

John Swisher #4

WATER QUALITY AND HYDROLOGIC STUDY
IN VICINITY OF
HUNTINGTON CREEK MINE NO. 4 AND LITTLE BEAR SPRING

Prepared for
SWISHER COAL COMPANY

August 1977

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CONTRACT RESPONSIBILITY

The study described in the following report was conducted for the purpose of determining the potential impact on ground water resulting from mining operations of Swisher Coal Company with recommendations for mitigating any potentially serious ground water impacts.

PROBLEM

Swisher Coal Company plans to expand their mining activity at Huntington Creek Mine No. 4 and Mill Fork Canyon, which is approximately twelve miles northwest of Huntington, Utah up Huntington Canyon. The expansion would be to the northwest in the vicinity of Little Bear Spring in Little Bear Canyon. Water from the spring is being used near Huntington for a domestic water supply. Concern has been expressed that extension of coal mining activity toward Little Bear Spring might intercept part or all of the flow that is now appearing at the spring and also that the quality of the spring water might be deteriorated.

OBJECTIVE OF THE STUDY

Vaughn Hansen Associates was requested to study the water quality and the hydrology in the vicinity of the intended activity. Two objectives were to guide the endeavor: (1) to determine the probable impact on Little Bear Spring of expanded mining and (2) to obtain background information pertaining to water quality for a reference to assess the cause of any changes in future quantity and quality of water at Little Bear Spring.

COORDINATION WITH FOREST SERVICE

Leases essential to the intended expansion of the mine are being requested from the U. S. Forest Service. This Federal Agency is concerned, therefore, about the probable adverse impact from the mining.

Several meetings have been held with staff from the Price office of the Forest Service to discuss the problem, to outline data acquisition procedures, and to discuss observations.

Forest Service personnel were to make geological observations in the area. Vaughn Hansen Associates was to gather and have analyzed water quality samples and to study the hydrology and fracturing patterns that may be related to water movement and water yield.

PERIOD OF FIELD STUDY

Field studies were conducted from November 8th through the 12th, 1976. These observations were after a dry fall and before the winter storms commenced. Data from water samples would, in general, reflect a base flow condition. In addition, samples were taken and field observations made during the period of May 31st through June 4th, 1977. This period of observation and sampling was preceded by an unusually wet May. Some ice was still melting in the deeper sections of Little Bear Creek. However, the snow cover had melted.

Little Bear Canyon, a tributary to Huntington Creek, is situated between Crandall Canyon and Mill Fork. (See Figure 1). It is located primarily in sections 8 and 9 of T.16S., R.7E. Because of the abrupt drainage divide created by the incision of Crandall Canyon and Mill Fork, Little Bear Canyon has been left quite isolated from surrounding canyons by past geologic events. Its average change in elevation of 1600 feet per mile compares with 660 feet per mile in Crandall Canyon and 590 feet per mile in Mill Fork. This rate of change difference and degree of isolation is especially striking when seen from aerial photos and from figure 1, which shows that lines of equal elevation occur in Little Bear Canyon at a point much further east than in the surrounding canyons. Ridges are sharp and the sides of the canyons surrounding Little Bear Canyon are steep. Drainage into Crandall Canyon and into Mill Fork Canyon has eroded to a common sharp ridge only one-half of a mile west of the head of Little Bear Canyon. This erosional pattern essentially intercepts any shallow ground water flow before it can reach Little Bear Canyon.

The drainage basin of Little Bear Canyon, covering approximately 755 acres, exposes six different geologic types, primarily cretaceous in age (See Figure 2): The North Horn Formation (a fluvial sandstone and mudstone), the Price River Formation (fluvial and marine sandstone and mudstone), the Castle Gate Sandstone (deltaic in origin), the Blackhawk Formation (sandstone, mudstone, shale, and coal), the Star Point Sandstone (deltaic and beach deposits), and the Masuk Shale member of the Mancos

FIGURE 1: ELEVATION CONTOUR MAP OF LITTLE BEAR AND NEIGHBORING CANYONS

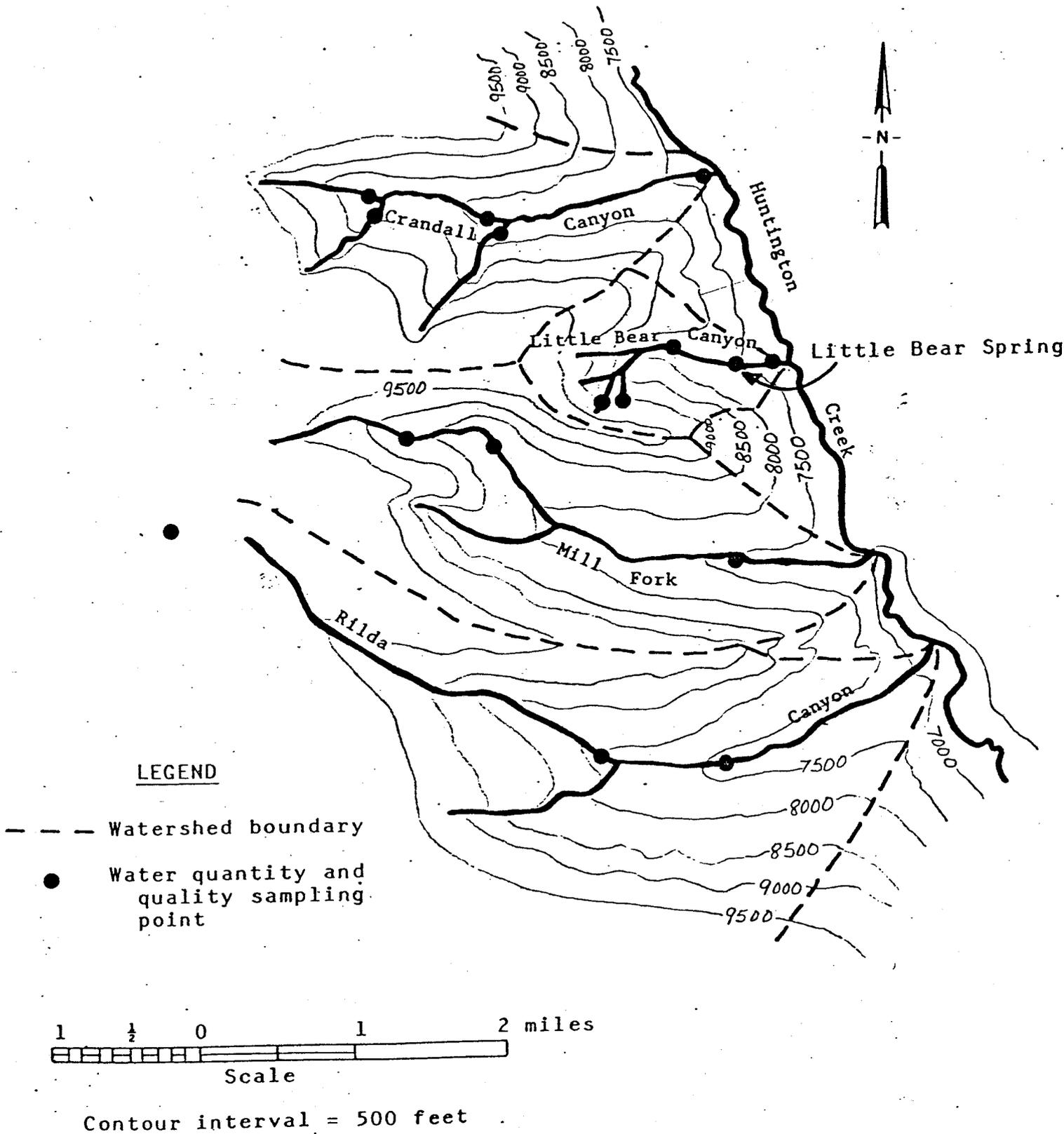
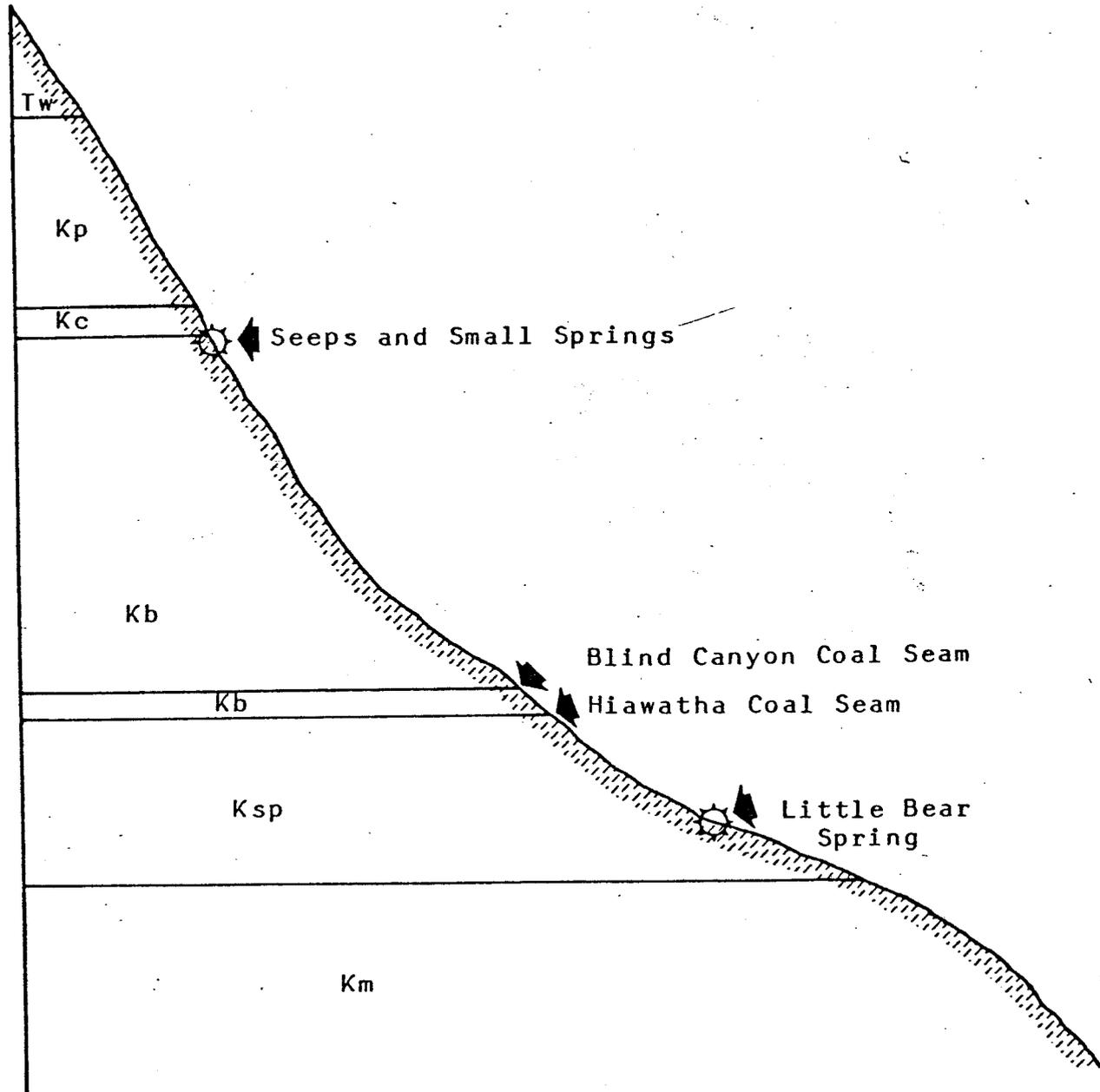


FIGURE 2: CROSS-SECTION OF LITTLE BEAR CANYON FROM WESTERN MOST POINT TO MOUTH SHOWING GEOLOGICAL TYPES, SEEPS, AND SPRINGS.



LEGEND

- Tw = North Horn Formation
- Kp = Price River Formation
- Kc = Castle Gate Sandstone
- Kb = Blackhawk Formation
- Ksp = Star Point Sandstone
- Km = Mancos Shale (Masuk Member)

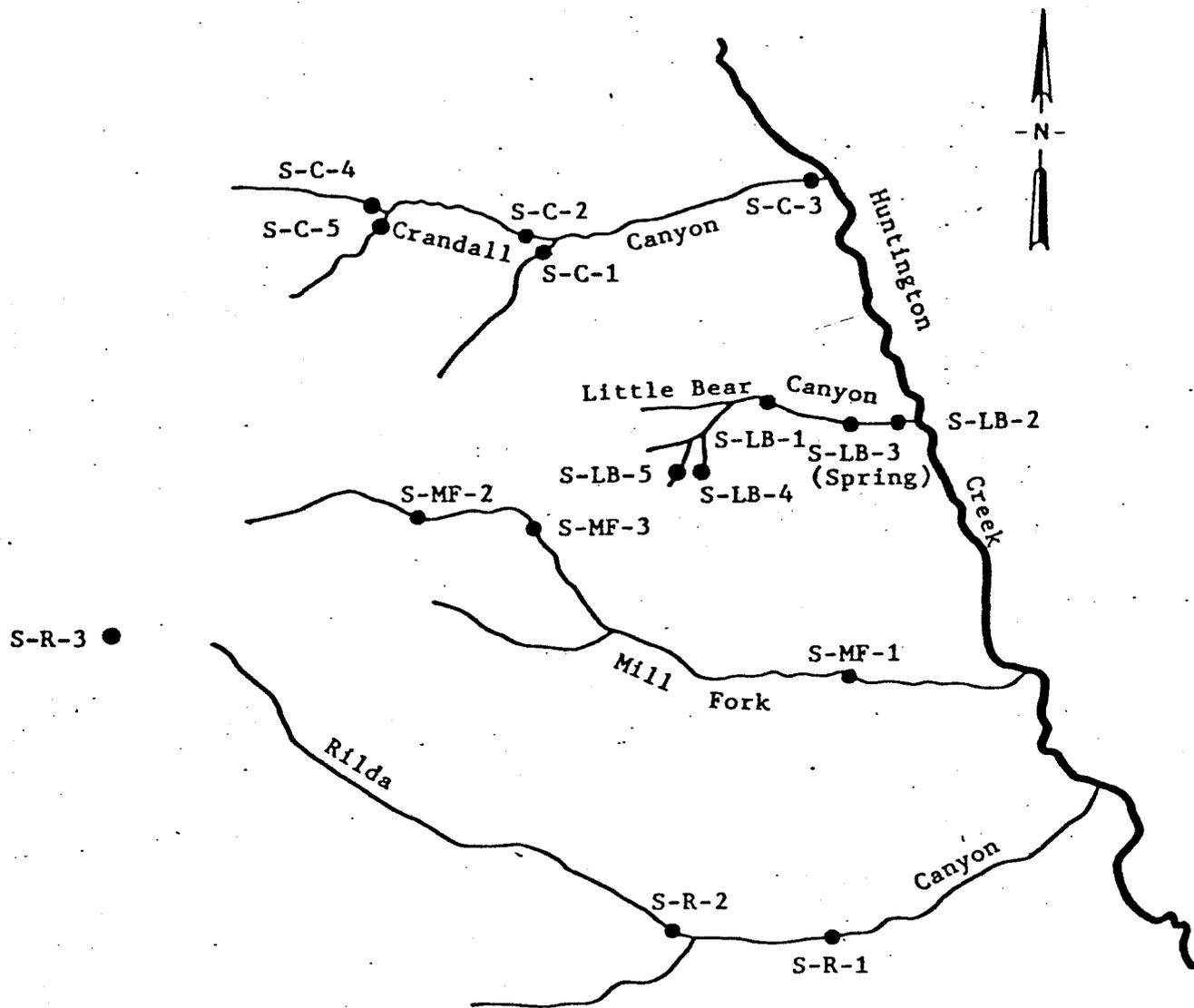
shale (marine in origin). The Hiawatha and Blind Canyon Coal Seams, of interest in this study, appear at or near the bottom of the Blackhawk Formation. Springs surface in the upper reaches of the canyon near the Castle Gate Sandstone - Blackhawk Formation boundary while Little Bear Spring issues from the Star Point Sandstone. The predominate faulting pattern according to information supplied by the U.S. Forest Service, is from the northwest to the southeast accompanied by additional faults in a northeast southwest direction and a set of faults orthogonal to the former set extending in a southwest - northeast direction.

