VOLUME 7

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1981 SUPPLEMENT

FEDERAL COAL LEASE NO. U-47080

MINING METHODS

In order to achieve maximum coal reserve recovery and enhance overall production rates, the proposed mining plan will involve two mining methodologies most appropriate for SUFCo's specific lease geology characteristics. The principal methodology adapted for the basic mine plan will involve the room and pillar mining system. The longwall method of mining will be implemented in Lease U-47080 where longwall mining is most appropriate due to seam thickness, cover depth, and soft substrata.

Room and Pillar Method

In order to safely and economically ensure the maximum recovery of reserves, it is desired that the room and pillar method of mining be used as follows:

1. To develop the mains, submains and panel entries.

2. To extract panels under cover of 1,500 feet or less. This is desirable as longwall mining would be economically prohibitive in comparison with recovery possible using the room and pillar system under this cover.

These factors, which affect the proposed mine plan, can be accomodated by the use of room and pillar mining which can not be attained by the longwall mining method. All entry and panel development will be accomplished by continuous miners using the room and pillar method of mining. Panel development is achieved by driving three panel entries from the main entries to the designated panel limits.

Each mining panel is then developed from these entries on the retreat. Coal is transported from the continuous miner to the belt feeder by diesel haulage units. Coal is conveyed out of the panel by belt conveyors.

Diesel-powered, rubber-tired tractors and service cars are used to transport personnel and materials from the portals to the working faces. The use of electric locomotives on tracks is considered impractical because of the irregular dip of the coal seam. Adequate amounts of air and well

maintained transportation routes for the rubber-tired diesel equipment will be provided.

Although now shown, the detailed layout of roof support will include all necessary and adequate steps, as approved by the appropriate authority, to ensure the stability of roof, floor and rib surfaces.

Longwall Mining

Longwall mining is proposed in Lease U-47080 for the extraction of large uniform blocks of mineable coal and will result in increased overall recovery. The mine layout is based on longwall mining in Lease U-47080 where the panels are more than 2,500 feet in length and where a suitable longwall panel can be constituted. Recoverable reserves in the longwall mining area are based on mining a maximum of 12 feet thickness of coal.

The proposed longwall mining system consists of three basic integrated subsystems: self-advancing roof support, shearer, and conveyance.

Roof support elements to be used are classified as shield supports. Shield supports are considered to be more suitable for the mining conditions expected and are designed for operation (expansion, contraction, advance and move) in varying thickness of coal seams.

Two basic types of coal shearer subsystems are available - the plow and the shearer. Since the plow system is designed for use in seams which are relatively constant in thickness, a double shearer system will be used for efficiency and flexibility of operation. Such a system consists of two rotary cutting drums mounted on ranging arms which are pivoted to a common body containing the power and drive assemblies. An optimum-tip drive speed is associated with each drum-pick configuration and diameter to assure the minimization of fines in the sheared coal.

The conveyance subsystem will be of adequate strength and power specifications to convey extracted coal along the 400 to 600-foot faces.

In areas where coal is thicker than the height capacity of the mining equipment, the unmined coal will be left in the bottom of the bed, unless economic or safety conditions warrant otherwise.

A high overall recovery of reserves can be expected as the longwall unit retreats through a panel. Pillars in developed entries will be left to protect adjacent panels. All entries located against faults and property boundaries will be left open as bleeders.

UNDERGROUND EQUIPMENT

The following is a list of underground equipment now in use. The same type of equipment or equivalent is expected to be used in the future.

TYPE OF MACHINERY	MANUFACTURER	MODEL NO.	NO. OF MACHINES	SUPPORT OR FACE
Cutting Machines	Joy	15RU	2	F
Continuous Miner	Lee Norse	HH455	1	F
	Jeffrey	120H2	4	F
	Joy	12CM11	1	F
Coal Drills	Long-Airdox	RDF-24	2	F
Roof Bolters	Lee Norse	T1-43	4	F
	Long-Airdox	LRB-22	1	F
	Secoma	PEC-22M-1BR-D4	1	F
Shuttle Cars	Wagner	MTT-F20-S18	6	F
		MTT-F17-14S	7	F
	Jeffrey	410H	1	F
		4114	3	F
Front End Loaders	Eimco	915D	5	F
	Eimco	913	1	F
	Eimco	915E	2	F
	Wagner	ST020	4	F
Feeder Breakers	Stamler	14B	5	F
	Long-Airdox	Roscoe 11	1	F
Service Vehicles	Sien	6067	2	S
	Sien	603	8	S
	Sien	620-E	1	S
	Sien	612-E	1	S
	Ford	1000	4	S
	Ford	1600	20	S
		1200		
	International	2500	9	S
	Wagner	UT45A	6	S
	Allis Chalmers	5030	7	S
Compressors	Gardner-Denver	185 CFM	2	S
Rock Dusters (hyd)	MSA	400	3	S
Mantrips	Getman	R62-11-PC	5	S
Longwall Shearer	Eickhoff	EDW-300-2	1	F
Shields	Hemscheidt - 4 leg support		100	F
Hydraulic Power Pack	Louis-Allis		1	F
Stage Loader	Hemscheidt-125 HP		1	F
Face Conveyor	Hemscheidt-Double End		1	F
Single Props	Hemscheidt-High Seam		50	F
Utility Tractor	Wagner	STA-20(s)	1	S

PROJECT MINING BY YEAR

Two alternative mine projections (Schemes 1 and 2) are presented in this Application for review by the regulatory agencies. The Applicant intends to utilize Scheme 1 until such time as the Emergency Lease Application (Federal Coal Lease No. U-47080) is approved and the Applicant is issued a lease pursuant to lease sale. At that time, Scheme 2 will be effectuated. The basis of the alternatives is the variations in proposed sequence of extraction by mining unit by year through depletion of the mineable reserve (shown on Exhibits 1 and 2). Table 81-1 provides the corresponding annual tonnage projected as being produced by the mining units for the respective scheme.

The first (primary) mining scheme projected attempts to predict the future of the mine if the Lease U-47080 Application (filed in October, 1980) for 1,160 acres to the northwest is not approved. Based on mining within the parameters presently experienced by SUFCo operating personnel, the recoverable tonnage would be 26 million tons. The number of mining units that could be deployed through the mine would be limited, and might therefore be reduced from seven to five within the next six years and to three units by 1992. In addition, the recoverable reserves may be entirely depleted in the year 2001 unless adjustments are made to this mining scheme.

The second mining scheme projected and presented assumes that SUFCo will mine the northwest federal lease. This projection also anticipates that the reserve area now under control will be mined by room-and-pillar mining employing the existing continuous miners and the support equipment now successfully used in the mine. Annual production projections for each mining unit are based on historic performance data. With seven continuous miners deployed (and 12 daily scheduled operating shifts) each unit is expected to produce approximately 329,000 tons per year. The drill hole information available at this time involving the Lease U-47080 area suggests both a thinning trend in coal thickness and a thickening trend in the "trash-band" occurrence below the coal seam.

Table 81-1

Mining Methods and Projections Summary

			Tons (Thousands)
Total In-Place Reserves	(a)	Existing Leases	103,800
	(b)	Lease Under Application	25,600
		Total In-Place Reserves	129,400
Total In-Place Reserves of Mineable Thickness	(a)	Existing Leases	58,100
	(b)	Leases Under Application	19,400
		Total In-Place Reserves of Mineable Thickness	77,500

Primary Alternative (No. 1)

			Tons (Thousands)
Total Recoverable Reserves	(a)	Existing Leases	26,000
	(b)	Lease Under Application	-
		Total Recoverable Reserves	26,000
Life of Mine @	(1)	2 Million Tons Per Year	3 years
	(2)	Through Depletion of Reserve	21 years
Recoverable Reserves by Projected Mining Method -			
	(a)	Continuous Miner	26,000
	(b)	Longwall	-

Alternative Scheme (No. 2)

			Tons (Thousands)
Total Recoverable Reserves	(a)	Existing Leases	26,000
	(b)	Lease Under Application	13,000
		Total Recoverable Reserves	39,000
Life of Mine @	(1)	2 Million Tons Per Year	8 years
	(2)	Through Depletion of Reserve	26 years
Recoverable Reserves by Projected Mining Method -			
	(a)	Continuous Miner	30,000
	(b)	Longwall	9,000

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The depth of cover over the Lease U-47080 is also in excess of 1,200 feet throughout much of the area. Consequently, it has been assumed that longwall mining will prove to be the most productive and economic method of mining for this new lease area. Longwall mining is presently scheduled to begin in 1983 with 9,000,000 tons being extracted using this method over a 14-year period. Longwall performance forecasts assume the use of the most recent generation of heavy-duty longwall face equipment which is currently in operation in United States coal mines and producing at rates herein predicted.

1981 SUPPLEMENT

FEDERAL COAL LEASE NO. U-47080

GEOLOGY

SCOPE

The following section includes geologic data and interpretations pertinent to Federal Coal Lease No. U-47080 which were not submitted with the November, 1980, SUFCo No. 1 Mine Plan and which are required under the Utah State program. The Applicant requests that the requirements of UMC 783.14(a)(1) be waived for Federal Coal Lease No. U-47080, pursuant to UMC 783.14(b). This Supplement includes data, geologic maps, and cross-sections for Federal Coal Lease No. U-47080 where information is not already included in the 1980 Mine Plan (Maps 81-2, 81-3, and 81-4).

A waiver of UMC 783.14(a)(1) has been requested by the Applicant. Appropriate justification for granting the waiver follows:

1. The submitted 1980 Mine Plan includes data from adjacent federal coal leases which are intended to satisfy UMC 783.14(a)(1) requirements.

2. Due to the extent of previous drilling in the area, it is reasonable to estimate geologic and chemical characteristics of the strata down to and including the floor material of the Upper Hiawatha coal seam. The Utah Geological and Mineralogical Survey (UGMS) and U.S. Geological Survey (USGS) have jointly drilled 26 coal exploration holes in the unleased federal coal area west of the permit area as defined in the 1980 Mine Plan (Smith, 1981).

   One of the UGMS/USGS boreholes, MC-20-AL, is located on Federal Coal Lease No. U-47080. Two holes, MC-17-AL and MC-18-AL, are less than one mile to the north. Hole MC-23-AL is approximately one-half mile to the west. Two holes, MC-21-AL and MC-29-AL are less than one and one-quarter miles to the southwest of the lease.

In addition to the UGMS/USGS drilling, the Applicant has drilled 10 holes on Federal Coal Lease No. SL-062583 along a one-quarter mile wide band adjacent to the east and south boundaries of Federal Coal Lease No. U-47080.

3. Federal Coal Lease No. U-47080 is in an area where no surface mining operations or facilities are anticipated.

METHODOLOGY

The geology of Federal Coal Lease No. U-47080 is inferred from drilling on the Applicant's adjacent leases to the east and south, and from the UGMS/USGS drilling as described in the Scope. Most of the geologic data descriptions and interpretations submitted with the SUFCo No. 1 Mine Plan in November, 1980, to satisfy the Utah State program requirements applies to Federal Coal Lease No. U-47080.

REGIONAL GEOLOGIC FRAMEWORK

The regional geology is described in the 1980 Mine Plan, Vol. 1, pp. 2-4. The North Horn Formation, which caps Duncan Mountain, covers an area of approximately 245 acres on Federal Coal Lease No. U-47080. Because the North Horn is not present in the adjacent SUFCo Mine area, its geologic description is not included in the 1980 Mine Plan. The geologic description of the North Horn Formation, the uppermost geologic unit present in the lease area, is included to amend the previously submitted geologic description.

Only two geologic formations are exposed on Federal Coal Lease No. U-47080, the Upper Cretaceous Price River Formation and the overlying Tertiary North Horn Formation. Spieker (1931, p.46) described the lower member of this Wasatch Formation, now given formation status as the North Horn Formation:

"The Wasatch formation contains a highly varied assemblage of rock types. The lower member consists in the central part of

> the plateau predominantly of vari-colored shale, in which the combinations of various shades of red, purple, chocolate-brown, green, and gray are characteristic of the coloring of Wasatch rocks in the general region, but it contains many irregular beds of gray, brown, and cream-colored sandstone of various texture, and thin beds of fresh-water limestone, chiefly steel-gray and cream-colored but in places also white, tan, and dark blue-gray. In the southwestern, central-eastern, and northern parts of the plateau the member contains more sandstone. Beds of conglomerate occur in the member irregularly both as to horizon and locality. Near the base of the formation this conglomerate belongs to this type of limestone conglomerate mentioned on page 43, but conglomerate whose pebbles are chert, quartz, and quartzite occurs at many places. The lower member ranges generally in thickness between 1,000 and 2,000 feet. This great range is doubtless due in part to the varied conditions under which the sediments accumulated and in part also to irregularities in the surface on which they were deposited."

Due to erosion, the maximum thickness of North Horn remaining on Duncan Mountain is estimated to be approximately 417 feet.

GEOLOGY OF THE PROJECT VICINITY

The stratigraphy and structure of the project vicinity are described in Volume 3 of the 1980 Mine Plan (the Permanent Program Section) Response to Comment 783.14(a)(Section I)). However, the stratigraphic description is supplemented to include the North Horn Formation description. Although no faults have been mapped on Federal Coal Lease No. U-47080, minor faulting could be encountered during mining.

GEOLOGY OF THE COAL BED AND ADJACENT UNITS

The geology of the Upper Hiawatha coal seam and adjacent units is described in the 1980 Mine Plan. The following data and interpretations supplement the previously submitted discussion to include Federal Coal Lease No. U-47080.

Exploration and Drilling

The Applicant has not yet conducted any drilling on Federal Coal Lease No. U-47080, although a notice of Intent to Explore was submitted to the Area Mining Supervisor, USGS, Salt Lake City, Utah on March 25, 1981. The proposed drilling program consists of four exploratory holes extended to provide geologic, geochemical, hydrologic and engineering data in support of mine planning and coal quality predictions.
No oil and gas or water well drilling is known to have occurred on the lease.

Stratigraphy

Drilling by the UGMS/USGS (Smith, 1981, and the Scope, this Supplement) confirms the Applicant's projections which indicate mineable thickness of coal in the Upper Hiawatha coal seam on Federal Coal Lease No. U-47080. Another significant coal seam, the Lower Hiawatha seam, lies about 19 feet below the Upper Hiawatha seam at UGMS/USGS drill hole MC-20-AL and is about 12 feet in thickness, based on the geophysical log. A parting appears to develop in the Upper Hiawatha seam between holes MC-20-AL and MC-23-AL (see Maps 81-3 and 81-4). The Lower Hiawatha seam is not mineable on the lease area due to its thin and lenticular character and the small interburden interval between it and the Upper Hiawatha seam.

Structure

The geologic structure of Federal Coal Lease No. U-47080 (Map 81-2) is like that of the adjoining Applicant federal coal leases. (See Map 80-5, 1980 Mine Plan.) Dips are expected to range from one to two degrees to the northwest, with local dips of up to 10 degrees in areas where paleochannels underlying the coal seam exhibit significant differential compaction. Such local structural variations cannot generally be predicted based on drilling due to the areal distribution of the narrow and sinuous channel deposits of the lower Blackhawk Formation in the SUFCo No. 1 Mine area.

Small scale faulting will probably occur due to local differential compaction or due to northwest-southeast oriented fractures commonly associated with such faulting in the SUFCo No. 1 Mine. Although aerial photographs may indicate possible local and small-scale faults, actual faulting cannot be confirmed until first encountered during mining.

Detailed Columns of Interest and Cross-Sections

A north-south oriented cross-section (see Maps 81-3 and 81-4) is constructed from geophysical logs to illustrate the stratigraphy of the coal seam and adjacent units.

Coal Reserves

According to the District Mining Supervisor, USGS, Salt Lake City, Utah (11/19/80 memorandum to BLM, State Director, Utah) mineable reserves occur only in the Upper Hiawatha seam on Federal Coal Lease No. U-47080. The USGS reserve estimates are slightly higher than the Applicant's estimates, but are within the 20 percent accuracy criteria for measured reserves (USGS Bulletin 1450-B, p. B6). Therefore, the USGS estimates are cited herein. Coal quality is expected to be similar to the analyses available for the SUFCo No. 1 Mine.

Reserve Calculations

The USGS memorandum cited above summarizes the reserve study as follows:

> "Enclosed is a copy of a geologic report in which the demonstrated reserve base for the applied for lands is estimated to be about 30 million tons. These reserves are contained in the Upper and Lower Hiawatha coal seams with an interburden separation of 17 to 25 feet. The minimum vertical distance in which coal seams can be mined safely is considered to be 30 feet. Therefore, only the Upper Hiawatha seam, containing an estimated in-place reserve of 27.7 million tons is considered minable by our criteria. The amount of coal that could be recovered from the Upper Hiawatha seam within the boundaries of the applied for lands is expected to be about 13.8 million tons or about seven years of reserve at the company's required level of production. The coal seams do not outcrop on the tract in the application."

Coal Quality

Coal quality data were provided in the 1980 Mine Plan (Vol. 1, Confidential Map Packet II, Map 1F).

Adjacent Units (Overburden)

The rock strata overlying the Upper Hiawatha coal seam are described in the 1980 Mine Plan. Due to the continental depositional setting and the associated lithologic variability, roof materials are expected to include sandstone, siltstone, and mudstones, complexly interbedded and intertonguing laterally.

Rock Characteristics, Acid-Toxic, Pyrite, Clay and Alkalinity

The 1980 Mine Plan (Vol. 3, Response to Comment 783.14(a)(2)(iii)) includes data and a discussion of pertinent analysis from the SUFCo No. 1 Mine area. A variety of lithologies were tested and described, and no potentially acid-forming, alkalinity-producing, or toxic-forming materials were examined.

GEOLOGIC EFFECTS OF MINING

The geologic effects of mining are minimal for Federal Coal Lease No. U-47080. Previous mining experience at the SUFCo No. 1 Mine is the most accurate indicator of the hazards and impacts associated with mining in the area.

Mining Hazards

Mining hazards in the SUFCo No. 1 Mine have been associated with several geologic factors. The Upper Hiawatha roof lithologies, particularly the slickensided clays and mudstone, tend to slate severely when exposed to air and are difficult to hold with roof bolting. Roof control problems have also been associated with the coincidence of some fractures at intersections of mains and crosscuts. These latter problems are generally avoided at the

SUFCo No. 1 Mine by ongoing underground mapping and projections of those fractures that prove significant.

Overall, roof conditions at the SUFCo No. 1 Mine have proven exceptionally good. However, this must be attributed in large part to the adaptation of mining methods to the areal geology.

Surface Hazards

No surface hazards have been associated with underground mining at the SUFCo No. 1 Mine. The effects of surface hazards on Lease No. U-47080 are expected to be less than on other Applicant leases in the mine area (see Impact of Mining).

Impact of Mining

Based on subsidence monitoring at the SUFCo No. 1 Mine, subsidence is expected to be less than one-quarter of seam height or in the range of two to three feet. Such a prediction is possible based on a relationship shown in Figure 4 of the Subsidence Report of the 1980 Mine Plan. At UGMS/USGS hole MC-20-AL, the Upper Hiawatha coal seam is approximately 12 feet in thickness and is at a depth of 1,058 feet. This represents a greater seam thickness and a lesser amount of overburden than is expected for most of the lease. Therefore subsidence on the remainder of the lease can be expected to be less than at this location.

If this seam thickness is uniform over a sufficiently large area, the maximum mining height of 12 feet would be possible with longwall mining. Extrapolating from Figure 4 referenced above, the expected subsidence would be 0.26 x 12 feet or about three feet.

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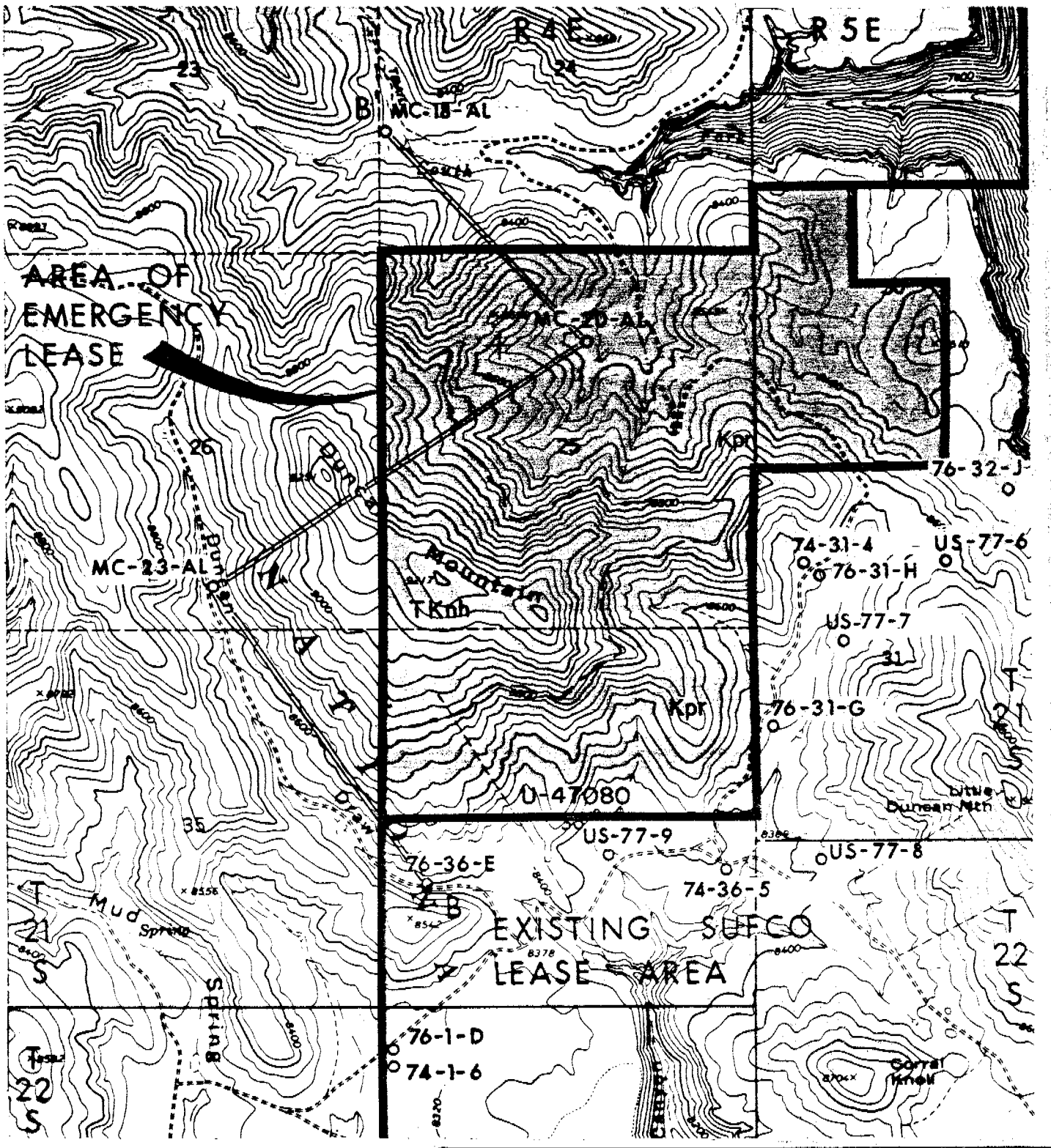

EXPLANATION

B═══B'	CROSS SECTION LINE
MC-23-AL	UGMS/USGS DRILL HOLE
76-36-E US-77-8	CSEC DRILL HOLE
TKnh	NORTH HORN FORMATION
Kpr	PRICE RIVER FORMATION

N

SOUTHERN UTAH FUEL COMPANY
A SUBSIDIARY OF
COASTAL STATES ENERGY COMPANY

GEOLOGIC MAP

FEDERAL COAL LEASE NO. U-47080

0' 2000'
SCALE (Ft.)

MAY 14, 1981

MAP NO. 81-2

Environmental Assessment

Finding of No Significant Impact
and
Decision Notice

Coastal States Energy Company Emergency Lease U-47080

Sevier County, Utah
Fishlake National Forest
USDA, Forest Service
Intermountain Region

This Environmental Assessment discusses Emergency Coal Lease Application U-47080 consisting of 1,158.05 acres of land within the Fishlake National Forest, Sevier County, Utah.

The Environmental Assessment, that follows a Bureau of Land Management format, presents a description of the existing or affected environment involved in the subject coal lease application, a range of leasing alternatives, and mitigating measures for surface protection. Appended to the Environmental Assessment is a study covering the Application of the Coal Unsuitability Criteria as required by the regulations in 43 CFR 3460, that indicates the area is suitable for underground coal mining.

Based upon the analysis and discussions within the Environmental Assessment and the Application of Coal Unsuitability Criteria, it is my decision that the preferred alternative is to recommend to the Bureau of Land Management that the subject coal lease be issued.

I have determined through the Environmental Assessment that this is not a major Federal action which would significantly affect the quality of the human environment; therefore, an Environmental Impact Statement is not required. This determination is further based upon the fact this action is in harmony with the Salina Land Use Plan for which an Environmental Impact Statement has been completed.

The Environmental Assessment is available for public review in the Supervisor's Office of the Fishlake National Forest at Richfield, Utah.

Project implementation may take place immediately after the date of this decision.

This decision is subject to administrative review pursuant to 36 CFR 211.19.

JEFF M. SIRMON
Regional Forester
Intermountain Region
Forest Service

5-1-81
Date

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

324 25th Street
Ogden, UT 84401

2820

MAY 1 1981

Mr. Dean E. Stepanek
Acting Utah State Director
Bureau of Land Management
136 East South Temple
Salt Lake City, UT 84111

Dear Dean:

Enclosed is the subject Environmental Assessment with attached Decision Notice for coal lease application U-47080 within the Fishlake National Forest.

I recommend the lease be issued subject to the standard USDA Stipulation 3109-3 and other standard coal lease stipulations. We request the additional stipulations, as follow, also be attached to the lease:

STIPULATIONS

The Mining Director shall mean the authorized representative of the U. S. Geological Survey or, as appropriate, the authorized representative of the Office of Surface Mining, who is delegated the authority for the approval and administration of mining and reclamation plans. The authorized officer of the surface management agency shall mean the Forest Supervisor, USDA, Forest Service, Fishlake National Forest, 170 North Main Street, Richfield, Utah 84701.

1. 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 and final determination of suitability for mining. The United States Government does not warrant that the entire tract will be susceptible to mining.

2. 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 Area 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 accomplished in such a manner that the modified landscape 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.

3. 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.

Sincerely,

JEFF M. SIRMON
Regional Forester

Enclosure

The attached Environmental Assessment/Technical Examination has been reviewed by the Utah State Office and the Office of Coal Management in Washington. They have determined that the assessment adequately addresses the impacts that would result from the proposed action. They have also determined that the proposed action is not considered to be a major federal action significantly affecting the quality of the human environment requiring an environmental statement pursuant to Section 102(2) (c) of the National Environmental Policy Act of 1969 (PL-91-190).

Richfield District Environmental Coordinator

3/7/81
Date

ENVIRONMENTAL ASSESSMENT/TECHNICAL EXAMINATION

TITLE 43 CFR PART 3425

EMERGENCY COAL LEASE APPLICATION U-47080

COASTAL STATES ENERGY COMPANY

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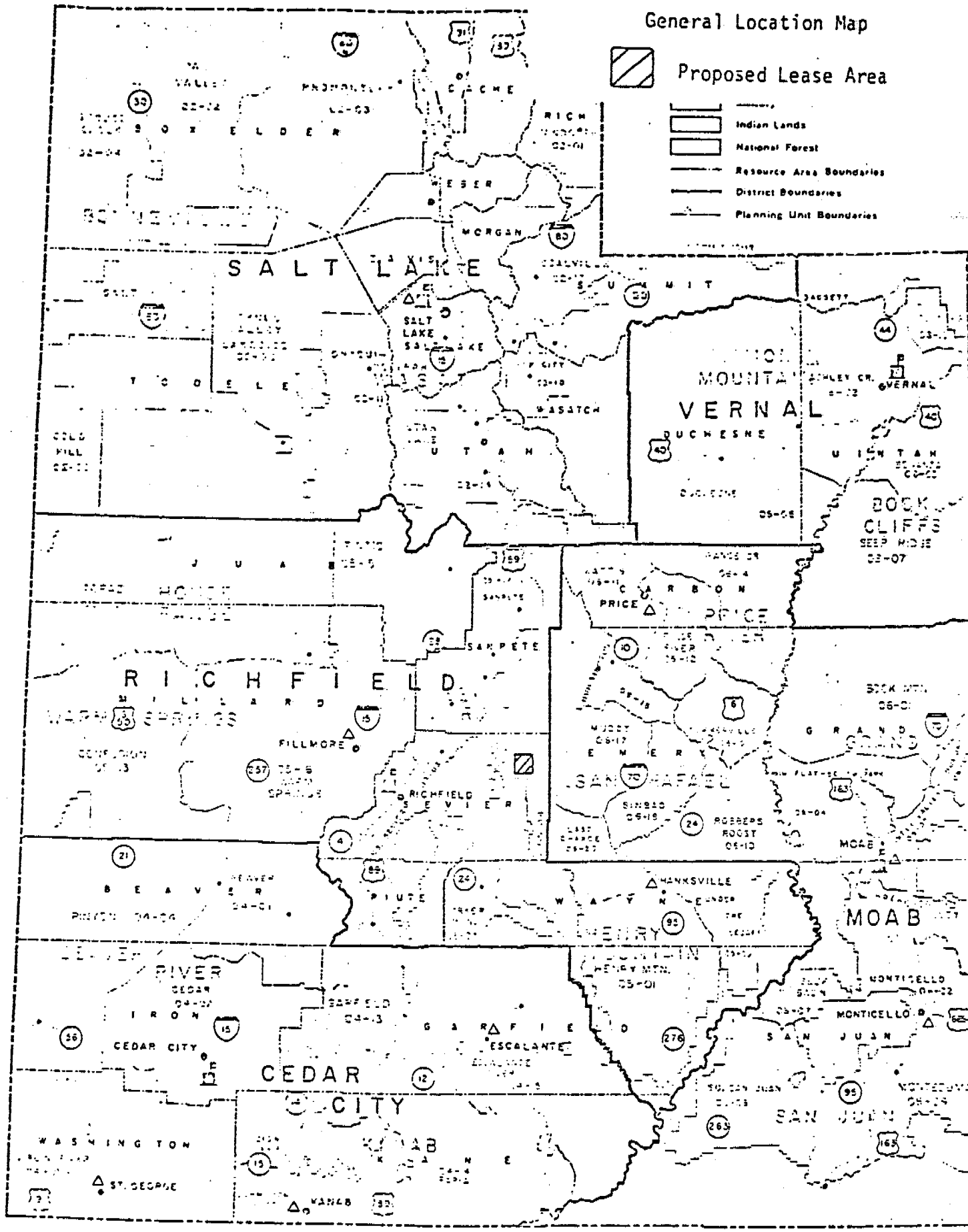
General Location Map



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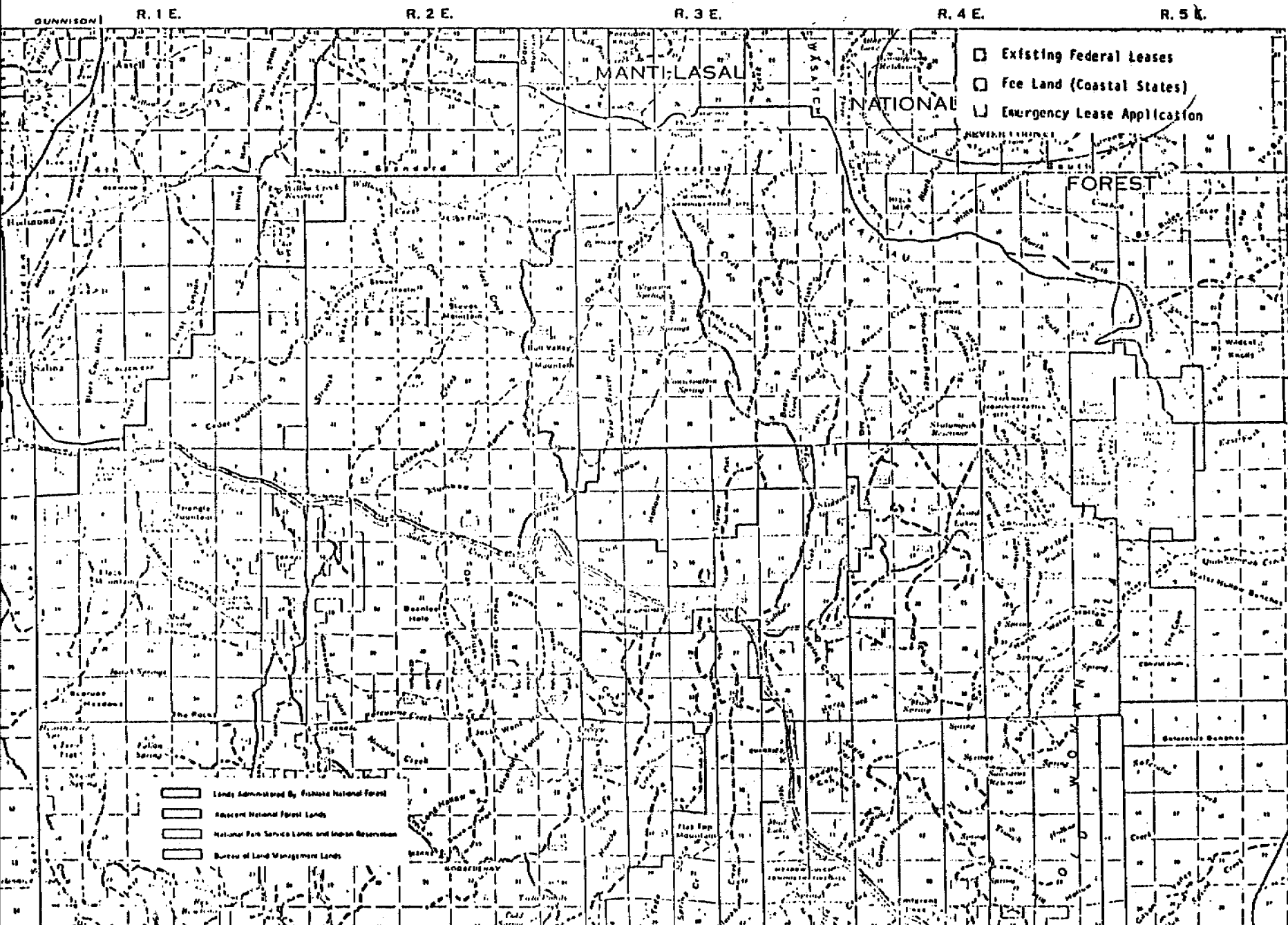
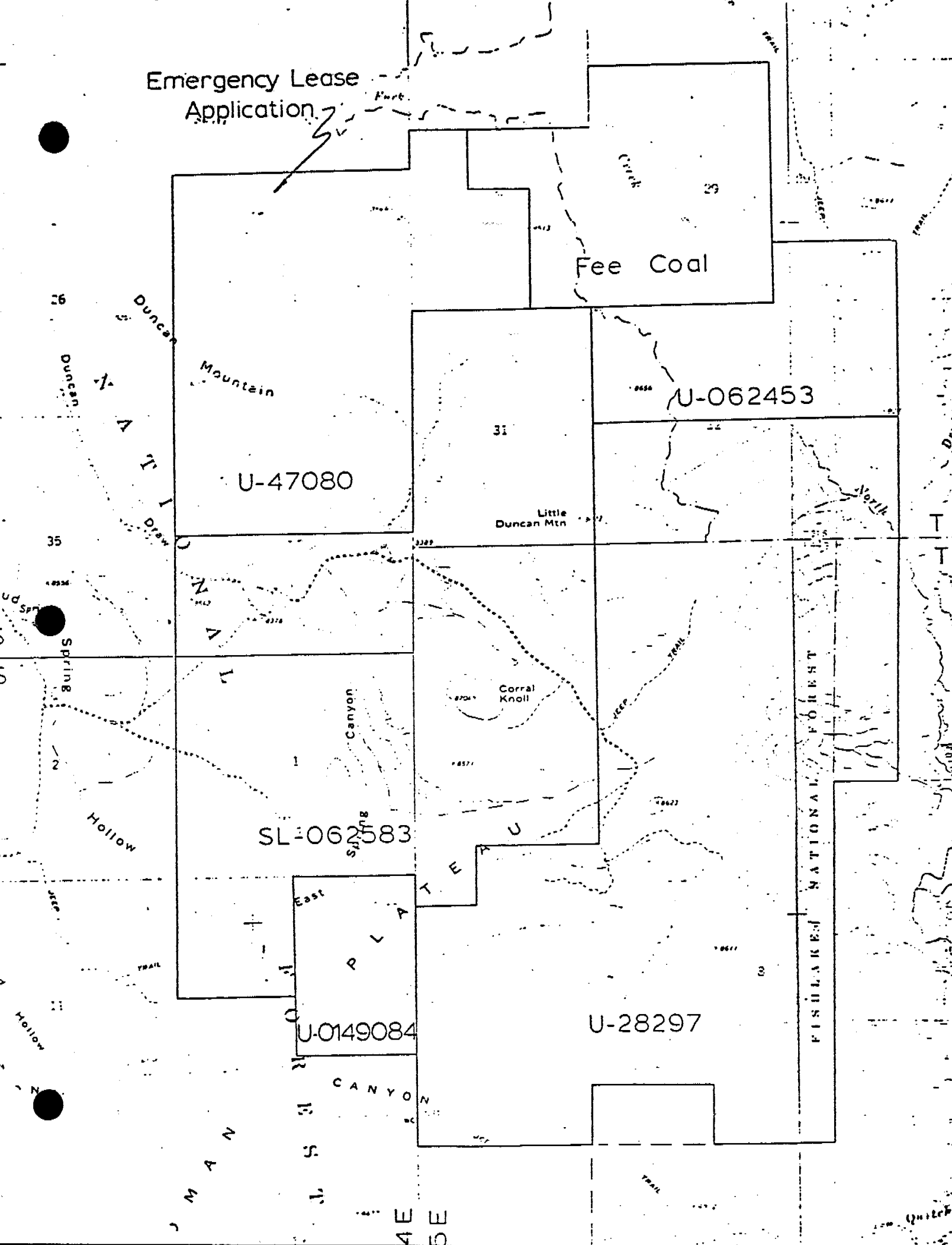

R. 1 E.
R. 2 E.
R. 3 E.
R. 4 E.
R. 5 E.
T. 20 S.
T. 21 S.
T. 22 S.
T. 23 S
GUNNISON
MANTI-LASAL
NATIONAL
FOREST
Existing Federal Leases
Fee Land (Coastal States)
Emergency Lease Application
Lands Administered By Fishlake National Forest
Adjacent National Forest Lands
National Park Service Lands and Indian Reservation
Bureau of Land Management Lands


Emergency Lease Application
Fee Coal
U-062453
U-47080
SL-062583
U-0149084
U-28297
Duncan Mountain
Little Duncan Mtn
Corral Knoll
Canyon
Hollow
Spring
FISHLAKE NATIONAL FOREST
T
T

CHAPTER I

INTRODUCTION

A. PURPOSE AND SCOPE OF ANALYSIS

On October 6, 1980, Coastal States Energy Company of Houston, Texas made application to the Bureau of Land Management (BLM) for an emergency coal lease under the authority of 43 CFR 3425 for 1,158.05 acres of open federal coal lands. The lands applied for are adjacent to Coastal States' active underground coal mine in Convulsion Canyon, Sevier County, Utah. All mining activity would be underground.

Coastal States' lease application was evaluated by the BLM and USGS in October and November, 1980, and was found to meet the emergency leasing criteria outlined in 43 CFR 3425.1-4. The Utah State Office of the BLM recommended that the acreage requested be put up for lease pending application of the unsuitability criteria for coal mining and preparation of an environmental assessment record/technical examination.

This environmental assessment record/technical examination was prepared in response to Coastal States' application for an emergency lease sale of open federal coal land. This document was prepared as required by the National Environmental Policy Act of 1969, through a cooperative effort of the U.S. Forest Service and the Bureau of Land Management. As required in 43 CFR 3461 the coal unsuitability criteria have been applied to the lands under application (see Appendix 1). The results of that study have been incorporated into this assessment. Data for the technical examination were gathered by an interagency environmental assessment team. The combined environmental analysis and technical examination were co-authored by personnel from the Fishlake National Forest and BLM Richfield District.

The purpose of the assessment is to:

1. Determine, through application of the coal unsuitability criteria, if the lands applied for by Coastal States Energy Company are suitable for leasing.

