engineer or land surveyor of the sedimentation pond. This report must include items 1-5 of this section.

UMC 817.50 Hydrologic Balance: Underground Mine Entry and Access Discharge

The operator shall submit the necessary information and designs which show how mine water discharge will be discharged from underground workings during postmining operations and by what means effluent limitations will be met.

Location Index for  
Determination of Completeness/Technical Deficiency  
Review/Responses

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783.19 Vegetation Information	12a
784.13 Reclamation Plan: General Requirements & 817.101, Backfilling & Grading	19b
784.16(a)(1)(1) & 784.23(e) Operation Plan: Maps and Plans	20a
784.20 Subsidence Control Plan	22a
784.22 Diversions	25a
784.11 Operation Plan: General Requirements	15a
784.13 Reclamation Plan: General Requirements	19a
784.14 Protection of Hydrologic Balance	19d
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817.50 Hydrologic Balance: Underground Mine Entry & Access Discharge	51c

UMC 771.23 Permit Application: General Requirements for Format and Contents:

(e)(2) The applicant must distinguish those portions in the mine plan area in which underground coal mining activities occurred prior to and after August 3, 1977. Map 1B would adequately supply this information if the five mining phases were depicted separately.

Response:

Those portions in the mine plan area in which underground coal mining activities occurred prior to and after August 3, 1977, and prior to May 3, 1978 are distinguished in Map 83-1, 1983 Appendices, Volume 8.

UMC 771.25 Permit Fees:

The applicant must provide proof that a \$5.00 permit fee was sent to the Division.

Response:

A photocopy of a receipt is presented in this section as proof of payment of the permit fee.



STATE OF UTAH  
NATURAL RESOURCES & ENERGY  
Oil, Gas & Mining

Scott M. Matheson, Governor  
Temple A. Reynolds, Executive Director  
Cleon B. Feight, Division Director

1241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

March 14, 1983

Mr. Vernal Mortensen  
Coastal States Energy Company  
411 West 7200 South  
Midvale, Utah 84047

RE: Permit Filing Fee  
Convulsion Canyon Mine  
ACT/041/002  
Folder No. 2  
Sevier County, Utah

Dear Vernal:

The Division is in receipt of the \$5.00 permit filing fee for Southern Utah Fuel Company's Convulsion Canyon Mine via check No. 006789, dated March 7, 1983.

Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read 'James W. Smith, Jr.', written in a cursive style.

JAMES W. SMITH, JR.  
COORDINATOR OF MINED  
LAND DEVELOPMENT

JWS/btb

Enclosure

cc: S. Linner, DOGM

REMITTANCE STATEMENT DETACH BEFORE DEPOSITING

SOUTHERN UTAH FUEL COMPANY

INVC. NO.	INV. DATE	DESCRIPTION	REF. NO.	GROSS AMOUNT	DEDUCTIONS	NET AMOUNT
500	3/ 7/83	FILING FEE	83-03-0148	5.00	0.00	5.00

**RECEIVED**  
MAR 11 1983

DIVISION OF  
OIL, GAS & MINING

C-77 (10-82)

006789

SOUTHERN UTAH FUEL COMPANY

006789

	006789
VOUCHER NUMBER	CHECK NUMBER

DATE MARCH 7, 1983

PAY \*\*\*\*\*5 DOLLARS AND 00 CENTS \$ \*\*\*\*\*5.00

TO THE  
ORDER OF

DIVISION OF OIL, GAS, & MINING  
4241 STATE OFFICE BUILDING  
SALT LAKE CITY UT 84134

SOUTHERN UTAH FUEL COMPANY

CITIBANK (NEW YORK STATE), N.A.  
NORTH AMERICAN BANKING GROUP

50-817  
213

By \_\_\_\_\_

By *A. L. Burger*

⑈00006789⑈ ⑆021308176⑆

30994835⑈

UMC 782.13 Identifications of Interests:

(e) Contiguous surface and subsurface owners to the mine permit area are not shown on Figure 80-1. Their addresses must also be given.

Response:

The name of all contiguous surface and subsurface owners are shown on Map 80-1, as revised. Their addresses are presented at Volume 3, Compliance Submittal 782.13 (e).

Map 80-1 has been revised to indicate that U-47080 is no longer an application for a federal coal lease but is a federal coal lease owned by Coastal States Energy Company, the Applicant.

UMC 782.13 Identification of Interests:

(e) Contiguous surface and subsurface owners to the mine permit area are not shown on Figure 80-1. Their addresses must also be given.

DETERMINATION OF COMPLETENESS

Contiguous surface and and subsurface owners to the mine permit area are not shown on Figure 80-1 (as revised, March 1983). The status of Lease U-47080 has not been updated on this map. Addresses of owners contiguous to (adjoining) the permit area must be given.

Response:

Map 80-1 has been further revised to show more clearly the owners of surface and subsurface lands contiguous to the mine permit area.

The addresses of the owners of contiguous surface and subsurface lands are presented in Response to Comment 782.13(e) at page 12 of the 1980 Compliance Submittal, Volume 3.

UMC 782.14 Compliance Information:

(c) The applicant should update this section to include all violations issued since September 1982, and the abatement of such violations.

Response:

Since the September 1981 submittal, three notices of violations have been issued by the regulatory authorities. The first of the three notices of violation concerned UMC 817.52 (b)(1)(ii) and resulted from not informing the Division within five days of a compliance problem with the NPDES permit. Abatement required written notification which was promptly submitted. The notice of violation was subsequently vacated by letter from the Division on June 2, 1982.

The second of the notices of violation was issued February 24, 1983 and concerned UMC 817.42 (a)(1) and 817.45. It resulted from disturbed area runoff undercutting the drainage ditch on the sediment pond access road such that the runoff would bypass the pond. Corrective action was taken to abate the notice of violation within the required time span.

The third of the three violations was issued March 24, 1983 and concerned UCA 40-10-18 (2)(i)(ii), UMC 817.42 (a)(7) and UMC 817.45 (ii). The notice of violations related to a discharge from SUFCo's sedimentation pond containing an alleged excess of total suspended solids. Abatement is in process and abatement procedures are being incorporated into SUFCo's mining and reclamation plan by way of the 1983 Completeness Response to Comment UMC 817.46, Volume 8.

UMC 782.15 Right of Entry and Operations Information:

(a) The operator is requested to provide the Division with documents regarding the legal access to lease U-47080.

Response:

A photocopy of Federal coal lease U-47080 which grants the Applicant, Coastal States Energy Company, the right to enter and conduct underground mining operations on the leased premises is presented in this section.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Serial Number  
U-47080

COAL LEASE

This lease, is entered into on OCT 15 1981, by the United States of America, the lessor, through the Bureau of Land Management, and

Coastal States Energy Company  
Nine Greenway Plaza  
Houston, Texas 77046

, the lessee,  
and shall become effective on OCT 1 1981, (effective date).

Sec. 1. STATUTES AND REGULATIONS--This lease is issued pursuant and subject to the terms and provisions of the Mineral Leasing Act of February 25, 1920, 41 Stat. 437, as amended, 30 U.S.C. Sections 181-263, hereafter referred to as the Act; and of the Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. Section 1201, et seq., the Federal Coal Leasing Amendments Act of 1976, as amended, 90 Stat. 1083-1092, and, in the case of acquired lands, the Mineral Leasing Act for Acquired Lands of September 7, 1947, as amended, 30 U.S.C. 351-359, et seq. This lease is also subject to all regulations of the Secretary of the Interior (including but not limited to, 30 CFR Part 211 and Chapter VII and 43 CFR Group 3400), and to all regulations of the Secretary of Energy promulgated pursuant to Section 302 of the Department of Energy Organization Act of 1977, 42 U.S.C. Section 7152, which are now in force or (except as expressly limited herein) hereafter in force, and all of such regulations are made a part hereof.

WITNESSETH:

Sec. 2. RIGHTS OF LESSEE--The lessor, in consideration of any bonus paid (or to be paid if deferred), rents and royalties and other conditions hereinafter set forth, hereby grants and leases to the lessee the exclusive right and privilege to mine and dispose of all coal in

T. 21 S., R. 4 E., SLM, Utah  
Sec. 25, all;  
Sec. 36, N $\frac{1}{2}$ .  
T. 21 S., R. 5 E., SLM, Utah  
Sec. 30, lots 2-4, W $\frac{1}{2}$ SE $\frac{1}{4}$ .

containing 1,158.05 acres, more or less, and subject to the conditions, limitations and prohibitions provided in this lease and in applicable acts and regulations, the right to construct all works, buildings, structures, equipment, and appliances which may be necessary and convenient for the mining and preparation of the coal for market, and, subject to the conditions herein provided, to use so much of the surface as may reasonably be required in the exercise of the rights and privileges herein granted for a period of 20 years and so long thereafter as the condition of continued operation is met.

Sec. 3. DILIGENT DEVELOPMENT AND CONTINUED OPERATION--The lessee shall engage in the diligent development of the coal resources subject to the lease. After diligent development is achieved, the lessee shall maintain continued operation of the mine or mines on the leased lands. The terms diligent development and continued operation are defined in the applicable regulations in Titles 10, 30, and 43 of the Code of Federal Regulations.

Sec. 4. BOND--The lessee shall file with the appropriate Bureau of Land Management office a lease bond in the amount of \$ 50,000.00 , for the use and benefit of the United States, to insure payment of deferred bonus payments, rentals and royalties and to insure compliance with all other items of this lease, the regulations and the Act (except for reclamation within the area covered by a surface mining permit issued under the permanent regulatory program by the regulatory authority) and, if appropriate, for the protection of the interests of the surface owners on the leased lands. An increase in the amount of the lease bond may be required by the lessor at any time during the life of the lease to reflect changed conditions.

Sec. 5. RENTAL--An annual rental of \$3.00 for each acre or fraction thereof shall be paid in advance on or before the anniversary date of this lease. This section shall not be subject to revision except in the course of lease readjustment.

Sec. 6. PRODUCTION ROYALTY--The lessee shall pay a production royalty of 12% percent of the value of coal produced by strip or auger mining methods and 8 percent of the value of coal produced by underground mining methods. The value of coal shall be determined as set forth in 30 CFR 211. Production royalties paid for a calendar month shall be reduced by the amount of any advance royalties paid under this lease to the extent that such advance royalties have not been used to reduce production royalties in a previous month. However, production royalties payable after the 20th year of the lease shall not be reduced by advance royalties paid during the first 20 years of the lease. Production royalties shall be payable the final day of the month succeeding the calendar month in which the coal is sold, unless otherwise specified in 30 CFR 211. The royalty rates provided in this section shall not be subject to revision except in the course of lease readjustment.

Sec. 7. ADVANCE ROYALTY--Upon request by the lessee, the District Mining Supervisor may accept, for a total of not more than 10 years, the payment of advance royalties in lieu of the condition of continued operation consistent with the regulations in 43 CFR 3473 and 30 CFR 211. The advance royalty shall be based on a percent of the value of a minimum number of tons which shall be determined in the manner established by the regulations in 43 CFR 3473.

Sec. 8. METHOD OF PAYMENTS--The lessee shall make rental payments to the appropriate Bureau of Land Management (BLM) office until production royalties become payable. Thereafter, all rentals, production royalties and advance royalties shall be paid to the appropriate office of the United States Geological Survey.

Sec. 9. EXPLORATION PLAN--The lessee shall not commence any exploration, except casual use, on the leased lands without an approved exploration plan. Exploration plans for leased lands covered by an approved mining permit shall be submitted to the Regional Director of the Office of Surface Mining in accordance with the regulations in 30 CFR Chapter VII. Exploration plans for leased lands not covered by an approved mining permit shall be submitted to the District Mining Supervisor in accordance with the regulations in 30 CFR 211.

Sec. 10. MINING PLAN--In accordance with the regulations in 30 CFR 211 and Chapter VII, the lessee shall submit a mining and reclamation plan not more than three years after the effective date of this lease. Mining operations shall not commence until after the mining and reclamation plan is approved. The mining and reclamation shall be conducted in accordance with the approved mining and reclamation plan. Exploration activities which were not included in the approved mining and reclamation plan require submittal of exploration plans in accordance with Section 9 of this lease.

Sec. 11. LOGICAL MINING UNIT (LMU)--This lease is automatically considered to be an LMU. This LMU may be enlarged, adjusted or diminished in accordance with the applicable regulations in Titles 10, 30, and 43 of the Code of Federal Regulations. The mining plan for the LMU shall require that the reserves of the LMU will be mined within a period of 40 years in accordance with 30 CFR 211 and 43 CFR 3400.0-5. The definition of LMU and LMU reserves and other applicable conditions are set forth in the regulations in 43 CFR 3400.0-5 and 3475, 30 CFR 211, and Title 10 of the Code of Federal Regulations.

Sec. 12. OPERATIONS ON LEASED LANDS--(a) In accordance with conditions of this lease, the exploration and mining and reclamation plans, the permit issued pursuant to 30 CFR Chapter VII, and all applicable acts and regulations, the lessee shall exercise reasonable diligence, skill, and care in all operations on leased lands.

(b) The lessee shall minimize to the maximum extent possible wasting of the coal deposits and other mineral and nonmineral resources, including but not limited to, surface resources which may be found in, upon, or under such lands.

Sec. 13. SPECIAL STATUTES--The lessee shall comply with the provisions of the Federal Water Pollution Control Act, 33 U.S.C. 1151-1175, and the Clean Air Act, 42 U.S.C. 7401, et seq.

Sec. 14. AUTHORIZATION OF OTHER USES AND DISPOSITION OF LEASED LANDS--(a) The lessor reserves the right to authorize other uses of the leased lands by regulation or by issuing, in addition to this lease, leases, licenses, permits, easements, or rights-of-way, including leases for the development of minerals other than coal under the Act. The lessor may authorize any other uses of the leased lands that do not unreasonably interfere with the exploration and mining operations of the lessee, and the lessee shall make all reasonable efforts to avoid interference with such authorized uses.

(b) The lessor reserves the right: (i) to sell or otherwise dispose of the surface of the leased lands under existing law or laws hereafter enacted insofar as said surface is not necessary for the use of the lessee in the extraction and removal of the coal therein, or (ii) to dispose of any resource in such lands if such disposal will not unreasonably interfere with the exploration and mining operations of the lessee.

(c) If the leased lands have been or shall hereafter be disposed of under laws reserving to the United States the deposits of coal therein, the lessee shall comply with all conditions as are or may hereafter be provided by the laws and regulations reserving such coal.

Sec. 15. EQUAL OPPORTUNITY CLAUSE--The lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations and relevant orders of the Secretary of Labor.

Sec. 16. CERTIFICATION OF NONSEGREGATED FACILITIES--By entering into this lease, the lessee certifies that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause of this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. Lessee further agrees that (except where lessee has obtained identical certifications from proposed contractors and subcontractors for specific time periods) lessee will obtain identical certifications from proposed contractors and subcontractors prior to award of contracts or subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that lessee will retain such certifications in lessee's files; and that lessee will forward the following notice to such proposed contractors and subcontractors (except where proposed contractor or subcontractor has submitted identical certifications for specific time periods). Notice to prospective contractors and subcontractors of requirement for certification of nonsegregated facilities. A Certification of Non-segregated Facilities, as required by the May 9, 1967 order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. Certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semiannually, or annually).

Sec. 17. EMPLOYMENT PRACTICES--The lessee shall pay all wages due persons employed on the leased lands at least twice each month in lawful money of the United States. The lessee shall grant all miners and other employees complete freedom to purchase goods and service of their own choice. The lessee shall restrict the workday to not more than 8 hours in any one day for underground workers, except in case of emergency. The lessee shall employ no person under the age of 16 years in any mine below the surface. If the laws of the State in which the mine is situated prohibit the employment, in a mine below the surface, of persons of an age greater than 16 years, the lessee shall comply with those laws.

Sec. 18. MONOPOLY AND FAIR PRACTICES--The lessor reserves full authority to promulgate and enforce orders and regulations under the provisions of Sections 30 and 32 of the Act (30 U.S.C. Sections 187 and 189) necessary to insure that any sale of the production from the leased lands to the United States or to the public is at reasonable prices, to prevent monopoly, and to safeguard the public welfare, and such orders and regulations shall upon promulgation be binding upon the lessee.

Sec. 19. TRANSFERS--

- This lease may be transferred in whole or in part to any person, association or corporation qualified under 43 CFR 3472.1-1 to hold a lease.
- This lease may only be transferred in whole or in part to another public body, or to a person who will mine the coal on behalf of and for the use of the public body, or to a person for the limited purpose of creating a security interest in favor of a lender who agrees to be obligated to mine the coal on behalf of the public body. The transferee must be qualified under 43 CFR 3472.
- This lease may only be transferred in whole or in part to other small businesses qualifying under 13 CFR 121 and 43 CFR 3472.2-2(c).

Any transfer of this lease in whole or in part is subject to the procedures and requirements for approval in the relevant regulations in 43 CFR 3400. A transfer will become effective on the first day of the month following its approval by the authorized officer, or, if the transferee requests, the first day of the month of the approval.

Sec. 20. RELINQUISHMENT OF LEASE--The lessee may file a relinquishment of the entire lease, a legal subdivision or aliquot part thereof, but not less than 10 acres, or any bed of the coal deposits therein. The relinquishment shall be filed in triplicate with the authorized officer. Upon the determination by the authorized officer that the public interest shall not be impaired, that all accrued rentals and royalties have been paid and that all of the obligations of the lessee under the regulations and the lease terms have been met, the relinquishment shall be accepted effective the date filed.

Sec. 21. NONCOMPLIANCE--Any failure to comply with the conditions of this lease, the approved exploration and mining and reclamation plans, the regulations, or applicable acts, shall be dealt with in accordance with the procedures set forth in the regulations.

Sec. 22. WAIVER OF CONDITIONS--The lessor reserves the right to waive any breach of the conditions contained in this lease, except the breach of such conditions as are required by the Act, but any such waiver shall extend only to the particular breach so waived and shall not limit the rights of the lessor with respect to any future breach; nor shall the waiver of a particular breach prevent cancellation of this lease for any other cause, or for the same cause occurring at another time.

Sec. 23. READJUSTMENT OF TERMS AND CONDITIONS--(a) The lease is subject to readjustment on the 20th year after the effective date and on each 10th year thereafter. In order that the lease may be readjusted as close as possible to the dates when it becomes subject to readjustment, the lessor may propose the terms of readjustment of any conditions of this lease, including rental and royalty rates, before the 20th year after the effective date and before each 10-year interval thereafter. The authorized officer shall notify the lessee whether he intends to readjust the terms and conditions of the lease and, if he intends to readjust, the nature of the readjustments in accordance with the regulations in 43 CFR 3451. Unless the lessee, within 60 days after receipt of the proposed readjusted terms, files with the lessor an objection to the proposed readjusted conditions or relinquishes the lease as of the effective date of the readjustment, the lessee shall be deemed conclusively to have agreed to such conditions.

(b) If the lessee files objections to the proposed readjusted conditions, the existing conditions shall remain in effect until there has been an agreement between the lessor and the lessee on the new conditions to be incorporated in the lease, or until the lessee has exhausted his rights of appeal under Section 24 of this lease, or until the lease is relinquished, except that the authorized officer may provide in the notice of readjusted lease terms that the readjustment or any part thereof is effective pending the outcome of the appeal. If the readjusted royalty provisions are subsequently rescinded or amended, the lessee shall be permitted to credit any excess royalty payments against royalties subsequently due to the lessor.

Sec. 24. DELIVERY OF PREMISES--Upon termination of this lease for any reason, or relinquishment of a part of this lease, the lessee shall deliver to the lessor in good order and condition all or the appropriate part of leased lands. Delivery of the leased lands shall include underground timbering and such other supports and structures as are necessary for the preservation of the mine or deposit, and shall be in accordance with all other applicable provisions of the regulations, including 30 CFR 211 and Chapter VII, for the completion of operations and abandonment.

Sec. 25. PROPRIETARY INFORMATION--Geological and geophysical data and information, including maps, trade secrets, and commercial and financial information which the lessor obtains from the lessee shall be treated in accordance with 43 CFR Part 2, 30 CFR 211.6 and other applicable regulations. Total lease reserve figures developed from this information will not be confidential.

Sec. 26. LESSEE'S LIABILITY TO LESSOR--(a) The lessee shall be liable to the United States for any damage suffered by the United States in any way arising from or connected with the lessee's activities and operations under this lease, except where damage is caused by employees of the United States acting within the scope of their authority.

(b) The lessee shall indemnify and hold harmless the United States from any and all claims arising from or connected with the lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damages occurred.

Sec. 27. INSPECTIONS AND INVESTIGATIONS--(a) All books and records maintained by the lessee showing information required by this lease or regulations must be kept current and in such manner that the books and records can be readily checked at the mine, upon request, by the Regional Director or District Mining Supervisor or their representative.

(b) The lessee shall permit any duly authorized officer or representative of the lessor at any reasonable time (1) to inspect or investigate the leased lands, the exploration and mining and reclamation operations, and all surface and underground improvements, works, machinery, and equipment, and all books and records pertaining to the lessee's obligations to the lessor under this lease and regulations and (2) to copy, and make extracts from any such books and records.

Sec. 28. UNLAWFUL INTEREST--No member of, or Delegate to, Congress, or Resident Commissioner, after his election or appointment, either before or after he has qualified and during his continuance in office, and no officer, or employee of the Department of the Interior, except as provided in 43 CFR 7.4(a)(3), shall hold any share or part in this lease or derive any benefit therefrom. The provisions of Section 3741 of the Revised Statutes, as amended, 41 U.S.C. Section 22, and the Act of June 25, 1948, 62 Stat. 702, as amended, 18 U.S.C. Sections 431-433, relating to contracts, enter into and form a part of this lease insofar as they may be applicable.

Sec. 29. APPEALS--The lessee shall have the right to appeal (a) under 43 CFR 3000.4 from an action or decision of any official of the Bureau of Land Management (b) under 30 CFR Part 290 from an action, order, or decision of any official of the United States Geological Survey, or (c) under applicable regulation from any action or decision of any other official of the Department of the Interior arising in connection with this lease, including any action or decision pursuant to Section 23 of this lease with respect to the readjustment of conditions.

Sec. 30. DEFERRED BONUS--This lease is issued subject to the payment of \$749,489.96<sup>10</sup> by the lessee as a deferred bonus. Payment of the deferred bonus by the lessee shall be made on a schedule specified in Section 31 (Special Stipulations) of this lease.

Sec. 31. SPECIAL STIPULATIONS--The District Mining Supervisor shall mean the authorized representative of the U.S. Geological Survey and the Regional Director shall mean the authorized representative of the Office of Surface Mining. The Authorized Officer shall mean the State Director, Bureau of Land Management. The Authorized Office of the Surface Management Agency shall mean the Forest Supervisor, Forest Service or District Manager, Bureau of Land Management as appropriate. Surface management agency for private surface is the Bureau of Land Management.

1. In addition to observing the general obligations and standards of performance set out in the current regulations, the Lessee shall comply with and be bound by the following special stipulations. These stipulations are also imposed upon the Lessee's agents and employees. The failure or refusal of any of these persons to comply with these stipulations shall be deemed a failure of the Lessee to comply with the terms of this lease. The Lessee shall require his agents, contractors, and subcontractors involved in activities concerning this lease to include these stipulations in the contracts between and among them. These stipulations may be revised or amended, in writing, by the mutual consent of the Authorized Officer and the Lessee at any time to adjust to changed conditions or to correct an oversight. The Authorized Officer may amend these stipulations at any time without the consent of the Lessee in order to make them consistent with any new Federal or state statutes and the regulations promulgated under authority of new statutes.

2. All lease operations shall be conducted so as to comply with the Federal Water Pollution Control Act (33 U.S.C. 1151-1175) and the Clean Air Act (42 U.S.C. 1857 and following).

3. In accordance with Sec. 523(b) of the "Surface Mining Control and Reclamation Act of 1977," surface mining and reclamation operations conducted on this lease are to conform with the requirements of this Act and are subject to compliance with Office of Surface Mining Regulations, or as applicable, a Utah program equivalent approved under cooperative agreement in accordance with Sec. 523(c) and final determination of suitability for mining. The United States Government does not warrant that the entire tract will be susceptible to mining.

4. All support facilities, structures, equipment, and similar developments will be removed from the lease area within two years after the final termination of use of such facilities. All disturbed areas and those areas occupied by such facilities will be rehabilitated in accordance with an approved reclamation plan, 30 CFR 211 and the "Surface Mining Control and Reclamation Act of 1977" or approved Utah program as applicable.

5. (a) Before undertaking any activities that may disturb the surface of the leased lands, the Lessee may be required to conduct a cultural resource intensive field inventory in a manner specified by the Regional Director or the Authorized Officer of the surface managing agency on portions of the mine plan area and adjacent areas, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. The inventory shall be conducted by a qualified professional cultural resource specialist (i.e., archaeologist, historian, or historical architect, as appropriate), approved by the Authorized Officer of the surface managing agency (BLM if the surface is privately owned), and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Regional Director (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area) and the Authorized Officer of the surface managing agency. The Lessee shall undertake measures, in accordance with instructions from the Regional Director (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area), to protect cultural resources on the leased land. The Lessee shall not commence the surface disturbing activities until permission to proceed is given by the Regional Director of the District Mining Supervisor as appropriate.

(b) The Lessee shall protect all cultural resource properties within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

(c) The cost of conducting the inventory, preparing reports, and carrying out mitigation measures shall be borne by the Lessee.

(d) If cultural resources are discovered during operations under this lease, the Lessee shall immediately bring them to the attention of the Regional Director (or the District Mining Supervisor as appropriate), or the Authorized Officer, Surface Management Agency if the Regional Director, or District Mining Supervisor, as appropriate, is not available. The Lessee shall not disturb such resources except as may be subsequently authorized by the Regional Director (or the District Mining Supervisor). Within two (2) working days of notification, the Regional Director (or the District Mining Supervisor, as appropriate) will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the Authorized Officer.

(e) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

6. Before undertaking any activities that may disturb the surface or the leased lands, the Lessee shall contact the Authorized Officer of the surface management agency to determine whether the Lessee will be required to conduct a paleontological appraisal of the mine plan and adjacent areas, or exploration plan areas, that may be adversely affected by lease-related activities. If the Authorized Officer, surface management agency, determines that one is necessary, the paleontological appraisal shall be conducted by a qualified paleontologist approved by the Authorized Officer of the surface management agency (BLM if the surface is privately owned), using the published literature and, where appropriate, field appraisals for determining the possible existence of larger and more conspicuous fossils of scientific significance. A report of the appraisal and recommendations for protecting any larger and more conspicuous fossils of significant scientific interest on the leased lands so identified shall be submitted to the Authorized Officer, surface management agency. When necessary to protect and collect the larger and more conspicuous fossils of significant scientific interest on the leased lands, the Lessee shall undertake the measures provided in the approval of the mining and reclamation plan or exploration plan.

(a) The Lessee shall not knowingly disturb, alter, destroy, or take any larger and more conspicuous fossils of significant scientific interest, and shall protect all such fossils in conformance with the measures included in the approval of the mining and reclamation plan or exploration plan.

(b) The Lessee shall immediately bring any such fossils that might be altered or destroyed by his operation to the attention of the Regional Director or the District Mining Supervisor, as appropriate. Operations may continue as long as the fossil specimen or specimens would not be seriously damaged or destroyed by the activity. The Regional Director or the District Mining Supervisor, as appropriate, shall evaluate or have evaluated such discoveries brought to his attention and, within five (5) working days, shall notify the Lessee what action shall be taken with respect to such discoveries.

(c) All such fossils of significant scientific interest shall remain under the jurisdiction of the United States until ownership is determined under applicable law. Copies of all paleontological resource data generated as a result of the lease term requirements will be provided to the Regional Director or the District Mining Supervisor, as appropriate.

(d) The cost of any required salvage of such fossils shall be borne by the United States.

(e) These conditions apply to all such fossils of significant scientific interest discovered within the lease area whether discovered in the overburden, interburden, or coal seam or seams. Fossils of significant scientific interest do not include those fossils commonly encountered during underground mining operations.

7. If the Authorized Officer, surface management agency, has reason to believe that threatened and endangered species and migratory species of high Federal interest occur in the area, the Lessee may be required, prior to entry upon the lease, to conduct an intensive field inventory of the areas to be disturbed and/or impacted including the access routes to the lease area. The inventory shall be conducted by a qualified specialist(s) approved by the Authorized Officer and a report of the inventory and recommendation for the protection of any endangered or threatened species and migratory species of high Federal interest, submitted to the Authorized Officer and Regional Director or District Mining Supervisor as appropriate. An acceptable report of any findings shall include the specific location, distribution, and habitat requirements of the species. The Lessee shall protect any threatened or endangered species and migratory species of high Federal interest within the lease area from any activities associated with operations conducted under the terms of the lease and shall undertake such protective measures as may be required by the Authorized Officer and Regional Director or District Mining Supervisor as appropriate.

8. Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to conform with the publication "Suggested Practices for Raptor Protection on Powerlines" (Edison Electric Institute, 1975). When feasible, powerlines will be located at least 100 yards from public roads.

9. The Lessee shall provide for the suppression and control of fugitive dust on all haul roads and at coal handling and storage facilities as required in 30 CFR 816.95 and shall comply with any Federal, State, and local air quality standards that may apply.

10. Prior to mining, the Lessee shall perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. The study will be established in consultation with and approved by the Authorized Officer--Surface Management Agency, the Regional Director, and the District Mining Supervisor and shall be adequate to locate, quantify, and demonstrate the inter-relationship of the geology, topography, all surface hydrology, vegetation, and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

11. The Lessee shall establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology, and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of an infinite number of points over the lease area. The monitoring shall be an extension of the baseline data and shall be conducted by a method approved by the Regional Director in consultation with and concurrence by the Authorized Officer, Surface Management Agency and District Mining Supervisor.

12. If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with Forest Service regulations.

13. The Lessee will be required to maintain a mine development and operation of a size that is compatible with the physical environment. The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of the access road, are factors which will determine the ultimate mine size. Because physical site limitations may cause severe conflicts with other Forest uses and access to Forest lands, the Authorized Officer, Surface Management Agency, through the Regional Director and in consultation with the District Mining Supervisor concerning regulatory requirements for diligent development, may place limits on the size of mine development or traffic loads on Forest roads.

14. Except at specifically approved locations, underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would: (1) cause the creation of hazardous conditions such as potential escarpment failure and landslides, (2) cause damage to surface structures, and (3) damage or alter the flow of perennial streams. The Lessee in his mining plan shall provide specific measures for the protection of escarpments. The Regional Director in consultation with and concurrence of the District Mining Supervisor and Authorized Officer, Surface Management Agency, shall approve such measures and may prescribe any additional measures to be employed such as mining methods, specify the amount of coal recovered, and determine any corrective measures considered necessary to assure that escarpment failure does not occur or that hazardous conditions are not created.

15. In order to avoid surface disturbance on steep canyon slopes and the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specific locations approved by the Regional Director with the concurrence of the Authorized Officer, Surface Management Agency and the District Mining Supervisor.

16. Existing surface improvements required for the surface uses of the lease area will need to be protected or maintained to provide for the post-mining continuance of the current land uses. Existing surface improvements whose utility may be lost or damaged as a result of mining activities are to be replaced, restored, or compensated for at the discretion of the Authorized Officer, Surface Management Agency.

17. The Lessee shall reclaim all areas disturbed as a result of mining and exploration operations to a land use capable of supporting the pre-mining levels of livestock grazing, big game winter range, and other wildlife habitat.

18. All operations will be conducted to protect the aesthetic and scenic values. Consideration will be given to site selections to reduce adverse visual impacts. Where alternative sites are available, the alternative involving the least damage to the scenery and other resources shall be selected if it is comparable from a technical standpoint with the proposed development site. Permanent structures and facilities will be designed to be architecturally compatible with the surrounding landscape where possible, will harmonize with the natural landscape, and screening techniques will be employed to reduce scenic impacts. The use of a qualified landscape architect may be required by the District Mining Supervisor in consultation with the Authorized Officer to design and achieve a final landscape compatible with the natural surroundings. Construction practices requiring the alteration or modification of the existing topography will be compatible with and graded into the adjoining land form. The creation of unusual, objectionable, or unnatural land forms and vegetative landscape features will be avoided.

19. In order to protect wintering and calving elk, exploration drilling and other surface development activities will be allowed only during the period from July 1 through October 31. Exceptions to this limitation in any year may be specifically authorized by the Authorized Officer of the surface management agency.

(c) Deferred Bonus Payment Schedule:

The balance of Coastal States Energy Company's bonus bid of 936,862.45 is due and payable, in four equal installments of 187,372.49, on the next four anniversary dates of the lease.

If the lease is relinquished or otherwise cancelled or terminated, the unpaid remainder of the bid shall be immediately payable to the United States.

THE UNITED STATES OF AMERICA

By [Signature]  
(Signing Officer)

CHIEF, MINERALS SECTION  
(Title)

OCT '5 1981  
(Date)

COASTAL STATES ENERGY COMPANY  
[Signature]  
(Signature of Lessee)  
Senior Vice President

APPROVED AS TO FORM  
202  
10/13/81  
LEGAL DEPT.

WITNESS TO SIGNATURE OF LESSEE

[Signature]  
Assistant Secretary

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
(Signature of Lessee)  
\_\_\_\_\_  
\_\_\_\_\_

UMC 782.16 Relationship to Areas Designated Unsuitable to Mining:

(a) What is the status of the unsuitability study concerning Township 21 (v. 3, Comment 782.16a)?

Response:

As stated in the 1980 response on page 39 of Volume 3, Township 21 South had not, at that time, undergone an unsuitable study. To date, no unsuitability study has been conducted although the U.S. Forest Service may conduct such a study at a later date.

UMC 782.18 Personal Injury and Property Damage Insurance Information:

The applicant must submit proof that liability insurance is currently in effect as required.

Response:

A Certificate of Insurance is presented in this section as proof that liability insurance is in effect.



ALEXANDER & ALEXANDER OF TEXAS, INC., P.O. BOX 27128, HOUSTON, TX 77027 • 713/974-6161 • TELEX: 77-5290

**CERTIFICATE OF INSURANCE**

This is to certify that the Insurance Company listed below has issued the indicated insurance policies and they are in force at this time and that if such policies are cancelled or materially changed, the Company will give ten (10) days prior written notice to the holder of this Certificate.

Issued to: State of Utah

Dept. of Natural Resources & Energy  
Division of Oil, Gas & Mining  
4241 State Office Bldg.  
Salt Lake City, Utah 84114

Insured's Name and Address: The Coastal Corporation/Coastal States Energy including All Affiliated or Subsidiary Companies  
Coastal Tower  
Nine Greenway Plaza  
Houston, Texas 77046

Type of Coverage	Policy Number	Policy Term	Limits of Liability
Workers' Compensation & Employers' Liability Statutory	61WBRP28000E (California)	1-1-83/84	\$250,000 ea. accident
	61WBRP28001E (Texas)		\$250,000 ea. accident
	61WBRP28002E (All Other)		\$500,000 ea. accident
Comprehensive General Liability including Contractual	61CLRP28003E	1-1-83/84	<b>Bodily Injury</b> \$1,000,000 ea. occurrence \$1,000,000 aggregate
			<b>Property Damage</b> \$1,000,000 ea. occurrence \$1,000,000 aggregate
Products — Completed Operations	61JPRP28004E	1-1-83/84	<b>Bodily Injury</b> \$1,000,000 ea. occurrence \$1,000,000 aggregate
			<b>Property Damage</b> \$1,000,000 ea. occurrence \$1,000,000 aggregate
Comprehensive Automobile Liability	61CP28005E	1-1-83/84	<b>Bodily Injury</b> \$ 500,000 ea. person \$1,000,000 ea. occurrence
	61MCPP28006E (Mass.)		<b>Property Damage</b> \$ 500,000 ea. occurrence

Date: 3/17/83

Alexander & Alexander of Texas, Inc.

Place: Houston, Texas

The Hartford Group

By William H. Lloyd  
WILLIAM H. LLOYD, VICE PRESIDENT

This Certificate of Insurance neither affirmatively nor negatively amends, extends or alters the coverage afforded by the policies shown above.

UMC 783.14 Geology Description:

(a)(2)(ii) The depth, classification and geologic structure of the overburden must be described adequately. The operator is requested to:

1. Extend cross-section A-A' to drill hole US-79-8, or submit to the division lithologic information from this well.
2. Extend cross-section B-B' across Quitchupah Creek to drill hole 76-29-Y or 76-29-Z (or include both wells).
3. Provide indexes to those cross-sections more legible than what have been received.
4. Submit lithologic logs for drill holes that penetrate areas to be mined according to the five-year plan (Map 80-2).
5. Give depths for coal seams intersected by the drill holes presented on Maps 81-3 and 81-4, as well as collar elevations.
6. (a)(2)(iii) Clay content data for the stratum immediately below the coal seam to be mined are requested. This may be included with (4) above.