Jeppson et al. (1968) indicate a normal annual precipitation of approximately 20 inches and a potential evapotranspiration of 18 to 21 inches per year in and near Little Bear Canyon. A comparison of the area with the headwaters of the nearby Price River Basin (as reported by Mundorff, 1972) leads one to believe that most of this precipitation falls as snow during the winter months. The steepness of Little Bear Canyon suggests that only a small portion of the summer precipitation infiltrates and appears later as spring flow. The bulk presumably runs off as surface flow.

METHODS OF DATA COLLECTION

A total of sixteen water quantity and quality sampling stations were selected in Crandall, Little Bear, Mill Fork, and Rilda Canyons (see Figure 3). A more complete description of the

FIGURE 3: WATER QUANTITY AND QUALITY SAMPLING STATIONS
NEAR HUNTINGTON CREEK MINE NO. 4



DESCRIPTION OF WATER QUANTITY AND QUALITY SAMPLING
STATIONS NEAR HUNTINGTON CREEK MINE NO. 4

<u>Station Code</u>	<u>Location*</u>	<u>Description</u>
S-C-1	(D-16-7) 6 dab	Crandall Canyon, 100 yards above confluence with West Branch.
S-C-2	(D-16-7) 6 dba	Crandall Canyon, 1.6 miles above highway, 200 yards above confluence with East Branch.
S-C-3	(D-16-7) 4 bbd	Crandall Canyon Creek above confluence with Huntington Creek.
S-C-4	(D-16-6) 1 acb	2.5 miles up Crandall Canyon on Right Fork of East Branch, beyond fence.
S-C-5	(D-16-6) 1 acb	2.5 miles up Crandall Canyon on Left Fork of East Branch, beyond fence.
S-LB-1	(D-16-7) 8 daa	Little Bear Creek, 2400 feet north and 500 feet west of southeast corner of Section 8.
S-LB-2	(D-16-7) 9dac	Little Bear Creek, above confluence with Huntington Creek.
S-LB-3	(D-16-7) 9cad	Little Bear Spring, 0.3 mile up Little Bear Canyon.
S-LB-4	(D-16-7) 8dbd	Draw flowing north-west from hillside, below last fork, Little Bear Canyon.
S-LB-5	(D-16-7) 8 dbb	Middle Fork of south branch, Little Bear Canyon.
S-MF-1	(D-16-7) 21 baa	Mill Fork Canyon Spring near lower coal loading area, 1 mile up canyon.
S-MF-2	(D-16-6) 13 aab	Spring 3.9 miles up Mill Fork Canyon, on north branch.
S-MF-3	(D-16-7) 18 abd	Mill Fork Canyon, 100 yards below major split in canyon east side.
S-R-1	(D-16-7) 28 cab	Rilda Canyon Creek, 30 feet above bridge at old Helco Mine.

TABLE 1 con't
DESCRIPTION OF WATER QUANTITY AND QUALITY SAMPLING
STATIONS NEAR HUNTINGTON CREEK MINE NO. 4

<u>Station Code</u>	<u>Location*</u>	<u>Description</u>
S-R-2	(D-16-7) 29 bdd	Rilda Canyon Springs water system, 2.6 miles up canyon on north fork.
S-R-3	(D-16-6) 14 cdb	Spring near the head of Rilda Canyon, near upper ridge.

* Based on the well and spring numbering system used in the State of Utah.

stations is found in Table 1. Stations four and five in Crandall and Little Bear Canyons as well as station three in Rilda Canyon were added for the June 1977 sampling period along with the other eleven stations sampled in November 1976.

During each of the sampling periods, data were collected to assess water quantity and quality. Flow measurements were estimated by the float method when applicable or by visual estimation in the case of low flows. The flow at Little Bear Spring was measured at a 90° V-notch weir located slightly downstream from the spring. Dip samples were also collected for chemical analyses. Those samples to be analyzed for trace metals were fixed with nitric acid. Chemical analyses were completed by Ford Chemical Laboratory in Salt Lake City.

For convenience in making comparisons, stations S-LB-3, S-MF-1, and S-R-1 have been grouped together and collectively called the lower springs. All other stations will be referred to as the upper stations. This was deemed justifiable due to the similarities found among the lower springs, as will be discussed.

RESULTS AND DISCUSSION

Water Quantity

Water in the upper portion of each of the canyons studied flows intermittently and originates as interflow which surfaces above or near the Castle Gate Sandstone - Blackhawk Formation interface

and/or overland flow. The former process presumably dominates during the spring runoff season while the latter is most common during the summer thundershower period, especially in Little Bear Canyon as previously discussed.

Springs throughout the area appear to be surfacing primarily above and below the Blackhawk Formation, with little groundwater activity showing in the Blackhawk, field observations in mines located in the San Rafael and Price River Basins have shown that typically, only a limited amount of subsurface water is found in the Blackhawk Formation. Apparently, even though fracturing in the area has presumably also penetrated the Blackhawk, the nature of the material (i.e. fine texture) is such that these fractures have sealed and thus remained relatively impermeable. It would appear, therefore, that water which does enter the ground in either the Castle Gate or Star Point Sandstone surfaces in the same formation in which it entered, with very little passing through the Blackhawk.

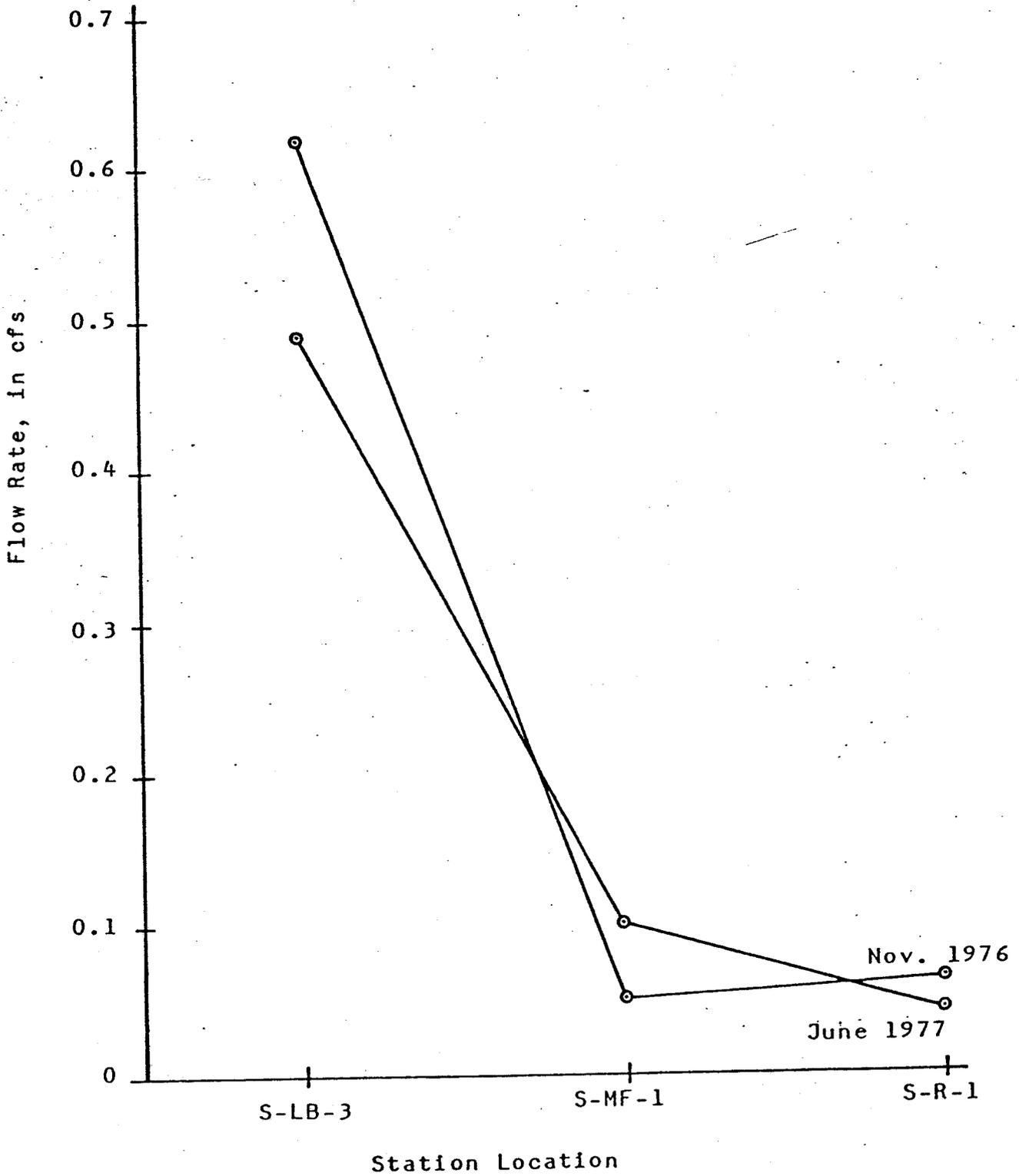
Subtracting the previously indicated annual potential evapotranspiration from the normal annual precipitation, the expected yield from Little Bear Canyon should be on the order of one to two inches per year. A comparison with similar areas in the nearby Price River Basin indicates that an upper limit of four inches of runoff might be expected from the canyon annually (See Utah Division of Water Resources, 1975). Measurements of flow quantities at Little Bear Spring during each of the two

sampling periods, however indicate an average annual yield of approximately six inches from the spring alone during the course of a severe drought period. This suggests that at least a portion of the water in Little Bear Spring is originating at some point other than on the watershed to the west above. Hughes¹ has indicated that springs issuing from fractures in the Star Point Sandstone between Rilda Canyon and Bear Creek Canyon to the south produce flows at a fairly constant rate, almost independent of season. Such a faulting system is present in the Star Point at and near Little Bear Spring, as indicated by field observations by the U.S. Forest Service and Vaughn Hansen Associates.

It has been observed that spring and surface water flow rates decrease in a southerly direction from canyon to canyon in the study area. This phenomenon is especially marked in the lower springs as seen in Figure 4. In addition, information supplied by the U.S. Forest Service indicates that the number of springs in the Huntington Creek drainage decrease as one approaches Little Bear Spring from the northwest. This, plus the information already presented, leads to the conclusion that ground water is approaching the area from the north or northwest, with a progressive downstream depletion of the aquifer.

¹Treavor C. Hughes, Associate Professor of Civil and Environmental Engineering, Utah Water Research Laboratory, Logan, Utah. Written communication received 18 July 1977.

FIGURE 4: FLOW RATES MEASURED AT THE LOWER SPRINGS
NEAR HUNTINGTON CREEK MINE NO. 4



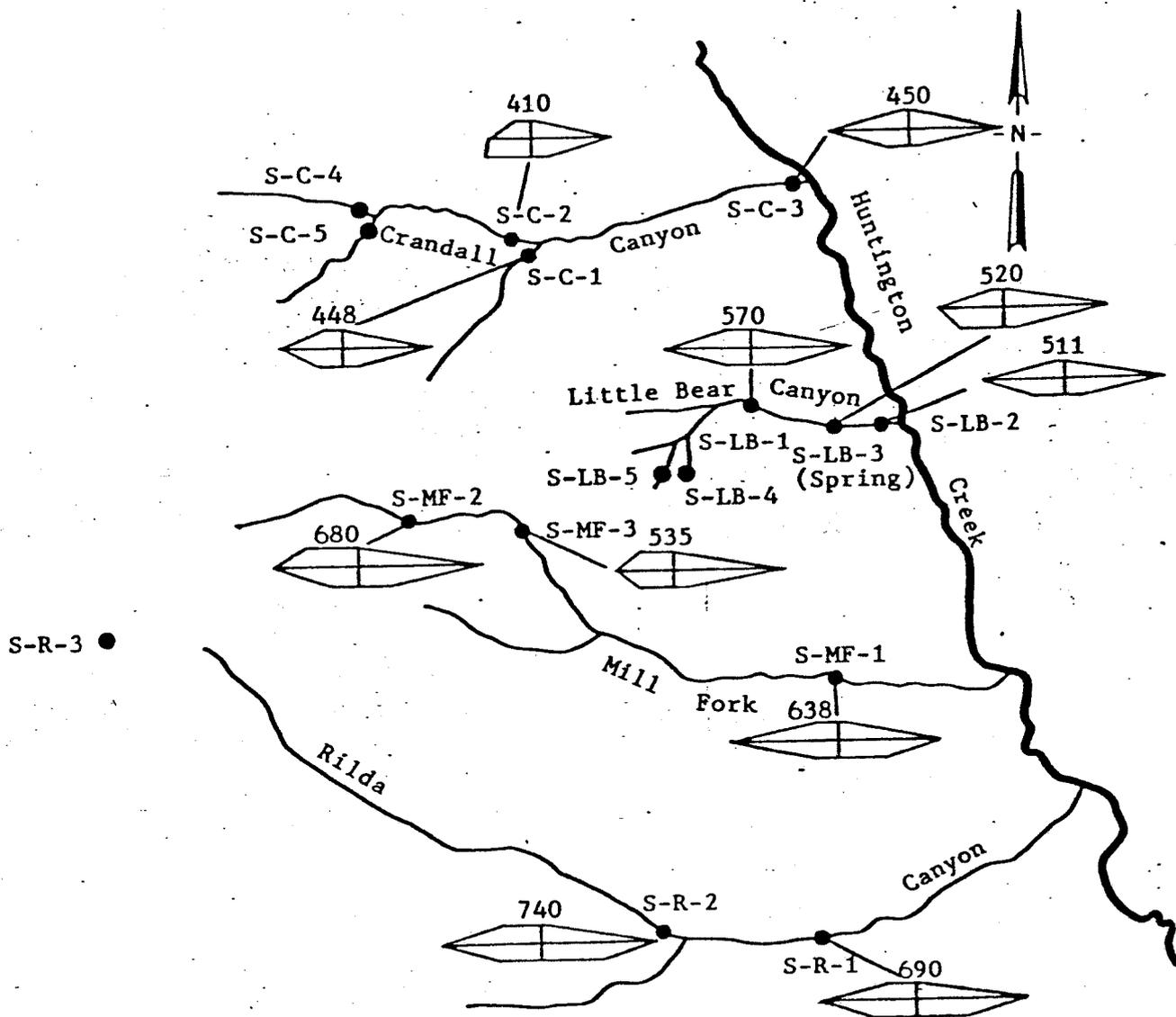
In summary, fractures in the more permeable sandstones above and below the Blackhawk Formation are presumably the means whereby ground water is surfacing in the area. The presence of the less permeable Blackhawk, the isolated nature and relatively small surface contributing area of Little Bear Canyon, the large flow measured at the spring, and the southward depletion in spring flow rates throughout the area indicate that water at Little Bear Spring originates primarily in the north, flowing through the Star Point Sandstone, rather than originating on the watershed to the west.

Water Quality

The waters of Crandall, Little Bear, Mill Fork, and Rilda Canyons are all chemically very closely related. The cation-anion configurations for all samples collected confirms this (see Figure 5 and 6). A progressive deterioration in water quality from north to south and west to east is also seen. It appears that if the water could be intercepted high in the system and discharged without passing through the lower portions of the various canyons, water of a higher quality would be available.