2. Evaluate the direct and indirect impacts of exploration and development of the lease as proposed by Coastal States Energy Company in their lease application.

3. Analyze all reasonable alternatives to development of the proposed lease and the no action alternative.

4. Determine if the leasing action (and implied development) meet the land use management plans of the surface managing agency.

5. Evaluate the technical and natural potential for successful reclamation on the proposed lease tract and develop site-specific surface protection stipulations which would be incorporated into the lease to protect the non-mineral interests in the lands under application.

6. Determine the need for preparing an environmental statement.

B. LAND DESCRIPTION

The proposed lease area is in Sevier County, Utah, approximately 30 miles east of Salina. The area lies on federal lands north of Convulsion Canyon on the southernmost edge of the Wasatch Plateau coal field (Figure 1). The surface is managed by the Forest Service, Fishlake National Forest.

Access to the area is gained by traveling east on I-70 from Salina, Utah, for 16 miles to exit 72, then north on a paved road to the existing mine (Figure 2). Access to the interior of the proposed lease tract is by an unimproved dirt road.

The proposed lease area is legally described as:

Tract	Location
U-47080	T. 21 S., R. 4 E., SLM, Utah
	Sec. 25: All
	Sec. 36: N½
	T. 21 S., R. 5 E., SLM, Utah
	Sec. 30: Lots 2, 3, 4, W½SE¼.
	Total. . . 1,158.05 Acres.

CHAPTER II

EXISTING OPERATION AND PROPOSED ACTION

A. PROBABLE TRACT DEVELOPMENT SCENARIO: COASTAL STATES ENERGY COMPANY

1. Coastal States Existing Operation

Coastal States presently controls 4,914.75 acres of adjoining Federal coal land contained in leases SL-062583, U-062453, U-0149084, and U-28297, and 640 acres of fee coal land for a total of 5,554.75 acres in Township 21 and 22 South and Ranges 4 and 5 East, SLM, Utah (Figure 3). Coastal States owns Southern Utah Fuel Company (SUFCO) who is the operator on the existing leases.

Present reserve holdings on the existing federal leases and fee coal is estimated to be 65.5 million tons of which 50 to 80 percent is recoverable. This estimate is based on one mineable seam in the presently held tracts.

Coastal States has divided its currently producing mine into two production zones. The first zone is mined and supportive pillars are left to protect main haulage ways and leave access to the lands being applied for and eventually to ensure surface stability. In the second zone, full extraction is employed; pillars are removed, and the surface is allowed to subside.

The mining method in the first zone protects the canyon from deterioration while mining under the canyon rim to the outcrop. The uneven boundary of the outcrop and the possibility of coal voids caused by ancient, naturally-burned zones, requires a mining method flexible enough to mine the coal between the voids and the coal outcrop.

The second zone is under the plateau, away from the canyon rim, and is sectioned into blocks and zones that are conducive to high-recovery mining methods. Full extraction using continuous miners and teletrams is a variation of the room-and-pillar method that quickly achieves full or nearly full extraction. The method involves driving three or four development headings up to 2,500 feet with crosscuts to the boundary of the panel. Panels are connected by bleeder headings. The width of panel headings and crosscuts is 15 to 18 feet. Retreat mining begins by driving rooms 500 feet on the side of the panel development heading and then robbing pillars and chain pillars as mining retreats out of the panel. Coal recovery in these panels is 80 to 85 percent, based on mining height.

As rooms advance, two rows of pillars are blocked out. On retreat, the last row of pillars along the length of the 500-foot room is mined to the panel development heading. At this point, another room is driven parallel to the original three, creating a new row of pillars, and again

providing two rows of pillars. The mining sequence is then repeated by mining the row of pillars next to the row previously mined. This sequence is continued until the panel is completely mined out to the barrier protecting the main or submain entries.

Annual mine production has grown steadily since 1942, and rapidly since 1972. In 1970, annual coal production was 70,000 tons; 1972 - 162,000 tons; and 1973 - 257,000 tons. Since 1974, production has increased from 320,000 tons per year to 1.6 million tons for the twelve month period ending August 31, 1980.

Coastal States has established a subsidence monitoring program. The work was begun in the field during September, 1977, and will be a continuing program. Emphasis of the program is on possible alterations of ground water and surface water hydrology systems in the vicinity of the mine.

Surface facilities on approximately 10 acres include maintenance and supply shops, bathhouse, engineering offices, power substation and switch house, powder house, fuel tanks, coal handling and loading station, and a flood sediment tank. A coal stockpile and limited parking area are also located at the mine. Power for the mine is provided by transmission lines from Emery, Utah. Sanitary wastes are handled by a septic tank - drain field system.

The mine currently produces more water than it uses. Excess water is discharged under authority of a National Pollution Discharge Elimination System Permit No. UT0022918. Water is pumped from the active workings at the rate of about 144,000 gallons per day. This water is diverted underneath the mine's surface facilities and flows into Convulsion Canyon.

Coal is currently hauled by 26 to 40-ton capacity trucks at an average rate of 11 per hour from the mine in Convulsion Canyon. The coal is transported to rail facilities in Salina and Levan, Utah or hauled by truck directly to consumers throughout the Intermountain area.

Coastal States currently employs 272 persons. Employees who work at the mine are bused from Salina by Coastal States.

2. Coastal States Proposed Action

Coastal States proposes to mine the applied for tract from existing portals by developing subentries (perpendicular to the present main entry system in Lease SL-062583) to the north and west. Subentries would consist of 5 to 7 openings depending on ventilation requirements. Panels would then be developed on either side of the access subentries. Mining would progress from panel to panel along the subentries over a period of years since each panel requires several months to deplete. Existing surface facilities, including conveyor belts, electrical cable, ventilation, water system and supplies, would adequately handle the expected increase in production; hence, no additional facilities are anticipated.

Should the proposed lease be issued to Coastal States, annual production rates would be as follows:

First Year - 1981	2.6 million tons
1982 - 1984	2.9 million tons
1985 - 1990	3.0 million tons
Thereafter	2.8 million tons

Coastal States indicates that the following annual production rates will come from the applied for emergency lease tract:

1981	125,000 tons
1982	910,000 tons
1983	1.07 million tons
1984 - 1985	2.1 million tons

Coal would continue to be trucked 30 miles to Salina, Utah, 80 miles to a loading facility on the Union Pacific Railroad west of Levan, Utah, and to various consumers throughout the Intermountain area. All travel would be on existing roads. Frequency of truck traffic would be increased from an average 11 trucks per hour at current levels to 12 trucks per hour, an increase of 9 percent. The trucks would run 21 hours per day, 5 days a week.

Coastal States would increase its work force to 305 persons should the lease be granted. Coastal States anticipates that all employees would come from Sevier and perhaps Sanpete Counties.

Preliminary reserve estimates on the proposed lease tract reveal a recoverable reserve of 13.8 million tons. However, further exploration would be necessary to assess coal depths, thickness, quality and distribution within the proposed lease tract. Coastal States anticipates that they would drill four exploration holes on the lease tract to assess the coal deposits.

This exploration program would be a separate and subsequent action to issuance of the emergency lease, but the impacts of the program will be evaluated in this assessment. Coastal States would be required to submit an exploration plan to the U.S. Geological Survey according to the requirements of 30 CFR 211. The plan would be evaluated and approved by USGS and the surface managing agency before the exploration could be conducted.

Coastal States anticipates that one drilling rig would be contracted for all sites. Drill sites would be prepared by clearing all vegetation in an area 40 feet by 60 feet. This area would accommodate

the drilling rig, drill service vehicle, water truck, logging truck and jeep. A mud pit, 8 feet wide, 10 feet long and 5 feet deep would be dug to contain cuttings and drilling fluid. Topsoil removed would be stockpiled for later use. Coastal States estimates that a maximum of 10 days would be required for each drill site. A maximum of 2 months would be spent "on-the-gound." This would occur during the first field season after lease issuance.

It is anticipated that all drill sites could be reached without the need for constructing new access roads. All drill sites and access routes would be rehabilitated per requirements of the surface managing agency.

If the lease is issued, development would begin and continue throughout the life of the mine. All coal on the proposed lease tract would be mined in conjunction with the existing operations.

The ability to mine coal on the proposed lease tract would extend the life of the mine approximately five (5) years. More important to Coastal States, however, is that acquisition of the lease would provide coal that is currently contracted and was thought to be available on Lease U-28297.

A hydrological monitoring system is being implemented for surface water, groundwater, and water quality. This proposal is described in detail in a report compiled for Coastal States by WESTECH. The objective of the monitoring is to characterize water quality in springs, streams, and underground drainage in the Coastal States mine, and water flows in these systems. The monitoring will allow calculation of loads in the system and indicate any impacts of subsidence.

3. Federal Actions Required

The two federal actions required are the application of the unsuitability criteria as required in 43 CFR 3461 and the processing of an emergency lease in accordance with 43 CFR 3425.

The issuance of the coal lease implies the right to explore, develop, produce, and beneficiate the coal. Responsibility for environmental protection and restoration would be integral components of the lease. If Coastal States obtains the lease, the proposed development and production methods described in this chapter will be utilized. It is assumed, for analysis purposes, that full development would occur should the lease be issued.

In addition to the requirements for approval of an exploration program, mining and reclamation plans would be required under Sections 502 and 523 of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87) and regulations promulgated pursuant to the Act. The mining and reclamation plans would be submitted by the lease holder for evaluation by the State of Utah, Office of Surface Mining, and USGS to determine compliance with State requirements and the requirements of Federal regulations contained in 30 CFR 211 and 30 CFR 700 et seq. The mining

reclamation plans would contain site specific information on requirements of the initial regulations. The lease holder would be required to use mitigating measures contained in Chapter IV of this EAR in development of exploration, mining, and reclamation plans.

The Bureau of Land Management is responsible for issuance of the lease and has lead responsibility for this action with participation and consent from the U.S. Geological Survey and the U.S. Forest Service. By issuing the lease, the Federal Government would grant the lessee the exclusive right to mine and dispose of all coal under the terms and conditions of the lease.

Under the terms set forth in 43 CFR 3473, the BLM has the right to adjust royalties and other terms and conditions of a coal lease at the end of the initial 20-year lease period and every ten (10) years thereafter.

B. PROBABLE TRACT DEVELOPMENT SCENARIO: ALTERNATE OWNERSHIP

Should someone other than Coastal States acquire Lease U-47080, alternative mining methods must be considered. Coastal States personnel have indicated that the likelihood of them allowing some other operator to utilize its underground access corridors and coal transportation facilities is nil. Therefore, alternative access to the coal would be required. Through application of the coal unsuitability study, the proposed lease area has been classified as unsuitable for year-round surface occupancy. The surface area is critical elk winter range, thus access to the coal for an alternate owner would be limited. The Manti National Forest has recommended no surface occupancy be allowed in the South Fork of the Quitchupah Canyon. Before an alternate owner attempts to acquire this coal lease, they would be required to determine access to the coal through negotiation with the Fishlake National Forest or the Manti National Forest.

Possible impacts of these alternatives are discussed in Chapter III. Lacking detail, the analysis of alternatives will be subjective in nature. However, for the purpose of this analysis, several development assumptions have been made:

1. An extensive exploration drilling program would be required for alternate ownership.

2. Alternate access would be difficult and expensive. Adherence to OSM regulations would make alternate ownership frustrating.

3. Alternate ownership would disturb 75-100 acres for surface facilities.

4. Rights-of-way would be required for installation of powerlines, telephone lines, haulage roads, etc. Temporary use permits would also be required for gravel, temporary roads, etc.

5. Based on estimated recoverable reserve figures, it is estimated that a new mining operation could produce coal at a rate of approximately 520,000 tons per year for a 25-year mine life. Using mines of a similar type and size in the area as a reference, approximately 120 to 150 employees would be needed in the new operation.

C. SURFACE MANAGEMENT PLANS FOR THE AFFECTED AREA

All lands in the emergency lease application are on the Fishlake National Forest and are managed under the direction of the Richfield Ranger District, Salina Land Use Plan. The Salina Land Use Plan allocates the land proposed for lease as a coal resource development area (USFS, 1976).

The following are management directions for the area as specified in the land use plan:

1. Work closely with the mining industry in planning developments to insure and accomplish coordination with other resources and values, with special emphasis on the protection of watershed and critical elk winter range.

2. Take actions necessary to insure water quality standards are maintained.

3. Allocate increased grazing capacities to big game species commensurate with the need to maintain big game populations to about their present number.

4. Require extensive transportation planning in conjunction with coal development.

5. Survey and protect archaeological sites.

6. Initiate big game habitat improvement and watershed rehabilitation programs.

Any activity that would prohibit implementation of these management directions would not be allowed.

D. ADJOINING LAND OWNERSHIP AND USES

The proposed lease tract is adjoined by existing Federal coal leases on the south and southeast, Forest Service administered lands on the west and north, and Fee land owned by Coastal States on the northeast (see Figure 3).

Federal Coal Leases SL-062583, U-0149084, U-062453 and U-28297 adjoin the proposed lease tract. Coastal States holds the total interest in Leases SL-062583, U-0149084 and U-28297. They hold a two-thirds interest in Lease U-062453; the other interest being held by Equipment Rental Service. Coastal States also owns 640 acres of fee coal land immediately north of the Federal Leases SL-062583 and U-062453.

Forest Service lands, currently unleased for coal, lie immediately to the west and north of the proposed lease tract. Federal coal leases held by Energy Reserve Group lie two miles to the west of the proposed lease tract. The Forest Service administers the lands under the concept of multiple use and provides for livestock grazing, wildlife habitat, watershed, mineral development and dispersed recreation.

E. PRESENT AND PROJECTED DEMAND FOR MINERAL MATERIAL

Coastal States' past attempts to increase production have been somewhat restricted because of the configuration of their lease hold (long and narrow). They felt they had solved the problem with the acquisition of Lease U-28297, but subsequent exploratory drilling indicated that much of the lease tract contained adverse geological conditions that would require a research and development program to determine if production could be achieved from the area at a later date. Prior to and at the time of the issuance of Lease U-28297, Coastal States signed contracts calling for the following commitments for coal:

Sierra Pacific	21 million tons through 2006
Salt River Project	14.5 million tons through 2006
Riverside Cement	10.3 million tons through 2006
Kennecott Copper	9.9 million tons through 2006
Calaveras Cement	5.7 million tons through 2006
U.S. Lime	2.0 million tons through 2006
U.S. Government Contracts	2.7 million tons through 2006
Nevada Cement	2.2 million tons through 2006
Georgia Pacific	0.5 million tons through 2006
State of Washington	0.6 million tons through 2006
Spot Sales - new contracts	5.7 million tons through 2006
Local Market	3.2 million tons through 2006
TOTAL REQUIREMENTS	78.9 Million tons through 2006

Coastal States' existing federal leases contain an estimated 36 million tons of recoverable coal. An additional six (6) million tons are contained in their fee lands. Production in 1980 was 1.6 million tons. This is expected to increase to 2.6 million tons in 1981, 2.9 million tons in 1982 through 1984, 3.0 million tons from 1985 through 1990, and then level off at 2.8 million tons for the remainder of the mine life.

The issuance of an emergency lease to Coastal States would give them an additional 13.8 million tons of recoverable coal. Even with this addition, Coastal States would fall short of their long-term contract requirements. Additional coal would have to be obtained by Coastal States under the normal leasing procedures.

F. SUMMARY OF UNSUITABILITY STUDY

The application of the unsuitability criteria to the proposed lease tract, as required by 43 CFR Part 3461, has been completed by Fishlake National Forest personnel (see Appendix 1). In general, the study concluded that there was nothing that would preclude underground mining of the tract. The study did, however, conclude that stipulations must be developed that would: 1) insure that road repairs be completed if subsidence or tension cracks cause road damage; 2) require a 50% archaeological survey be conducted for those areas in which the mine plan recognizes as predicted subsidence areas; 3) require additional raptor surveys in buffer zones adjacent to the lease with emphasis in cliff dwelling species around Convulsion and Quitchumpah Canyons; and 4) not allow exploration or other surface disturbing activity from November through May to protect wintering elk.

CHAPTER III

DESCRIPTION OF EXISTING ENVIRONMENT AND ASSOCIATED IMPACTS OF PROPOSED ACTION AND ALTERNATE OWNERSHIP

A. GEOLOGY AND TOPOGRAPHY

1. Existing Environment

The proposed lease area is in the Wasatch Plateau coal field which underlies a major portion of the Wasatch Plateau. The Wasatch Plateau is the northeastern most of the high plateaus of Utah. The plateau is a high tableland, forming part of the great highland rim of the Colorado Plateau region, which sweeps in a broad curve from western Colorado to southwestern Utah. It is connected with the other high plateaus on the south, and on the north it merges with the highland between the Uintah Basin and Wasatch Maountains. On the east the Wasatch Plateau is bounded by Castle Valley and on the west by the Sevier and Sanpete Valleys. The plateau surface is 8,000 to 11,000 feet above sea level and 3,000 to 6,000 feet above the valleys to the east and west.

The geologic formations of the Wasatch Plateau coal field range in age from upper Cretaceous (80 million years ago) to lower Eocene (50 million years ago). Exposed formations include sandstone, conglomerate, shale, mudstone, and limestone. The cliff and slope topography of the plateau is generally a result of differential weathering on resistant and non-resistant rock units.

Several fault zones have been identified on the plateau. These faults are all of the normal type--that is, they involve the simple dropping of the beds on one side of a break in strata. The proposed lease area lies midway between the Joes Valley - Paradise fault zone on the east side of the Wasatch Plateau and the Musinia fault zone on the west side of the Plateau.

The Wasatch Plateau coal field ranges from 7 to 20 miles wide and about 90 miles long. The field covers an area of about 1,100 square miles and includes parts of Carbon, Emery, Sanpete, Sevier, and Utah Counties. Principal coal beds of the field occur in the lower 250 to 350 feet of the Blackhawk Formation of the Mesa Verde Group. Thinner beds occur in the upper part of the Blackhawk Formation and in the Ferron Sandstone member of the Mancos Shale, which underlie the field at considerable depths.

The proposed lease area lies near the southeastern edge of the Plateau. The lease tract includes the east half of Duncan Mountain which rises 600 feet above the surrounding lands. The remainder of the area is a gentle rolling surface that is terminated in the east and south by precipitous cliffs cut by Convulsion Canyon and the North and South Forks of Quitchupah Canyon.

A generalized columnar section of the rock units that underlie the proposed lease area is shown in Figure 4. This sequence of rock units is characterized by steep slopes and vertical cliffs that make the canyon walls almost inaccessible. The cliff forming units are the Star Point and Castlegate Sandstones. The coal-bearing Blackhawk Formation is situated between these two units.

The geologic structure of the proposed lease area is simple. The Acord Lakes Fault lies two miles to the west of the proposed lease tract and has dropped the west block of the fault some 200 feet. The beds in the lease area are relatively undisturbed. Generally, the rock formations have a strike that trends roughly northeast and have a shallow dip of about 250 feet per mile to the northwest. A few small faults, having vertical displacement of 3 feet or less, and joint sets that occur both parallel and perpendicular to the faults are expected to occur in the proposed lease area.

The coal seams that underlie the proposed lease area are located in the basal portion of the Blackhawk Formation of the Mesa Verde Group (Figure 5). The coal seam that is currently being mined and that would be mined in the proposed lease area has been referred to as both the Upper Hiawatha bed and Upper Ivie bed. This bed varies in thickness from 7 feet to 16 feet in the area currently being mined, and generally averages 13 feet thick.

The Hiawatha bed, a 2 to 4 foot coal bed, lies 15 to 25 feet below the Upper Hiawatha bed. Because of the thinness of this bed and its closeness to the Upper Hiawatha bed, it is not technically feasible to mine.

Subsidence of the surface above areas that are currently being mined has occurred, and would be expected to occur on the proposed lease area. Coastal States has placed subsidence monitoring stations at strategic locations to monitor subsidence above active mining areas. Surface subsidence at the existing mine is expressed as fracture zones at the surface. These zones are generally a series of parallel fractures that roughly outline the mined area. Individual displacements along fractures are less than 1 foot vertically and laterally. Although not evident to the casual viewer, a vertical displacement of about 9 feet has been measured at the center of the subsided area on the existing lease area. The visible evidences of subsidence are several fractures located adjacent to East Spring Canyon. Subsidence in this area is the result of underground mining at an 85 percent recovery rate.

Subsidence includes two stress-yield conditions resulting from excavation of coal resources: 1) Compression arches occur above and below the mine panels. Such stresses transfer the overburden load in coal-extraction areas to adjacent solid coal boundaries or barrier pillars. As extraction progresses, the compression arches migrate higher in the overburden strata and may eventually reach the surface. The rate of upward migration is a function of the thickness and strength of overburden strata, mining sequence, and duration and rate of mining. 2) Caving and flexure of strata into the mine cavities is caused by distressed zones within the compression arches. Flexure produces tensile and compressive stresses within lithologic units and shear stresses across lithologic boundaries (Dunrud, 1976).

FIGURE 4

GENERALIZED STRATIGRAPHIC SECTION
OF BEDROCK UNITS OF THE
SOUTHERN WASATCH PLATEAU, UTAH

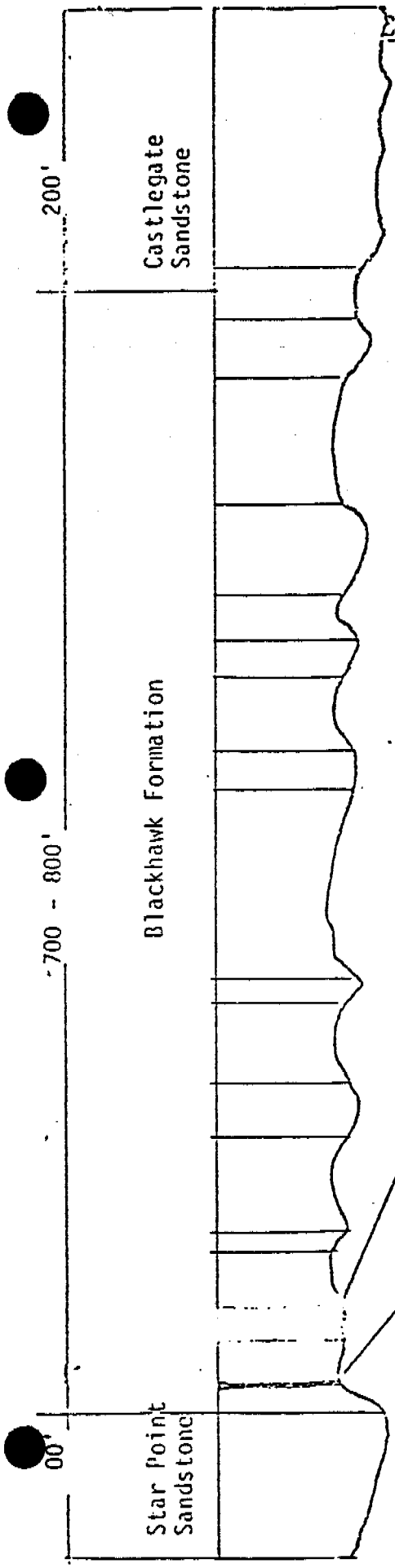
Age		Stratigraphic Units	Thickness (Feet)	Description
TERTIARY		North Horn Formation	500 - 1,000	Claystone; vari-colored interbeds of sandstone limestone, conglomerate; forms slopes.
UPPER CRETACEOUS	MESA VERDE GROUP	Price River Formation	600 - 1,000	Sandstone; medium-to-coarse grained; light gray to whit color; claystone interbeds (gray to brown); variable friability; forms slopes and hills.
		Castlegate Sandstone	15 - 200	Sandstone; medium-to-coarse grained, conglomeratic; lig gray to white color, weathe tan; forms prominent cliffs.
		Blackhawk Formation	700 - 800	Interbedded sandstone; silt stone, shale, and coal; tra sitional marine and fluvial origins; major coal seams; fossiliferous; forms ledges and slopes.
		Star Point Sandstone	200	Sandstone; fine and medium-grained; light gray color, weathers light brown: tran-sitional marine origin; trac fossils; cliff former.

FIGURE 4 (Continued)

Age		Stratigraphic Units	Thickness (Feet)	Description
UPPER CRETACEOUS	MANCOS SHALE	Masuk Shale	600	Claystone; yellow to blue-gray color; marine origin; form slopes.
		Emery Sandstone	800	Sandstone; yellow-gray color; fine to medium grained; some siltstone interbeds; forms ledges.
		Blue Gate Member	1,600	Siltstone and claystone; Blue-gray color; marine origin; forms slopes.
		Ferron Member	50 - 900	Alternating yellow-gray sandstone; sandy shale; important coal beds; forms cliffs.

FIGURE 5

Coal Seams That Underlie the Proposed Lease Area



Castlegate Sandstone - light gray to white, medium to coarse-grained sandstone, conglomeratic.

Blackhawk Formation - gray to black shale, silty shale, and claystone, with abundant light gray, fine to medium-grained sandstone beds and lenses, sparse medium gray thin-bedded siltstone.

Upper Hiawatha (Upper Ivie) Seam - averages 13 feet in thickness, thicker to northwest, thins toward southeast.

Hiawatha (Ivie) Seam - varies from 2 to 4 feet in thickness, lies 15 to 25 feet below Upper Hiawatha Seam.

Star Point Sandstone - light gray to white, fine to medium-grained burrowed sandstone with sortings and grain-size increasing upwards.

2. Impacts of Coastal States Proposal

According to Coastal States, approximately 50 percent or 578 acres of the proposed lease area has the potential of subsiding. Surface deformation of the proposed lease area would be expected to result from subsidence. This deformation probably would be expressed as surface fractures above the areas of mining activities. These fractures would be the most visible manifestation of subsidence. Individual displacements along these fractures would not be expected to exceed 1 foot either vertically or in width. In addition, there would be a slight reduction in elevation of those areas that do subside.

The chronological sequence of surface deformation would be expected to occur as follows: (1) formation of tension cracks above barrier pillars a few months after mining; (2) appearance of compression bulges and anticlines on the surface about 1½ to 2 years after completion of mining; additional formation of tension cracks as the surface subsides to a final profile, several years after completion of mining (Dunrud, 1976); WESTECH, 1977).

3. Impacts of Alternate Ownership

Impacts on geology and topography resulting from alternate ownership of the proposed lease tract would be similar to those identified in the Coastal States proposal. The effects on topography would depend upon location of surface facilities. Subsidence would occur on various portions of the proposed lease in relation to mining methods used and the amount of coal removed.

B. MINERAL RESOURCES

1. Existing Environment

a. Coal

Numerous analyses of the coal of the upper Hiawatha bed that is currently being mined by Southern Utah Fuel Company are available in published information. The range of ash content is from 5.9 to 7.1 percent. Sulfur content ranges from 0.3 to 0.6 percent. The heat value of the coal ranges from 11,390 to 12,260 Btu per pound. Coal that underlies the proposed lease area is expected to have similar characteristics (Doelling, 1972). USGS (1980) has calculated that inplace reserves in the Upper Hiawatha bed underlying the proposed lease area are 27.7 million tons. USGS estimates that 13.8 million tons of coal are recoverable by present mining methods. The coal seam does not outcrop on the proposed lease tract.

USGS has estimated that 2.3 million tons of coal exist in the underlying Hiawatha bed. They have stated, however, that none of this coal is recoverable because of the limited interburden separation of only 17 to 25 feet between the two beds. The minimum vertical distance in which coal seams can be mined safely is considered to be 30 feet.

b. Oil & Gas

The proposed lease area is currently covered by non-competitive oil and gas leases U-15084, U-15667 and U-15668. The area is underlain by the Ferron Sandstone Member of the Mancos Shale and the Dakota Sandstone, both of which have

been prolific producers of natural gas in other portions of the Wasatch Plateau. Entrapment of hydrocarbons in these units is a result of structural closure accompanied by lateral facies variations.

Oil and gas exploration in the area has been limited. One test well was drilled in the area in 1952. It reached a depth of 3,973 feet and bottomed out in the lower Mancos Shale. There were no reported oil or gas shows and three drill stem tests produced water. Megadon Energy has scheduled a 16,000 foot Madison Formation test in the SE¼SW¼ of Section 22 of T. 21 S., R. 4 E., 1½ miles west of the proposed lease tract. Drilling is scheduled to begin in the spring of 1981.

c. Other Mineral Resources

No other mineral resources are known to exist within the proposed lease area. The area was reportedly explored for uranium in the early 1970's. As of December 29, 1980, no mining claim locations have been recorded with the BLM.

2. Impacts of Coastal States Proposal

a. Coal

Recoverable coal from the Upper Hiawatha bed by the proposed mining methods would average 50 percent of the inplace reserves. Using this recovery rate, about 13.8 million tons would be mined. The remaining 13.8 million tons of coal would be permanently lost.

b. Oil and Gas

Those sedimentary units that have produced oil and gas in the Wasatch Plateau, the Ferron Sandstone Member of the Mancos Shale and the Dakota Sandstone, lie more than 3,000 feet below the coal of the Upper Hiawatha bed. Although there would be no conflict between the two resources, future wildcat wells that may be drilled on the proposed lease area would require coordination efforts between Coastal States and the oil and gas operator.

c. Other Mineral Resources

No environmental impacts are anticipated.

3. Impacts of Alternate Ownership

a. Coal

The recovery rate of coal reserves on the proposed-lease area would be dependent upon the mining plan and the mining techniques used. Normal underground recovery rates range from 45 to 50 percent of the inplace reserves. A lower recovery rate would result from the necessity to leave barrier pillars between this operation and Coastal States' existing operation. The remaining coal would be permanently lost.

b. Oil and Gas

Environmental impacts associated with alternative ownership would be similar to those associated with Coastal States' proposal.

c. Other Mineral Resources

No environmental impacts are anticipated.

C. HYDROLOGY

1. Existing Environment

The east side of the Wasatch Plateau, in which the proposed lease area lies, is in the Colorado River drainage. Annual precipitation ranges from less than 10 inches on the floor of Castle Valley to over 30 inches on the high plateaus (U.S. Forest Service, 1976). Most perennial streams of the Wasatch Plateau have their sources in the highlands. Ephemeral stream flows result from springs, seeps, seasonal snowmelt and precipitation.

Surface water quality degrades as it flows eastward into Castle Valley. Dissolved solids concentrations increase from less than 100 mg/liter in the highland streams to 3,000 mg/liter or more in streams of the valley floor. Sulfate concentrations increase similarly, from less than 50 mg/liter to more than 250 mg/liter. These trends are a result of a number of factors. Geologic formations encountered by stream waters, particularly less resistant shale strata, contain mineral constituents that are readily dissolved. Evapotranspiration along the water courses, return irrigation flow, and the influent seepage of highly mineralized ground water also contribute to the mineral content of stream water in Castle Valley (Price & Waddell, 1973).

The proposed coal lease area is in the drainage basin of Muddy Creek, a headwater tributary of the Dirty Devil River which empties into the Colorado River about 85 air miles southeast of the lease area. Muddy Creek receives runoff from intermittent drainages on the lease area by way of Convulsion Canyon and Quitchupah Creeks.

The main drainages in Convulsion Canyon and Quitchupah Creek have recently been guaged. Prior to installation of the gauge, mean annual runoff from the 6712 acre lease area (currently under lease and proposed for lease) was estimated to be about 900 acre-feet (USGS, Water Resources Division, 1977). A streamflow guaging and recording station was installed in the South Fork of Quitchupah Creek immediately to the north of the proposed lease tract in June of 1980. A water quality monitoring program has been implemented in the area. Water quality data collected in 1978 and 1979 indicates that water in the area is of fair to good quality, is a calcium-magnesium-bicarbonate type, is alkaline and has low concentrations of nutrients and metals (Hydrometrics, 1980).

Ground water is present in most rock units that underlie the area. Although most units have some degree of permeability, most water enters the units by deep seepage of precipitation that falls on the surrounding plateaus. This water moves down gradient through interstices (pores, fractures, etc.) in the

rocks and is either stored there or discharged as seeps, springs, or streams. Geologic structures apparently have control on the movement of ground water in the lease area (WESTECH Report, 1977). One small upland spring is located on the proposed lease tract in the SE¼NW¼NE¼ of Section 25. In the spring of 1980, this spring was flowing an estimated 2 gallons per minute. Since the spring was not flowing in previous years, the discharge probably was directly related to heavy snowmelt from the 1979-1980 snowpack (Hydrometrics, 1980). The spring, when flowing, has no identified uses.

Overall consideration of the probable ground water flow patterns indicates that water is probably contained in the overlying sandstone members of the Price River Formation, particularly the basal Castlegate Sandstone, and in the sandstone members of the Blackhawk Formation which overlie the Upper Hiawatha coal bed. Despite the presence of aquifers above the workings, the Convulsion Canyon Mine has remained essentially dry because the sandstone sequence contains several shale and silt members which serve as aquicludes to retard the vertical percolation of ground water and form a perched aquifer above the coal (WESTECH, 1977).

Minor faults encountered in the mine have breached the integrity of the aquicludes and allow vertical percolation into the mine. Faults in existing workings produce water, some of which is diverted from the mine into East Spring Canyon.

The depth to the regional water table (main zone of saturation) in the area is not known. Coal seams being mined are above the regional water table near their outcrop areas, but probably extend beneath the water table (into the main zone of saturation) to the north and west of the existing lease area (WESTECH, 1977).

Chemical quality of ground water in the area is good. According to Price and Waddell (1973), dissolved solids concentrations of ground water in this area are generally less than 500 mg/liter. Samples collected in July, 1975 from West and East Springs, which discharge from faults intersected by present mine workings, contained 406 and 428 mg/liter of dissolved solids respectively (Southern Utah Fuel Mine Plan, 1977). Water discharged from the mine was sampled September 27, 1976 by the U.S. Geological Survey and contained only 276 mg/liter of dissolved solids.

Occasional high intensity summer thundershower activity in the area contributes to flooding in the canyons that surround the proposed lease area. Data on flood flows and the frequency of flooding in the area are not available.

There are no lands which have been committed by the surface managing agency to use as municipal watersheds or identified by the State of Utah as National Resource waters within the proposed lease area (see Appendix 1, Unsuitability Study).

2. Impacts of Coastal States Proposal

There would be no new surface construction and only minimal surface disturbance as a result of exploratory drilling; therefore, there would be no increase in runoff or fluvial sedimentation. Subsidence and the associated rock fracturing following mining would increase ground water recharge rates. Surface water quality would be expected to be comparable to that of existing sources.

Subsidence and the associated rock fracturing may provide additional avenues for precipitation falling in the area to enter the ground water system. Several aquicludes exist above the coal being mined that retard the vertical percolation of ground water. A particularly effective seal is obtained by a 20-foot thick stratum of bluish-gray bentonitic shale that directly overlies the Upper Hiawatha coal bed. Past drill data indicates the bentonitic layer is continuous throughout the proposed lease area. Existing faults have breached this aquiclude and have created a hydraulic connection between water-bearing zones that occur bove the coal bed. Subsidence after mining may breach this aquiclude and provide additional avenues for hydraulic connection of water-bearing zones. Water zones in the area are currently fresh; however, the creation of additional avenues for water movement increases the potential of raising the dissolved solids concentrations of the water, thus reducing its quality. Water quality sampling to date, however, does not indicate that dissolved solids concentrations are increasing.

Flow from the upland spring located on the proposed lease area may be reduced by loss of ground water to the fracture zones. If water flow from the spring is reduced or stopped, it is doubtful that flows would ever return to former levels even if the aquifer recharged itself.

Mining operations on the proposed lease area would not be expected to encounter water problems unless mining extends below the depth of the regional water table. As mining operations encounter fault zones or perched water tables, water would be released into the mine and pumped out. However, judging from flows encountered in the existing operations, these water zones are quickly depleted.

Issuance of the lease and subsequent activities would have no impact on the flood potential of the area. No facilities would be constructed in any of the drainage bottoms in the area.

3. Impacts of Alternate Ownership

Environmental impacts on surface and subsurface hydrology would be similar to those which would be associated with the Coastal States proposal.

The additional surface disturbance associated with developing new mine facilities associated access roads, etc. (approximately 75-100 acres) would increase potential runoff and fluvial sedimentation. Intensity and significance would depend on location of the disturbance. Liquid and solid waste disposal at a new mine facility could impact surface or subsurface waters.

Alternative ownership of the proposed lease would not increase the flood potential of the area; however, mine sites, access roads, etc. could be subject to flood damage depending on their location. The 75-100 acres of disturbed soils could slightly increase runoff.

D. SOILS

1. Existing Environment

Soils on the plateau are generally very shallow, sand to silty sand in texture, with high percolation rates. Rocks exposed at the surface are alternating layers of sandstone and shale. Beds of coal and limestone are also exposed in the

canyons. Soils are highly susceptible to wind erosion but inherent erosion hazard from water is low (WESTECH, 1977). Mancos shale dominates the canyon bottoms.

No prime or unique farmlands, flood plains, or alluvial valley floors are located on the proposed lease area. (See Appendix 1, Unsuitability Study).

2. Impacts of Coastal States Proposal

Approximately .25 acre of topsoil would be disturbed by exploration drilling activities. This disturbance would occur during the first field season after lease issuance. This disturbance would be short-term in duration as similar drill sites on the plateau have been successfully revegetated within two (2) years of initial disturbance.

3. Impacts of Alternate Ownership

Between 75-100 acres of surface disturbance could be anticipated should alternate ownership and development of the lands occur. Part of this disturbance would be short-term; other disturbances would be long-term and extend for the duration of the mining. These areas would include permanent access roads, mine sites, etc. Increased erosion at construction sites would be inevitable during the period of soil exposure, particularly during intense rainstorms. Studies in the area indicate that approximately 1.5 to 4.0 cubic yards of soil per acre per year could be eroded during the period of soil exposure. This is 1.0 to 3.0 cubic yards per acre per year above the natural rate of erosion (Pacific Southwest Inter-Agency Committee System, 1968). After rehabilitation is completed, erosion rates would probably decline to near normal levels as vegetation becomes established.

Productivity of disturbed and occupied soils would be lost for the duration of the disturbance.

E. CLIMATE, AIR QUALITY, NOISE

1. Existing Environment

Annual precipitation in the proposed lease area averages 12 to 16 inches. The majority of the precipitation occurs as winter snow, but high intensity thunderstorms which occur between July and September also contribute to the precipitation total (WESTECH, 1977).

Temperatures range from 95°F during the summer months to as low as -20°F during the winter. There is a maximum of four frost-free months. The nearest wind reporting weather stations, Green River and Hanksville, are not representative of this area due to distance, elevation, and terrain differences. Prevailing winds are basically up-canyon from south-southwest to north-northeast. During summer months winds are light except during thunderstorm activity. During frontal passage, strong winds (25 - 40 mph) occur (WESTECH, 1977).

Air quality is currently monitored at the mine mouth by Coastal States. Although no known air samples have been taken in the vicinity of the lease application, air quality appears to be good. The limited air pollutants present are the result of motorized vehicles traversing the area, but these pollutants are quickly dissipate

Offsite air quality in the vicinity of the Convulsion Canyon Mine is being slightly degraded by engine emissions from the haulage of coal along the 10-mile paved road from the mine to Interstate 70.

There are no background noise data for the area. However, current noise levels are assumed to be within existing State and Federal guidelines.

2. Impacts of Coastal States Proposal

Climate would not be affected by the proposed action. Some temporary reduction in local air quality (particulate matter) could be anticipated during exploratory drilling activities on the proposed lease. This drilling activity would be completed in a two-month period, thus any reduction in air quality would be limited to this period. Localized sources of noise would also result from the exploration drilling. The noise level would not be otherwise affected by the proposed action.

Coal transport trucks would continue to produce exhaust emissions. Exhaust levels would be slightly increased as truck traffic would increase an average of one (1) truck per hour. Truck traffic would also utilize the haulage road for an additional five (5) years.

3. Impacts of Alternate Ownership

Climate would not be affected by alternate ownership of the proposed lease area.

An undetermined reduction of air quality could be anticipated during all phases of mine development, including road and powerline construction, construction of surface facilities to support the underground operation, and exploratory drilling. Haulage of coal from the new mine portal would produce additional amounts of dust and engine emissions.

All phases of new mine development would increase noise levels in the area an undetermined degree.

F. FIRE

1. Existing Environment

Wildfire is a natural occurrence in the vicinity of the proposed lease area. Two to three fires start every year from lightning. The fires are mostly small because of patchy fuels and may burn out before they are detected. Man-caused fires have been of little concern because of the low level of use in the area. Only one fire has been attributed to mining activities in the area. The fire hazard is greatest during July through October.

2. Impacts of Coastal States Proposal

The proposed action would introduce a higher man-caused fire risk in the area during the exploratory drilling program.