Responses:

1. Lithologic logs for drill hole US-79-8 have been incorporated into Appendix 783.14, Volume 7.

2. Lithologic logs for drill holes 76-29-Y and 76-29-Z have been incorporated into Appendix 783.14, Volume 7.
3. Maps 80-6 (cross-section A-A') and 80-7 (cross-section B-B') in Volume 3 have been replaced with copies that have legible cross-section indices.
4. The five-year plan (Map 80-2) projects mining through drill holes 74-36-5, 76-28-K, 76-29-Y, US-79-14, US-79-15 and US-81-4. Lithologic logs for these drill holes have been incorporated into Appendix 783.14, Volume 7.
5. Maps 81-3 and 81-4 in Volume 7 have been replaced with revised copies which have both collar elevations and depths to coal seams intersected.
6. Clay content of floor samples was not determined analytically. The lithology of the stratum immediately below the mineable coal varies from drill hole to drill hole, therefore, the clay content will range from almost 100% in a pure claystone, to less than 5% in a submature or mature sandstone. Drill holes 74-36-5, 76-28-K, 76-29-Y, US-79-14, US-79-15 and US-81-4 penetrate the stratum immediately below the coal seam to be mined according to the five year plan. Lithologic logs for these drill holes (which include lithotypes of the stratum immediately below the coal seam to be mined) have been incorporated into Appendix 783.14, Volume 7.

UMC 783.19 Vegetation Information:

The vegetation map submitted in 1981 should be revised to show the location of all disturbed areas, including the mine facilities area, sedimentation ponds, breakouts and reference areas.

Also in 1981 a preliminary Emergency Lease Area Vegetation map was submitted. This map should be finalized and combined with the vegetation map for the rest of the permit area. Any sites of present or proposed disturbance should be shown.

The Pond Area Vegetation Map (Map C - 1980 submittal) should be revised to show the as-built situation.

Seventeen acres was given as the amount of land disturbed in the pinyonjuniper (P-J) community type, but no total acreage of the P-J type on the permit area has been submitted. This should be done along with submittal of total acreage of riparian habitat disturbed by the sedimentation pond, if any was disturbed, and the total acreage of riparian habitat present on the permit area.

Sampling to characterize the P-J reference area is not complete at this time, some determination of productivity of the ground cover layer must be made as well as a determination of the shrub density on the reference area. Table 33 indicates that browse species make up 42 percent of the composition of the ground cover, but no density figures for these species given in Table 34.

If any riparian habitat was disturbed and the remaining riparian area is to be used as a reference area as indicated in the 1980 vegetation study, data must be collected on ground cover and productivity and shrub density. The size of this reference area should be indicated. The applicant must commit to doing this additional required sampling in the P-J and riparian reference areas during the 1983 field season.

The applicant must also document that the reference area(s) are permanently marked (all 4 corners staked) and will not be disturbed during minelife.

Response:

Vegetation Maps A and C have been revised to show the location of all disturbed areas, including the mine facilities area, sedimentation ponds, breakouts, and reference areas.

Vegetation communities of the Emergency Lease Area are combined with those of the general lease area on the Vegetation Map A. There are no areas of present or proposed disturbance within the Emergency Lease Area. Finalization of community boundaries will be accomplished by additional ground truthing during the 1983 field season.

The Pond Area Vegetation Map (Map C) has been revised to show the as-built situation.

The pinyon-juniper community type comprises 26% of the total lease area (see Table 1 of Vegetation Report, Volume 5). The total acreage of this community type in the permit area is 1,611. The estimate of 17 acres to be disturbed in the P-J community indicates a percentage of 1.1.

Construction of the sedimentation pond was moved to the base of the fill slope below the mine portal area. No riparian community was disturbed. Original classification of the area (less than one acre in size) as riparian was based on the presence of water coming from the mine portal only. This water has been re-routed and does not currently traverse the area. Upon cessation of mining activities there will be no flow of water from the mine portal. There is a minor terrace formation where the canyon bottom intersects the main drainage. The vegetation at this site, however, is solely big sagebrush.

Ground cover productivity and shrub density measurements will be completed during the 1983 field season and will be submitted as soon as sampling is completed.

Designation of a riparian community is tenuous, as discussed above. Since the area is so small and none of the habitat was disturbed by construction activities further characterization of the community as riparian seems academic.

The reference areas will be permanently marked with metal stakes during the 1983 field season.

UMC 783.19 Vegetation Information:

The vegetation map submitted in 1981 should be revised to show the location of all disturbed areas, including the mine facilities area, sedimentation ponds, breakouts and reference areas.

DETERMINATION OF COMPLETENESS (#1)

The revised vegetation map (Map A) shows that not only the pinyon-juniper community, but also the fir, sage-grassland and mountain brush communities have been disturbed by development. Disturbed acreages must be submitted for all disturbed communities.

Seventeen acres were given as the amount of land disturbed in the pinyon - juniper (P-J) community type, but no total acreage of the P-J type on the permit area has been submitted. This should be done along with submittal of total acreage of riparian habitat disturbed by the sedimentation pond, if any was disturbed, and the total acreage of riparian habitat present on the permit area.

DETERMINATION OF COMPLETENESS (#2)

The applicant had originally indicated that there were only 17 acres of disturbance to be reclaimed. However, the response to UMC 784.13(b)(2) shows a total disturbed acreage of 27.79 acres. A table must be submitted breaking down this acreage into each type of disturbance (i.e., surface facilities, sediment pond, breakouts) and listing the vegetation type disturbed in each area. A reclamation plan must be submitted for each vegetation community for which there is one acre or more of disturbance. This table must be submitted prior to 1983 vegetation sampling to determine sampling requirements.

UMC 783.19 Vegetation Information:DETERMINATION OF COMPLETENESS (#2) (cont'd)

Sampling to characterize the P-J reference area is not complete at this time, some determination of productivity of the ground cover layer must be made as well as a determination of the shrub density on the reference area. Table 33 indicates that browse species make up 42 percent of the composition of the ground cover, but no density figures for these species are given in Table 34.

DETERMINATION OF COMPLETENESS (#3)

The applicant has indicated that additional vegetation sampling as required will be done in the 1983 field season. The permitting process will continue while these data are being collected; however, the applicant must commit in writing at this time to meet with DOGM representatives and the applicant's consultant prior to initiation of any further studies to insure that all necessary information is collected as expediently as possible.

The applicant must also document that the reference area(s) are permanently marked (all 4 corners staked) and will not be disturbed during mine life.

DETERMINATION OF COMPLETENESS (#4)

A commitment has been made to permanently mark reference areas; however, the applicant must still ensure that reference areas will not be disturbed during mine life.

Response:

1. Vegetation Map A is somewhat misleading in its identification of community types contiguous with the portal yard area of the SUFCO

UMC 783.19 Vegetation Information:Response: (cont'd)

mine. The limits of the portal yard are generalized on the map, and in reality approach other community types adjacent to the pinyon-juniper. However the actual disturbed site is smaller than that indicated and only affects the pinyon-juniper community.

Disturbed areas resulting from the breakouts are yet to be sampled for community characterization. It is probable that these areas actually disturb less than one acre of vegetation. After 1983 sampling has been completed, the disturbed acreages will be submitted.

The vegetation map will be ground-truthed again during 1983 sampling procedures. If revisions need to be made, a new map will be submitted at that time following the field work. Mapping of the community types surrounding the portal yard areas will be truthed specifically.

2. The entire acreage within the limits of the portal yard area is 27.79. However, only 17 acres have been disturbed, all of which are within the pinyon-juniper community type. The 17 acres of disturbed vegetation will eventually be reclaimed to this community type. Since this community is the only one affected by disturbance, the table suggested above is considered necessary.

A reclamation plan for the portal yard and pond areas have previously been submitted. After 1983 vegetation sampling of the breakout areas, a reclamation plan will be submitted for each vegetation community for which there is one acre or more of disturbance. Seed mixes and rate of seeding per acre, stocking rates for shrub plantings, planting techniques, fertilization methods and amount and frequency of application, as well as season of planting will be included in the reclamation discussion.

UMC 783.19 Vegetation Information:Response: (cont'd)

3. A meeting was held on Monday, June 27, 1981 to discuss these stipulations and all other concerns pertaining to the permitting process for the SUFCo mine. In attendance were representatives of the Division of Oil, Gas and Mining, the Applicant and the Applicant's consultants. Procedures and requirements for future sampling were discussed.

Measurements of productivity and shrub density for the P-J reference area will be conducted during the 1983 field season. Dry weight productivity by life-form only will be measured. It was recommended by the Division of Oil, Gas and Mining that sample adequacy for productivity measurements will not be required and that clippings from ten quadrat will be deemed sufficient. It was also recommended that the point-quarter method be used for obtaining density figures, and that plants, not stems, be counted. These suggestions will be followed during sampling.

4. Reference areas will be permanently staked in all four corners with metal markers during the 1983 season. The Applicant ensures that the marked reference areas will not be disturbed during the period of mine life.

SOUTHERN UTAH FUEL COMPANY MINE  
Convulsion Canyon  
Sevier County, Utah

REPORT OF 1983 FIELD INVESTIGATIONS

Prepared for  
COASTAL STATES ENERGY  
411 West 7200 South  
Midvale, Utah 84047

Prepared by  
Stanley L. Welsh and Joseph R. Murdock  
ENDANGERED PLANT STUDIES, INC.  
129 North 1000 East  
Orem, Utah 84057

12 August 1983

## INTRODUCTION

In response to the latest document of review received from DOGM (dated 14 June 1983) concerning the SUFCo Mine in Convulsion Canyon, several items of information have been obtained. Items considered to insure completeness of the mine plan include the following: 1) The map of the area previously known as the emergency lease area was to be ground truthed and exact delineation of community types around the portal yard were to be made; 2) Additional vegetation sampling, to include measurements of productivity and shrub density, was to be completed in the Pinyon-juniper Reference area; 3) All reference areas were to be permanently marked; and 4) Reclamation plans for all disturbed areas exceeding one acre in size were to be submitted.

The purpose of this report is to acknowledge completion of these requirements and to submit all pertinent information and field data. The surveys were completed at SUFCo on the 21st and 22nd of July by Stanley L. Welsh, Joseph R. Murdock, Blaine T. Welsh, and L. Matthew Chatterley.

## DISCUSSION OF FINDINGS

On the 21st of July, 1983 productivity and shrub density measurements were taken in the Pinyon-juniper Reference area just below the office buildings in the portal yard area. Sampling procedures had previously been discussed and agreed upon with Susan Linner, a DOGM representative, and sampling was completed according to the methods discussed. Dry weight productivity by life form only was measured. It was recommended by DOGM

that sample adequacy for productivity measurements not be required for this community type because of the expected paucity of understory species. Clippings from ten quadrats were deemed sufficient to indicate productivity. Ten quadrats (a 9.6 sq. ft. hoop was used) were randomly placed in the community. Only two plots had any observable shrubs, forbs, or grass in them. The average green weight for all species sampled was only 1.2 grams. Because the 9.6 sq. ft. hoop was used, this converts directly to 1.2 lbs./acre of green weight productivity. Measurement of dried samples was accomplished in the lab, indicating that the dry weight of the species was approximately half that of the green weight. The dry weight productivity for the Pinyon-juniper Reference area is 0.63 lbs/acre. These figures reflect the essential barren nature of the understory in the pinyon-juniper woodland (see Table 1).

Measurement of the shrub density in the Pinyon-juniper Reference area was also completed. The point-quarter method was used for obtaining density figures. Entire plants were counted. The total number of shrubs per acre was 63. This is indication again of the sparse undercover in the pinyon-juniper woodland. Quercus gambelii was the most frequently encountered shrub species, with 47.6 percent of the shrub composition. Mahonia repens was the next most frequent species with 20 percent of the composition. Symphoricarpos oreophilus comprised 11.7 percent, Petradoria pumila comprised 10 percent, and Pachystima myrsinites comprised 5.9 percent. Thirty plots were measured in the reference area. Sample adequacy tests indicated that 72 plots were needed to satisfy an 80 percent statistical confidence level. However, because of the extreme sparseness of species

and the fact that sample adequacy did not change significantly when measured at 10, 20, or 30 plots, no more samples were taken (see Table 2).

The reference area was marked in all four corners by metal stakes. The starting point of the original transect line in the middle of the reference area is marked by a stake painted red.

Also on the 21st of July the vegetation mapping in the portal yard area and the emergency lease area was ground truthed. The emergency lease area mapping was found to be satisfactory and no changes are made on the map in that area. However, some changes needed to be made in the portal yard area and are included on the map submitted with this report. All disturbance in this area lies within the Pinyon-juniper community type. All future efforts of reclamation will be to restore disturbed sites to this community type.

On the 22nd of July, 1983, the breakout areas were reached by traveling underground, through the mine. The Quitchupah breakout area occurs near the bottom of Quitchupah Canyon in T21S, R5E, SW/SW Sec 29. There are two portals used for air ventilation, water discharge and emergency escape with each having less than one acre of disturbance in the Fir and mountain mahogany community type. The disturbed area around the southern portal is approximately 7,500 sq. ft. The disturbed area around the northern portal is less than that. The 3 - East breakout area consists of two portals located in T21S, R5E, SW/NE Sec 32. These portals are on a north-facing slope in the pinyon-juniper and douglas fir community types. The total disturbance area of both portals is only 1,400 sq. ft. The 1 - South, Convulsion Canyon breakout area occurs southeast of the portal

yard in T22S, R4E, NE/SE Sec 12. The pinyon-juniper community here is more xeric. There is also less than one acre of disturbance area. Because the total acreage of disturbed area is less than one at each of these sites, no reclamation plans need to be submitted to DOGM at this time. The mining company, however, has plans to return these areas to their natural vegetation after mine life has been completed.

TABLE 1  
 PINYON-JUNIPER REFERENCE AREA  
 T22S, R4E, SE/NW SEC 12

Productivity measurements

Quadrat Size: 9.6 sq. ft. hoop                      Date: 21 July 1983

	Green Weight	Dry Weight
Sample Mean:	1.2	0.63
Standard Deviation:	2.53	1.34
Sample Size:	10	10
LIFE FORM	AVERAGE GREEN WT.	AVERAGE DRY WT.
Shrubs	.5 g	.22 g
Grasses	.2 g	.10 g
Forbs	.5 g	.31 g
TOTALS:	1.2 g	.63 g
Productivity:	1.2 lbs/acre	.63 lbs/acre

TABLE 2  
 PINYON JUNIPER REFERENCE AREA  
 T22S, R4E, SE/NW SEC 12

Shrub Density Measurements

Method: Point Quarter

Date: 21 July 1983

Sample Size: 30

Sample Adequacy at 80 percent: 72

Sample Mean: 26.27

Standard Deviation: 17.37

SPECIES	Relative Frequency	Trees Sampled	Number per Acre
<i>Quercus gambelii</i>	47.6 %	57	30.0
<i>Symphoricarpos oreophilus</i>	11.7	14	7.0
<i>Mahonia repens</i>	20.0	24	13.0
<i>Petradoria pumila</i>	10.0	12	6.0
<i>Clematis ligusticifolia</i>	0.8	1	0.5
<i>Eriogonum corymbosum</i>	0.8	1	0.5
<i>Opuntia polyacantha</i>	0.8	1	0.5
<i>Echinocereus triglochidiatus</i>	0.8	1	0.5
<i>Leptodactylon pungens</i>	0.8	1	0.5
<i>Gutierrezia sarothrae</i>	0.8	1	0.5
<i>Pachystima myrsinites</i>	5.9	7	4.0
TOTALS:	100.0%	120	63.0

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

September 13, 1983

Mr. Keith Welch  
Costal States Energy Co.  
411 West 7200 South  
Midvale, Utah 84047

RE: 1983 Vegetation Study  
Southern Utah Fuel Company  
Convulsion Canyon Mine  
ACT/041/002, Folder No. 3

Dear Mr. Welch:

While reviewing the recently submitted vegetation report, "Report of 1983 Field Investigations" several deficiencies have come to light. The most serious of these concerns the fact that an adequate sample of shrub density on the P-J reference area was not taken. The Division's Vegetation Information Guidelines provide a maximum number of samples that must be taken, if the applicant chooses not to take enough samples to meet sample adequacy. The maximum sample size for the point center-quartered method of determining shrub density is 40 (guidelines page 11), however, only 30 samples were taken in this study. It is imperative that 10 more samples be taken on the reference area as soon as possible, so that the Technical Analysis (TA) for the mine area can be completed. Table two will need to be revised to incorporate the additional data collected.

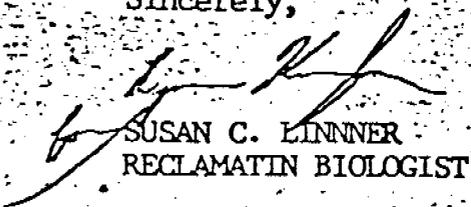
The other deficiencies relate to reclamation plans. The applicant committed in the 1983 ACR response, under section UMC 784.13 Reclamation Plan, to supply the Division with a map showing the location of proposed shrub plantings in the portal yard and to submit final reclamation plans for the break outs. Both of these areas were discussed in the June 27, 1983 meeting between yourself, the vegetation consultants and myself. The applicant also submitted a new seed mix in the June 1983 submissions without giving any seed amounts, and committed to submit detailed reclamation plans for all vegetation types with over one acre of disturbance after the 1983 field season. Although the individual breakouts disturb less than an acre, final reclamation practices may need to differ from those used in the mine yard due to steep slopes. No reclamation plans were included with the 1983 report. Therefore detailed reclamation plans for the break-outs still must be provided and those for the mine yard updated to include the new seed mix and shrub planting data. These plans could be stipulated in the Final Permit Approval, but it is preferred that as much information as possible be submitted prior to the completion of the TA, as stipulations are not desirable.

Mr. Keith Welch  
ACT/041/002  
September 13, 1983  
Page 2

It should also be noted that the productivity figures given in the report are off by a factor of 10. Productivity figures should be corrected to read 12 lbs/acre green weight.

If you or your consultants need any further clarification on these matters, please contact me.

Sincerely,



SUSAN C. LINNER  
RECLAMATION BIOLOGIST

SL/jvb

cc: Lou Hamm, OSM Denver

The following items are in response to recent comments from DOGM stated in a letter dated September 13, 1983, concerning certain aspects of the vegetation sampling and reclamation plans at the SUFCo Convulsion Canyon mine.

1. Sample adequacy of shrub density measurements. An adequate sample of shrub density in the pinyon-juniper reference area was not taken during the 1983 field season. Though sample adequacy indicated 72 plots were needed to correctly characterize the community, because of the sparseness of shrubs in the type only 30 plots were measured. However, DOGM requested that a minimum number of 40 samples be taken if sample adequacy is not met, in order to protect the company's interests at the time of reclamation. On the 21 September 1983 ten more samples were taken in the pinyon-juniper reference area by Matthew Chatterley. Kerry Frame of SUFCo was contacted by Mr. Chatterley at that time to make him aware of the situation. The information obtained is included in the revised shrub density table appended to this letter.

2. Planting of shrub seedlings in the portal yard. Revegetation of the portal yard area is to include the planting of 1,000 seedling shrubs and trees per acre. It is recommended that the seedlings be planted in clumps to maximize edge effect and provide more adequate cover for wildlife. Transplants should include the following species:

Rubber rabbitbrush  
Utah juniper  
Pinyon pine  
bitterbrush

At least five clumps per acre (consisting of 200 seedlings per clump) should be planted at intervals insuring 35 to 50 percent of each acre is

covered. These clumps should be randomly scattered through the reclaimed area as much as possible. Slopes in the portal yard are extremely steep and plantings will depend on preparation of the slopes at the time of reclamation. A map of the proposed plantings is not considered necessary.

3. Seed mix. In June 1983, a new seed mix was submitted and approved for reclamation in the portal yard area. To insure that the number of seeds planted per acre were acceptable, Rubber rabbitbrush and sagebrush were added to the original proposed species. The complete list with seed amounts is as follows.

Grasses

Blue bunch wheatgrass	2 lbs
Western wheatgrass	2 lbs
Basin wildrye	2 lbs
Salina wildrye	2 lbs

Forbs

American vetch	2 lbs
Lewis flax	2 lbs

Shrubs

Rubber rabbitbrush	2 lbs
sagebrush	2 lbs

TOTAL	16 lbs/acre
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4. Reclamation of breakout areas. There are three breakouts in the lease area which will be reclaimed at the end of mine life. However, the area of disturbance for each is less than one acre and submission of detailed plans for reclamation are not required. DOGM has been concerned that reclamation procedures for these areas will be different than for the portal yard and have asked for a brief statement of proposed reclamation activities for the breakout areas. The mining company will return these areas to natural vegetation, but the limited size of the disturbed areas and the steepness of the slopes will require minimal activity. It is recommended that the breakouts be covered with soil and prepared for seeding with the standard seed mix. Other plantings and the further preparation of slopes is not considered necessary at this time.

5. Productivity of the pinyon-juniper reference area. The productivity figures given in the previous report were off by a factor of ten. The corrected table is appended to this letter.

TABLE 1  
 PINYON-JUNIPER REFERENCE AREA  
 T22S, R4E, SE/NW SEC 12

Productivity measurements

Quadrat Size: 9.6 sq. ft. hoop

Date: 21 July 1983

	Green Weight	Dry Weight
Sample Mean:	1.2	0.63
Standard Deviation:	2.53	1.34
Sample Size:	10	10

LIFE FORM	AVERAGE GREEN WT.	AVERAGE DRY WT.
Shrubs	.5 g	.22 g
Grasses	.2 g	.10 g
Forbs	.5 g	.31 g
TOTALS	1.2 g	.63 g

PRODUCTIVITY:	12 lbs/acre	6.3 lbs/acre
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TABLE 2  
 PINYON-JUNIPER REFERENCE AREA  
 T22S, R4E, SE/NW SEC 12

Shrub Density Measurements

Method: Point Quarter

Date: 21 July 1983 and  
 21 September 1983

Sample Size: 40

Sample Adequacy at 80 percent: 81

Sample Mean: 23.13

Standard Deviation: 16.27

SPECIES	Relative Frequency	Shrubs Sampled	Number per Acre
Quercus gambelii	43.2	69	35.0
Symphoricarpos oreophilus	11.9	19	10.0
Mahonia repens	25.6	41	20.5
Petradoria pumila	10.0	16	8.0
Clematis ligusticifolia	0.6	1	0.5
Eriogonum corymbosum	1.9	3	1.5
Opuntia polyacantha	0.6	1	0.5
Echinocercus triglochidiatus	0.6	1	0.5
Leptodactylon purgens	0.6	1	0.5
Gutierrezia sarothrae	0.6	1	0.5
Pachystima myrsinites	4.4	7	3.5
TOTALS:	100.0	160	81.0

UMC 783.24 Map: General Requirements and 784.18 Relocation of Public Roads:

The location of the P-J reference area cannot be found on any existing vegetation map. Both this location and the location of any riparian reference area should be shown on the revised vegetation map, as discussed under 783.19.

All maps, particularly surface facility maps, that are outdated, should be revised and resubmitted.

(b) The operator is requested to show boundaries of land upon which there is a legal right of entry.

(d) The applicant is requested to show the locations of buildings within 1,000 feet of lease U-47080 (if any).

(e) The applicant is requested to show the locations of surface and subsurface man-made features within, passing through or passing over lease U-47080.

The applicant submitted cross-sections of the East Side Road. A note should be made, however, of the maps and plans general requirements for this submittal (UMC 771.23). Please resubmit.

Response:

Map A, Vegetation, Volume 5 has been revised and resubmitted to provide the location of the reference areas (transect sites) for both the P-J and riparian communities.

Map 80-1 in Volume 3 has been revised to show all boundaries of land upon which the Applicant has a legal right of entry.

No buildings are located within 1,000 feet of lease U-47080. Map 80-4, "Man Made Features", has been revised to present such features within lease U-47080 as well as other properties in which the Applicant has the legal right of entry.

The cross-sections of the East Side Road which are presented as Appendix 784.18 in the 1981 Responses to the Completeness Review, Volume 7 have been revised and resubmitted with a horizontal scale.

UMC 783.25 Cross-Sections, Maps and Plans:

Cross-sections and maps numbered 5, 6 of Valley Engineering Report (Vol. 6) and Exhibits 9-2, 9-3, 9-4 of the Merrick and Company Report (Vol. 2 Addendum) are not certified as required under Section L.

Response:

The as-built drawings are now in place of construction drawings in the Valley Engineering report presented in Volume 6. The as-built drawings are all certified by a registered, professional engineer. The cover sheet certifying the Exhibits 9-1, 9-2, 9-3, 9-4, 9-5, 9-6, 9-7, 9-8 and 9-9 is included as Exhibit 9-0 in Volume 2.

UMC 784.11 Operation Plan: General Requirements:

(b) The applicant shall supply plans and a narrative explaining maintenance and removal of dams, impoundments, berms, diversions, culverts, treatment facilities and other water pollution control structures.

Plans and a narrative should be submitted explaining how disturbed runoff will be routed past the sedimentation pond and how sediment control will be achieved as required under UMC 817.46(u). Please show how sediment ponds will be left in place while the pad is reclaimed and what alternative sediment control will be installed during post-mining operations and reclamation period.

Response:

The drawings of final reclamation submitted in 1979 as Exhibits 11 and 12 in Volume 2 are to be replaced by revised and updated Maps 83-3 and 83-4 (Final Reclamation Contours and Final Reclamation Cross-Sections respectively). The final reclamation will proceed following total cessation of mining in the sequence presented as follows:

1. Removal of structures. Existing buildings, walls, utilities, and coal handling structures will be raised and removed from the site. Structures which cannot be sold will be disposed of in private or municipal sanitary landfills. Concrete foundations that will not interfere with final grading will be buried on site to a depth of three feet.
2. Excavation and filling to approximate original contour. The present fill material will be used to reduce the slope of cut faces and the fill face. The excavation operation will start by filling in the sediment pond and reducing the slope of the present fill face as shown in Map 83-3 and cross-sections in Map 83-4. Fills will be placed as described in the DOC/TD

UMC 784.11 Operation Plan: General Requirements:Response: (cont'd)

(July, 1983) response to Comment UMC 784.13. During this process pipelines and culverts intercepted will be removed or plugged with a minimum of 10 feet of concrete plug. The main drainage culverts from Mud Spring Hollow and East Spring Canyon will be plugged in the upper yard during the excavating process. The discharge down the present rip-rapped channel will also be plugged.

3. The stream channels for both Mud Spring and East Spring Canyons will be constructed and rip-rapped as outlined in the DOC/TD (July, 1983) Response to Comment UMC 817.44. Erosion control terraces consisting of 15 feet wide terraces with the outer slope edge four feet higher than the in slope edge and having approximately 1% grade toward the undisturbed slopes will be installed as shown on the final reclamation contour Map 83-3.
4. The topsoil will be placed as described in the DOC/TD (July, 1983) to Comment 784.13.
5. Reseeding procedures are presented in Response to UMC 784.13.

The reclamation plan will incorporate the previously reclaimed areas such as the dam of the sediment pond and part of the hillsides in back of the shop and office buildings. The ephemeral flow from East Spring Canyon and Mud Spring Canyon is not likely to be interrupted during excavation and filling operations unless a rain storm happens during the short period needed to switch from the culverts to the constructed channel. The channel is designed with an increasing gradient that approximates the original gradient and will prevent silting. The terraces will control erosion by retaining sediment and carrying water from the reclaimed area towards undisturbed ground.

Backfilling and Grading:

It is suggested that 1 1/2 to 2 pounds PLS of Oryzopsis hymenoides be included in the reclamation seed mix, as it is the most prevalent grass on the reference area. That would bring the total seeding rate to 18 18 1/2 lbs. per acre, which would be a sufficient quantity for the hydromulching method.

It was also indicated that shrub seedlings would be planted at 3 foot spacing for approximately 5,000 per acre. This is considerably more than the 184 trees per acre indicated in Table 34. The addition of shrub densities should still not bring the figure up anywhere near 5,000. It is strongly suggested that, since wildlife habitat will be a major postmining land use, shrubs be planted in clumps of no more than 1,000 per acre. These clumps should be no more than an acre in size and should cover 33-50 percent of the area to be revegetated. A map showing proposed location of shrub clumps on the area to be finally revegetated should be submitted.

If any riparian habitat has been disturbed, a plan for revegetation of the riparian area, consistent with the existing riparian vegetation, should be submitted. This can be done after the area is more thoroughly characterized during 1983 sampling.

A plan for reclamation of the break-outs should be submitted.

If grazing should prove detrimental to revegetation efforts, a plan for fencing or other protection of the revegetated area must be worked out with the regulatory authority.

Excavation and filling to approximate original contour is mentioned in the reclamation plan and shown in Exhibits 11 and 12. The question arises if the present fill is adequate as depicted on the drawings?

The slope stability is mentioned, however, no other details are given. Please be more specific about the heavy equipment for compaction and what will be achieved, i.e., 80 percent compaction, 50 percent compaction, etc.

(b)(2) A revised bond estimate to reflect inflation and any additional disturbances should be included.

Responses:

1. Shrubs will be planted in clumps of no more than 1,000 per acre according to the suggestions stated above. Total acreage of the portal yard area to be revegetated is estimated at 17. The larger number of shrubs and seedlings to be used in revegetation efforts is given to ensure establishment of the pinyon-juniper community over the disturbed site. A map showing the proposed location of shrub clumps will be submitted after field sampling of the 1983 season is completed.
2. No riparian habitat has been disturbed.
3. Community characterization of the break-out areas will be conducted during the 1983 field season. A reclamation plan will be submitted after completion of the 1983 field work utilizing the data collected during the survey.
4. The total acreage of disturbed area to be revegetated is small enough that fencing could be an economically feasible means of protection. If grazing animals does prove detrimental to revegetation attempts, such measures will be implemented following consultation with the regulatory authorities.

5. Backfilling operations, utilizing equipment such as dozers, scrapers, front-end loaders and dump trucks will be conducted in the portal, shop and sediment pond areas when the mining operation is completed. The present slope face above the sediment pond is stable due to this area being constructed originally using sliver fills with limited compaction. Since the final grade and slopes through the mine yard are significantly flatter than the slope above the sediment pond, no stability problems are anticipated in this area. Compaction operations, utilizing equipment such as sheepsfoot tampers, will be conducted to stabilize all filled holes and depressions. Compaction will be 75-80 percent until the fill reaches 1-2 feet of final grade.

Prior to topsoil redistribution, regraded land will be scarified by a ripper-equipped tractor. The surface will be ripped to a suitable depth in order to reduce surface compaction, provide a roughened surface assuring topsoil adherence and to promote vegetational root penetration.

Within a suitable time period prior to seeding, topsoil will be distributed on all areas to be reclaimed. Topsoil redistribution procedures will ensure an approximate uniform thickness of six inches. Topsoil will be redistributed at a time of the year suitable for seeding permanent revegetation. During this time period, the topsoil will be allowed to settle and attain equilibrium with its natural environment. This procedure will be followed for all areas in which facilities such as road beds, mine pads, and building sites are to be abandoned.

To minimize compaction of the topsoil following redistribution, travel on reclamation areas will be limited. After topsoil has been applied, surface compaction will be reduced by discing or ripping to a suitable depth. This operation will also help prepare a proper seed bed and protect the redistributed topsoil from wind and water erosion.

The Applicant will exercise care to guard against erosion during and after application of topsoil and will employ the necessary measures to ensure the stability of topsoil on graded slopes.

6. No additional acreage disturbance has occurred or is planned which would increase the reclamation requirements beyond that presented in the 1980 submittal. The cost to reclaim the disturbed area with the 27.79 acres to be bonded as estimated at page 213, 1980 Submittal, Volume 3, has increased due to inflation which has occurred since 1980. Since a twelve percent escalation of the 1980 cost is appropriate, the final reclamation cost is estimated to have increased from \$858,190 to \$961,000.

In April, 1983 Coastal States Energy Company posted with the Division of Oil, Gas and Mining a bond in amount of \$138,950.00 to cover reclamation costs as required by interim regulations and the Utah Mining Code. A copy of correspondence and bond regarding this bonding requirement is presented in this section.

STATE OF UTAH  
 DEPARTMENT OF NATURAL RESOURCES AND ENERGY  
 DIVISION OF OIL, GAS AND MINING  
 4241 State Office Building  
 Salt Lake City, Utah 84114

THE MINED LANDS RECLAMATION ACT

Bond No. 96 94 84

BOND

\*\*\*\*\*

The undersigned COASTAL STATES ENERGY COMPANY  
 as principal, and HIGHLANDS INSURANCE COMPANY as  
 surety, hereby jointly and severally bind ourselves, our heirs, administrators,  
 executors, successors and assigns unto the State of Utah, Division of Oil, Gas  
 and Mining, and the U. S. Department of the Interior, Office of Surface Mining  
 in the penal sum of ONE HUNDRED THIRTY-EIGHT THOUSAND NINE HUNDRED FIFTY  
dollars (\$ 138,950.00). Such sum shall be payable to  
 one, but not both, of the above-named agencies.

The principal estimated in a "Notice of Intention to Commence Mining  
 Operations and a Mining and Reclamation Plan," filed with the Division of Oil,  
 Gas and Mining on the 1st day of April,  
19 83, that 27.79 acres of land will be affected by this mining  
 operation in the State of Utah. A description of the affected land is attached  
 hereto as Exhibit "A."

If the principal shall satisfactorily reclaim the above-mentioned lands  
 affected by mining by the said principal in accordance with the Mining and  
 Reclamation Plan and shall faithfully perform all requirements of the Mined  
 Land Reclamation Act, and comply with the Rules and Regulations adopted in  
 accordance therewith, then this obligation shall be void; otherwise it shall  
 remain in full force and effect until the reclamation is completed as outlined  
 in the approved Mining and Reclamation Plan.

If the approved plan provides for reclamation of the land affected on a  
 piecemeal or cyclic basis, and the land is reclaimed in accordance with such  
 plan, then this bond may be reduced periodically.

In the converse, if the plan provides for a gradual increase in the area  
 of the land affected or increased reclamation work, then this bond may  
 accordingly be increased with the written approval of the surety company.

NOTE: Where one signs by virtue of Power of Attorney for a surety company, such Power of Attorney must be filed with this bond. If the principal is a corporation, the bond shall be executed by its duly authorized officers with the seal of the corporation affixed.

COASTAL STATES ENERGY COMPANY

Principal (Company)



By

Leo Smith

Company Official - Position

LEO C. SMITH, PRESIDENT

Date: April 15, 1983

HIGHLANDS INSURANCE COMPANY

Surety (Company)

By

Janice Watts

Official of Surety - Position

Janice Watts, Attorney-in-Fact

DATE: 4-1-83

# HIGHLANDS INSURANCE COMPANY

## HOUSTON, TEXAS

### GENERAL POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS:

That the Highlands Insurance Company, a corporation duly incorporated under the laws of the State of Texas, doth hereby constitute and appoint Ollie F. Menasco, Dan C. Jones, Ben A. Reid, Kenneth L. Meyer, Janice Watts, Jointly or Severally of the City of Houston, State of Texas, to be its true and lawful attorney-in-fact for the following purposes, to-wit:

To sign its name as surety, and to execute, seal and acknowledge any and all bonds, recognizances, obligations, stipulations, undertakings or anything in the nature of the same, and to respectively do and perform any and all acts and things set forth in the appended resolution of the Board of Directors of the said Highlands Insurance Company; provided, that the penal sum of no single one of such bonds, recognizances, obligations, stipulations or undertakings shall exceed the sum of

Unlimited Dollars (\$ Unlimited ): the Company hereby ratifying and confirming all and whatsoever the said attorney-in-fact may lawfully do in the premises by virtue of these presents, but reserving to itself full power of substitution and revocation.

IN WITNESS WHEREOF, the said Highlands Insurance Company, pursuant to a resolution passed by its Board of Directors, at a meeting held on the 29th day of July, A.D., 1974, a certified copy of which is hereto annexed, has caused these presents to be sealed with its corporate seal, duly attested by the signature of its President, Vice Presidents, Assistant Vice Presidents and Secretary this 15th day of November, A.D. 19 82.



HIGHLANDS INSURANCE COMPANY

D. E. Walk  
Secretary

By J. L. Darnold  
Vice President

STATE OF TEXAS  
COUNTY OF HARRIS  
CITY OF HOUSTON

On this 15th day of November in the year 19 82 before me personally

appeared J. L. Darnold to me known, who, being by me duly sworn, did depose and say: That he resides in Houston, Texas; that he is Vice President of the Highlands Insurance Company, the corporation described in and which executed the above instrument; that he knows the Seal of said corporation; that the Seal affixed to said instrument is such corporation Seal; that it was affixed to such instrument by and under authority conferred by the Board of Directors of said corporation; and that he signed his name thereto by like authority.



Vickie Ann Beyer  
Notary Public, State of Texas

**RESOLUTION**

RESOLVED, that this Company do, and it hereby does authorize and empower its President or any one of its Senior Vice Presidents, Vice Presidents or Assistant Vice Presidents, in conjunction with any one of its Secretaries or any one of its Assistant Secretaries, under its corporate seal, to execute and deliver or to appoint any person or persons as attorney-in-fact or attorneys-in-fact, or agent or agents of this Company, in its name and as its act, to execute and deliver any and all contracts guaranteeing the fidelity of persons holding positions of public or private trust, guaranteeing the performance of contracts other than insurance policies and executing or guaranteeing bonds and undertakings, required or permitted in all actions or proceedings, or by law allowed; and, in its name and as its attorney-in-fact or attorneys-in-fact, or agent or agents, to execute and guarantee the conditions of any and all bonds, recognizances, obligations, stipulations, undertakings or anything in the nature of the same, which are or may by law, municipal or otherwise, or by any Statute of the United States or of any State or Territory of the United States, or by the rules, regulations, orders, customs, practice or discretion of any board, body, organization, office or officer, local municipal or otherwise, be allowed, required or permitted to be executed, made, taken, given, tendered, accepted, filed or recorded for the security or protection of, by or for any person or persons, corporation, body, office, interest, municipality or other association or organization whatsoever, in any and all capacities whatsoever, conditioned for the doing or not doing of anything or any conditions which may be provided for in any such bond, recognizance, obligation, stipulation or undertaking, or anything in the nature of the same; the nature, class or extent of the instruments so authorized to be specified in such power of attorney.