The major cation and anion concentrations remained fairly constant from November 1976 to June 1977. An increase in magnesium, noted at the lower stations, was observed in June with decreases in most other cases. The cation-anion ratios for all stations were similar during both sampling periods. The following is a synopsis of chemical quality results of the samples collected. See Appendix A

FIGURE 5: CATION-ANION DIAGRAMS OF SAMPLES COLLECTED NOVEMBER 8 THROUGH 12, 1976



LEGEND

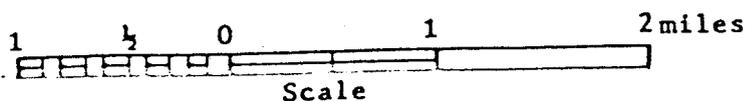
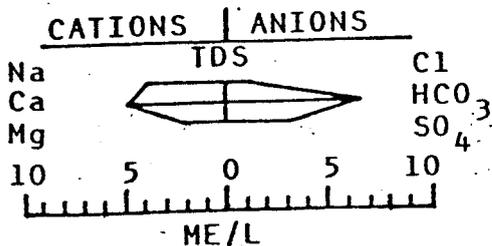
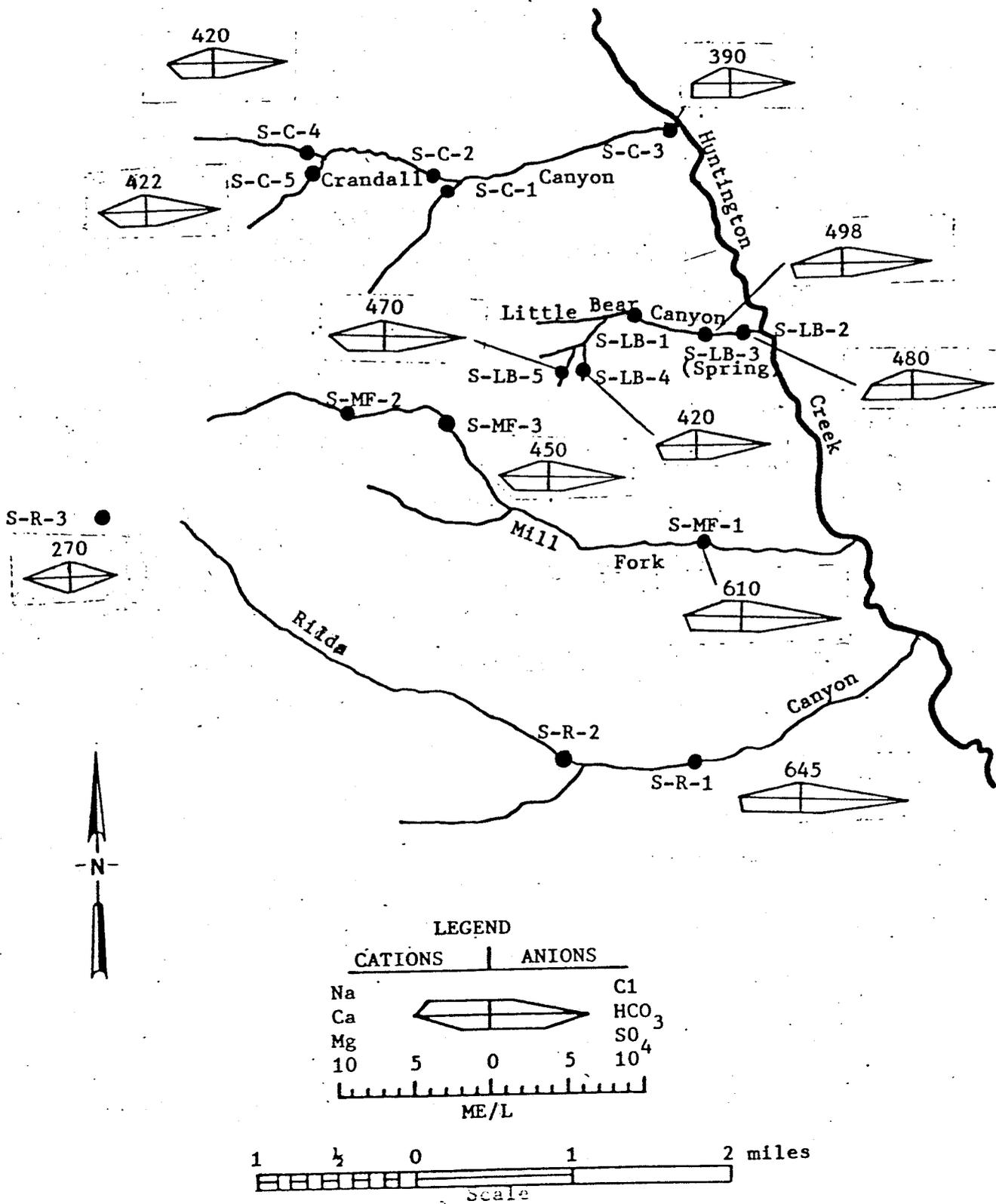


FIGURE 6: CATION-ANION DIAGRAMS OF SAMPLES COLLECTED

MAY 31 to JUNE 4, 1977



for a tabular presentation of all water quality data and Appendix B for maps showing the location of these data in the field.

Total Dissolved Solids

The recommended drinking water standard limit of 500 mg/l was exceeded at eight of the eleven stations sampled in the Fall. The average concentration was 563 mg/l. No samples in Crandall Canyon were in excess of 500 mg/l. During June 1977 two of the eleven stations sampled had TDS concentrations in excess of 500 mg/l. The average concentration was 461 mg/l. The two stations in excess of the recommended standard were the lower stations in both Mill Fork and Rilda Canyons. Concentrations typically increased from north to south in the study area.

Hardness

Hardness levels tended to increase as the water reached the deeper parts of the various canyons.

Alkalinity

Increases in alkalinity levels are seen as the water reaches the deeper canyon area.

Barium

None of the water samples exceeded the mandatory maximum limit of 1.0 mg/l. The concentrations ranged from 0.002 mg/l to 0.37 mg/l.

Bicarbonate

Bicarbonate showed the same increasing trends as alkalinity and hardness.

Boron

In November 1976, all analyses for boron were below the laboratory detection limit of 0.001 mg/l. In June 1977, the concentrations for boron ranged from less than 0.001 mg/l to 0.085 mg/l.

Calcium

Calcium concentrations increased as the water reached the deeper portions of Huntington Canyon. The highest concentrations were found in Rilda Canyon.

Chloride

Chloride is of little concern in this area. The recommended maximum concentration for drinking water supplies is 250 mg/l and the highest concentration found was 10 mg/l. The average concentration was 5 mg/l.

Copper

Copper concentrations were consistently low. The high concentration was 0.040 mg/l, found in Little Bear Spring, Mill Fork, and Rilda Canyons during the November sampling period. The high concentration in June was 0.035 mg/l in lower Crandall.

Fluoride

Fluoride concentrations averaged 0.18 mg/l. The concentrations increased deeper in the canyons.

Iron

Iron concentrations averaged 0.14 mg/l for both sampling periods. Upper Little Bear Canyon had the high concentration of 0.311 mg/l in November 1976.

Magnesium

Magnesium concentrations ranged from 2.88 mg/l on top of Rilda Canyon to 46.08 mg/l at the lower Rilda Canyon station. The average concentration for all samples was 25.09 mg/l. The June sampling averaged 10 mg/l higher in concentration than the November samples.

Manganese

No violations of the 0.05 mg/l recommended limit were observed. The average concentration was 0.008 mg/l.

Potassium

Potassium concentrations averaged 1.17 mg/l in November and 1.99 mg/l in June. The concentrations increased as the water reached the deeper parts of the canyons.

Sodium

Sodium concentrations increased in the deeper portions of Huntington Canyon. The November average was 31.1 mg/l. June's average concentration was 9.6 mg/l.

Sulfate

Sulfate concentrations increased from north to south with the highest concentrations being found in Rilda Canyon. The average concentrations were 74.9 mg/l and 41.8 mg/l in November and June, respectively. There was a greater range of sulfate concentrations in the Fall (27.7 to 167 mg/l) over the Summer (34 to 66 mg/l).

Zinc

Zinc concentrations increased in the lower waters. The average in November was 0.055 mg/l while only 0.010 mg/l in June.

The water quality data thus far collected indicate concentration gradients in both a north-south and west-east direction. This again leads to the conclusion that subsurface water supplies originate from one of two sources: (1) water which falls in the upper portions of the canyons tributary to Huntington Creek and subsequently infiltrates and flows east, surfacing normally above the Blackhawk Formation or (2) water which enters the area through aquifers in the Star Point Sandstone from the north, possibly being fed by Huntington Creek or its tributaries.

Data from this study and from the 208 water Quality Study show increases in concentration from increased contact with the mancos derived soils. The deeper the canyon, the more both the Blackhawk formation above the Star Point Sandstone and the underlying mancos formation are exposed. The longer the flow path, the greater the concentration.

CONCLUSIONS

Water quantity and quality data collected during November 1976 and June 1977 suggest that surface and subsurface water enters the study area both from the west and also from the north. Because of the apparent limited amount of ground water which flows through the less permeable Blackhawk Formation, water at Little Bear Spring is suspected to originate in the north, flowing through aquifers in the Star Point Sandstone, and surfacing usually at fractures ~~is~~ in the formation. The southward depletion in flow noted at the lower springs suggests that little ground water would be encountered if mining coal at the Blackhawk Formation-Star Point Sandstone interface were to expand in that direction.

The water table at Little Bear Spring is below the coal seams to be mined. Crandall Canyon serves as a major interceptor drain cutting into the Star Point Formation. These conditions indicate that increased mining proposed by Swisher Coal Company would have little or no effect on the Little Bear Spring.

Water quantity and quality should be monitored during the mining operation to document the impact on adjacent ground water.

LITERATURE CITED

Jeppson, R. W., G. L. Ashcroft, A. L. Huber, G. V. Skogerboe, and J. M. Bagley. 1968 Hydrologic Atlas of Utah, Utah Water Research Laboratory and Utah Department of Natural Resources. PRWG 35-1, Utah State University, Logan, Utah.

Mundorff, J. D. 1972. Reconnaissance of Chemical Quality of Surface Water and Fluvial Sediment in the Price River Basin, Utah. Utah Department of Natural Resources, Division of Water Rights. Technical Publication No. 39, Salt Lake City.

Utah Division of Water Resources, 1975. Hydrologic Inventory of the Price River Basin. Utah Department of Natural Resources, Salt Lake City.

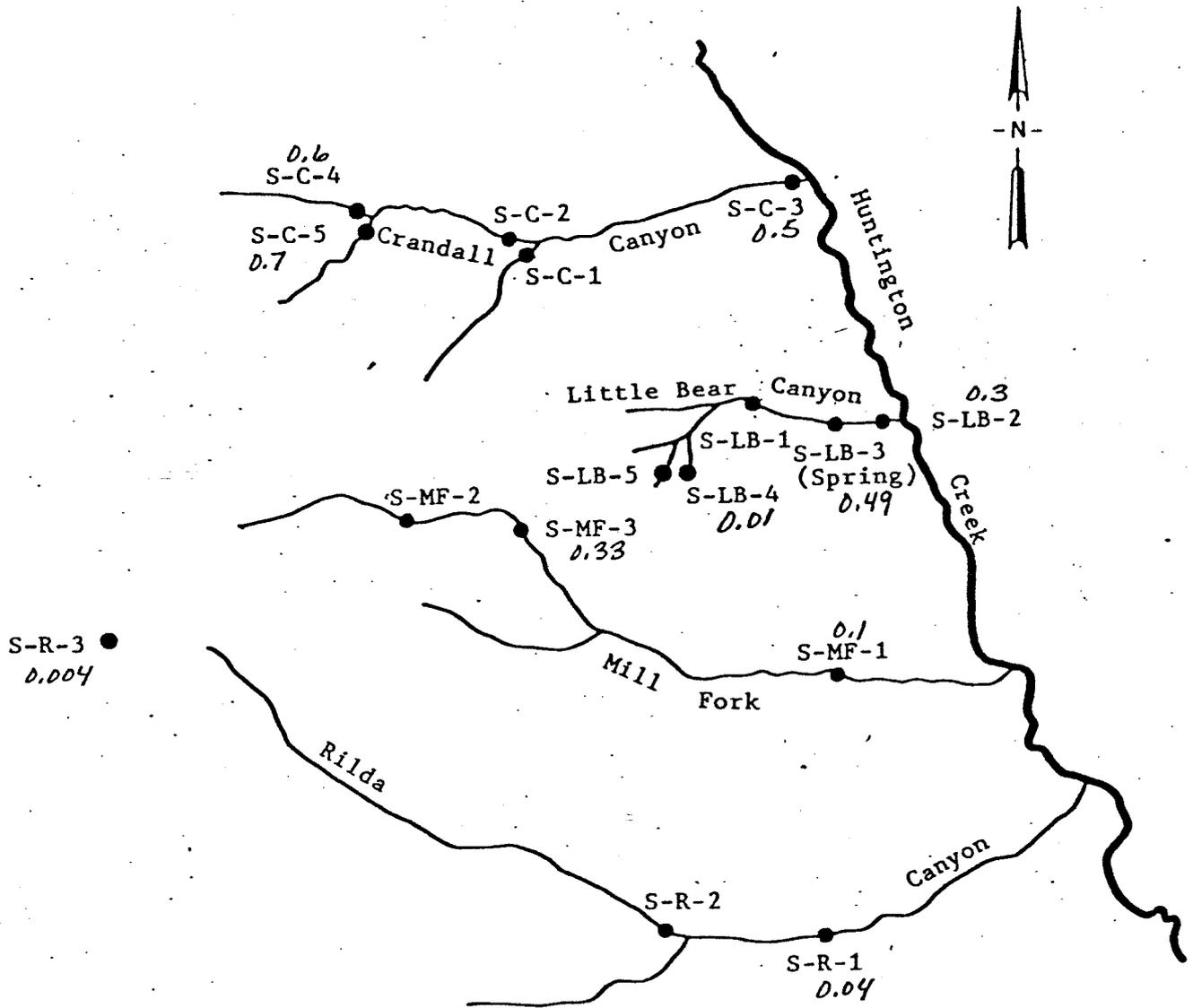
APPENDIX A

RAW WATER QUALITY DATA

APPENDIX B

WATER QUALITY SAMPLING
LOCATION MAPS

WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Flow
Date May 31 to June 4, 1977

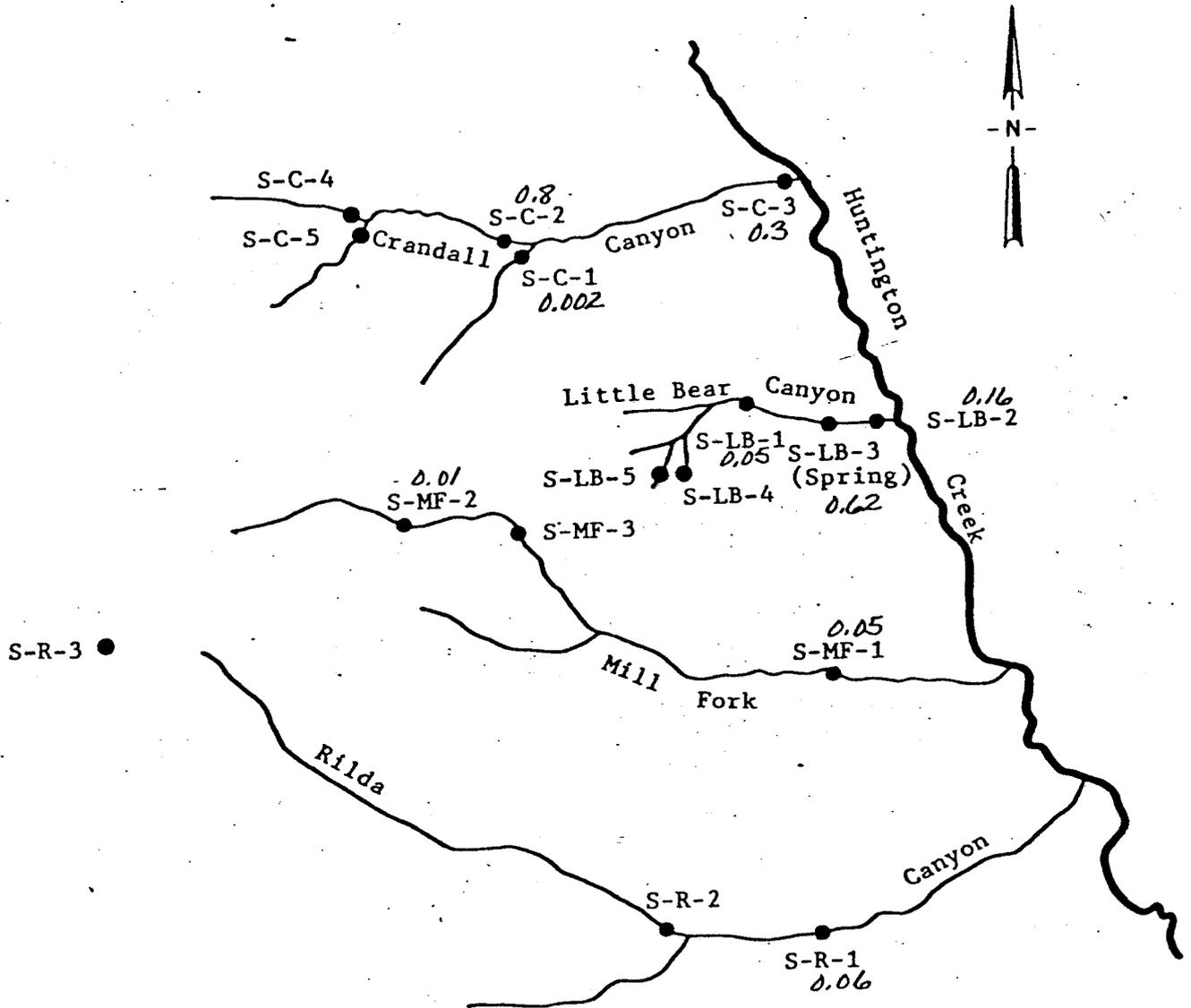
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Flow, cfs.
Date November 8-12, 1976