3. Impacts of Alternate Ownership

The possibility of man-caused fires would increase as a result of men and equipment working in the area. These additional people would be in the area at least 25 years. They would also provide earlier detection of fires started by man or nature.

G. FISH AND WILDLIFE

1. Existing Environment

There is a variety of wildlife in the vicinity of the proposed lease area. Better known species include: mule deer, elk, cougar, black bear, jackrabbit, cottontail rabbit, snowshoe hare, red squirrel, chipmunk, pocket gopher, wood rat, coyote, bobcat, badger, and several species of birds including golden eagle, blue grouse, ruffed grouse, mourning dove, common flicker, robin, mountain blue bird, chickadee, Steller's Jay, and pine siskin (Dalton et al, 1977; USFS, 1976).

The proposed lease area is in deer herd unit 45 (Last Chance - Quitchupah) and elk herd unit 14 (Fishlake). These units receive considerable hunting pressure for deer and elk. During the 10-year period 1957-1976, an average of 729 deer hunters and 1,072 elk hunters were afield on these units annually (UDWR, 1977). The area of the proposed lease includes deer summer and winter range and the area is an elk winter concentration site. Elk calving areas are located on the proposed lease area. Major northwest-southeast migration routes for deer and elk traverse the area, and uses such as Interstate 70, the coal haul road, and Acord Lakes subdivision create a migration barrier (USFS, 1976). Range studies have identified carrying capacity for deer winter range in the area. The pinyon-juniper type will support .07 deer per acre; the sagebrush-grassland type will support .12 deer per acre; and the mountain shrub type will support .25 deer per acre. Presently, the limiting factor for deer and elk is the lack of adequate winter range (personal correspondence, Larry Wilson, Regional Supervisor Southeastern Region, Utah Division of Wildlife Resources, November 2, 1977). Deer highway mortality on I-70 in Salina Canyon averaged 100 deer annually during the period 1970-1976 (UDWR, 1977). Some deer are killed along the Coastal States access road; however, data on this mortality are not available.

The intermittent flow of streams near the proposed lease area do not support fish.

No resident threatened or endangered species are known to inhabit the proposed lease area, but bald and golden eagles are winter visitors in the area. It is believed that they utilize escarpments in the area during winter months for roosting purposes. No bald or golden eagle nests are known to exist in the area (Boner, et al, 1977; White, 1980). Three other species of migratory birds of high Federal interest are found in the area. These are the western bluebird, flammulated owl and ferruginous hawk. There is no known high priority habitat for these species (Appendix 1, Unsuitability Study).

2. Impacts of Coastal States Proposal

The two-month exploratory drilling program would temporarily displace wildlife species. Mule deer would be affected because they utilize the area during the summer months.

Drilling access and drill pad construction would cause the loss of up to an acre of vegetation utilized by wildlife. This loss would continue until revegetation is successful. Loss of this vegetation would reduce the carrying capacity for deer by less than one (1) deer annually. The loss or reduction of flow from the

spring located on the lease tract would not be significant, because its flow is apparently associated with heavy snowmelt (Hydrometrics, 1980). There would be other surface water available for wildlife at this time. Big game highway mortality would increase because of the increased traffic associated with the higher rate of coal production. Highway mortality is directly related to degree of road improvement and volume of traffic (McClune, 1951; Oxley, et al, 1974). Deer mortality on the highways between the mine and the railroad loading facility at Levan could increase as much as 9 percent.

3. Impacts of Alternate Ownership

Should an alternate owner obtain the proposed lease, surface disturbance would be between 75-100 acres. Much of this land would be lost over the long term as it would be occupied by haulage roads, mine site, etc. Wildlife populations would be reduced in those areas which immediately surround areas of heavy and sustained human activity.

Mule deer and elk could be displaced from 75 to 100 acres of traditional habitat occupied by new mine development. This would represent loss of summer or winter range for mule deer and loss of winter range for elk. Disturbance of elk calving grounds that occur on the lease tract during the period from May through June would cause the loss of elk calves. The area and extent of loss cannot be predicted because of the lack of specific data for alternate ownership and development. If 100 acres of surface disturbance occurred on winter range, the lost carrying capacity for deer would range from 7 to 25 deer annually. This impact would continue for the life of the mine.

The location of these impacts, duration, and species affected cannot be determined until mine locations, size of operation, road routes, etc. are known. Increased deer mortality on the highways between the mine and Levan would be similar to that associated with the Coastal States proposal.

H. VEGETATION

1. Existing Environment

The following major vegetation communities have been identified in the proposed lease application area:

Pinyon/Juniper Woodland

Sagebrush/Grassland

Ponderosa Pine

Mountain Shrub

Mixed Conifer

Aspen

Community distribution is a function of climatic variables, land form (slope and aspect), soil conditions, elevation, fire, and past and present land-use patterns (mainly grazing and logging). A description of the vegetation communities follows:

Pinyon/Juniper Woodland

In the proposed lease area, Pinyon/Juniper Woodland is found on steep slopes at lower elevations of the South Fork of Quitchupah Creek.

Pinyon and juniper vary in coverage in the overstory with almost pure stands of juniper in some areas. Understory in this type is generally sparse consisting of bluebunch wheatgrass, Indian ricegrass, and several forbs including yarrow, Indian paintbrush, comandra, and daisies.

Sagebrush/Grassland

The plateau and slopes above the steep canyon walls are dominated in large areas by the Sagebrush/Grassland community. Big sagebrush and low sagebrush are dominant shrubs. Bitterbrush and rabbitbrush are often associated with this type. Common grasses in this community include slender wheatgrass, Letterman needlegrass, needle-and-thread grass, western wheatgrass, prairie junegrass and sedges.

Ponderosa Pine

The Ponderosa Pine community is found on benches and plateaus above the Pinyon/Juniper Woodland. It is also found at the head of several draws in the lease area. Commonly associated with the pine are mountain mahogany and manzanita.

Logging has occurred in many of the pine stands and is continuing. Larger old-growth pine are being harvested. Pine regeneration is sparse and openings created by harvesting are being invaded by mountain mahogany, manzanita, and other shrubs.

Mountain Shrub

This type is a combination of the scrub oak type and the curlyleaf mountain mahogany type. These two species may occur as separate stands or growing together. Topographically, the mountain shrub type is found above the Pinyon/Juniper Woodland and below the Aspen type.

Mixed Conifer

The Mixed Conifer type is found on steep north or east aspects along Quitchupah Canyon and on the north side of Duncan Mountain. White fir, Douglas fir, and Ponderosa pine are dominant in the overstory.

Aspen Type

Aspen communities are common above 8,500 feet elevations on north and east aspects and in some swales at various aspects. Snow accumulation appears to be an important factor in aspen distribution. Understory vegetation in this

type is mainly shrubs and forbs. Snowberry, wild rose, chokecherry, willow, and serviceberry are common shrubs in the aspen type. Common forbs include yarrow, meadow rue and osmorhiza (WESTECH, 1977). The only riparian vegetation that is thought to occur on the proposed lease tract would be associated with the spring located in the SE¼NW¼NE¼ of Section 25.

Dr. Stanley K. Welsh of Brigham Young University and Endangered Plant Studies, Inc., surveyed the proposed lease tract for the presence of threatened or endangered plant species. His survey concluded that none of the species currently listed or reviewed were found in the area (see Appendix 2). Dr. Welsh indicated that the survey was conducted during July and August when plants were at their peak in growth and flowering.

2. Impacts of Coastal States Proposal

Approximately one (1) acre of vegetation, mostly shrubs and forbs, would be removed or destroyed as a result of drill pad construction and drilling access. As has been the situation with similar drilling activities in the area, this disturbance would be temporary and vegetation could be brought back into productivity in 2-3 years.

Possible impacts resulting from subsidence include exposure of plant roots along subsidence crevices resulting in plant mortality and the invasion of annual grasses and forbs.

If the spring on the proposed lease area dries up as a result of surface subsidence, vegetation surrounding the spring would die out and be replaced by a dryland vegetative type. Less than ¼ acre of vegetation could be affected.

3. Impacts of Alternate Ownership

Vegetation would be disturbed on 75-100 acres of land. Disturbance of areas used for haulage roads, mine sites, etc. would continue for the life of the mine. It would be 25 years before this land would be rehabilitated. The remainder of the impacts (those areas used for exploration drill sites and temporary access roads) would be similar to Coastal States, and the land would be returned to productive levels within 2-3 years after rehabilitation. Possible impacts from subsidence would be the same.

I. SOCIOECONOMIC

1. Existing Environment

In 1970, the population of Sevier County was 10,103 and presently it is estimated at 14,742 (1980 Census). This county has experienced a sustained growth in recent years. The nearest community to the Coastal States mine is Salina. Salina, with a population of 1,998 (1980 Census) has a small shopping area, one doctor 2 days a week, a medical clinic, its own water and sewage treatment system, three local policemen, an adequate school system, and a volunteer fire department. Presently, homes can be bought in Salina and its outlying areas. Population growth is expected to continue in Sevier County as a result of increased mining and economic development.

The 1973 per capita income estimate for Sevier County was $3,584 which was below the State average. The economy of Sevier County is primarily based on mining (gypsum, clay, salt, and coal), agricultural products, and manufacturing.

Ethnically and religiously, Sevier County communities are almost entirely white and mostly Mormon.

Richfield has a new hospital and a new county courthouse which serve Salina. Salina citizens, in anticipation of future growth, have extended the sewer lines. The people want job opportunities in the area largely because they want their sons and daughters to remain in the area. Although availability of housing was once a major concern, units are now available.

2. Impacts of Coastal States Proposal

Coastal States would hire an additional 33 employees. It is anticipated that these positions would be filled by the local population in Sevier, and perhaps, Sanpete Counties.

The city and county tax base and total regional income associated with continued coal mining would contribute to the Salina and general Sevier County business economy. Increases in the work force at the mine would increase the total regional income.

These additional jobs would induce some of the local young people, who would normally leave the area, to stay as well as providing additional sources of income for long-time residents. Support businesses such as food stores, gasoline stations, restaurants, etc., would benefit since much of the anticipated additional income would be spent locally. No significant housing shortages would be anticipated.

3. Impacts of Alternate Ownership

Socioeconomic impacts are difficult to define since no proposal for another mine in the area has been made. Therefore, the number of people and kinds of equipment involved are not known. It can be assumed that the impacts would be similar to other mines in the general area. Approximately 120-150 employees would be involved. An undetermined number of "outsiders" would probably move into the area bringing extra incomes and causing possible housing shortages.

J. HISTORY, ARCHAEOLOGY, AND PALEONTOLOGY

1. Existing Environment

No significant archaeological or cultural sites have been identified in the proposed lease area by archaeologists contracted by Coastal States (see Appendix 3). Archaeological values found in the area consist of three (3) lithic scatters. These do not represent significant scientific values. No National Register Properties are found on the proposed lease area (Appendix 1 - Unsuitability Study).

Invertebrate fossils are found in most of the stratigraphic units that comprise the Wasatch Plateau coal field. Numerous invertebrate fossils have been found in the Emery Sandstone Member of the Mancos Shale. Poorly preserved fossil plants have been collected from the Black Hawk Formation. Brackish water fossils have been collected from the shale beds in the upper part of the Castlegate Sandstone Member of the Mesa Verde Group. No specific data on fossils within the proposed area are available (Spieker, 1931).

2. Impacts of Coastal States Proposal

Archaeological values consisting of lithic scatters could be encountered during Coastal States' exploration drilling. The probability of destroying values could be decreased by avoiding the three previously identified lithic scatters. Paleontologic resources would not be impacted by Coastal States' proposal.

3. Impacts of Alternate Ownership

Although site-specific, surface-disturbing activities associated with a new mining operation have not been identified, the potential exists for encountering archaeological values. It is anticipated that 75-100 acres of surface disturbance would occur. As with the Coastal States proposal, it is not anticipated that paleontologic resources would be impacted.

K. PUBLIC HEALTH AND SAFETY

1. Existing Environment

All underground mining operations would be conducted in accordance with Federal and State mining regulations. Only proven methods of coal extraction would be utilized.

2. Impacts of Coastal States Proposal

Coal truck traffic would increase from an average of 11 trucks per hour to 12 trucks per hour for the life of the mine.

3. Impacts of Alternate Ownership

Truck traffic would be substantially increased should an alternate owner obtain the lease.

L. TIMBER MANAGEMENT

1. Existing Environment

The major timber species on the proposed lease area is Ponderosa pine. Commercial stands occur on the flat benches in the area. The trees are generally of low quality and cutting is limited to older, over-mature trees. These trees are harvested by local citizens for home heating. Aspen stands are also found on the proposed lease tract and have been harvested for firewood.

2. Impacts of Coastal States Proposal

The timber resource on the proposed lease area would not be affected by Coastal States' exploration program.

3. Impacts of Alternate Ownership

Although site-specific developments of an alternate owner are not known, the timber resource could be adversely affected should an alternate owner receive the lease. The possible development of access roads and surface facilities on the benches of the lease area could require removal of an undetermined amount of timber.

M. RANGE MANAGEMENT

1. Existing Environment

The proposed lease area is located in the Quitchupah C & H Allotment, Fishlake National Forest. The Allotment is presently managed under a rest-rotation grazing management system. Range improvements on the proposed lease area include two stock watering ponds.

2. Impacts of Coastal States Proposal

Less than one (1) AUM would be temporarily lost as a result of Coastal States' exploration program. No existing range improvements would be affected.

3. Impacts of an Alternate Ownership Proposal

An undetermined amount of forage would be temporarily taken out of production because of the development of the access and haulage roads and new mine facilities. However, assuming that 100 acres of forage were taken out of production, the result would be the loss of about 7 AUMs per year. This would constitute 3.7 percent of the total AUMs in the affected allotments.

N. RECREATION-AESTHETICS - VISUAL RESOURCE MANAGEMENT (VRM)

1. Existing Environment

Recreational activities on the proposed lease area are limited. The major recreational activity is big game hunting, which occurs over a 1-month period in the fall of each year. No developed recreation facilities are located on the proposed lease area.

The entire area has been designated VRM Class 3, Partial Retention, or Class 4, Modification. The Fishlake National Forest Salina Land Use Plan describes the aesthetic variety of the lease area as having mesa and canyon landforms of distinctive variety. Color variation is well stratified and adds greatly to the landform variety. Variations in the vegetative patterns range from sagebrush mesas to the pine covered edges and mahogany slopes. Water features are minor, located mainly in the canyons. The mesa rim and deep canyons can be seen as background from Dog Valley. No VRM Class I areas exist in the area (Appendix 1 - Unsuitability Study).

2. Impacts of Coastal States Proposal

No impacts would occur as a result of Coastal State's exploration activities. Lease issuance would not interfere with hunting activities in the area.

3. Impacts of Alternate Ownership

The surface facilities associated with alternate ownership could affect the aesthetic quality of the area. The building of access roads onto the lease area and the construction of new surface mining facilities would be intrusions on the existing aesthetic qualities. 75-100 acres of surface disturbance could be expected. It is not known how much, if any, interference with hunting activities would occur if the lease was issued to an alternate owner.

O. TRANSPORTATION

1. Existing Environment

Access to the proposed lease area is provided by the Convulsion Canyon Road, a paved road which leads from Interstate 70 to Coastal States' existing mine. Access to the surface of the proposed lease tract is provided by Forest Service maintained roads. A low-standard dirt road traverses the east and northern edge of the proposed lease tract.

The Convulsion Canyon Road is utilized for moving all materials to the existing mine and hauling the coal from the mine.

Coal is hauled by truck to railroad sidings in Salina and Levan, Utah and to various consumers throughout the Intermountain Area.

All roads used for coal haulage are maintained by county and state road departments. The usage tax paid by the various coal haulers pays for a portion of the maintenance.

2. Impacts of Coastal States Proposal

Frequency of truck travel would be increased from 11 trucks per hour to 12 trucks per hour, which represents an increase of about 9 percent in coal transportation traffic. This figure assumes that a production level of 2.8 million tons per year is reached and maintained. The trucks would run 5 days a week, 21 hours a day. The additional truck will not necessitate additional maintenance of existing roads.

3. Impacts of Alternate Ownership

The impacts of coal transportation from a new mine would depend largely upon the access proposed to the new mine portal and mine production rates, both of which are currently unknown. It is assumed, however, that if production rates are one-third those of Coastal States', coal haulage requirements would be 4 trucks per hour.

P. RESEARCH, ADMINISTRATION AND SPECIAL USES

1. Existing Environment

No administration or special use sites exist on the proposed lease tract (Appendix 1 - Unsuitability Study). An administrative study area covering about 40 acres is immediately southeast of the proposed lease area. It is on Coastal States' existing Federal lease and consists of contour trenching on the west side of Little Duncan Mountain. The study was initiated a number of years ago to reduce erosion and stop gully expansion.

2. Impacts of Coastal States Proposal

No impacts would be anticipated.

3. Impacts of Alternate Ownership

No impacts would be anticipated.

Q. WILDERNESS AND ROADLESS AREAS

1. Existing Environment

The Forest Service roadless area review and evaluation (RARE II), was the process used to determine which of the inventoried roadless areas should be: 1) recommended to Congress for inclusion in the National Wilderness Preservation System; 2) managed for non-wilderness uses; or 3) require further planning before a resolvable decision can be made.

Due to existing intrusions, such as regularly maintained roads, permanent surface structures, etc., no RARE II areas were identified in or near the proposed lease area on the Fishlake National Forest (Appendix 1 - Unsuitability Study).

2. Impacts of Coastal States Proposal

No impacts are anticipated.

3. Impacts of Alternate Ownership

No impacts are anticipated.

CHAPTER IV

POSSIBLE MITIGATING OR ENHANCING MEASURES

A. GEOLOGY AND TOPOGRAPHY

1. Coastal States Proposal and Alternate Ownership

Coastal States has a subsidence monitoring program that will be expanded to the new lease tract, thus no additional mitigating measures have been developed for their proposal.

In case of alternate ownership, the lessee would be required to monitor the area for subsidence.

B. MINERAL RESOURCES

1. Coastal States Proposal and Alternate Ownership

Coordination between the oil and gas and the coal lessee would be necessary if exploration drilling is proposed on the coal lease area.

C. HYDROLOGY

1. Coastal States Proposal

Hydrological monitoring stations would remain in operation so that effects of subsidence or mine discharge could be evaluated on a continuing basis. If Coastal States' existing monitoring program did not cover the application area, it would be expanded to cover the area.

2. Alternate Ownership

The lessee would be required to establish, in conjunction with Coastal States' existing system, an appropriate hydrological monitoring system to measure possible effects of mining on water sources in the area. Mine water or solid and liquid waste would not be discharged unless it meets the quality standards required by the State of Utah (Title 73141, et al) or EPA, whichever is applicable.

D. SOILS

1. Coastal States Proposal and Alternate Ownership

All suitable topsoil on disturbed areas, i.e., exploration drill pads, new road construction areas and lands covered by surface structures would be properly stockpiled for reuse when operations in the area are completed.

All disturbed areas would be restored to the original contours using stockpiled topsoil. The sites would then be revegetated with a plant species mixture specified by the surface management agency. Timing and method of revegetation would also be determined by the surface management agency. In addition, any improved roads would be established along natural terrain to abate erosion. Roads would be appropriately water barred as specified by the surface management agency.

E. CLIMATE, AIR QUALITY, NOISE

1. Coastal States Proposal

No mitigating measures have been developed.

2. Alternate Ownership

If major haulage roads are not paved, appropriate methods would be utilized to abate dust.

F. FIRE

1. Coastal States Proposal and Alternate Ownership

During exploration activities, proper fire fighting equipment such as shovels and pulaskis would be available at all times. Waste material would be disposed of in accordance with applicable State and Federal regulations.

G. FISH AND WILDLIFE

1. Coastal States Proposal and Alternate Ownership

The lease holder would provide a wildlife biologist who is qualified and approved by the appropriate federal official to provide additional raptor surveys in buffer zones adjacent to the lease with emphasis on cliff dwelling species around Convulsion and Quitchupah Canyons.

No surface disturbance would be allowed along the cliffs that would impact cliff dwelling raptors.

All disturbed areas would be rehabilitated to restore native habitat conditions as specified by the surface management agency.

In order to protect wintering and calving elk, exploration activities would have to be conducted after June and completed by November.

H. VEGETATION

1. Coastal States Proposal and Alternate Ownership

The applicant would provide a botanist who is qualified and approved by the appropriate federal official to survey for threatened and endangered flora.

The botanist would intensively survey all areas to be disturbed and designate those areas in which no disturbance would be permitted. The botanist would be available, as needed, during surface disturbance activities.

All disturbed areas would be revegetated with species specified by the surface management agency. All stockpiled topsoil should be replaced on disturbed areas prior to reseeding.

I. SOCIOECONOMICS

1. Coastal States Proposal and Alternate Ownership

No mitigating measures have been developed.

J. HISTORY, ARCHAEOLOGY, AND PALEONTOLOGY

1. Coastal States Proposal and Alternate Ownership

The applicant would provide a qualified archaeologist who would be subject to approval by the appropriate federal official. The archaeologist would intensively survey the area prior to any surface disturbance. An approved archaeologist would be available, as needed, during surface disturbance. If the archaeologist determines that cultural values would be disturbed, construction would not proceed until appropriate action could be taken.

The lease owner would be required to complete a 50% intensive archaeological survey for those areas in which their mine plan recognizes as predicted subsidence areas.

The applicant would provide a qualified paleontologist who would be subject to approval by the appropriate federal official. The paleontologist would conduct an intensive survey of all areas to be disturbed. An approved paleontologist would be availabe, as needed, during surface disturbance. If the paleontological values would be disturbed, construction would be halted until appropriate action would be taken.

K. PUBLIC HEALTH AND SAFETY

1. Coastal States Proposal

Coastal States would be required to continue to monitor mine discharge and meet state and federal regulations.

2. Alternate Ownership

The applicant would comply with all federal, state, and local regulations pertaining to air and water quality control. As mining progresses below the water table, it is anticipated that it would be necessary to pump ground water out of the mine and discharge it to the surface. If such discharge is necessary, the operator would apply for a permit, and would monitor the discharge as required by the permit. Sanitary waste disposal would conform to state codes.

L. TIMBER MANAGEMENT

1. Coastal States Proposal

No mitigating measures have been developed.

2. Alternate Ownership

Sites of surface disturbance such as access roads, drill pads and permanent surface facilities would be located so as to avoid timber stands.

M. RANGE MANAGEMENT

1. Coastal States Proposal and Alternate Ownership

If the existing stock watering ponds are destroyed by surface facilities or subsidence, supplemental water sources will be provided.

N. RECREATION - AESTHETICS - VISUAL RESOURCE MANAGEMENT

1. Coastal States Proposal

Disturbance of surface lands would be limited to areas required for drill pad construction during exploration drilling.

2. Alternate Ownership

Disturbances of surface lands would be limited to areas required for construction of building, structures, mine portal opening, and waste disposal.

Restoration work on the lease area would include sealing of the mine openings with permanent, noncumbustible seals approved by MESA and USGS. Mine openings would be sealed and covered with earth and rock to the original contours or as near to that as practical. Excavations at the mine openings would be covered with earth and rock to the natural angle of repose. The fills would be revegetated as recommended by the land management agency.

O. TRANSPORTATION

1. Coastal States Proposal and Alternate Ownership

No mitigating measures have been developed.

P. RESEARCH, ADMINISTRATION, AND SPECIAL USES

1. Coastal States Proposal and Alternate Ownership

No mitigating measures have been developed.

Q. WILDERNESS AND ROADLESS AREAS

1. Coastal States Proposal and Alternate Ownership

No mitigating measures have been developed.

CHAPTER V

ADVERSE IMPACTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED OR AN ALTERNATE OWNERSHIP OCCUR

A. GEOLOGY AND TOPOGRAPHY

1. Coastal States Proposal

Subsidence would occur on approximately 578 acres (50 percent of the proposed lease area). Subsidence (up to 9 feet) has occurred over Coastal States' existing mine workings. However, the only obvious surface manifestations are surface fractures in the vicinity of East Spring Canyon. Individual displacements along these fractures are usually less than 1 foot vertically and in width.

Surface deformation on the proposed lease area would probably be expressed as surface fractures above the areas of mining activities. Formation of tension cracks would appear a few months after mining. Compression bulges and anticlines would appear about 1½ to 2 years after completion of mining. Additional formation of tension cracks as the surface subsides to a final profile would occur several years after completion of mining. In addition, there would be a slight reduction in elevation of the proposed lease area.

2. Alternate Ownership

The adverse impacts of alternate ownership would be similar to those described above. Effects on topography would be dependent upon location of facilities and mining methods used. Subsidence would occur on various portions of the proposed lease area in relation to mining methods used and the amount of coal removed.

B. MINERAL RESOURCES

1. Coastal States Proposal

a. Coal - Approximately 13.8 million tons would be mined during the life of the lease at 50 percent recovery rate. The remaining coal would be permanently lost.

b. Oil and Gas - The sedimentary units that have produced oil and gas in the Wasatch Plateau lie more than 3,000 feet below the coal of the Upper Hiawatha bed. Although there would be no conflict between the two resources, future wildcat wells that may be drilled on the lease area may require special methods of drilling and coordination with Coastal States to avoid mining operations.

c. Other Mineral Resources - No adverse impacts are anticipated.

2. Alternate Ownership

a. Coal - Recovery rate of coal reserves on the proposed lease tract would be dependent upon the mining plan and mining techniques. Coal not mined would be lost. Normal underground recovery rates range from 45 to 50 percent of inplace reserves. A lower recovery rate would result from the necessity to leave barrier pillars between Coastal States' operation and the new mine.

b. Oil and Gas - Adverse impacts associated with alternate ownership would be similar to those analyzed for the Coastal States proposal.

c. Other Mineral Resources - No adverse impacts are anticipated.

C. HYDROLOGY

1. Coastal States Proposal

Subsidence after mining could break a 20-foot thick bentonitic shale aquiclude above the coal seam providing additional avenues for hydraulic connection of water bearing zones. Water zones in the area are fresh; however, the creation of additional avenues for water movement increases the potential for raising the dissolved solids concentrations in the water, reducing water quality.

The flow of one upland spring may be lost or reduced. The spring has no identified uses, and is not essential to livestock or wildlife because of other water sources.

2. Alternate Ownership

Environmental effects on surface and subsurface hydrology would be similar to those associated with the Coastal States proposal. The additional surface disturbance associated with developing new mine facilities, haulage roads, etc. (approximately 75 - 100 acres) would increase potential for runoff. Intensity and significance would depend on the location of the disturbances.

D. SOILS

1. Coastal States Proposal

Impacts associated with the exploration program are temporary and can be mitigated in 2-3 years. No prime or unique farmlands, floodplains, or alluvial valley floors exist on the proposed lease tract.

2. Alternate Ownership

Between 75-100 acres of surface disturbance is anticipated should alternate ownership and development of the lease occur. Part of this disturbance would be short-lived and the remainder would extend for the duration of the mining activities. Long-term impacts include haulage roads, surface facilities, and

power transmission lines. Increased erosion at construction sites could not be avoided during the period of soil exposure, particularly during intense rainstorms. Studies in the area indicate that approximately 1.5 to 4.0 cubic yards per acre per year could be eroded during the period of soil exposure. This is an increase of 1.0 to 3.0 cubic yards above the natural rate of erosion (Pacific Southwest Interagency Committee System, 1968). After rehabilitation is completed, erosion rates would decline to near normal levels. Normal productivity of disturbed and occupied soils would be lost for the duration of the disturbance.

E. CLIMATE, AIR QUALITY, AND NOISE

1. Coastal States Proposal

Limited reduction in local air quality (particulate matter) could be anticipated during exploration activities. Trucks would continue to produce exhaust emissions at slightly increased rates as coal truck traffic would increase from an average of 11 to 12 trucks per hour.

2. Alternate Ownership

Undetermined reductions in air quality could be anticipated during all phases of mine development, including road and powerline construction onto the proposed lease area, the construction of surface facilities, and exploratory drilling activities. Haulage of coal from the new mine would produce additional amounts of noise, dust, and engine emissions. All phases of new mine development would increase noise levels in the area an undetermined degree.

F. FIRE

1. Coastal States Proposal

No adverse impacts are anticipated.

2. Alternate Ownership

The possibility of man-caused fires would increase as a result of men and equipment working in the area. These additional people would be in the proposed lease area for up to 25 years. They would also provide earlier detection of fires started by man or nature.

G. FISH AND WILDLIFE

1. Coastal States Proposal

Big game highway mortality could not be avoided and the mortality associated with the proposed action would continue for the extended life of the mine. Deer highway mortality on the highway between the mine and Levan could increase by 9 percent or 9 deer annually.

The two month exploratory drilling program would temporarily displace deer use. Drill pad construction and access routes could cause the loss of up to an acre of vegetation utilized by wildlife.

Impacts to bald or golden eagles which may occur in the area can be successfully mitigated by those measures indicated in Chapter 4.

2. Alternate Ownership

Vegetation could be disturbed and removed on 75-100 acres, resulting in loss of deer and elk range. Lost carrying capacity for deer would range from 7 to 25 deer annually. Wildlife populations would be reduced in those areas immediately surrounding areas of heavy and sustained activity.

Increased wildlife highway mortality of up to 3 deer annually could not be avoided and would continue for the life of the mine.

H. VEGETATION

1. Coastal States Proposal

Impacts associated with the loss of vegetation during the exploration program can be successfully mitigated.

2. Alternate Ownership

Vegetation would be disturbed or removed from all areas where exploratory drilling would occur and where permanent surface facilities would be located. This could result in 75 to 100 acres of disturbance. Much of the vegetation loss would extend for the life of the mine.

The probability of encountering possible threatened or endangered plant species would be enhanced with increased soil disturbance. However, if proper clearances are made, damage to these species could be avoided.

I. SOCIOECONOMICS

1. Coastal States Proposal

The city and county tax base and total regional income associated with continued coal mining would contribute to the Salina and Sevier County business economy, thus creating beneficial impacts. Increases in the work force at the mine would increase the total regional income.

These additional jobs would induce some of the local young people, who would normally leave the area, to stay as well as providing additional sources of income for long-time residents. Support businesses such as food stores, gasoline stations, restaurants, etc., would benefit since much of the anticipated additional income would be spent locally. No significant housing shortages would be anticipated.

2. Alternate Ownership

Beneficial socioeconomic impacts are difficult to define since no proposal for another mine in the area has been made. Therefore, the number of people and kinds of equipment involved are not known. It can be assumed that the impacts would be similar to other mines in the general area; approximately 120 - 150 employees would be involved.

J. HISTORY, ARCHAEOLOGY, AND PALEONTOLOGY

1. Coastal States Proposal

Proper clearances made prior to surface disturbing activities would protect cultural values which otherwise could be damaged or destroyed.

2. Alternate Ownership

Proper clearances made prior to surface disturbing activities would protect cultural values which otherwise could be damaged or destroyed.

K. PUBLIC HEALTH AND SAFETY

1. Coastal States Proposal and Alternate Ownership

No adverse impacts are anticipated.

L. TIMBER MANAGEMENT

1. Coastal States Proposal and Alternate Ownership

The extensive surface disturbing activities associated with alternate ownership would probably require the removal of some timber species. No adverse impacts are anticipated with Coastal States' proposal.

M. RANGE MANAGEMENT

1. Coastal States Proposal and Alternate Ownership

Impacts associated with Coastal States' exploration program can be successfully mitigated.

An undetermined amount of forage would be taken out of production as a result of construction of new haul roads, mine facilities, etc. by an alternate lessee. Assuming that 100 acres of forage were taken out of production, the result would be the loss of about 7 AUMs annually, which represents approximately 3.7 percent of the allotments affected. Two range improvements could be destroyed by surface facilities of an alternate owner.

N. RECREATION - AESTHETICS - VISUAL RESOURCE MANAGEMENT

1. Coastal States Proposal

No adverse impacts are anticipated.

2. Alternate Ownership

Activity associated with alternate ownership would affect the aesthetic quality of the area by building access routes onto the lease area and the construction of new surface mining facilities.

Impacts on hunting activities could be mitigated.

CHAPTER VI

RELATIONSHIP BETWEEN SHORT-TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Subsidence and surface fractures would be permanent surface deformation features directly related to mining. Approximately 578 acres would be subject to subsidence. Proposed mining activities and resultant subsidence may preclude the placing of any permanent structures on the lands that are predicted to subside.

Soils disturbed by the expanded mining activities (one (1) acre for Coastal States or 75-100 acres for alternate ownership) would be taken out of vegetative production and committed to mining activities. Duration would range from a single growing season (associated with exploration activities) to a longer term loss resulting from construction of haulage roads, surface facilities, etc. which would be associated with alternate ownership. Those lands which could be revegetated would eventually return to previous production levels.

Development of possible oil and gas reserves on the proposed lease area may be made difficult by extraction of the coal. Coordination efforts between interested parties would be necessary.

Coastal States would hire an additional 33 employees in the near future. The city and county tax base and total regional income associated with expanded mining would contribute to the Salina and Sevier County business economy. It is assumed that under an alternate owner, approximately 120-150 employees would be required. Some of these would be brought into the area.

The purpose of the proposed action is to provide a supply of coal for the generation of electricity and other industrial uses. The use and commitment of about 27.7 million tons of coal (13.8 million tons recoverable, the remainder unrecoverable) involves a tradeoff between presently needed coal and other energy resources, some of which are in short supply. The use of this coal would help alleviate short-term energy demands and would constitute utilization of a natural resource, thus contribution towards the nation's self-sufficiency in energy.

Coal extraction represents an immediate commitment of the resource. Improvement in underground mining techniques, resulting in greater recovery rates than experienced at the present, can be expected in the future.

Visual qualities of the area would be impacted from alternate development disturbances. The extent would depend on the development proposal of an alternate owner.

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

A. GEOLOGY AND TOPOGRAPHY

1. Coastal States Proposal

Mining the lease area following the issuance of a lease would result in the irreversible and irretrievable commitment of 578 acres (50 percent of the proposed lease area) to subsidence. Subsidence would be expressed as tension cracks on the ground surface. Such tension cracks most likely would not be expected to exceed 1 foot, either vertically or in width. In addition, there would be a slight reduction in elevation on those areas that do subside.

2. Alternate Ownership

Irreversible and irretrievable commitments of resources would be similar to those described for the Coastal States proposal.

B. Mineral Resources

1. Coastal States Proposal

The proposal would require the irretrievable commitment of 13.8 million tons of coal at 50 percent recovery rate. The remaining 50 percent, or 13.8 million tons of coal would be permanently lost for use because of its inaccessibility after mining of the recoverable coal.

2. Alternate Ownership

Alternate ownership would result in the irretrievable commitment of coal at a recovery rate of 45 to 50 percent. The remaining coal would be permanently unavailable for use because of the need to leave barrier pillars between Coastal States' operation and a new mine.

C. HYDROLOGY

1. Coastal States Proposal

Subsidence may cause the irretrievable loss of flow from one local upland spring. The likelihood of this occurring cannot be accurately predicted as it is unknown whether this spring may heal itself and again establish normal or near-normal flows.

2. Alternate Ownership

A similar irretrievable commitment of water resources may occur, as indicated for the Coastal States' proposal.

G. RECREATION - AESTHETICS - VISUAL RESOURCE MANAGEMENT

1. Coastal States Proposal

No significant irretrievable or irreversible commitments of recreation and aesthetic resources would occur.

2. Alternate Ownership

Irretrievable or irreversible commitment of resources could only be determined when an alternate owner submits an operating plan.

H. WILDERNESS AND ROADLESS AREAS

1. Coastal States Proposal and Alternate Ownership

No irretrievable or irreversible commitment of wilderness or roadless values would occur.

CHAPTER VIII

NO ACTION ALTERNATIVE

Adoption of this alternative would preclude mining the coal on the proposed lease area at this time.

Selection of this alternative would not result in any additional impacts on biological or physical components of the environment over and above those currently occurring in connection with existing operations and uses in the area.

Adverse impacts on the social economic component of the environment would occur. Coastal States indicates that should they be unable to obtain the proposed lease tract, they will prepare plans for phased cutbacks in production and employment. These cutbacks, if necessary, would likely begin before mid-1981, and, if carried out, would eliminate approximately one million tons of annual production, and correspondingly, about 100 jobs by mid-1982. The elimination of 100 jobs would have a severe impact on the economy of Sevier County.

The trimming of one million tons of production from Coastal States mine would cause disruptions in the market place. Such disruptions would force Coastal's existing customers to seek other sources of coal.

The no action alternative would not create a bypass situation resulting in the permanent loss of the use of the coal in the emergency lease area.

CHAPTER IX

RECORD OF INVOLVEMENT

During review of the lease application, application of the unsuitability criteria, and preparation of this environmental assessment, the following were consulted:

U.S. Geological Survey - Evaluated Coastal States' application and stated that they did meet the emergency leasing criteria. USGS also reviewed and commented on the draft environmental assessment.

Utah Division of Wildlife Resources - Provided input into the unsuitability study.

U.S. Fish and Wildlife Service - Provided input into the unsuitability study.

State of Utah, Office of the Governor - Governor Matheson recommended that the proposed lease should be issued.

A Public Meeting and Hearing on the Environmental Assessment and the application of the unsuitability criteria was held on February 10, 1981 in Richfield, Utah. Personnel from the Fishlake National Forest conducted the Public Meeting and presented information on the proposed lease and the results of application of the unsuitability criteria. Max Nielson, BLM - Utah State Office, conducted the Public Hearing.

Fourteen individuals attended the meeting and hearing. All attendees represented governmental agencies and industry. No adverse reaction to the proposed lease or any anticipated environmental impacts were expressed at the meeting, and no one presented any comments during the public hearing.

APPENDIX 1

APPLICATION OF THE COAL UNSUITABILITY CRITERIA

AS REQUIRED BY 43 CFR 3461

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
170 North Main
Richfield, Utah 84701

February 24, 1981

Don Pendleton, District Manager
Richfield BLM District
Richfield, Utah 84701

Dear Don:

Enclosed is the coal unsuitability study as it applies to the emergency lease request made by Coastal States Energy Company for federal coal within the Fishlake National Forest. After application of the unsuitability criteria to the requested lease area, there is nothing that would preclude underground mining of coal as requested. However, there are required lease stipulations, see criteria 3, 7, 11, and 15.

I understand this study will be included in the environmental assessment being prepared by your staff for the emergency lease request.

If you need additional information we might have please feel free to contact us.

Sincerely,

J. KENT TAYLOR
Forest Supervisor

Enclosure

Coastal States Energy Company (CSE)

5 Greenway Plaza, East Houston, Texas 77046 has made request for a Federal coal lease on lands administered by the Fishlake National Forest.

CSE has made application for lease under the authority of 43 CFR 3425 for 1,158.05 acres of open Federal coal lands. The lands applied for are adjacent to CSE's active underground coal mine in Convulsion Canyon, Sevier County, Utah. All mining activity would be underground.

Coastal States' lease application was evaluated by the BLM and USGS in October and November, 1980, and was found to meet the emergency leasing criteria outlined in 43 CFR 3425.1-4. The Utah State Office of the BLM recommended that the acreage requested be put up for lease pending application of the unsuitability criteria for coal mining and preparation of an environmental assessment record/technical examination. This is currently being done in a cooperative effort between the Richfield District BLM and the Fishlake National Forest.

The area is: T21S, R4E, S.L.M. (SEE ENCLOSED MAP)
Sections 25 All
Section 36 N½

T21S, R5E, S.L.M.
Section 30, Lots 2, 3, & 4, W½ SE¼
Containing 1158.05 acres.

Directions for application of the coal unsuitability criteria are set forth in 43 CFR part 3460. These directions have been followed in assessing lands unsuitable for all or certain stipulated methods of coal mining.

Each criterion as defined in the Federal Register 43 CFR 3461.1, effective July 19, 1979, is presented first followed by analysis. Exceptions are discussed where applicable.

Criterion No. 1:

All Federal lands included in the following land systems or categories shall be considered unsuitable: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, National Forests, and Federal lands in incorporated cities, towns and villages. All Federal Lands which are recommended for inclusion in any of the above systems or categories by the administration in legislative proposals submitted to the Congress or which are required by statue to be studied for inclusion in such systems or categories shall be considered unsuitable.

There are no National Park Systems, National Wildlife Refuge Systems, National Systems of Trails, National Wilderness Protection Systems, National Wild and Scenic Rivers Systems, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund or Federal lands in incorporated cities, towns, and villages within the requested lease area. However the lease request is for Federal lands administered by the Fishlake National Forest.