FURTHER RESOLVED, That the signature of any of the persons described in the foregoing resolution may be facsimile signatures as fixed or reproduced by any form of typing, printing, stamping or other reproduction of the names of the persons hereinabove authorized.

I, D. E. Walker, Secretary of Highlands Insurance Company, hereby certify that at a meeting of the Board of Directors of said Company, duly called and held at the office of the Company at the City of Houston, on the 29th day of July, A.D., 1974, at which was present a quorum of said Directors, duly authorized to act in the premises, resolutions were passed and entered on the minutes of said Company, of which resolutions the foregoing is a true copy and of the whole thereof.

IN TESTIMONY WHEREOF, I have hereunto set my hand and seal of Highlands Insurance Company, this 15th day of November, A.D. 19 82.



D. E. Walker  
Secretary

STATE OF TEXAS  
COUNTY OF HARRIS

I, D. E. Walker, Secretary of Highlands Insurance Company, do hereby certify the above and foregoing is a true and correct copy of a Power of Attorney, executed by said Highlands Insurance Company, which is still in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said Company in the City of Houston, Texas, this 1st day of April, A.D. 19 83.



D. E. Walker  
Secretary

EXHIBIT "A"

"Being an area of 27.79 acres of land included in metes and bounds described commencing at a point located North 2496.35 feet and East 1328.25 feet from the Southwest corner of Section 12, Township 22 South, Range 4 East, Salt Lake Base and Meridian; thence North  $05^{\circ}40'35''$  East 475.16 feet; thence North  $10^{\circ}48'06''$  East 733.69 feet; thence North  $09^{\circ}09'52''$  East 324.72 feet; thence North  $79^{\circ}52'45''$  East 566.78 feet; thence South  $06^{\circ}14'10''$  West 229.10 feet; thence South  $02^{\circ}27'59''$  West 315.17 feet; thence South  $16^{\circ}33'$  East 675.62 feet; thence South  $04^{\circ}14'46''$  East 384.92 feet; thence South  $75^{\circ}06'07''$  West 457.81 feet; thence South  $74^{\circ}53'25''$  West 151.96 feet; thence North  $73^{\circ}06'06''$  West 405.04 feet to the point of beginning."

UMC 784.13 Reclamation Plan: General Requirements:

The applicant shall provide a detailed timetable for the completion of each major step in the reclamation process.

The applicant shall explain the measures to be taken after cessation of mining activities to ensure protection to the quality of surface and groundwater.

A narrative should be included describing the regional flow direction so groundwater and how mining and subsidence has and will effect the regional flow.

Response:

The reclamation timetable is presented in the DOC/TD (July, 1983) Response to Comment UMC 784.11, at page 15a, Volume 8.

Measures to be taken after cessation of mining activities to protect the quality and quantity of groundwater are discussed in Southern Utah Fuel Company's Hydrological Response to OSM's Apparent Completeness Review, at pages 59-62, Volume 4. The effect of subsidence upon the regional flow as well as available regional flow information is summarized in sections 784.14-784.16 of the above referenced report. As the report indicates, subsidence has little, if any, effect on the movement or amount of the regional flow.

UMC 784.13 Reclamation Plan: General Requirements and UMC 817.101Backfilling and Grading:

It is suggested that 1 1/2 to 2 pounds PLS of Oryzopsis hymenoides be included in the reclamation seed mix, as it is the most prevalent grass on the reference area. That would bring the total seeding rate to 18 - 18 1/2 lbs per acre which would be a sufficient quantity for the hydromulching method.

DETERMINATION OF COMPLETENESS (#1)

The paragraph concerning the use of Oryzopsis hymenoides in reclamation was not addressed. Please do so.

A plan for reclamation of the break-outs should be submitted.

DETERMINATION OF COMPLETENESS (#2)

The applicant must submit detailed reclamation plans for all disturbed areas (including the sediment pond and breakouts). For all vegetation types for which one or more acres have been disturbed, revegetation plans must be submitted following 1983 sampling (see discussion under Section UMC 783.19).

Response:

1. The Applicant believes that the size of seeds and number of seeds per acres, instead of merely pounds per acre, should be considered. The Applicant and Applicant's consultant have discussed this with the Division of Oil, Gas and Mining and recommends the following revisions to the reclamation seed mix.

Grasses

Bluebrunch wheatgrass	Basin wildrye
Western wheatgrass	Salina wildrye

UMC 784.13 Reclamation Plan: General Requirements and UMC 817.101

Backfilling and Grading:

Response: (cont'd)

Forbs

American vetch

Lewis flax

Shrubs

Rubber rabbitbrush

Sagebrush

The inclusion of Oryzopsis hymenoides was not deemed as important as consideration of the overall amount of seeds per acre. The addition of Rubber rabbitbrush and Sagebrush to the seed mix should make the number of seeds per acre acceptable.

2. Detailed reclamation plans will be submitted for all vegetation types for which one or more acres have been disturbed. This will be completed following 1983 sampling procedures.

784.14 Protection of Hydrologic Balance:

(d) The applicant should submit plans and describe how portal seals will be constructed to provide for the control or discharge of ground water that is presently being discharged via gravity flow through the breakouts.

Response:

Portals will be sealed according to the plans previously submitted in Response to Comment 784.13(a) included in the 1980 compliance submittal at page 216, Volume 3. Water is presently being discharged via gravity flow from the Quitcupah 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 the old underground mine works. When mining operations are completed in the northeastern portion of the mine, water will not be pumped to the higher elevation and, consequently, the discharge from the portal will cease because of the vast area of old underground mine workings at a lower elevation. The breakout seals will be constructed in the breakout areas from the inside as shown on the Typical Portal Seal drawing presented in Volume 3 at page 216. The seals will be of such a design and constructed of concrete block utilizing a waterproof sealant such that the seals will withstand the hydraulic head that could develop if the entire mine was inundated.

UMC 784.16 (a)(1)(1) and 784.23(e) Operation Plan: Maps and Plans:

Maps, plans and cross-sections shall be prepared by, or under the direction of and certified by a qualified, professional engineer. The 1980 submittal of technical correspondence is referred to, but was unable to be located. Please resubmit.

The applicant needs to submit operation and maintenance requirements (i.e., sediment disposal plans, operation inspection schedules, etc.) for both sediment ponds.

The results of the geotechnical analysis mentioned on page 1-6, Section 22 of the 1981 submittal (Vol. 6) should also be submitted.

Response:

Certification of preparation of maps, plans, and cross-sections by a qualified, professional engineer was presented in Volume 6, "Technical Correspondence". Certification of all subsequently filed maps, plans, and crosssections contained within this addendum is presented in this section.

Discussion of the operational and maintenance requirements concerning the sedimentation pond dam adequacy is in response to Comments UMC 817.45 through 817.47, Volume 8.

During construction of the sediment pond, it was determined by the project engineer/designer that a geological investigation of the foundation was unnecessary since bedrock was exposed over the entire area. Consequently, no optional geotechnical analysis as mentioned in the specifications on page 16, Section 22 of the 1981 Submittal, Volume 6, was conducted.



**Coastal States  
Energy Company**

Nine Greenway Plaza  
Houston, Texas 77046  
(713) 877-1400

Subsidiary of  
The Coastal  
Corporation

April 8, 1983

TO WHOM IT MAY CONCERN:

Please be advised that all engineering drawings prepared by Coastal States Energy Company since November 14, 1980 and submitted as a part of the SUFCo Mine Permit Application were prepared by or under the direct supervision of the writer, B. G. Long.

Mr. Long is registered as a Professional Engineer in the State of Texas, certification No. 39734.

Very truly yours,

B. G. Long



UMC 784.16(a)(1) and 784.23(e) Operation Plan: Maps and Plans:

The applicant needs to submit operation and maintenance requirements (i.e., sediment disposal plans, operation inspection schedules, etc.) for both sediment ponds.

DETERMINATION OF COMPLETENESS

The applicant still needs to submit sediment disposal techniques, disposal area and frequency of clean out and volume of expected sediment to be removed at maximum level for the sediment pond and the concrete settling basin.

Response:Sediment Pond Maintenance Operating Plan

Southern Utah Fuel Comany will operate and maintain the sediment control system as described below.

Concrete Settling Basin: The telescoping decanting valve will be locked to prevent unauthorized drainage of the concrete structure. On regular NPDES sampling days, the structure will be inspected for sediment content. If a sediment delta is in evidence at water level extending to or beyond the first of the mine discharge pipes, the structure will be decanted within one week of the observation. The decanting period shall not exceed four days. Sediment material from the structure will then be removed with a front-end loader and mixed with coal in the adjacent coal storage pile awaiting shipment and sale.

Main Sediment Pond: The staff gauge or the standpipe or both devices will be marked to indicate the level at which the pond's remaining capacity is sufficient to contain the runoff from a 10 year, 24 hour precipitation event and 40% of the required sediment storage volume. At least once each year following the spring runoff event, the pond will be drained with the decanting device to inspect the accumulated sediment level.

784.16(a)(1)(1) and 784.23(e) Operation Plan: Maps and Plans:Response: (continued)

The pond shall be sampled for effluent quality immediately before the decanting operation.

If sediment has accumulated to the mark described above the pond will be cleaned. The sediment will be either pumped to the surface facility or hauled to the mine portal and surfacility area by way of the sediment pond access road. The sediment will be transported in the bucket of a front-end loader.

The sediment will be disposed of in one of three means. If the material can be mixed and sold with the run-of-mine coal without affecting the overall quality and heat content of the coal, the sediment will be blended as that from the concrete basin. If the sediment is pumped to the surface facility, the material may be either blended with the coal pile or pumped into abandoned mine workings for disposal. The third and least desirable alternative to the Applicant is hauling the sediment to the sanitary landfill in Salina, Utah.

UMC 784.16 Ponds, Impoundments, Banks, Dams and Embankments:

(a)(3)(iv) The applicant must provide details, a timetable and plans to remove the sedimentation pond. See related comments under UMC 784.11.

Response:

The details, timetable and plans for removal of the sedimentation pond are presented in the DOC/TD (July, 1983) Response to Comment UMC 784.11, page 15a, Volume 8.

UMC 784.20 Subsidence Control Plan:

(a)(1) Map 80-2 shows that nearly full recovery is planned near the southwest rim of Quitchupah Canyon and Map 80-10 indicates that some subsidence will occur on the canyon slopes. However, in Volume 2, Exhibit 3, page 24, it is stated that mining will be limited to room and pillar methods under steep canyon rims, and that 30 to 40 percent recovery is planned. Please clarify.

(a)(2) No maps are given which show the projected subsidence for lease U-47080. Please provide the Division with this information and state whether there will be more than two subsidence monitoring stations for this lease (as shown on Map 80-10).

(b)(3)(v) The applicant is requested to send to the Division copies of subsidence monitoring reports compiled subsequent to the filing of the mine plan application (November 1980) and to regularly submit to DOGM these reports when they are completed.

Response:

(a)(1) Map 80-2, as revised, Volume 3, is a mining sequence map which shows that mining is planned near the southwest rim of Quitchupah Canyon. However, Exhibit 3, Volume 2 at page 24 explains that this mining is of the room and pillar type with recovery of 30 to 40 percent. This should virtually eliminate the possibility of subsidence of the steep canyon slopes. Map 80-10B presents the area of planned subsidence which is delineated along the rim of Quitchupah Canyon by the 800 feet overburden isopach except in the privately owned lands. This isopach line generally follows the top of the outcropped Castlegate Sandstone which is a cliff forming member of the Price River Formation. Topography above the

Castlegate is relatively gently sloping, whereas below its rim, cliffs and steep slopes are present. Considering the topography and overburden depth, subsidence rarely exceeds 50 percent of the mining height with greater than 800 feet of overburden, therefore, in the Quitchupah Canyon area, the 800 feet isopach line is the optimum border between full extraction and low recovery room and pillar mining. With the pertinent owner's permission, privately owned lands will be mined using the full extraction methods.

(a)(2) Revised Map 80-10B, Volume 3, shows the planned subsidence for lease U-47080. Since geologic and mining uncertainties often force change of planned mining sequences, installation of subsidence points prior to panel development could be a wasted effort. Therefore, additional subsidence monitoring points will be installed when the panels are in their development phase. When the mining panels have been developed on the leasehold, subsidence points will be installed near existing roads and on roughly 1,000 feet centers above and parallel to each panel.

(b)(3)(v) Copies of the 1981 and 1982 subsidence monitoring reports are presented in Volume 8, 1983 Appendices. Future subsidence monitoring reports will be submitted as completed.

UMC 784.20 Subsidence Control Plan:

(a)(i) Map 80-2 shows that nearly full recovery is planned near the southwest rim of Quitchupah Canyon and Map 80-10 indicates that some subsidence will occur on the canyon slopes. However, in Volume 2, Exhibit 3, page 24, it is stated that mining will be limited to room and pillar methods under steep canyon rims, and that 30 to 40 percent recovery is planned. Please clarify.

DETERMINATION OF COMPLETENESS

Map 80-2 (as revised, April 1983) must be resubmitted to the Division in a more legible form (i.e., the legend and other fine print on the map cannot be read).

Response:

A legible copy of Map 80-2 (as revised April 1983) has been prepared and is presented in Volume 3.

UMC 784.22 Diversions:

The applicant needs to submit descriptions (maps and cross-sections) of existing and proposed diversions. These should probably include the CBE drainage diversion along east road, an indication of diversions along the western boundary of the surface facilities and at the toe of the east slope behind the warehouse and office facilities.

Response:

The location and descriptions of existing and proposed diversions in and around the mine site are located in the mining plan as follows:

1. East Side Road

The contributing basin east (CBE) drainage diversion along the east road has been included in the updated Exhibit 9-9 Drainage Basin Map which is a part of the Merrick and Company Study, Volume 2. The cross sections and flow calculations for the CBE are in the Merrick and Company Study.

2. East Side Road Substation Diversion Culvert

The east side road drainage will be conveyed past the substation pad area in a bypass culvert and drain system as shown on the updated Exhibit 9-1 Site Plan Map-I, Volume 2.

3. East Side Road Continuance Diversion

This diversion consists of a riprapped channel from the east side road to the natural drainage channel located on the updated Exhibit 9-2 Site Plan Map-II, Volume 2. Calculations are in the Merrick and Company Study, Volume 2.

4. East Spring Canyon and Mud Spring Hollow Bypass Culverts  
The calculations for the diversion for this drainage is described in the Merrick and Company Study, Volume 2. The culverts are located and were built as shown in the Valley Engineering Alternate #1.
5. Sediment Pond Access Road Diversion  
This diversion is described in the Valley Engineering Alternate #1, Volume 6.
6. Sediment Trap-Sediment Pond Diversion System  
This diversion collects all the runoff from the disturbed area, the drainage from the contributing basin west (CBW) and the toe of the east slope behind the warehouse and office facilities. All of these drainage areas flow across the mine yard into the sediment trap and sediment pond diversion system as shown in the Valley Engineering Alternate #1, Volume 6.
7. Sediment Pond Spillway  
This diversion is described in the Valley Engineering Alternate #1 and in the 1983 Completeness Response to Comment UMC 817.47.
8. Substation Pad Diversion  
The runoff from a small area (0.188 acres as delineated on Exhibit 9-1, Volume 2) enclosing the mine main power substation will be diverted into the east side road diversion ditch. Since the substation pad is on the uphill drainage of the diversion ditch, channeling the runoff to the sediment pond without ponding water on the pad is technically and economically unfeasible and could create a hazardous and unsafe area. Prior ponding of water on the substation pad has caused saturation of the area and initiated movement of the slope and substation. Because of these considerations, the runoff of the pad above the east side road diversion ditch will be diverted away from the sediment pond facility into the east side road diversion ditch in accordance with the alternate sediment control criteria.

9. Main Mine Fan Diversion

The main mine fan is located in a depression which is nine feet below the adjacent mine yard drainage system. The area of the depression is 0.23 acres. A sump pump with automatic float controls in front of the main fan will pump the runoff from this area into the yard facilities.

10. East Spring Canyon Bypass Culvert Emergency Diversion at Fan

When the East Spring Canyon bypass culvert trash rack plugs up with debris during a very large flow event, the water overflows and ponds in the low area around the fan. This has caused flooding of the main mine fan controls. Normal runoff for the 10 year, 24 hour event into this low area is handled by the Main Mine Fan Diversion pump (Item #9). This secondary emergency diversion consists of a large 3.5 foot square drop drain with an oil skimmer cap dropping into a 48" CMP culvert directed into the East Spring Canyon 72" bypass culvert. The drop drain is installed such that a 1.5 foot free board is maintained above the normal operating level of the pump and will only be used if the precipitation event is greater than a 10 year, 24 hour event.

11. Topsoil Stockpile Diversion

The runoff from a small area (0.105 acres) located below the sediment pond consisting of the small amount of topsoil removed and stockpiled from the area where the minesite sediment pond was constructed is diverted below the sediment pond facility in accordance with the alternate sediment control criteria. This area is protected by alternative sediment control measures in the form of sparse quick growing vegetative cover and a silt fence installed below the stockpile to help trap sediment runoff coming off the stockpile. This area should have no problem meeting effluent limitations.

Riprap sizes used in minesite diversions were sized in accordance with the table presented in the 1981 mine plan submittal, Comment 817.44, Volume 7. The design velocity calculations and assumptions used in conjunction with the chart were obtained from either the Merrick and Company Study, the Valley Engineering design, or SUFCo calculations as discussed in 1983 Completeness Response to Comment UMC 817.47, Volume 8.

UMC 784.22 Diversions:

The applicant needs to submit descriptions (maps and cross-sections) of existing and proposed diversions. These should probably include the CBE drainage diversion along east road, an indication of diversions along the western boundary of the surface facilities and at the toe of the east slope behind the warehouse and office facilities.

DETERMINATION OF COMPLETENESS

The cross-references and descriptions for the diversions included in the Response to the ACP, Volume 8, are not adequate. UMC 771.23 - Permit Applications, Section (b) states "Information set forth in the mine plan shall be current, presented clearly and concisely and supported by appropriate references to technical and other written material available to the Division."

The diversions should be outlined on a single map to facilitate the review process. This will serve a two-fold purpose: 1) allow the reader to readily assess the intended drainage pattern at the minesite; 2) insure that all areas of the site are drained properly. Resubmittal of outdated maps such as Exhibits 9-1 and 9-2 of Volume 2 will only generate more confusion as people unfamiliar with the site read the plan and will undoubtedly result in delay of the permit review.

The following diversions and/or descriptions of areas requiring drainage should be depicted. This list may not be inclusive of all the diversions and the operator should include any that are not specified. Cross-sections must be submitted for #3, 8 and 9 showing the dimensions of the diversions, including any required riprap layer. The diversions are:

UMC 784.22 Diversions:DETERMINATION OF COMPLETENESS (cont'd)

1. CBE drainage along road.
2. CBE bypass culvert.
3. CBE continuance.
4. South parking lot diversion to silt fence and ditch downslope from fence showing fate of drainage.
5. Mine yard drainage system (incorporate June 21, 1982 submittal, if current).
6. Ditch and any berms used to direct flow from substation pad to CBE ditch.
7. Main mine fan diversion: page 40 of Volume 8 states a six inch pipe is used whereas page 25 states drainage is through ESC bypass culvert. Please clarify.
8. CBW diversion: depict all drainage to pipe #5 (Exhibit 9-2 of Volume 2) and pattern of drainage along road into mine from corner located approximately 1/3 mile from minestie.
9. Undisturbed area north of the ATOF and warehouse.
10. Pipe #5 found on Exhibit 9-2.
11. Sediment pond access diversion.

Response:

The drainage diversions are outlined on Map 83-2. The cross-sections showing the dimensions and any required riprap layer for:

1. Item #3 are located in the DOC/TD (July, 1983) Response to Comment UMC 817.43.
2. Item #8 are located in the DOC/TD (July, 1983) Response to Comment UMC 817.43.

UMC 784.22 Diversions:Response: (cont'd)

3. Item #9 are located in the DOC/TD (July, 1983) Response Comment UMC 817.43.

The comment under #7 listed above relative to the main mine fan diversion on pages 25 and 40 of Volume 8, the first sentence on page 25, #10 main mine fan diversion should be amended to read "The runoff from a small area (0.23 acres) enclosing the main mine fan will be diverted through a drop drain and 6" pipeline into the 72 inch East Spring Canyon bypass culvert."

A diversion not specified above is the substation pad undisturbed interception ditch which diverts the undisturbed runoff from CBE away from the substation pad to prevent saturation of the area. Saturation in the past has caused some slope movement. The cross-section and required riprap layer are discussed in the DOC/TD (July, 1983) Response to Comment UMC 817.43.



UMC 784.25 Return of Coal Processing Waste to Abandoned Underground Workings:

(b) The Applicant is requested to provide the Division with information regarding the source and quality of waste that is stored, areas that are backfilled, percent of the mine void that is and will be filled with waste, method of constructing underground retaining walls, influence of the backfilling operation on active underground mine operations and the anticipated occurrence of surface effects following backfilling.

Response:

The Applicant incurs no coal processing waste which must be returned to abandoned underground workings since there is no washplant or other coal preparation facility at the minesite which generates such waste.

UMC 784.26 Air Pollution Control Plan:

(a) Please submit to the Division the final air quality monitoring report that was due in July 1982.

Response:

The final air quality monitoring report is presented in Volume 6, "Air Monitoring".

UMC 817.11 Signs and Markers:

(e) The applicant is requested to address and show where buffer zone markers have been placed in the mine permit area.

Response:

Mining activity approaches stream buffer zones at two locations. The north ventilation entries as shown on Map 80-2, as revised, of the 1980 Submittal, Volume 2, are within 100 feet of the North Fork of Quitchupah Creek, a perennial stream. A special request to effect these breakouts was submitted to the Division on December 18, 1981 and on January 20, 1982, approval was granted. Copies of the correspondences are presented in this section. A marker sign will be placed at each of these entries identifying the buffer zone and prohibiting dumping.

The second location is at the portal area where facilities have been constructed in East Spring Canyon. The stream in this canyon has historically been ephemeral but now receives a small constant flow from mine discharge. This flow is augmented by spring water in the area of the confluence with Quitchupah Creek and forms the headwater of that creek. A pump station and a leachfield are located in this general area. Two signs will be placed here identifying the buffer zone and prohibiting dumping.

FILE: GOVT - DOGM - CORRES



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

Subsidiary of  
Coastal States  
Energy Company

December 18, 1981

Mr. Jim Smith  
Division of Oil, Gas and Mining  
1588 West North Temple  
Salt Lake City, Utah 84116

Dear Mr. Smith:

We will be breaking our first Quitchupah Canyon ventilation entries outside at the outcrop near the end of January 1982. These will be the ones located at the east end of our 3 East submain entries in section 32 T21S R5E. Discussion of the ventilation intake entries is in our mine plan submittal in volume three on page 219 and on map 80-2. They were addressed as part of the 1980 mining plan compliance submittal. Map 80-2 is now out of date with regard to mining panel orientation. However, the notation regarding ventilation entries and the approximate locations still hold true. The most current mine layout design is shown on exhibit 1 in volume seven of the SUFCO plan. Both Coastal's January 19, 1981 approval request to OSM for extended mining limits and our recent November 3, 1981 request to your office accurately locate the ventilation entries.

The breakout into Quitchupah Canyon at the end of the 3 East entries will probably occur during the last week of January and we request approval for modification to the planned location. The modification is necessary because the outcrop has been burned where the entries would surface if continued in the present direction. The burn must be avoided due to the hazardous nature of the material with regard to roof control. To avoid this burned area, it is planned to divert the entries to the northwest 700 feet from the originally planned exit. The portals will therefore face north-northeast in the northernmost of two small side drainages in this area of the canyon.

Members of our engineering department have thoroughly inspected all proposed breakout locations in the canyon for archaeological evidence. None was found. These inspections were part of the surveys investigating exact burn and outcrop locations.

Mr. Jim Smith  
December 18, 1981  
Page 2

We were notified in OSM's letter of February 17, 1981 that it would be acceptable to construct these breakouts at any time except during the months of April and May in consideration of raptor nesting habits. However, we may now require a second approval from your office pursuant item (e) in OSM's December 7, 1981 letter to you and due to the breakout modification described above. If such is the case, please process this letter as a request for approval. If further approval is not necessary, please notify me at your earliest convenience.

Yours very truly,

COASTAL STATES ENERGY COMPANY

*Vernal Mortensen*

Vernal Mortensen  
Vice President Utah Operations

KAF:dlj

Enclosures (2)

xc: Robert Hagan, OSM  
Dick Allred, USFS  
Jackson Moffitt, USGS



STATE OF UTAH  
 NATURAL RESOURCES & ENERGY  
 Oil, Gas & Mining

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

Scott M. Matheson, Governor  
 Temple A. Reynolds, Executive Director  
 Cleon B. Feight, Division Director

January 20, 1982

Mr. Vernal J. Mortensen  
 Vice President  
 Utah Operations  
 Coastal States Energy Corporation  
 411 West 7200 South  
 Midvale, Utah 84047

SUFco

RE: Ventilation Breakouts  
 Quitchupah Canyon  
 Convulsion Canyon Mine  
 ACT/041/002  
 Sevier County, Utah

Dear Mr. Vernal Mortensen:

Following the Division's review of Coastal States' recently submitted material and an on-site visit by members of the Division staff, approval is hereby granted for relocation of the Convulsion Canyon Mine surface breakouts in Quitchupah Canyon. This approval is conditioned upon written concurrence from the surface owner(s) and/or surface management agency.

Sincerely,

JAMES W. SMITH, JR.  
 COORDINATOR OF MINED LAND DEVELOPMENT

JWS/GLH:te

cc: Richard Dawes, OSM, Denver

Shirley Copeland  
 Utah Contact w/ OSM  
 (303) 837-2457  
 5656

Board: Charles P. Henderson, Chairman • John L. Bell • E. Steele McIntyre • Edward T. Beck  
 Robert R. Norman • Margaret P. Erd • Herm Olsen

Division Director: Cleon B. Feight

Ken Hamilton  
 Don Hinman

UMC 817.11 Signs and Markers:

(e) The applicant is requested to address and show where buffer zone markers have been placed in the mine permit area.

DEFICIENCIES

The applicant must indicate when buffer zone signs will be placed at the sites identified in the ACR Response. A diagram of the signs showing wording to be used should also be submitted.

Response:

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

The sign dimensions are 12" x 18" and the wording used is "Stream Buffer Zone No Disturbing Beyond This Point."

UMC 817.14 Casing and Sealing of Underground Openings: Temporary:

(a) Each mine entry which is temporarily inactive, but has a further projected useful service under the approved permit application, shall be posted with signs to identify the hazardous nature of the opening.

Response:

The only temporary openings at the SUFCo mine are ventilation entries placed to facilitate air flow to extended workings. These entries are typically protected by steel mesh gates installed and operated as outlined in Volume 3, at page 219 of the 1980 Submittal. The 1980 documents, however, did not note that the entries are posted with "DANGER" signs in accordance with MSHA regulation 30 CFR 75.1711. These gates and signs are periodically inspected by mine personnel to ensure proper maintenance.

UMC 817.22 Topsoil Substitute:

(e) The applicant must provide the source and the total volume of soil material needed to reclaim the total disturbed area. A six inch layer at the least should be spread over all graded and prepared areas. Any and all material that is to be used by the applicant for a topsoil substitute (plant growth medium), must be sampled and subjected to the same chemical and physical analysis as topsoil. This analysis will be used to judge the suitability of the proposed soil material to achieve the proposed postmining land-use.

Response:

The SUFCo mine has been in operation since 1941. At the time the facilities were constructed, no topsoil was segregated and saved. Therefore, the Applicant proposes that suitable topsoil be purchased from one of several sources in the Sevier Valley in sufficient quantity to provide at least a six inch layer and hauled to the SUFCo mine site as a part of the reclamation activities. Prior to purchase and haulage to the SUFCo minesite, the Applicant will, following consultation with the regulatory authorities, sample the chemical and physical properties of the topsoil proposed for use. The Applicant will purchase and utilize the proposed topsoil subsequent to approval of the regulatory authorities that such proposed topsoil is acceptable for such use.

A six inch layer of topsoil placed on the areas to be revegetated would be a considerable improvement over native conditions in the general vicinity and should be more than adequate. Approximately 13,713 cubic yards will be needed to place six inches of topsoil over the estimated 17 acres of disturbance area to be reclaimed.

Revised 12/19/88

Revised 6/89

Revised 8/89

Revised 11/89

UMC 817-23 Topsoil Storage:

All proposed topsoil substitutes are subject to UMC 817.23. Therefore, a plan to fulfill the requirement under this section must be submitted.

Response:

The only topsoil storage at the SUFCo operation is the small amount of topsoil removed under UMC 817.22 from the area where the sediment pond was constructed. This topsoil material was segregated and stockpiled. The stockpiled materials were selectively placed in an Alternate Sediment Control Area (ASCA) pile on a stable surface area (0.105 acres) below the sediment pond within the permit area. This topsoil ASCA stockpile is isolated with no means of access from the main surface area to protect the topsoil from contaminants and unnecessary compaction that would interfere with vegetation. A topsoil storage sign was installed at the base of the stockpile. The stockpile is protected from wind and water erosion. The ASCA stockpile was promptly revegetated with a sparse quick growing vegetative cover and through other approved measures by installing silt fence below the stockpile to help trap sediment runoff coming off the stockpile. This topsoil will not be moved or disturbed until required for redistribution during the final reclamation phase.

Excess subsoil associated with construction of a run of mine coal stockpile is stored at SUFCO's 40 acre waste rock disposal site. This material is stored in a segregated area as described in Section 3.1.6 of Volume 9. This subsoil material will be available for fill during the final reclamation phase of the minesite if needed. About 1,100 cubic yards of topsoil are stored immediately west of the excess subsoil described above. This material represents the upper twenty-four (24) inches of topsoil that was removed prior to placing the subsoil. This material is stored and protected as described in Section 3.1.6 of Volume 9 of SUFCO's MRP. This topsoil is reserved to reclaim the subsoil storage area.

The Applicant foresees no future disturbance at the SUFCo minesite of additional lands which would require topsoil storage. In the event additional disturbance is needed which would generate topsoil, a plan to store the segregated topsoil will be prepared and submitted for approval prior to initiation of such activities.

UMC 817.24 Topsoil: Redistribution:

The applicant must submit a plan for topsoil redistribution.  
The plan should include the depth of topsoil and the type of equipment that will be used to prepare the topsoil for a proper seedbed.

Response:

Topsoil redistribution is covered in the response to Comment UMC 784.131 Reclamation Plan, Volume 8.

UMC 817.41 Hydrologic Balance: General:

The applicant shall conduct a study to determine the source of TDS anomaly which contributes to the excess effluent limitations from the sedimentation pond, and provide mitigating methods to bring the discharge into acceptable effluent standards.

Response:

The Applicant has conducted a study to determine the sources of the TDS anomaly and is implementing measures to bring the discharge into compliance. The sources identified to date include:

1. Evaporative concentrating of the sediment pond.
2. Washwater from equipment cleaning in the shop.
3. Precipitation event runoffs which carry surface accumulations of salt from the Mancos soils and also of salt stored for snow removal purposes.
4. Salt imported with ice and slush on the undercarriages of the highway coal trucks.

It has been determined that, while the sources of the TDS concentrations change during the year, the highest concentrations occur during the winter and consist primarily of runoff carrying salt spread for snow removal purposes. Mitigating measures currently being implemented include source control, where practical, and a change in effluent limitation.

On November 16, 1982, requests were simultaneously submitted to the Division of Oil, Gas and Mining and to the Fishlake National Forest for approval of plans to construct protective devices for the salt and sand storage and for the stoker coal storage area. The salt shelter was recommended to eliminate the TDS contribution from the stored salt. The Division responded on December 14, 1982 granting approval to the Applicant's request with certain stipulations. A modification to this approval was

received from the Division dated January 20, 1983 incorporated recommendations from officials of the Fishlake National Forest. Comments were also subsequently received from the Division of Environmental Health. On February 7, 1982, the Applicant responded with a written agreement to the provisions. Copies of these correspondences are presented within this section.

On February 1, 1983, a letter was sent to the Utah Water Pollution Committee requesting a change in the TDS limitation imposed by NPDES permit number UT-0022918. Justification for the requested action was based primarily on the impracticability of additional control measures and on the documented lack of detrimental impact on the receiving stream. The response to this request, dated March 3, 1983, established a new TDS limitation but also establishes more stringent monitoring and requirements. Copies of these correspondences are also presented in this section.

The mitigating methods to bring the discharge into acceptable effluent standards will consist of both of the above approved actions. The impact of these actions will continue to be monitored and additional methods will be implemented by mutual agreement. Copies of the monitoring reports will be provided to the Division of Oil, Gas and Mining on a quarterly basis.



STATE OF UTAH  
NATURAL RESOURCES & ENERGY  
Oil, Gas & Mining

Scott M. Matheson, Governor  
Temple A. Reynolds, Executive Director  
Cleon B. Feight, Division Director

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

December 14, 1982

Mr. Ken Payne  
Southern Utah Fuel Company  
P.O. Box P  
Salina, Utah 84654

RE: Approval of Storage Area  
Modification  
Convulsion Canyon Mine  
ACT/041/002  
Sevier County, Utah

Dear Mr. Payne:

The Division has completed its review of SUFCO's November 16, 1982 submittal concerning the proposed construction of a salt and sand storage area, oiled-stoker coal storage area and enlargement of the lump coal storage pad. We hereby grant formal approval to the above modifications as proposed with the exception of the stoker coal storage.

The Division is concerned about the proposed open stockpiling of the oiled-stoker coal and the potential for runoff of oil during rainfall events. At an application rate of two gallons of oil per ton of coal, approximately 2,000 gallons, or 42 barrels, of oil could be present at the stoker stockpile with an average storage of 1,000 tons. The volume of oil which could potentially be delivered to the sediment system would probably be less than this value due to adsorption of some oil by the slack coal.

After a review of the water quality data from the discharge below the pond (#002), it was found that during the last two years two samples resulted in oil and grease values above the maximum limit and seven samples showed some presence of oil and grease (approximately 2.0 mg/l). Additionally, a preliminary conclusion drawn from the current technical analysis of the MRP indicates that the sedimentation pond may be underdesigned for the 10 year, 24 hour design storm. Therefore, a runoff event of less than this magnitude could result in an oil discharge from the emergency spillway since it is not equipped with an oil skimming device.

In consideration of the above, approval for the proposed stoker stockpile is hereby granted with the following provisions:

1. The Division supports the Department of State Health's recommendations for containment of oil at the stockpile and installation of an impervious layer at the storage area to prevent any potential oil infiltration. Construction of this area should be delayed until these concerns are resolved.

Mr. Ken Payne  
December 14, 1982  
Page Two

2. The Division strongly recommends containment of the oil at the stockpile site pursuant to UMC 817.89, Disposal of Non-coal Wastes:

" wastes including...greases, lubricants, flammable liquids ... shall be placed and stored in a controlled manner in a designated portion of the permit area ..."

" Placement shall ensure leachate and surface runoff do not affect surface or groundwater ... and area remains suitable to reclamation and revegetation."

The Division believes that the function of the sedimentation system is not for storage of these wastes.

3. The results (if available) of a chemical analysis of the oil to be applied to the coal, to include heavy metals and trace elements, should be submitted within 60 days.

4. A contingency plan for the handling and disposal of excess oil accumulation in the sedimentation pond(s) and mitigation of the problem should oil concentrations increase beyond current effluent standards should be developed and submitted to the Division within 60 days.

5. SUFCO should keep the Division advised of any developing problem(s) relative to the stoker stockpile and oil concentrations.

If you have any questions concerning this matter, please don't hesitate to contact myself or Rick Summers of my staff.

Sincerely,



JAMES W. SMITH  
COORDINATOR OF MINED LAND DEVELOPMENT

JWS/RS/tck

cc: Rick Summers, DOGM  
Wayne Hedberg, DOGM  
Susan Linner, DOGM  
Ken Wyatt, DOGM  
Doug Maier, DOGM  
Steve McNeal, State Health Department

Ken Payne  
Vice President & General Manager



**Southern Utah  
Fuel Company**

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

Subsidiary of  
Coastal States  
Energy Company

November 16, 1982

Mr. Charles R. Allred  
District Ranger  
Fishlake National Forest  
P.O. Box 646  
55 South 100 East  
Richfield, Utah 84701

Dear Mr. Allred:

SUFCo requests approval for the attached plans to construct a salt and sand storage area, stoker coal storage area and to enlarge the lump coal storage pad. The road salt storage installation is required due to the problems with salt contaminated runoff causing excessive TDS levels in the sediment pond discharge. In addition, we need a larger storage area for slack stoker coal and lump coal to handle surges of trucks wanting specialty coal. Thus, when several trucks arrive at the minesite within a short time frame, the result is that some trucks have to wait in line until we generate more stoker or lump coal. This waiting time is jeopardizing our customer relations and could result in SUFCo losing some current customers and curtail new sales for specialty coal.

A map and drawing showing the locations and dimensions are enclosed. The proposed salt and sand storage area will be a 30 ft. x 30 ft. concrete pad with concrete walls along both sides and the back and will be located just north of the tipple oil tanks next to the hill.