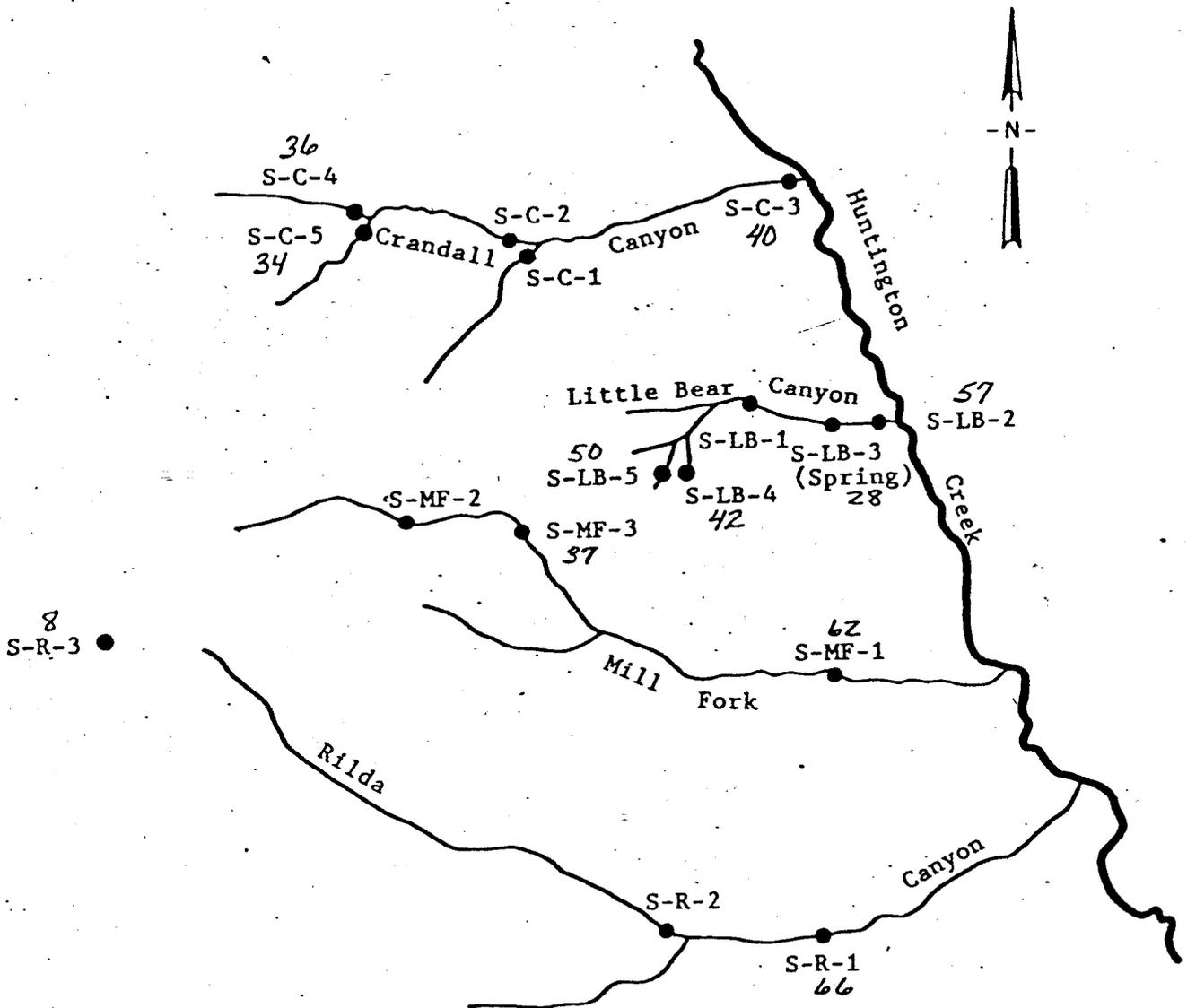
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

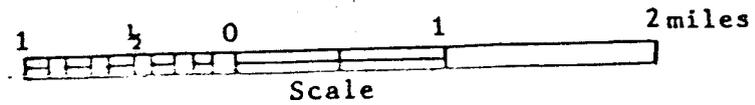


Parameter Sulfate
Date May 31 to June 4, 1977

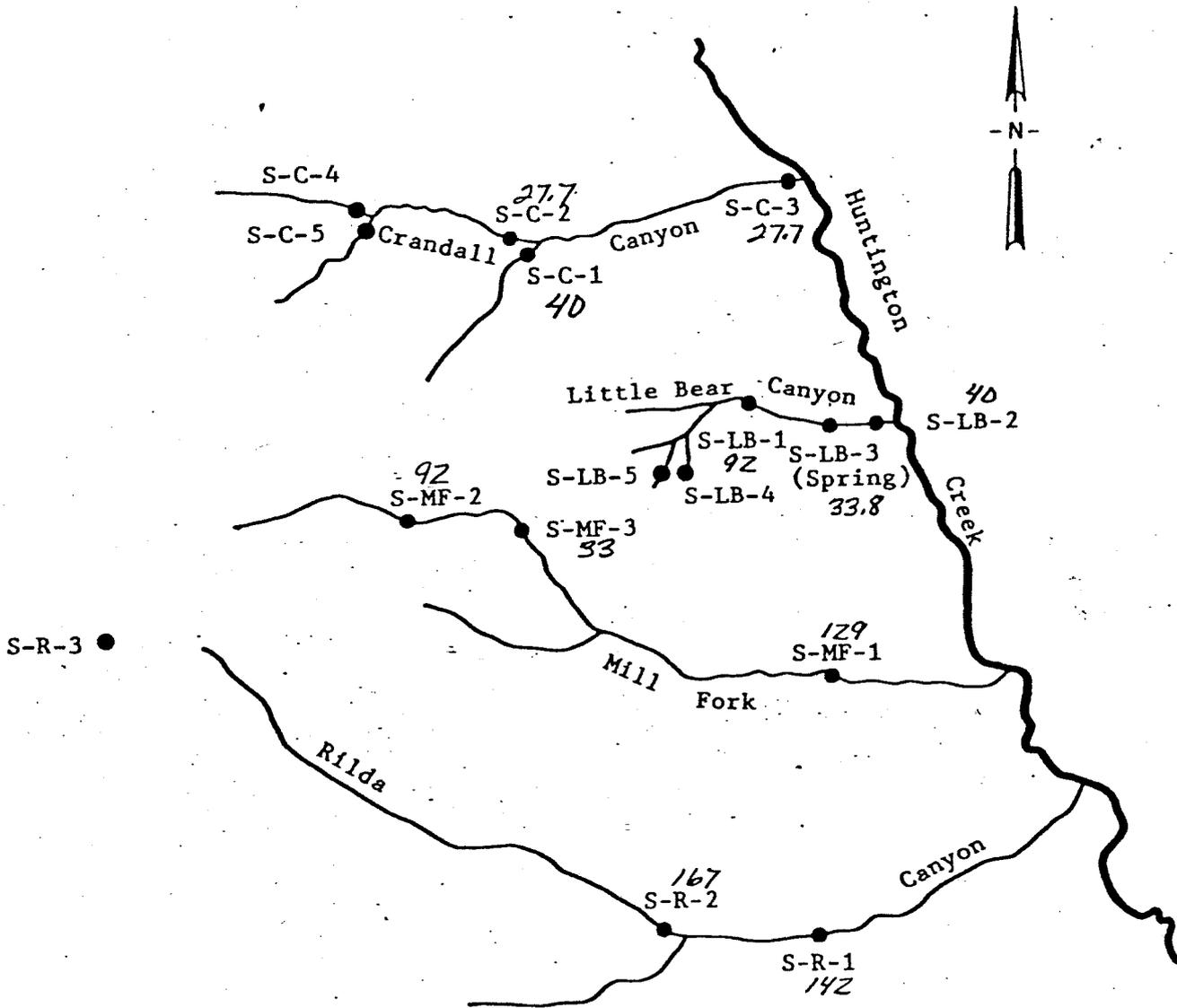
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 250 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Sulfate
Date November 8-12, 1976

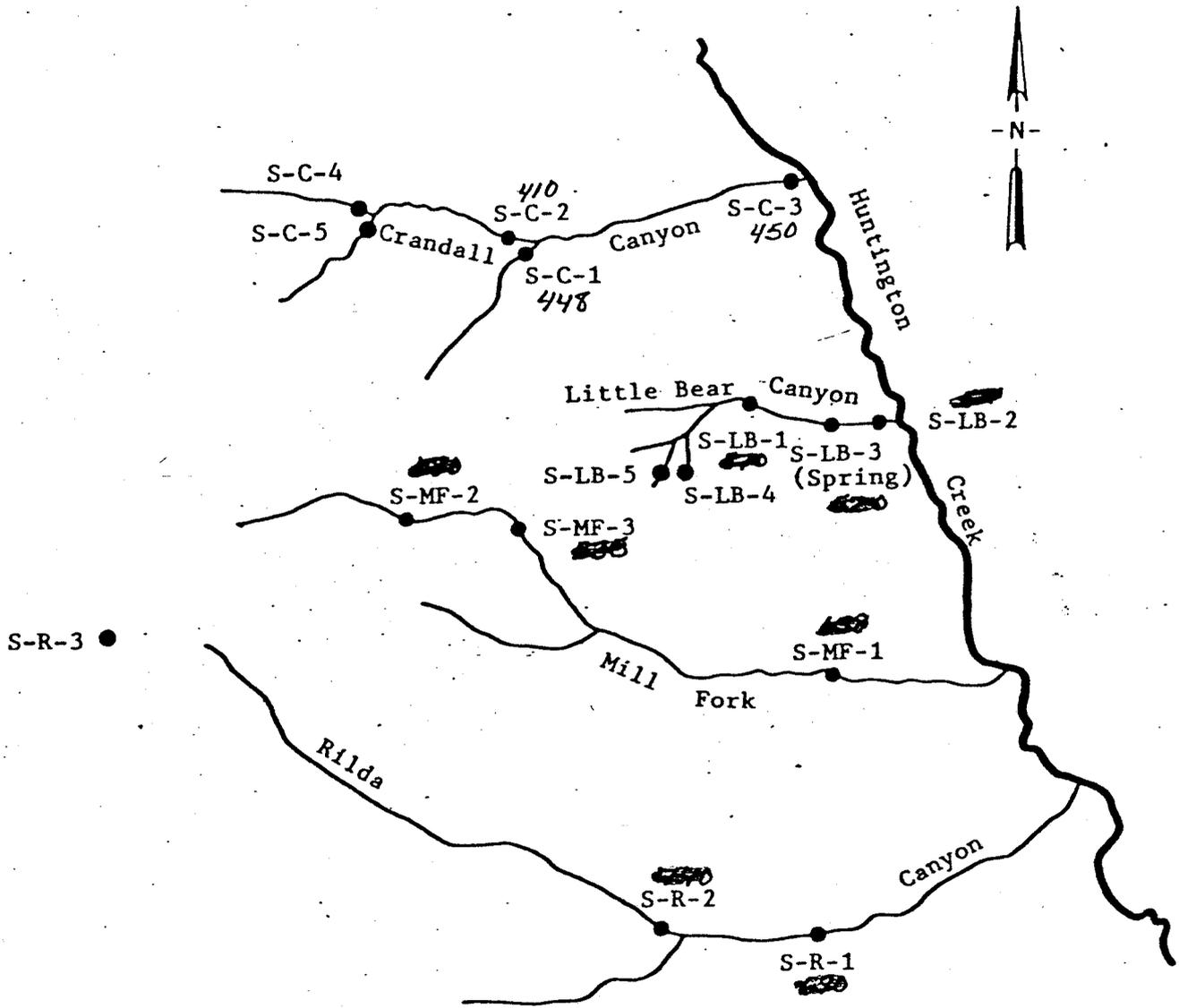
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 250 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Total Dissolved Solids
Date November 8-12, 1976

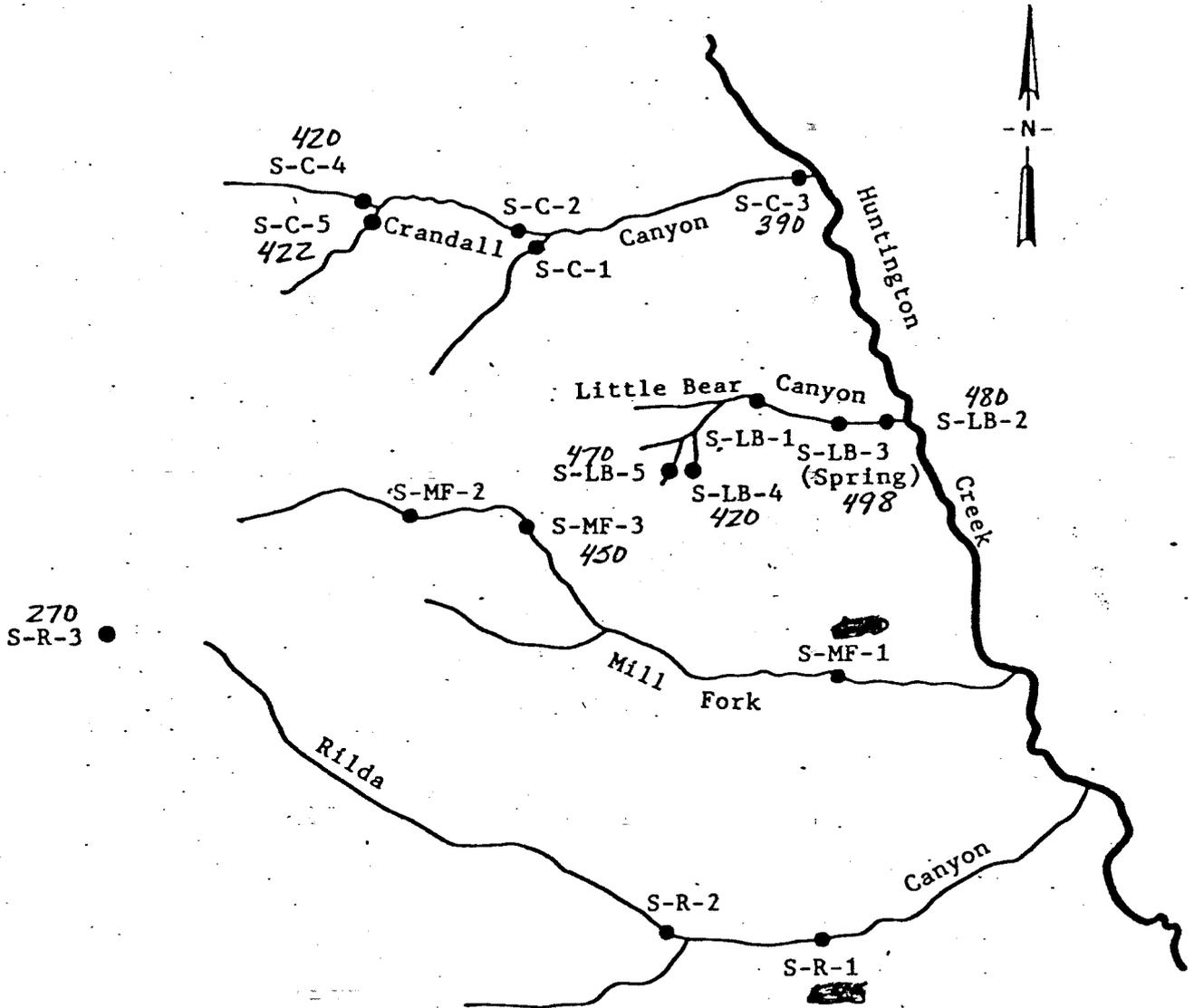
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower
upper 500 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