Exceptions:

The Secretary of Agriculture has found no significant recreational, timber, economic, or other values within Fishlake National Forest which may be incompatible with a lease. Therefore, land within the Fishlake National Forest may be considered as suitable for future coal lease consideration pending assessment of all the criteria (Salina Land Use Plan, 1975).

Criterion No. 2:

> Federal lands that are within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes, or for agricultural crop production on Federally owned surface shall be considered unsuitable.

There are no rights-of-ways, easements, leases for residential, commercial, industrial or other public purpose, or for agriculture crop production on the land requested for lease. (See Criterion 3 for Road Right-of-Ways).

Criterion No. 3:

> Federal lands affected by section 522(e)(4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public road or within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.

There are no known cemeteries, public buildings, schools, churches, community or institutional buildings, or public parks within the requested lease area. Forest road #40007 (Duncan Mountain Road) crosses the requested lease area. This road and all land within 100 feet of either side of this road is considered unsuitable.

Exemption:

Underground mining may be permitted because surface disturbance, i.e. subsidence and tension cracks, can be repaired to a standard equal to or better than the existing road condition. Underground mining is allowed pursuant to section 3461.2 of the criteria.

Criterion No. 4:

> Federal lands designated as wilderness study areas shall be considered unsuitable while under review by the Administration and the Congress for possible wilderness designation. For any Federal land which is to be leased or mined prior to completion of the wilderness inventory by the surface management agency, the environmental assessment or impact statement on the lease sale or mine plan shall consider whether the land possesses the characteristics of a wilderness study area. If the finding is affirmative, the land shall be considered unsuitable unless issuance of noncompetitive coal leases and mining on leases is authorized under the Wilderness Act and the Federal Land Policy and Management Act of 1976.

There are no proposed or designated wilderness study areas within the requested lease area. (Forest Service RARE II, 1979).

Criterion No. 5:

Scenic Federal lands designated by visual resource management (VRM) analysis as Class I (an area of outstanding scenic quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks shall be considered unsuitable. A lease may be issued if the surface management agency determines that surface coal mining operations will not significantly diminish or adversely affect the scenic quality of the designated area.

There are no lands listed as VRM Class I within the requested lease area. (Salina Land Use Plan, 1976).

Criterion No. 6:

Federal lands under permit by the surface management agency and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstration or experiment, except where mining could be conducted in such a way as to enhance or not jeopardize the purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods or mining.

There are no lands within the lease requested area that are being used for scientific studies involving food or fiber production, natural resource or technology demonstrations, (Salina Land Use Plan, 1976).

Criterion No. 7:

All districts, sites, buildings, structures, and objects of historic, architectural, archeological, or cultural significance on Federal lands which are included in or eligible for inclusion in the National Register of Historic Places, and an appropriate buffer zone around the outside boundary of the designated property (to protect the inherent values of the property that makes it eligible for listing in the National Register) as determined by the surface management agency in consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Office shall be considered unsuitable.

There are no known districts, sites buildings, structures, and objects of historic, architectural, archeological, or cultural significance on Federal lands which are included or eligible for inclusion in the National Register of Historic Places.

Criterion No. 8:

Federal lands designated as natural areas or National Natural Landmarks shall be considered unsuitable.

There are no Federal lands designated as natural areas or as National Natural Landmarks within the lease request area, (Salina Land Use Plan, 1976).

Criterion No. 9:

> Federally designated critical habitat for threatened or endangered plant and animal species, and habitat for Federal threatened or endangered species which is determined by the U.S. Fish and Wildlife Service (USFWS) and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

There are no Federally designated critical habitats for threatened and endangered plant and animal species. (White, USFWS, 1981).

Criterion No. 10:

> Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.

The State of Utah, Division of Wildlife Resources (UDWR), considers the Federal threatened and endangered list to be adequate (Coffeen, 1981).

Criterion No. 11:

> A bald or golden eagle nest or site on Federal lands that is determined to be active and appropriate buffer zone of land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the USFWS.

There are no known active bald or golden eagle nest sites on the lease request area.

Criterion No. 12:

> Bald and Golden Eagle roost and concentration areas on Federal lands used during migration and wintering shall be considered unsuitable.

There are no known Golden Eagle roost and concentration areas on the lease request area.

Criterion No. 13:

> Federal lands containing a falcon (excluding kestrel) cliff nesting site with an active nest and a buffer zone of Federal land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the USFWS.

There are no known active falcon nest sites within the lease request area.

Criterion No. 14:

Federal lands which are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and the USFWS, shall be considered unsuitable.

The migratory species of high Federal interest that are present on the proposed lease area are: Western bluebird, Flammulated Owl, Ferruginious hawk, Coopers hawk, and Golden Eagle. There is no known priority habitat for these species in the area.

Underground mining will not cause adverse impacts on these species of high Federal interest.

Criterion No. 15:

Federal lands which the surface management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. Examples of such lands which serve a critical function for the species involved include:

(i) Active dancing and strutting grounds for sage grouse, sharp-tailed grouse, and prairie chicken;

(ii) Winter ranges most critical for deer, antelope, and elk; and

(iii) Migration corridors for elk.

A lease may be issued if, after consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not have a significant long-term impact on the species being protected.

The lease area has 116 species of special interest to the State of Utah. The following areas have been identified by the Forest Service as of essential habitat due to their dependent use by wildlife for feeding, reproduction and wintering.

1. Cliff areas associated with raptor nest. (Quitchumpah Canyon-Convulsion Canyon).

2. All perennial and ephemeral water sources riparian habitat within a 0.5 mile buffer zone on each side of riparian habitat..... (Quitchumpah Canyon).

3. The requested lease area is in a location designated critical elk winter range by the Forest Service and UDWR and is unsuitable.

The Forest Service and UDWR have determined that underground mining will not cause adverse impacts to the elk. The lease should stipulate no surface occupancy during winter time while elk use the area. This is normally November thru May. Any causal use or other surface activity done by the lessee at a time when elk are wintering on the proposed lease will require authorization from the Forest Service.

Criterion No. 16:

> Federal lands in riverine, coastal, and special floodplains (100-year recurrence interval) shall be considered unsuitable unless after consultation with USGS, the surface management agency determines that all or certain stipulated methods of coal mining can be undertaken without substantial threat of loss to people or property, and to the natural and beneficial values of the floodplain on the lease tract and downstream.

There are no lands in special floodplains on the area requested for lease.

Criterion No. 17:

> Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.

There are no Federal lands which have been committed by the USFS to use as municipal watersheds.

Criterion No. 18:

> Federal lands with National Resource Waters, as identified by states in their water quality management plans, and a buffer zone of Federal lands 1/4 mile from the outer edge of the far banks of the water, shall be unsuitable.

Utah Division of Water Resources has not identified any Federal lands with National Resource Waters (Lawrence, 1980).

Criterion No. 19:

> Federal lands identified by the surface management agency, in consultation with the state in which they are located, as alluvial valley floors according to the definition in 3400.0-5(a) of this title, the standard in 30 CFR Part 822, the final alluvial valley floor guidelines of the Office of Surface Mining Reclamation and Enforcement when published and approved state programs under the Surface Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue, or preclude farming, shall be considered unsuitable. Additionally, when mining Federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface of underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.

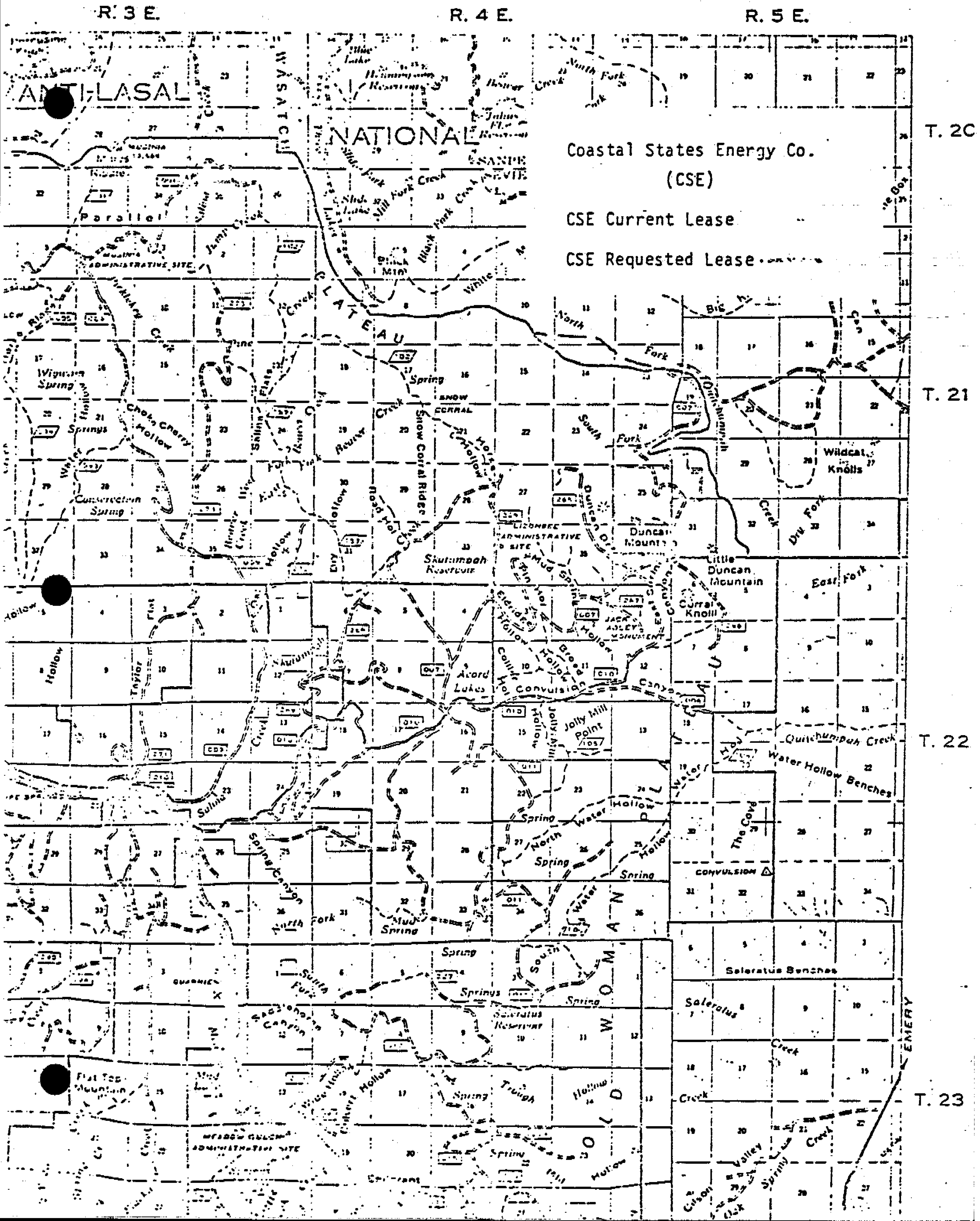
There are no alluvial valley floors located within the requested lease area. No farming would be impacted if a lease was allowed in this area for underground mining.

Criterion No. 20:

> Federal lands in a state to which is applicable a criterion (i) proposed by that state, and (ii) adopted by rulemaking by the Secretary, shall be considered unsuitable.

The State of Utah has not proposed or adopted any other criteria.

After application of the unsuitability criteria to the requested lease area, there is nothing that would preclude underground mining of coal as requested.


R. 3 E.
R. 4 E.
R. 5 E.
T. 20
T. 21
T. 22
T. 23
Coastal States Energy Co.
(CSE)
CSE Current Lease
CSE Requested Lease
MANTI-LASAL
NATIONAL
WASATCH
PLATEAU
Parallel
Administrative Site
Black Mtn
Snow Corral Ridge
Snow Corral
Skutumpah Reservoir
Lizonbee Administrative Site
Duncan Mountain
Little Duncan Mountain
Corral Knoll
Wildcat Knolls
Jack Ashley's Monument
Acord Lakes
Convulsion Canyon
Jolly Mill Point
Quitchumpah Creek
Water Hollow Benches
The Cove
Convulsion
North Water Hollow
Spring Canyon
North Fork
Mud Spring
Saleratus Benches
Saleratus Reservoir
Saleratus Creek
Quarries
Flat Top Mountain
Meadow Gulch Administrative Site
Old Woman Plateau
Wigwam Spring
Choke Cherry Hollow
Conservation Spring
Jump Creek
East Fork
Dry Fork
Emery

APPENDIX 2

THREATENED AND ENDANGERED PLANT SPECIES

INVENTORY STATEMENT

Endangered Plant Studies, Inc.
129 North 1000 East
Orem, Utah 84057
(801) 225-7085

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

Dear Mr. Welch:

This letter is to confirm the examination of that portion of the Southern Utah Fuel Company property included under conditions of potential lease at the northwest edge of the current lease application area. Specifically, the property in question consists of all of section 25 and the northern half of section 36 in T21S, R4E, and much of section 30 in T21S, R5E. These areas were searched for the presence of plant species listed or proposed as endangered or threatened under terms of the Endangered Species Act of 1973, as amended in 1978. This letter will serve as a notice of negative review. None of the species currently listed or reviewed were found on the general lease area or in the properties cited herein.

The property was surveyed on a quarter-section by quarter-section basis, with all plant communities within each quarter-section being investigated. The survey was conducted during July and August when plants were at their peak in growth and flowering.

I wish to thank you for the opportunity of serving you in this way. If there are any questions please call me.

Sincerely yours,

Stanley L. Welch

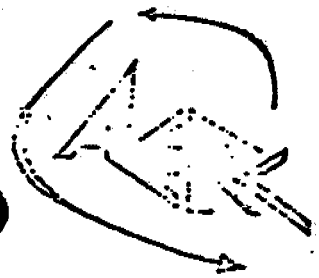
Stanley L. Welch
Plant Taxonomist

Job change made as per telephone conversation with Stan Welch
4/2/81 Daniel Hanks

APPENDIX 3

ARCHAEOLOGICAL REPORT FOR THE PROPOSED

LEASE AREA



ARCHEOLOGICAL - ENVIRONMENTAL RESEARCH CORPORATION

588 West 800 South Bountiful, Utah 84010
Tel: (801) 292-7061 or 292-9668

February 9, 1981

Subject: ADDENDUM - Emergency Lease Area Cultural Resources Evaluation in the Duncan Mountain Locality (Addendum to AERC Paper No. 20 entitled "Intensive Archeological Surface Evaluations and Sample Survey of the Southern Utah Fuel Company Coal Mine in Sevier County, Utah" dated October, 1980).

Project: Southern Utah Fuel Company - 1981 Permit Application

Project No.: SUFC-S1-1

Permit: U.S. Forest Service Special Use Permit issued to AERC January 28, 1981

To: Coastal States Energy Company, ATTN: Mr. Keith Welch, 1354 E. 3300 South, Suite 303, Salt Lake City, Utah 84106

District Ranger, Fishlake National Forest, Richfield Ranger District, P.O. Box 646, Richfield, Utah 84701

Forest Supervisor, Fishlake National Forest, U.S. Forest Service, 170 North Main, Richfield, Utah 84701

Info: Mr. H. G. Wylie, Archeologist, Region 4, U.S. Forest Service, 324 - 25th Street, Ogden, Utah 84401

Dr. David B. Madsen, State Archeologist, Antiquities Section, State Historic Preservation Office, 300 Rio Grande, Salt Lake City, Utah 84101

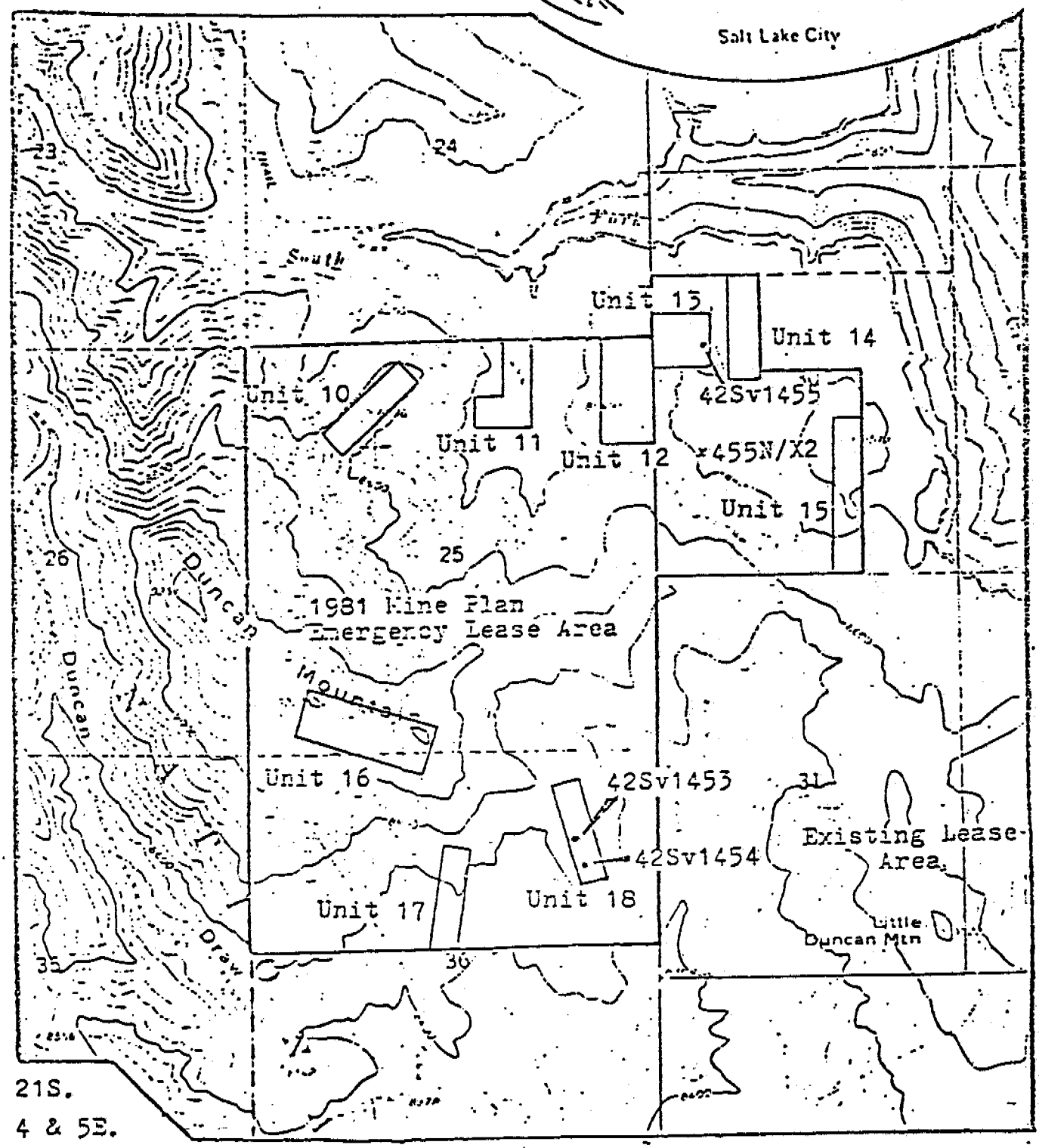
GENERAL DATA ON THE PROJECT:

From January 28 to January 30, 1981, V. Garth Norman of the Archeological-Environmental Research Corporation conducted a sample survey cultural resources evaluation in the Duncan Mountain locality Emergency Lease Area for the Southern Utah Fuel Company (SUFC), a division of Coastal States Energy Company. This evaluation is an extension of the 1980 study, with this report as an addendum to AERC Paper No. 20 entitled Intensive Archeological Surface Evaluations and Sample Survey of the Southern Utah Fuel Company Coal Mine in Sevier County, Utah (see Hauck et al. 1980).

The resource inventory included nine sample units ranging from 10 to 25 acres each, totaling 120 acres, and are numbered in sequence from 10 to 18 in order to continue the sequence established in the 1980 study. This acreage comprised a ten percent sampling of about 1160 acres in the Emergency Lease area. As with the previous study, the purpose of this research was to ascertain, through non-random sample analysis, the probability for existence of significant historic and/or prehistoric cultural resource sites that could sustain adverse affect from subsidence occurring as a result of future underground mining operations.

The surface areas surveyed and locations of cultural resources are shown in Figure 1, and are situated within Sections 25 and 36 of Township 21 South, Range 4 East, and in Section 30 of Township 21 South, Range 5 East, in the Fishlake National Forest lands of Sevier County, Utah. The project area is situated on the northwest corner of the 1980 Mine Plan area, and is located between 8200 and 9200 foot ASL contours on Duncan Mountain and adjacent foothills to the south of the South Fork of Quitchupah Creek (see Figure 1).

ARCHEOLOGICAL-ENVIRONMENTAL RESEARCH CORPORATION



T. 21S.

R. 4 & 5E.

Meridian: Salt Lake B. & M.

Quad: Acord Lakes, Utah 7.5 Minute USGS

Project: SUPC-81-1

Series: Central Utah

Date: 2/2/81

Figure 1
SAMPLE SURVEY UNITS
AND
CULTURAL RESOURCES
IN THE
EMERGENCY LEASE
PROPOSED AREA

0 .5 1

.5 0 .5 1 Km

Legend:

Sample Unit

Archeological Site •

Isolated Artifact x

All field notes and site data are filed at AERC headquarters in Bountiful, Utah. Site reports are being submitted to the State Historic Preservation Office as well as to all other relevant government agencies.

Please refer to the initial report (AERC Paper No. 20) for details of Prehistory, Environment, Previous Investigations, and Research Design.

FIELD RESEARCH:

A biased selection of sample units was made by AERC based upon an analysis of the terrain involved and the high relative potential of each sample unit for containing cultural resource sites. Saddles, ridges, alcoves, and sagebrush flats were all included in the surfaces sampled during this survey.

Locations of the sample units and their land ownership and acreage are shown on Table 1.

Table 1

Sample Unit Locations

Sample Unit	Acreage	Location	Ownership
10	10	T.21S., R.4E., Sec. 25	U.S. Forest
11	10	" " " "	" "
12	20	" " " "	" "
13	10	" 5E., " 30	" "
14	10	" " " "	" "
15	15	" " " "	" "
16	25	" 4E., " 25 and 36	" "
17	10	" " " 36	" "
18	10	" " " "	" "

A large portion of the Emergency Lease area lies on Duncan Mountain's steep terrain which has a low site potential. The AERC analysis indicated that potential for sites was greatest in level to moderately sloping ridge areas, in saddles, and at the head or mouth of draws. Sample units were located to examine these topographic features. Units 12, 15, and 16 are in ridge and saddle areas. Units 10, 17, and 18 are on ridge areas overlooking draws. Unit 11 is in a low ridge area

at the mouth of a major draw. Unit 13 is on a relatively flat ridge overlooking low knolls in Unit 14 and the adjacent flatlands.

All inventoried sample units were examined by performing parallel and zigzag transects at a 15 meter (50 feet) spacing between transects. Specific areas judged to be of high site potential were walked at an eight to ten meter spacing.

A total of three archeolcgical sites was recorded in the Emergency Lease project area (see Figure 1). These sites, 42Sv1453, 42Sv1454, and 42Sv1455, were recorded, photographed, sketched, and their locations marked on an Acord Lakes 7.5 minute U.S.G.S. topographic map. Site reports for all relevant government agencies are included in an appendix to this report.

The three previously unrecorded cultural resource sites located during this inventory are small, prehistoric lithic scatters in poor condition. They are located on foothill ridge areas of Duncan Mountain. No cultural affiliation could be established for these sites (see Table 2).

Table 2

Cultural Resource Site Summary

AERC Site No.	Permanent Site No.	Site Type	Culture
539N/1	42Sv1453	Lithic scatter	Unknown
539N/2	42Sv1454	" "	"
539N/3	42Sv1455	" "	"

Sites 42Sv1453 and 42Sv1454 appear to be limited use hunting stations. They are located on relatively flat surfaces on the west rim of a ridge area, overlooking a draw to the southwest. Natural surface erosion could cover lithics

and artifact assoications on site 42Sv1453, but thin soils and rock exposure on site 42Sv1454 negate any potential for depth.

Site 42Sv1455 is located on a slightly raised residual point along a ridge line overlooking a draw and flatland to the east. The site is of limited usage and has limited depth potential. This site could have been previously collected since an old wagon trail extends along the ridge to the site locality.

In addition to the three sites, one isolated projectile point (455N/X2) was previously located in the survey area during the 1980 survey (see Figure 1). Another isolated point (455N/X1) was recovered near the center of sample unit 2 during the previous sample survey, but is mistakenly illustrated as being found in the area of unit 18 in Figure 3a of AERC Paper No. 20.

Two sites (42Sv1453 and 42Sv1455) have been given a CRRS:S-3 status, having limited depth potential and limited scientific value.

Site 42Sv1454 was recorded as CRRS:S-4 status, i.e., having minimal scientific value, lacking temporal diagnostic remains or depth potential (see AERC Paper No. 20 for definition of CRRS evaluation system). Should additional research reveal a greater value for any of these sites, the site value will be adjusted accordingly.

Table 3

Site Significance

Site	Quality	Condition	CRRS Value Rating
42Sv1453	c	Poor	S-3
42Sv1454	-	"	S-4
42Sv1455	c	"	S-3

AERC Quality Indicators are:

a) size or layout is unique;

b) quantity and/or quality of artifacts is unique;

c) depth is indicated;

d) environmental location is unique;

e) unique artifacts, architecture, are, or structure exist;

f) condition is excellent for preservation of materials or data;

g) site contains specific cultural data revelant to temporal and spatial identifications;

h) site is scene of an important event; and

i) site is associated with an important person.

IMPACT POTENTIAL ON CULTURAL RESOURCE SITES AND RECOMMENDATIONS:

Direct impact potential of cultural resource sites is related to the possible subsidence of surface areas that could be affected in the future by the removal of coal seams within the project area on Old Woman Plateau (see Table 4).

Direct impact stemming from project development, e.g., bulldozing, portal development, etc., is not being considered in this report since direct impact to archeological sites due to these kinds of activities is being mitigated through avoidance procedures by AERC. Inasmuch as no historic or prehistoric site types which are susceptible to extensive disturbance from subsidence are known within the subsidence zone, the potential for direct impact of these types of sites is considered to be nil.

Indirect impact is a greater threat to the archeological sites. This, however, would result primarily from non-project related hunting and camping activity by casual visitors and not from mining operations.

Sparse lithic remains on all three sites suggests that significant impact from vandalism has already occurred.

The low significance of all three cultural resource sites recorded in the Emergency Lease area does not warrant alteration of recommendations as provided in the report for the initial sample survey (see AERC Paper No. 20, pages 45 and 46).

NATIONAL REGISTER CRITERIA OF ELIGIBILITY:

Application of the National Register Criteria of Eligibility, defined under 36 CFR 60.6, to each of the three sites that are situated in the Emergency Lease project area provides the following information:

a) None of the three sites "is associated with events that have made a significant contribution to the broad patterns of our history;" or

b) none of the three sites "is associated with the lives of persons significant in our past;" or

c) none of the three sites "embodies the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction;" or

d) none of the three newly recorded sites (42Sv1453, 1454, and 1455) can be judged "likely to yield information important in the prehistory" of the region as a National Register site.

Based upon application of the criteria established in 36 CFR 60.6, none of the three sites evaluated in this report is eligible for nomination to the National Register of Historic Places.

Table 4

Cultural Resource Impact Potential

Site	CRRS Status	Possible Direct Impact	Indirect Impact	Impact Agent
42Sv1453	S-3	Mining operations	Low	Casual visitors
42Sv1454	S-4	" "	"	" "
42Sv1455	S-3	" "	"	" "

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1981 COMPLETENESS REVIEW

COMMENT 782.19

The applicant must show the application for an NPDES for water discharge at the sedimentation pond as well as for the mine water discharge; at present there is mixing at the sediment pond with no sampling.

RESPONSE:

A reproduction of the Applicant's NPDES permit is submitted herein as Appendix 782.19.

COMMENT 783.12

The staff of the Utah State Historic Preservation Officer has reviewed SUFCO's application and it is the opinion of that office, that one area needs to be addressed further.

The question of significance of the sites is somewhat confused in that the report suggests that some of the sites meet Criteria D of 36 CFR 60.6, as being of scientific value, and then addresses the question of their not being eligible based on the Bureau of Land Management CRSS (sic) rating system. This is inconsistent, and the sites thus are not adequately addressed as to whether they are eligible or not eligible.

The confusion is again reflected in the recommendations of the cultural resource report. It is stated that there are indirect impacts on some of the sites, and gives a detailed listing of the kind of mitigation that may solve this indirect impact problem. If the sites are not eligible, there is not impact.

Applicant must submit readable copies of the site forms. The top of each page is cut off and the site number cannot be read.

There are a variety of minor omissions from the archaeological report which will be detailed in the final TEA.

RESPONSE:

Beginning in 1980, the Applicant and its contracted cultural resources consultant (AERC) conducted a review of the total studies reports submitted to evaluate potential contradictions, deficiencies, and any need to perform additional investigative surveys and/or analyses. To clarify identified contradictions (identified above and in Completeness Review Comment 784.17), various data and text amendments are presented herein as supplements to the 1980 submitted mine plan.

To address the question of site significance and recommendation, pages 29, 34, 38, 42, 45, and 46 of the 1980 Archaeology Report (Volume 4) have had clarifying statements added. In addition, a 1981 Submittal Report has been included to further address study objectives and results. Readable site form copies have

RESPONSE 783.12 (Continued)

been included with this submittal in the Archaeology - 1981 Submittal Report section of Volume 4.

Responses to the Completeness Comment 784.17 are presented in the following and additionally appear in the 1981 Submittal Report section of Volume 4 (Archaeology).

1981 COMPLETENESS REVIEW

COMMENT 783.13

Applicant should present a discussion concerning the direction of groundwater flow and possible discharge areas for aquifers identified and/or encountered within the permit area.

The application should indicate the areas of inflow into the mine on the underground map. The applicant states that the mine is dry on page 30, Vol. 2, this contradicts a 600 gpm discharge rate.

The applicant should futher discuss the role of the aquicludes which prevent inflow of groundwater into mine. What evidence is available to support this contention?

RESPONSE:

In response to receiving the Apparent Completeness Review Comments, the Applicant requested its SUFCo Mine engineering staff and the contracted hydrological consultant (Hydrometrics) to conduct a complete review of all hydrological study reports submitted in behalf of the SUFCo Mine permitting effort. In addition, any investigative work required to provide adequate response to regulatory agency concerns was determined and appropriately initiated.

The primary results of this effort are presented in report format as a 1981 Submittal Report (prepared by Hydrometrics) to Hydrology, Volume 4. Specifically addressed in this report are the responses to Completeness Review Comments 783.13, 783.15(b), 783.16, 783.25, 784.14, and 784.20.

Additional responses, which primarily involved the site specific technical assistance of the SUFCo Mine engineering staff are presented as appropriate in this section of individual comment responses.

1981 COMPLETENESS REVIEW

COMMENT 783.14

Applicant should supply lithologic logs of the observation wells installed to date.

RESPONSE:

Lithologic logs of the observation wells are presented herein as Appendix 783.14.

1981 COMPLETENESS REVIEW

COMMENT 783.15(b)

The recharge areas should be identified for spring sites being monitored at the surface and from within the mine.

The applicant states that various faults and fractures are producing the increasing amounts of water intercepted within the mine (600 gpm at present). Has any attempt been made to map the areas producing significant amounts of inflow? This information may provide a means of projecting and indentifying potential surface recharge areas.

It is necessary for the applicant to provide the water well injection information stated to be derived from tests during the fall of 1980. This was to be compiled on four observation wells showing the extent of the hydraulic connection within the Blackhawk Formation. (p. 18, Vol. 4)

Have the holes in the 001 spring area been completed yet? If so information thus attained should be submitted along with a monitoring schedule.

Will mining or subsidence effect the domestic spring 048, if so what is an alternate water supply (UMC 783.17)?

RESPONSE:

The reviewing authority should refer to the detailed response information presented in the 1981 Submittal Report of Hydrology (Volume 4) prepared by the Applicant's contracted consultant, Hydrometrics.

1981 COMPLETENESS REVIEW

COMMENT 783.16

The applicant has provided semi-annual surface water monitoring data to identify seasonal variation. Extra-polated (sic) data has also been generated from empirical formulas for the Quitchupah Creek drainage area. These data are apparently complete, but may be technically deficient (i.e., specific information delineating similarities between watersheds has not been provided).

RESPONSE:

The reviewing authority should refer to the detailed response information presented in the 1981 Submittal Report of Hydrology (Volume 4) prepared by the Applicant's contracted consultant, Hydrometrics.

1981 COMPLETENESS REVIEW

COMMENT 783.19

The applicant should provide in the plant community description section, the acreage calculations for each major vegetation type in the affected area and in the reference areas.

The "statistically acceptable techniques" to be used in determination of percent cover and vegetation composition in revegetated disturbed area (p. 37, Vegetation and Soils, Vol. 5) should be specifically indicated by the applicant.

The applicant should submit standard deviation data which correlate with the mean species cover and production data for each plant community.

The applicant has indicated only Site 12 (pp. 75-76, Report of Studies of Vegetation and Soils, Vol. 5, Mine Plan Application) as a vegetation reference area. Site 12 includes the Pinyon/Juniper vegetation community at a sedimentation pond site. The applicant must establish and describe adequate reference areas, indicate their locations on a map, and submit reference area data for cover, productivity, and shrub/tree density for each vegetation community. The applicant should also clearly indicate the status of vegetation reference areas with respect to a grazing plan and restrictions.

RESPONSE:

Upon receipt of the above Completeness Review Comment, the Applicant requested the original contracted vegetation consultant, Endangered Plant Studies, Inc., to review the study reports submitted to date and prepare response material. The response material prepared by Endangered Plants Studies, Inc. is reproduced in full and presented in the Soils and Vegetation section, 1981 Submittal, Volume 5.

1981 COMPLETENESS REVIEW

COMMENT 783.25(b),(f)

(b) The precise locations of the air quality monitoring stations should be plotted on one of the topographic base maps in order to facilitate the Technical Analysis phase of this review.

(f) Potentiometric surface levels should be shown on a map or cross-section.

RESPONSE:

(b) The reviewing authority should refer to the detailed response information presented in the 1981 Submittal Report of Hydrology (Volume 4) prepared by the Applicant's contracted consultant, Hydrometrics.

(f) A topographic map (scale 1:24,000) is presented as Map 81-5, Air Monitoring section, Volume 6, to illustrate the precise locations of the air quality monitoring stations.

1981 COMPLETENESS REVIEW

COMMENT 784.11(a),(b)

(a) Explosives. The applicant should clarify whether or not any surface blasting will occur as part of the operation. If none will occur the explosives section is complete. If surface blasting will occur a narrative description of the surface blasting procedures must be submitted that demonstrates how the applicant will comply with 30 CFR 817.61 through 817.68.

(b) Underground waste disposal areas should be shown on a map.

RESPONSE:

(a) It is not anticipated that the use of explosives will be required on the surface during the remaining operating life of the mine. In the event that blasting is anticipated, a blasting plan will be prepared (in compliance with 30 CFR 817.61 through 817.68) and submitted to the respective authorities for approval prior to actual blasting.

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

1981 COMPLETENESS REVIEW

COMMENT 784.13

In the 1980 Vegetation and Soils study (Vol. 5), several conclusions and recommendations were made. The applicant should address the following statements which were made in this report and verify what is to be actually performed.

(a) A list of only native species was recommended on pages 35-36 of the Vegetation and Soils study to be used for the revegetation mix. This list is in contradiction with those species proposed for revegetation in the 1979 Mine Plan submission (Vol. 2, pages 53-54). The applicant needs to clarify what seed mixture, seedlings, or transplants will be used for revegetation. Also, indicate the rates of application (as pounds pure live seed per acre), and the species, subspecies, and scientific name for each species in the mixture. The applicant should also address if specific revegetation seed mixtures will be utilized for different situations, including steep areas, mesas, along drainages, around sedimentation ponds, topsoil piles, and any saline, alkaline, or sandy soil areas. The applicant must also address if any introduced species (such as Yellow Sweetclover) is to be used in revegetation. The applicant should demonstrate that each introduced species to be utilized is necessary for controlling erosion, consistent with the approved postmining land use, compatible with native plant and animal species, and not poisonous or noxious.

(b) On page 36 of the Vegetation and Soils study, a recommendation is made that reclamation on steeper slopes (1.5:1 or steeper) be accomplished without application of topsoil. In the 1979 Mine Plan submission, topsoil was to be spread at a one-inch minimum depth. The applicant should clarify plans for topsoil redistribution and should substantiate that no harm will be caused to vegetation with a topsoil thickness of less than six inches. The applicant should also provide clarification as to the source, quality, and quantity of additional topsoil needed for revegetation. The applicant should also address what amount of fertilizer will be used, since 150 lbs./acre was proposed in the 1979 Mine Plan submission and 100 lbs./acre was recommended in the 1980 Vegetation and Soils study.

(c) With respect to both the reference areas and the affected area, plans for fencing and livestock grazing management plan should be addressed by the applicant.

(d) Shrub and subshrub density data should be provided in the applicable tables of the 1980 Vegetation and Soils study. The applicant should indicate the tree, shrub, and subshrub species, stocking rates, and mapped planting locations to be utilized for wildlife habitat.

(e) The proposed schedule of revegetation seeding (p. 35, Vegetation and Soils, Vol. 5) is too general in its reference to spring, summer, and early fall plantings. The schedule should be more specifically discussed.

(f) More specific information needs to be submitted with respect to mulching techniques. The rates of application, the type of mulch, and areas of use should be specifically discussed. The applicant should also address if temporary cover crops will be used, providing specific details about the type of crop, application rates, locations where utilized, and that the cover crops will not adversely affect revegetation efforts.

(g) The applicant should address if irrigation and/or pest and disease control will be utilized in revegetation efforts. If either is used, the applicant should discuss the details which will be utilized.

(h) The applicant should include sufficient discussion that a perennial vegetation cover will be established within a year of the final regrading of topsoil, how this will be accomplished, and whether a cover crop will be used between the time topsoil is prepared and the perennial seed mixture is used.

RESPONSE:

The Applicant has requested the original contracted consultants (Endangered Plant Studies, Inc.) to prepare discussion text appropriate to this comments section. The prepared text is presented in the 1981 Submittal Report, Soils/Vegetation section, Volume 5.

1981 COMPLETENESS REVIEW

COMMENT 784.14(a),(b)(1-3),(c)

(a) A description of potential quantitative changes in ground water recharge and discharge should be presented.

(b)(1) The postmining reclamation plan (Exhibits 11 and 12) shows final stream restoration for East Spring Canyon. The applicant proposes to restore the channel over the fill at a slope of 17.5 percent for approximately 1,600 feet. The applicant has estimated the peak run-off resulting from 100-year precipitation event to be 761 cubic feet per second. The use of riprap as proposed by the applicant will not provide long-term stability for the stream channel. The applicant must demonstrate that the stream channel will be stable or that a permanent maintenance plan will be implemented for the stream channel.

(b)(2) The applicant states that TSS and Oil and grease concentrations have exceeded the NPDES effluent limits for surface and mine water discharges on occasions. Possible solutions to correct the surface water effluent problem have been presented, but not for the mine water discharge.

The applicant should present adequate methods to bring the mine water discharge into the acceptable effluent standards.

The Division would suggest an additional monitoring site at the point where the mine water exits the by-pass culvert and discharges into the natural drainage of East Spring Canyon.

(b)(3) Applicant should present an adequate surface and ground water monitoring plan for operations and postmining periods. Will the same schedule be utilized as for baseline monitoring? What is the monitoring frequency of the two springs identified within the mine?

(c) The applicant should address the potential impacts of subsidence upon the quantity and quality of Quitchupah Creek waters utilized by downstream irrigation projects and upon the baseflow contributions from North Fork of Quitchupah Creek after cessation of mining operations.

It appears that discharges from the mine portal to East Spring Canyon will offset any impacts to baseflow which may be lost during mining operations.

RESPONSE 784.14(a),(b)(1-3),(c)

In Response to Comments 784.14(a), 784.14(b)(3), and 784.14(c), the reviewing authority should refer to the detailed response information presented in the 1981 Submittal Report of Hydrology (Volume 4) prepared by the Applicant's contracted consultant, Hydrometrics.

The Applicant's Responses to Comments 784.14(b)(1) and 784.14(b)(2) are presented in the following.

(b)(1) The determination of riprap size and quality for the main stream channel was made by Merrick and Company in their "Drainage Facility and Sediment Control Plan for the Southern Utah Fuel Company Mine No. 1" dated September 17, 1979 (Exhibit 9, Vol. 2). Merrick and Company utilized Manning's Equation and two publications of the Bureau of Public Roads (Publications 5 and 10) in their calculations. The Applicant believes that the use of these standard equations and reference materials indicates that the size and quality of riprap so determined (15 inch, Class II riprap) shall provide long-term stability for the stream channel.