For the slack stoker coal storage area, we propose to install an inclined concrete wall against the north slope of the lower mine yard to extend about 110 feet east and west, and a concrete pad to extend 10 feet to the south from the wall. The remainder of the pad will be constructed of compacted road base and coal to form the stockpile area. This storage area will allow SUFCo to stockpile approximately 1,000 tons of slack stoker coal for shipping. The riprapped east drain channel coming down this slope from the upper yard will be replaced with a drain into the mine yard drainage pipeline that discharges into the sediment system. The west drain channel will be directed around the storage stockpile.

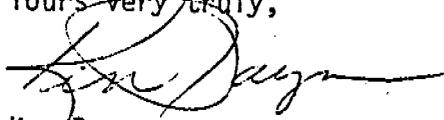
We propose to enlarge the existing 15 ft. x 15 ft. concrete lump coal pad to 30 ft. x 25 ft. with temporary walls of wood on the back and sides for approximately 100 tons of lump coal storage.

Construction of these facilities will require minimal maintenance. They will be reclaimed upon conclusion of the project along with all other structures. No additional disturbed area will result from this construction and drainage will flow from all three structures to and through the sediment treatment system.

Mr. Charles R. Allred  
November 16, 1982  
Page 2

Please pursue the required approval for these installations. We propose to start construction as soon as possible in order to take advantage of weather conditions. If you have any questions or concerns regarding these additional installations which this letter does not address, please notify us so that the concerns may be satisfied during our planning process.

Yours very truly,



Ken Payne  
Vice President and General Manager

MLD:d1j

Enclosures

Ken Payne  
Vice President & General Manager



**Southern Utah  
Fuel Company**

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

Subsidiary of  
Coastal States  
Energy Company

November 16, 1982

Mr. Jim Smith  
Division of Oil, Gas and Mining  
4241 State Office Building  
Salt Lake City, Utah 84114

Dear Mr. Smith:

SUFCo requests approval for the attached plans to construct a salt and sand storage area, stoker coal storage area and to enlarge the lump coal storage pad. The road salt storage installation is required due to the problems with salt contaminated runoff causing excessive TDS levels in the sediment pond discharge. In addition, we need a larger storage area for slack stoker coal and lump coal to handle surges of trucks wanting specialty coal. Thus, when several trucks arrive at the minesite within a short time frame, the result is that some trucks have to wait in line until we generate more stoker or lump coal. This waiting time is jeopardizing our customer relations and could result in SUFCo losing some current customers and curtail new sales for specialty coal.

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Construction of these facilities will require minimal maintenance. They will be reclaimed upon conclusion of the project along with all other structures. No additional disturbed area will result from this construction and drainage will flow from all three structures to and through the sediment treatment system.

Mr. Jim Smith  
November 16, 1982  
Page 2

Please pursue the required approval for these installations. We propose to start construction as soon as possible in order to take advantage of weather conditions. If you have any questions or concerns regarding these additional installations which this letter does not address, please notify us so that the concerns may be satisfied during our planning process.

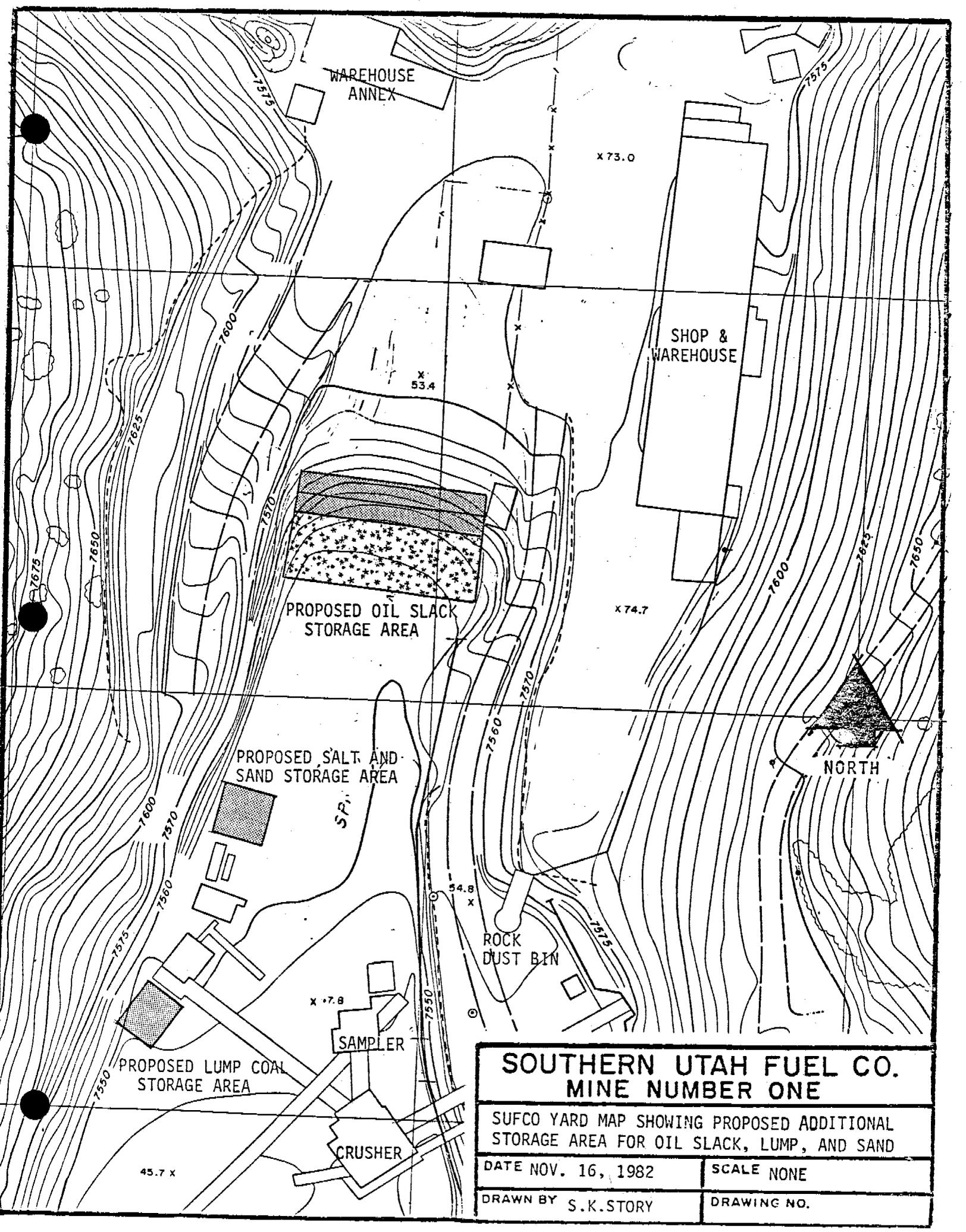
Yours very truly,



Ken Payne  
Vice President and General Manager

MLD:d1j

Enclosures



**SOUTHERN UTAH FUEL CO.  
MINE NUMBER ONE**

SUFCO YARD MAP SHOWING PROPOSED ADDITIONAL STORAGE AREA FOR OIL SLACK, LUMP, AND SAND

DATE NOV. 16, 1982

SCALE NONE

DRAWN BY S.K.STORY

DRAWING NO.

53.4

7570

110'

SLOPED RETAINING WALL  
110' x 12'

CONCRETE PAD  
110' x 10'

GRAVEL PAD  
110' x 40'

USED-OIL  
TANK

10'

50'

PROPOSED OIL SLACK STORAGE AREA



NORTH

SOUTHERN UTAH FUEL CO.  
MINE NUMBER ONE

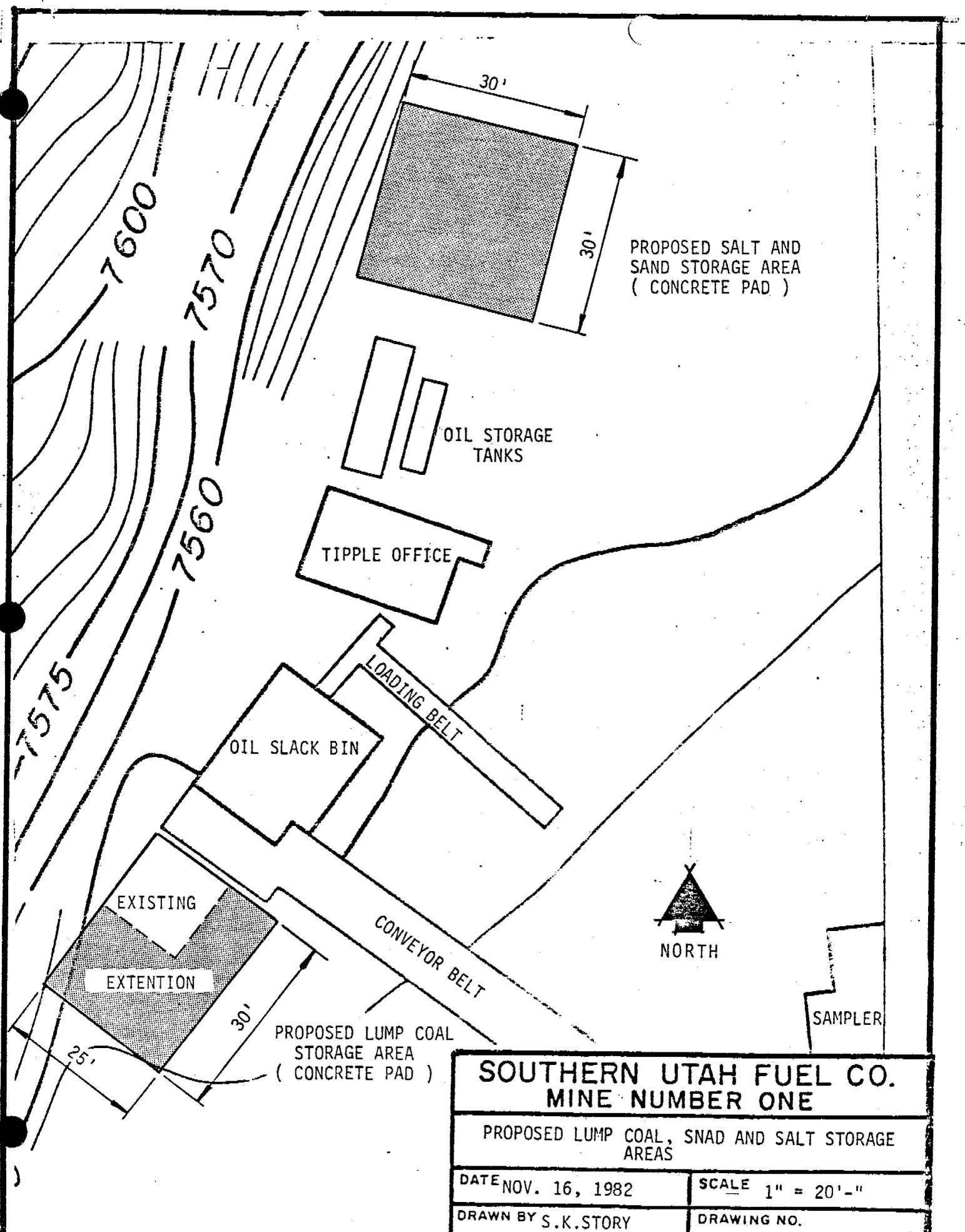
PROPOSED OIL SLACK STORAGE AREA

DATE NOV. 16, 1982

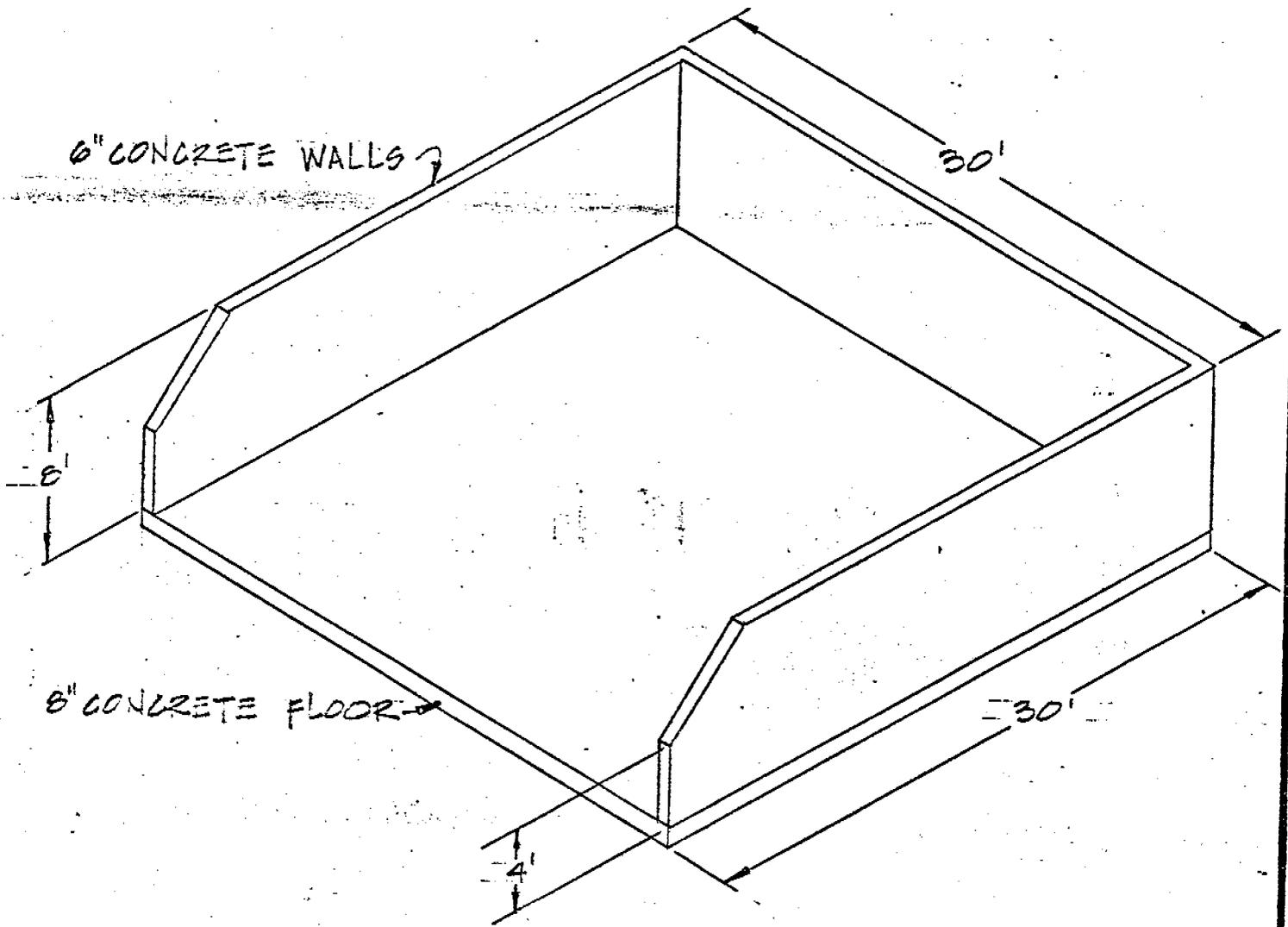
SCALE 1" = 20'-0"

DRAWN BY S.K.STORY

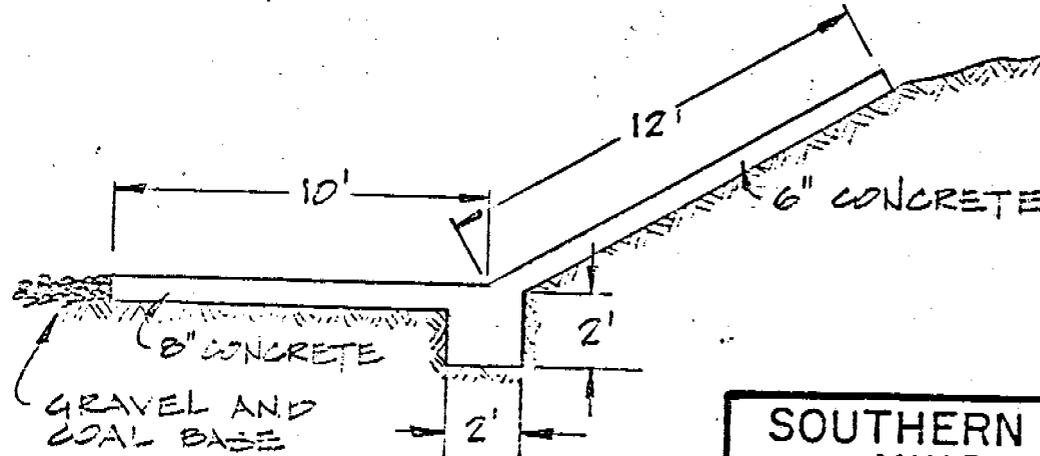
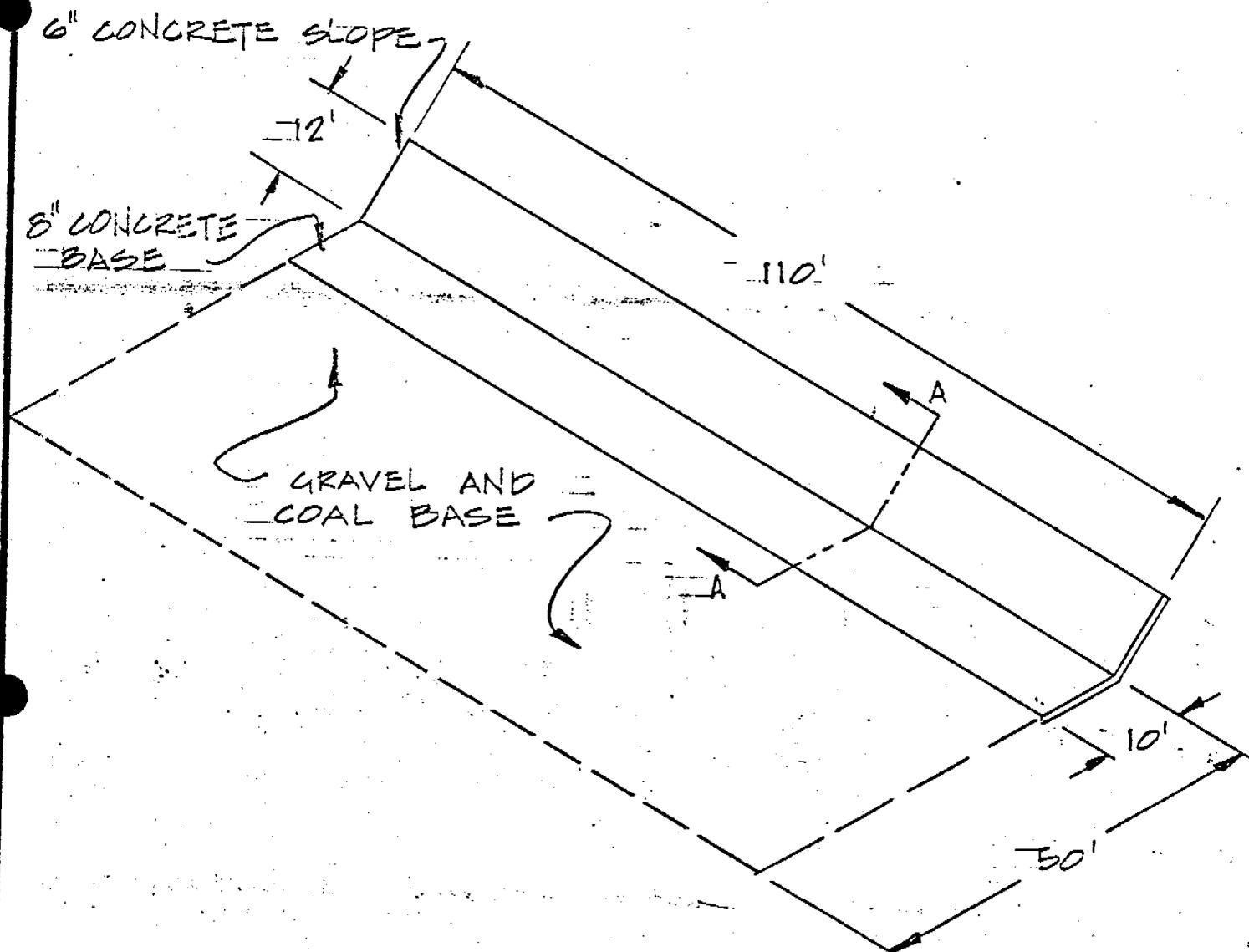
DRAWING NO.



<b>SOUTHERN UTAH FUEL CO. MINE NUMBER ONE</b>	
PROPOSED LUMP COAL, SAND AND SALT STORAGE AREAS	
DATE NOV. 16, 1982	SCALE 1" = 20'-"
DRAWN BY S.K.STORY	DRAWING NO.

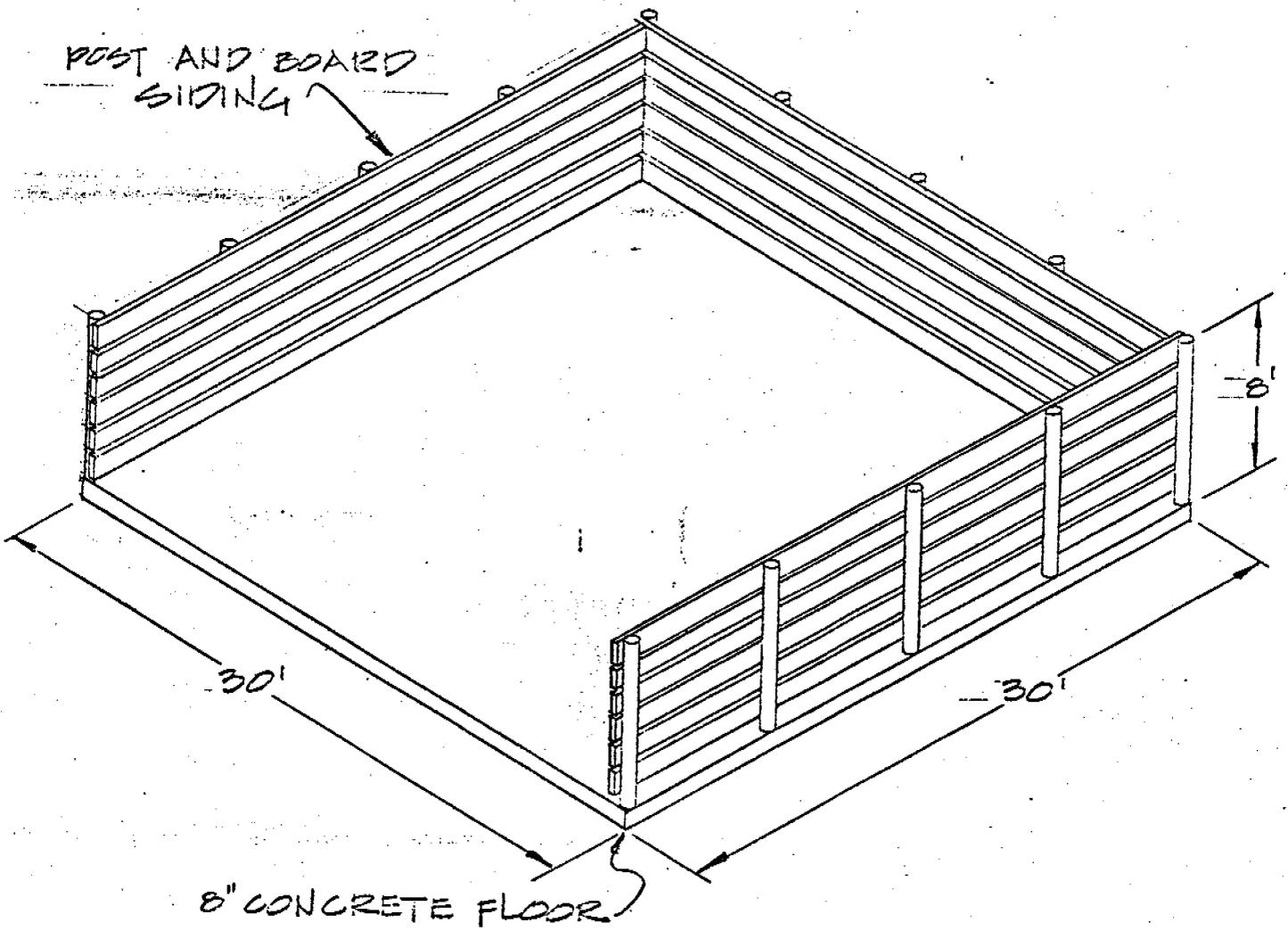


SOUTHERN UTAH FUEL CO.	
MINE NUMBER ONE	
SAND & SALT STORAGE AREA	
ISOMETRIC VIEW	
DATE	NOV. 23, 1982
SCALE	1/8" = 1'-0"
DRAWN BY	S.K. STORV
DRAWING NO.	



CROSS-SECTION A-A  
SCALE: 1" = 5'-0"

SOUTHERN UTAH FUEL CO. MINE NUMBER ONE	
OIL SLACK STORAGE AREA ISOMETRIC VIEW	
DATE: NOV. 23, 1982	SCALE: 1" = 20'-0"
DRAWN BY: E.K. STOEY	DRAWING NO.



SOUTHERN UTAH FUEL CO.	
MINE NUMBER ONE	
LUMP COAL STORAGE AREA	
ISOMETRIC VIEW	
DATE	NOV. 23, 1982
SCALE	1/8" = 1'-0"
DRAWN BY	S.K. STORY
DRAWING NO.	

Scott M. Matheson  
Governor



STATE OF UTAH  
DEPARTMENT OF HEALTH  
DIVISION OF ENVIRONMENTAL HEALTH  
150 West North Temple, P.O. Box 2500, Salt Lake City, Utah 84110-2500

533-6146

December 31, 1982

Marv H. Maxell, Ph.D., Acting Director  
Room 474 801-533-6121

James O. Mason, M.D., Dr.P.H.  
Executive Director  
801-533-6111

Mr. Ken Payne  
Southern Utah Fuel Co.  
P.O. Box P  
Salina, UT 84654

DIVISIONS

Community Health Services  
Environmental Health  
Family Health Services  
Health Care Financing

OFFICES

Administrative Services  
Community Health Nursing  
Management Planning  
Medical Examiner  
State Health Laboratory

Re: Salt and Stoker Coal Storage

Dear Mr. Payne:

The Utah Bureau of Water Pollution Control has reviewed Southern Utah Fuel Company's November 16, 1982 letter to the Utah Division of Oil, Gas and Mining regarding construction of salt storage and slack stoker coal storage areas. We consider the possibility of salt and oil seepage and runoff sufficiently great to warrant extra precaution in the construction of these facilities. The designed concrete pad and walls for the salt storage area should help prevent leaching and runoff.

Although these facilities will not require a construction permit from this office, the following recommendations should be incorporated in the design, construction and maintenance of these areas.

1. It is suggested that the stoker coal storage area beyond the ten foot concrete pad be constructed with a clay or synthetic liner to reduce oil into the ground.
2. It is important that the salt and stoker coal storage have sufficient berms to prevent runoff from or onto the pad areas and to maintain compliance with the NPDES effluent limitations.

The implementation of these measures should help minimize water pollution from high salt and oil discharges.

Sincerely,

Steven McNeal  
Public Health Engineer  
Utah Water Pollution Control

SRM:na

cc: Rick Summers, Div. of Oil, Gas and Mining  
Six-County A.O.G.  
Central Utah District Health Dept.

1446



STATE OF UTAH  
NATURAL RESOURCES & ENERGY  
Oil, Gas & Mining

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

File ROOM PERMITS  
FILE

Scott M. Matheson, Governor  
Temple A. Reynolds, Executive Director  
Cleon B. Feight, Division Director

January 20, 1983

Mr. Ken Payne  
Southern Utah Fuel Company  
P. O. Box P  
Salina, Utah 84659

RE: Approval of Storage Area  
Modification  
Convulsion Canyon Mine  
ACT/041/002  
Sevier County, Utah

Dear Mr. Payne:

The Division has received comments from the Fishlake National Forest and the Office of Surface Mining (OSM) concerning the proposed modification submitted November 16, 1982.

The Forest Service expressed concerns with the potential for unsuitable conditions for revegetation at the time of reclamation due to the salt and oiled-stoker coal storage. Additionally, they share our concern with the potential for violation of water quality limitations as the result of the inadequacy of the sediment system to remove the oil and salt as the runoff passes through the system. They also feel containment of the runoff at the respective storage areas in order to prevent contamination at the sediment pond would be much preferred to the proposed design.

OSM had no comments concerning the proposed design and has given verbal approval to the project.

In summary, the modification has been approved with the provisions of the Division of Oil, Gas and Mining (DOG M) letter dated December 14, 1982 and the following:

1. Materials to be stored are contained on an impervious layer, this will also include sealing of the joints for the salt storage area.

Mr. Ken Payne  
ACT/041/002  
January 20, 1983  
Page 2

2. It is recommended that consideration be given to the possibility of salt spillage outside the constructed bin during loading operations. The loading ramp to the bin should be constructed insloping in order to help prevent drainage from the area.
3. The storage pads are to be designed and constructed to ensure against:
  - A. drainage leaving the pad areas,
  - B. contact of surface runoff from the surrounding areas with materials being stored.

If you have any questions about this matter, please don't hesitate to call.

Sincerely,



RICK SUMMERS  
RECLAMATION HYDROLOGIST

RS/btb

cc: Ron Naten, OSM  
J. Kent Taylor, Fishlake National Forest  
Sue Linner, DOGM  
Doug Maier, DOGM  
Dave Darby, DOGM  
Jim Smith, DOGM

Ken Payne  
Vice President & General Manager



**Southern Utah  
Fuel Company**

P.O. Box P  
Salina, Utah 84654  
(801) 529-7428  
(801) 637-4850 (Mine)

Subsidiary of  
Coastal States  
Energy Company

February 1, 1983

Mr. Calvin K. Sudweeks  
Executive Secretary  
Utah Water Pollution Committee  
P.O. Box 250  
Salt Lake City, Utah 84110

RE: TDS Violations of NPDES  
Permit No. UT-0022918

Dear Mr. Sudweeks:

During the past several months, Southern Utah Fuel Company has consistently exceeded the Total Dissolved Solids daily maximum discharge limitation of 650 mg/l from the 002 discharge. The sources for the TDS concentrations are varied and change from season to season. The sources identified to date include:

1. Evaporative concentrating of the sediment pond--the outlet of which constitutes discharge 002;
2. Washwater from equipment cleaning in the shop;
3. Precipitation event runoffs which carry surface accumulations of salt from the Mancos soils and also of salt stored for snow removal purposes; and
4. Salt imported with ice and slush on the undercarriages of the highway coal trucks. This concentrated material, which comes from state and county roads, drops from the trucks as they await loading on the warm southern exposure and appears to account for a significant amount of the TDS during the winter season.

Analysis of these sources does not indicate a practical solution to the problem of TDS concentration. Dilution with well water would reduce the concentration but in turn would increase the total salt load. Dilution with a portion of our mine water discharge would reduce the concentrations at point 002, but would incur a pumping cost and would not result in better or worse water quality below the confluence of the North and South forks of Quitcupah Creek.

Mr. Calvin K. Sudweeks  
February 1, 1983  
Page 2

Based on the above factors, we are requesting that your office review the 650 mg/l TDS limitation and, if possible, grant an exemption to this requirement. It is our recommendation that a total daily loading restriction be applied instead. We feel that this approach is justified based on the following factors:

1. A low average discharge flow of 4-5 gpm;
2. A rapid dilution by water from Quitchupah Creek of 1:1 minimum with an average of approximately 3:1 of 450 mg/l TDS water;
3. A continuing mixing and dilution over a 2½ mile reach to the confluence with the North Fork of Quitchupah Creek at which point dilution mixing is approximately 200:1 with a 500 mg/l TDS concentration (of which 750 gpm is 450 mg/l TDS mine water discharge from our point source 003); and
4. A water use classification of 3A and 4, recognizing that Quitchupah Creek is totally dewatered during the summer to irrigate Mancos farmland.

We are willing to work with you and your staff to resolve this problem and will provide additional data upon request. It is our intention to eliminate the need to constantly file violation notices and to reduce the paper mill work load where possible.

Sincerely,



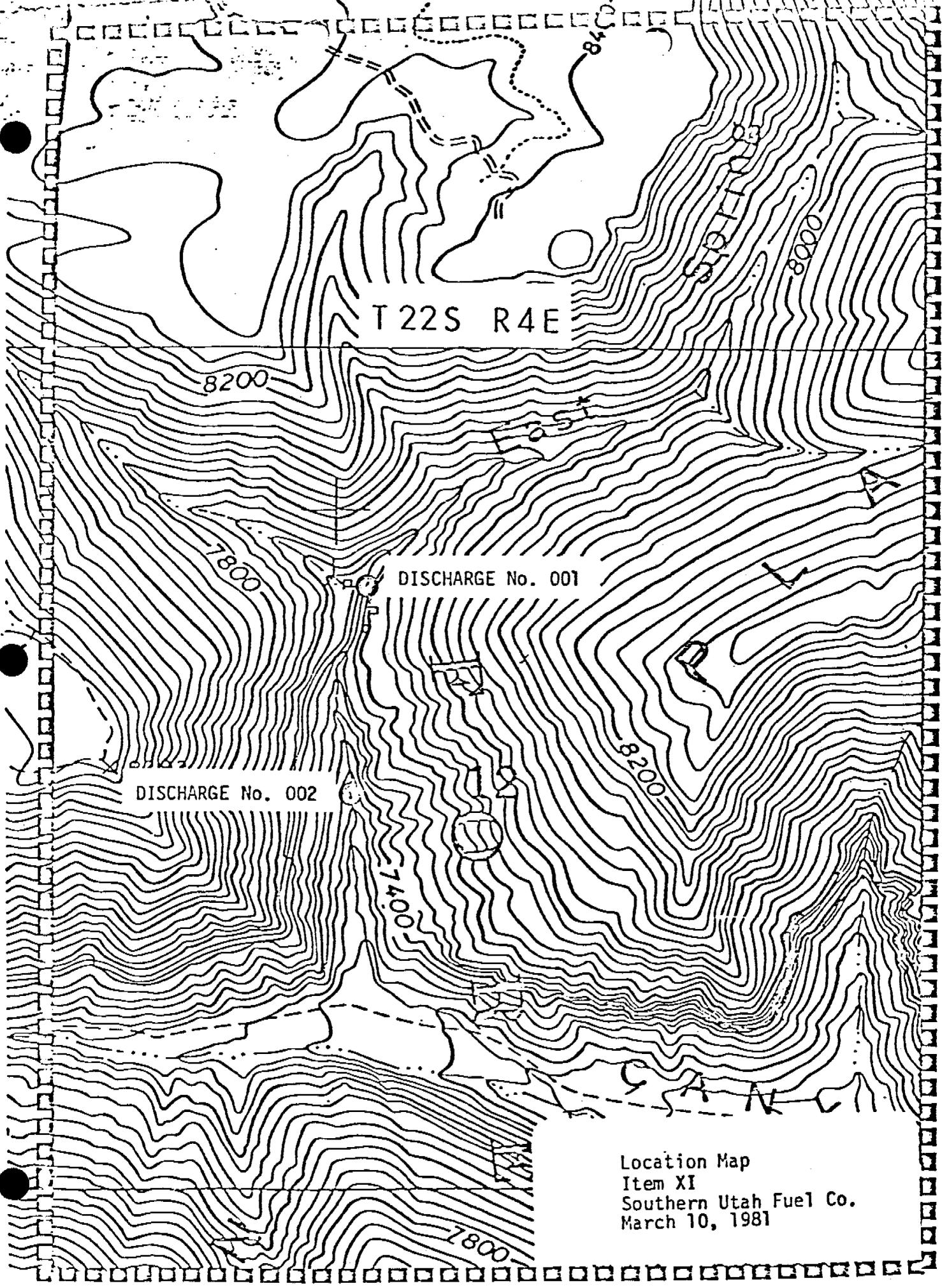
Ken Payne  
Vice President and General Manager