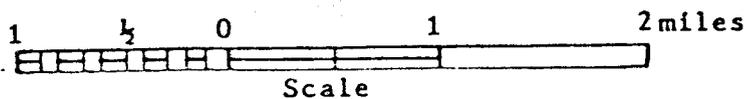


Parameter Total Dissolved Solids
Date May 31 to June 4, 1977

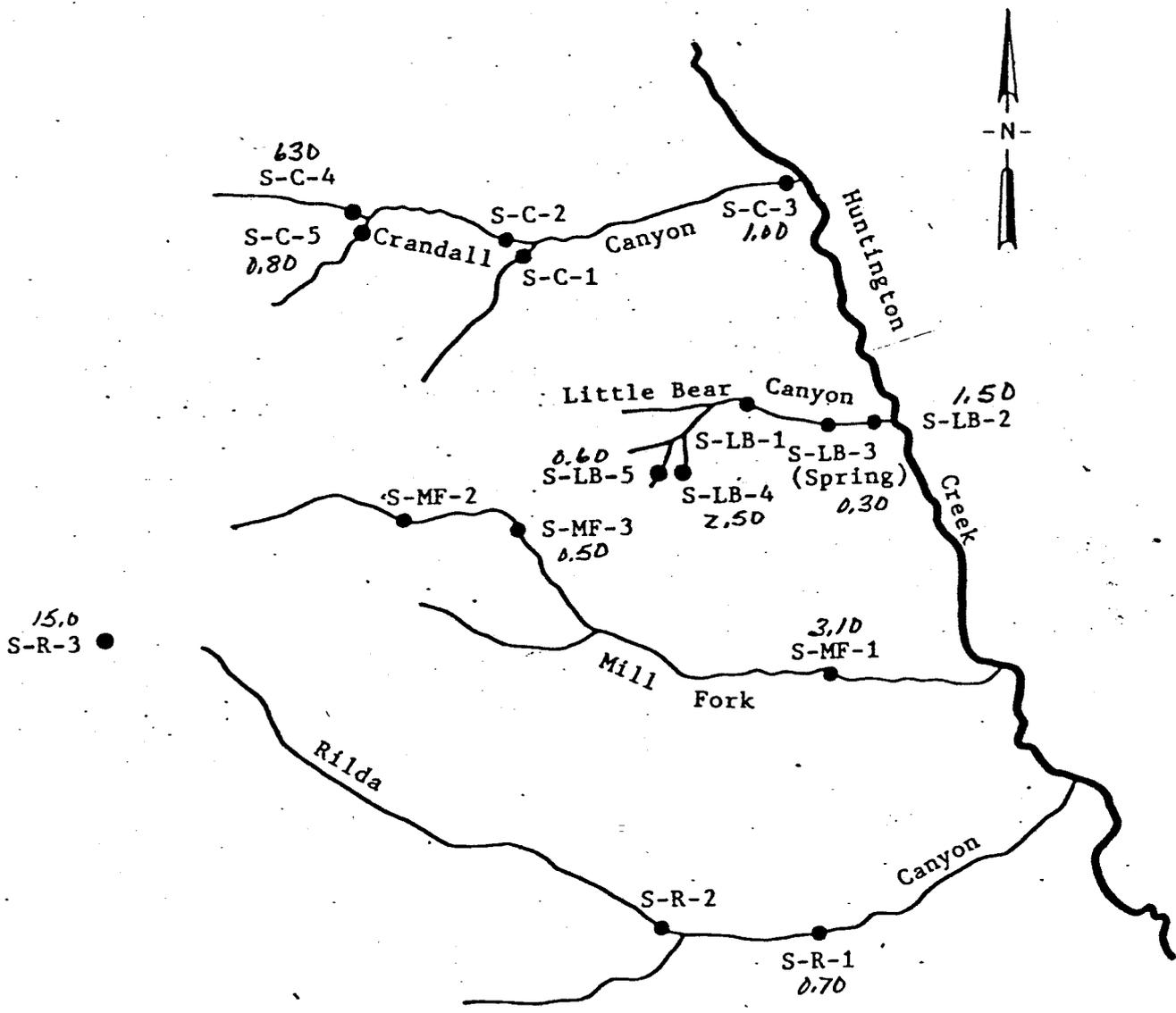
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 500 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

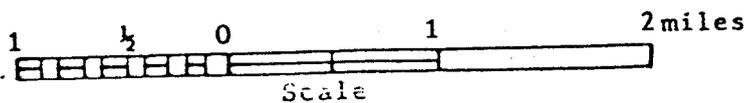


Parameter Turbidity
Date May 31 to June 4, 1977

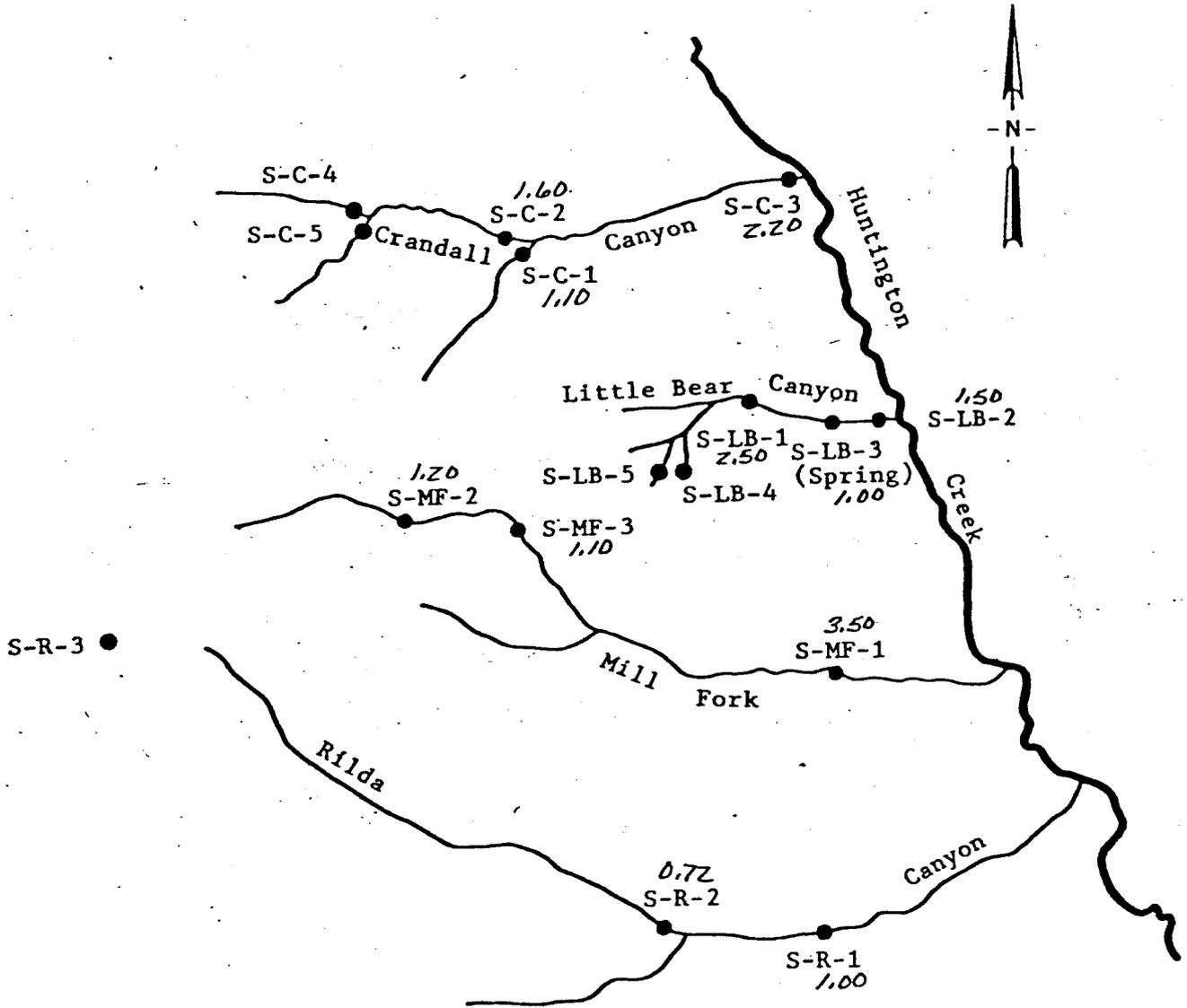
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Turbidity
Date November 8-12, 1976

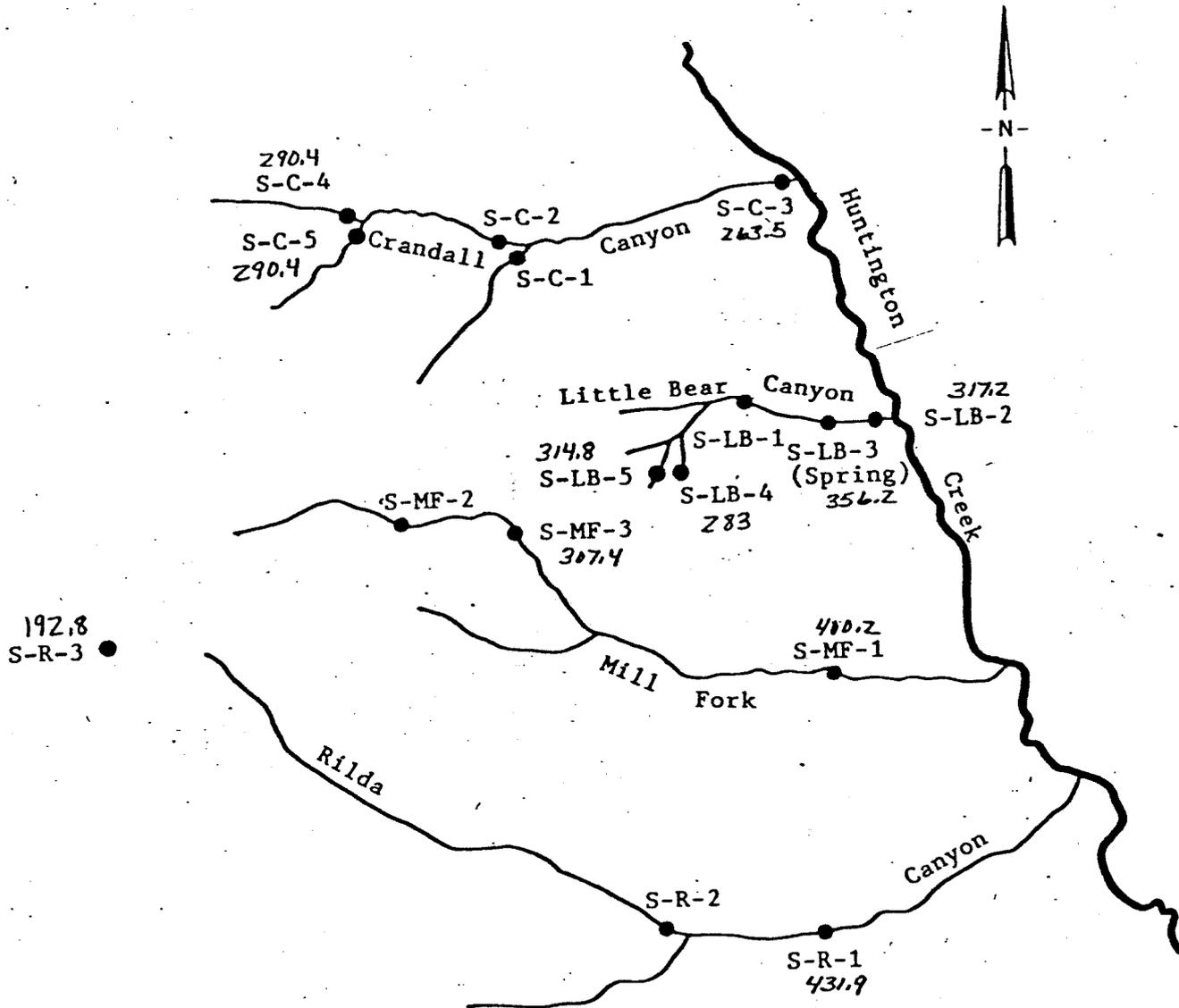
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Bicarbonate
Date May 31 to June 4, 1977

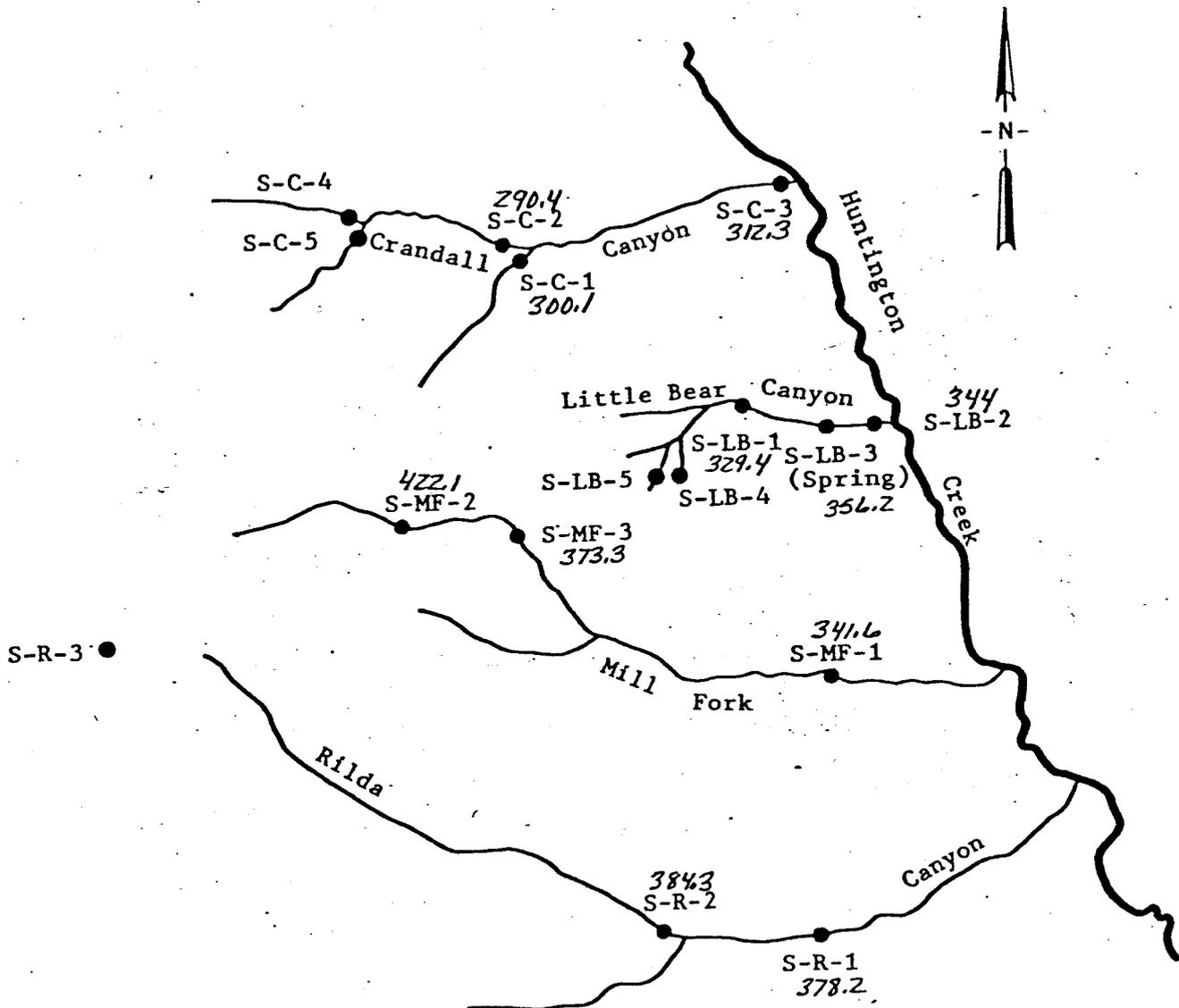
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Bicarbonate
Date November 8-12, 1976