(b)(2) The underground sedimentation basin capacity was increased to control the total suspended solids (TSS) and oil and grease concentration. Accordingly, the mine water discharge has, for the six month period ending August 1, 1981, yielded no samples which exceeded permit effluent limits for TSS or oil and grease. The Applicant will continue to monitor such discharge and take further remedial action if needed.

1981 COMPLETENESS REVIEW

COMMENT 784.15

The applicant should submit statements of confirmation that the proposed postmining land use is consistent with the surface owner plans and the local land use plan and programs.

The applicant needs to describe how the postmining land use will be achieved and the support activities which will be necessary to achieve the postmining land use.

RESPONSE:

The surface lands within the permit area (except for 640 acres owned by the Applicant) are owned by the U.S. Government and are either parts of the Fishlake National Forest or the Manti-LaSal National Forest. These lands have undergone inventory resulting in the preparation of land use plans covering the permit area by the respective Forest Service units who are responsible for the administration and use of these Forest Service lands.

The Applicant intends that the postmining land uses will be consistent with the land use plans prepared by the Forest Service. Final reclamation activities such as grading and seeding as detailed within this Mining and Reclamation Plan will be completed in a manner to provide uses of the lands consistent with those uses required by the U.S. Forest Service land use plans.

Surface owner approval of the Applicant's proposed postmining land use will be confirmed by the approval of this Mining and Reclamation Plan by the respective Forest Service units.

1981 COMPLETENESS REVIEW

COMMENT 784.17

Summary of Major Deficiencies for Cultural Resources

1) 180 acres were reported surveyed as a 10% sample of areas to be impacted by subsidence; however, the mine plan states that approximately 5,230 acres will be affected or disturbed, not 1,800 as stated in the survey report. If the total area surveyed, including access roads and seismic lines, but excluding drill holes, is less than 10% it is suggested SUFCo require the original contractor or hire another competent entity to complete the survey.

2) The areas in the canyons that will be broken out for ventilation entries need to be surveyed, and the information added to the existing report.

3) An explanation of sampling strategy is needed of why the size, shape, and placement of surveyed areas was chosen i.e., why nine 20-acre plots instead of 20 nine-acre plots?

4) A statement of ground visibility and vegetative cover must be provided, as it relates to the potential for unknown sites.

5) Legal descriptions for sites 1435, 1436, 1437, 1438, 1439 and 1440 do not agree with map locations. Furthermore, the site number has been cut off site forms for 1439, 1440 and 1441 and the end of the legal description cut off 1439 and 1440. UTM grid locations are needed for all sites.

6) Site maps are needed for sites 983 and 984. Clear photographs or drawings are needed for site 1440. The remaining site maps need to be redrawn with scales to show details of site, not just area of topographic location. Photos of sites need to be discernable, especially for site 1440.

7) The stated research goals need to be related to the resources located by survey.

8) Possible impacts to cultural resources must be discussed in a consistent fashion. Table 7 indicates all known sites may be impacted by the effects of subsidence. Yet on page 43 it is stated"...the potential for direct impact of these types of sites is considered to be nil." One site (1435), however, is a rock shelter (considered a susceptible site) with a CRRS-S2 designation. What is the potential for impacts?

9) National Register eligibility statements are inconsistent. Several sites are assigned an S2 or S3 designation, which by definition makes them eligible for nomination to the National Register. Yet no recommendations to this effect are made; in fact it is stated that none are eligible. This is very contradictory. If, on the other hand, no sites are eligible, no further mitigation measures (avoidance, testing for eligibility) are necessary. Consistent statements of eligibility, determinations of impact (see 36 CFR 800) and recommendations for further mitigation of adverse impact are needed throughout the survey report, including site forms. We would also recommend dropping the use of the CRRS system, as BLM no longer utilizes the system, and it leads to confusion in recommendations of eligibility of sites to the National Register, pursuant to 36 CFR 60.6.

10) According to the site forms, artifacts were collected from a National Forest. Is this permitted? What is the Forest Service Permit Number and expiration date? Why is it stated in B. Laboratory Research that artifacts were not collected? Inconsistencies need clarification.

11) Page 16 "...no Paleo-Indian sites or materials have been discovered in the project area".

Page 38 "The Plano phase of the Paleo-Indian period is shown in the Cascade bipoint collected in 1976."

This inconsistency needs clarification.

12) Sites need more interpretation--ceramic analysis, diagnostic artifact analysis, and site size (dimensions and/or m^2). Additional discussion of Premont ceramics is necessary.

13) Reports detailing all previous surveys in the mine plan should be included in the mine plan.

14) A more thorough statement on the local significance of the Addley Monument (42Sv1440) would be helpful for an eligibility determination. Documented conversations with local informants and consultation with SHPO would help in reaching a decision.

All the above deficiencies will need correction before the mine plan can be considered complete and OSM can begin consultation with the SHPO pursuant to Section 106 of the National Historic Preservation Act of 1966 and 36 CFR 800. Items 1 and 2, however, could be completed after approval of the mine plan.

RESPONSE:

Potential contradictions and deficiencies are addressed in the 1981 Submittal Report section of Archaeology (Volume 4).

1981 COMPLETENESS REVIEW

COMMENT 784.18

Maps and cross-sections of the East Side Road and Mine Access Road should be submitted. Vertical and horizontal alignments should be shown.

The applicant must further clarify the right-of-way boundary of the east road as a public road, and describe the potential use of this road as a diversion. The applicant must discuss erosion prevention measures that will be implemented.

RESPONSE:

Stability studies and cross sections of the sediment pond and main mine access roads are presented on the following page and in the 1981 Submittal (Appendix A) in the Drainage/Sediment Control Section, Volume 6. The East Side Road and mine access road locations are shown on Maps 80-4a and 80-4b. Cross sections of the East Side Road are also presented as Appendix 784.18. The road is classified by the county as a class D road. The Forest Service is presently working to have the road reclassified as an extension of Forest Development Road 265. The road is used by the Applicant for access to the substation and to the East Spring Canyon water tank. Right-of-way extends only to the road edge. The East Side Road's existence pre-dates mining activities and is used by local ranchers to herd cattle to the upper plateau. The road is the boundary between disturbed and undisturbed area at the mine portal facilities. Run-off from the undisturbed area east of the surface facilities and the road is diverted by the road to minimize the required sediment control facility size. The Applicant has constructed water bars in the road section bordering the undisturbed area along the mine site. In addition, regular inspections of the road condition are conducted by mine personnel to ensure erosion will not become a problem. In the event one of these regular checks shows that erosion has occurred on or along side the road, the Applicant will repair the damage and construct additional run-off structures to prevent similar future occurrences at that location.

RESPONSE 784.18 (Continued)

The road extending from Interstate Highway 70 to the mine, providing employee access and a truck haulage route, is a paved class B county road.

1981 COMPLETENESS REVIEW

COMMENT 784.19

The applicant should describe plans for an underground waste disposal site proposed. Applicant must show he has the Salina City approval to use city dump for disposal of sediment pond sediment or underground waste.

The applicant should describe plans for disposal of development waste underground and show that these plans comply with MSHA requirements. A letter of MSHA compliance would be appropriate. The applicant states that 2,000-3,000 tons of rock are disposed annually. Does the applicant have plans for a future surface disposal site, if so, he should discuss.

RESPONSE:

The Applicant has no specifically designated underground waste disposal site. Discussion of waste disposal plans is presented in the Response to Comment 784.11(b). A reproduction of the contract with the City of Salina covering disposal of trash at the city dump is presented herein as Appendix 784.19. Since a majority of the sediment pond sediment consists of coal fines, it is planned to mix the sediment with regular coal sales tonnage.

APPENDIX 784.19

July 10, 1977

SOUTHERN UTAH FUEL COMPANY proposes to enter into an agreement with the SALINA CITY, effective the 5th day of July, 1977. Such agreement would be based on the following proposed terms:

1. It is agreed that Southern Utah Fuel Company will provide trucks which will carry all garbage from the minesite, 30 miles east of Salina, to the city dump in Salina, Utah.
2. All trucks will be weighed at the minesite by Southern Utah Fuel Company and tickets will be mailed to the Salina City office once a month.
3. The Salina city will push all garbage into the trench at the city dump.
4. The Salina City will bill Southern Utah Fuel Company every two months at the rate of $2.00 per ton.

Please indicate your acceptance by signing and returning the original of this letter. The duplicate may be retained in your files.

Roland Heath, Chief Engineer
SOUTHERN UTAH FUEL COMPANY

Courtney Larsen, Mayor
CITY OF SALINA, UTAH

COMMENT 784.20(a)(2),(d)

(a)(2) Figure 4, Vol. 5. The "x" coordinate has no scale. It should be in feet to correspond with the report, in which case decimal points are misplaced. This indicates less subsidence than actually occurs and gives a false impression of the situation. It should be corrected.

(d) Have any plans been made to mitigate the effects of subsidence on springs 001 and 033?

RESPONSE:

(a)(2) The x scale on Figure 4, Volume 5, has no quantity units. It is shown that the x scale values are the quotient ratios of subsidence amounts to mined heights. The graph displays this with respect to overburden depths to show that the Applicant has found subsidence to be extremely dependent on overburden thickness. The Applicant has revised the explanation of the x scale on the graph for further clarification. The revised Figure 4 has replaced the original in the 1980 Subsidence Report, Volume 5.

(d) The reviewing authority should refer to the detailed response information presented in the 1981 Submittal Report of Hydrology (Volume 4) prepared by the Applicant's contracted consultant, Hydrometrics.

COMMENT 784.23

The applicant should show the location of the sewage drainage field on maps, any proposed location for additional facilities during the term of the permit (5 years) including any proposed waste disposal areas.

RESPONSE:

The sewage leach field is in Convulsion Canyon and is shown on Map 80-4, Volume 3. No additional facilities are planned during the permit term. The presently existing facilities are adequate for the total projected employment of 300 to 330 persons. The Applicant holds a special use permit for the facilities from the Forest Service and a permit from the State of Utah, Department of Health. The Applicant has no plans for a surface waste disposal area other than the current pit located near the mine site entrance. The agreement with the City of Salina for final disposal of the trash in its sanitary dump is included with Response to Comment 784.19. In the event the Applicant develops a need for a rock waste disposal area, plans for such an area will be developed and submitted to the regulatory authority for approval at a later date.

1981 COMPLETENESS REVIEW

COMMENT 784.24

The applicant should describe how all roads belonging to the applicant are classified, class or public, etc.

The applicant should update the application to show the access road to the sedimentation pond, including profiles and cross-section. The applicant must make the stability study for this road part of the application and commit to maintaining this road and embankment in conditions for which it was recommended for stability.

The applicant should discuss final reclamation of roads, will roads be left, etc.

The applicant must show how compliance on the Water Tank Road will be achieved. Does the applicant need access to the tank if he intends to reclaim this road?

RESPONSE:

A discussion of road classification and maintenance is presented in the Reponse to Comment 784.18. Additionally, road cross sections are included.

Stability studies analysis of the access road is presented in the 1981 Submittal (Appendix A) of the Drainage/Sediment Control section of Volume 6. Additionally, a report containing technical specifications for sediment pond improvements (Appendix B) is presented in the same section.

The Water Tank Road discussed on page 31 of the 1979 Mine Plan Submittal has been closed and revegetated. The road was constructed solely for the installation of the buried water tank. Maintenance access is still possible from the adjacent public East Side Road.

Since the tank is buried and the area has been reclaimed, neither the Water Tank Road or the actual Water Tank site is considered disturbed area for bonding purposes.

It is anticipated that upon final reclamation, the tank and the maintenance manhole will be filled with soils materials.

COMMENT 784.26

There is no listing of any fugitive dust emission permit in the application.

RESPONSE:

The State of Utah "Air Quality Approval Order" for the SUFCo Coal Mine is presented in Response to Comment 782.19(c),(d) located in Volume 3.

1981 COMPLETENESS REVIEW

COMMENT 817.21

The soils analysis should include the saturation percentage; if not available, a statement to that effect should be made.

No productivity data for the various soils, either present or potential was found. An association between vegetation communities and soil should be provided.

RESPONSE:

Saturation percentages are unavailable. When the original sampling and analysis of soils for the portal yard area were completed, saturation percentage was not an item required by the regulatory agencies as part of the analysis.

The "Report of Studies of Vegetation and Soils, Vol. 5, Mine Plan Application", supercedes previous submitted reports. In Volume 5, productivity data (electrical conductivity, etc.) for the portal yard area is included on Table 57. This information corresponds with sample site 21 and is indicated on the General Lease Area Soils Map.

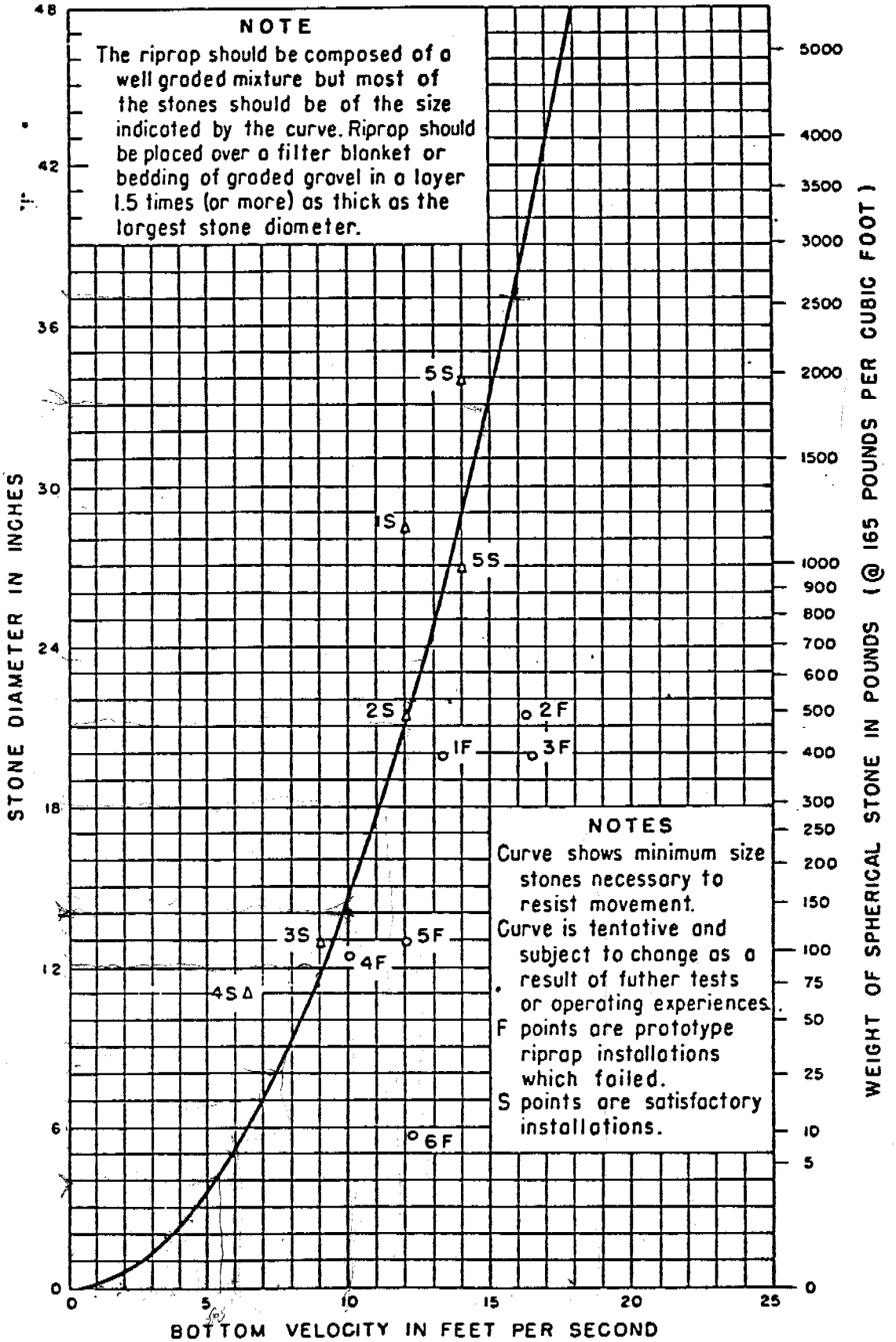
COMMENT 817.44

The applicant must show the design calculations for the riprapped channel to show that it is designed for the 100-year, 24-hour event; that the exit and entry to the channel are designed to prevent erosion; that the riprap is properly designed to prevent head-cutting through the fill after reclamation; that maintenance of the riprapped channel will not be necessary upon abandonment; and that the present culvert will either be removed or filled, to prevent collapse.

RESPONSE:

Design calculations for the riprapped channel are presented within Merrick and Company's report entitled "Drainage Facility and Sediment Control Plan for the Southern Utah Fuel Company Mine No. 1" dated September 17, 1979 (Exhibit 9, Vol. 2). The use of standard hydraulic equations and publications by Merrick and Company ensure that the design will provide adequate long-term stability. The design, as determined by Merrick and Company, will meet or exceed those standards derived from the graph entitled "Curve to Determine Maximum Stone Size in Riprap Mixture" presented herein as Appendix 817.44. It is presently anticipated that the by-pass culvert structure, which is below the anticipated final grade, will be filled with concrete and the portions of the culvert located above final grade will be removed.

APPENDIX 817.44



Curve to determine maximum stone size in riprap mixture

1981 COMPLETENESS REVIEW

COMMENT 817.46(d)

Following an on-site inspection (May 12, 1981) it was noted that the orifice to the sedimentation pond decanting device is situated below the designated sediment accumulation level as indicated on the staff gage. A vertical extension of the decanting structure should be provided.

RESPONSE:

The top of the decanting structure for the sediment pond has been vertically extended to the design height.

1981 COMPLETENESS REVIEW

COMMENT 817.89

The applicant must provide plans to show compliance with 817.89 and describe the designated site for all wastes. Has incinerating of trash been approved by the Division of Oil, Gas and Mining?

RESPONSE:

Waste disposal was discussed in the Responses to Comments 784.11(b), 784.19 and 784.23 and in various sections of the Mining and Reclamation Plan. No incineration of trash is planned or proposed by the Applicant. Therefore, approval by the Division for trash incineration has not been requested.

COMMENT 817.97(a),(c),(d)(8)

The fish and wildlife plan has a number of inadequacies which should be addressed by the applicant. These inadequacies are discussed in the following paragraphs.

(a) In the Wildlife section of 1979 Mine Plan submission (Vol. 2, p. 44) the applicant has discussed the possibility for enhancement of wildlife habitat. However, the applicant needs to specifically address how this enhancement will be accomplished. The applicant should submit in a discussion and map specific plans for shrub/tree stocking, including a verification of the proposed revegetation plant species, stocking rates, and locations of the stocking area. The applicant should also indicate if shrubs and trees will be stocked in the vicinity of ponds or impoundments (and other areas) for wildlife. The applicant should verify and discuss plans for fencing in the vicinity of impoundment and other areas, roads, and migration routes with respect to wildlife and domestic grazing use.

In the Wildlife section of the 1979 Mine Plan submission, four methods are discussed (p. 45, Vol. 2) for possibly controlling public recreational use in the mining area. Four measures are also discussed for enhancing wildlife habitat away from the mine area (p. 45) with the coordination of appropriate regulatory agencies. The applicant needs to specifically update each of these potential recommendations and verify which will be actually done.

In the 1980 Wildlife Assessment Report (Vol. 5, pp. 1-63) various recommendations were made with respect to wildlife mitigation. The applicant needs to verify which recommendations will be incorporated into the Fish and Wildlife Plan and how they will be accomplished.

(c) The applicant must ensure that all electric power lines and other transmission facilities are constructed in accordance with the document cited in 817.97(c)?

(d)(8) The applicant should address in more detail the plan to prevent, control, and suppress range forest and coal fires.

RESPONSE 817.97(a),(c),(d)(8)

(a) The discussion in the Wildlife section of the 1979 Mine Plan (Volume 2, pages 44-45) presents possible mitigating actions by which wildlife habitat might be enhanced and possible public recreational use of the lease areas might be reduced. The discussion points out possible actions which only the Division of Wildlife Resources and Forest Service might use to accomplish these ends outside of the disturbed area. The Applicant does not have authority to implement these possible measures, and therefore, does not intend to directly pursue them. The regulatory agencies will directly implement the measures if they are deemed necessary outside of the disturbed area. The habitat within the disturbed area will be enhanced through implementation of the revegetation plan by the Applicant.

The specific details of the Applicant's proposed reclamation plan (e.g. plant species, stocking rates, etc.) are documented in this Mining and Reclamation Plan to a considerable extent. Most recently, in Response to Comment 784.13, the proposed revegetation plan has been reiterated to further clarify the reviewing agency awareness of the Applicant's documented plan (Soils and Vegetation Report, Volume 5).

(c) Electric power lines and other major facilities will have been installed before August 31, 1981 to ensure compliance with the documents cited in 30 CFR 817.97(c).

(d)(8) The Applicant has trained personnel in fire fighting techniques and has installed a 10,000-gallon water tank which gravity feeds fire hydrants throughout the surface facility area. In addition, at least one person is on site at all times with access to telephone communications, such that a fire in the vicinity of the mine site can be reported.

1981 COMPLETENESS REVIEW

COMMENT 817.101

The applicant must update Exhibits 11 and 12 to show (on the ground changes) that are now pertinent topsoil stockpile, etc.

RESPONSE:

Changes have been made to all maps and exhibits of surface facilities in the Mining and Reclamation Plan to make them current through July, 1981.

APPENDIX 782.19

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80295

MAR 5 1981

Ref: 8E-WE

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Glenn Zumwalt
Vice President & General Manager
Southern Utah Fuel Company
Nine Greenway Plaza
Houston, Texas 77046

Dear Mr. Zumwalt:

Herewith enclosed is the NPDES permit for Southern Utah Fuel Company, UT-0022918. This permit shall become effective and issued thirty (30) days following your receipt of this letter, unless within thirty (30) days following the date of receipt you submit a request for an evidentiary hearing in accordance with the provisions of 40 CFR Section 124.74. Such request must be addressed to:

Roger L. Williams (8E-WE)
Regional Administrator
U.S. Environmental Protection Agency
Region VIII, Suite 103
1860 Lincoln Street
Denver, Colorado 80295

If you have any legal questions with regard to this matter, please contact Mr. Alfred C. Smith of this Agency at (303) 837-4812. Questions regarding monitoring requirements should be directed to Mr. Doug Skie of this Agency at (303) 837-4335.

Sincerely yours,

Lance C. Vinson
Director
Enforcement Division

Enclosures

NPDES Discharge Permit
EPA Form 3320-1 for reporting of self-monitoring

MI

Permit No.: UT-0022918 (RENEWAL)

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et. seq.)(hereinafter referred to as "the Act"),

the Southern Utah Fuel Company,

is authorized to discharge from a facility located in Convulsion Canyon, NW¼ Section 12, Township 22 South, Range 4 East, Salt Lake Meridian and Baseline, Sevier County, Utah,

to receiving waters named East Spring Canyon, a tributary to Quitchupa Creek which is part of the Colorado River Basin,

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on the date of issuance.*

This permit and the authorization to discharge shall expire at midnight, June 30, 1981.

Signed this 5th day of March, 1981.

Lance C. Vinson
Director
Enforcement Division

*Thirty (30) days after the date of receipt of this permit by the Applicant.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Runoff Sedimentation Structures and Active Mining Operations

1. During the period beginning immediately and lasting through June 30, 1981, the permittee is authorized to discharge from all point sources associated with runoff sedimentation structures and active mining operations indicated on the area maps submitted and approved pursuant to Part III, A.1. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitation		Monitoring Requirements b/	
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type
Flow - M^3/Day, gpd	N/A	N/A	Two per month[2]	Measured a/
Total Suspended Solids	25 mg/l	45 mg/l	Two per month[2]	Grab
Total Iron	N/A	2.0 mg/l d/	Two per month[2]	Grab
Alkalinity-Acidity (At all times Alkalinity shall be greater than Acidity)			Two per month[2]	Grab
Total Dissolved Solids	500	N/A c/	Two per month[2]	Grab

Oil and Grease shall not exceed 10 mg/l and shall be monitored monthly by a grab sample.

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units and shall be monitored twice per month by grab sample. 2/

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge of sanitary wastes.

2. Normal sampling days shall be the second and fourth Wednesdays of each month. However, if sufficient rainfall occurs so as to cause a discharge before the fourth Wednesday, one sample must be taken within 12 hours following the rainfall event. Data from the rainfall event sample shall be submitted in lieu of the data from one of the normal sample days.

3. See Schedule of Compliance. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At any point which is representative of each discharge prior to its mixing with the receiving stream and as indicated by the solid triangles on the current area maps submitted pursuant to Part III, A.1.

---

a/ See Part I, C.3.c.

b/ See Part III, A.2.

c/ The total amount of Total Dissolved Solids (TDS) discharged from all outfalls is limited to one ton (2,000 pounds) per day of TDS.

d/ If any Iron analysis exceeds this limitation, the State of Utah and the permittee shall review the actions necessary to achieve compliance with the limitation and the continued appropriateness of the limitation. In no event shall the discharge exceed a daily maximum limitation for Total Iron of seven (7) milligrams per liter.

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

   a. If the permittee has not previously submitted Area Map(s) described in Part III, A., such Area Map)s) shall be submitted within 30 days of the effective date of this permit.

   b. Revised Area Map(s) as described in Part III, A., must be submitted 60 days prior to commencement of the discharge.

2. No later than 14 calendar days following a date identified in the above Schedule of Compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice to the permit issuing authority of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

C. MONITORING AND REPORTING

1. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Monitoring results obtained during the previous 3 months shall be summarized for each discharge for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on April 28, 1981. Duplicate signed copies of these, and all other reports required herein, shall be submitted to the Regional Administrator and the Director of the State of Utah Water Pollution Agency at the following addresses:

U.S. Environmental Protection Agency
Suite 103, 1860 Lincoln Street
Denver, Colorado 80295
Attention: Enforcement - Permits

Utah Department of Health
Division of Environmental Health
Bureau of Water Pollution Control
P.O. Box 2500
Salt Lake City, Utah 84110

3. Definitions

a. The "daily average" concentration means the arithmetic average of all the daily determinations of concentration made during a calendar month. Daily determinations of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily determination of concentration shall be the arithmetic average of all the samples collected during the calendar day.

b. The "daily maximum" concentration means the daily determination of concentration for any calendar day.

c. Measurement of flow shall be performed by a direct flow measurement technique such as a flow meter, weir, or gauge.

d. A "composite sample" shall consist of at least three grab samples which is representative of the discharge.

e. "Active mining area" means a place where work or other activity related to the extraction, removal, or recovery of coal is being conducted or carried on, except any land or area on or in which there has commenced or been completed reclamation work following the grading stage. (Subject to a more stringent definition pursuant to 401 state certification, see Part III, B.)

3. Definitions (Continued)

f. The term "ten-year, 24-hour, precipitation event" shall mean the maximum 24-hour precipitation event with a probable reoccurrence interval of once in 10-years as defined by the National Weather Service and Technical Paper No. 40, "Rainfall Frequency Atlas of the U.S.," May 1961, and subsequent amendments or equivalent regional or rainfall probability information developed therefrom.

g. For additional definitions, see Part III, B and C.

4. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(h) of the Act, under which such procedures may be required.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;
b. The dates the analyses were performed;
c. The person(s) who performed the analyses;
d. The analytical techniques or methods used; and,
e. The results of all required analyses.

6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form (EPA No. 3320-1). Such increased frequency shall also be indicated.

7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the State water pollution control agency.

A. MANAGEMENT REQUIREMENTS

1. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

2. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State of Utah with the following information, in writing, within five (5) days of learning or being advised of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge. This written submission shall not be considered as excusing or justifying the failure to comply with the effluent limitations.

3. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

4. Facilities Operation

   a. The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

   b. Dilution water shall not be added to comply with effluent requirements.

5. Bypassing

   a. Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where essential to prevent loss of life or severe property damage or (ii) in cases of overflow from a structure designed and maintained to contain a 10-year, 24-hour precipitation event. The permitee shall furnish written notification to the Regional Administrator and the State of Utah for each such diversion or bypass explaining in detail how such diversion is allegedly justified for any of the above exceptions.

   b. Storm water runoff from undisturbed areas or reclaimed areas within the area delineated in Part III (Other Requirements) and diverted around the permittee's active operations and treatment facility is authorized to be discharged without numerical limitations or monitoring and reporting requirements.

   c. Any untreated overflow from facilities designed, constructed, and operated to treat the mine drainage, the wastewater from the coal preparation plant, or the wastewater from the associated areas, and the runoff at the treatment facility resulting from a 10-year, 24-hour, precipitation event, shall not be subject to the limitations set forth in Part I, A. of this permit. The 10-year, 24-hour, rainfall is 2.0 inches during any 24-hour period.

6. Removed Substances

   Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. Power Failures

No later than 30 days after the effective date of this permit, the permittee shall certify in writing to the permit issuing authority either that:

a. An alternative mechanical or electrical power source sufficient to operate essential facilities utilized by the permittee to maintain compliance with the terms and conditions of the permit has been or will be installed or,

b. Upon reduction, loss or failure of one or more of the primary sources of electrical power to essential facilities utilized by the permittee to maintain compliance with the terms and conditions of this permit, the permittee shall halt, reduce, or otherwise control production and/or all discharges in order to maintain compliance with the terms and conditions of this permit.

8. Delineated Discharges

Any discharge delineated in Part III (Other Requirements) (originating from operations covered by standard industrial classification codes 1211 and 1213) that commences after the effective date of this permit shall be in compliance with all effluent limitations, monitoring requirements, and other conditions contained herein upon initiation of discharge.

9. Contamination Control

The permittee shall be responsible for instituting management practices for the minimization and prevention of contamination of surface waters by contaminated runoff from disturbed areas. Those areas subject to the institution of these management practices shall include coal storage areas, refuse storage areas, coal preparation plants, and coal preparation plant ancillary areas.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the head of the State water pollution control agency, the Regional Administrator, and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the State water pollution control agency.

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Regional Administrator and the State water pollution control agency. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. Toxic Pollutants

Notwithstanding Part II, B.4. above, if a toxic effluent standard or prohibition (including any Schedule of Compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. Civil and Criminal Liability

Except as provided in permit conditions on "Bypassing" (Part II, A.5.) and "Power Failures" (Part II, A.7.), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulations under authority preserved by Section 510 of the Act.

9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

A. OTHER REQUIREMENTS

1. General Requirements

a. Area Maps (Mine Drainage, Coal Preparation Plant, and Associated Areas)

(1) Underground mines which have already identified the location of each discharge need not submit an area map.

(2) The permittee shall submit revised Area Map(s) to show any changes, corrections, or other modifications or adjustments of the location of the point source discharges. The purpose of this requirement is to assure that the Regional Administrator and the State of Utah are kept fully advised as to the current location of such discharges.

(3) The revised Area Map(s) shall be submitted in the form specified below and shall be made from USGS topographical maps (7.5 or 15-minute series) or other appropriate sources as approved by the Regional Administrator or his designee. Each revised Area Map shall be 8½ inches by 11 inches and shall be in black and white suitable to produce readable copies by rapid printing methods (Xerox, Dennison, Offset printing, etc.) or as approved by the Regional Administrator or his designee. Where additional 8½-inch by 11-inch maps are required to show the area of operation, they shall be numbered and a key shall be shown on the first map. The first map section shall have the company name, mine/job name, address, and NPDES number clearly printed thereon. Also, one line of latitude and one line of longitude shall be marked on each map section. The Area Map(s) shall delineate the following, using the graphics as indicated:

(a) Existing Area of Operation _____ (Solid Outline)

(b) Existing point source  (Solid Triangle)

(c) The projected area of operation for the next five years. -----(Dashed Outline)

(d) Projected point source for the next five years.  (Opened Triangle)

A. OTHER REQUIREMENTS (Continued)

1. General Requirements (Continued)

(e) The monitoring reports must indicate the active-inactive status of all discharge points which are listed on the current area maps. These discharge points shall be assigned numbers 001, 002, 003, etc.

b. Monitoring of a discharge may be terminated if either:

(1) Sufficient data has been accumulated to show to the satisfaction of the Regional Administrator or his designee that the untreated discharge from an area where active mining has ceased will meet the limitations herein; or

(2) The discharge emanates from an area on which the State of Utah has released the grading bond or has taken other similar action.

c. Permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge after the expiration date, the permittee shall, no later than 180 days prior to the expiration date of this permit, submit a new NPDES application and fees as required by the permit issuing authority.

2. Special Requirements

This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C), and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

(a) Contains different conditions or is otherwise more stringent than any other effluent limitation in the permit; or,

(b) Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

B. ADDITIONAL INFORMATION CONCERNING DISCHARGES OF POLLUTANTS FROM COAL MINING OPERATIONS

Section 502 of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1362) sets forth the following definitions:

1. "Pollutant" means: ". . . solid waste, incinerator residue, sewage, garbage, sewage sludge, . . . chemical wastes, biological materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water." 33 U.S.C. 1362(6)

2. "Discharge of pollutants" is the "addition of any pollutant to navigable waters from any point source . . ." 33 U.S.C. 1362(12)

3. A "point source" is "any discernible, confined, and discrete conveyance, including but not limited to, any pipe, channel, ditch, tunnel, conduit, well, discrete fissure, container . . . from which pollutants are or may be discharged." 33 U.S.C. 1362(14)

4. "Navigable waters" is all "waters of the United States . . ." 33 U.S.C. 1362(7)

Examples of discharges which are covered by Section 402 of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1342) include, <u>but are not limited to</u>, the following:

1. Pumped or gravity drainage from the bench.

2. Pumped or gravity drainage from underground mines.

3. Discharges from silt basins.

4. Discharges resulting from preparation plant operations.

5. Discharges from sanitary waste treatment plants.

6. Discharges from other treatment facilities associated with coal operations.

C. ADDITIONAL DEFINITIONS

1. The term "coal preparation plant" means a facility where coal is crushed, screened, sized, cleaned, dried, or otherwise prepared and loaded for transit to a consuming facility.

2. The term "coal preparation plant associated areas" means the coal preparation plant yards, immediate access roads, slurry ponds, drainage ponds, coal refuse piles, and coal storage piles and facilities.

ADDITIONAL INSTRUCTIONS FOR SAMPLE FORM.

1. This is a sample form only.

2. This report requires no carbon, therefore please bear down on pen when completing the report.

3. Those effluent limitations indicated under permit condition's may not necessarily be the limits which are indicated on your permit. You must check your permit to determine the limitations which apply.

4. Monitor only those parameters specified in the monitoring section of your permit. The sample report includes those parameters most often required of municipalities; however, your permit may be different.

5. The frequency of sampling and the type of sample to be collected are specified in your permit for each parameter. Those shown on the "sample" report are typical.

6. Please be sure to include your NPDES number in the space provided and a valid telephone number in the lower right hand corner.

7. Please read the instructions on the back of the self-monitoring forms and call (303) 837-4335, if you have questions.

8. IF NO DISCHARGE OCCURS, PLEASE REPORT <u>NO DISCHARGE</u>.

SAMPLE FORM

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

SAMPLE FORM

Form Approved
OMB No. 158 R0073

PERMITTEE NAME
ADDRESS STREET ADDRESS
CITY STATE ZIP
FACILITY
LOCATION

PERMIT NUMBER (15-19)

DISCHARGE NUMBER (17-19)

MONITORING PERIOD

FROM YEAR (23-24)	MO (25-26)	DAY (27-28)	TO YEAR (29-30)	MO (31-32)	DAY (33-34)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		QUANTITY OR LOADING (42-53) AVERAGE	QUANTITY OR LOADING (42-53) MAXIMUM	UNITS (54)	QUALITY OR CONCENTRATION (46-53) MINIMUM	QUALITY OR CONCENTRATION (46-53) AVERAGE	QUALITY OR CONCENTRATION (46-53) MAXIMUM	UNITS	NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
FLOW	SAMPLE MEASUREMENT			MGD	******	******	******				
	PERMIT REQUIREMENT				******	******	******			CONT	
pH	SAMPLE MEASUREMENT	******	******	STANDARD UNITS		******		STANDARD UNITS			
	PERMIT REQUIREMENT	******	******		6.0	******	9.0				GRAB
BOD_5	SAMPLE MEASUREMENT			LB/DAY OR KG/DAY				MG/L			
	PERMIT REQUIREMENT	******	******		******	30	45				COMP
Percent Removal BOD_5	SAMPLE MEASUREMENT	******	******					%		******	****
	PERMIT REQUIREMENT	******	******		85	******	******			******	****
Total Suspended Solids	SAMPLE MEASUREMENT			LB/DAY OR KG/DAY				MG/L			
	PERMIT REQUIREMENT	******	******		******	30	45				COMP
Percent Removal Suspended Solids	SAMPLE MEASUREMENT	******	******					%		******	****
	PERMIT REQUIREMENT	******	*****		85	******	******			******	****
Coliforms (Fecal or Total)	SAMPLE MEASUREMENT	******	******					N/100ML			
	PERMIT REQUIREMENT	******	******		******	200	400				GRAB

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER: THIS DOCUMENT IS SIGNED WITH RECOGNITION THAT KNOWINGLY MAKING A FALSE CERTIFICATION ON THIS REPORT OR DOCUMENT CONTAINING SUCH RESULTS OR INTENTIONALLY TAMPERING WITH ANY MONITORING DEVICE OR METHOD ARE CRIMINAL OFFENSES SEE 18 U.S.C. §1001 AND 33 U.S.C. §1319. (Penalties include fines of not more than $10,000 for each of such acts and/or maximum imprisonment of not more than 6 months and 5 years)

TYPED OR PRINTED

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: AREA CODE | NUMBER

DATE: YEAR | MO | DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS

EPA Form 3320-1 (12-77) PREVIOUS EDITION OBSOLETE (FORM 7440 WHICH MAY NOT BE USED.)

PAGE OF

PERMITTEE NAME/ADDRESS (Include Name/Location if different) SAMPLE FORM

NAME

ADDRESS

FACILITY

LOCATION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

SAMPLE FORM

Form Approved
OMB No. 158 - R0073

(1-16) PERMIT NUMBER

(17-19) DISCHARGE NUMBER

MONITORING PERIOD

FROM	YEAR (20-21)	MO (22-23)	DAY (24-25)	TO	YEAR (26-27)	MO (28-29)	DAY (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		QUANTITY OR LOADING (if Code Only) (42-45)			QUALITY OR CONCENTRATION (46-53)				NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
Residual Chlorine	SAMPLE MEASUREMENT	******	******					MG/L			GRAB
	PERMIT REQUIREMENT	******	******		******	******	0.5				
Oil & Grease	SAMPLE MEASUREMENT	******	******					MG/L			Visual or Grab
	PERMIT REQUIREMENT	******	******		******	******	10				
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
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	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

TYPED OR PRINTED

THIS DOCUMENT is SIGNED WITH RECOGNITION THAT KNOWINGLY MAKING A FALSE CERTIFICATION ON THIS REPORT OR KNOWINGLY SUBMITTING FALSE INFORMATION OR INTENTIONALLY TAMPERING WITH ANY MONITORING DEVICE OR METHOD ARE CRIMINAL OFFENSES SEE 18 U.S.C. 1001 AND 33 U.S.C. §1319. Penalties may include fines up to $10,000 and/or maximum imprisonment of [illegible] years.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE

AREA CODE | NUMBER

DATE

YEAR | MO | DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS

EPA Form 3320-1 (Rev. 10-77) PREVIOUS EDITIONS TO 9 [illegible] ARE OBSOLETE (A FORM T-40 WHICH MAY NOT BE USED.)