KAF:d1j

Enclosure

xc: Steve McNeal  
Department of Health





T 22 S R 4 E

DISCHARGE No. 001

DISCHARGE No. 002

Location Map  
Item XI  
Southern Utah Fuel Co.  
March 10, 1981

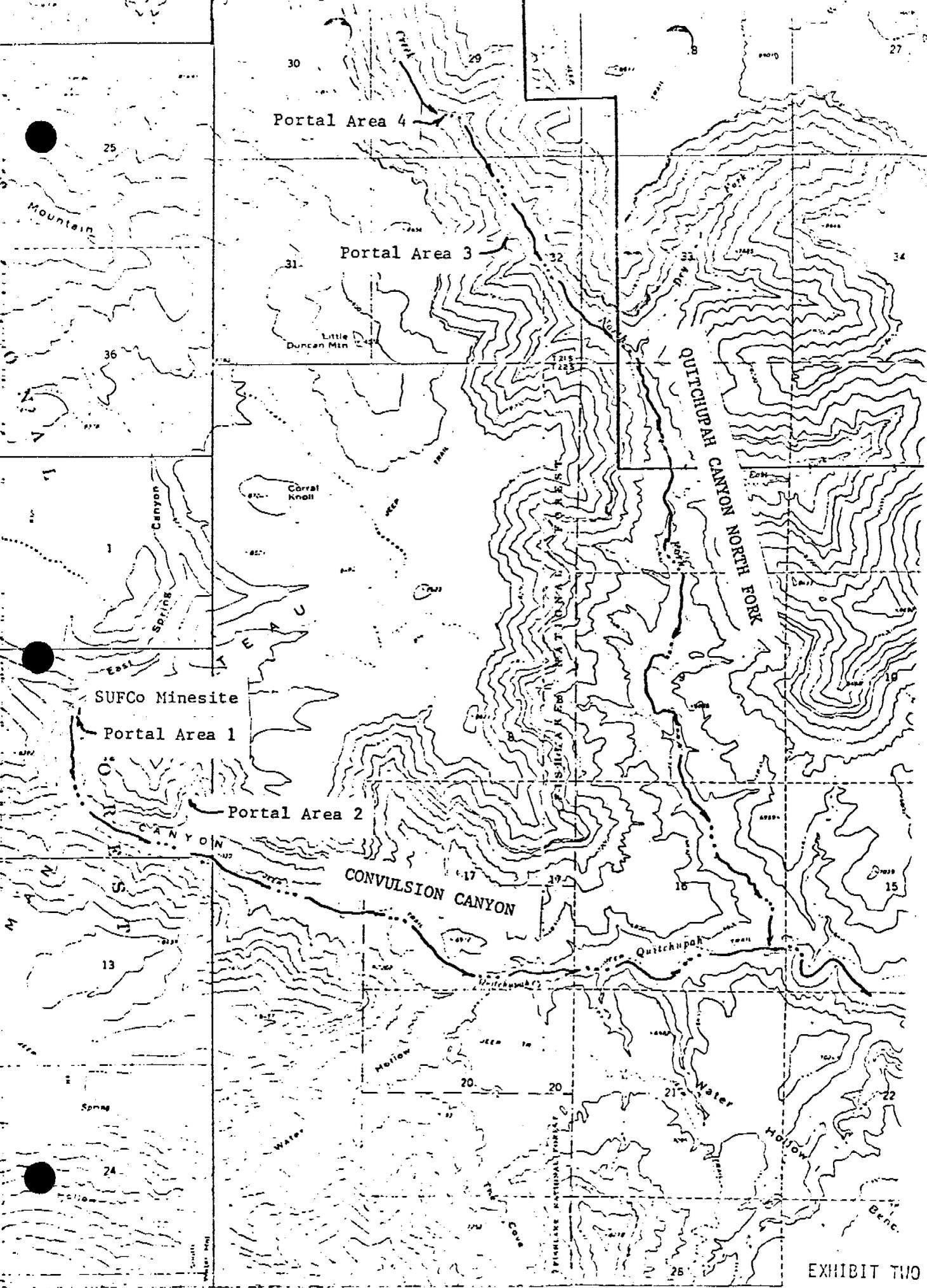
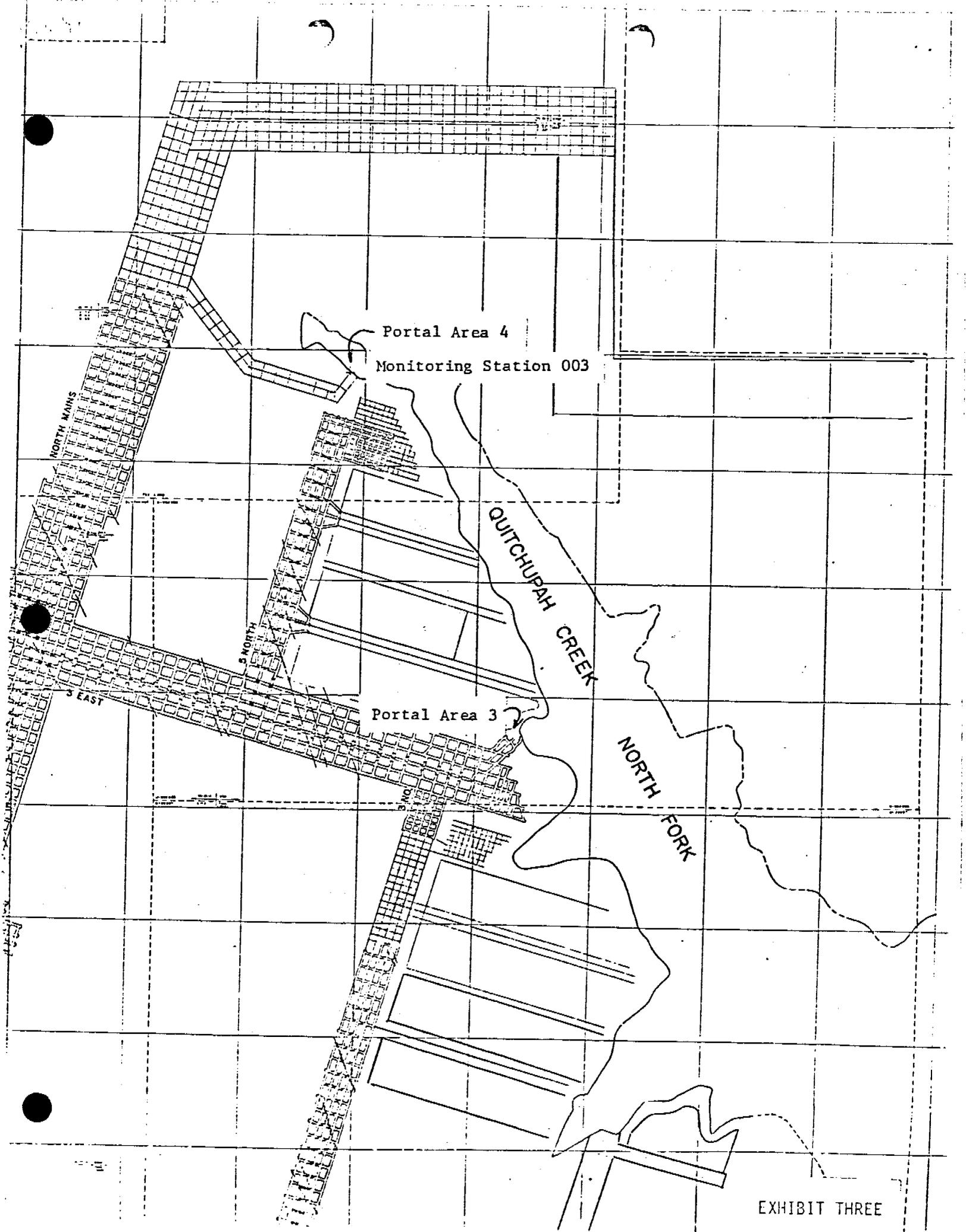


EXHIBIT TWO



Portal Area 4

Monitoring Station 003

Portal Area 3

QUITCHUPAH CREEK

NORTH FORK

NORTH MAINS

S NORTH

S EAST

S MC

Ken Payne  
Vice President & General Manager



**Southern Utah  
Fuel Company**

P.O. Box P  
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Subsidiary of  
Coastal States  
Energy Company

February 7, 1983

Mr. James W. Smith  
Division of Oil, Gas and Mining  
4241 State Office Building  
Salt Lake City, Utah 84114

RE: Storage Area Modification Responses

Dear Mr. Smith:

Concerning the provisions in the Division's approval letters on our storage area modification dated December 14, 1982 and January 20, 1983 over the potential for runoff of oil and salt during a rainfall event, the following provisions have been incorporated into the design of the oil slack pad:

1. Installation of a synthetic liner under the storage area base to reduce any potential oil infiltration into the ground.
2. Installation of a berm and drainage line at the top of the slope to prevent any runoff from the upper yard onto the stockpile storage pad area.
3. Building up of the yard area around the storage pad to ensure against drainage leaving the pad area for containment of oil at the stockpile area.

The following provisions have been incorporated into the design of the sand and salt storage bin area:

1. The concrete joints will be sealed.
2. The storage bin will be constructed to ensure against contact of surface runoff from the surrounding areas with the sand and salt being stored.
3. A loading ramp to the bin will be constructed insloping in order to prevent drainage from the area in case of a sand and salt spillage during loading and unloading operations.

Mr. James W. Smith  
February 7, 1983  
Page 2

Concerning the contingency plan for the handling and disposal of excess oil accumulation in the sedimentation pond, should oil concentrations increase beyond current effluent standards, the following procedures will be followed. After receiving a water sample test back that shows oil and grease concentrations above our current effluent standards, we will immediately take a second sample to substantiate the first sample test. Should both of these two consecutive samples show that the oil and grease concentrations are beyond our current effluent standards, the excess oil and grease will be removed and disposed of from the sedimentation pond by salvage trucks or other effective means.

A copy of the results of a chemical analysis of the oil applied to the coal is attached.

If you have any questions concerning this matter, please call Mike Davis at 637-4880.

Sincerely,



Ken Payne  
Vice President and General Manager

MLD:d1j

xc: J. Kent Taylor  
Fishlake National Forest

# THE INDUSTRIAL LABORATORIES COMPANY

Analytical and Consulting Chemists

Telephone 303 287-9691

P.O. Box 16207  
Denver, Colorado 80216

1450 East 62nd Avenue

## ANALYSIS REPORT

**PETERSON OIL INC.**  
1095 So. Hwy 89  
Richfield, Utah

DATE RECEIVED: 10/20/80  
DATE REPORTED: 10/27/80  
LAB NUMBER: 8301

SAMPLE MARKED: Waste Oil

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED IN WRITING TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC) IN ADVANCE

ANALYSIS: EP Toxicity Waste Procedure

### Milligrams per Liter

Arsenic	Less than 5.0
Barium	Less than 100
Cadmium	Less than 1.0
Chromium	Less than 5.0
Lead	Less than 5.0
Mercury	Less than 0.2
Selenium	Less than 1.0
Silver	Less than 5.0

### MEMBERS OF:

AMERICAN ASS N OF CEREAL CHEMISTS  
AMERICAN CHEMICAL SOCIETY  
AMERICAN OIL CHEMISTS SOCIETY  
ASS N OF OFFICIAL RACING CHEMISTS  
BAKERY ENGINEERS OF AMERICA  
INSTITUTE OF FOOD TECHNOLOGY  
SIGMA XI

**THE INDUSTRIAL LABORATORIES COMPANY**

*D. Paul Vels*

CHEMIST

Table 2. ASSAY OF CRANKCASE  
DRAIN OILS FROM API<sup>1</sup>

	Mobil burning tests Staten Is., NY	Exxon burning tests Sewell's Point, VA	Gulf burning tests Gulf R&D Co.	Tests Co.
Flash point, °F..	215	350-400	218	- flash 14
Vis. @ 100°F, SSU.....	248	268	256	
12 Vis. @ 210°F, SSU.....	56.4	.....	.....	
Viscosity index..	186	.....	.....	
Gravity, °API...	24.6	26.0	25.0	
Ash.....	1.81	1.80	2.41	
Water, vol. %...	4.4	.....	.....	
BS&W, vol. %...	0.6	.....	.....	
Sulfur, wt. %...	0.34	.....	0.21	- Sulphur
Metals, wt. %				
Lead.....	1.11	0.90	.....	
Zinc.....	0.08	0.07	.....	
Barium.....	0.06	0.10	.....	
Calcium.....	0.17	0.10	.....	
Phosphorous....	0.09	0.11	.....	
Iron.....	0.036	0.02	.....	

STATE OF UTAH  
DEPARTMENT OF HEALTH  
OFFICE OF ENVIRONMENTAL HEALTH  
Utah Water Pollution Control Committee

150 West North Temple, P.O. Box 2500, Salt Lake City, Utah 84110-2500



Calvin K. Sudweeks  
Executive Secretary  
(801) 533-6146 Rm 410

James O. Mason, M.D., Dr.P.H.  
Executive Director,  
Department of Health  
801-533-6111

Marv H. Maxell, Ph.D.,  
Acting Director,  
Division of Environmental Health  
(801) 533-6121

MEMBERS

Grant K. Borg, Chairman  
W. Lynn Courell  
Harold B. Lamb  
Marv H. Maxell, Ph.D.  
Noel T. Robins  
Gerald L. Sermersheim  
Joseph A. Urbanik  
C. Arthur Zeldin  
Mrs. Lloyd G. Bliss

533-6146

March 3, 1983

Mr. Ken Payne  
Vice President and Manager  
Southern Utah Fuel Co.  
P.O. Box P  
Salina, UT 84654

RE: Sediment Pond  
Total Dissolved Solids

Dear Mr. Payne:

This office has reviewed your February 1, 1983 letter requesting a revision of the total dissolved solids (TDS) limitation for the sediment pond. We have also reviewed the Southern Utah Fuel stream monitoring data for the last six months of 1982. It appears that the stream standards are normally maintained even though there have been discharges from the sediment pond with TDS concentrations greater than the current permit limitation.

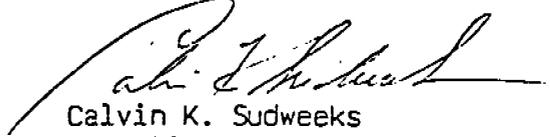
Based on the above noted facts we conclude that the following conditions would now be appropriate.

1. Implement and maintain best management control of the salt storage and use.
2. Analyze the shop water discharge and submit information on the practicability of achieving no salt discharge from this portion of the facility.
3. Not exceed a maximum of 2000 mg/l TDS from the sediment pond.
4. Not exceed 100 lb/day of salt on a monthly average from the sediment pond.
5. Analyze and submit quarterly reports on the flows and TDS concentrations in East Spring Canyon, Convulsion Canyon and Quitchupah Creek. The sediment pond discharge must be controlled so as to not cause Quitchupah Creek to exceed 723 mg/l on a monthly average and 1200 mg/l maximum.

If these conditions are acceptable to the company and EPA, notice of violations will not have to be submitted as long as these interim conditions are achieved.

Sincerely,

UTAH WATER POLLUTION CONTROL COMMITTEE -



Calvin K. Sudweeks  
Executive Secretary

SRM:laf

cc: Division of Oil, Gas & Mining  
EPA/Denver - Water Management - Rob Walline  
Six County Commissioner's Organization  
Central Utah District Health Dept.  
Coastal States - Keith Welch

1175-3

UMC 817.41 Hydrologic Balance: General Requirements:

The operator should submit information concerning the water rights permit required for intercepting and discharging water from the mine.

The operator shall submit an updated map along with a narrative explaining the mine dewatering system. Included in the map shall be the underground dam, directions of flow and discharge points.

Response:

The State of Utah Engineer's opinion is that all groundwater will ultimately appear as a spring or surface water and, therefore, generally does not issue a water rights permit to "developed ground water."

An updated mine map (Plate H-III as revised April 1983, presented in Volume 4) showing the underground dam and directions of flow was submitted as part of the 1983 ACR response, Volume 8. NPDES discharge points 001 and 003 are located in East Spring Canyon near fan No. 1 and in Quitchupah Canyon at the easterly breakout below 4 East, respectively. Plate H-III has been further revised and resubmitted to show these discharge points.

The mine dewatering system collects water in the face areas (where active mining is done) and conveys it through a combination of pipelines and gravity flow channels to underground settling ponds. The water is then held in one of two underground treatment areas consisting of ponds (formed by damming in mined out areas) for a sufficient time to settle any sediments. The water is then discharged at either NPDES point 001 or 003. Both underground dams are equipped with oil skimmers to minimize the amount of oil and grease in the effluents. The discharge for point 001 is pumped to the surface from the dam near the pumphouse via an 8" pipeline. The discharge from NPDES point 003 flows by gravity through a 15" pipeline out the easterly Quitchupah breakout.

UMC 817.42 Hydrologic Balance: Water Quality Standards and Effluent Limitations:

Pursuant to Section (a)(1) of this code, the applicant must pass the drainage from the Coal Slide Area (CSA) through the sediment pond. An exemption may be granted under Section (a)(3)(i) if the applicant can demonstrate by the use of alternate sediment control measures that drainage will meet effluent limitations and meet other sections of this code.

The applicant needs to provide a map showing the location of the CSA and other disturbed areas outside the surface facilities map (Exhibit 9-2, Volume 2, Addendum).

Response:

The coal slide areas reference in Merrick's hydrology runoff calculations for the initial (1980) Convulsion Canyon sediment pond proposal are located along the county road access to the minesite just south of the permit area in East Spring Canyon and are shown on Map 9-2, Volume 2. At the time that the Merrick pond design was under consideration, the U.S. Forest Service requested that Coastal States Energy Company reclaim evidence of coal disposal on the west side of East Spring Canyon in this area concurrently with pond construction. Since reclamation activity was anticipated in this area, the area was included in the contributing runoff areas for the proposed sediment pond.

The pond, as proposed by Merrick, with its overland pipeline and large disturbed area, was later determined undesirable by both the U.S. Forest Service and the Office of Surface Mining. Instead, the currently employed sedimentation pond, designed by Valley Engineering, was constructed subsequent to approval from the regulatory authorities. Although the redesigned plan eliminated the proposed activity in the coal slide areas, the Applicant

carried out its commitment to the U.S. Forest Service to reclaim the unsightly coal slide. This reclamation program included the submittal of a reclamation plan which was carried out in 1980 and 1981 to the satisfaction of the U.S. Forest Service. A copy of pertinent correspondence concerning this reclamation effort off the permit area is presented in this section.

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
55 South First East  
Richfield, Utah 84701

July 9, 1980



┌ Kerry Frame  
Chief Engineer  
SUFCO  
P. O. Box P  
└ Salina, Utah 84654

Dear Kerry,

This letter authorizes you to go ahead with the stabilization of "gob" dumped into East Spring Canyon several years ago by SUFCO. The work to be done is as per your plan submitted to us on 6/13/80.

If you find that what you are doing is not as you hoped or thought it would be, please feel free to make recommendations to further stabilize these areas.

Sincerely,

*Darrel Hintze*

*for* CHARLES R. ALLRED  
District Ranger



Southern Utah  
Fuel Company

P.O. Box P  
Salina, Utah 84654  
(801) 529-7428

Division of  
Coastal States  
Energy Company

June 13, 1980

C. R. Allred  
Ranger  
Fishlake National Forest  
55 South First East  
Richfield, Utah 84701

Dear Mr. Allred:

The enclosed rehabilitation plan for East Spring Canyon is for your review. If your office can approve it as written, we will begin lining out the work right away. However, if alterations are needed for approval, we will work with you at your convenience to make the plan satisfactory. We remain committed to solve the problem this year.

The plan should work to alleviate the concerns expressed during the various meetings. We believe it will provide a permanent solution. In any event our commitment shall remain intact.

Please call if we can provide further information to expedite the approval of this proposed plan. We appreciate the opportunity to work with you and your people. Southern Utah Fuel Company is determined to maintain a responsible posture in this area and we look forward to a mutually beneficial relationship with your office for many years to come.

Yours very truly,

Kerry A. Frame  
Chief Engineer

KAF:ble

Enclosure

# PROPOSED STABILIZATION AND REHABILITATION PLAN

## COAL SLIDE IN EAST SPRING CANYON

Southern Utah Fuel Company

Southern Utah Fuel Company (SUFCo) operates a two million tons per year underground coal mine with portals in East Spring Canyon, Sevier County, Utah. It is located within the Fishlake National Forest and is served by the paved Convulsion Canyon access road.

Several years ago, waste rock and coal fines, called "gob" by the miners, was dumped into the canyon from the access road causing slides from the road to the canyon bottom. The dumping points are located several hundred feet south of the mine permit area. Southern Utah Fuel Company has made a commitment to the Fishlake National Forest to rehabilitate these unsightly slides. Contained herein is the proposed plan to stabilize and revegetate them so that further erosion and sedimentation of coal material contained in these slides does not continue to move into East Spring Creek and eventually into Quitchupah Creek.

### Description of Slides

The North-South mine access road is located on the west slope of East Spring Canyon 300 feet above the canyon floor. The most unsightly slide is located 320 feet south of the company's gate, below the mine access road. It is approximately 20 feet wide at the top near the road. The flow of the material fanned out to cover approximately 150 feet of the stream channel in the canyon bottom to a maximum depth of 9 or 10 feet. This dam created an impoundment which subsequently filled with run-off sediment. The total length of the disturbed area of the stream channel is 250 feet. The slide has stabilized with respect to mass movement and is covered with rock talus at its lower end. However, erosion on the face of the slide and erosion over the dam contributes dark grey sediment to the stream when it contains run-off flows. The gob material has been tested by Al Southard, a soils scientist from Utah State University, and his report regarding vegetative potential is attached.

A second slide is located 450 feet south of the above described grey slide. It is composed primarily of natural tan sand and talus. However, the south quarter of the fan at the bottom consists of fine coal particles. Several hundred square feet of this material is exposed and evident from various vantage points in the canyon. Although no erosional channel occurs in the material, it is unconsolidated and subject to wind erosion. It is estimated to be no deeper than four feet and does not obstruct the stream channel.

A third slide exists between the above described slides. It developed during the course of construction of the road and consists entirely of light tan rock material. No coal or underground mining waste material is in this slide. Tumble weeds have made considerable progress in vegetating the slide.

### REHABILITATION PLAN

The Northern-most slide, which is described first above, has caused the most concern to both the Forest Service and SUFCo due to its visibility and impact on the stream channel. It is proposed to rehabilitate this slide by vegetating the slide slope to eliminate face erosion and to stabilize the stream channel through the created dam at the bottom. Access to the bottom with heavy equipment is impossible without major disturbance to the canyon floor between the slide and Convulsion Canyon.

The slide slope will first be terraced to key in a later topsoil covering. Three terraces at equal intervals will be dug by hand either into base material or with a three foot wide bench, whichever occurs first. The slope of the terrace benches will be down into the face of the hill and horizontal along their length to provide an adequate keying surface. Topsoil will then be dumped from the road down over the slide. It is anticipated that the source of soil will be from the Sevier Valley and that it will be hauled to the site in end dump coal trucks. A sufficient quantity to cover the face three inches deep will be used. Working from the top down, the surface will be hoed with horizontal terraces approximately three feet apart, and the width of a garden hoe. These will direct run-off water to the sides of the slide so erosion will be minimized down the fill face.

Rocks in the canyon bottom on the dam will be moved manually to channelize the stream. The channel will be rip-rapped five feet wide and three feet deep in the center. The rip-rap material will be sandstone or siltstone and range in size from one foot diameter to as large as two men can handle. The channel will be established in the present water course and energy dissipating rocks will be placed to prevent further erosion.

The dam will be covered with a one inch layer of topsoil from excess amounts dumped down the slide. The total disturbed area will be hydro-seeded with the mixture recommended by Dr. Southard of two pounds each of Yellow Sweet Clover, Crested Wheat Grass and Russian Wild Rye per 1000 square feet, and nitrogen at 100 pounds per acre and phosphorus at 50 pounds per acre. The surface will then be covered with an erosion control fabric similar to "Hold Gro" which is a nylon net mesh material with decomposable paper strips woven through the net. Throughout the remainder of the 1980 growing season, SUFCo will sprinkle the slide with water on a frequent basis such that the soil remains moist but does not erode.

The Southern-most slide will be rehabilitated by first removing most of the coal fines with a front end loader and truck. It is located near a vehicle path in the bottom confluence of Convulsion Canyon and East Spring Canyon. The material will be deposited at

the mine site for later disposal with gob material in accordance with proper disposal methods now in use. Topsoil will then be emplaced on the excavated slide area to cover any remaining evidence of the coal fines. The entire slide will be hydro-seeded with the mixture mentioned above and mulched. Because the damaged area is on a much flatter gradient, erosion control mesh should not be necessary. The entire slide will be watered as described above.

SUFCo plans to hydro-seed the middle slide. It has stabilized with respect to mass movement and is not unsightly due to color.

The vegetative growth on the Northern and Southern slides will be evaluated on a monthly basis until it has the same percentage ground cover as the natural slope on either side of the individual slides. Watering will be continued during the growing season on a gradually less frequent basis until it is shown that the growth is stabilized at that level of cover.

KAF:rtb

UMC 817.42 Hydrologic Balance: Water Quality Standards and Effluent  
Limitations:

(a)(2) The reclamation plan requested under UMC 784.11 should include plans to leave sediment pond and underground workings treatment facilities following reclamation until effluent limits and water quality standards are met as required by this section.

Response:

This concern is addressed in DOC/TD (July, 1983) Responses to Comments UMC 784.11, page 15a, Volume 8 and UMC 817.50, page 51c, Volume 8.



**Coastal**  
The Energy People

KEN PAYNE  
VICE PRESIDENT &  
GENERAL MANAGER  
SOUTHERN UTAH FUEL COMPANY

January 7, 1992

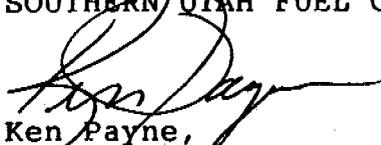
Mr. Lowell Braxton  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

Dear Mr. Braxton:

Enclosed are 14 copies of the materials to update Southern Utah Fuel Company's currently approved M&RP with respect to ASCA's. Pages 36b and 36c should be used to replace the respective pages in Volume 8 of the M&RP. Map 80-4b, revised January 1991, should be used to replace Map 86-4b in Volume 3 of the M&RP.

Please approve these updates and make the necessary distribution of the copies, so that Southern Utah Fuel Company's approved M&RP is current.

Sincerely,  
SOUTHERN UTAH FUEL COMPANY

  
Ken Payne,  
Vice President and General Manager

KP/WKS:jad#254

Enclosures

**RECEIVED**

JAN 13 1992

DIVISION OF  
OIL GAS & MINING

UMC 817.42 Hydrologic Balance: Water Quality Standards and Effluent Limitations:

(a)(3)(i) The three areas for which the operator has requested small area exemption status in the 1983 ACR Response (Volume 8) must have alternate sediment control facilities. Additionally, the operator is required to demonstrate that the drainage will meet effluent limitations. The south end parking lot area has a proposed silt fence treatment facility. The substation pad and the main mine fan areas must also have alternate sediment control measures. The applicant must also commit to a plan for sampling the drainage from these areas during runoff events to demonstrate effluent limitation compliance. Reports of the sample analysis must be submitted to the Division until the sample size is determined to be adequate.

Response:

Two of the above three areas were added back into the sediment control system; the parking lot in 1984, and the main mine fan in 1985. The substation pad area qualifies as a Alternate Sediment Control Area and is equipped with alternate sediment control facilities. The substation pad area is graveled and equipped with silt fence sediment control facilities.

Alternate Sediment Control Areas are:

1. Substation pad as described above (see map 80-4a, Vol. 3 and Map 83-2, Vol. 8). The disturbed area is 0.188 acres. Runoff volume for a 10-year 24-hour event is 335 ft<sup>3</sup>, CN=80.
2. Topsoil pile near minesite sedimentation pond (see page 31, Vol 8. DOC/TD July 1983, Map 80-4b, Vol. 3 and Map 83-2, Vol. 8). Sediment controls include vegetation and silt fencing. The disturbed area is 0.105 acres. Runoff volume for a 10-year 24-hour event is 60 ft<sup>3</sup>, CN=68.
3. Subsoil and sediment pond topsoil piles at Waste Rock Disposal site. Sediment controls include containment berms, vegetation and silt fencing. The disturbed areas are subsoil stockpile 0.51 acres and pond topsoil 0.293 acres (see pages 28a and 32, Vol. 9). Total runoff volume for both stockpiles from a 10 year 24 hour event is 1950 ft<sup>3</sup>, CN=81.
4. Area above mine fan in East Spring Canyon. Sediment controls consist of vegetation and silt fencing. Drainage is directed into East Spring Canyon. The disturbed area is 0.122 acres (see Map 80-4a, Vol. 3, and Map 83-2, Vol. 9). Runoff volume for a 10-year 24-hour event is 108 ft<sup>3</sup>, CN=72.
5. Spring collection field in Convulsion Canyon. Sediment controls consist of vegetation forming an effective vegetative filter. Area is fenced to prevent grazing. The disturbed area is 0.390 acres (See Map 80-4c, Vol 3). Runoff volume for a 10 year 24 hour event is 6 ft<sup>3</sup>, CN=49.

6. Pump house in Convulsion Canyon. Sediment control consists of containment berms and silt fencing. The disturbed area is 0.075 acres. (See Map 80-4c, Vol. 3). Runoff volume for a 10-year 24-hour event is 66 ft<sup>3</sup>, CN=72.
7. Leachfield in Convulsion Canyon. Sediment control consists of berms and vegetation forming an effective vegetative filter. Area is fenced to prevent grazing. The disturbed area is 0.280 acres (See Map 80-4c, Vol. 3). Runoff volume for a 10-year 24-hour event is 110 ft<sup>3</sup>, CN=39.
8. Water Tank area northeast of minesite. Sediment control consists of berms, water bars, and vegetation. The disturbed area is 0.193 acres (See Map 80-4a, Vol. 3). Runoff volume for a 10-year 24-hour event is 109 ft<sup>3</sup>, CN=68.
9. Portal sites in Quitchupah Canyon. These sites disturbed an area of about 15 feet by 25 feet on the steep hillside in two locations from 70 to 100 feet apart. There are three remaining portal sites in Quitchupah Canyon: South Portals, 3 East Portals, and Quitchupah Portals. Another single portal (5 East) was reclaimed in September 1989. Alternate Sediment control consists of routing runoff from disturbed areas into the mine with berms and insloping. The runoff is then treated using in mine settling ponds prior to discharge through approved NPDES points. The disturbed area associated with the South Portals is 0.017 acres. The disturbed area associated with the 3 East Portals is 0.017 acres. The disturbed area associated with the Quitchupah Portals is 0.017 acres (See Map 80-4, Vol. 3 for locations of portals). Total runoff for the three sites for a 10-year 24-hour event is 45 ft<sup>3</sup>, CN=72.

The total area for Alternate Sediment Control Areas (ASCA) is 2.207 acres. This is 8.4 percent of 26.22 acres of disturbed area at the minesite and waste rock disposal site (including ASCA's).

When practical samples of effluent from the ASCA's during runoff events will be taken. Samples will be analyzed to comply with applicable state and federal regulations. Results of the analyses will be submitted to the Division in the annual report.

UMC 817.42 Hydrologic Balance: Water Quality Standards and Effluent Limitations:

(a)(3)(i) The three areas for which the operator has requested small area exemption status in the 1983 ACR Response (Volume 8) must have alternate sediment control facilities. Additionally, the operator is required to demonstrate that the drainage will meet effluent limitations. The south end parking lot area has a proposed silt fence treatment facility. The substation pad and the main mine fan areas must also have alternate sediment control measures. The applicant must also commit to a plan for sampling the drainage from these areas during runoff events to demonstrate effluent limitation compliance. Reports of the sample analysis must be submitted to the Division until the sample size is determined to be adequate.

Response:

Two of the above three areas were added back into the sediment control system; the parking lot in 1984, and the main mine fan in 1985. The substation pad area qualifies as an Alternate Sediment Control Area and is equipped with alternate sediment control facilities. The substation pad area is graveled and equipped with silt fence sediment control facilities.

Alternate Sediment Control areas are:

1. Substation pad as described above (see Map 80-4a, Vol. 3 and Map 83-2, Vol. 8). The disturbed area is 0.231 acres. Runoff Volume for a 10-year 24-hour event is 412 ft<sup>3</sup>, CN=80.
2. Topsoil pile near minesite sedimentation pond (see page 31, Vol 8. DOC/TD July 1983, Map 80-4b, Vol. 3 and Map 83-2, Vol. 8). Sediment controls include vegetation and silt fencing. The disturbed area is 0.105 acres. Runoff volume for a 10-year 24-hour event is 60 ft<sup>3</sup>, CN=68.
3. Subsoil and sediment pond topsoil piles at Waste Rock Disposal site. Sediment controls include containment berms, vegetation and silt fencing. The disturbed areas are subsoil stockpile 0.51 acres and pond topsoil 0.293 acres (see pages 28a and 32, Vol. 9). Total runoff volume for both stockpiles from a 10-year 24-hour event is 1950 ft<sup>3</sup>, CN=81.
4. Area above mine fan in East Spring Canyon. Sediment controls consist of vegetation and silt fencing. Drainage is directed into East Spring Canyon. The disturbed area is 0.122 acres (see Map 80-4a, Vol. 3, and Map 83-2, Vol. 9). Runoff volume for a 10-year 24-hour event is 108 ft<sup>3</sup>, CN=72.
5. Spring collection field in Convulsion Canyon. Sediment controls consist of vegetation forming an effective vegetative filter. Area is fenced to prevent grazing. The disturbed area is 0.390 acres (See Map 80-4c, Vol. 3). Runoff volume for a 10-year 24-hour event is 6 ft<sup>3</sup>, CN=49.

6. Pump house in Convulsion Canyon. Sediment control consists of containment berms and silt fencing. The disturbed area is 0.075 acres. (See Map 80-4c, Vol. 3). Runoff volume for a 10-year 24-hour event is 66 ft<sup>3</sup>, CN=72.
7. Leachfield in Convulsion Canyon. Sediment control consists of berms and vegetation forming an effective vegetative filter. Area is fenced to prevent grazing. The disturbed area is 0.280 acres (See Map 80-4c, Vol. 3). Runoff volume for a 10-year 24-hour event is 110 ft<sup>3</sup>, CN=39.
8. Water Tank area northeast of minesite. Sediment control consists of berms, water bars, and vegetation. The disturbed area is 0.193 acres (See Map 80-4a, Vol. 3). Runoff volume for a 10-year 24-hour event is 109 ft<sup>3</sup>, CN=68.
9. Portal sites in Quitchupah Canyon. These sites disturbed an area of about 15 feet by 25 feet on the steep hillside in two locations from 70 to 100 feet apart. There are three remaining portal sites in Quitchupah Canyon: South Portals, 3 East Portals, and Quitchupah Portals. Another single portal (5 East) was reclaimed in September 1989. Alternate Sediment control consists of routing runoff from disturbed areas into the mine with berms and insloping. The runoff is then treated using in mine settling ponds prior to discharge through approved NPDES points. The disturbed area associated with the South Portals is 0.017 acres. The disturbed area associated with the 3 East Portals is 0.017 acres. The disturbed area associated with the 3 East Portals is 0.017 acres. The disturbed area associated with the Quitchupah Portals is 0.017 acres (See Map 80-4, Vol. 3 for locations of portals). Total runoff for the three sites for a 10-year 24-hour event is 45 ft<sup>3</sup>, CN=72.
10. The 4 East portal site consists of a future pad area where a mine fan is to be built. The disturbed area associated with the two portal openings at this site will be 0.50 acres. Alternate sediment control at this pad will consist of a containment berm and silt fencing. Total runoff for this site for a 10-year 24-hour event will be 441 ft<sup>3</sup>, CN=72.
11. The new substation pad disturbed area is 0.287 acres. The sediment controls include revegetation, gravel, and silt fences. Runoff volume for a 10-year 24-hour event is 253 ft<sup>3</sup>, CN=72.

The total area for Alternate Sediment Control Areas (ASCA) is 3.037 acres. This is 11.3 percent of 26.85 acres of disturbed area at the minesite and waste rock disposal site (including ASCA's).

When practical samples of effluent from the ASCA's during runoff events will be taken. Samples will be analyzed to comply with applicable state and federal regulations. Results of the analyses will be submitted to the Division in the annual report.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow, Shallow Ground Water Flow and Ephemeral Streams:

The applicant must delineate all diversions (refer to comments of UMC 784.22) and present evidence they will pass the 10-year, 24-hour event with a design freeboard of no less than 0.3 feet. The information should include the area each diversion is draining and method and assumptions of calculating the design flow (e.g., curve number analysis).

The applicant should indicate the riprap size in lining diversions and the design velocity calculations and assumptions used to determine that size.

Response:

The location and discussion of the various diversions in and around the minesite have been presented in the Completeness Response to Comment UMC 784.22, Volume 8. Calculations of freeboard capacity for the various diversions are as follows:

1. East Side Road

Flow calculations are presented in the Merrick and Company Study for the Contributing Basin East (CBE), Volume 2.

2. East Side Road Substation Diversion Culvert  
Pipe Sizing:

Q = 6.2 from Merrick and Company Study

10 ft.

S = 300 ft. = 3.33%

1.49

Q =  $\frac{1.49}{n} = AR^{2/3} S^{1/2}$  from Manning

n = 0.024 for corrugated metal pipe

<u>Size</u>	<u>A</u>	<u>R</u>	<u>Q</u>	
12	0.79	0.25	3.54	No Good
18	1.77	0.375	10.39	Good
15	1.23	0.28	5.94	No Good

Use 18" corrugated metal pipe

$$Q/Q_{\text{Full}} = 0.60$$

$$V = 3.5 \text{ fps}$$

3. South End of Parking Lot Diversion Through the Silt Fence Treatment Facility

Silt Fence Treatment Facility Channel Sizing

Area of south end of parking lot = 0.97 acres

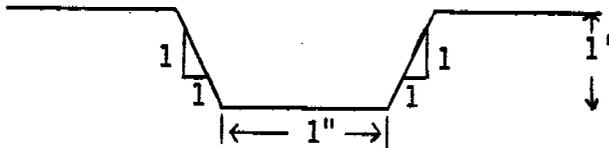
Peak flow for 10 year, 24 hour event is 9.2 cfs for 12.0 acres (the area top of fill (ATOF) from Merrick and Company Study).

Therefore, for this small area of the ATOF, the  $Q = 0.75 \text{ cfs}$ .

$$\frac{5 \text{ ft.}}{100 \text{ ft.}} = 5\%$$

$$S = 100 \text{ ft.} = 5\%$$

Berm Height = 1 ft.



From Manning

$$\frac{1.49}{n}$$

$$Q = n AR^{2/3} S^{1/2}$$

$$n = 0.045$$

<u>Xft</u>	<u>Wft</u>	<u>A</u>	<u>R</u>	<u>Qcfs</u>	
1	3	2	0.52	9.58	
.5	2	0.75	0.53	3.63	
.2	1.4	0.24	0.24	1.01	Good V = 3.13 fps

4. East Side road Continuance Diversion

Calculations are presented in the Merrick and Company Study, Volume 2.