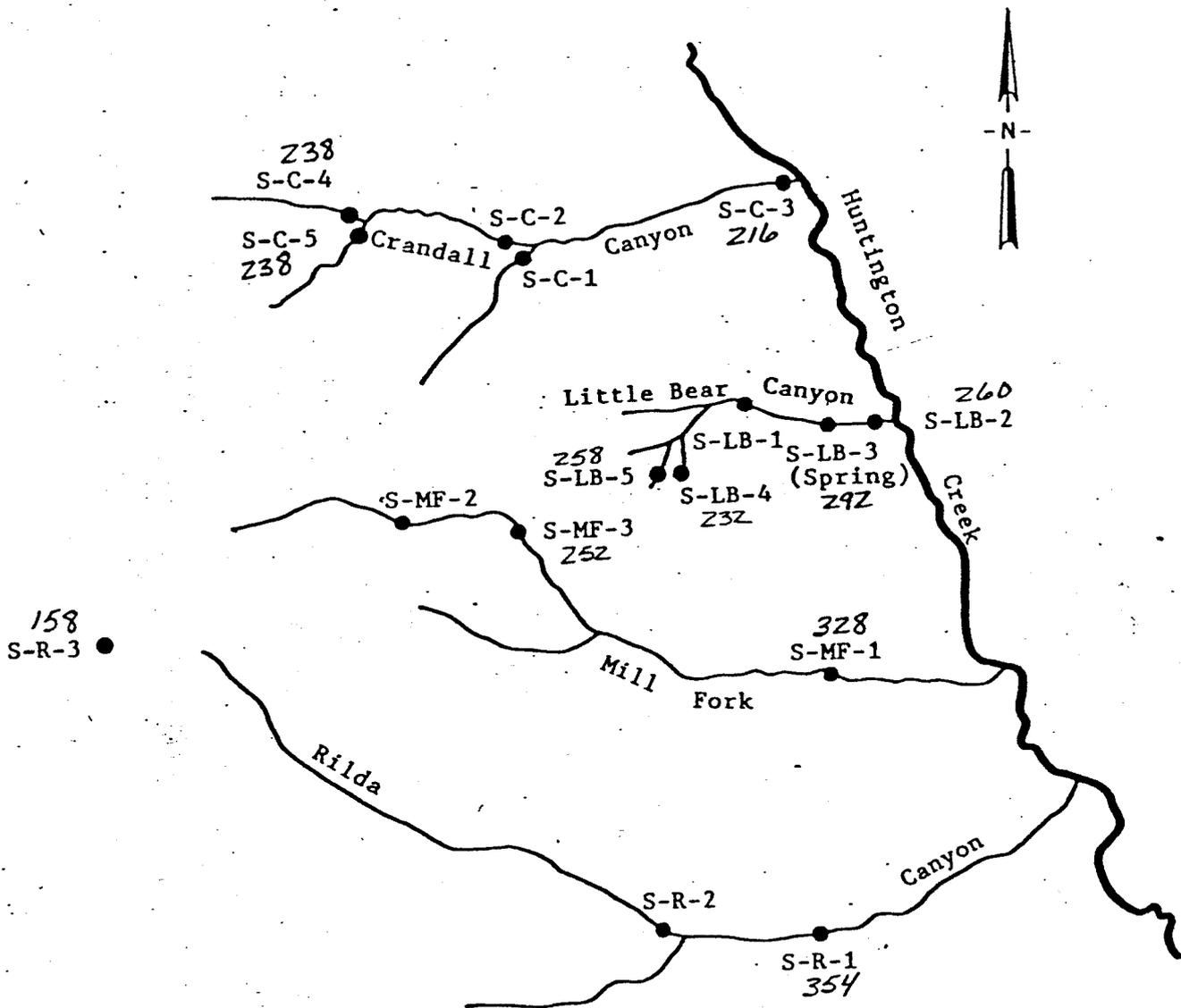
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Total Alkalinity
Date May 31 to June 4, 1977

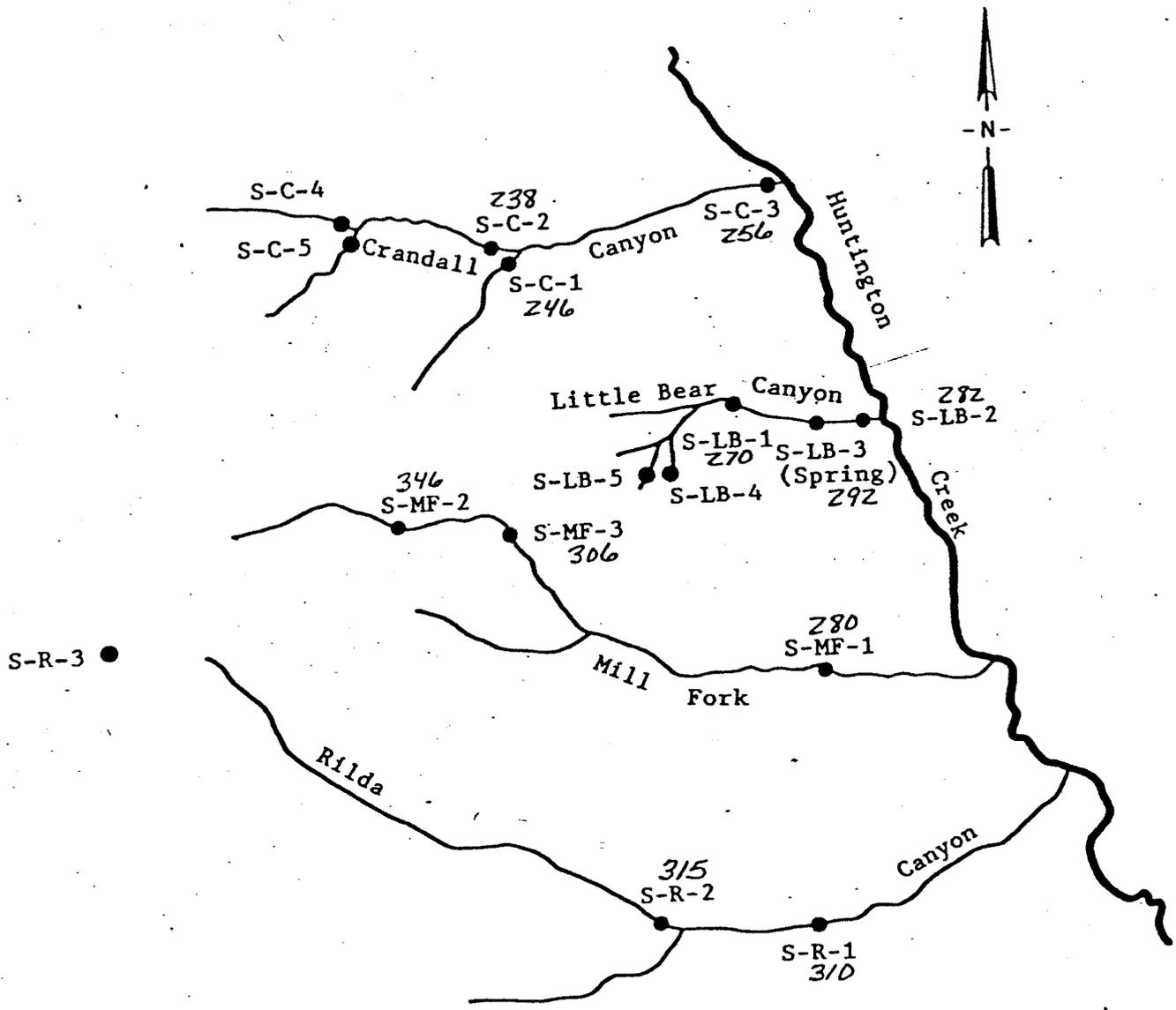
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

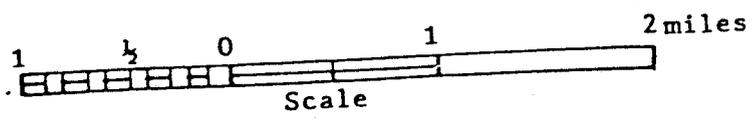


Parameter Alkalinity (Total)
 Date November 8-12, 1976

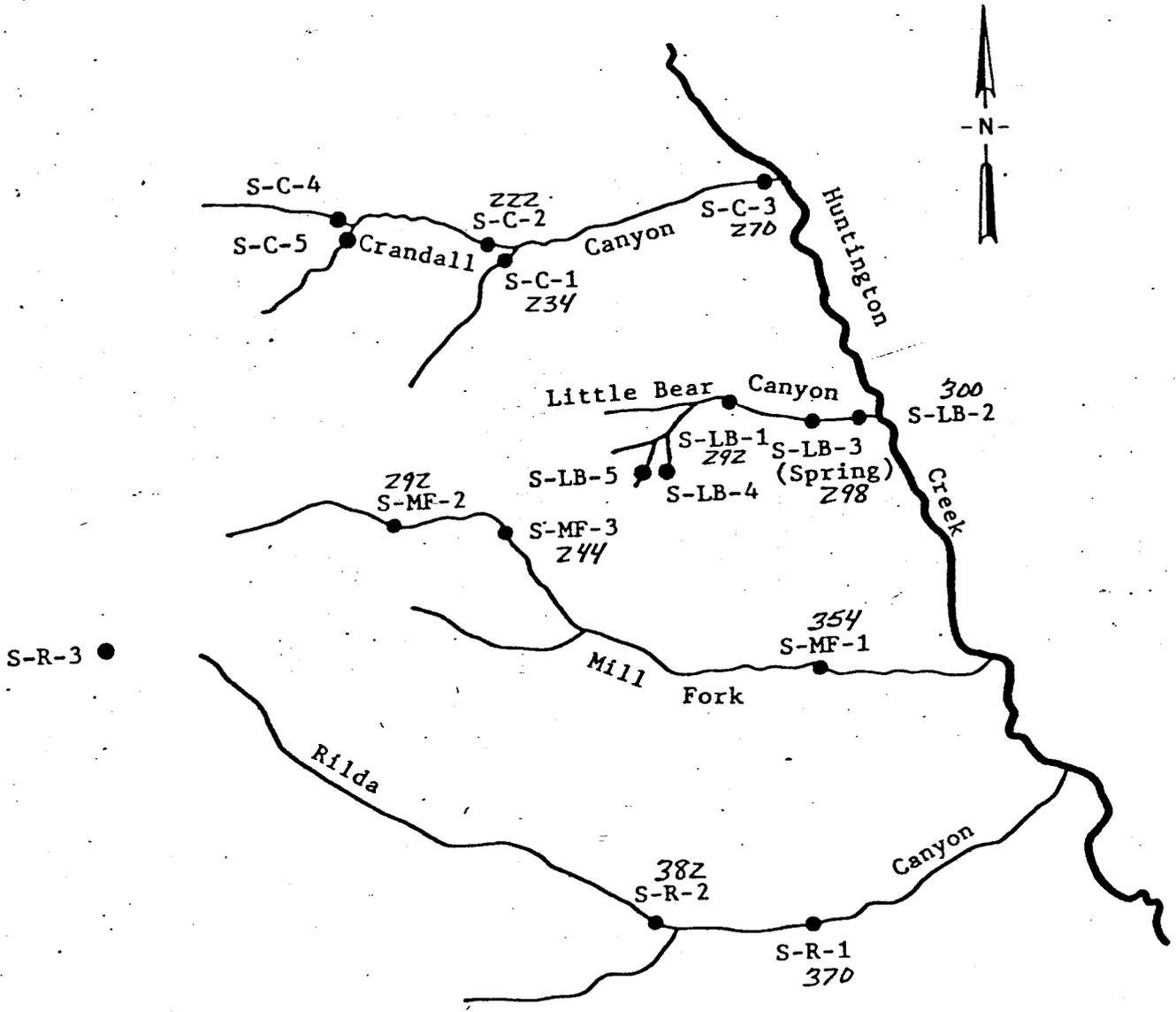
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
 lower _____
 upper _____

Vaughn Hansen Associates
 5620 South 1475 East
 Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

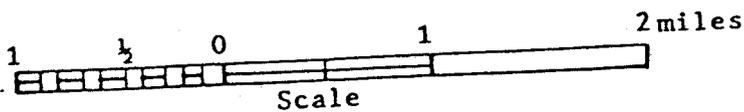


Parameter Hardness
Date November 8-12, 1976

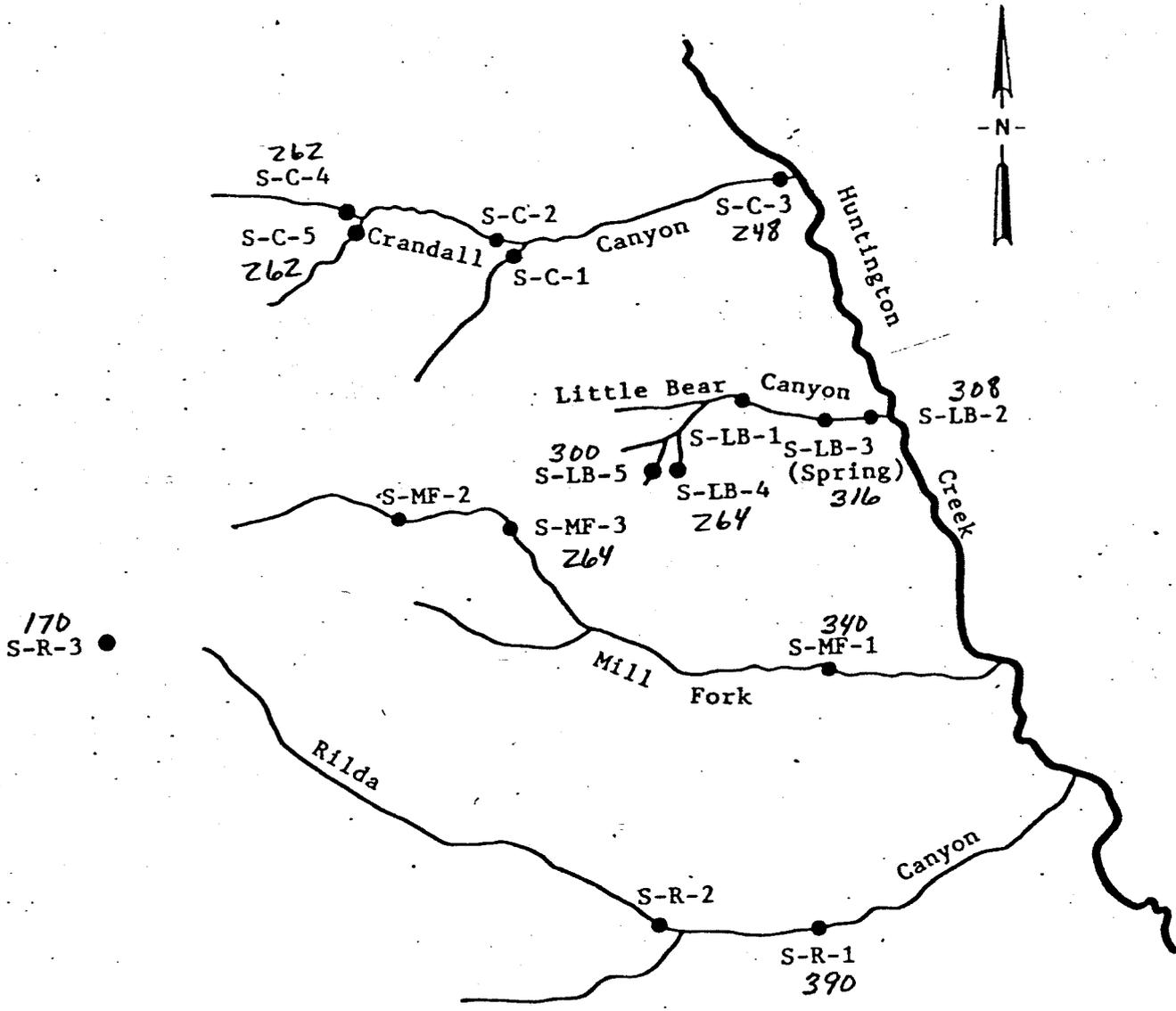
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Hardness
Date May 31 to June 4, 1977