PAGE OF

PERMITTEE NAME/ADDRESS (*Include Facility Name/Location if different*)

NAME
ADDRESS

FACILITY
LOCATION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (*NPDES*)

DISCHARGE MONITORING REPORT (*DMR*)

Form Approved
OMB No. 158 - R00

(2-16)	(17-19)
PERMIT NUMBER	**DISCHARGE NUMBER**

	MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53) AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) QUALITY OR CONCENTRATION (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPL TYPE (69-70)
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
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	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. *(Penalties under these statutes may include fines up to $10,000 and/or maximum imprisonment of between 6 months and 5 years.)*

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (*Reference all attachments here*)

GENERAL INSTRUCTIONS

1. If form has been partially completed by preprinting, disregard instructions directed at entry of that information already preprinted.
2. Enter "PERMITTEE NAME/MAILING ADDRESS (and facility name/location, if different)," "PERMIT NUMBER," and "DISCHARGE NUMBER" where indicated. (A separate form is required for each discharge.)
3. Enter dates beginning and ending "MONITORING PERIOD" covered by form where indicated.
4. Enter each "PARAMETER" as specified in monitoring requirements of permit.
5. Enter "SAMPLE MEASUREMENT" data for each parameter under "QUANTITY" and "QUALITY" in units specified in permit. "AVERAGE" is normally arithmetic average (geometric average for bacterial parameters) of all sample measurements for each parameter obtained during "MONITORING PERIOD." "MAXIMUM" and "MINIMUM" are normally extreme high and low measurements obtained during "MONITORING PERIOD." (NOTE to municipals with secondary treatment requirement, enter 30-day average of sample measurements under "AVERAGE" and enter maximum 7-day average of sample measurements obtained during monitoring period under "MAXIMUM".
6. Enter "PERMIT REQUIREMENT" for each parameter under "QUANTITY" and "QUALITY" as specified in permit.
7. Under "NO. EX" enter number of sample measurements during monitoring period that exceed maximum (and/or minimum or 7-day average as appropriate) permit requirement for each parameter. If none, enter "0".
8. Enter "FREQUENCY OF ANALYSIS" both as "SAMPLE MEASUREMENT" (actual frequency of sampling and analysis used during monitoring period) and as "PERMIT REQUIREMENT" specified in permit. (e.g., Enter "CONT." for continuous monitoring, "1/7" for one day per week, "1/30" for one day per month, "1/90" for one day per quarter, etc.)
9. Enter "SAMPLE TYPE" both as "SAMPLE MEASUREMENT" (actual sample type used during monitoring period) and as "PERMIT REQUIREMENT." (e.g., Enter "GRAB" for individual sample, "24HC" for 24-hour composite, "N/A" for continuous monitoring, etc.)

FOLD HERE FIRST

10. WHERE VIOLATIONS OF PERMIT REQUIREMENTS ARE REPORTED, ATTACH A BRIEF EXPLANATION TO DESCRIBE CAUSE AND CORRECTIVE ACTIONS TAKEN. REFERENCE EACH VIOLATION BY DATE.
11. If "no discharge" occurs during monitoring period, enter "NO DISCHARGE" across form in place of data entry.
12. Enter "NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER" with "SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT," "TELEPHONE NUMBER" and "DATE" at bottom of form.
13. Mail signed Report to Office(s) by date(s) specified in permit. Retain copy for your records.
14. More detailed instructions for use of this DISCHARGE MONITORING REPORT (DMR) form may be obtained from Office(s) specified in permit.

LEGAL NOTICE

This report is required by law (33 U.S.C. 1313; 40 C.F.R. 122.22). Failure to report or failure to report truthfully can result in civil penalties not to exceed $10,000 per day of violation; or in criminal penalties not to exceed $25,000 per day of violation, or by imprisonment for not more than one year, or by both.

FOLD HERE SECOND

PLACE STAMP HERE

FOLD HERE THIRD

STAPLE HERE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80295

JUL 15 1981

Ref: 8E-WE

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Kenneth P. Payne
Assistant General Manager
Southern Utah Fuel Company
P.O. Box P
Salina, Utah 84654

Dear Mr. Payne:

We are forwarding for your information a copy of the U.S. Environmental Protection Agency public notice, fact sheet and proposed permit for the Southern Utah Fuel Company, UT-0022918.

Sincerely yours,

Christine Phillips

Christine M. Phillips
Acting Director
Enforcement Division

Enclosure

U.S. ENVIRONMENTAL PROTECTION AGENCY
WATER AND HAZARDOUS WASTE ENFORCEMENT BRANCH
ENFORCEMENT DIVISION
SUITE 103, 1860 LINCOLN STREET
DENVER, COLORADO 80295
303+837-4901

JULY 20, 1981

FACT SHEET

FOR NPDES PERMIT APPLICATION TO DISCHARGE LIQUID EFFLUENT

PERMIT INFORMATION

PERMITTEE NAME:	SOUTHERN UTAH FUEL COMPANY SUBSIDIARY OF COASTAL STATES ENERGY COMPANY
MAILING ADDRESS:	411 WEST 7200 SOUTH MIDVALE, UTAH 84047
TELEPHONE NUMBER:	801+566-7111
FACILITY MAILING ADDRESS:	P.O. BOX P SALINA, UTAH 84654
TELEPHONE NUMBER:	801+637-4880
NPDES PERMIT NUMBER:	UT-0022918
PUBLIC NOTICE NUMBER:	UT-81-R6

The permittee operates an underground coal mining operation in Convulsion Canyon, near Salina, Utah. The mine produces approximately 9,550 tons of coal per day. This discharge permit is for the point source discharges associated with runoff control sedimentation structures and for a mine water discharge. The receiving stream is East Spring Canyon classified in the Utah Water Quality Standards for the following beneficial uses: 3A - protected for cold water species of game fish and other cold water aquatic life; and, 4 - protected for agricultural uses including irrigation of crops and stock watering.

The Total Suspended Solids (TSS) limitation of 70 mg/l and the alternative precipitation limitations are based on BPJ BAT. The Oil and Grease limitation of 10 mg/l is Regional EPA policy. The Total Dissolved Solids (TDS) limitation of 650 mg/l is included at the request of the State of Utah in order to comply with the Colorado River Basin Salinity Policy. The 2 mg/l daily maximum for Total Iron is Utah policy based upon data of other Utah coal mine discharges. A 2 mg/l limit should not cause Quitchupa Creek to exceed background or the State of Utah's water quality standard of 1 mg/l Dissolved Iron.

Tentative determinations have been made by the EPA staff in cooperation with the State of Utah relative to effluent limitations and other conditions to be imposed on the permit. These limitations and conditions will assure that State Water Quality Standards and applicable provisions of the Clean Water Act of 1977 will be protected. The recommended expiration date for the permit is June 30, 1986.

The U.S. Environmental Protection Agency, in cooperation with the State of Utah , has identified those parameters which are pertinent to the industry's production process and has specified effluent limitations which shall not be exceeded for those parameters.

Those parameters not enumerated in the Fact Sheet but enumerated in the draft permit are considered to be either not affected by this industry's activity or are adequately controlled indirectly by key parameters for which effluent limitations have been established.

Written Comments. Interested persons are invited to submit written comments on the proposed discharges and the EPA Regional Administrator's proposed determinations. Comments should be submitted by August 20, 1981, either in person or by mail to: U.S. Environmental Protection Agency, Water and Hazardous Waste Enforcement Branch, Enforcement Division, 1860 Lincoln Street, Denver, Colorado 80295.

The application number should appear next to the above address on the envelope and on the first page of any submitted comments. All comments received by August 20, 1981 , will be considered in the formulation of final determinations.

Information and Copying. Persons wishing further information may write to the above address, or call the Water and Hazardous Waste Enforcement Branch at 303+837-4901. Copies of the application, the proposed permit, including proposed effluent limitations and special conditions, comments and any other documents which are received (other than those which the EPA Regional Administrator maintains as confidential) are available at the Water and Hazardous Waste Enforcement Branch for inspection and copying. A copy machine is available for public use at a charge of $0.20 per copy sheet.

Register of Interested Persons. Any person interested in a particular application, or group of applications, may leave his name, address, and telephone number as part of the application file. This list of names will be maintained as a means for persons with an interest in an application to contact others with similar interests.

Public Hearing. If submitted comments indicate significant public interest in the application or if it is believed that useful information may be produced thereby, the Regional Administrator, at his discretion, may hold a public hearing on the application. Any person may request the Regional Administrator to hold a public hearing on an application.

Public notice of a hearing will be published and circulated at least thirty days in advance of the hearing. The hearing will be held in the vicinity of the discharge. The Regional Administrator will provide final determinations within twenty days of the date of the public hearing.

Further information relative to the procedures and nature of public hearings concerning discharge permits may be obtained by calling 303+837-4901, or by writing the U.S. Environmental Protection Agency, Water and Hazardous Waste Enforcement Branch, Enforcement Division, 1860 Lincoln Street, Denver, Colorado 80295.

MI

Permit No.: UT-0022918 (RENEWAL)

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et. seq.)(hereinafter referred to as "the Act"),

the Southern Utah Fuel Company,

is authorized to discharge from a facility located in Convulsion Canyon, NW¼ Section 12, Township 22 South, Range 4 East, Salt Lake Meridian and Baseline, Sevier County, Utah,

to receiving waters named East Spring Canyon, a tributary to Quitchupa Creek which is part of the Colorado River Basin,

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on the date of issuance.*

This permit and the authorization to discharge shall expire at midnight, June 30, 1986.

Signed this day of

Acting Director
Enforcement Division

*Thirty (30) days after the date of receipt of this permit by the Applicant.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Active Mining Operations)

1. During the period beginning immediately and lasting through June 30, 1986, the permittee is authorized to discharge from all point sources associated with active mining operations indicated on the area maps submitted and approved pursuant to Part III, A.1. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATION			MONITORING REQUIREMENTS	
	Daily Average	7-Day Average b/	Daily Maximum	Measurement Frequency	Sample Type
Flow - M^3/Day, gpd	N/A	N/A	N/A	Two per Month	Measured a/d/
Total Suspended Solids	25 mg/l	35 mg/l	70 mg/l	Two per month	Grab
Total Iron	N/A	N/A	2.0 mg/l c/	Two per Month	Grab
Total Dissolved Solids	N/A	N/A	650 mg/l	Two per Month	Grab

Oil and Grease shall not exceed 10 mg/l and shall be monitored monthly by a grab sample.

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units and shall be monitored twice per month by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge of sanitary wastes.

2. See Schedule of Compliance. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At any point which is representative of each discharge prior to its mixing with the receiving stream and as indicated by the solid triangles on the current area maps submitted pursuant to Part III, A.1.

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a/ See Part I, C.3.c.

b/ This limitation shall be determined by the arithmetic mean of a minimum of three (3) consecutive samples taken on separate days in a 7-day period (minimum total of three (3) samples).

c/ If any Iron analysis exceeds this limitation, the State of Utah and the permittee shall review the actions necessary to achieve compliance with the limitation and the continued appropriateness of the limitation. In no event shall the discharge exceed a daily maximum limitation for Total Iron of seven (7) milligrams per liter.

d/ For the intermittent discharges, the duration of the discharge shall be reported.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Active Mining Operations) (Continued)

3. Any overflow, increase in volume of a discharge or discharge from a bypass system caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour, precipitation event (or snowmelt of equivalent volume) shall comply with the following limitation instead of the Total Suspended Solids limitations contained in Part I.A.1.:

Effluent Characteristic	Daily Maximum
Settleable Solids	0.5 ml/l

Settleable Solids shall be monitored weekly during periods of precipitation.

4. Any overflow, increase in volume of a discharge or discharge from a bypass system caused by precipitation within any 24-hour period greater than the 10-year, 24-hour, precipitation event (or snowmelt of equivalent volume) shall comply with the following limitations instead of the otherwise applicable limitations:

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units.

5. The alternate limitations provided in Parts I.A.3. and I.A.4., shall apply only if:

   a. The treatment facility is designed, constructed, operated and maintained to contain at a minimum the volume of water which would drain into the treatment facility during the 10-year, 24-hour, precipitation event (or snowmelt of equivalent volume);

   b. The treatment facility is designed, constructed, operated and maintained to consistently achieve the effluent limitations set forth in Part I.A.1., during periods of no precipitation (or snowmelt).

6. The operator shall have the burden of proof that the preceding conditions have been met in order to qualify for the alternate limitations in Parts I.A.3. and I.A.4. The alternate limitations in Parts I.A.3. and I.A.4. shall not apply to treatment systems that treat underground mine water only.

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

   a. If the permittee has not previously submitted Area Map(s) described in Part III, A., such Area Map)s) shall be submitted within 30 days of the effective date of this permit.

   b. Revised Area Map(s) as described in Part III, A., must be submitted 60 days prior to commencement of the discharge.

2. No later than 14 calendar days following a date identified in the above Schedule of Compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice to the permit issuing authority of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

C. MONITORING AND REPORTING

1. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Monitoring results obtained during the previous month shall be summarized for each discharge for the month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on October 28, 1981. Duplicate signed copies of these, and all other reports required herein, (as required by Part II, A.9.) shall be submitted to the Regional Administrator and the Director of the State of Utah Water Pollution Agency at the following addresses:

U.S. Environmental Protection Agency
Suite 103, 1860 Lincoln Street
Denver, Colorado 80295
Attention: Enforcement - Permits

Utah Department of Health
Division of Environmental Health
Bureau of Water Pollution Control
P.O. Box 2500
Salt Lake City, Utah 84110

3. Definitions

a. The "daily average" means the arithmetic average of all the daily determinations made during a calendar month. Daily determinations made using a composite sample shall be the value of the composite sample. When grab samples are used, the daily determination shall be the arithmetic average of all the samples collected during the calendar day. Daily determinations of mass shall be determined by the daily determination of concentration multiplied by the volume of discharge for that day.

b. The "daily maximum" concentration means the daily determination of concentration for any calendar day.

c. Measurement of flow shall be performed by a direct flow measurement technique such as a flow meter, weir, or gauge

d. A "composite sample" shall consist of at least three grab samples which is representative of the discharge.

e. "Active mining area" means the areas on and beneath land used or disturbed in activity related to the extraction, removal, or recovery of coal from its natural deposits. This term excludes coal preparation plants, coal preparation plant associated areas and post-mining areas.

C. MONITORING AND REPORTING (Continued)

3. Definitions (Continued)

f. "Reclamation area" means the surface area of a coal mine which has been returned to required contour and on which revegetation (specifically, seeding or planting) work has commenced.

g. The term "10-year, 24-hour, precipitation event" shall mean the maximum 24-hour precipitation event with a probable reoccurrence interval of once in 10 years as defined by the National Weather Service and Technical Paper No. 40, "Rainfall Frequency Atlas of the U.S.," May 1961, and subsequent amendments or equivalent regional or rainfall probability information developed therefrom.

h. For additional definitions, see Part III, B.

4. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(h) of the Act, under which such procedures may be required.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;
b. The dates the analyses were performed;
c. The person(s) who performed the analyses;
d. The analytical techniques or methods used; and,
e. The results of all required analyses.

6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form (EPA No. 3320-1). Such increased frequency shall also be indicated.

C. MONITORING AND REPORTING (Continued)

7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer, if requested by the Regional Administrator or the State of Utah water pollution control agency.

A. MANGEMENT REQUIREMENTS

1. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the environment resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

2. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State of Utah with the following information, in writing, within five (5) days of learning or being advised of such condition:

a. A description of the discharge and cause of noncompliance; and,

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge. This written submission shall not be considered as excusing or justifying the failure to comply with the effluent limitations.

3. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

A. MANAGEMENT REQUIREMENTS (Continued)

4. Facilities Operation

a. The permittee shall at all times maintain in good working order and operate as efficiently as possible, all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

b. Dilution water shall not be added to comply with effluent requirements.

5. Bypass of Treatment Facilities

a. Definitions

(1) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass Not Exceeding Limitations

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs c and d of this Section.

c. Notice

(1) Anticipated Bypass

If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible, at least ten (10) days before the date of the bypass.

(2) Unanticipated Bypass

The permittee shall submit notice of an unanticipated bypass as required in Part II, A.2.

A. MANAGEMENT REQUIREMENTS (Continued)

5. Bypass of Treatment Facilities (Continued)

d. Prohibition of Bypass

(1) Bypass is prohibited and the Director may take enforcement action against a permittee for bypass, unless:

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This conditions is not satisfied if the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

(c) The permittee submitted notices as required under paragraph c of this Section.

(2) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph d.(1) of this Section.

6. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of waste waters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering waters of the United States.

7. Power Failures

No later than 30 days after the effective date of this permit, the permittee shall certify in writing to the permit issuing authority either that:

a. An alternative mechanical or electrical power source sufficient to operate essential facilities utilized by the permittee to maintain compliance with the terms and conditions of the permit has been or will be installed or,

b. Upon reduction, loss or failure of one or more of the primary sources of electrical power to essential facilities utilized by the permittee to maintain compliance with the terms and conditions of this permit, the permittee shall halt, reduce, or otherwise control production and/or all discharges in order to maintain compliance with the terms and conditions of this permit.

A. MANAGEMENT REQUIREMENTS (Continued)

8. Delineated Discharges

Any discharge delineated in Part III (Other Requirements) (originating from operations covered by Standard Industrial Classification Codes 1211 and 1213) that commences after the effective date of this permit shall be in compliance with all effluent limitations, monitoring requirements, and other conditions contained herein upon initiation of discharge.

9. Signature Requirements

All reports or information submitted pursuant to the requirements of this permit must be signed and certified by a principal official or by a duly authorized representative of that person. Signatory regulations are established in 40 CFR 122.6.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the head of the State of Utah water pollution control agency, the Regional Administrator, and/or their authorized representiatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where a regulated facility or activity is located or in which any records are required to be kept under the terms and conditions of this permit; and,

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the State of Utah water pollution control agency.

B. RESPONSIBILITIES (Continued)

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Regional Administrator and the State of Utah water pollution control agency. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or,

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. Toxic Pollutants

Notwithstanding Part II, B.4. above, if a toxic effluent standard or prohibition (including any Schedule of Compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. Civil and Criminal Liability

Except as provided in permit conditions on "Bypassing" (Part II, A.5.) and "Power Failures" (Part II, A.7.), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

B. RESPONSIBILITIES (Continued)

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulations under authority preserved by Section 510 of the Act.

9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

11. If the permittee desires to continue to discharge, he shall reapply at least one hundred eighty (180) days before this permit expires using the application forms then in use. The permittee should also reapply if he desires to maintain a permit, even though there was not a discharge from the treatment facilities during the duration of this permit.

A. OTHER REQUIREMENTS

1. General Requirements

a. Area Maps (Acting Mining Operations, Coal Preparation Plant, and Associated Areas)

(1) Underground mines which have already identified the location of each discharge need not submit an area map.

(2) The permittee shall submit revised Area Map(s) to show any changes, corrections, or other modifications or adjustments of the location of the point source discharges. The purpose of this requirement is to assure that the Regional Administrator and the State of Utah are kept fully advised as to the current location of such discharges.

(3) The revised Area Map(s) shall be submitted in the form specified below and shall be made from USGS topographical maps (7.5 or 15-minute series) or other appropriate sources as approved by the Regional Administrator or his designee. Each revised Area Map shall be 8½ inches by 11 inches and shall be in black and white suitable to produce readable copies by rapid printing methods (Xerox, Dennison, Offset printing, etc.) or as approved by the Regional Administrator or his designee. Where additional 8½-inch by 11-inch maps are required to show the area of operation, they shall be numbered and a key shall be shown on the first map. The first map section shall have the company name, mine/job name, address, and NPDES number clearly printed thereon. Also, one line of latitude and one line of longitude shall be marked on each map section. The Area Map(s) shall delineate the following, using the graphics as indicated:

(a) Existing Area of Operation ———————— (Solid Outline)

(b) Existing point source ▲ (Solid Triangle)

(c) The projected area of operation for the next five years - - - - - - - - - - - - - - (Dashed Outline)

(d) Project point source for the next five years △ (Opened Triangle)

A. OTHER REQUIREMENTS

1. General Requirements (Continued)

(e) The monitoring reports must indicate the active-inactive status of all discharge points which are listed on the current area maps. These discharge points shall be assigned numbers 001, 002, 003, etc.

b. Monitoring of a discharge may be terminated if either:

(1) Sufficient data has been accumulated to show to the satisfaction of the Regional Administrator or his designee that the untreated discharge from an area where active mining has ceased will meet the limitations herein; or,

(2) The discharge emanates from an area on which the State of Utah has released the grading bond or has taken other similar action.

c. Permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge after the expiration date, the permittee shall, no later than 180 days prior to the expiration date of this permit, submit a new NPDES application and fees as required by the permit issuing authority.

B. ADDITIONAL DEFINITIONS

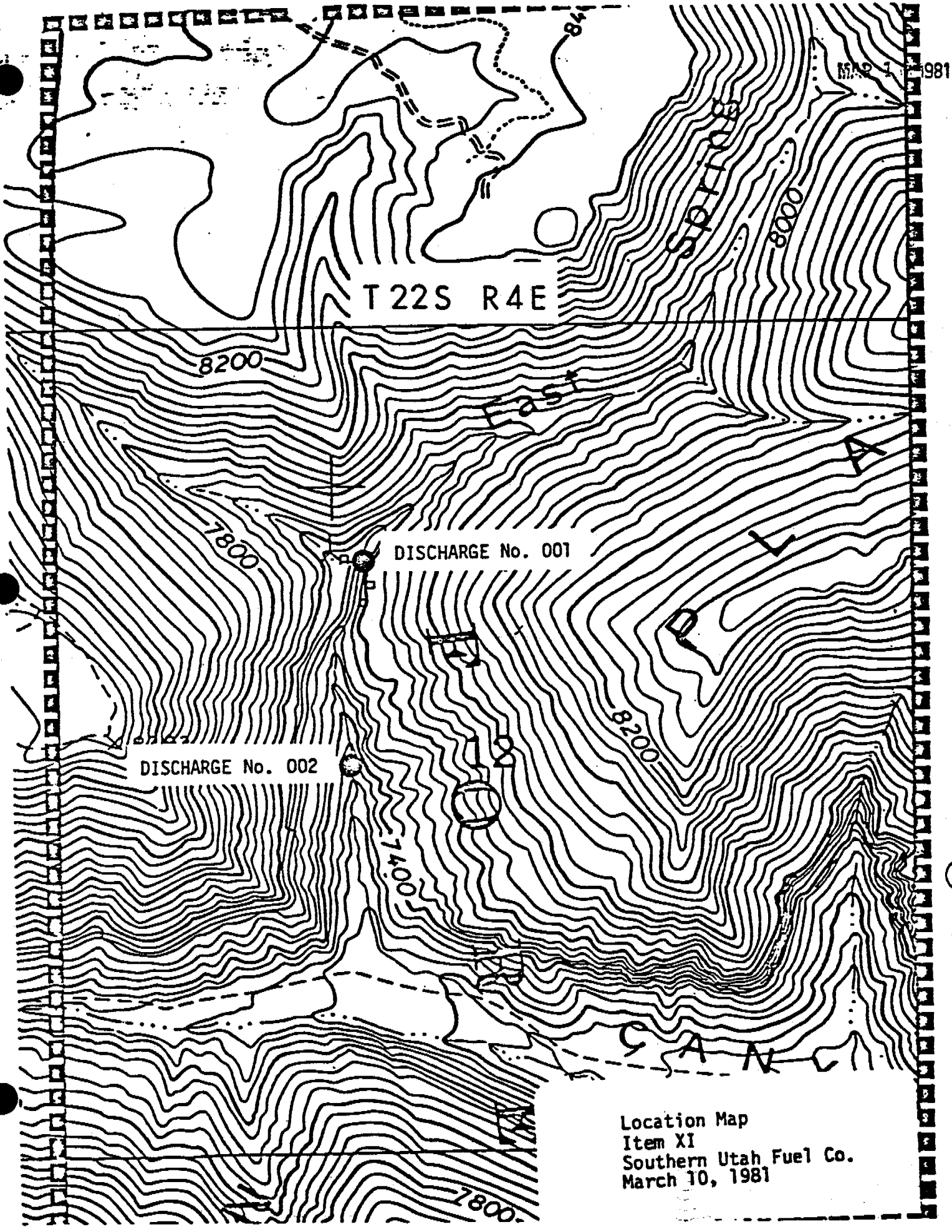
1. The term "coal preparation plant" means a facility where coal is crushed, screened, sized, cleaned, dried, or otherwise prepared and loaded for transit to a consuming facility.

2. The term "coal preparation plant associated areas" means the coal preparation plant yards, immediate access roads, coal refuse piles, and coal storage piles and facilities.

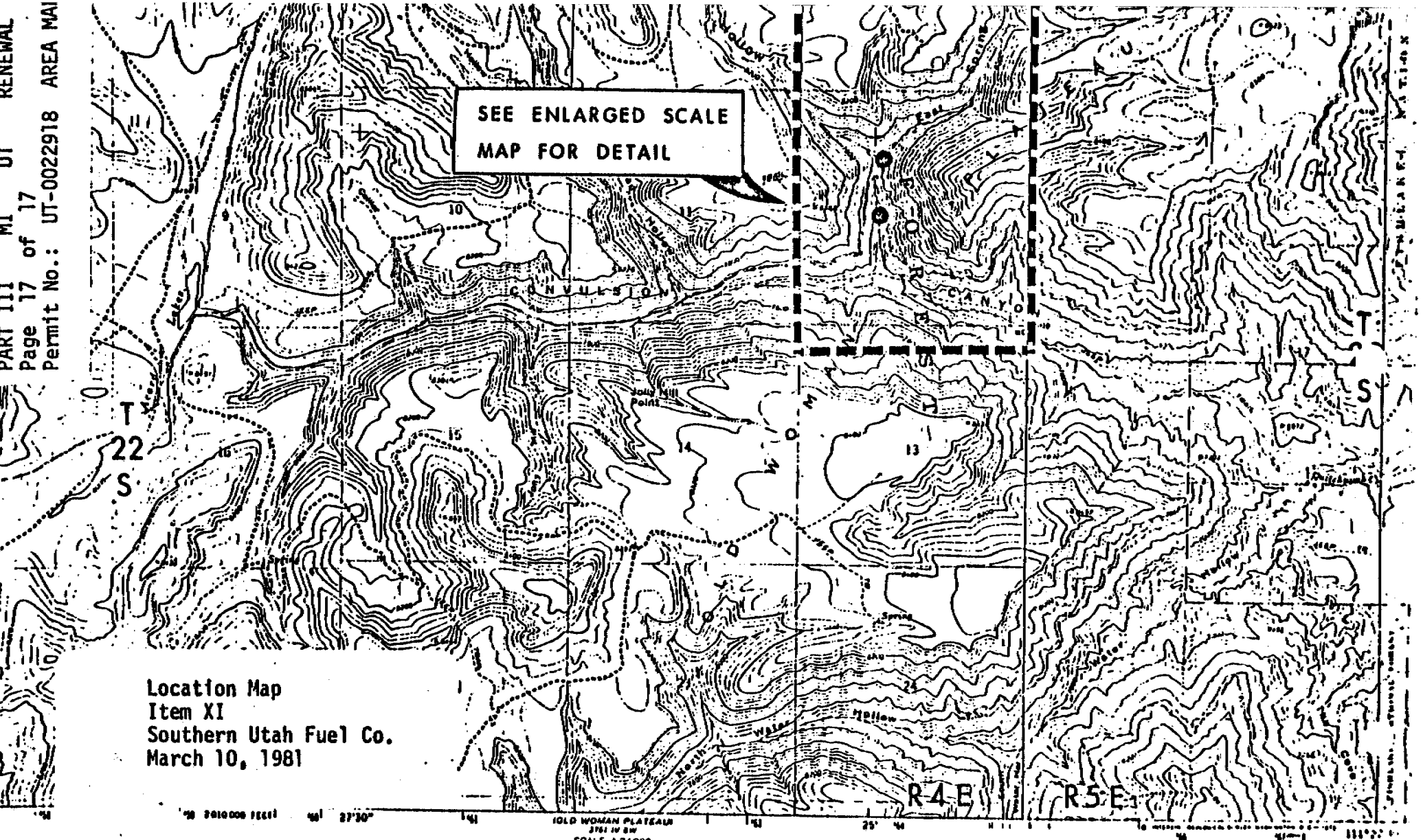
3. The term "settleable solids" is that matter measured by the volumetric method specified below:

The following procedure is used to determine settleable solids:

Fill an Imhoff cone to the one-liter mark with a thoroughly mixed sample. Allow to settle undisturbed for 45 minutes. Gently stir along the inside surface of the cone with a stirring rod. Allow to settle undisturbed for 15 minutes longer. Record the volume of settled material in the cone as milliliters per liter. Where a separation of settleable and floating material occurs, do not include the floating material in the reading.



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


SEE ENLARGED SCALE MAP FOR DETAIL
CONVULSION
CANYON
Jolly Hill Point
T 22 S
T 21 S
R 4 E
R 5 E
Location Map
Item XI
Southern Utah Fuel Co.
March 10, 1981
SCALE 1:24000
CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL
ROAD CLASSIFICATION
Primary highway, hard surface
Light duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U S Route
State Route
QUADRANGLE LOCATION
ACORD LAKES, UTAH
N3852.5—W11122.5/7.5
1968
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER: F Ut-0022918

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

Ut - 0022918

Southern Utah Fuel Co. - Mine No. 1

P.O. Box P
Salina, Utah 84654

Convulsion Canyon, Sevier County
30 Miles East of Salina, Utah

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affi it in the designated space. Review the inform ation carefully; if any of it is incorrect, cro through it and enter the correct data in th appropriate fill-in area below. Also, if any o the preprinted data is absent *(the area to th left of the label space lists the informatio that should appear)*, please provide it in th proper fill-in area(s) below. If the label complete and correct, you need not complet Items I, III, V, and VI *(except VI-B whic must be completed regardless)*. Complete a Items if no label has been provided. Refer t the instructions for detailed item descrip tions and for the legal authorizations und which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X	
B. Does or will this facility *(either existing or proposed)* include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	X		
D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)		X	
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP: SOUTHERN UTAH FUEL COMPANY - MINE NO. 1

IV. FACILITY CONTACT

A. NAME & TITLE (last, first, & title): 2 KENNETH P PAYNE, ASST GEN MGR

B. PHONE (area code & no.): 801 637 4880

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX: 3 PO BOX P (MINE SITE)

B. CITY OR TOWN: 4 SALINA

C. STATE: UT

D. ZIP CODE: 84654

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: 5 CONVULSION CANYON

B. COUNTY NAME: SEVIER COUNTY

C. CITY OR TOWN: 6 30 MILES EAST OF SALINA

D. STATE: UT

E. ZIP CODE:

F. COUNTY CODE (if known):

CONTINUE ON REVER

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST	B. SECOND
1211 (specify) Raw Coal	(specify)

C. THIRD	D. FOURTH
(specify)	(specify)

VIII. OPERATOR INFORMATION

A. NAME

COASTAL STATES ENERGY COMPANY

B. Is the name listed Item VIII-A also owner? [X] YES [ ] NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)

P (specify)

D. PHONE (area code & no.) A 801 566 7111

E. STREET OR P.O. BOX

411 WEST 7200 SOUTH

F. CITY OR TOWN MIDVALE

G. STATE UT

H. ZIP CODE 84047

IX. INDIAN LAND

Is the facility located on Indian lands? [ ] YES [X] NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)
9 N Ut-0022918	9 P
B. UIC (Underground Injection of Fluids)	**E. OTHER** (specify)
9 U	9 (specify)
C. RCRA (Hazardous Wastes)	**E. OTHER** (specify)
R	9 (specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

Coal production from underground coal mine. Coal to be hauled by truck to remote storage or loadout facilities.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
Vernal J. Mortensen Vice President--Utah Operations	Vernal J. Mortensen	3-10-81

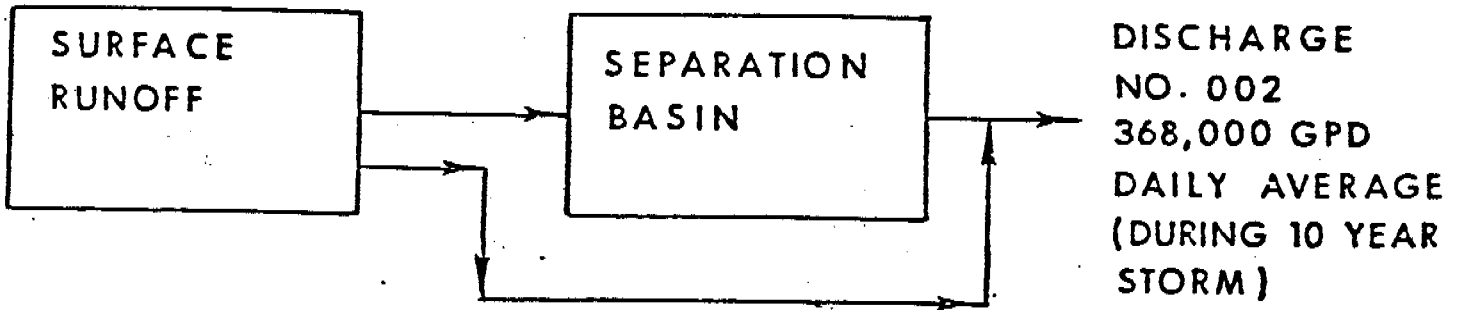
COMMENTS FOR OFFICIAL USE ONLY

*U.S. GOVERNMENT PRINTING OFFICE: 1980—323-829

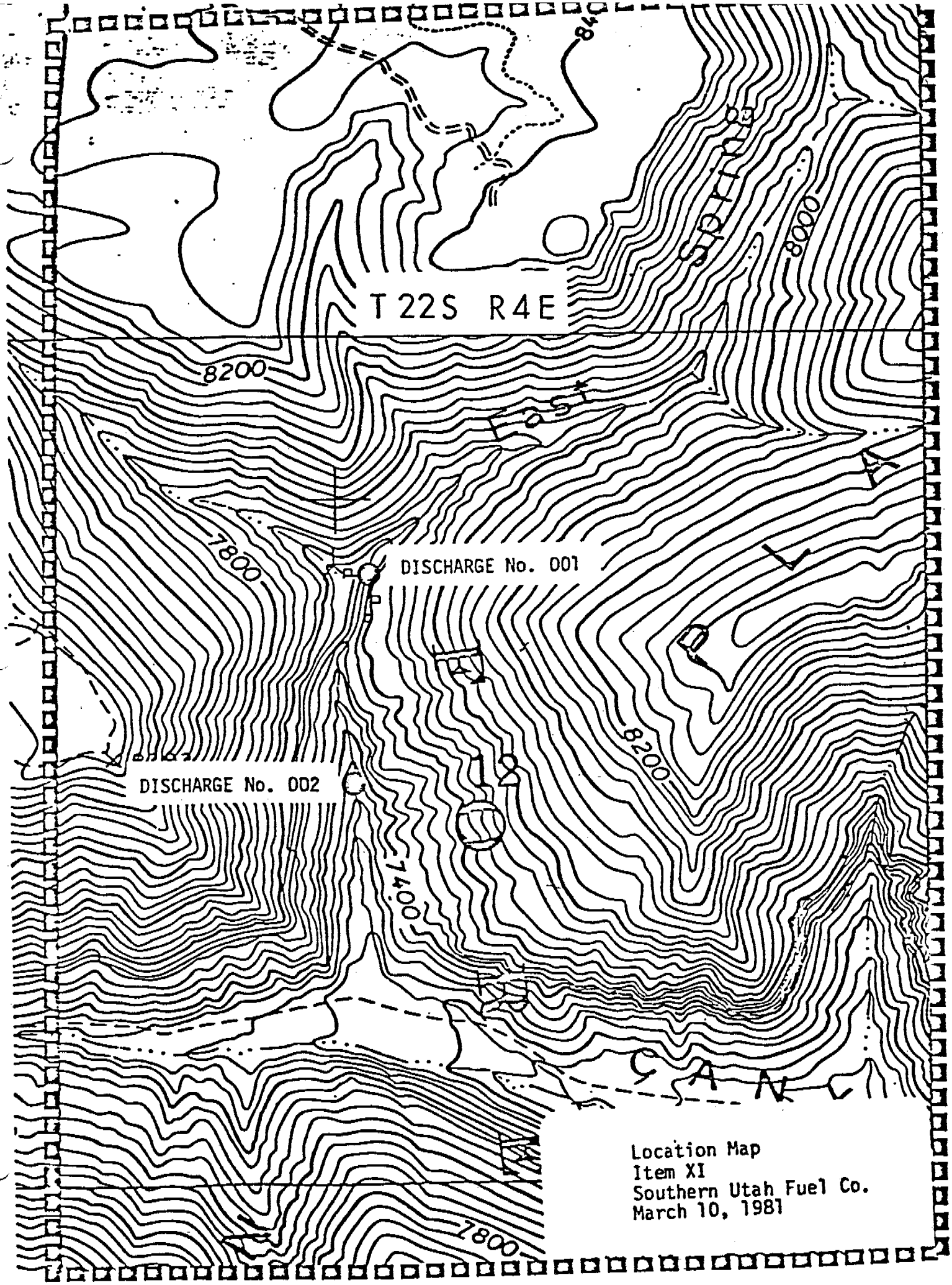
SCHEMATIC OF WATER FLOW

DISCHARGE NO. 001

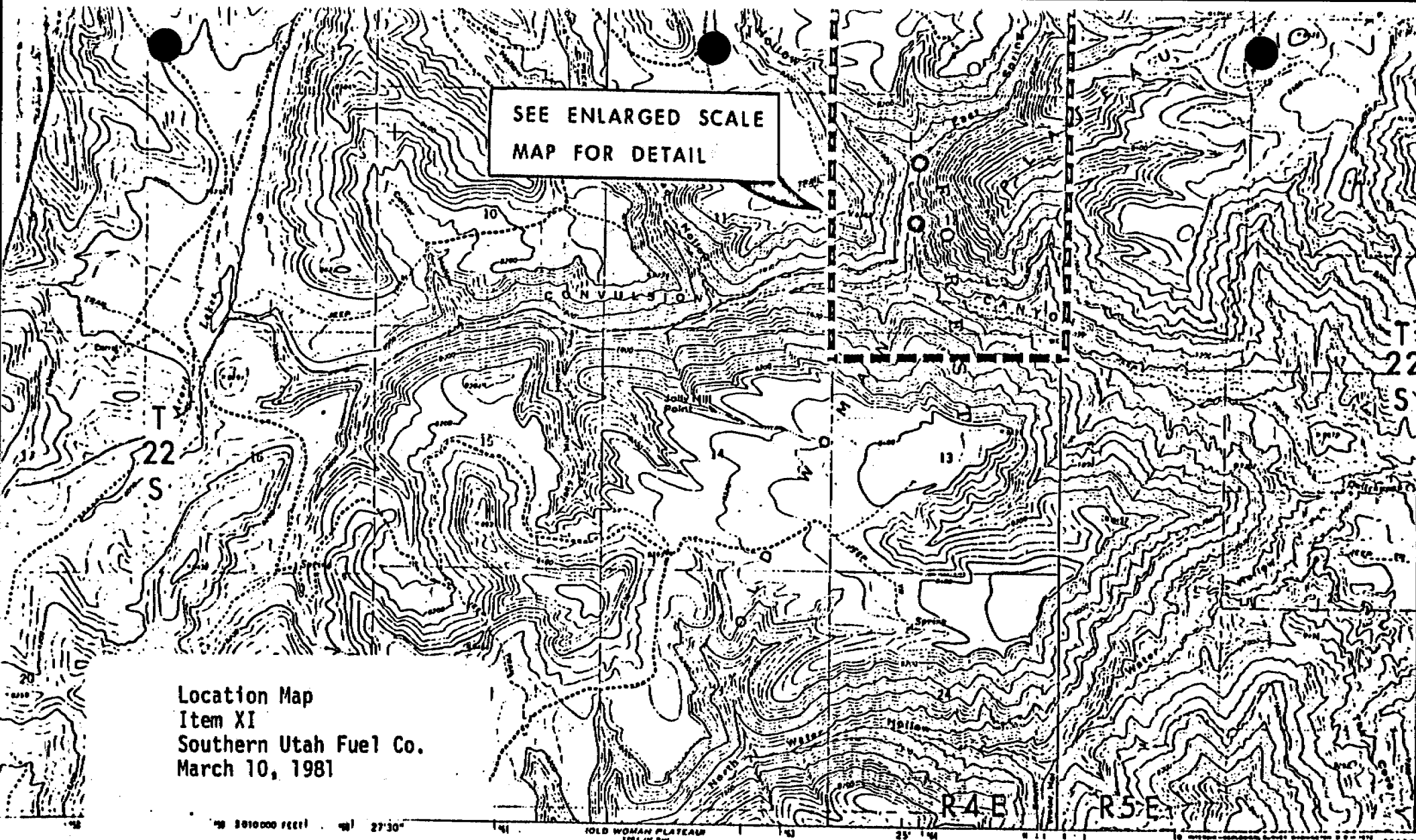
DISCHARGE NO. 002



Item 11-A
SOUTHERN UTAH FUEL CO.
SUFCo No. 1 MINE
March 10, 1981



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



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

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ACORD LAKES, UTAH
ACORD LAKES 15 QUADRANGLE
N3852.5—W11122.5/7.5
1968
AMS 3761 IV NW—SERIES V897

Please print or type in the unshaded areas only. | Ut-0022918 | Form Approved OMB No. 158-R0173

FORM 2C NPDES

U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS
Consolidated Permits Program

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER (list)	B. LATITUDE 1. DEG.	2. MIN.	3. SEC.	C. LONGITUDE 1. DEG.	2. MIN.	3. SEC.	D. RECEIVING WATER (name)
001	38	54	55	111	24	57	East Spring Canyon Creek
002	38	54	45	111	24	59	East Spring Canyon Creek

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluen and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing averag flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined *(e.g., for certain mining activities)*, provide pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewate cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Contin on additional sheets if necessary.