5. Sediment Pond Access Road Diversion

Calculations are presented in the Valley Engineering design study incorporating a design freeboard of no less than 0.3 feet.

$$A = 1.92$$

$$R = 0.48$$

$$S = 15\%$$

$$\frac{1.49}{n}$$

$$Q = AR^{2/3} S^{1/2} \text{ from Manning}$$

$$n = 0.045$$

$$Q = 24.62 \text{ cfs}$$

The diversion is more than adequate to handle the total contributing basin west (CBW) which Merrick and Company calculated to have a peak flow of 9.5 cfs for the 10-year, 24-hour precipitation event. This drainage diversion handles only a part of the contributing basin west drainage whereas most of the runoff from CBW flows through the yard to the sediment trap system and then on to the sediment pond.

6. Sediment Pond Spillway

Calculations are in the Completeness Response to Comments UMC 817.47 and UMC 817.46, Volume 8.

7. East Spring Canyon and Mud Spring Hollow Bypass Culverts

Calculations for these bypass culverts are presented in the Merrick and Company Study, Volume 2.

8. General Sediment Trap/Sediment Pond Diversion System

Calculations for the sediment trap/sediment pond diversion system are presented in the Merrick and Company Study, Volume 2, and in the Valley Engineering calculations, Volume 6.

9. Substation Pad Diversion

Area of the substation pad is 0.188 acres. Since the peak flow for 10-year, 24-hour event is 9.2 cfs for 12.0 acres (for the area top of fill as calculated in the Merrick and Company Study), the 0.188 acre substation pad has a corresponding Q of 0.144 cfs. The runoff flow for the east side road diversion was calculated by Merrick and Company to be 6.2 cfs. The ditch handling the east side road runoff was designed for 7.1 cfs. Therefore, the combined total of 6.344 cfs is still well under the 7.1 cfs design sizing for the diversion interception ditch.

10. Main Mine Fan Diversion

Diversion area around fan is 0.23 acres. Using the same reasoning as Item 9 just above, the Q = 0.176 cfs.

$$S = \frac{2 \text{ ft.}}{30 \text{ ft.}} = 6.7\%$$

$$\text{From Manning } Q = \frac{1.47}{n} AR^{2/3} S^{1/2} \quad n = 0.015$$

For six inch steel pipe:

$$A = 0.196$$

$$R = 0.125$$

$$Q = 1.26 \text{ cfs}$$

Therefore, the six inch steel pipe is more than adequate to handle the runoff of 0.176 cfs.

Riprap sizes used in mine site diversions were sized in accordance with the table presented in the 1981 mine plan submittal under part 817.44, Volume 7. The design velocity calculations and assumptions used in conjunction with the chart were obtained from either the Merrick and Company Study, the Valley Engineering design, or SUFCo calculations as discussed in the 1983 Completeness Response to Comment UMC 817.47.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow,  
Shallow Ground Water Flow and Ephemeral Streams:

The applicant must delineate all diversions (refer to comments of UMC 784.22) and present evidence they will pass the 10-year, 24-hour event with a design freeboard of no less than 0.3 feet. The information should include the area each diversion is draining and method and assumptions of calculating the design flow (e.g., curve number analysis).

The applicant should indicate the riprap size used in lining diversions and the design velocity calculations and assumptions used to determine that size.

DEFICIENCIES

The operator must submit design plans for diversions #5, 6, 9 and 10 as labeled under comments for UMC 784.22. Additionally, the following items should be addressed or corrected:

1. The CBE diversion has not been designed for 0.3 feet freeboard. The ditch is depicted in Volume 2 as 0.6 feet deep with no freeboard.
2. Although peak flows cannot be calculated by using proportions as was done in the 1983 ACR Response, the value calculated for the south parking lot diversion was found to be adequate. The operator should clarify the size of ditch to be used, as the diagram on page 38, Volume 8 shows one foot width by one foot depth and the calculation on page 34 shows X and W to be .2 foot and 1.4 feet. Please clarify and define these values. The operator should also calculate the design velocity and present size of riprap for ditch beyond the silt fence and down the dirt road depicted on Exhibit 9-2.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland  
Flow, Shallow Ground Water Flow and Ephemeral Streams:

DEFICIENCIES (cont'd)

3. Although Volume 2 contains calculations for the peak flows for CBE, the operator must present plans for the east road continuance diversion. These plans must include size of channel, slope, velocity calculation and riprap size. Also indicate that discharge is directed on an existing boulder for an energy dissipator.
4. The applicant should submit culvert sizes and drop drain structures with calculations for the mine yard drainage system.
5. The applicant should be aware that calculation of peak flows for small areas of a larger basin cannot simply be done by ratio methods. Review during technical analysis may show the calculations for diversions #2, 9, and 10 to be inaccurate and redesign of the diversion may be needed.
6. The operator must indicate the size of riprap used in each diversion and present corresponding velocity value used in determination of that size (including source of calculation by volume and page).
7. The drainage from the CEW needs clarification. Does drainage from pipe #5 (Exhibit 9-2) south to the corner of the road leading into the mine drain north or south? It appears from Exhibit 9-9 that the drainage would be north and page 48 of Volume 8 states this area currently drains to pond. If this is the case, the area delineated as CEW should encompass that drainage.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland  
Flow, Shallow Ground Water Flow and Ephemeral Streams:

DEFICIENCIES (cont'd)

8. The undisturbed drainage from the area directly north of the 'TOF (warehouse) should be diverted to the ESC or MSH culvert using a diversion ditch around the fill perimeter. The operator should address this area and present plans and calculations for any existing or proposed diversions.
9. The branch from the bypass substation culvert extending in a northeast direction (see Exhibit 9.1, Volume 2) should be explained and detailed in the plan and calculations if this is in fact a proposed culvert or diversion.

Response:

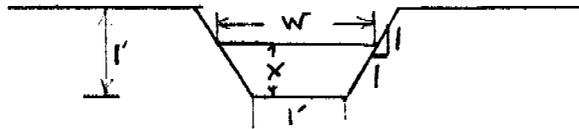
The design plans for diversions #5, 6, 9 and 10 as labeled under Comments for UMC 784.22 are included under the responses below which correspond to the item numbers needing clarification or corrections.

1. The CBE diversion has been designed for a 0.3 feet freeboard. The East side road which is the CBE diversion ditch depicted in Volume 2 as 0.6 feet deep has a one foot high berm along the edge of the road for the freeboard as shown in the East side road cross-sections in Appendix 784.18 in the 1981 Responses to the Completeness Review, Volume 7.
2. To clarify and define the values on page 38 and 39, Volume 8. The size of the ditch to be used has a one foot width at the bottom by one foot depth as shown in the diagram on page 38, Volume 8. The calculations on page 39 show X and W to be 0.2 feet and 1.4 feet. These values of X and W are the depth and width at the top of the

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow,  
Shallow Ground Water Flow and Ephemeral Streams:

Response: (cont'd)

area required to handle the peak flow for a 10-year, 24-hour event.



Therefore, this diversion is adequate to handle the runoff with a freeboard of 0.3 feet. The design velocity and riprap size for the ditch beyond the silt fence and down the road are:

1. The water velocity = 3.13 fps from the 1983 Completeness Response Volume 8, page 39.
2. The riprap size required is 1 1/2" minimum using the riprap chart presented in the 1981 Completeness Response for Comment 817.44, Volume 7.
3. East Road Continuance Diversion.

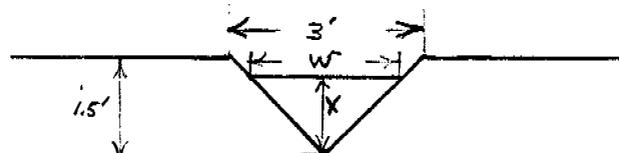
$Q = 6.2$  from Merrick and Company Study, Volume 2, Exhibit 9

$S = 10\%$  Minimum

$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$  from Manning

$n$

$n = 0.045$



UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow,  
Shallow Ground Water Flow and Ephemeral Streams:

Response: (cont'd)

<u>W</u>	<u>X</u>	<u>A</u>	<u>R</u>	<u>Qcfs</u>
3	1.5	2.25	0.53	15.4
3	1.0	1.5	0.42	8.73
3	0.8	1.2	.35	6.22

Therefore, the size of this diversion (3' x 1.5') is adequate to handle the runoff with a freeboard of 0.3 feet. The rip rap size required is 4" as determined using the riprap chart presented in the 1981 Completeness Response for comment 817.44, Volume 7. The discharge from this channel is directed on an existing boulder in the natural drainage as an energy dissipator.

4. The mine yard drainage system was not planned or designed to handle the 10-year, 24-hour peak flow. The mine yard surface area is the diversion for the 10-year, 24-hour peak flow. The surface area is graded to divert all the runoff flow to the sediment trap leading to the sediment pond treatment facility. The mine yard drain system was installed to handle the normal surface flow to reduce the mud and erosion in the mine yard. The main mine yard drainage system consists of drop drains and a 10' pipeline leading to the sediment trap. The runoff overflow to this system will run over the surface to the sediment trap.
  
5. Applicant does not have the hydrologic expertise in-house to supply method of calculations and design for the determination of the peak flow for the 10-year, 24-hour storm event to meet the July 8, 1983 submittal date. Applicant commits to having a qualified consulting firm prepare the calculations and diversion design for submittal to the Division of Oil, Gas and Mining for its review before these diversions are installed.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow,  
Shallow Ground Water Flow and Ephemeral Streams:

Response: (cont'd)

6. The size of riprap used in the diversions requiring riprap that are not already included in this response and with corresponding velocity values used in determination of that size are:

	Diversion	Riprap Size	Velocity	Velocity or Riprap Source
1.	East Side Road (CHE)	1/2"	1.97 fps	Merrick & Co. (Volume 2, Exhibit 9)
2.	Sediment Pond Access Road	3" Class III		Valley Engineering Design (Sheet 2)
3	Sediment Pond Spillway	30"	18 fps	page 50, Volume 8

7. Pipe #5 Diversion

Drainage from the proposed pipe #5 (Exhibit 9-2) south to the corner of the road leading into the mine drains north toward the pipe. The drainage area (11.48 acres) south of the CHE will be diverted through the pipe across the mine and sediment pond access roads and will not drain into the sediment pond. The area delineated as CHE on Exhibit 9-9 currently drains to the sediment pond.

Applicant does not have the hydrologic expertise in-house to supply method of calculations and design for the determination of the peak flow for the 10-year, 24-hour storm event to meet the July 8, 1983 submittal date. Applicant commits to having a qualified consulting firm prepare the calculations and diversion design for submittal to the Division of Oil, Gas and Mining for its review before this diversion is installed.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow,  
Shallow Ground Water Flow and Ephemeral Streams:

Response: (cont'd)

8. Area north of ATOF diversion - The undisturbed drainage (1.83 acres) from the area directly north of the ATOF is diverted both ways to the East Spring Canyon and Mud Spring Canyon culverts. This diversion consists of a riprapped diversion ditch running along the edge of the disturbed area from the MSH culvert behind the warehouse annex across to the existing main mine fan diversion which is diverted through a 6" pipe into the ESC culvert.

Applicant commits to having a qualified consulting firm prepare the calculations and diversion design for submittal to the Division of Oil, Gas and Mining for its review before this diversion is installed.

9. The two branches and three drop drains on the substation pad leading to the bypass substation culvert are 12" c.m.p. culverts. The substation pad surface area will be graded, graveled and sloped to divert the 10-year, 24-hour event to the east side road diversion which runs on the outside edge of the pad area. The drop drains and culverts will help divert part of the runoff flow to the CBE bypass culvert to reduce the time and runoff water will be on the pad area to reduce the chance of water migrating through the substation pad fill and lubricating the substation slide slip zone.
10. A diversion not specified above is the substation pad undisturbed interception ditch which runs above the substation pad. This diversion diverts part of the undisturbed area (CBE) runoff away

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow,  
Shallow Ground Water Flow and Ephemeral Streams:

Response: (cont'd)

from the substation pad to prevent saturation of the area  
Saturation in the past has caused some slope movement.

Applicant commits to having a qualified consulting firm prepare  
the calculations and diversion design for submittal to the Division  
of Oil, Gas and Mining for its review before this diversion is  
installed.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow,  
Shallow Ground Water Flow and Ephemeral Streams:

Response:

The following assumptions and input calculations are supplied for the determination of the peak flow for the 10-year, 24-hour storm event for items 5, 7, 8 and 10 of the DOC/TD-July 1983 submittal, Volume 8:

ASSUMPTIONS AND INPUT CALCULATIONS

<u>Area</u>	<u>Acres</u>	<u>CN</u>	<u>Length</u>	<u>Change In Elevation</u>	<u>Tc*</u>	<u>Qp (cfs)</u>
CBE Substation Bypass Culvert	16.07	72	1,250	630	0.121	4.09
Substation Pad	0.39	90	285	10	0.08	0.40
South End Parking Lot	0.97	92	365	55	0.052	1.10
Area North of ATOF Part A	1.8	79	900	425	0.112	0.91
Part B	18.4	79	1,850	745	0.167	3.78
Area Upslope of Substation Pad Undisturbed Drainage Ditch	6.9	72	820	390	0.117	0.96
CBW Draining to Pipe #5	11.48	79	1,450	794	0.121	5.81

\*Calculated as mean of four methods: Kirpitch's, Kent's, USBR/Kirpitch and Hathaways.

The design calculations for the above diversions follow:

A. Item #5, p. 41e

1. CBE Substation Bypass Culvert

$$Q_p = 4.09 \text{ cfs}$$

$$Q_p \times 1.5 \text{ S.F.} = 6.14 \text{ cfs}$$

Design flow used was 6.2 cfs Volume 8, p. 37. Therefore, this diversion design is adequate with  $Q = 10.39$  cfs for the 18" culvert.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow, Shallow Ground Water Flow and Ephemeral Streams:

Response: (Cont'd)

2. Substation Pad

$$Q_p = 0.40 \text{ cfs}$$

$$Q_p \times 1.5 \text{ S.F.} = 0.6 \text{ cfs}$$

The added runoff from the substation pad (0.6 cfs) combined with the CBE runoff (6.2 cfs Merrick and Company East Side Road Volume 2, Exh. 9) has the combined total of 6.8 cfs which is still under the 7.1 cfs design sizing for the diversion interception ditch (Merrick and Company Volume 2), the 10.39 cfs sizing for the 18" substation Bypass Culvert (Vol. 8, p. 38) and the East Road Continuance Diversion sizing for 8.73 cfs (Vol. 8, p. 41d).

3. South End of Parking Lot

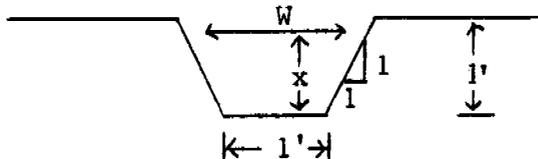
$$Q_p = 1.1 \text{ cfs}$$

$$Q_p \times 1.5 \text{ S.F.} = 1.65 \text{ cfs}$$

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2} \text{ from Manning}$$

$$S = 5\%$$

$$n = 0.045$$



$\frac{X}{.4}$	$\frac{W}{1.8}$	$\frac{A}{0.56}$	$\frac{R}{0.26}$	$\frac{Q \text{ cfs}}{1.68}$	$\frac{v \text{ fps}}{3.0}$
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UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow, Shallow Ground Water Flow and Ephemeral Streams:

Response: (Cont'd)

Therefore, this diversion is adequate to handle the runoff with a freeboard of 0.3 feet. The rip rap size required is 1½" as determined using the rip rap chart presented in the 1981 Completeness Response for comment 817.44, Volume 7.

B. Item 7, p. 41f - Pipe #5 Diversion

$$Q_p = 5.81 \text{ cfs}$$

$$Q_p \times 1.5 \text{ S.F.} = 8.71 \text{ cfs}$$

$$S = 2\%$$

$$n = 0.024$$

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2} \text{ from Manning}$$

<u>Size</u>	<u>A</u>	<u>R</u>	<u>Q cfs</u>	<u>v fps</u>
18"	1.767	0.375	8.05	
21"	2.405	0.437	12.13	5.04

Use 21" corrugated metal pipe.

The rip rap size required for outlet with 5.04 fps velocity is 4" as determined using the rip rap chart presented in the 1981

Completeness Response for comment 817.44, Volume 7.

C. Item 8, p. 41g - Area North of ATOF

1. Part A of the Area North of ATOF flow ( $Q = 0.91$  cfs) is diverted to the Main Mine Fan Diversion ( $Q = 0.176$  Vol. 8). This total combined flow of 1.086 cfs is less than the design flow of  $Q = 1.26$  cfs for the 6" pipe from Volume 8, p. 41.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow, Shallow Ground Water Flow and Ephemeral Streams:

Response: (Cont'd)

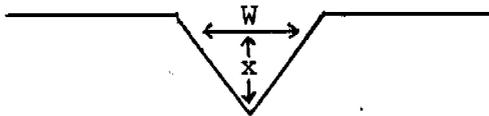
For the diversion ditch design and cross section to the 6" pipe.

$$Q_p = 0.91$$

$$S = 4\%$$

$$n = 0.045$$

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2} \text{ from Manning}$$



$$\frac{W}{1.5} \quad \frac{X}{0.7} \quad \frac{A}{0.525} \quad \frac{R}{0.255} \quad \frac{Q}{1.39} \quad \frac{v}{2.65}$$

Therefore, a diversion ditch 1.5 feet wide and one foot deep is adequate to handle the runoff ( $Q = 1.39$  cfs) with a freeboard of 0.3 feet. The rip rap size required for  $v = 2.65$  fps is 1" as determined using the rip rap chart presented in the 1981

Completeness Response for comment 817.44, Volume 7.

2. Part B of the Area North of ATOF runoff flow ( $Q = 3.78$  cfs) is diverted with a diversion ditch to Mud Spring Hollow Bypass Culvert.

$$Q_p = 3.78 \text{ cfs}$$

$$Q_p \times 1.5 \text{ S.F.} = 5.67 \text{ cfs}$$

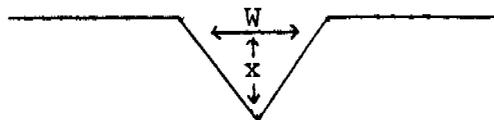
$$S = 4\%$$

$$n = 0.045$$

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2} \text{ from Manning}$$

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow, Shallow Ground Water Flow and Ephemeral Streams:

Response: (Cont'd)



$\frac{W}{2.5}$	$\frac{X}{1.2}$	$\frac{A}{1.5}$	$\frac{R}{0.434}$	$\frac{Q}{5.68}$	$\frac{v}{3.79}$
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Therefore, a diversion ditch 2.5 feet wide and 1.5 feet deep is adequate to handle the runoff with a freeboard of 0.3 feet.

The rip rap size required for  $v = 3.79$  fps is 2" as determined using the rip rap chart presented in the 1981 Completeness Response for comment 817.44, Volume 7.

D. Item 10, p. 41g - Area Upslope of Substation Pad Undisturbed Drainage Ditch

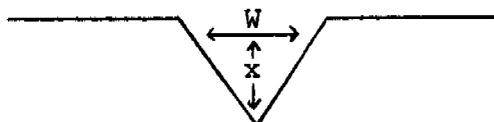
$Q_p = 0.96$  cfs

$Q_p \times 1.5$  S.F. = 1.44 cfs

$S = 2\%$

$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$  from Manning

$n = 0.045$



$\frac{W}{2}$	$\frac{X}{1}$	$\frac{A}{1.0}$	$\frac{R}{0.35}$	$\frac{Q}{2.3}$	$\frac{v}{2.3}$
2	.8	.8	0.313	1.72	2.15

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow,  
Shallow Ground Water Flow and Ephemeral Streams:

Response: (Cont'd)

Therefore, a diversion ditch 2 feet wide and 1.1 feet deep is adequate to handle the runoff with a freeboard of 0.3 feet. The rip rap size required for  $v = 2.15$  fps is 1" as determined using the rip rap chart presented in the 1981 Completeness Response for comment 817.44, Volume 7.

UMC 817.44 Hydrologic Balance: Stream Channel Diversions:

The operator shall provide information detailing how and when reclamation of the stream channel culvert will take place. Designs and calculations for erosion control structures such as channel lining structures, retention basins and/or artificial channel roughness structures, which prevent additional contributions of suspended solids, will need to be submitted to the Division.

Response:

The stream channel culverts will be reclaimed by installing a 10 feet concrete plug on the downstream end and backfilling with sand and then installing another 10 feet concrete plug on the upstream end. The culverts will be plugged when they are encountered during the excavating and filling portion of final reclamation. The upstream plugs will be a minimum of five feet below final grade. The stream channels will be reconstructed as a 12-foot wide channel with 1V:2h sloped sides. The depth will vary with stream gradient, a one foot board will be maintained. The channel will be lined with riprap composed of a well graded mixture with most of the stones greater than 12 inches. Riprap will be placed over a filter blanket of graded gravel at least 24 inches thick. The calculations are given below:

Using Chezy Equation

$$Q = AV$$

$$V = 1.486 \frac{R^{2/3} S^{1/2}}{n}$$

where

R = hydraulic radius in ft

S = slope in ft. per ft.

n = 0.04 for class A riprap

For Mud Spring

$$Q_{100} = 147 \text{ cfs from Merrick \& Company}$$

$$S = 0.03$$

Depth 1.5' will handle 164 cfs

$$V = 7.28 \text{ fps}$$

UMC 817.44 Hydrologic Balance: Stream Channel Diversions:Response: (cont'd)

Most stones should be 7.5 inch minimum from curve to determine maximum stone size in riprap mixture "Appendix 817.44 1981 Response" 12" stones will be adequate

## For East Spring

Q100 = 247 cfs from Merrick & Company

S = 0.03

Depth 2.0' will handle 273 dfs

V = 8.54 fps

Most stones should be 10 inch minimum from curve

12" stones will be adequate

For Combined Drainages

East Spring

Q100 = 247

Mud Spring

Q100 = 147

Disturbed

Q100 = 56 cfs - 1983 TD response to 817.46  
450 cfs

For S = .03

D = 2.75' will handle 489 cfs

V = 10.15 fps

Most stones need to be 14" minimum from curve

Use 14" stones

UMC 817.44 Hydrologic Balance: Stream Channel Diversions:

Response: (cont'd)

For S = .114

D = 1.9' will handle 486 cfs

V = 16.2 fps

Most stones need to be 38" minimum from curve  
Use 38" stones and install energy dispators  
of transition to 11.4% and from 11.4% to  
21.4% consisting of rock lined pools with 48"  
and larger boulders.

For S = .214

D = 1.6' will handle 490 cfs

V = 20.2 fps

Most stones need to be greater than 48"  
from curve  
Use stones larger than 48" and install  
energy dispators.

UMC 817.45 Hydrological Balance: Sediment Control Measures:

The Division recommends that the applicant consider diverting the runoff draining the undisturbed contributing basin west (if, in fact, it is undisturbed) from the slope of fill area and the sedimentation pond.

Response:

The Applicant recognizes that runoff from the undisturbed contributing basin west minimizes the efficiency of the sediment control structure by adding throughput volume which need not be treated. However, the cut slope at the mine site area against the bottom of the contributing basin west is highly unstable. Consequently, it is the opinion of both the U.S. Forest Service and the Applicant that construction of a diversion ditch along the top of the cut slope from the trash pit north to Mud Spring Hollow is highly inadvisable. It may be feasible to divert part of the runoff from the contributing basin west (from the area from the trash pit south to Convulsion Canyon) if it is determined that the sediment pond cannot adequately handle such flow.

UMC 817.46 Hydrologic Balance: Sediment Ponds (pages 7-13 of 1983  
Completeness Review):

The applicant must state in the mine reclamation plan which sedimentation system Merrick and Company or Valley Engineering Alternate #1) has been implemented.

The review of the sediment volume required that follows is based upon the assumption stated under the Division's comments found under UMC 817.46 (c-g) conclusion #3.

The calculated 65 percent reduction in the area top of fill sediment volume required (1.2 acre-feet) due to the use of the concrete basin cannot be used due to the lack of available sediment storage volume in the concrete basin:

$$(1.2 \text{ acre-feet}) (0.65) = 0.78 \text{ acre-feet required}$$

Volume available in pond:

$$(1,400 \text{ ft}^3 / [43,560 \text{ ft}^3 / \text{acre-feet}]) = 0.032 \text{ acre-feet}$$

Deficit:

$$0.78 - 0.032 = 0.748 \text{ acre-feet lacking}$$

The maximum that SUFCo will be allowed to reduce the required sediment volume will correspond to the available storage in the concrete basin or:

$$(0.032 \text{ acre-feet} / 1.2 \text{ acre-feet}) = 2.69\%$$

The applicant has not included any predicted sediment volume from the CBW area.

Response:

The sediment pond presently in use in the Valley Engineering Alternate #1 and is discussed in the 1980 Compliance Submittal, Volume 6. The existing sediment control system uses a primary sediment collection structure in the form of a concrete sediment trap on top of the fill and a secondary settling structure which is the pond at the base of the fill. It is intended that 65 percent of the anticipated sediment will be removed in the primary structure to allow the size of the secondary structure to be considerably reduced below that volume recommended in Comment UMC 817.46, Volume 8, and in accordance with the experimental practice option.

The 65 percent settling is based not only on more frequent clean outs but on characteristics of the sediment trap (a rippled tank floor, multiple outlets, Stoke's Law characteristics, etc.)

The Valley Engineering Alternate #1 was selected after consultation with representatives from the Office of Surface Mining, the Division of Oil, Gas and Mining and the U.S. Forest Service during the spring of 1980 and was built subsequent to approval of the various regulatory authorities. The design was selected in preference to the Merrick and Company design or any other design employing a full size pond in the bottom due to environmental considerations. Among these considerations was that any full size pond would have required the disturbance of at least twelve additional acres of presently undisturbed area and the resulting pond would have been exceedingly difficult to maintain with respect to regular and frequent sediment recovery and disposal.

The sediment pond design calculations and assumptions are adequately explained in the previously submitted Merrick and Company Study, Volume 2, and Valley Engineering design packages, Volume 6. In addition to the information previously submitted, a further explanation of Merrick assumptions and calculations is provided in their March 23, 1983 correspondence to SUFCo which is presented in this section.

The sediment pond plan, design calculations, and operating considerations have already been fully reviewed and approved by both the Division of Oil, Gas and Mining and Office of Surface Mining by letters dated August 17, 1980 and September 12, 1980, respectively. Copies of correspondence regarding approval of the plan are presented in this section.

The structure has been in use for less than two years. During that time, there has been little evidence of compliance difficulties with respect to Total Suspended Solids (TSS) during periods of flow equivalent to less than a ten year precipitation event. A listing of all samples taken from the sediment pond effluent by SUFGCo is contained within this section. The chart illustrates that only the first three of more than twenty samples were out of compliance before the recent high runoff levels during the winter of 1983 with the exception of one 30-day average. The contributing basin east was diverted into the sediment pond during the spring of 1982 to prevent a potential slide that was endangering the electrical substation. This activity increased the sediment volume and flow above the design levels of the system. To remedy this problem, a bypass culvert will be installed past the substations to convey the contributing basin east runoff upon approval of the regulatory authorities. This runoff will further be diverted as shown in response to Comment UMC 784.22, Volume 8. These modifications will return the system to design quantities for flow and sediment volume. The discharge at the sediment pond will be further upgraded by installing a decanting valve and raising the present standpipe approximately five feet. The modification will allow decanting of the pond during no flow after the sediment load has been dropped. These measures proposed by the Applicant comply with the approved experimental practices used in the sediment trap and should eliminate any further TSS compliance problems relative to the permitted discharge.

The pond and access road are examined routinely when water samples are taken. A record of these examinations will be kept at the mine site.

The pond will be examined for structural weakness and erosion at least four times per year. A report of these findings will be submitted to the Division on a quarterly basis in the months of February, May, August and November.

An effective program of dam stabilization using vegetation was carried out in 1982. Hydroseeded areas were as presented on sheet 2 of the Valley Engineering plan, Volume 6. These areas which include the downstream dam slope, the topsoil storage pile and the face of the fill slope were seeded with the seed mixture as specified in the mining and reclamation plan. Significant growth of vegetation was observed in the 1982 growing season.

SOUTHERN UTAH FUEL COMPANY MINE

Effluent Quality History  
Point Source 002

Date	Acidity	Alkaline	Iron	Oil & Grease	TSS	TDS	pH
9-8-81	5.4	60.0	0.260	14.80	72.0	1475	7.6
12-9-81	10.0	159.1	0.965	<.10	112.0	3075	7.6
2-22-82			2.730	<1.00	194.0		8.2
5-3-82			0.360	1.4	14.0		8.0
5-17-82	<.01	323.8	0.588	<.10	3.0	1012	7.8
6-9-82	<.01	337.7	0.120	2.0	8.0	775	8.1
6-23-82	<.01	362.5	0.030		3.0	734	7.8
7-14-82	6.0	324.0	0.130	0.60	3.0	890	6.8
7-16-82			0.080		3.0	866	
7-30-82	7.0	219.8	0.060		19.0	1904	7.6
8-11-82	<.01	298.0	0.450	<.10	12.0	1310	8.2
8-25-82	7.0	186.0	0.090		10.0	1500	7.6
9-13-82	<.01	266.6	0.370	2.0	31.0	975	8.1
9-27-82	3.0	247.0	0.110		36.0	820	7.3
10-13-82	9.0	415.0	0.098	0.4	7.0	675	7.6
10-27-82	9.0	322.8	1.120		11.0	705	7.8
11-10-82	3.0	290.6	0.115	1.6	9.0	868	7.6
11-24-82	15.0	371.3	0.090		17.0	750	7.8
12-8-82	4.0	277.8	0.430	0.6	27.0	3050	7.2
12-28-82	<.01	340.0	0.540		7.0	1300	8.4
12-29-82	<.01	376.0	0.040		1.0	920	8.3

1 2 SEP 1980

Mr. Vernal J. Mortensen  
Vice President  
Utah Operations  
Coastal States Energy Company  
411 West 7200 South  
Midvale, UT 84047

Dear Vern:

By letter of June 24, 1980, Southern Utah Fuel Company (SUFCO) petitioned the Office of Surface Mining (OSM) for approval of a revised sedimentation pond plan for the Convulsion Canyon Mine. This revised plan supersedes the sedimentation pond plan submitted with SUFCO's mine plan addendum currently considered incomplete by OSM. The revised plan includes the use of a concrete sedimentation basin in conjunction with a sedimentation pond.

After reviewing the revised plan and consulting with the Fishlake National Forest and the U.S. Geological Survey, OSM approves the revised plan with one stipulation. The stipulation requires SUFCO to state in writing, prior to dan construction, that SUFCO will comply with the requirements of the Mine Safety and Health Administration (30 CFR 77.216). This requirement should not prevent immediate construction of the access road, concrete sedimentation basin, or associated diversions.

Both OSM and the Forest Service consider the revised plans to be environmentally better than the initial sedimentation pond plan. OSM commends SUFCO for taking the initiative to make use of new technology. It is our wish to work closely with SUFCO on monitoring the effectiveness of this system.

Attached for your information is OSM's technical review of the sedimentation control system. I want to emphasize that prior to construction of the dam, OSM needs written acceptance by SUFCO of the above noted stipulation.

If you have any questions in regard to this approval, please contact John Nadolski of my staff (303-837-3773).

Sincerely,

DONALD A. CRANE

bcc: Ofc  
Reading R/D ✓  
Chron  
Nadolski  
Humphrey  
Nadolski:kf:12September80

Attachment

cc: Mortensen, SUFCO (with attachment)  
Taylor, USFS (with attachment)  
Moffit, USGS, Salt Lake City (with attachment)  
Trippe, USGS, Denver

*Handwritten signature/initials*

✓



SCOTT M. MATHESON  
Governor

GORDON E. HARMSTON  
Executive Director,  
NATURAL RESOURCES

CLEON B. FEIGHT  
Director

STATE OF UTAH  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS, AND MINING  
1588 West North Temple  
Salt Lake City, Utah 84116  
(801) 533-5771

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August 27, 1980

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

RE: Drainage Facilities  
and Sedimentation  
Control Plan  
ACT/041/001  
Sevier County, Utah

Dear Mr. Frame,

The Division has completed its review for the Drainage Facilities and Sediment Control Plan submitted by Southern Utah Fuel Company. The Division hereby grants approval for construction of the above facilities with the following stipulations:

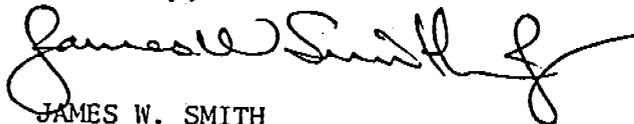
1. Southern Utah Fuel Company must comply with the requests of the Division of Water Rights concerning the construction of the above mentioned sedimentation pond as specified in their letters dated July 15, 1980 and October 29, 1979 attached hereto.
2. Detailed designs including cuts and fills and profiles in critical areas must be submitted to the Division. A narrative must be included which discusses how the performance standards contained in UMC 817.160-166 or 817.170-176 will be met. Also, justification of the proposed use for which class the road falls under must be furnished. These designs must be provided to the Division within 3 weeks of this approval.
3. The stability of cut slopes and fills along the road must be certified by a qualified professional engineer, and a copy of the analysis including properties of embankment, cut, and foundation materials, hydraulic conditions, types of failures analyzed (outslope flowslides, rotational slides, foundation spreading etc.), methods of analysis, and calculations must be submitted to the Division before the end of construction.

Mr. Frame  
August 27, 1980  
Page Two

4. The reclamation that will be accomplished on road embankments and sediment structures during mining should be described as well as a schedule for implementation following construction. These measures must be made part of the final approval of the construction and submitted to the Division prior to the end of construction.

The Division is aware of Southern Utah Fuel's time constraints in accomplishing the construction and has decided to allow construction to begin as long as the above stipulations are followed.

Sincerely,



JAMES W. SMITH  
COORDINATOR OF MINED  
LAND DEVELOPMENT

JWS/lml  
CC: Don Crane/OSM  
Mike Davis/SUFCO  
Dee C. Hansen/State Engineer  
Enclosure: letters (2)



March 23, 1983

Mr. Wesley K. Sorensen  
Senior Mining Engineer  
Southern Utah Fuel Company  
P. O. Box P  
Salina, Utah 84654

Subject: Southern Utah Fuel Company, Mine #1  
Sediment and Erosion Control Plan

Dear Wes:

In response to your letter of March 11, 1983, and your telephone conversation with Mark Glidden of our office on March 21, 1983, we have compiled the following information which we hope will allow you to prepare a response to the DOGM letter of February 2, 1983. We have addressed DOGM's comments on a case by case basis as follows:

1. Page 9. Runoff Volume Review

No calculations were found for the ATOF curve number. The determination was based on the field reconnaissance by a member of Merrick & Company's staff. We do feel that the 80 CN can be justified when using the breakdowns as developed by DOGM. Our files indicate that the soils in the ATOF exhibit moderate infiltration which, based on the National Engineering Handbook, Section 4, Chapter 7, (SCS NEH4, CH 7), indicates a soil group B classification.

In developing the composite CN for the undeveloped areas upstream of the mine, the CN's were weighted by area at the direction of Utah SCS personnel. Chapter 2 of SCS TR55 corroborates this information. This methodology should therefore be appropriate in this case.

The CN for concrete is unchanged regardless of soil classification, and would remain 98. The value for roads, pads and parking areas is based on 2 hydrologic soil group classification of D, which is inconsistent with the classification B, as previously described. This CN would be 85, when taken from SCS TR55, Chapter 2, Table 2.2. Hillslopes were assumed to have a CN of 85, with a soil classification C. Assuming a soil classification B, this would more reasonably be 78. DOGM indicates that dirt compacted fill with soil group D has a CN of 89. This is based on dirt roadways from NEH4, Chapter 9.1, which is, in our opinion, far too conservative. The actual remaining areas are certainly not compacted as roadways and might more closely approximate farmsteads. A value of CN somewhere between 82 (dirt roads, soil group B), and 74 (farmsteads, soil group B) is therefore reasonable.

The weighted CN would then be:

	<u>%</u>	<u>CN</u>	<u>% x CN</u>
Concrete	6.7	98	6.57
Roads, Pads, Parking	16.3	85	13.68
Hillslopes	28.3	78	22.07
Dirt Compacted Fill	48.7	74-82	36.04-82.43
Composite	100.0		78.53-82.43

Based on the above analysis, it is evident that a CN of 80 is justifiable and accurate for the ATOF basin and the SOF also. Based on this analysis a runoff volume of 0.49 acre ft. is appropriate and correct.

2. Page 10. Runoff Volume Review (continued)

SOF runoff volume is also to remain 0.10 acre ft., when the area of 2.5 acres is used, not 12.5 acres, as indicated in the table.

CBW runoff volume would remain unchanged with a CN of 72, which was a composite value for the entire tributary basin. Soil type #21, which comprises CBW, has been classified as soil group B and has a CN of 70. (This derivation will be discussed more fully in the next section.) CN 72, used for this analysis, may be conservative. The runoff volume would remain 0.51 acre ft.

The total runoff volume would remain unchanged at 1.10 acre ft.

3. Page 10. Conclusion #1

A CN of 80 can be justified as explained above.

A CN of 72, for the undisturbed areas, is based on weighted CN's obtained from Land Systems Inventory, Salina Planning Unit, Fishlake National Forest, Richfield, Utah, 1975. In addition to this source, several sources were contacted, who were very familiar with the area. They were:

SCS Utah State Office  
T. A. Hutchings  
Austin Erickson, State Soil Scientist

U.S. Forest Service Regional Office  
Tom Collins, Regional Soil Scientist

U.S. Forest Service, Richlake Office, Fishlake National Forest  
Dee Thomas, Hydrologist  
Tim Bliss, Soil Scientist

CN's were based on their interpretation of the soils information and their familiarity with the site. AMC II was assumed.