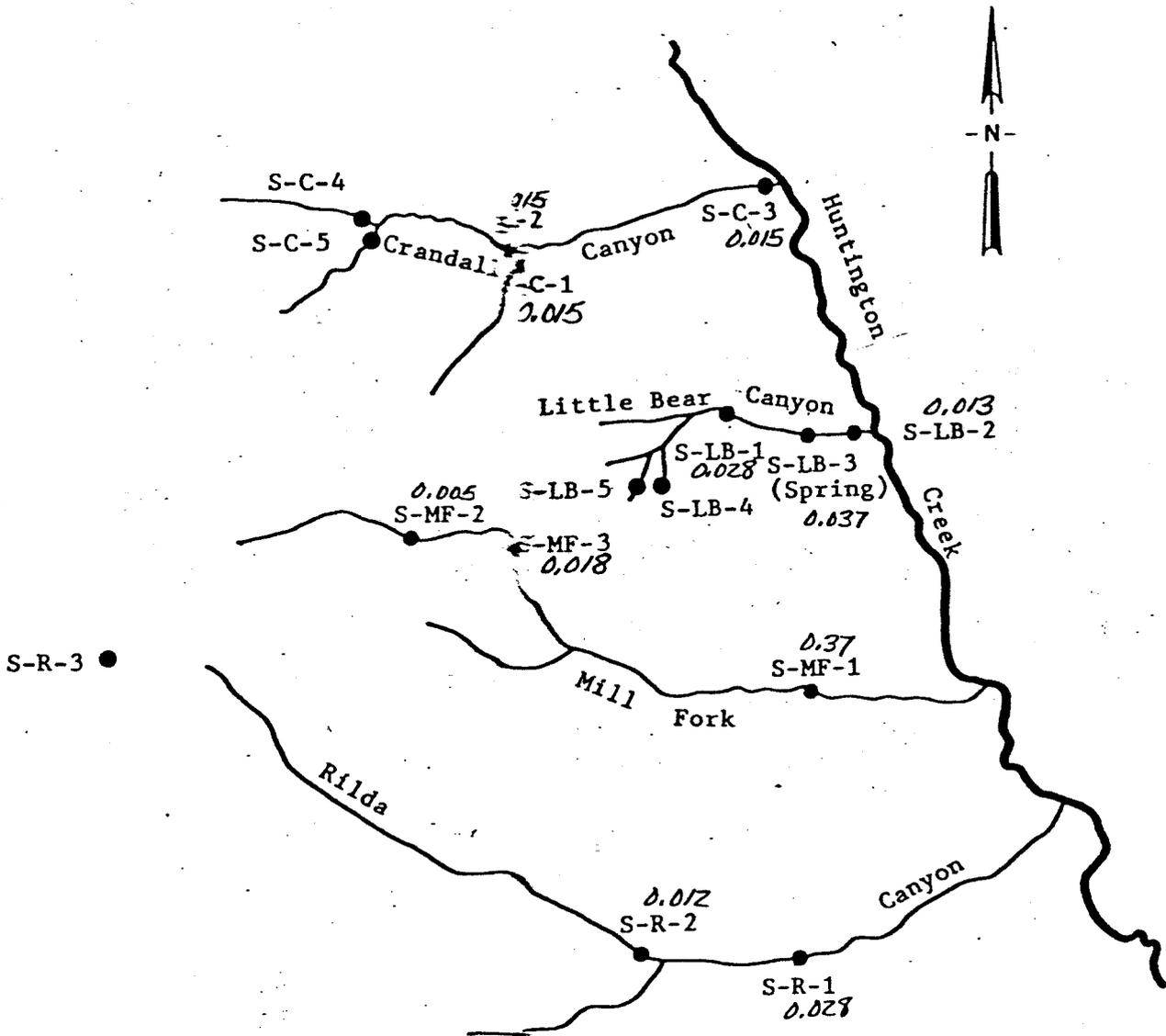
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON MINE 4
SWISHER COMPANY

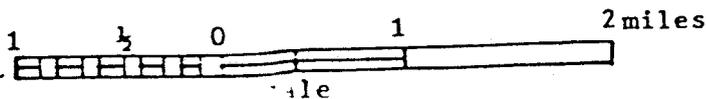


Parameter Barium
Date November 8-12, 1976

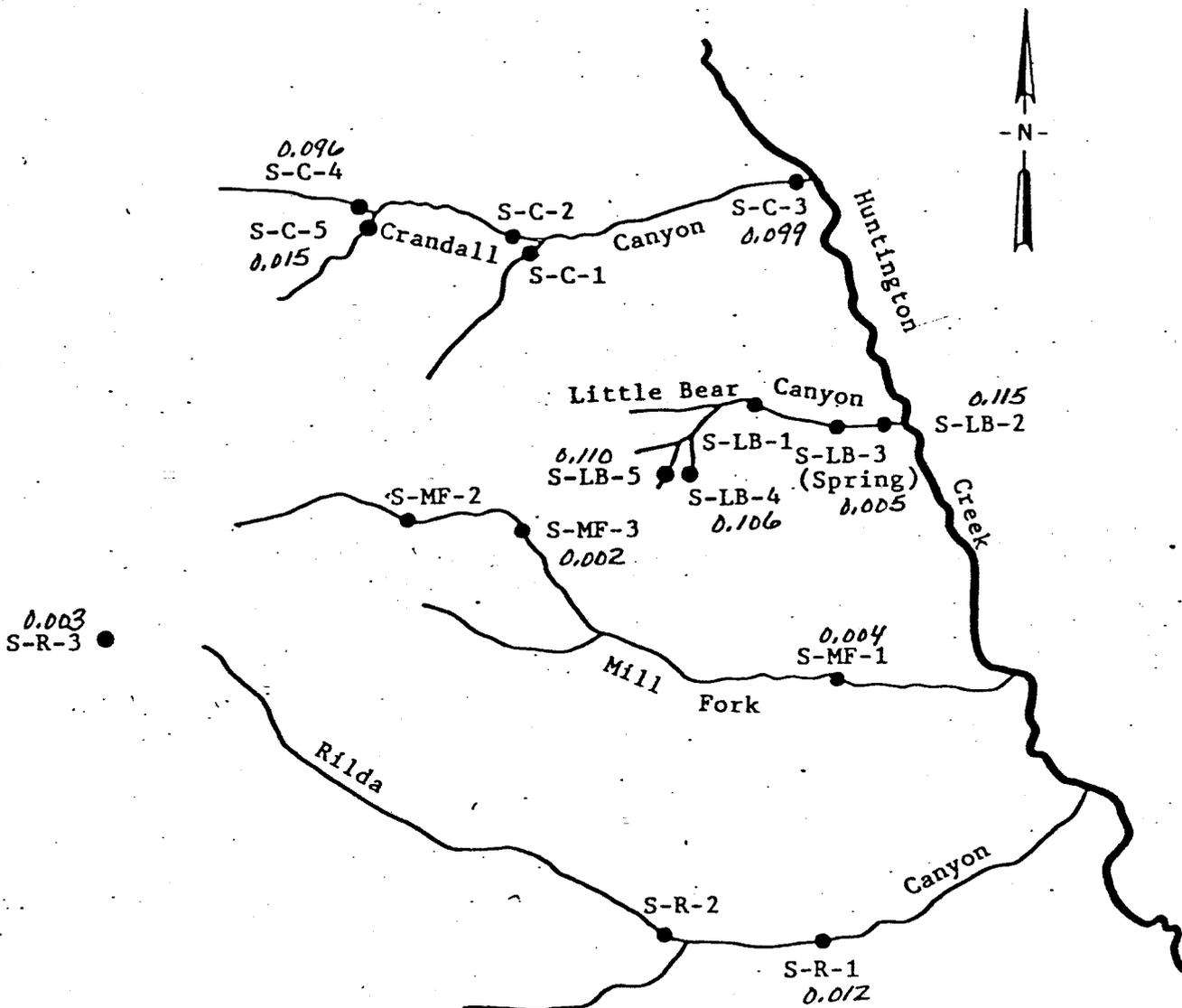
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 1.0 mg/l Mandatory

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Barium
Date May 31 to June 4, 1977

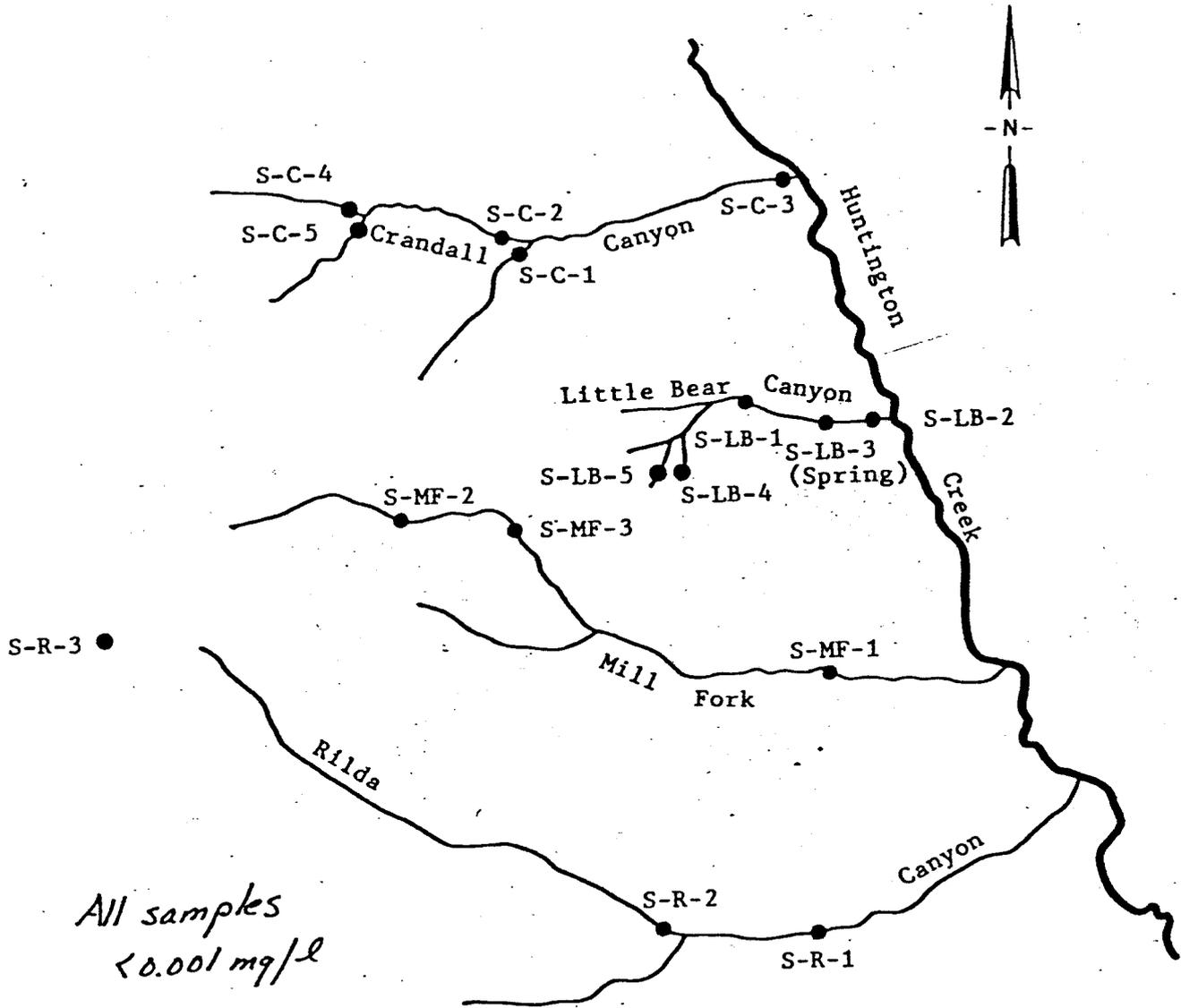
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 1.0 mg/l Mandatory

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



All samples
< 0.001 mg/l

Parameter Boron
Date November 8-12, 1976

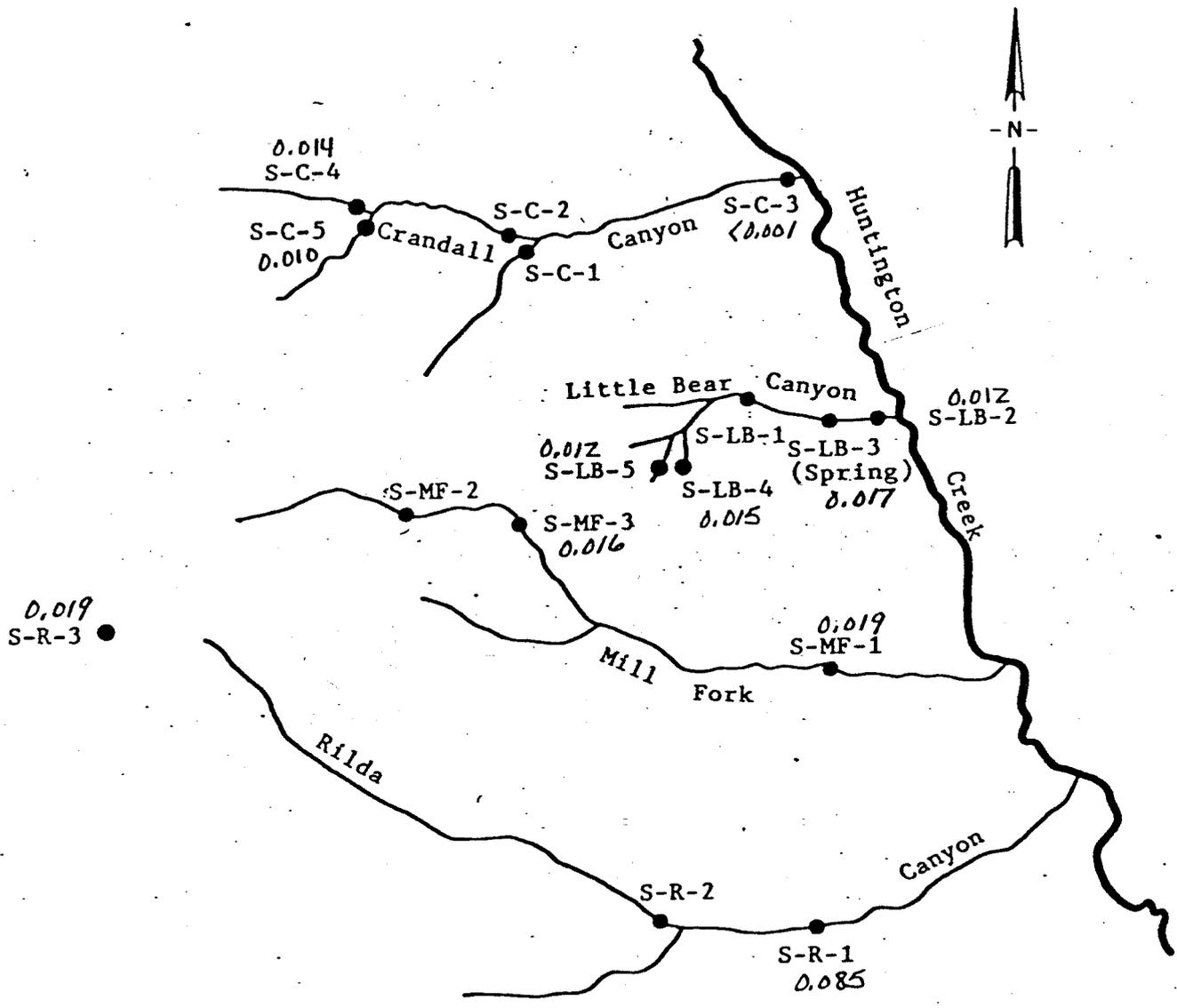
NOTE: Stations marked in red
are outside of state limits
for the sample taken during
the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