1. OUTFALL NO. (list)	2. OPERATION(S) CONTRIBUTING FLOW a. OPERATION (list)	b. AVERAGE FLOW (include units)	3. TREATMENT a. DESCRIPTION	b. LIST CODES FR TABLE 2C-1	
001	Mine Discharge	660,000 gpd	Sedimentation Pond	1-U	
002	Storm Run-off	No discharge has been experienced as of this date. Flow from 10-yr., 24-hr. storm is estimated at 368,000 gpd.	Sedimentation Pond Discharge Screening	1-U 1-T	

OFFICIAL USE ONLY *(effluent guidelines sub-categories)*

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?

☒ YES *(complete the following table)* ☐ NO *(go to Section III)*

1. OUTFALL NUMBER *(list)*	2. OPERATION(s) CONTRIBUTING FLOW *(list)*	3. FREQUENCY		4. FLOW				
		a. DAYS PER WEEK *(specify average)*	b. MONTHS PER YEAR *(specify average)*	a. FLOW RATE *(in mgd)*		b. TOTAL VOLUME *(specify with units)*		c. DURATION *(in days)*
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
001	Discharge is pumped with hi-lo switch control. Pumps operate approximately 18 hours per day. Flow rate varies with increase or decrease in mine face activity.	7	12		.660		660,000 gpd	

III. MAXIMUM PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?

☒ YES *(complete Item III-B)* ☐ NO *(to to Section IV)*

B. Are the limitations in the applicable effluent guideline expressed in terms of production *(or other measure of operation)*?

☐ YES *(complete Item III-C)* ☒ NO *(go to Section IV)*

C. If you answered "Yes" to Item III-B, list the quantity which represents an actual measurement of your maximum level of production, expressed in the term and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. MAXIMUM QUANTITY			2. AFFECTED OUTFALLS *(list outfall numbers)*
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. *(specify)*	

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operation of was water treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includ but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and gra or loan conditions.

☐ YES *(complete the following table)* ☒ NO *(go to Item IV-B)*

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs *(or other environmental projects which may affe your discharges)* you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual planned schedules for construction. ☐ MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

EPA I.D. NUMBER (copy from Item 1 of Form 1)
Ut-0022918

Form Approved OMB No. 158-R0173

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding — Complete one set of tables for each outfall — Annotate the outfall number in the space provided. NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
NA			

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

A. Is any pollutant listed in Item V-C a substance or a component of a substance which you do or expect that you will over the next 5 years use or manufacture as an intermediate or final product or byproduct?

☐ YES *(list all such pollutants below)* ☒ NO *(go to Item VI-B)*

B. Are your operations such that your raw materials, processes, or products can reasonably be expected to vary so that your discharges of pollutants may during the next 5 years exceed two times the maximum values reported in Item V?

☐ YES *(complete Item VI-C below)* ☒ NO *(go to Section VII)*

C. If you answered "Yes" to Item VI-B, explain below and describe in detail the sources and expected levels of such pollutants which you anticipate will be discharged from each outfall over the next 5 years, to the best of your ability at this time. Continue on additional sheets if you need more space.

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☐ YES *(identify the test(s) and describe their purposes below)* ☒ NO *(go to Section VIII)*

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

☐ YES *(list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)* ☐ NO *(go to Section IX)*

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
Ford Chemical Laboratory	40 West Louise Avenue, Salt Lake City, Utah 84115	801-466-8761	All

IX. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the formation is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. PHONE NO. (area code & no.)
Vernal J. Mortensen, Vice President--Utah Operations	801-566-7111
C. SIGNATURE Vernal J. Mortensen	D. DATE SIGNED 3-10-81

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets *(use the same format)* instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*: Ut-0022918

Discharge 001

Form Approved OMB No. 158-R0173

V. INTAKE AND EFFLUENT CHARACTERISTICS *(continued from page 3 of Form 2-C)* — OUTFALL

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (2) MASS	d. NO. OF ANALYSES	3. UNITS (specify if blank) a. CONCENTRATION	3. UNITS b. MASS	4. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	4. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	4. INTAKE b. NO. ANALYSES
a. Biochemical Oxygen Demand (BOD)	37.0	92					1	mg/1	Kg/day			
b. Chemical Oxygen Demand (COD)	16.0	40					1	mg/1	Kg/day			
c. Total Organic Carbon (TOC)	9.70	24					1	mg/1	Kg/day			
d. Total Suspended Solids (TSS)	65.0	162			31.3	78.2	13	mg/1	Kg/day			
e. Ammonia (as N)	<.01						1	mg/1	--			
f. Flow	VALUE 660,000		VALUE		VALUE			gpd	--	VALUE		
g. Temperature (winter)	VALUE 12^0		VALUE		VALUE		1	°C		VALUE		
h. Temperature (summer)	VALUE 12^0		VALUE		VALUE		1	°C		VALUE		
i. pH	MINIMUM 7.1	MAXIMUM 8.0	MINIMUM	MAXIMUM			13	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you ma column 2-a for any pollutant, you must provide the results of at least one analysis for that pollutant. Complete one table for each outfall. See the instructions for additior details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK 'X' a. BELIEVED PRESENT	2. MARK 'X' b. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	4. UNITS b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE b. NO. ANALYSES
a. Bromide (24959 67-9)		X	<.01	--					1	mg/1	--			
b. Chlorine, Total Residual		X	<.01	--					1	mg/1	--			
c. Color	X		10	25					1	co.unit	Kg/day			
d. Fecal Coliform	X		2.0	5					1	MPN/100m1	--			
e. Fluoride (16984 48 8)	X		.20	.5					1	mg/1	Kg/day			
f. Nitrate-Nitrite (as N)	X		.10	.25					1	mg/1	Kg/day			

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK 'X' a. BELIEVED PRESENT	b. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
g. Nitrogen, Total Organic (as N)	X		.10	.25					1	mg/l	Kg/day			
h. Oil and Grease	X		20.0	50			3.4	8.49	13	mg/l	Kg/day			
i. Phosphorus (as P), Total (7723-14-0)	X		.100	.25					1	mg/l	Kg/day			
j. Radioactivity														
(1) Alpha, Total	X		.8	2.0					1	pCi/l	--			
(2) Beta, Total	X		1.2	3.0					1	pCi/l	--			
(3) Radium, Total		X	<.05	--					1	pCi/l	--			
(4) Radium 226, Total		X	<.05	--					1	pCi/gm	--			
k. Sulfate (as SO_4) (14808-79-8)	X		85.5	214					1	mg/l	Kg/day			
l. Sulfide (as S)	X		.86	2.2					1	mg/l	Kg/day			
m. Sulfite (as SO_3) (14265-45-3)		X	<.01	--					1	mg/l	--			
n. Surfactants	X		.04	.10					1	mg/l	Kg/day			
o. Aluminum, Total (7429-90-5)	X		.030	.07			.017	.04	7	mg/l	Kg/day			
p. Barium, Total (7440-39-3)	X		.090	.22					1	mg/l	Kg/day			
q. Boron, Total (7440-42-8)	X		.270	.67					1	mg/l	Kg/day			
r. Cobalt, Total (7440-48-4)		X	<.001	--					1	mg/l	--			
s. Iron, Total (7439-89-6)	X		1.250	3.12			.47	1.17	6	mg/l	Kg/day			
t. Magnesium, Total (7439-95-4)	X		32.64	81.54					1	mg/l	Kg/day			
u. Molybdenum, Total (7439-98-7)		X	<.001	--					1	mg/l	--			
v. Manganese, Total (7439-96-5)	X		.145	.36			.033	.08	9	mg/l	Kg/day			
w. Tin, Total (7440-31-5)		X	<.01	--					1	mg/l	--			
x. Titanium, Total (7440-32-6)		X	<.01	--					1	mg/l	--			

CONTINUE ON PAGE V-3

EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
Ut-0022918	001

CONTINUED FROM PAGE 3 OF FORM 2-C

Form Approved OMB No. 158-R0173

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a *(secondary industries, non-process wastewater outfalls, and non-required GC/MS fractions)*, mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe to be absent. If you mark either columns 2-a or 2-b for any pollutant, you must provide the results of at least one analysis for that pollutant. Note that there are seven pages to this part; please review each carefully. Complete one table *(all seven pages)* for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (If available)	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	a. Testing required by EPA	b. Believed present	c. Believed absent	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)			X	<.001	--					1	mg/l	--			
2M. Arsenic, Total (7440-38-2)			X	<.001	--					1	mg/l	--			
3M. Beryllium, Total, 7440-41-7)			X	<.01	--					1	mg/l	--			
4M. Cadmium, Total (7440-43-9)			X	<.001	--					1	mg/l	--			
5M. Chromium, Total (7440 47 3)			X	<.001	--					1	mg/l	--			
6M. Copper, Total (7550-50-8)			X	<.001	--					1	mg/l	--			
7M. Lead, Total (7439 97-6)			X	<.001	--					1	mg/l	--			
8M. Mercury, Total (7439 97-6)			X	<.0002	--					1	mg/l	--			
9M. Nickel, Total (7440-02-0)		X		.025	.06			.01	.02	8	mg/l	Kg/day			
10M. Selenium, Total (7782-49-2)			X	<.001	--					1	mg/l	--			
11M. Silver, Total (7440-22-4)			X	<.001	--					1	mg/l	--			
12M. Thallium, Total (7440-28-0)			X	<.01	--					1	mg/l	--			
13M. Zinc, Total (7440-66-6)		X		.235	.59			.049	.12	6	mg/l	Kg/day			
14M. Cyanide, Total (57-12-5) ✓		X		.011	.03					1	mg/l	Kg/day			
15M. Phenols, Total ✓			X	<.001	--					1	mg/l	--			
DIOXIN															
2,3,7,8-Tetra-				DESCRIBE RESULTS											

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TEST-ED FOR	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	4. UNITS b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE (optional) b. NO. OF ANALYSES
GC/MS FRACTION – VOLATILE COMPOUNDS															
1V. Acrolein (107-02-8)			X												
2V. Acrylonitrile (107-13-1)			X												
3V. Benzene (71-43-2)			X												
4V. Bis (Chloromethyl) Ether (542-88-1)			X												
5V. Bromoform (75-25-2)			X												
6V. Carbon Tetrachloride (56-23-5)			X												
7V. Chlorobenzene (108-90-7)			X												
8V. Chlorodibromomethane (124-48-1)			X												
9V. Chloroethane (75-00-3)			X												
10V. 2-Chloroethylvinyl Ether (110-75-8)			X												
11V. Chloroform (67-66-3)			X												
12V. Dichlorobromomethane (75-27-4)			X												
13V. Dichlorodifluoromethane (75-71-8)			X												
14V. 1,1-Dichloroethane (75-34-3)			X												
15V. 1,2-Dichloroethane (107-06-2)			X												
16V. 1,1-Dichloroethylene (75-35-4)			X												
17V. 1,2-Dichloropropane (78-87-5)			X												
18V. 1,2-Dichloropropylene (542-75-6)			X												
19V. Ethylbenzene (100-41-4)			X												
20V. Methyl Bromide (74-83-9)			X												
21V. Methyl Chloride (74-87-3)			X												

1. POLLUTANT AND CAS NUMBER (If available)	MARK 'X' a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION – VOLATILE COMPOUNDS (continued)															
22V. Methylene Chloride (75-09-2)			X												
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X												
24V. Tetrachloroethylene (127-18-4)			X												
25V. Toluene (108-88-3)			X												
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X												
27V. 1,1,1-Trichloroethane (71-55-6)			X												
28V. 1,1,2-Trichloroethane (79-00-5)			X												
29V. Trichloroethylene (79-01-6)			X												
30V. Trichlorofluoromethane (75-69-4)			X												
31V. Vinyl Chloride (75-01-4)			X												
GC/MS FRACTION – ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)			X												
2A. 2,4-Dichlorophenol (120-83-2)			X												
3A. 2,4-Dimethylphenol (105-67-9)			X												
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X												
5A. 2,4-Dinitrophenol (51-28-5)			X												
6A. 2-Nitrophenol (88-75-5)			X												
7A. 4-Nitrophenol (100-02-7)			X												
8A. P-Chloro-M-Cresol (59-50-7)			X												
9A. Pentachlorophenol (87-86-5)			X												
10A. Phenol (108-95-2)			X												
11A. 2,4,6-Trichlorophenol (88-06-2)			X												

CONTINUE ON REVERSE

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION — BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)			X												
2B. Acenaphtylene (208-96-8)			X												
3B. Anthracene (120-12-7)			X												
4B. Benzidine (92-87-5)			X												
5B. Benzo (a) Anthracene (56-55-3)			X												
6B. Benzo (a) Pyrene (50-32-8)			X												
7B. 3,4-Benzo-fluoranthene (205-99-2)			X												
8B. Benzo (ghi) Perylene (191-24-2)			X												
9B. Benzo (k) Fluoranthene (207-08-9)			X												
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)			X												
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)			X												
12B. Bis (2-Chloro-isopropyl) Ether (39638-32-9)			X												
13B. Bis (2-Ethyl-hexyl) Phthalate (117-81-7)			X												
14B. 4-Bromo-phenyl Phenyl Ether (101-55-3)			X												
15B. Butyl Benzyl Phthalate (85-68-7)			X												
16B. 2-Chloro-naphthalene (91-58-7)			X												
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)			X												
18B. Chrysene (218-01-9)			X												
19B. Dibenzo (a,h) Anthracene (53-70-3)			X												
20B. 1,2-Dichloro-benzene (95-50-1)			X												
21B. 1,3-Dichloro-benzene (541-73-1)			X												

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TESTED	b. REQUIRED	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	4. UNITS b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE (optional) b. NO. OF ANALYSES
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (continued)															
22B. 1,4-Dichlorobenzene (106-46-7)			X												
23B. 3,3'-Dichlorobenzidine (91-94-1)			X												
24B. Diethyl Phthalate (84-66-2)			X												
25B. Dimethyl Phthalate (131-11-3)			X												
26B. Di-N-Butyl Phthalate (84-74-2)			X												
27B. 2,4-Dinitrotoluene (121-14-2)			X												
28B. 2,6-Dinitrotoluene (606-20-2)			X												
29B. Di-N-Octyl Phthalate (117-84-0)			X												
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7			X												
31B. Fluoranthene (206-44-0)			X												
32B. Fluorene (86-73-7)			X												
33B. Hexachlorobenzene (118-71-1)			X												
34B. Hexachlorobutadiene (87-68-3)			X												
35B. Hexachlorocyclopentadiene (77-47-4)			X												
36B. Hexachloroethane (67-72-1)			X												
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X												
38B. Isophorone (78-59-1)			X												
39B. Naphthalene (91-20-3)			X												
40B. Nitrobenzene (98-95-3)			X												
41B. N-Nitrosodimethylamine (62-75-9)			X												
42B. N-Nitrosodi-N Propylamine			X												

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS *(continued)*															
43B. N-Nitrosodiphenylamine (86-30-6)			X												
44B. Phenanthrene (85-01-8)			X												
45B. Pyrene (129-00-0)			X												
46B. 1,2,4-Trichlorobenzene (120-82-1)			X												
GC/MS FRACTION – PESTICIDES															
1P. Aldrin (309-00-2)			X												
2P. α-BHC (319-84-6)			X												
3P. β-BHC (319-85-7)			X												
4P. γ-BHC (58-89-9)			X												
5P. δ-BHC (319-86-8)			X												
6P. Chlordane (57-74-9)			X												
7P. 4,4'-DDT (50-29-3)			X												
8P. 4,4'-DDE (72-55-9)			X												
9P. 4,4'-DDD (72-54-8)			X												
10P. Dieldrin (60-57-1)			X												
11P. α-Endosulfan (115-29-7)			X												
12P. β-Endosulfan (115-29-7)			X												
13P. Endosulfan Sulfate (1031-07-8)			X												
14P. Endrin (72-20-8)			X												
15P. Endrin Aldehyde (7421-93-4)			X												
16P. Heptachlor (76-44-8)			X												

CONTINUE ON PAGE V-9

CONTINUED FROM PAGE V-8

EPA I.D. NUMBER (copy from Item 1 of Form 1): Ut-0022918 | OUTFALL NUMBER: 001

Form Approved OMB No. 158-R0173

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TEST INC. REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION – PESTICIDES (continued)															
17P. Heptachlor Epoxide (1024-67-3)			X												
18P. PCB-1242 (53469-21-9)			X												
19P. PCB-1254 (11097-69-1)			X												
20P. PCB-1221 (11104-28-2)			X												
21P. PCB-1232 (11141-16-5)			X												
22P. PCB-1248 (12672-29-6)			X												
23P. PCB-1260 (11096-82-5)			X												
24P. PCB-1016 (12674-11-2)			X												
25P. Toxaphene (8001-35-2)			X												

APPENDIX 783.14

DATE 10-17-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-7

LOGGED BY MAHOOD GROUND ELEV. 8497' PROJECT SUFCO

LOCATION S½ NW¼ SEC 31, T21S R5E, Sevier County, Utah WEATHER Clear, Warm

CIRCULATION WITH: AIR FROM 0 TO 285, ~~WATER~~ FOAM FROM 285 TO 1220

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	0	15	15	Alluvium	light brown, fine grained, very poorly sorted, angular, sand, calcareous.	
	15	20	5	Siltstone	dark brown, sandy, calcareous, soft.	
	20	25	5	Sandstone	light brown, fine grained, poorly sorted, angular, calcareous.	
	25	40	15	Claystone	dark gray, silty, calcareous, soft.	
	40	45	5	Sandstone	light gray, very fine grained, moderately sorted, non calcareous, soft.	
	45	50	5	Claystone	light to dark gray; as above.	
	50	60	10	Sandstone	light gray, calcareous, as above interbedded with claystone described as above at 60'.	
	60	65	5	Sandstone	dark gray, very fine grained, moderately sorted, subangular, calcareous, carbonaceous material noted.	
	65	75	10	Siltstone	dark gray, sandy, calcareous, carbonaceous material noted, hard.	
	75	90	15	Claystone	light gray, silty, non calcareous, carbonaceous material noted, soft; becoming dark gray downward; calcareous at 85'.	
	90	100	10	Siltstone	light gray, sandy, calcareous, hard.	
	100	105	5	Sandstone	light gray, very fine grained, mod. sorted, calc.	
	105	115	10	Sandstone	light gray, fine grained, poorly sorted, subrounded, calcareous, hard thin carbonaceous laminae and pyrite noted.	
	115	125	10	Sandstone	as above, very fine grained.	
	125	135	10	Sandstone	white, fine grained, poorly sorted, rounded, frosted castlegate; well rounded at 130'.	
	135	155	20	Sandstone	white, very fine grained, as above, well sorted.	
	155	170	15	Sandstone	fine grained, as above.	
	170	175	5	Sandstone	very fine grained, as above, poorly sorted.	
	175	200	25	Sandstone	fine grained, as above, frosted grains noted at 200'.	
	200	205	5	Sandstone	medium gray, as above.	
	205	240	35	Sandstone	fine grained, as above, light gray.	
	240	255	15	Sandstone	white, very fine grained, well sorted, as above.	
	255	270	15	Sandstone	as above, fine to medium grained.	
	270	275	5	Sandstone Claystone	interbedded gray, poorly sorted, fine grained, sandstone; and dark gray, soft non calcareous claystone, pyrite noted. Kbh.	
	275	285	10	Sandstone Siltstone	interbedded sandstone as above and gray, sandy non calcareous, siltstone.	
					Begin foam injection.	
	285	295	10	Siltstone	dark grayish brown, sandy, slightly carbonaceous, calcareous, soft, pyrite noted, lenses of claystone noted at 290'.	
	295	340	45	Sandstone	dark gray, very fine grained, poorly sorted, silty, calcareous, hard, coal laminae noted, pyrite noted.	
	340	375	35	Sandstone	light gray, as above very fine to fine grained, becoming softer at 360'.	
	375	380	5	Siltstone	dark gray, sandy, calcareous, hard.	
	380	405	25	Sandstone	light gray, as above, carbonaceous laminae, soft, calc.	

DATE 10-18-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-7

LOGGED BY MAHOOD GROUND ELEV. 8497 PROJECT SUFCO

LOCATION S½ NW¼, Sec 31, T21S R5E, Sevier County, Utah WEATHER Clear, Warm

CIRCULATION WITH: AIR FROM 0 TO 285 , FOAM FROM 285 TO 1220

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	405	410	5	Sandstone Carb.Sh.	interbedded sandstone described as above and black coaly fissile. soft carbonaceous shale.	
	410	415	5	Shale	Gray, soft, calcareous.	
	415	425	10	Siltstone	light gray, soft, calcareous, sandy, coal fragments noted at 425'.	
	425	430	5	Siltstone	as above, hard, pyritic.	
	430	435	5	Carb. Siltstone	dark gray to brownish gray, resinous, carbonaceous laminae, soft.	
	435	440	5	Siltstone	dark gray, calcareous, hard.	
	440	450	10	Siltstone Sandstone	interbedded siltstone as above and very fine grained, moderately sorted, calcareous, hard, sandstone.	
	450	455	5	Siltstone	light gray, sandy, calcareous, hard.	
	455	465	10	Siltstone Claystone	interbedded siltstone as above and light gray, very hard, calcareous, claystone, COAL NOTED (TRACE).	
	465	475	10	Sandstone COAL	light gray, fine grained, moderately sorted, angular, soft; vitrain fragments noted.	
	475	485	10	Siltstone	light gray to tan, calcareous, hard - trace coal noted.	
	485	490	5	Siltstone Carb.Sh.	interbedded siltstone as above and black, thinly fissile, soft, carbonaceous shale.	
	490	500	10	Siltstone	as above, becoming sandier.	
	500	510	10	Siltstone	dark gray, calcareous, very hard.	
	510	515	5	Siltstone Shale	interbedded siltstone as above and black, hard, calcareous, shale.	
	515	520	5	Siltstone	gray, sandy, very calcareous, hard.	
	520	530	10	Sandstone	light gray, very fine grained, poorly sorted, subrounded, calcareous, soft.	
	530	540	10	Sandstone Siltstone	interbedded sandstone as above and black, soft, non calcareous siltstone; sandstone becoming coarser grained, coaly and pyritic laminae noted.	
	540	555	15	Sandstone	as above, fine grained, carbonaceous and pyrite absent.	
	555	560	5	Claystone	gray, calcareous, silty, hard.	
	560	575	15	Sandstone	light gray, very fine grained, poorly sorted, subangular, calcareous, soft, trace coal noted at 575'.	
	575	585	10	Sandstone COAL	interbedded sandstone described as above and black resinous, banded, vitrain and durain, conchoidal fracture, cleated. Coal increasing over sandstone at 585'.	
	585	590	5	Siltstone COAL	interbedded gray, calcareous, soft, siltstone; and coal described as above (Minor).	
	590	615	20	Sandstone COAL	light gray, very fine grained, well sorted, angular, calcareous, soft trace coal noted.	
	615	625	10	Sandstone	as above, fine grained.	
	625	640	15	Sandstone	as above very fine grained.	
	640	655	15	Sandstone Siltstone	interbedded sandstone described as above, and siltstone, light gray, calcareous, hard.	
	655	660	5	Sandstone	light gray, very fine grained, poorly sorted, calc, subrounded, soft; trace coal noted.	
	660	670	10	Siltstone	very light gray, calcareous, hard becoming sandy at 665' coal noted.	
	670	680	10	Siltstone Sandstone	interbedded siltstone as above and sandstone very fine grained, as above.	
	680	685	5	Siltstone	interbedded light to dark gray, calcareous, soft, siltstone.	

DATE 10-19-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-7

LOGGED BY MAHOOD GROUND ELEV. 8497 PROJECT SUFCO

LOCATION S½NW¼ Sec 31, T21S R5E, Sevier County, Utah WEATHER Partly cloudy, warm.

CIRCULATION WITH: AIR FROM 0 TO 285 , ~~WATER~~ FOAM FROM 285 TO 1220

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	685	700	15	Siltstone Sandstone	interbedded as above.	
	700	705	5	Siltstone Carb.Sh.	interbedded light gray, sandy, calcareous, soft, siltstone, and black soft, pyritic, carbonaceous shale; coal fragments noted.	
	705	710	5	Siltstone	as above.	
	710	720	10	Siltstone	light to dark gray, dark gray has carbonaceous laminae as above.	
	720	725	5	Sandstone Siltstone	interbedded light gray, very fine grained, poorly sorted, silty, calcareous, carbonaceous laminae, sandstone; and dark gray siltstone described as above.	
	725	740	15	Sandstone	light gray, as above, slightly coarser grained.	
	740	745	5	Siltstone Sandstone	interbedded light gray, sandy, calcareous, siltstone and sandstone described as above.	
	745	750	5	Siltstone	dark gray, very fine siltstone, calcareous, hard.	
	750	770	20	Siltstone	interbedded dark to light gray siltstone, described as above, becoming sandy at 770'.	
	770	780	10	Sandstone	light gray, very fine grained, poorly sorted, subangular, silty, calcareous, carbonaceous laminae noted; trace carbonaceous shale at 780'.	
	780	785	5	Sandstone Siltstone	interbedded sandstone described as above and siltstone gray, calcareous, hard.	
	785	795	10	Siltstone	interbedded light and dark gray, calcareous, hard, siltstone.	
	795	820	25	Siltstone	gray, calcareous, very hard, becoming sandy at 810' trace carbonaceous shale noted at 815'.	
	820	825	5	Siltstone	gray, calcareous, very sandy, hard. trace coal noted.	
	825	840	15	Sandstone	light gray, very fine grained, well sorted, angular, calcareous, soft.	
	840	845	5	Sandstone Siltstone	interbedded sandstone described as above and dark gray, hard, calcareous, siltstone.	
	845	850	5	Sandstone	as above, silty.	
	850	860	10	Sandstone Siltstone	interbedded sandstone as above, light gray, calcareous, hard, siltstone, trace coal noted.	
	860	875	15	Siltstone	interbedded light gray, very sandy, calcareous, siltstone, and dark gray, calcareous, hard, siltstone, trace coal noted.	
	875	900	25	Sandstone Siltstone COAL	interbedded described as above, coal minor, large fragments of vitrain noted.	
	900	905	5	Siltstone	black, sandy, carbonaceous, calcareous, interbedded with siltstone, light gray, as above.	
	905	915	10	Siltstone	light to dark gray, described as above; coal noted, trace, resinous, pyrite on cleat, trace.	
	915	920	5	Sandstone COAL	light gray, very fine grained, moderately sorted, calcareous, carbonaceous laminae noted, trace coal described as above.	
	920	930	10	Siltstone COAL	as above.	
	930	940	10	Siltstone Claystone	interbedded siltstone as above, dark gray, hard, calcareous, claystone.	
	940	945	5	NR	No recovery.	
	945	950	5	Siltstone Carb. Sh.	interbedded siltstone as above, black soft, coaly laminae noted, carbonaceous shale.	
	950	960	10	Sandstone	light gray, very fine grained, well sorted, angular, silty, calcareous, coaly laminae noted, coal noted at 960'.	
	960	970	10	Sandstone	light gray, fine grained, poorly sorted, angular, calcareous, trace coal noted.	
	970	975	5	Siltstone	light gray to dark gray, calcareous, carbonaceous, pyritic, hard.	
	975	980		NR	No recovery	

DATE 10-20-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-7

LOGGED BY MAHOOD GROUND ELEV. 8497 PROJECT SUFCO

LOCATION S½ NW¼, Sec 31, T21S R5E, Sevier County, Utah WEATHER Cloudy, Rainy

CIRCULATION WITH: AIR FROM 0 TO 285 , FOAM ~~WATER~~ FROM 285 TO 1220

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	980	995	15	Sandstone Siltstone	interbedded sandstone and siltstone both described as above, trace coal noted.	
	995	1005	10	Siltstone	light gray, sandy, calcareous, soft.	
	1005	1010	5	Siltstone	interbedded light gray, sandy siltstone, as above, and black, thinly bedded, soft, siltstone.	
	1010	1020	10	Siltstone Sandstone	interbedded siltstone and sandstone described as above, sandstone increasing over siltstone at	1020.
	1020	1030	10	Siltstone	light gray to buff, sandy, calcareous, hard, carbonaceous laminae noted at 1030'.	
	1030	1040	10	Siltstone	light gray, as above.	
	1040	1045	5	Sandstone	light gray, very fine grained, poorly sorted, sub-rounded, silty, calcareous, carbonaceous laminae and grains noted.	
	1045	1050	5	Sandstone Siltstone Carb. Sh.	interbedded sandstone and siltstone described as above; trace black, soft, thinly fissile carbonaceous shale.	
	1050	1055	5	Siltstone Sandstone	interbedded dark gray, carbonaceous laminae, calcareous, hard, siltstone, and sandstone described as above.	
			Core	#1	Cut 1055.0 - 1065.0, recovered 10.0'	
Bag # 1a&1b	1055.0	1061.0	6.0	COAL	Durain, black, poor cleat, calcite on cleat, hard well consolidated, cleat well developed at 1058.6 - 1058.75, highly fractured. two bags 1a & 1b; one bag too small for sample. well consolidated poor cleat below 1058.75'.	
Bag 2	1061.0	1063.0	2.0	COAL	Durain, black, hard, well consolidated, poor cleat, pyrite noted on cleat surfaces as thin coatings.	
Bag 3	1063.0	1065.0	2.0	COAL	as above.	
			Core	#2	Cut 1065.0 - 1075.0; recovered 8.45'	
Bag 4	1065.0	1066.7	1.7	COAL	Durain, good cleat, pyrite on cleat, highly broken in barrel at 1065.65 - 1065.80 and at 1066.25 to 1066.7.	
Box 1	1066.7	1066.77	.07	Carb.Sh.	black, silty, soft, pyrite between laminae.	
"	1066.77	1067.75	.98	Siltstone	dark gray becoming light gray with depth, sandy, very hard, carbonaceous, decreasing with depth, carbonaceous laminae and pyrite noted.	
"	1067.75	1068.75	1.10	Claystone	dark gray, silty non calcareous, pyrite noted, highly broken in core barrel, conchoidal fracture, thinly bedded.	
"	1068.85	1071.0	2.15	Siltstone	greenish gray, well consolidated, hard, non calcareous, trace carbonaceous material noted.	
"	1071.0	1073.45	2.45	Sandstone	light gray, very fine grained, poorly sorted, subangular, calcareous, carbonaceous and pyrite grains noted. hard, becoming coarser grained with depth.	
	1073.45	1075.0	1.55	NR	No recovery.	
			Core	#3	Cut 1075.0 - 1085.0, recovered 10.0'.	
Box 2	1075.0	1076.80	1.80	Sandstone	light gray, very fine grained, well sorted, angular, calcareous, minor carbonaceous laminae and pyrite grains noted.	

DATE 10-21-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-7

LOGGED BY MAHOOD GROUND ELEV. 8497 PROJECT SUFCO

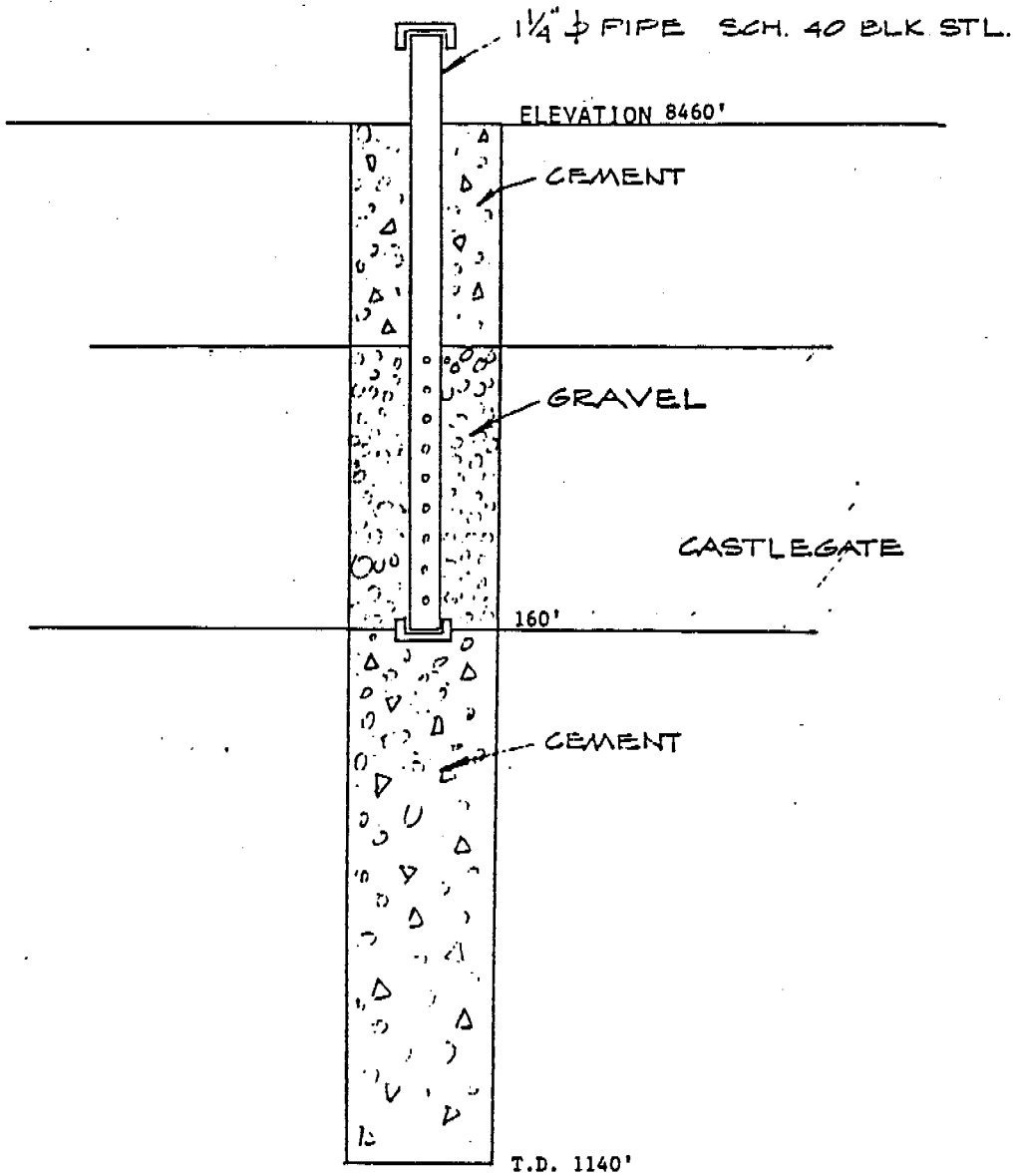
LOCATION S½ NW¼ Sec 31, T21S R5E, Sevier County, Utah WEATHER Cloudy, Thundershower

CIRCULATION WITH: AIR FROM 0 TO 285 , FOAM ~~WATER~~ FROM 285 TO 1220

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
Box 2	1076.80	1078.55	1.75	Siltstone	dark gray, calcareous, coalified plant remains noted, sandy, sand content decreasing with depth.	
"	1078.55	1078.80	.25	Sandstone	dark gray, very fine grained, poorly sorted, angular, calcareous, abundant thin carbonaceous laminae.	
"	1078.80	1082.10	4.30	Siltstone Sandstone	interbedded dark gray, calcareous, carbonaceous, sandy siltstone; and light gray, very fine grained, poorly sorted calcareous, carbonaceous laminae, sandstone, pyrite inclusions noted at 1081.15, 1081.95'.	
"	1082.10	1082.40	.30	Claystone	dark greenish gray, calcareous, soft, conchoidal fracture, slightly silty.	
"	1082.40	1083.0	.60	Sandstone	light gray, fine grained, very poorly sorted, calcareous, carbonaceous laminae, and pyrite noted.	
"	1083.0	1083.50	.50	Claystone	dark greenish gray, as above.	
"	1083.50	1084.55	1.05	Sandstone	light gray, fine grained, poorly sorted, subrounded calcareous, carbonaceous grains noted.	
"	1084.55	1085.0	.45	Sandstone Claystone	interbedded light gray, fine grained, poorly sorted, angular, calcareous, very carbonaceous, sandstone, and claystone described as above.	
					Resume Plug drilling	
	1085	1095	10	Sandstone	light gray, very fine grained, silty, poorly sorted, calcareous, soft.	
	1095	1105	10	Sandstone Claystone	interbedded sandstone as above, and dark greenish gray, calcareous, silty, claystone, calcareous.	
	1105	1135	30	Sandstone Claystone Siltstone	interbedded as above, gray, calcareous, sandy siltstone, pyrite noted. sandstone increasing with depth.	
	1135	1170	35	Sandstone	light gray to white, very fine grained, well sorted, rounded, calcareous, pyrite noted.	
	1170	1190	20	Sandstone Claystone	interbedded sandstone as above and dark gray, silty, calcareous siltstone, pyrite noted, sandstone increasing with depth.	
	1190	1220	30	Sandstone	light gray, fine grained, moderately sorted, rounded, calcareous, pyrite noted.	
					TD 1220'	

Coastal 833 (9/74)

GROUNDWATER MONITORING HOLE US-77-8



DATE 11-10-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-8

LOGGED BY BARNUM GROUND ELEV. 8423 PROJECT

LOCATION WEATHER Cloudy

CIRCULATION WITH: AIR FROM 0 TO 260 . WATER FROM 260 TO T.D.

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	0	5	5	Alluvium Siltstone	medium gray, siltstone in minor amounts.	
	5	10	5	Siltstone	as above, decreasing alluvium.	
	10	20	10	Sandstone	white to tan, very fine to fine grained, rounded.	
	20	25	5	Sandstone	white to light purple, fine to medium grained, rounded.	
	25	75	50	Sandstone	fine to very fine grained, lighter than above.	
	75	110	35	Sandstone	as above, only slightly lighter color.	
	110	125	15	Sandstone	as above with minor (10%) tan, medium grained, sandstone, well rounded.	
	125	145	20	Sandstone	as above with increasing amount of fine to medium grained, tan sandstone as above.	
	145	150	5	Sandstone	light brown, fine to medium grained, rounded, well sorted.	
	150	155	5	Sandstone	as above,but stronger cement; very minor claystone medium gray, shaley.	
	155	165	10	Claystone	medium gray, slightly silty, thinnly laminae, shaley.	
	165	175	10	Claystone	as above with some siltstone, light gray, well cemented.	
	175	180	5	Claystone Siltstone	as above but more poorly cemented.	
	180	190	10	Sandstone	white to tan, very fine to fine grained, rounded, well sorted.	
	190	200	10	Sandstone	white to light purple, very fine to medium grained, rounded.	
	200	210	10	Sandstone	light brown, as above. minor claystone, medium gray, shaley, hard.	
	210	220	10	Sandstone	as above but is darker brown and slightly finer grained.	
	220	225	5	Claystone Sandstone	as above but claystone is 80% of cuttings.	
	225	235	10	Sandstone Claystone	as above with claystone decreasing to 50%.	
	235	260	25	Claystone	medium gray with siltstone, light gray, very hard.	
	260	275	15	Claystone Siltstone	as above with minor carbonaceous shale and very minor coaly fragments.	
	275	460	185	Claystone Siltstone	as above with siltstone becoming fine grained.	
	460	470	10	Claystone Siltstone	as above with minor carbonaceous shale and coaly fragments.	
	470	510	40	Claystone	dark gray, shaley and silstone, light gray, hard, minor amount of sandstone, light gray, very fine grained, interbedded.	
	510	520	10	Claystone Siltstone	as above with carbonaceous shale. no sandstone.	
	520	535	15	Claystone	medium to dark gray, shaley, minor carbonaceous shale interbedded.	
	535	565	30	Claystone	as above without carbonaceous shale,	
	565	575	10	Claystone	as above with minor carbonaceous shale and coaly fragments.	
	575	595	20	Siltstone	light gray, hard, minor sandstone, light gray, very fine grained.	
	595	600	5	Siltstone Sandstone	as above with minor claystone, dark gray, shaley	
	600	680	80	Siltstone	sandstone and claystone as above.	
	680	725	45	Siltstone	as above with 10% sandstone, light gray, to light brown rounded, well sorted fine grained.	