<u>Soil #</u>	<u>Soil Group</u>	<u>CN</u>
11	A	50
15	B-C	75
16	B	
20	C	78
21	B	70
22	A	70

4. Page 12. Item 1(b) 1, 2 and 3

Method for determining  $T_c$  is shown in the runoff appendix of the report.  $T_c = L/V$  where  $L$  was measured and  $V$  was determined from SCS TR55, Ch. 3, Fig. 3.1. A minimum  $T_c$  of 0.1 hours was assumed. This is a standard convention and accounts for acceleration, a required increase in head and other hydraulic phenomena.

$qp$  was obtained from SCS TR-55 Ch. 5, Table 5.3.

5. Page 13. Item 1(b) 4

$$Q \text{ peak} = Q_r A \text{ qp}$$

Where  $Q \text{ peak} =$  peak rate or runoff  
 $Q_r =$  excess precipitation in inches  
 $A =$  area in square miles  
 $qp =$  peak discharge per square mile per inch of runoff (csm/in)

We hope this information clarifies any questions DOGM may have regarding Merrick & Company's report. Should additional information or clarification be required, please do not hesitate to contact us.

Very truly yours,

MERRICK & COMPANY



Duane M. Johnson

DMJ/dlr

cc Mark Glidden

UMC 817.46 Hydrologic Balance: Sediment Pond:

The fourth Apparent Completeness Review of the applicant's MRP, as modified and sent to applicant on March 7, 1983 by the Division of Oil, Gas and Mining, listed Division conclusions on pages 7 through 13 with regard to sediment pond design. Applicant's response to these conclusions in Volume 8 of the April 27, 1983 ACR submittal was inadequate for the Division. Consequently, many of the conclusions were restated in the Division's June, 14, 1983 Determination of Completeness (DOC). The following is a response on a conclusion-by-conclusion basis to the Division's March 7, 1983 conclusions.

At the outset, it is important to note that most of the Division concerns and conclusions regard how well the original sediment pond design satisfies the pond sizing requirements of UMC 817.46(b)(2) and (c). The original pond design varied from these requirements because it allowed for a 50% reduction in sediment storage volume in addition to a 0.065 acre foot per acre of disturbed area reduction as a result of the measures achieved with use of the concrete settling basin.

Although both the Division and OSM approved this 50% allowance before the sediment control system was built in 1980, the Division has apparently informally rescinded this approval due to effluent compliance problems during the spring-snowmelt-runoff event of 1983. The Applicant therefore herein proposes to make increases to the pond capacity such that the 50% variance described above will no longer be required.

With approval from the Division, it is planned to drain the pond and then increase storage capacity to hold both the 1.10 acre feet of runoff from a 10-year, 24-hour precipitation event and all of 0.035 acre-foot of sediment for each acre of disturbed area within the upstream drainage area while making use of the concrete settling basin to provide sediment removal measures equal to 0.065 acre-foot for each acre of disturbed area.

UMC 817.46 Hydrologic Balance: Sediment Pond: (cont'd)

The increased volume will be achieved by:

1. Raising the standpipe to an elevation one foot below the spillway elevation.
2. Raising the spillway, if necessary, such that the elevation will be no more than 19 feet above the upstream toe of the impoundment and such that the spillway may still handle the expected 32.2 cfs flow from a 25 year, 24-hour event with 0.3 feet freeboard capacity.
3. Excavating the holding area of the pond which is not a part of the dam.

The resulting storage volume will be measured by survey to exceed 1.77 acre feet which is the sum of:

- 1.10 acre feet from Q<sub>10</sub> runoff volume
- 0.42 acre feet sediment from 65% of 0.1 of ATOF
- 0.25 acre feet sediment from SOF
- 1.77 acre feet

In addition, the Applicant may augment the sediment control facilities with the installation of a pump at the concrete settling basin and a buried pipeline from the concrete basin into the old mine directly north of the surface facilities. The pump capacity would be sized to handle the volumes of water produced in the shop wash bay. The expected 20 gallon-per-minute capacity pump will discharge into a 3" buried pipeline extending from the concrete basin to the old mine portal located 30' east of the warehouse annex building. The pump will be controlled with either floats, timers or switches in a pump well

UMC 817.46 Hydrologic Balance: Sediment Pond: (cont'd)

with dimensions 2' x 2' x 5' deep constructed adjacent to the telescopic valve well in the settling basin. Installation of the pump/pipeline will be based on need as may be determined by Applicant during the life of the operation. In event the pump/pipeline system is installed, the water will be used in underground dust suppression and will ultimately be treated in existing underground settling ponds and discharged at NPDES discharge point 003.

## DETAILED RESPONSES TO DOGM MARCH 7, 1983 ACR CONCLUSIONS:

Page 8, Conclusion 1

The Applicant has not provided for sediment storage from the Contributing Basin West (CBW) because it is undisturbed area and, therefore, need not be provided for by UMC 817.46.

Page 8, Conclusion 2

Although the concrete basin does not have 65% of the total sediment volume it permits reduction of the main pond size by that amount because it provides a sediment control measure for the removal of sediment equal to the reduced volume. The measure results from the increased practicality of sediment removal and subsequent frequency. As a result of use of the concrete settling basins, it is estimated that at least 4500 cubic feet of sediment have been removed and disposed during five separate basin cleanouts during the past two years.

Page 8, Conclusion 3

As stated above, the Applicant does not plan to propose a 50% reduction of required sediment volume due to more frequent cleaning if it can be demonstrated that the pond has in excess of 1.77 acre feet of capacity by survey subsequent to proposed modifications.

UMC 817.46 Hydrologic Balance: Sediment Pond: (cont'd)

The sediment pond has been cleaned and surveyed. The Its as-built volume was determined to be 1.78 acre feet, which exceeds the required 1.77 acre feet determined previously on page 47b of Volume 8. The abatement letter is given as an exhibit in the following two pages. A contour map of the sediment pond, and a cross section showing the new decanting valve and, stand pipe are shown in drawing 83-5. The elevations of the 60% and maximum sediment levels are also given in drawing 83-5.



**Southern Utah  
Fuel Company**

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

*Subsidiary of  
Coastal States  
Energy Company*

August 11, 1983

Mr. Ken Wyatt  
Division of Oil, Gas and Mining  
4241 State Office Building  
Salt Lake City, Utah 84114

RE: NOV N83-7-3-1 Abatement

Dear Ken:

We are submitting the enclosed information as additional abatement action required by your June 14, 1983 letter concerning NOV N83-7-3-1. It demonstrates the adequacy of our existing sediment control structure to contain a 10 year, 24 hour precipitation event.

We have completed the steps planned in our June 23, 1983 letter to your office. The sediment pond has been drained and the sediment was cleaned out such that we could survey the "as-built" dimensions of the pond. The previously described modifications to increase the height of the standpipe and ensure proper spillway elevations have been completed such that the pond's holding capacity to the spillway elevation is 1.78 acre feet (0.01 acre feet more than required).

The recent modifications, which extended the standpipe to an elevation of 7,417 feet (1 foot below the spillway), have increased the holding capacity to 1.60 acre feet at this elevation. Until these recent modifications, the standpipe elevation was 7,411 feet. The holding capacity of the pond to this elevation was only 0.60 acre feet. Consequently, the retention time during last spring's runoff event was likely inadequate. The volume available for sediment storage and a 10 year, 24 hour precipitation event exceeds 1.77 acre feet. This 2½ fold increase in static holding capacity and the confirmation of 1.78 acre foot spillway capacity demonstrate the pond is in conformance with the design criteria and specifications determined by Merrick and Company.

This means that SUFCo does not need a variance permitting a 50% reduction in sediment storage volume over and above the 0.65 acre feet per acre of disturbed area reduction credited due to the two step removal system. The enclosed "as-built" map and drawing describes the critical dimensions.

Mr. Ken Wyatt  
August 11, 1983  
Page 2

You will recall that our first abatement attempt referenced only our April 27, 1983 ACR response. You determined that response inadequate because it did not address the Division's comments on pages 8 through 13 of the ACR in detail. We subsequently addressed those comments in detail with our July 5th determination of completeness response. Please consider those individual responses in conjunction with this submittal in determining whether or not we have satisfactorily abated the violation.

Please notify us promptly if this satisfactorily abates the violation. If you have any further questions, please call either Wess Sorensen or me.

Yours very truly,  
SOUTHERN UTAH FUEL COMPANY



Kerry A. Frame  
Chief Engineer

KAF:d1j

Enclosures

UMC 817.46 Hydrologic Balance: Sediment Pond:

## DETAILED RESPONSES TO DOGM MARCH 7, 1983 ACR CONCLUSIONS (cont'd)

Page 8, Conclusion 4

The April 27, 1983 ACR response on page 45, Volume 8, committed to raise the discharge structure. It is restated above that this modification will take place in addition to other modifications to increase the pond capacity to 1.77 acre-feet or more.

The decanting device referenced on page 45 will be installed on the standpipe at an elevation three feet higher than the elevation at which the pond will hold 60% of 0.67 acre feet of sediment in accordance with State Department of Health requirements.

Page 8, Conclusion 5

The Valley Engineering Report does indeed have a typographical error on page 11. The stated value of 0.58 microns should be read as 58 microns.

Page 8, Conclusion 6

The flow rate of the spring located near the shop building varies seasonally the maximum observed flow is about 10 gallons per minute. It is planned to isolate this flow with a protected concrete catchment and divert the flow through a 4" pipe to the 72" bypass culvert at either the 72" intake or at an intersection in front of the shop. The 4" pipe will be buried.

Page 10, Conclusion 1

The justification of the chosen CN value is contained in Merrick's March 23, 1983 letter located behind page 47 of the April 27, 1983 ACR response in Volume 8.

UMC 817.46 Hydrologic Balance: Sediment Pond:

DETAILED RESPONSES TO DOGM MARCH 7, 1983 ACR CONCLUSIONS (cont'd)

Page 10, Conclusion 2

A current map showing drainage at the surface facilities is presented in this Volume 8 as Map 83-2.

Page 10, Conclusion 3A

It is the position of the Applicant that the calculations of Merrick and Company, as supported by their March 23, 1983 correspondence, correctly estimates a 1.10 acre-feet runoff volume from a 10-year, 24-hour precipitation event.

Page 10, Conclusion 3B

The sediment volume issue is modified and further addressed in the response to the Page 8, Conclusion 2 and in the DOC/TD (July, 1983) Responses to Comment UMC 784.16(a)(1)(1) and 784.23(e).

Page 10, Conclusion 3C

The Applicant has, in the general discussion before these detailed responses, committed to pond excavation, standpipe, and spillway modifications necessary to assure a retention storage volume in the pond of at least 1.77 acre feet below the spillway.

Page 10, Conclusion 3D

Sediment from CEW is addressed above in this response (Page 8, Conclusion 1).

UMC 817.46 Hydrologic Balance: Sediment Pond:

DETAILED RESPONSES TO DOGM MARCH 7, 1983 ACR CONCLUSIONS (cont'd)

Page 10, Conclusion 3E

The overestimation of sediment storage volume available will be corrected with the pond modifications described above in the general discussion, the response to conclusion 3C, and on page 45 of the April 27, 1983 ACR response submittal in Volume 8.

Page 11, Conclusion 1

Although the ponds have not been designed to prevent short circuiting completely when judged pursuant to EPA's 1976 criteria outlined by Haan in 1978, they have been designed to prevent short circuiting to the extent possible when considering the geometry required to retro-fit them in the canyon after 40 years of mining activity.

In addition, it appears the Division's surface area calculation for the main pond is off by a factor of 10. The apparent surface area of the pond as built at the 7417.5 feet elevation is 10,500 square feet.

If  $L = 82.4$  ft.

and  $W_e = \text{surface area}/L$

$= 10,500/82.4$

$= 127.43$

The L:W ratio is  $127.43/82.4 = 1.55$

and not 0.70 as indicated on page 11 of the March 7, 1983 ACR document. Therefore, 78% of the recommended value was achieved rather than only 35% as indicated in the ACR.

UMC 817.46 Hydrologic Balance: Sediment Pond:

DETAILED RESPONSES TO DOGM MARCH 7, 1983 ACR CONCLUSIONS (cont'd)

Page 11, Conclusion 2

The Applicant herein commits to discussions and review with the Division regarding incorporation of designs to help minimize short circuiting to the extent possible in the event of major future construction modifications to the pond. Modifications proposed in this DOC/TD (July, 1983) response document are not considered major in nature.

Page 11, Conclusion (g)

As indicated in the responses above, the pond will be modified to hold the required sediment volume at 0.035 acre-feet-per-acre disturbed and the 10-year, 24-hour runoff volume at the spillway elevations. Since the centroid of the inflow will be retained in the pond more than 24 hours, the detention time required under UMC 817.46(c) will be satisfied.

Page 11, Conclusion (h)

The DOC/TD (July, 1983) Response provided by the Applicant to Comments UMC 784.16(a)(1)(1) and 784.23(e) should satisfy the requirements of UMC 817.46(h).

Page 11, Conclusion (i)

The Applicant agrees to reconsider the title of the referenced section. The section should indeed read "Conversion factor for correction of partial duration series to annual series data."

The method and calculation for the determination of the 10- and 25-year, 24-hour storm values for ( $T_c$ ), velocity,  $gp$  (discharge peak) and the method of peak flow determinations are indicated on page 3 of the Merrick and Company March 23, 1983 letter in Volume 8 just following page 47.

UMC 817.46 Hydrologic Balance: Sediment Pond:

DETAILED RESPONSES TO DOGM MARCH 7, 1983 ACR CONCLUSIONS (cont'd)

Page 12, Conclusion (c)

The 100 year, 24-hour peak flow referenced at the top of page 5 in the Valley Engineering Report does erroneously include runoff from areas CSA and ATTP (4.6 and 2.2 cfs respectively). Therefore, the expected 100 year, 24 hour event is actually calculated to be only  $62.4 - 6.8 = 55.6$  cfs to the pond and the 25 year, 24 hour event is actually only  $36.3 - 2.9 - 1.2 = 32.2$  cfs to the pond.

Page 12, Conclusion K

The dam was constructed to a height allowing for 5% settling subsequent to construction to design height.

Page 13, Conclusion with Respect to Peak Flow From the Discharge Pipe

The runoff volumes as calculated by Merrick and shown on their Table 6 but without the contribution from areas CSA and ATTP are:

Event	Peak Flow CFS	Runoff Volume Ac Ft	Sediment Vol.		Total Ac Ft
			@ 0.1 Ac Ft/Ac Ac/Ft	@ 0.035 Ac Ft/Ac Ac Ft	
10 yr.	20.6	1.10	1.45	0.67	1.77
25 yr.	32.2	1.72	1.45	0.67	2.39
100 yr.	55.6	2.97	1.45	0.67	3.64

Applicant believes the Division's recommended use of the equation for orifice controlled flow is inappropriate for calculation of the standpipe capacity. The equation is better used for sharp-edged-opening installations used to measure flow rates. Applicant's standpipe discharge capacity calculations are as follows:



UMC 817.46 Hydrologic Balance: Sediment Pond:

## DETAILED RESPONSES TO DOGM MARCH 7, 1983 ACR CONCLUSIONS (cont'd)

2) To find H required for 20.2 CFS,

$$V = \frac{20.2}{0.79} = 25.6 \text{ ft/sec}$$

$$\begin{aligned} \text{On Moody diagram: } VD'' &= 25.6 \times 12 \\ &= 307 \end{aligned}$$

$$\text{Relative Roughness} = 0.00015$$

$$\text{Therefore } f = 0.0136$$

$$\begin{aligned} H &= \frac{1.95V^2}{2g} + \frac{109.5 \times 0.0136 \times V^2}{2g} \\ &= \frac{1.95 (25.6)^2}{64.4} + \frac{1.489 (25.6)^2}{64.4} \\ &= \underline{35.0 \text{ feet}} \end{aligned}$$

Therefore, an equivalent 17 vertical feet of head would have to be added to the outflow drop distance to handle 20.2 cfs peak flow. However, installation of such an extension is not considered necessary since the pond has capacity to hold 14% of the total runoff as surge and since the period of flow exceeding the 14 cfs peak capacity will be less than 14% of the available runoff time.

In fact, the 14 cfs discharge capacity is 16 times the average  $Q_{10}$  runoff rate of 0.89 cfs through the pond. Consequently, the 14 cfs discharge capacity in combination with 0.25 acre-foot pond surge capacity is expected adequate to prevent peak flow runoff out the emergency spillway during the 10 year 24 hour event.

Page 13, Conclusion r

Certification of constructed is presented in the DOC/TD (July, 1983) Response to Comment UMC 817.49.

UMC 817.46 Hydrologic Balance: Sediment Pond:

DETAILED RESPONSES TO DOGM MARCH 7, 1983 ACR CONCLUSIONS (cont'd)

Page 13, Conclusion s

Areas associated with the sediment control structures which have been stabilized or which are being stabilized are shown on sheet 2 of the Valley Plan presented in Volume 2. Stabilization work is described in the April 27, 1982 ACR response on page 46 in Volume 8. The areas to be stabilized are shown on the drawings and stabilization work accomplished to date is described in the text. There are no "drawing plans" for revegetation as such.

Page 13, Conclusion t

Inspection commitments for the dam and related structures were made in the April 27, 1983 response on page 46 in Volume 8.

UMC 817.47 Hydrologic Structures: Discharge Structures:

"Discharge shall be controlled by energy dissipators...riprap channels...designed according to standard engineering procedures."

SUFCo must provide:

1. Riprap size around eight feet boulder at end of 24-inch culvert (Sheet 5).
2. Clarification of emergency spillway design. Sheet 4, section C-C' shows spillway as bank of embankment, whereas Sheet 3 D-D' shows spillway partially cut into natural ground.

Cross section D-D' on Sheet 3 of the Valley Engineering Report shows the emergency spillway built partially on natural ground and partially on dam fill. Has any problem concerning differential settling developed at spillway crest?

3. Spillway riprap size and velocity calculation.
4. Class of riprap size used on energy dissipator depicted on Sheet 5.
5. Clarification of design flow. A design flow of 23.2 cfs was reported in Valley Engineering Report on page 7 for use in page 9 calculation of energy dissipator size. This value appears to have been taken from Table 6 of Merrick which includes Q peak from CSA and ATTP. This value should be supported with all design calculations and assumptions. CSA and ATTP areas are not designed to pass through concrete pond.

See comments concerning peak flow calculations and design of discharge structures under UMC 817.46(g) comments.

A discrepancy exists between the Merrick and Company and Valley Engineering reports. Runoff for  $Q_{10}$  for SOF is given as 0.25 acre-feet on page 4 of the Valley report and 0.10 acre-feet in the Merrick report. It appears the Valley Engineering Report is in error. Please clarify.

Response:

1. Riprap size in all structures on the sediment pond dam is 30 inches or greater.
2. Cross sections C-C' and D-D' through the spillway are located on fill and cut surfaces respectively.

Since the dam construction used compaction methods which resulted in 90 or better Proctor analysis, there has been no observed differential settling on the face of the dam.

- 3 & 4. Spillway riprap sizes and velocity calculations are as follows:  
From Manning for Flow in Open Channels

$$V = \frac{1.486}{n} AR^{2/3} S^{1/2}$$

Where  $n$  = roughness coefficient

= 0.045 for jagged irregular rock

$A$  = cross sectional area of flow not including 0.3' freeboard

$$= \frac{17.5' + 11'}{2} \times 2.7' = 38.5 \text{ ft}^2$$

$P$  = wetted perimeter =  $11' + 6' + 6' = 23'$

$$R = \text{hydraulic radius} = \frac{A}{P}$$

$$= \frac{38.5'}{23'} = 1.67$$

$$S = \text{slope} = \frac{6 \text{ ft.}}{40 \text{ ft.}} = 0.15$$

$$V \text{ Possible} = 0.045 \times (1.67)^{2/3} \times (0.15)^{1/2}$$
$$= 18 \text{ ft/sec}$$

From Valley Engineering

$$Q = 670 \text{ cfs}$$

$$V \text{ max} = \frac{Q}{A} = \frac{670}{38.5} = 17.4 \text{ ft/sec}$$

Since 17.4 ft/sec is less than 18 ft/sec, the spillway is adequate with 0.3 feet freeboard available.

Riprap Sizing

The riprap stones in the spillway are 30 inch diameter or greater. Using the riprap chart in the 1981 Completeness Response for Comment 817.44, Volume 7, for a bottom velocity less than 17 ft/sec, the spillway riprap size consistence is within the satisfactory envelope.

5. The design flow used to size the energy dissipator installed at the inlet to the sediment pond at the outlet of the 24 inch CMP was indeed overstated. Not only were the coal slide area and area

tributary the pond erroneously included, but the flow from the surface of the fill was also included. This inclusion overstated the flow by 4.5 cfs. Consequently, the flow was overstated by 24 percent and the energy dissipator was oversized accordingly.

The Valley Engineering Company design did erroneously use 0.25 acre-feet as the runoff for  $Q_{10}$  for SOF. The value used should have been 0.10 acre-feet. Consequently, the sediment pond is correspondingly further oversized.

UMC 817.47 Hydrologic Balance: Discharge Structures:

"Discharge shall be controlled by energy dissipators...riprap channels...designed according to standard engineering procedures."  
SUFCo must provide:

3. Spillway riprap size and velocity calculation.

DEFICIENCIES

The use of a value for Q of 670 cfs as taken from Valley Engineering (page 50, Volume 8) is in error. This value of Q was derived from the calculation of the expected velocity of the given spillway size and is not the expected peak discharge from the pond. The correct value (from the application) to use would be 62.4 cfs (although this value has not been technically reviewed) which indicates the spillway is probably adequately sized. This will be determined during the technical analysis state of the permit review.

Response:

The determination made was the riprap size required for the peak spillway capacity. The peak spillway capacity is 670 cfs not 62.4 cfs and, therefore, the 670 cfs value was used in the calculations.

UMC 817.49 Hydrologic Balance: Permanent and Temporary Impoundments:

(h) The applicant must submit a certification report by a registered, professional engineer or land surveyor of the sedimentation pond.

This report must include items 1-5 of this section.

Response:

A certification report for the dam covering items 1-5 of this section is presented as a part of this response and follows page 51b.



**TRI-STAR LTD.**  
30 N. 400 WEST  
SALINA, UTAH 84654  
801-529-7404 - 7405

INITIAL CERTIFICATION REPORT  
FOR SEDIMENTATION POND  
SOUTHERN UTAH FUEL CO., MINE NO. 1

This report is written to certify the integrity and adequacy of the runoff impoundment located at the SUFCO #1 mine in Salina Canyon, Utah.

It is important to point out that the size and other design criteria of the impoundment are such, that the impoundment does not fall under regulations outlined in 30 CFR 77.216(a). Also, the impoundment and associated catchment, drainage, and conveyance works were constructed to meet or exceed State and Federal regulations in force at the time of construction. The construction materials and workmanship were continually inspected and said materials and workmanship were in compliance with the plans and specifications for construction dated August 1980 and entitled "Southern Utah Fuel Co. Mine No. 1, Estimate and Technical Specifications for Sedimentation Pond Improvements."

Existing and required monitoring procedures and instrumentation for the sediment pond deal, primarily, with two areas, sediment level monitoring and discharge water quality.

During construction, a staff gauge was constructed such that the depth at the maximum allowable sediment volume and the depth at 60 per cent of the maximum allowable sediment volume are clearly marked by red bands located on the staff gauge. When the sediment reaches the 60 per cent level, the pond must be cleaned and the sediment removed to the original lines and grades of the impoundment. The staff gauge was designed so that the sediment depth can be monitored from the parking lot near the main office building.

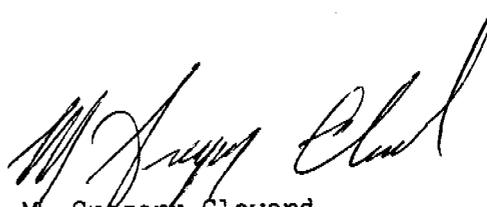
The discharge water quality is monitored on a regular basis in accordance with the criteria outlined in the NPDES permit for this installation.

The design maximum depth of the impoundment is 18 feet and occurs at elevation 7418' above MSL. Average water surface elevations are expected to remain at the outlet elevation of 7411' above MSL, except for short periods during peak storm flows.

The design storage capacity of the dam is 1.62 acre feet at the elevation of the overflow channel.

There have been no fires in the construction material to date and none are expected as all materials used were inorganic and most were imported.

The overall stability of the dam is very good. The dam was carefully designed and constructed and should be stable for the life of the mine. Visual inspection of the dam surfaces indicate no movement or leakage since the completion of construction.



M. Gregory Cloward  
Utah P.E. #4622  
June 28, 1983



UMC 817.50 Hydrologic Balance: Underground Mine Entry and Access Discharge:

The operator shall submit the necessary information and designs which show how mine water discharge will be discharged from underground workings during postmining operations and by what means effluent limitations will be met

Response:

As stated in Response to Comment UMC 784.14, no discharge is anticipated during postmining operations. All breakout entries 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 occurred through the coal seam or one of the seals, it would be similar to natural spring flow. No quality or quantity problems with effluents will be experienced because of settling effect. No pH problems should be experienced because of the lack of iron pyrite in the coal seam, the lack of iron minerals in the surrounding strata, and the absence of prior pH problems with mine effluents.

UMC 817.52 Hydrologic Balance: Surface and Groundwater Monitoring:

The applicant will be required to submit surface and groundwater monitoring information to depict the seasonal variation. The procedures, frequency and parameters to define the seasonal variation has been submitted to Dave Winget of SUFCo.

Response:

The Applicant will continue the program of hydrograph definition but at a modified frequency as recommended by the Division in their December 16, 1982 correspondence (David Darby to David Winget). A slight alteration will be incorporated, however, to maintain program consistency in that late August will be substituted for late July in the seasonal monitoring schedule. This alteration is per agreement with Mr. Wayne Hedberg in telecommunication on January 7, 1983.

Flow measurements will begin in May, or as early as conditions permit, and will continue at two week intervals through August and then on a monthly basis at least through October. This frequency will continue until it is mutually agreed between the Applicant and the Division of Oil, Gas and Mining that the hydrograph has been defined after which measurements will be made seasonably.

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.

Water quality parameters shall continue to be evaluated seasonally, June, August, and October, with the 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.

UMC 817.57 Hydrologic Balance: Stream Buffer Zone:

(a) Since the North Fork of Quitchupah Creek and Quitchupah Creek have been determined to contain a biological community (Vol. 6, Environmental Consultants Report), a 100 foot buffer zone shall be in effect. The applicant must address the proximity of all disturbances to the stream, especially breakouts planned and/or completed to date.

The applicant should supply information which details long-term protection to the stream channel where mining has accrued under the stream.

Response:

Of the eight ventilation entries identified on Map 80-2, Volume 3, only the two on the north are within the 100 foot stream buffer zone. These and other facilities located in the proximity of perennial or intermittent streams are addressed in the response to Comment UMC 817.11 (e), Volume 8.

On August 31, 1982 the Applicant notified the Division of Oil, Gas and Mining of its intent to cross beneath Quitchupah Creek and included details on how this would be accomplished. Approval to effect this crossing was granted by the Division on November 4, 1982. Copies of these correspondences are presented in this section.

Long-term protection to the stream channel will come primarily from subsidence avoidance as outlined in the August 31, 1982 correspondence. Additionally, hydrologic monitoring for changes in flow will continue both the surface and underground. While not anticipated, if a hydrologic disruption should occur, the nature of the problem will be investigated and a solution determined through consultation with the Division of Oil, Gas and Mining.

Water rights are protected in that all flow from this area remains part of the Quitchupah Creek hydrologic regime. Water quality from the mine discharge is controlled through the NPDES permit system.



STATE OF UTAH  
NATURAL RESOURCES & ENERGY  
Oil, Gas & Mining

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

Scott M. Matheson, Governor  
Temple A. Reynolds, Executive Director  
Cleon B. Feight, Division Director

November 4, 1982

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

RE: North Entry Stream Crossing  
Convulsion Canyon Mine  
ACT/041/002  
Sevier County, Utah

Dear Kerry:

Please accept my apology for not responding sooner concerning SUFCO's proposal to mine under the North Fork of Quitchupah Creek.

Mining in this section was a concern to the Division because of the limited amount of cover existing between the stream channel and the coal seam. The Division realizes that SUFCO places major importance on protecting the entry ways as well as providing protection to personnel.

Although precautions were taken by SUFCO to prevent disruption to the existing environmental conditions, the Division wants to make SUFCO aware of some further responsibilities that will need to be addressed.

1. The Division should be notified if there are any changes in the existing conditions.
2. The protection of water rights must be ensured.
3. Any water encountered must be handled and controlled to meet federal and state water quality standards.
4. A statement must be submitted to the Division ensuring that the highest level of economically feasible technology will be used to provide appropriate protection to the stream crossing at the time of abandonment.

Mr. Kerry Frame  
ACT/041/002  
November 4, 1982  
Page Two

If you have any questions or require any additional clarification, please contact me or Dave Darby of my staff.

Sincerely,



JAMES W. SMITH, JR.  
COORDINATOR OF MINED LAND DEVELOPMENT

JWS/DWD/tck

cc: Al Klein, OSM  
Vernal Mortensen, Coastal States Energy  
Cy Young, DOGM  
Sue Linner, DOGM  
Doug Maier, DOGM  
Ken Wyatt, DOGM  
Dave Darby, DOGM  
Pam Grubaugh-Littig, DOGM



**Southern Utah  
Fuel Company**

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

Subsidiary of  
Coastal States  
Energy Company

August 31, 1982

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 Quitcupah 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.

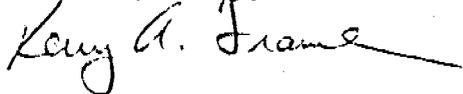
The typical cross sections illustrate the overburden above the coal seam and mining activity below the creek. A 100 foot buffer zone, where no second mining will occur, will be maintained on each side of the creek. Where second mining occurs adjacent to the buffer zone, full recovery will be halted so 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.

Mr. James W. Smith  
August 31, 1982  
Page 2

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

Yours very truly,

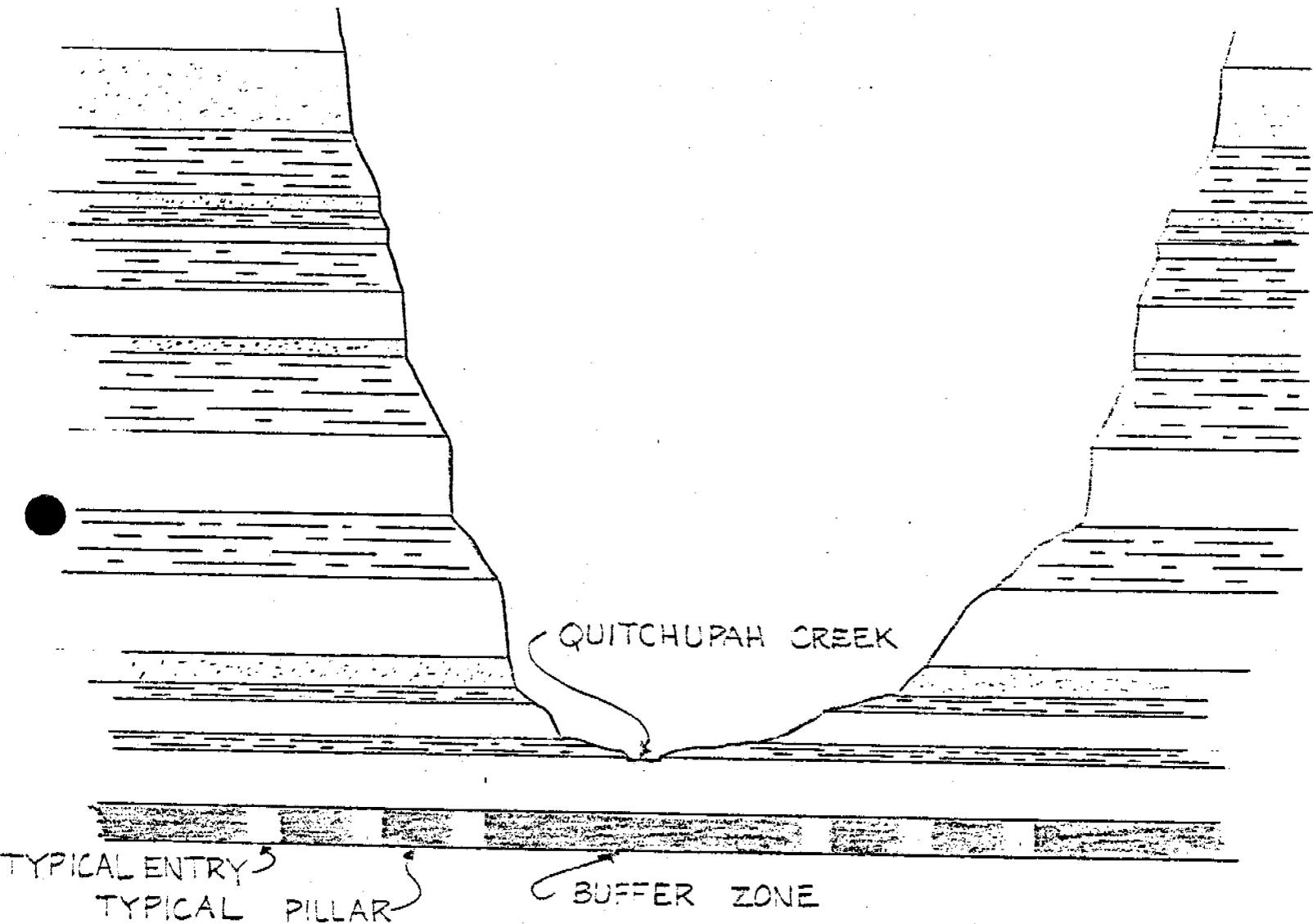
A handwritten signature in cursive script that reads "Kerry A. Frame". The signature is written in dark ink and is positioned above the typed name.

Kerry A. Frame  
Chief Engineer

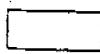
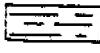
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Enclosures

# CROSS SECTION A-A'



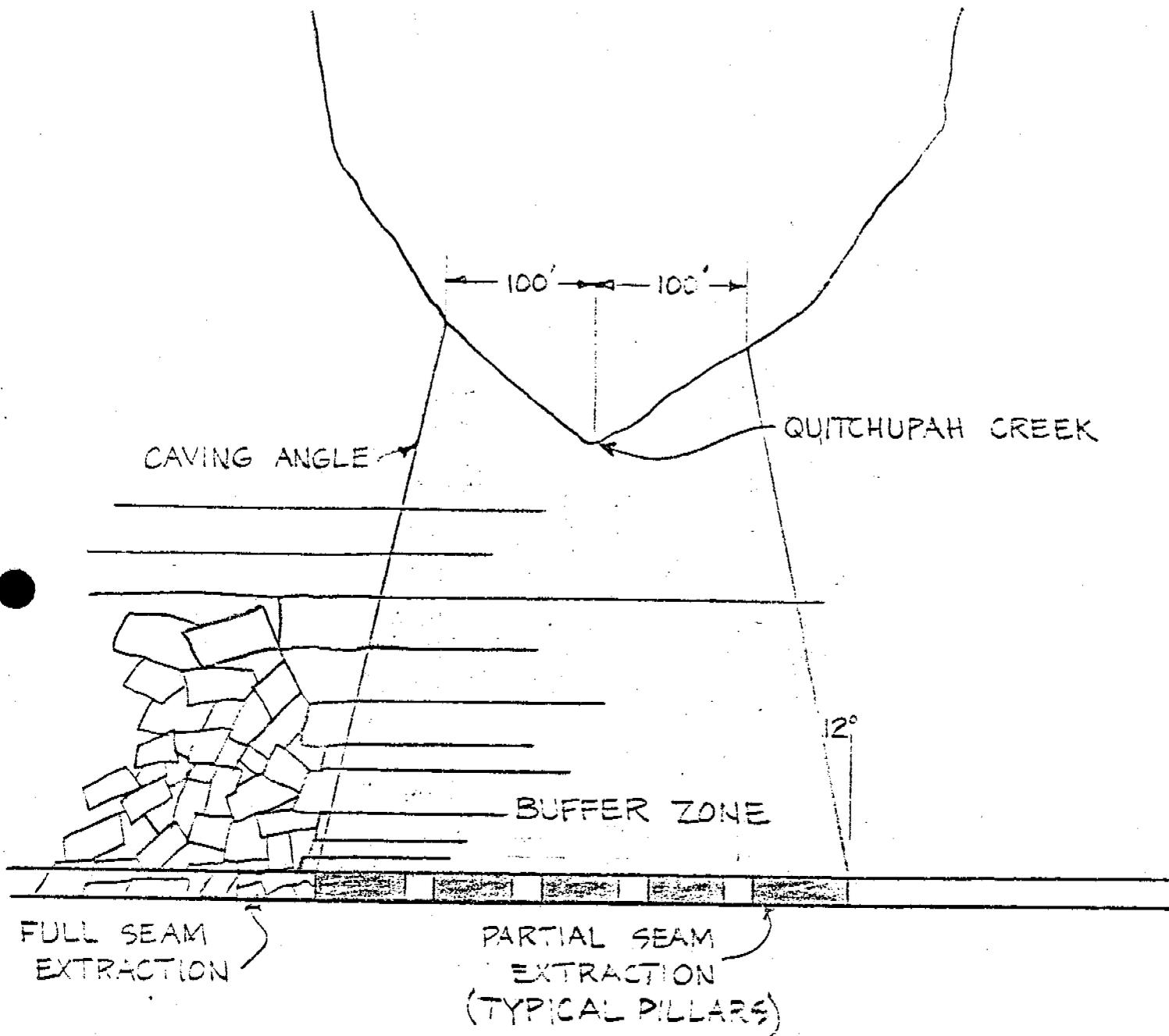
## LEGEND

-  SILTSTONE
-  SANDSTONE
-  SHALE
-  COAL

SCALE:

1" = 100' HORIZ.  
1" = 50' VERT.

# CROSS SECTION (E-E)



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)

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

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

UMC 817.59 Coal Recovery:

What is the current status of the southern portion of lease U-28297 regarding coal recovery?

Will the Duncan seam be mined on the Convulsion Canyon property?

Response:

Current geologic interpretations indicate that the majority of the southern portion of lease U-28297 contains a paleochannel system and associated parting. The parting varies from 0 to 24.5 feet in thickness and occurs in a NE-SE trending band varying from 2,000 feet to 7,500 feet in width. Because of this parting, most of the southern portion of the lease is deemed unmineable from both technological and economic viewpoints. However, a reserve block will be recovered below 1 East along the southeastern boundary of U-28297 in the future, probably just before cessation of mining.

The Duncan seam will not be mined as a part of the Southern Utah Fuel Company mining operations since the Duncan seam does not contain sufficient mineable reserves to warrant mining within the lease boundaries. Secondly, the Applicant does not have the legal right to mine this seam since lease U-28297 grants the right to mine only the Lower Hiawatha seam.

UMC 817.97 Protection of Fish, Wildlife and Related Environmental Values:

(b) The applicant must commit to promptly notify the Division of the presence in the permit area of any critical habitat of a threatened or endangered species, any plant or animal listed as threatened or endangered, or any Bald or Golden eagle which has not been previously reported.

(c) The applicant must reply to the Division's February 26, 1982 letter regarding raptor protection on power lines. Two options were listed for poles constructed prior to 1977: SUFCo must choose and pursue one of these. Plans for pole modification should be approved in advance by the Division.

(d)(5) Any riparian vegetation disturbed must be restored. Sampling of the remaining riparian vegetation must be done as outlined under Section 783.19.

(d)(6) An aquatic resources study, with stations to be monitored for a period of three years, was begun in 1980. Only the preliminary report was submitted. Please submit yearly reports for 1981 and 1982.

(d)(7) The applicant must commit to not use persistent pesticides on the mine area. Any pesticide program must be approved by the Division prior to implementation.

(d)(9) Since the postmining land use is wildlife habitat, shrubs should be grouped and distributed in a manner which optimizes edge effect, cover, and other benefits for wildlife.

The applicant must develop and commit to a specific wildlife mitigation plan prior to permit approval being granted. This can be done in conjunction with the U.S. Forest Service and Division of Wildlife Resources. There are several suggested mitigation measures in the Wildlife and Aquatic Resources Studies which could form the nucleus of such a plan.

Response:

(b) The Applicant will promptly notify the Division of Oil, Gas and Mining of the presence of any critical habitat of a threatened or endangered species, any plant or animal listed as threatened or endangered, or Bald or Golden eagle which has not been previously reported.

(c) All power lines within the SUFCo mine permit area were modified during the summer of 1981 to comply with the guidelines of REA Bulletin 61-10, "Power Line Contacts by Eagles and Other Large Birds". Various correspondence regarding the Applicant's modification of power line is presented in this section.

(d)(5) No riparian vegetation has been disturbed.

(d)(6) A summary of the results of the aquatic resource monitoring for the 1980-1982 period has been included as a part of 1983 submittal and is presented in Volume 6, "Aquatic Resources" immediately following the previously submitted aquatic resources report.

(d)(7) No persistent pesticides will be used by the Applicant in the mine area unless previously approved by the Division of Oil, Gas and Mining.

(d)(9) Shrubs and seedlings will be planted in clumps of not more than 1,000 per acre as indicated in response to Comment UMC 784.13, Volume 8. Edge effect, cover and other benefits for wildlife will be optimized. The Applicant will continue with the mitigation plan proposed in the

1980 Submittal, Wildlife, Volume 5, as modified by the response under response to Comment UMC 784.13, Volume 8. This plan was recently submitted to both the U.S. Forest Service and to the Division of Wildlife Resources for comment. Copies of letters from these agencies concurring with the original mitigation plan are presented in this section. The Salina Land Use Plan was used in the preparation of the 1980 Wildlife Assessment as recommended by the U.S. Forest Service.



SCOTT M. MATHESON  
Governor

GORDON E. HARMSTON  
Executive Director,  
NATURAL RESOURCES

CLEON B. FEIGHT  
Director

STATE OF UTAH  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS, AND MINING  
1588 West North Temple  
Salt Lake City, Utah 84116  
(801) 533-5771

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June 19, 1981

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

RE: Guidelines on Perimeter Markers and  
Raptor Protection on Power Lines

Dear Mr. Frame:

As you know, on January 23, 1981, Utah's partial or conditional approval under the permanent program appeared in the Federal Register.

Some of the regulations in the permanent program are supplemental to those enforced under the Interim Program. More specifically, these regulations deal with perimeter markers and electrical power line design and construction. Because of their relative newness there exists some ambiguity concerning what the Division is actually looking for, particularly from the inspection viewpoint.

This letter, then, is to inform you of the Division's policy with regard to the enforcement of UMC 817.11(b) (Perimeter Markers) and UMC 817.97(c) (Raptor Protection on Power Lines).

Perimeter Marker Guidelines

1. The perimeter markers should be durable and should be visible enough to allow easy detection by the public, the mine equipment operator and the inspector under a wide range of weather conditions.
2. The perimeter markers should extend along the entire boundary of the permit area as indicated on maps submitted to the Division pursuant to the Mining and Reclamation Plan. At a minimum, all areas which are currently, or will be, affected by any surface effects of underground mining during the permit term shall be so marked.

Mr. Kerry Frame  
June 19, 1981  
Page two

Special attention is due in any and all areas of the minesite where the public, an equipment operator, or any individual associated in any way with the mining operation, or any authorized representative of the Division or other concerned agency will be aided by their presence.

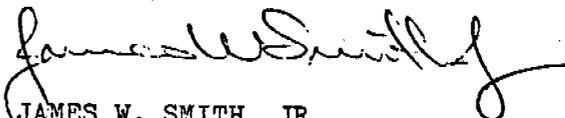
Any mine which does not have adequate perimeter markers as of July 1, 1981, shall be considered in violation and subject to enforcement action.

Raptor Protection on Power Lines

You should also be aware of UMC 817.97(c) requiring that operators ensure that the design and construction of electric power lines and other transmission features used for, or incidental to, the underground mining activities on the permit area be designed and constructed in accordance with the guidelines set forth in Environmental Criteria for Electric Transmission Systems (USPI, USDA 1970). Power lines should be designed and constructed in accordance with REA Bulletin 61-10, Power Line Contacts by Eagles and Other Large Birds. These and other guidelines, including diagrams of inexpensive pole modifications are available from the Division, the Office of Surface Mining and the Department of Interior. The Division requires that this regulation be addressed by July 1, 1981, or enforcement action will be warranted.

If you have any questions concerning these or other regulations in the permanent program please contact the Division.

Sincerely,



JAMES W. SMITH, JR.  
COORDINATOR OF MINED  
LAND DEVELOPMENT

JWS/TLP/te

August 31, 1981

Inspection Memo  
to Coal File:

RE: SUFCO  
Convulsion Canyon Mine  
ACT/041/002  
Sevier County, Utah

Division Inspectors Tom Portle and Dave Lof made a partial inspection at the above-mentioned minesite on August 19, 1981. They were accompanied on the inspection by Kerry Frame and Mike Davis of SUFCO.

In a letter from the Division dated June 19, 1981, SUFCO was informed of the guidelines concerning perimeter markers. At the time of the inspection, it was noted that SUFCO had installed red steel posts along the entire boundary of the permit area in order to comply with UMC 817.11(b).

On the access road to SUFCO's substation, it appeared as though either a spring was coming up or they had a leak in their water line which travels under the road just below the switchback. Water was running down the road off the permit area via a road on the south end of SUFCO's parking pad. SUFCO was also having a problem with the ponding of water next to the berm on the south end of the parking pad. According to SUFCO's mine plan, this entire pad is supposed to drain north into the sediment trap. Since this was not the case, SUFCO was asked to address this problem. A possible solution which was discussed with SUFCO was the placement of a berm around the perimeter of the parking pad and install some sort of drainage system which would carry this disturbed area runoff to the sediment pond where it could be treated.

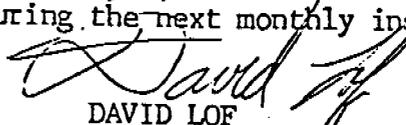
SUFCO is presently working on plans to channel mine water through mined out, caved in sections of the mine so that oil and grease and suspended solids will have a better chance of settling out before being discharged into the settling pond. SUFCO is proposing to use mine Section 3 left, 2 east as their filtering and settling structure. The mine water will travel through Sections 1, 2 and 3 left (approximately 2,500 feet) to the 2 East ventilation bleeder. From there, it will gravity feed to the north mains then to the present sump where it will be pumped out to the settling pond. Inspectors asked that SUFCO submit plans to the Division with their ACR response since the plans are already being developed for EPA.

During the inspection, inspectors looked at SUFCO's surface water monitoring data for June 10, 1981. The data indicated that SUFCO was out of compliance, the value for Total Suspended Solids (TSS) was 91 milligrams per liter. This had been reported to State Health in SUFCO's quarterly report.

The operator is placing perches on all power poles within their permit area, some of the perches are already in place.

INSPECTION MEMO TO COAL FILE  
ACT/041/002  
August 31, 1981  
Page two

While reviewing SUFCO's mine plan, it was found that two breakouts had occurred on August 30, 1976. They are presently being used as ventilation portals. These breakouts are shown on Map 1E entitled "Mine #1 Underground Mine Map." The breakouts are located in Section 12, Township 22 South, Range 4 East on the west side of the small drainage which is just east to the drainage which the mine is in and, at approximately 7,200 feet elevation. It is suggested these breakouts be inspected during the next monthly inspection.

  
DAVID LOF  
RECLAMATION OFFICER

cc: Tom Emmett, OSM  
Kerry Frane, SUFCO  
Inspection Staff

DL/btm

Statistics:

Vehicle: #EX 69300--765 miles  
Per Diem: Two persons X two days, nine hours @ \$62.09/person = \$124.18  
Grant: A & E



STATE OF UTAH  
NATURAL RESOURCES & ENERGY  
Oil, Gas & Mining

Scott M. Matheson, Governor  
Temple A. Reynolds, Executive Director  
Cleon B. Feight, Division Director

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

February 26, 1982

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

RE: Power Line and Raptor  
Protection Policy

Dear Mr. Frame:

Since there has been some confusion and misunderstanding regarding power lines and raptor protection, the Division has adopted the following policy.

Pursuant to UMC 817.97(c) (SMC 816.97[c] for surface mines) which states:

"A person who conducts underground (surface) coal mining activities shall ensure that the design and construction of electric power lines and other transmission facilities used for or incidental to the underground (surface) mining activities on the permit areas shall be designed and constructed in accordance with the guidelines set forth in Environmental Criteria for Electric Transmission System (USDI, USDA [1970]), or in alternative guidance manuals approved by the Division. Distribution lines shall be designed and constructed in accordance with REA Bulletin 61-10, Power Line Contacts by Eagles and Other Large Birds, or in alternative guidance manuals approved by the Division. For informational purposes, these two documents are available at the OSM Office, U. S. Department of the Interior, South Interior Building, Washington, D. C. 20240, at each OSM Regional Office, District Office and Field Office, and at the Central Office of the Division."

The Division will evaluate compliance as outlined below.

For "new" poles or when old poles on existing lines are replaced, the operator should design and construct these poles according to the design criteria of the above-mentioned guidelines.

Mr. Kerry Frame  
February 26, 1982  
Page two

For pre-Law poles (those constructed prior to 1977), the operator has two options:

Option 1

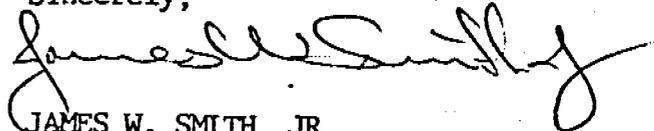
All poles with hazardous configurations shall be physically modified according to the criteria set forth in the guidelines above or according to plans approved by the Division. The operator will have 180 days to make the necessary modifications.

Option 2

Certain existing power line poles may be exempted from modification based upon United States Fish and Wildlife Service (USFWS) surveys of existing power lines and their recommendations. If not already completed, the survey should be conducted and the results submitted to the Division within 180 days of receipt of this notification. Adequate plans for modifying those poles requiring modification (as indicated by the survey) should be submitted to the Division for approval within 45 days of the survey and should be modified within 45 days of the Division's approval of the modification plans. If raptor populations or behavior changes dictate, future surveys may be required and additional poles modified. In the event a raptor is electrocuted on a pole that had not been previously recommended for modification, the Division may require several poles in that area to be modified.

Should you have any problems or questions, please don't hesitate to contact Lynn Kunzler or Susan Linner of my staff.

Sincerely,



JAMES W. SMITH, JR.  
COORDINATOR OF MINED  
LAND DEVELOPMENT

cc: Richard Dawes, OSM  
Clark Johnson, USFWS  
Douglas F. Day, DWR

JWS/LMK:btb



STATE OF UTAH  
NATURAL RESOURCES & ENERGY  
Oil, Gas & Mining

Scott M. Matheson, Governor  
Temple A. Reynolds, Executive Director  
Cleon B. Feight, Division Director

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

March 8, 1982

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

RE: Raptor Protection on  
Power Lines

Dear Mr. Frame:

Pursuant to the policy on raptor protection that was sent to your company on February 26, 1982, it has become apparent that additional clarification is needed.

~~Should you elect to follow~~ Option 1 and modify all existing poles, plans indicating how the poles will be modified need to be submitted to the Division in time to allow for review and approval and still leave sufficient time for implementation within the 180-day time frame.

Should you elect to follow Option 2, it will be necessary for you to contact the Division to arrange for the survey to be done. The U. S. Fish & Wildlife Service (USFWS) has indicated it will initiate a survey of the power lines on minesites (as per the February 26, 1982, letter) only when such requests come from the Division. Therefore, it becomes necessary that you request (in writing) that the Division contact the USFWS for consultation on raptor protection for power lines within your permit area. It is further requested that you contact the Division by April 30, 1982, to allow sufficient time to arrange and conduct the surveys and obtain the results within the 180-day time frame.

Should you need additional clarification, please don't hesitate to call Lynn Kunzler or Susan Linner of my staff.

Sincerely,

JAMES W. SMITH, JR.  
COORDINATOR OF MINED  
LAND DEVELOPMENT

cc: Richard Dawes, OSM  
Clark Johnson, USFWS

JWS/LMK:btb

# DEPARTMENTAL CORRESPONDENCE

Date April 23, 1982

Subj RAPTOR PROTECTION ON POWER LINES

To Distribution

Dep't. \_\_\_\_\_

From Keith W. Welch

*K. Welch*

Dep't \_\_\_\_\_

Recent correspondence from DOGM suggested that coal operators have a retroactive responsibility to raptor proof power lines. Some confusion has existed concerning the responsibility for this effort and also concerning the limits of DOGM jurisdiction in this matter.

Discussions with all parties have resulted in a mutually agreeable decision that DOGM does not have jurisdiction over that portion of the power distribution system which is installed and maintained by the power company. At Skyline this means that we assume responsibility at the sub-station and are covered by the approval granted to the M&RP. UP&L has responsibility for the power lineup to the sub-station which line, incidentally, was constructed in accordance with REA Bulletin 61-10.

In a telecommunication with Mr. Jim Smith of DOGM on this date, Skyline compliance with UMC 817.97(c) was confirmed and assurance given that no further action on this matter is required. We should, however, continue to monitor future design for compliance with REA Bulletin 61-10.

KWW:k1

xc: Vernal Mortensen  
Roland Heath  
Ken Payne  
Bill Shriver  
Kevin Yocum



STATE OF UTAH  
NATURAL RESOURCES & ENERGY  
Wildlife Resources

Scott M. Matheson, Governor  
Temple A. Reynolds, Executive Director  
Douglas F. Day, Division Director

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

Reply To SOUTHERN REGIONAL OFFICE  
622 North Main Street, Box 606, Cedar City, Utah 84720  
(801) 586-2455

March 29, 1983

Keith W. Welch  
Environmental Coordinator  
Coastal States Energy Company  
411 West 7200 South  
Midvale, Utah 84047

Dear Keith;

I have carefully reviewed the printed materials dealing with wildlife and the Southern Utah Fuel Company's mine expansion in the Salina Planning Unit of the Fish Lake National Forest.

Since the mine has been operating for about 40 years, I see no need to suggest changes in operation or design, because, as it has already been suggested, wildlife using the area have habituated to the present facilities. I feel that H. Duane Smith and Clyde L. Pritchett presented an honest and thorough discussion dealing with mitigation in their report entitled "Wildlife Assessment of the Southern Utah Fuel Company Mining Property and Adjacent Areas, Sevier County, Utah," dated September 1980. I would merely like to re-emphasize their conclusions:

1. Wildlife habitat loss should be minimized by opening air intake portals to the outside from underground mine tunnels.
2. These portals should be placed so no major big game migration trails are interrupted.
3. Efforts should be maintained to minimize wildlife loss and/or harrassment associated with operation of the mine. Haul and access roads should be posted with appropriate speed limits and precautionary signs warning of the presence of wildlife. The current use of a commuter bus should be maintained. All employees should be required to attend a biannual wildlife orientation program. SUFCo should continue to restrict the handling and discharge of firearms by employees on certain roads and areas.
4. Wildlife habitat improvement should occur in key areas where such species as deer and elk would be attracted away from impact areas, such as hazardous stretches of highway.

Augmenting present wildlife ranges may favorably mitigate

Board: Warren T. Howard, Chairman • L. S. Skaggs • Lewis C. Smith • Jack T. World • Roy L. Young

Keith Welch  
Coastal States Energy Company  
page 2

highway mortality, providing improvements are extensive and well planned.

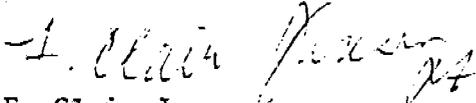
5. The present water resource must not be reduced. It would be advantageous if additional permanent waters could be provided by wells, guzzlers, or developed springs. Such water sources should be fenced to restrict use by domestic animals.

I am looking forward to further cooperation with your company. If I can be of service, please contact me.

Sincerely,



Wes Shields  
Resource Analyst



F. Clair Jensen  
Regional Supervisor

FCJ/WS/kkc

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

55 South First East  
Richfield, Utah 84701

2820

April 18, 1983



Coastal States Energy Company  
411 West 7200 South  
Midvale, Utah 84047

ATTN: Keith Welch, Environmental Coordinator

Dear Keith:

Pursuant to the State of Utah Completeness Review and Technical Deficiency Document for Convulsion Canyon Coal Mine, the Forest Service has the following comments about wildlife mitigating needs.

We concur with the comments in a letter sent you from the Division of Wildlife Resources on 3/29/83. The letter was signed by both Wes Shields and Clair Jensen.

We also suggest you use the management direction in the Salina Land Use Plan, as a guide when preparing the wildlife mitigating plan. Please review both the Skumpah and Old Woman management units, in the Salina Land Use Plan for direction.

If further input is needed from us please feel free to contact us as needed.

Sincerely,

*Darrel Hintze*

*for*

CHARLES R. ALLRED  
District Ranger

817.97 Protection of Fish, Wildlife and Related Environmental Values:

(c) The applicant must reply to the Division's February 26, 1982 letter regarding raptor protection on powerlines. Two options were listed for poles constructed prior to 1977: SUFCo must choose and pursue one of these. Plans for pole modification should be approved in advance by the Division.

DEFICIENCIES (#1)

SUFCo's response to this concern is inadequate. The attached memo deals with the Skyline Mine and is inapplicable here. If the poles have been modified, a map of all poles on the permit area, showing which have been modified, and a design drawing of the modification should be included in the mine plan. The U.S. Fish & Wildlife Service (USFWS) must make a determination that the poles are safe for raptors. A USFWS representative should be at the minesite in the near future to examine the power poles.

Response:

By letter dated June 19, 1981, the Division of Oil, Gas and Mining required installation of raptor perches by July 1, 1981. Upon receipt of that letter, the applicant's representative, Mr Kerry A. Frame, discussed the issue with Ms. Mary Ann Wright of DOGM and was advised to either:

1. Contact the USFWS representative for an inspection to determine which poles required protection and construct devices in accordance with that representative's advice, or
2. Construct devices on every company owned pole at the minesite in accordance with designs described in REA Bulletin 61-10, Powerline Contacts by Eagles and Other Large Birds.

817.97 Protection of Fish, Wildlife and Related Environmental Values:Response: (continued)

Attempts to schedule an inspection with the USFWS representative prior to July 1, 1981 were unsuccessful and, therefore, Ms. Wright provided SUFCo a copy of the REA Bulletin during July 1981. Installation of the perches began immediately in accordance with alternative 2 presented above, and as referenced in Dave Lof's August 31, 1981 inspection memo.

Six months later, the Division's February 26, 1982 letter requested conformance with one of the two options. At that itme, the protective devices had already been installed and satisfied one of the options set out in the letter which stated, "All poles with hazardous configurations shall be physically modified according to the criteria set forth in the guidelines above or according to plans approved by the Division. The operator will have 180 days to make the necessary modifications."

Since the letter did not require Division approval of the modification plans if the Bulletin was used, no further action was taken. The installations have been repeatedly inspected during regular DOGM inspection and have been examined by USFWS personnel. All pertinent correspondence has been previously provided in responses in both the 1981 and the 1983 Apparent Completeness Reviews. The locations of minesite power poles are shown on Map 80-4A, presented in Volume 3.

817.97 Protection of Fish, Wildlife and Related Values:

The applicant must develop and commit to a specific wildlife mitigation plan prior to permit approval being granted. This can be done in conjunction with the U.S. Forest Service and Division of Wildlife Resources. There are several suggested mitigation measures in the Wildlife and Aquatic Resources Studies which could form the nucleus of such a plan.

DEFICIENCIES (#2)

The applicant references a mitigation plan in the 1980 submittal, page 54-56 of the Wildlife Report. This is not a mitigation plan, but rather recommendations from the applicant's wildlife consultant as to what should go into a mitigation plan. The applicant should use those recommendations, along with the recommendations made by the Utah Division of Wildlife Resources and the U.S., Forest Service to make a definitive reclamation plan. (Example: SUFCo will implement an employee education program, will improve wildlife habitat in areas adjacent to the minesite, will provide additional watering sources, etc.)

Response:

Since the SUFCo mine has been operating for over 40 years, wildlife also using the area have habituated to the present facilities and operation. For example, deer regularly migrate through and graze in the mine surface facilities area. Relative to the protection of wildlife, Southern Utah Fuel Company has already committed to and implemented:

- use of employee commuter buses to minimize highway traffic
- installation of raptor protection on mine power poles
- posting the access road with appropriate speed limits
- restricting use of firearms by company personnel.

817.97 Protection of Fish, Wildlife and Related Values:Response: (continued)

Since there exists already numerous watering sources above and adjacent to the mine area, the Applicant believes that a commitment to create new watering areas and sources is unnecessary.

In addition to above listed items, Applicant also will include in all future new-employee orientation programs the Utah Division of Wildlife Resources slide presentation, Coal Mining and Wildlife. This presentation has already been purchased and being used by Applicant.

Past submittals, particularly in the 1981 ACR Response to Comments UMC 817.97 (a), (c), (d)(8) presented in Volume 7, pointed out that there are other possible actions to enhance wildlife habitat in publicly accessible areas adjoining the SUFCo permit area. However, these additional measures, as listed on page 45 of the 1979 Mine Plan Addendum, Volume 2, are of a nature requiring management by the appropriate regulatory authority. Such measures are not within the Applicant enforcements power since the measures require restrictions on the general public. Therefore, the Applicant does not propose to incorporate any of these additional mitigating measures to further habituate the mine area with wildlife.

UMC 817.99 Slides and Other Damage:

A commitment by SUFCo is needed so that any time a slide occurs which may have a potential adverse effect on public property, health, safety or the environment, SUFCo shall notify the Division by the fastest available means and comply with any remedial measures required by the Division.

Response:

The SUFCo mine general manager or his designated representative will promptly notify the Division of Oil, Gas and Mining of the occurrence of a slide which has potential for adverse effect on public property, health, safety or the environment. The Applicant will comply with remedial measures required by the regulatory authorities to reduce or eliminate the potential adverse effect of such slide.

UMC 817.100 Contemporaneous Reclamation:

Applicant should file a plan for contemporaneous (interim) reclamation, including seeding and other land stabilization techniques.

Response:

A plan for contemporaneous (interim) reclamation for the coal slide areas was submitted in the 1980 Submittal, Compliance Response, 784.11 (b), Volume 3. All other reclamation activities prior to final reclamation will be performed as proposed for final reclamation (Soils and Vegetation, Volume 5), as applicable, except:

1. Where the area to be reclaimed is to be redisturbed at a later date, the Applicant will only revegetate such areas for the interim period with grasses and forbs. An example of this type of interim reclamation would be an area in which erosion control is needed for the interim period before redisturbance.
2. Where Mine Health and Safety regulations require that areas be kept barren of vegetation such as areas around mine ventilation openings.
3. Where an activity involving land disturbance is permitted separately from the mining operation such as an exploratory drilling operation. In these instances, permit conditions will dictate the reclamation measures to be performed.

UMC 817.106 Rills and Gullies:

Applicant must include in the backfilling and grading plan, methods that will be used to fill, grade or otherwise stabilize rills and gullies should they occur.

Response:

The Applicant will exercise care to guard against erosion during and after application of topsoil and will employ the necessary measures to ensure the stability of topsoil on graded slopes. Erosion control measures will include surface roughing and matting of slope areas thought to be unstable.

Graded slopes showing instability tendencies will have topsoil anchored with matting during revegetation. The Applicant will fill, regrade, or otherwise stabilize any rills or gullies 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 otherwise stabilized, will be reseeded or stabilized accordingly.

UMC 817.122 Subsidence Control: Public Notice:

The mining schedule shall be distributed by mail to all owners of property and residents within the area above the underground workings and adjacent areas that would be affected by subsidence if it occurred.

Response:

A map showing the projected sequence of mining for the SUFCo operation has been mailed to all property owners and residents within the area which could potentially be affected by subsidence caused by underground coal mining.



**Southern Utah  
Fuel Company**

P.O. Box P  
Salina, Utah 8465A  
(801) 529-7428  
(801) 637-4880 (Mine)

**Subsidiary of  
Coastal States  
Energy Company**

December 9, 1981

Mr. Robert Hagan  
Regional Director  
Office of Surface Mining  
Brooks Towers  
1020 - 15th. Street  
Denver, Colorado 80202

Dear Mr. Hagan:

Attached to this letter please find a copy of Southern Utah Fuel's subsidence tables and maps. They have been prepared as an update to the current subsidence report.

It is our understanding that OSM handles distribution of copies to the USGS in Salt Lake City, DOGM, and the U.S. Forest Service in Richfield, Utah. Therefore, nine copies have been provided for your convenience.

If there are any questions concerning this submittal, please contact me.

Sincerely,

Kerry A. Frame  
Chief Engineer

KAF:dlj

Enclosures

xc: Dick Allred, U.S. Forest Service w/o enclosures  
Jackson Moffitt, U.S. Geological Survey w/o enclosures  
Jim Smith, Division of Oil, Gas and Mining w/o enclosures

bxc: Bud Long  
Ken Payne

SUBSIDENCE TABLES



# SUBSIDIANCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. 1 L 3 10-76	8272.90	108362.24	103696.18									
5-19-77				8268.28	108362.69	103697.38	-4.12	+ .45	+ 1.20	-4.12	+ .45	+ 1.20
7-22-77				8263.50	108362.59	103697.81	-4.78	- .10	+ .43	-8.90	+ .35	+ 1.63
10-28-77				8264.08			+ .58			-8.32		
5-12-78				8264.15	108362.62	103697.47	+ .07	+ .03	- .34	-8.25	+ .38	+ 1.29

STA. 1 L 4 10-76	8410.41	107838.36	103603.32									
5-19-77				8408.60	107839.20	103604.00	-1.81	+ .84	+ .68	-1.81	+ .84	+ .68
7-22-77				8404.25			-4.35			-6.16		
10-28-77												
5-12-78				8403.65	107839.57	103603.73	- .60	+ .37	- .27	-6.76	+ 1.21	+ .41

# SUBSIDIENCE

STA.	DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
		ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
2L1	6-10-77	8380.44	109697.17	103371.95									
	9-14-77				8380.47			+ .03			+ .03		
	10-28-77				8380.35			- .12			- .09		
	6-14-78				8380.51			+ .16			+ .07		

STA. 2L2	6-16-77	8383.72	109253.34	103263.02									
	10-20-77				8384.04			+ .32			+ .32		
	10-28-77				8384.02			- .02			+ .30		
	6-14-78				8383.43			- .59			- .29		

# SUBSIDIENCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. 2L3	6-10-77	8390.60	108854.14	103177.23								
	10-20-77			8390.52								
	10-28-77			8390.41								
	11-25-77			8389.70								
	6-14-78			8388.39								

STA. 2L4	6-30-77	8394.42	108484.82	103069.07								
	10-15-77			8391.93								
	10-28-77			8391.67								
	11-25-77			8390.96								
	6-14-78			8390.14								

# SUBSIDENCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. 2 L 5 6-30-77	8392.12	108139.69	102986.76									
10-28-77				8391.33			- .79			- .79		
6-14-78				8391.52			+ .19			- .60		

STA. S-1 6-1-78	8545.31	109951.19	106497.26									
7-10-80				8545.31	109951.19	106497.26	0	0	0			

# SUBSIDIANCE

STA.	DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
		ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
S-2	6-1-78	8452.20	111140.62	106863.75									
	11-17-78				8452.20	111140.62	106863.75	0	0	0			
	7-10-80				8452.20	111140.60	106863.78	0	-0.02	+0.03	0	-0.02	+0.03

STA. S-3	6-1-78	8487.93	111010.43	107505.79									
	11-17-78				8487.92	111010.43	107505.79	-0.01	0	0	-0.01		
	12-19-79				8487.50	111010.36	107505.75	-0.42	-0.07	-0.04	-0.43	-0.07	-0.04
	7-10-80				8487.26	111010.33	107505.74	-0.24	-0.03	-0.01	-0.67	-0.10	-0.05
	6-5-81				8487.39	111010.29	107505.68	+0.13	-0.04	-0.06	-0.53	-0.14	-0.11

# SUBSIDIENCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. S-4 6-1-78	8466.82	110684.13	107332.76									
11-17-78				8466.82	110684.13	107332.76	0	0	0			
7-12-79				8464.04			- 2.78					
12-19-79				8464.78	110683.22	107333.15	+ .74	- .91	+ .39	- 2.04	- .91	+ .39
7-10-80				8464.55	110683.16	107333.10	- .23	- .06	- .05	- 2.27	- .97	+ .34
6-11-81				8464.69	110683.18	107333.01	+ .14	+ .02	- .09	- 2.13	- .95	+ .25

STA. S-5 6-1-78	8524.14	109797.78	107124.22									
7-12-79				8520.19			- 3.95			- 3.95		
12-19-79				8519.97	109798.25	107124.92	- .22	+ .47	+ .70	- 4.17	+ .47	+ .70
7-10-80				8519.28	109798.34	107124.88	- .69	+ .09	- .04	- 4.86	+ .56	+ .66
6-11-81				8519.91	109798.14	107124.78	+ .63	- .20	+ .10	- 4.23	+ .36	+ .76





# SUBS~~IDE~~ENCE

STA.	DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
		ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
S-10	6-8-78	8362.30	110394.77	102239.86									
	7-10-80				8362.30	110394.77	102239.86	0	0	0	0	0	0
	6-12-81				8362.80	110394.96	102239.53	+ .50	+ .19	- .33	+ .50	+ .19	- .33

STA. S-11	6-8-78	8372.66	110220.31	102857.30									
	7-10-80				8372.67	110220.31	102857.30	+ .01	0	0	+ .01	0	0
	6-12-81				8372.72	110220.48	102856.95	+ .05	+ .17	- .35	+ .06	+ .17	- .35

# SUBSIDENCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. 6-8-78	*											
S-12 6-8-78	8361.43	109105.19	102573.00									
12-14-78				8358.64			- 2.79			- 2.79		
12-19-79				8358.62			- .02			- 2.81		
7-10-80				8358.62			0			- 2.81		
6-12-81				8359.39	109106.16	102572.04	+ .77	+ .97	- .96	- 2.04	+ .97	- .96

\* S-12 HAD INITIAL SUBSIDENCE OF ±1.0' BEFORE INSTALLATION

STA. 6-8-78	8355.18	109312.11	101972.26									
S-13 12-14-78				8350.36			- 4.82			- 4.82		
12-19-79				8350.84	109311.65	101971.34	+ .48	- .46	- .92	- 4.34	- .46	- .92
7-10-80				8350.84	109312.00	101971.31	0	+ .35	- .03	- 4.34	- .11	- .95
6-12-81				8350.85	109312.45	101971.28	+ .01	+ .45	- .03	- 4.33	+ .34	- .98

# SUBSIDIANCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. 5-14 6-8-78	8337.65	109478.72	101247.57									
12-14-78				8337.65			0			0		
12-19-79				8333.46			-4.19			-4.19		
7-10-80				8333.37	109477.12	101247.36	-0.09	+0.40	-.21	-4.28	+0.40	-0.21
6-12-81				8333.31	109479.36	101247.11	-.06	+.24	-.25	-4.34	+.64	-.46

STA. 5-15 6-8-78	8323.19	109593.36	100856.93									
7-10-80				8323.18	109593.36	100856.93	-.01	0	0	-.01	0	0

# SUBSIDIENCE

	DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
		ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA.	6-21-78	8305.10	108559.75	100269.74									
S-16	9-22-78				8305.10			0			0		

STA.	6-14-78	8331.73	108374.49	100983.67									
S-17	9-22-78				8331.73			0			0		





# SUBSIDENCE

STA.	DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
		ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
S-22	6-21-78	8427.25	111882.08	100224.13									
	7-25-80				8427.05	111882.09	100224.22	-0.20	+0.01	+0.09	-0.20	+0.01	+0.09
	6-5-81				8427.55			+0.50			+0.30		

STA.	6-21-78	8417.17	111880.09	100505.69									
S-23	7-25-80				8416.94	111879.93	100505.84	-0.23	-0.16	+0.15	-0.23	-0.16	+0.15
	6-5-81				8415.02			-1.92			-2.15		















# SUBSIDENCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. WC-3 3-5-80	585.71											
6-24-80				585.59			-0.12			-0.12		
8-6-80				585.64			+0.05			-0.07		
6-4-81				585.46			-0.18			-0.25		

STA. WC-4 6-24-80	456.00											
8-6-80				455.92			-0.08			-0.08		
6-4-81				455.59			-0.33			-0.41		



# SUBSIDENCE

	DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
		ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. <u>4L38</u>	10-2-80	8552.91	109720.06	108853.78									

STA. <u>4L39</u>	10-2-80	8556.45	109680.89	108986.19									



# SUBSIDIANCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. 4L42 10-2-80	8642.37	110020.63	109237.31									
4-30-81				8641.12	110020.07	109236.82	- 1.25	- .56	- .49	- 1.25	- .56	- .49
6-9-81				8641.08	110019.45	109236.66	- .04	- .62	- .16	- 1.29	- 1.18	- .65

STA. 4L43 10-2-80	8600.70	109826.81	109186.41									
4-30-81				8599.64	109826.18	109186.66	- 1.06	- .63	+ .25	- 1.06	- .63	+ .25
6-4-81				8599.74	109825.62	109186.50	+ .10	- .56	- .12	- .96	- 1.19	+ .13

# SUBSIDENCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. 4L44 10-2-80	8562.14	109638.17	109130.63									
4-30-81				8561.46	109637.68	109130.90	- .68	- .49	+ .27	- .68	- .49	+ .27
6-4-81				8561.97	109637.23	109130.92	+ .51	- .45	+ .02	- .17	- .94	+ .29

STA. 4L45 10-2-80	8540.47	109453.94	109076.14									
4-30-81				8540.00	109453.82	109076.44	- .47	- .12	+ .30	- .47	- .12	+ .30
6-4-81				8541.07	109453.66	109076.52	+ 1.07	- .16	+ .08	+ .60	- .28	+ .38



# SUBSIDENCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. 4L48	10-2-80	8516.05	108859.66	108905.26								
	6-25-81				8516.05	108859.66	108905.26	0	0	0	0	0

STA. 4L49	10-2-80	8503.90	108671.98	108850.00								

# SUBSIDENCE

DATE	INITIAL READING			PERIODICAL READING			DIFFERENCE IN READINGS			ACCUMULATED DIFFERENCES		
	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST	ELEV.	NORTH	EAST
STA. <u>4L50</u>	10-2-80	8500.68	108534.89	108810.05								

STA. <u>4L51</u>	10-2-80	8564.45	109579.77	109328.09								