DATE 11-10-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-8

LOGGED BY BARNUM GROUND ELEV. 8423 PROJECT

LOCATION WEATHER

CIRCULATION WITH: AIR FROM 0 TO 260 , WATER FROM 260 TO T.D.

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	725	760	35	Siltstone	as above with sandstone decreasing.	
	760	765	5	Siltstone	as above, claystone, dark gray, shaley as above increasing.	
	765	775	10	Siltstone	as above claystone as above increasing.	
	775	785	10	Siltstone	as above with minor coaly fragments.	
	785	810	25	Siltstone	as above.	
	810	825	15	Siltstone	as above with sandstone, light brown, fine grained, rounded, sorted.	
	825	830	5	Siltstone	as above with decreasing sandstone as above.	
	830	840	10	Siltstone	as above with sandstone as above increasing.	
	840	865	25	Siltstone	as above, sandstone as above becoming finer and decreasing.	
	865	885	20	Siltstone	as above, sandstone continuing to decreasing to minor amount.	
	885	890	5	Siltstone	as above with minor less than 10% coaly fragments.	
	890	900	10	Siltstone	as above, sandstone as above increasing to +50% no coaly fragments.	
	900	910	10	Siltstone	as above. sandstone decreasing.	
	910	920	10	Siltstone Claystone	as above.	
	920	935	15	Siltstone Claystone	as above with minor sandstone, light brown, fine grained.	
	935	935.3	0.3	Siltstone	medium gray, with very thin carbonaceous laminations.	
	935.3	935.6	0.3	Siltstone	as above with carbonaceous shale streak 0.02' thick.	
	935.6	937	1.4	Siltstone	as above.	
	937	937.65	0.65	Carb. Shale	with very thin coal laminae.	
	937.65	937.7	0.05	Coal	black, dull attrital.	
	937.7	937.9	0.2	Carb. Shale	as above.	
	937.9	944.8	6.9	Claystone	light gray, silty, hard.	
	944.8	945	0.2	NR	No recovery.	
	945	946.5	1.5	Claystone	light gray, silty, very well cemented.	
	946.5	947	0.5	Claystone	as above with carbonaceous laminae.	
	947	947.2	0.2	Carb. Shale	slightly silty, coal laminae.	
	947.2	948.35	1.15	Carb. Shale	as above.	
	948.35	948.95	0.60	Coal	black, primarily bright attrital, minor vitrain bands, resinous, well cleated.	
	948.35	950.5	1.55	Claystone	light gray, silty, minor carbonaceous laminae.	
	950.5	950.65	0.15	Carb. Shale	as above.	
	950.65	950.95	0.30	Coal	black, bright attrital, some dark bands, resinous.	
"	950.95	951.05	0.10	Carb.Sh.	parting.	
"	951.05	951.25	0.2	Coal	dull attrital, cleated slightly, very minor pyrite.	

DATE 11-10-77 COASTAL STATES ENERGY CO. HOLE NO. US 77-8

LOGGED BY BARNUM GROUND ELEV. 8423 PROJECT

LOCATION WEATHER

CIRCULATION WITH: AIR FROM 0 TO 260 , WATER FROM 260 TO T.D.

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
[illegible]	951.25	954.25	3.0	Coal	bright attrital, minor vitrain bands, some dull attritus, resinous, pyrite in cleat.	
	954.25	955	0.75	NR	No recovery.	
[illegible]	955	957.5	2.5	Coal	bright attrital, minor dull attrital, resin and pyrite noted. fractured.	
[illegible]	957.5	959.25	1.75	Coal	hard, dull attrital, unfractured, minor vitrain bands.	
[illegible]	959.25	960.15	0.90	Coal	bright attrital as above, very fractured.	
[illegible]	960.15	963.15	3.0	Coal	bright attrital, dull bands present, hard, unfractured.	
[illegible]	963.15	965.15	2.0	Coal	dull attrital, fractured.	
	965.15	965.5	0.35	NR	No recovery.	
[illegible]	965.5	967.1	1.60	Coal	bright attrital, minor dull coal, pyrite noted in cleat.	
[illegible]	967.1	968.1	1.0	Carb. Shale	with minor coal bands, some vitrain. - "Trash band".	
	968.1	968.75	0.65	Siltstone	hard, medium gray.	
	968.75	968.9	0.15	Carb. Shale	as above.	
	968.9	974.6	5.70	Siltstone	medium gray, as above.	
	974.6	975.	0.40	NR	No recovery.	
	950	980	5	Coal	black, concoidal fracture, cleated, 60%+ of cuttings, siltstone, light to medium gray, well consolidated, some carbonaceous laminae.	
	980	985	5	Coal	as above with very minor white sandstone fragments noted.	
	985	990	5	Coal	as above sandstone as above, very fine grained, soft, clayey, increasing.	
	990	1000	10	Coal	as above.	
	1000	1005	5	Siltstone	medium gray, slightly sandy, well consolidated, carbonaceous material (70%), sandstone light to medium gray, fine grained, friable, calcareous, slightly salt and pepper, sub to well rounded	
					minor coal as above.	
	1005	1010	5	Sandstone	as above increasing 60%, siltstone as above decreasing sharply, coal, black mostly vitrain concoidal fracture, slightly resinous 10% of cuttings.	
	1010	1015	5	Coal	as above increased slightly, sandstone as above.	
	1015	1020	5	Ksp	coal as above, decreased, sandstone, light to medium gray, friable, fine grained, sub-rounded frosted.	
	1020	1025	5	Ksp	as above, claystone, gray, silty, well consolidated calcareous, pyrite noted.	
	1025	1030	5	Ksp	sandstone, fine grained, light gray, friable, sub to well rounded, 50/50 frosted-clear, claystone, siltstone, coal contamination.	
	1030	1040	10	Ksp	as above.	
	1040	1080	40	Sandstone	as above, 90% of cuttings, pyrite inclusion in sandstone, sandstone, white to light gray when dry.	
	1080	1085	5	Sandstone	as above with partially oxidized pyrite.	

DATE 11-10-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-8

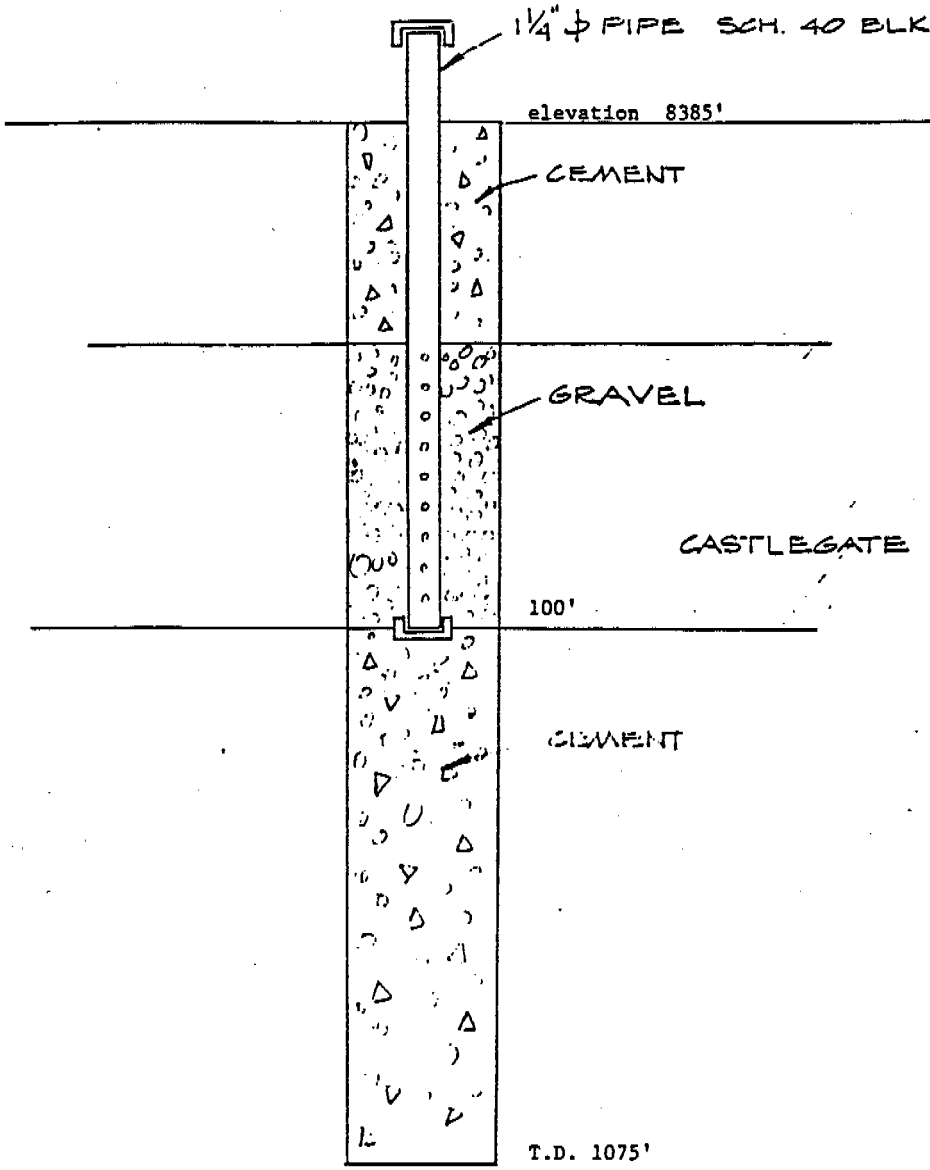
LOGGED BY BARNUM GROUND ELEV. 8423 PROJECT

LOCATION WEATHER

CIRCULATION WITH: AIR FROM 0 TO 260 , WATER FROM 260 TO T.D.

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	1085	1140	55	Sandstone	as above.	

GROUNDWATER NONITORING HOLE US-77-9



DATE 11-17-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-9

LOGGED BY BARNUM GROUND ELEV. 8360 PROJECT

LOCATION WEATHER cool, cloudy

CIRCULATION WITH: AIR FROM TO . WATER FROM TO

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	0	5	5	Kc	Alluvium.	
	5	15	10	Siltstone	light brown to tan, well consolidated.	
	15	20	5	Siltstone	as above, with sandstone, white to light brown fine grained, rounded, sorted, poorly consolidated.	
	20	30	10	Sandstone	as above.	
	30	35	5	Sandstone	as above with slight increase in tan to light brown grains.	
	35	140	105	Sandstone	as above with light brown color.	
	140	150	10	Sandstone	as above with some light purple color.	
	150	160	10	Sandstone	as above with purple color decreasing, light tan color increasing.	
	160	215	55	Sandstone	as above, with to light brown as above.	
	215	220	5	Sandstone	as above, light brown color predominant, coarser grain size.	
	220	230	10	Sandstone	as above, carbonaceous fragments, minor siltstone, light brown.	
	230	240	10	KBH	No recovery.	
	240	245	5	Siltstone	light gray, hard, claystone, shaley, gray, silty, sandstone, light brown, hard, very fine grained, carbonaceous fragments.	
	245	290	45	Siltstone	as above with sandstone as above decreasing.	
	290	300	10	Siltstone	as above with coaly fragments, more than 10% of cuttings.	
	300	315	15	Siltstone	as above with coaly fragments.	
	315	395	80	Siltstone	as above with carbonaceous shale, slightly silty, and minor coaly fragments.	
	395	400	5	NR	No recovery.	
	400	405	5	NR	No recovery.	
	405	415	10	Siltstone Claystone	as above, with sandstone, light brown, very fine grained.	
	415	430	15	Siltstone Claystone	as above, sandstone as above decreasing.	
	430	435	5	Siltstone Claystone	as above, minor sandstone as above, carbonaceous shale as above increas to more than 10% of cuttings.	
	435	445	10	Siltstone Claystone	as above reduced carbonaceous shale.	
	445	455	10	Siltstone Claystone	as aboved increased carbonaceous shale.	
	455	530	75	Siltstone	as above with sandstone, light tan to brown, fine grained, well consolidated more than 10% cuttings.	
	530	540	10	Siltstone	as above with sandstone as above decreasing.	
	540	550	10	Siltstone Claystone	as above.	
	550	600	50	Siltstone Claystone	as above with minor carbonaceous shale.	
	600	755	155	Siltstone Claystone	as above, siltstone and claystone interbedded.	
	755	760	5	Siltstone Claystone	as above with minor coal fragments.	
	760	800	40	Siltstone Claystone	as above coal fragments and gray claystone decreasing.	
	800	927	127	Siltstone Claystone	as above, slightly less consolidated.	

DATE 11-17-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-9

LOGGED BY BARNUM GROUND ELEV. 8360 PROJECT

LOCATION WEATHER Cool, cloudy

CIRCULATION WITH: AIR FROM 0 TO 220 , ~~XXXX~~ FROM 220 TO T.D.

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	927	929.60	2.6	Siltstone	light gray, with clay laminae, medium gray, shaley.	
	929.60	929.70	0.1	Claystone	medium gray, silty, shaley.	
	929.70	931.20	1.5	Siltstone	as above with small (1mm) coal streak.	
	931.20	931.50	0.3	Siltstone	as above - lenticular coal laminae.	
	931.50	932.8	1.3	Siltstone	as above no coal.	
	932.8	934.2	1.4	Siltstone	as above fractured, red iron stains on both sides of fracture, calcite crystals inside	
					fracture opening. other minor fractures.	
	934.2	937	2.8	Siltstone	as above with plant follils noted.	
	937	937.5	.50		Lost	
	937.5	941.1	3.6	Siltstone	light gray, as above, claystone, medium gray, silty shaley, some woody material noted. Pyrite also	
					noted in a fracture plane.	
	941.1	941.9	0.8	Carb. Shale	badly broken.	
	941.9	943.1	1.2	Siltstone Claystone	interbedded as above, fractured.	
	943.1	945.85	2.75	Siltstone	light gray as above.	
	945.85	945.9	0.05	Coal	vitrain, black, fractured and cleated, very good coal.	
	945.9	946.25	0.35	Siltstone	as above - slightly darker with carbonaceous streaks.	
	947.05	947.07	0.025	Coal	vitrain, seamlett as above.	
	947.07	947.17	0.1	Carb. Shale	as above.	
	947.17	947.95	0.78	Siltstone	light to medium gray as above.	
	947.95	948	0.05		Lost.	
	948	949.1	1.1	Siltstone	light to medium gray, claystone, medium gray, silty, shaley interbedded.	
	949.1	949.9	0.8	Sandstone	light gray, fine grained, rounded, well consolidated.	
	949.9	950	0.1	Sandstone	as above with carbonaceous laminae.	
	950	952.8	2.8	Sandstone	as above without laminae.	
	952.8	954.7	1.9	Coal	primarily bright attrital. 2 bands of dull attrital @ 0.15' thick. minor resin.	
	954.7	956.6	1.9	Coal	bright attrital, slightly resinous, pyrite noted, minor vitrain, fractured.	
	956.6	957.9	1.3	Coal	bright attrital, highly resinous, cleated with calcite on cleat. minor pyrite.	
	957.9	958	0.1	NR	No recovery.	
	958	958.7	0.7	Coal	bright attrital, some vitrain, predominant resin band, cleat, fractured.	
	958.7	960.7	2.0	Coal	bright attrital with dull bands minor resin, calcite on cleat, unfractured.	
	960.7	962.5	1.8	Coal	as above, increasing calcite in fracture planes, some dull coal, minor resin, pyrited noted.	
	962.5	962.7	0.2	Claystone	silty, dark gray to black, shaley, minor coal fragments, parting?	
	962.7	963.7	1.0	Coal	dull attrital, minor vitrain, some calcite and resin noted.	

DATE 11-17-77 COASTAL STATES ENERGY CO. HOLE NO. US-77-9

LOGGED BY BARNUM GROUND ELEV. 8360 PROJECT

LOCATION WEATHER

CIRCULATION WITH: AIR FROM 0 TO 220 , WATER FROM TO

CORE BOX NO.	DEPTH FROM	DEPTH TO	THICKNESS OF STRATUM	FORMATION (KIND ROCK)	DESCRIPTION & REMARKS	STRIP LOG
	963.7	965.9	2.2	Coal	bright attrital as above.	
	965.9	966.9	1.0	Claystone	dark gray to black, carbonaceous, silty, shaley, minor vitrain bands. "trash"	
	966.9	968	1.1	Siltstone	light gray as above.	
	968	972.2	4.2	Siltstone	light gray, hard, minor carbonaceous laminae.	
	972.2	972.4	0.2	Claystone	medium gray, slightly carbonaceous, very slightly silty.	
	972.4	978.4	6.0	Siltstone	light gray, as above, pryite noted.	
	978.4	978.5	0.1	NR	No recovery	
	978.5	985	6.5	NR	No recovery.	
	985	990	5	Sandstone	light gray, very fine grained, carbonaceous fragments, siltstone, medium gray, very minor coal.	
	990	995	5	Sandstone	as above, siltstone increasing - coaly.	
	995	1000	5	Sandstone	as above - individual grains of quartz noted, fine grained, well rounded, some frosted.	
	1000	1005	5	Ksp	as above, sandstone as above, getting more carbonaceous, pyrite noted.	
	1005	1010	5	Ksp	as above.	
	1010	1015	5	Ksp	as above.	
	1015	1035	20	Ksp	as above increase in white sandstone, calcareous very well rounded, increase in pyrite.	
	1035	1040	5	Ksp	as above pyrite increasing.	
	1040	1045	5	Ksp	as above pyrite still increasing white sandstone, as above increasing.	
	1045	1060	15	Ksp	as above.	
	1060	1065	5	Ksp	as above white sandstone, with pyrite increasing highly calcareous.	
	1065	1070	5	Ksp	as above increasing carbonaceous shale.	
	1070	1075	5	Ksp	as above increasing carbonaceous shale, non calcareous.	

Coastal 833 (9/71)

TYPE OF DESCRIPTION	
CUTTINGS	
CORE	X
OUTCROP	

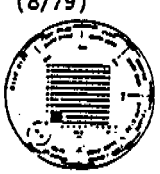
CO. STAL STATES ENERGY CO.

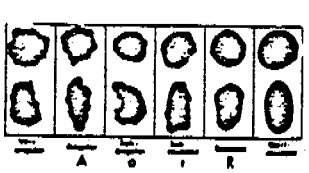
Muddy Seam

HOLE NO. US-79-9

BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG 1"=	MEDIAN GRAIN SIZE V F M C V	ROUNDNESS A g r R	SORTING P M W	DESCRIPTION & REMARKS
3	A	730.0	730.9	0.90'					sandstone, light to dark gray, very fine grained to silty, dark gray is carbonaceous material, banded.
		730.90	731.52	0.62'					coal, midlustrous, attrital, abundant resin.
	B	731.52	731.96	0.44'					coal, dull interbanded with bright, vitrain 2 mm.
		731.96	732.36	0.40'					coal, moderately dull, attrital.
	C	732.36	732.82	0.46'					siltstone, dark gray, carbonaceous, vitrain bands to 2 mm, abundant pyrite.
		732.82	733.26	0.44'					claystone, dark gray, carbonaceous.
		733.26	735.64	2.38'					sandstone, light gray, calcareous, very fine grained to silty, carbonaceous specks and bands.
		735.64	736.62	0.98'					sandstone, light gray with dark carbonaceous bands, indications of cross bedding,
	D								calcareous.
		736.62	736.77	0.15'					siltstone, light to dark gray, thin vitrain band (1 mm), non-calcareous, slightly sandy
		736.77	737.23	0.46'					coal, midlustrous, attrital, abundant resin.
	E	737.23	737.92	0.69'					coal, moderately dull, attrital, occasional vitrain bands to 2mm., considerable resin.
		737.92	738.34	0.42'					coal, moderately bright attrital, abundant resin, calcite on cleat.
		738.34	738.47	0.13'					coal, dull attrital.
	F	738.47	739.08						coal, dull interbanded with bright, minor resin, moderate pyrite, vitrain bands to 3mm.
		739.08	740.0	0.92'					coal, moderately dull attrital, hard, occasional vitrain bands to 3mm, abundant pyrite.

C - 1857 (8/79)





HOLE NO. ____

mm 1 2 3 4 5 6 7 8

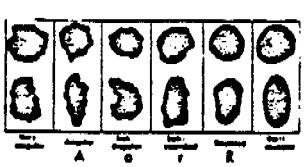
COASTAL STATES ENERGY CO.

TYPE OF DESCRIPTION	
CUTTINGS	
CORE	X
OUTCROP	

HOLE NO. US-79-9
PAGE 2 OF 2

BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG	MEDIAN GRAIN SIZE	ROUNDNESS	SORTING	DESCRIPTION & REMARKS
		740.00	740.66	0.66'					coal, dull interbedded with bright, abundant resin, moderate pyrite, cleat not well developed.
4	G	740.66	741.35	0.59'					coal, moderately dull attrital, moderate pyrite.
	H	741.35	741.73	0.38'					siltstone, dark gray, carbonaceous, thin vitrain stringers, pyrite in top ½ inch.

C - 1857 (8/79)



PAGE ____ OF ____

HOLE NO. ____

COASTAL STATES ENERGY CO.

TYPE OF DESCRIPTION	
CUTTINGS	X
CORE	
OUTCROP	

HOLE NO. US-79-9
PAGE 1 OF 15

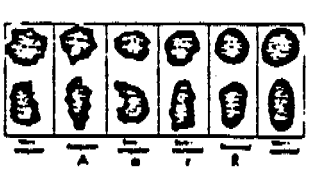
BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG Ft. 20	MEDIAN GRAIN SIZE V S F M C V	ROUNDNESS A sr R	SORTING P M W	DESCRIPTION & REMARKS
		0	10	10	0				Sandstone: weathered, soil.
		10	45	35	20 – 40				Sandstone: white, fine to medium grained, sorted, clean, subrounded to rounded, very friable, unconsolidated sample, non-calcareous, interlayered with minor claystone: chalky, also contains minor rose quartz, medium grained in sample. At 45' sand contains more abundant rose quarts grains making sample as a whole more tan in color.
		45	75	30	60				At 50' sandstone: light buff to tan, containing fine to coarse grain (minor).
		75	80	5	80				75-80 NO SAMPLE (circulation was not lost)
		80	125	45	100 – 120				Sandstone: light buff tan, unconsolidated, very friable, medium grained, subrounded to rounded, well sorted, non-calcareous.
		125	135	10					At 120-125 sandstone color is more orange tan. Sandstone: tan, unconsolidated, very friable, medium grained, subrounded to rounded, well sorted, non-calcareous, clean, interlayered with claystone (numerous to abundant), green to brownish-grey, soft, waxy, non-calcareous.
		135	168	33	140 – 160				Sandstone: buff tan, unconsolidated sample, very friable, fine to medium grained, well sorted, clean, non-calcareous, subrounded to rounded; with depth sandstone becomes more fine.
		168	185	17	180				Thin interbedded: Sandstone: medium grey, fine to medium grained, moderate sorting, subrounded, clean quartz grn Siltstone: medium grey, highly calcareous, fissile, firm, and Claystone: medium grey, highly calc, slightly carbonaceous, hard, chunky.
		185	190	5					Sandstone: light to medium grey, very fine to medium grained, poor sorting, subrounded, highly calc, clean, unconsolidated, except minor very fine grained fissile stringers.
		190	200	10	200				Silty claystone: medium to dark grey, with frequent floating rounded clear quartz grains, highly calcareous, slightly carbonaceous, fissile, brittle.

TYPE OF DESCRIPTION

CUTTINGS	X
CORE	
OUTCROP	

COAST. _ STATES ENERGY CO.

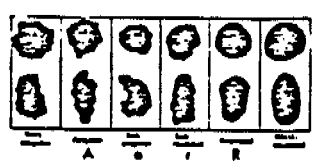
SMPL. NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG 1" = 20'	MEDIAN GRAIN SIZE V S F M C V	ROUNDNESS A Sr R	SORTING P M W	DESCRIPTION & REMARKS
	200	220	20	200				Silty claystone: medium grey, highly calcareous, platey to fissile, firm, and Sandstone: yellow to brown, very fine grained, moderate sorting, highly calcareous, predominantly unconsolidated.
	220	235	15	220				Sandy siltstone: medium to dark grey, highly calcareous, carbonaceous, fissile, with abundant, floating, clear, rounded, fine to medium grained quartz grains.
	235	245	10	240				Silty claystone: medium to dark grey, highly calcareous, carbonaceous, platey, hard.
	245	250	5					Siltstone: med. grey, highly calc., platey, firm.
	250	265	15	260				Sandstone: light grey, fine grained, moderate sorting, subangular to subrounded, highly calcareous, clear, clean quartz with minor silt particles yielding light salt & pepper color.
	265	315	50	280 300				Thin interbeds: Siltstone: light to medium grey, highly carbonaceous, platey, firm, and Claystone: medium to dark grey, highly calcareous, carbonaceous, chunky, hard.
	NO	SAMPLE						
	315	325	10	320				Siltstone: dark grey, highly calcareous, carbonaceous, platey, firm, and
	325	335	10					Sandstone: light yellow to brown, very fine grained to silty, moderate sorting, highly calcareous, fissile.
	335	350	15	340				Claystone: dark grey, highly calcareous, carbonaceous, stems, platey, hard. Sandy siltstone: light-medium grey, calcareous, very hard, massive, with minor fine grained quartz and
	350	360	10					Sandstone: light yellow to brown, very fine grained, moderate sorting, highly calc.
	360	390	30	360 380				Claystone: dark grey, highly calc., carb., irregular fracture, firm. Sandstone: light tan, fine to medium grained, moderate sorting, rounded, highly calcareous, minor fine grained carbonaceous particles, abundant yellow calcareous cement.
								Coal seam: intermediate bright.
	390	410	20	400				Siltstone: medium grey, highly calcareous, platey, hard.



COASTAL STATES ENERGY CO.

TYPE OF DESCRIPTION	
CUTTINGS	X
CORE	
OUTCROP	

BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG Ft. 20	MEDIAN GRAIN SIZE V S F M C V	ROUNDNESS A or R	SORTING P M W	DESCRIPTION & REMARKS
		400	410	10	400				Siltstone: medium grey, highly calc., platey, hard.
		410	422	12	420				Sandstone: light to medium grey, very fine grained, well sorted, subangular to sub-rounded, highly calcareous, fissile.
		422	467	45	440 460				Sandstone: light brown, fine to medium grained, well sorted, rounded, highly calcareous, unconsolidated, abundant yellow calcareous cement, clean, clear quartz.
		467	495	28	480				Coal seam. Thinly interbedded: Siltstone: medium to dark grey, highly calc., carbonaceous, platey, hard, and Sandy siltstone: light to medium grey, highly calcareous, abundant very fine to fine grained quartz, friable and firm.
		495	515	20	500				Silty claystone: medium to dark grey, highly calcareous, carbonaceous, fissile, hard.
		515	545	10	520 540				Thinly interbedded: Claystone: medium to dark grey, highly calcareous, carbonaceous, fissile, hard, and Sandstone: light to medium grey, very fine grained, well sorted, highly calcareous, firm.
		545	555	10					Sandstone: light grey, very fine to fine grained, moderate sorting, subrounded to rounded, calcareous, numerous carbonaceous stringers, firm.
		555	590	35	560 580				Thinly interbedded: Sandstone: medium grey, very fine to fine grained, moderate sorting, subrounded, calcareous, firm to hard, and Claystone: dark grey, highly calcareous, carbonaceous, frequent carbonaceous partings, traces of coal are common.
		590	595	5					Sandstone: light grey, very fine to fine grained, moderate sorting, subrounded to rounded, with frequent coal partings, soft.
		595	600	5	600				Claystone: medium to dark grey, highly calcareous, fissile, hard.



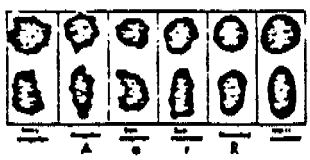
COASTAL STATES ENERGY CO.

TYPE OF DESCRIPTION

CUTTINGS	X
CORE	
OUTCROP	

HOLE NO. US-79-9

BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG	MEDIAN GRAIN SIZE	ROUNDNESS	SORTING	DESCRIPTION & REMARKS
		600	615	15	600				Claystone: medium to dark grey, highly calcareous, carbonaceous, fissile, hard.
		615	630	15	620				Sandstone: very fine to fine grained, scarce silt, moderate sorting, subrounded to rounded, calcareous, carbonaceous stringers common, friable to firm, traces coal.
		630	680	50	640 660				Thinly interbedded: Claystone: light to dark grey, highly calcareous, carbonaceous, fissile, brittle, and Sandstone: light to medium grey, very fine to fine grained, moderate sorting, subrounded, calcareous, numerous carbonaceous stringers, friable to firm.
		680	695	15	680				Sandstone: light grey, fine grained, well sorted, rounded, highly calcareous, numerous coal particles (predominantly medium grained), clean, clear quartz.
		695	720	25	700 720				Carbonaceous claystone: dark gray to black, highly calcareous, platey, firm, traces of coal are common.



TYPE OF DESCRIPTION

CUTTINGS	
CORE #1	X
OUTCROP	

COASTAL STATES ENERGY CO.

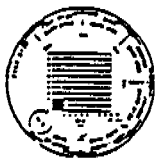
Core run: 720' to 730'

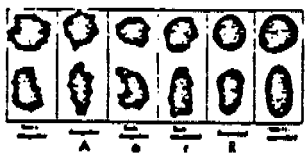
Total recovery: 9.89'

HOLE NO. US-79-9

PAGE 5 OF 15

BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG ft.	MEDIAN GRAIN SIZE (V S F M C)	ROUNDNESS (A S R)	SORTING (P M W)	DESCRIPTION & REMARKS
		720	720.45		720				Claystone: medium to dark grey, hard, slightly massive, interlayered with numerous small carbonaceous partings, irregular contact with next lithology unit.
		720.45	721.46		721				Claystone: dark grey, very hard, calcareous, massive, silty, interlayered with numerous scattered coaly partings and minor thin coal bands, irregular contact on both ends of interval.
		721.46	723.49		722 723				Claystone: medium to dark grey, hard, calcareous, massive, interlayered with numerous small coaly partings and carbonized wood fragments, irregular, convoluted, contact at both ends of lithology unit (interval).
		723.49	724.54		724				Sandstone: light grey, very fine grained to silty, sorted, subangular, calcareous, hard, vitreous luster, interlayered with numerous to abundant carbonaceous partings, minor irregular to convoluted bedding produced by carbonaceous layering.
		724.54	726.74		725 726				Claystone: dark grey, very hard, silty, calcareous, interlayered irregularly with light grey claystone: carbonaceous, and also interlayered with abundant coaly partings and carbonized wood and leaf fragments and imprints, minor bioturbation at top and bottom of interval; minor to numerous irregular convoluted bedding.
		726.74	727.38		727				Coal: intermediate dull, brown to black, dirty, shaley, hard, brittle, sparce, thin banding, minor calcite coatings on cleat surfaces, interlayered with numerous to abundant small resin inclusions.
		727.38	727.78						Sandstone: light to tannish grey, hard, carbonaceous, very fine to silty, sorted, subangular, calcareous, interlayered with numerous scattered coaly partings and carbonized wood fragments; also bioturbated.
		727.78	728.14		728				Sandstone: dark grey, hard, calcareous, very fine grained, silty, sorted, subrounded, very carbonaceous, bioturbated, interlayered with numerous scattered coaly partings.
		728.14	728.79						Sandstone: medium grey, hard, calcareous, very fine grained to silty, sorted, subrounded, bioturbated with convoluted bedding (minor), interlayered with coaly partings (minor).
		728.79	729.31		729				Siltstone: light grey, sandy, hard, frosty luster, calcareous, containing sparce small carbonaceous partings.
		729.31	729.85						Siltstone: light to medium grey, sandy, hard, carbonaceous, calcareous, interlayered with numerous to abundant carbonaceous partings, minor irregular bedding.
					730				





mm 1 2 3 4 5 6 7 8

TYPE OF DESCRIPTION

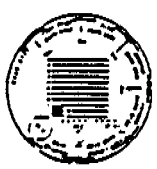
CUTTINGS	
CORE #2	X
OUTCROP	

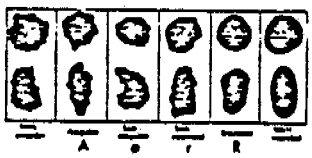
COASTAL STATES ENERGY CO.

Core interval: 730-740
Total recovery: 730-740

HOLE NO. US-79-9
PAGE 6 OF 15

BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG ft. 1	MEDIAN GRAIN SIZE V S F M C V	ROUNDNESS A g r R	SORTING P M W	DESCRIPTION & REMARKS
2	2	730	730.93		730				Siltstone: light to dark grey, hard, calcareous, slightly brittle, interlayered with abundant carbonaceous partings and interlayered with dark grey claystone producing irregular bedding very slightly bioturbated.
3		730.93	732.68		731 / 732				Coal: black, intermediate dull, hard, interlayered with numerous small calcite coatings on fracture faces and abundant resin inclusions; good conchoidal fracture, generally moderately thin banding.
		732.68	733.52		733				Claystone: dark brown to black, hard, shaley, non-calcareous, very carbonaceous, interlayered with several coaly partings and sparce, medium coal bands.
		733.52	734.23		734				Siltstone: light to medium tan-grey, hard, calcareous, carbonaceous, top 1" is very carbonaceous, interlayered with abundant to numerous coaly partings and with several carbonized root casts.
		734.23	734.29						Siltstone: medium grey, hard, non-calcareous, very carbonaceous, with root casts (carbonized) with minor bioturbation.
		734.29	734.80						Siltstone: light tan-grey, hard, calcareous, carbonaceous, interlayered with numerous to scarce carbonaceous partings.
		734.80	735.60		735				Claystone: medium tan-grey, hard, slightly calcareous, carbonaceous, slightly silty, irregular bedding, minor bioturbation.
		735.60	736.57		736				Siltstone: light grey, hard, calcareous, interlayered with dark grey, siltstone, hard, producing irregular bedding.
		736.57	736.80						Claystone: dark grey, hard, non-calcareous, carbonaceous, containing numerous coaly partings.
		736.80	740		737 / 738 / 739 / 740				Coal: black, intermediate bright, hard, moderately thin to medium banded, interlayered with abundant resin inclusions.





COASTAL STATES ENERGY CO.

TYPE OF DESCRIPTION	
CUTTINGS	
CORE #3	X
OUTCROP	

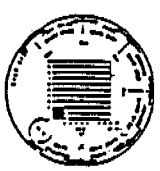
Core interval: 740'-750'

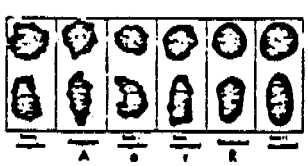
Total Recovery: 10.2'

HOLE NO. US-79-9

PAGE 7 OF 15

BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG	MEDIAN GRAIN SIZE	BOUNDNESS	SORTING	DESCRIPTION & REMARKS
4		740	741.35		740				Coal: intermediate bright, black, moderately hard, brittle, fair conchoidal fracture, interlayered with abundant resin inclusions and with numerous calcite coatings on fracture planes.
4					741				
		741.35	741.91						Claystone: dark grey, silty, hard, brittle, very carbonaceous, non-calcareous, slightly fissile, interlayered with numerous coaly partings.
MISSIN		741.91	742.78		742				Claystone: light grey, hard, silty, carbonaceous calcareous, some bioturbation near top of interval, interlayered with claystone: dark grey, hard, silty, producing irregular to convoluted bedding and interlayered with numerous scattered carbonaceous partings.
		742.78	743.29		743				Siltstone: medium to dark grey, hard, calcareous, carbonaceous, interlayered with small scattered minor to several carbonaceous partings.
5		743.29	743.68						Claystone: dark grey to tan, carbonaceous, hard, slightly fissile, non-calcareous, coaly, containing coaly partings.
		743.68	745.22		744				Claystone: light grey, hard, silty, calcareous, interlayered with abundant, small carbonaceous partings and particles.
					745				
		745.22	745.34						Claystone: dark grey, hard, slightly calcareous, carbonaceous, produces irregular bedding between claystone intervals above and below this interval.
					746				
					747				
		745.34	750.0		748				Siltstone: light grey, hard, calcareous, interlayered with scattered very fine grain size carbonaceous particles; slightly massive with intermittant scattered bioturbation.
					749				
					750				

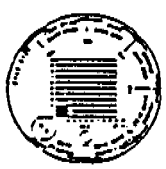


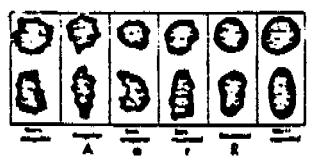


COASTAL STATES ENERGY CO.

TYPE OF DESCRIPTION	
CUTTINGS	X
CORE	
OUTCROP	

BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG Pg. 20	MEDIAN GRAIN SIZE V S F M C V	ROUNDNESS A S R	SORTING P M W	DESCRIPTION & REMARKS
		Interval Described on Page 4			700				
		Cored Interval			720				
					740				
		750	775	25	760				Coal: 3' thick - intermediate bright. Siltstone: light grey, calcareous, platey, hard, with scattered very fine grained, carbonaceous particles.
		775	800	25	780				Silty sandstone: light grey, very fine to fine grained in a silty matrix, poor sorting, subrounded to rounded, highly calcareous, with very fine grained carbonaceous particles and carbonaceous stringers abundant, platey, friable.
		800	820	20	800				Claystone: medium grey, highly calcareous, fissile, traces of coal stringers, brittle, scarce floating fine grained rounded quartz grains.
		Cored Interval			820				





COASTAL STATES ENERGY CO.

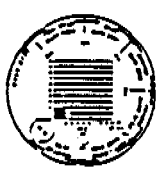
TYPE OF DESCRIPTION	
CUTTINGS	
CORE #4B	X
OUTCROP	

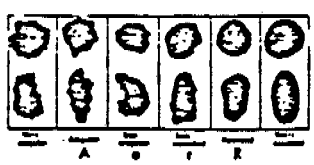
Total Recovery: 9.9'

HOLE NO. US-79-9

PAGE 9 OF 15

BOX NO.	SMPL NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG	MEDIAN GRAIN SIZE	ROUNDNESS	SORTING	DESCRIPTION & REMARKS
									Top of core 824'
5B					820				
									Siltstone: medium gray, calcareous, micro mica, scattered very fine grained carbonaceous particles, massive, hard, scarce carbonaceous stringers, frequent bioturbation (trace glauconitic), and trace root casts.
					821				
					822				
		820	825.1	5.1	823				Abundant coal wood fragments.
					824				
					825				
		825.1	825.75	.65					Carbonaceous claystone: dark grey, non-calcareous waxey, irregular bedding, firm to crumbly, coal partings.
		825.75	826.1	.35	826				Coal: bright, dominant, moderate bands, resin. Carbonaceous claystone: dark grey to black, interbedded with coal in gradational contact, non-calcareous, highly fissile, soft.
		826.1	826.4	.3					
		826.4	827.4	1.0	827				Claystone: dark grey, carbonaceous, slightly calcareous, hard, abundant, bright, coal stringers and angular inclusions, slight bioturbation.
5B 6B		827.4	828.7	1.3	828				Claystone: highly carbonaceous, abundant coal partings and stringers, non-calcareous, firm, frequent coal stringers up to 3mm, irregular bedding, traces bioturbation.
		828.7	829.9	1.2	829				Siltstone: medium to dark grey, calcareous, carbonaceous, abundant coal stringers and scattered angular coal inclusions, root casts, bioturbation.
					830				





TYPE OF DESCRIPTION	
CUTTINGS	
CORE #5B	X
OUTCROP	

COASTAL STATES ENERGY CO.

Total Recovery: 9.7'

BOX NO.	SMPL. NO.	DEPTH FROM	DEPTH TO	THICKNESS	STRIP LOG	MEDIAN GRAIN SIZE	ROUNDNESS	SORTING	DESCRIPTION & REMARKS
					829.9				Top of core 829.9'
					830.9				Entire core is thinly interbedded:
					831.9				Siltstone: light grey, calcareous, hard, traces of angular carbonaceous inclusions.
					832.9				and
					833.9				
		829.9	839.6	9.7	834.9				Sandstone: light grey, very fine grained to silty, well sorted, numerous small low-angle cross beds, calcareous, hard.
6B					835.9				
7B					836.9				Both the sandstone and siltstone are irregularly bedded, with abundant thin medium grey partings, some of which are coaly, frequent bioturbation. There is one 3mm coal seam as illustrated. The sandstone predominates in the upper part of the core, whereas the silt predominates below.
					837.9				
					838.9				
					839.9