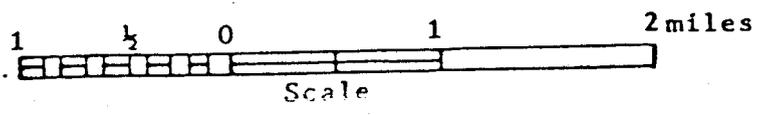


Parameter Boron
Date May 31 to June 4, 1977

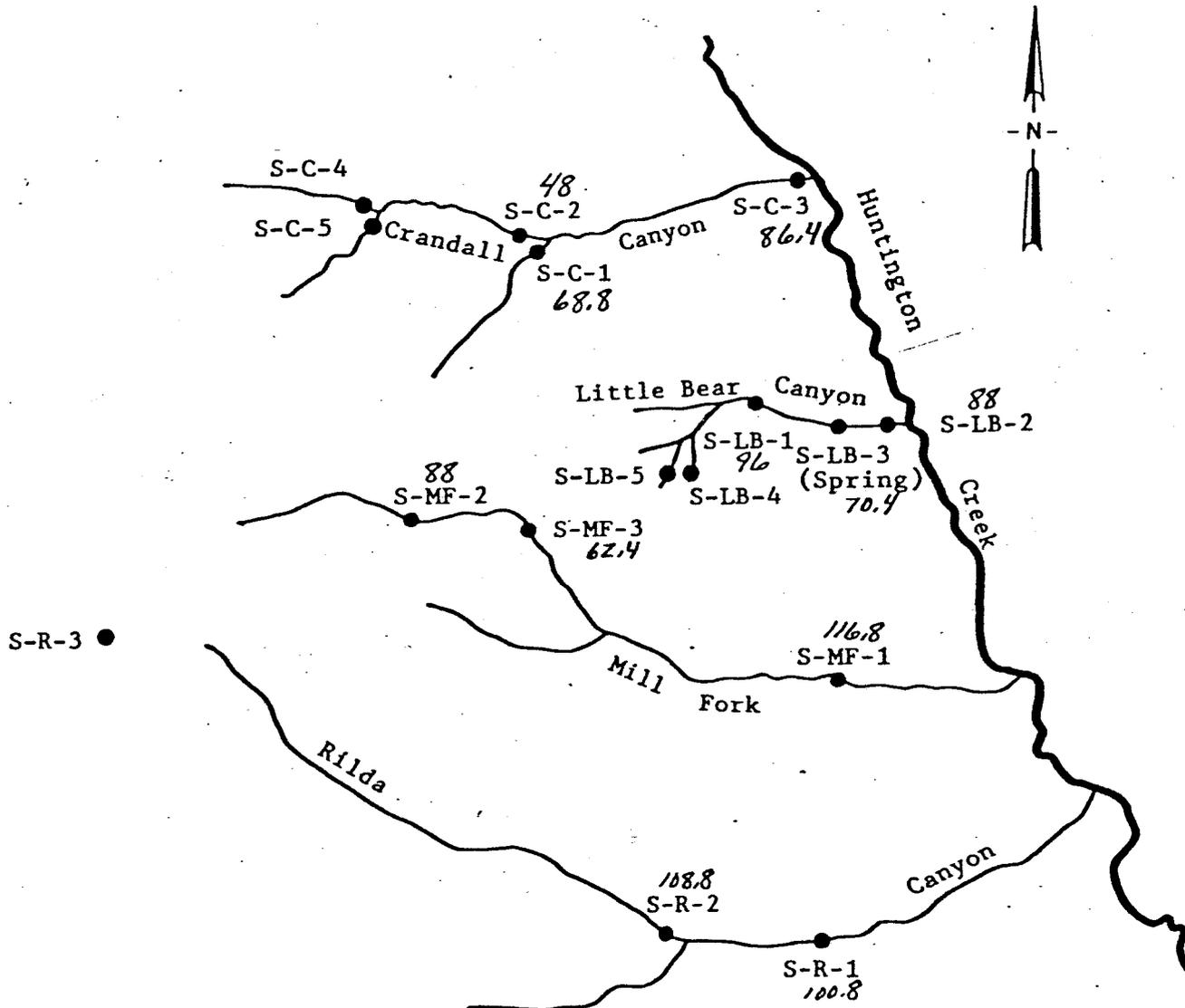
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Calcium
Date November 8-12, 1976

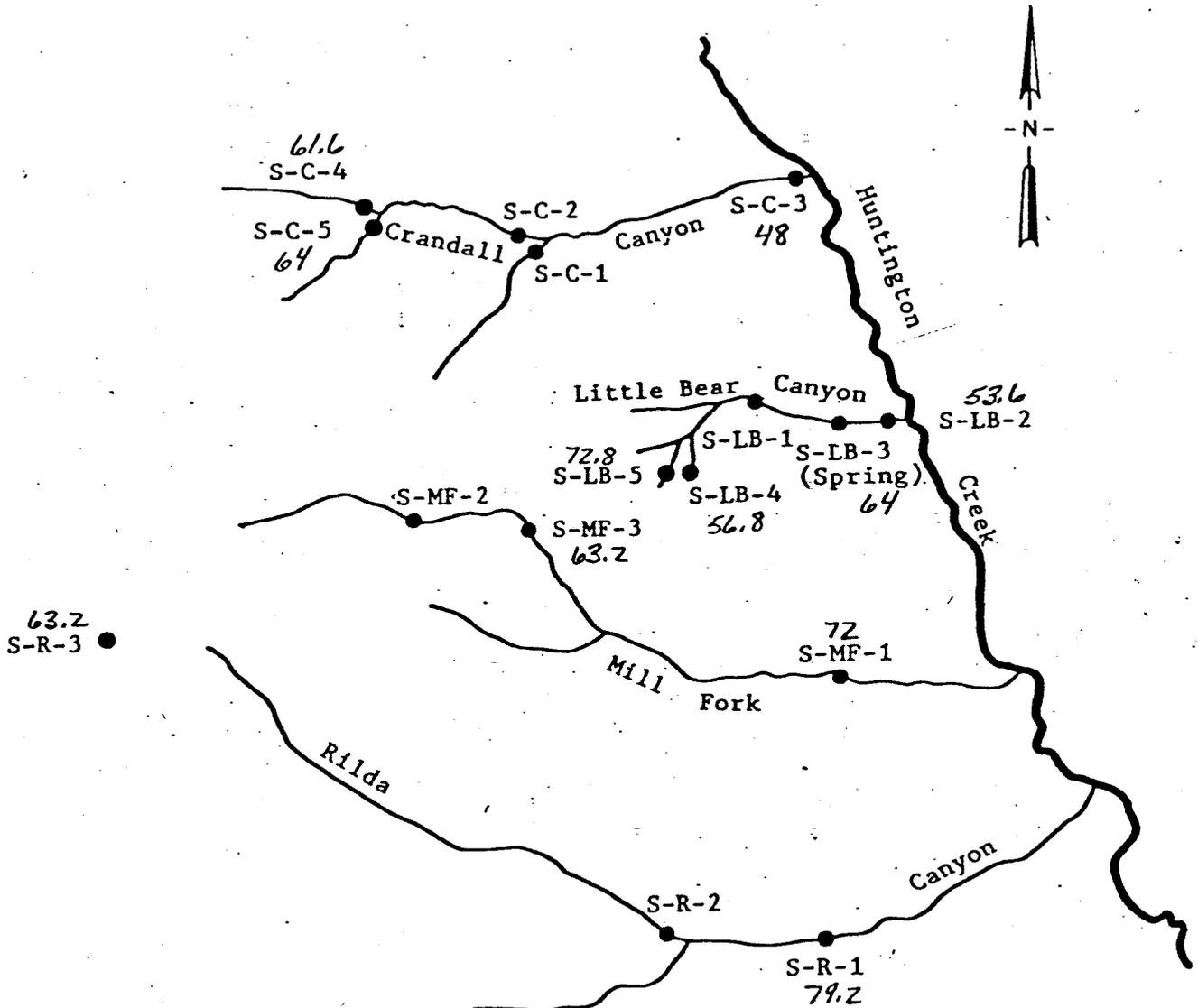
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Calcium
Date May 31 to June 4, 1977

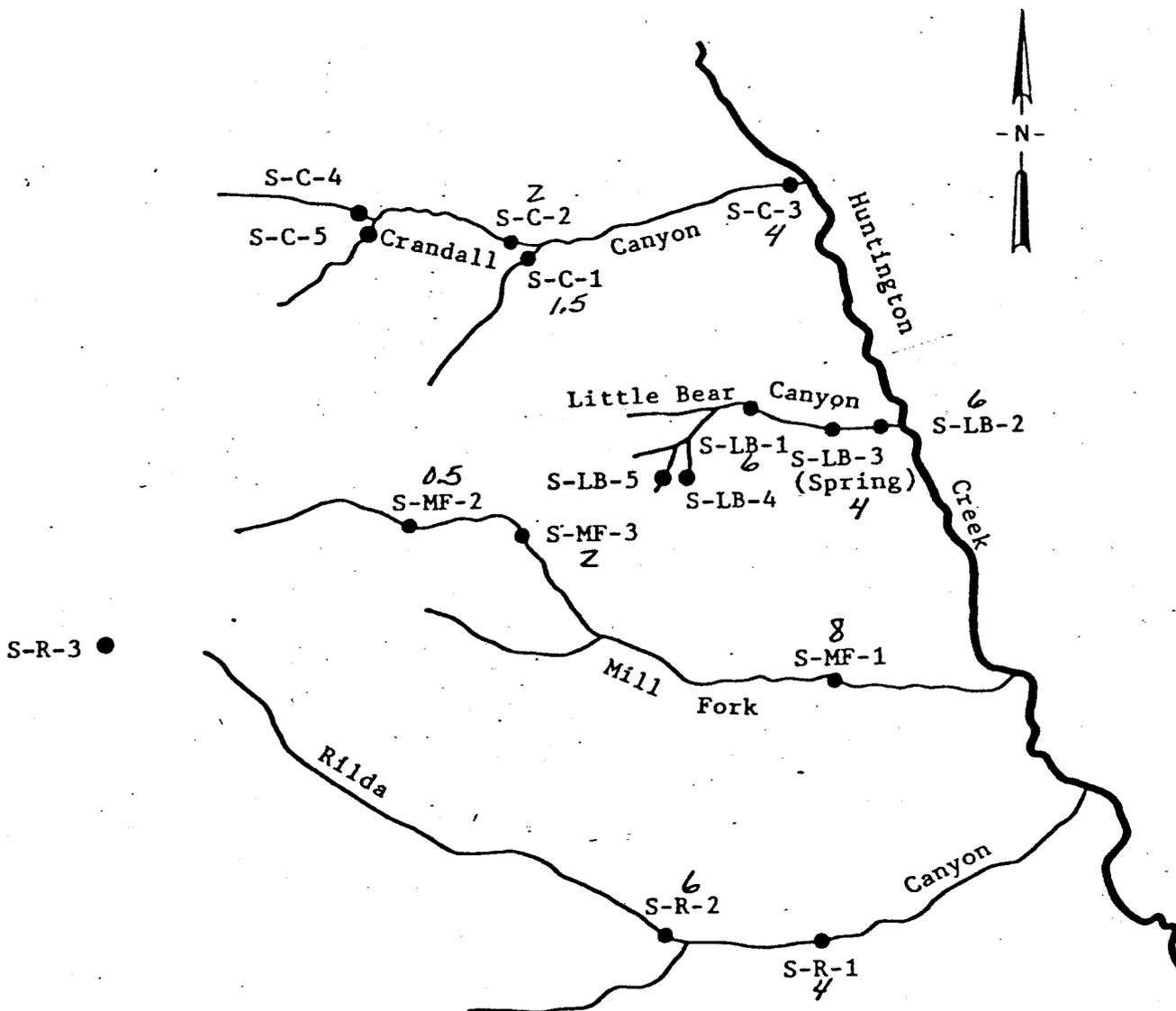
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Chloride
Date November 8-12, 1976

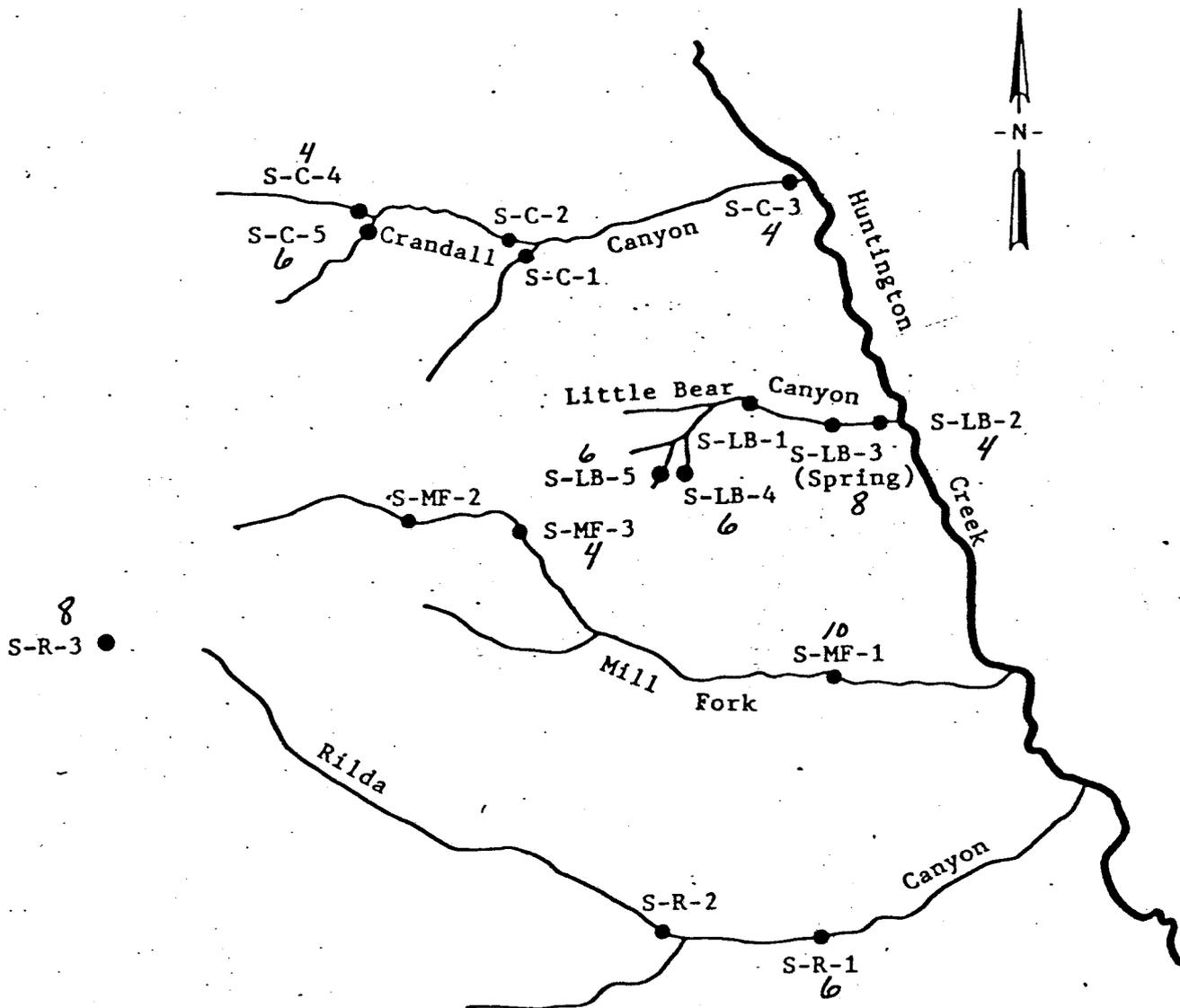
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 250 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

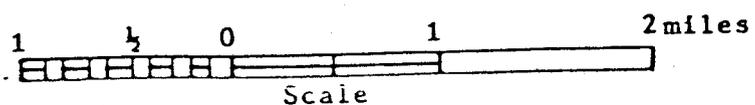


Parameter Chloride
Date May 31 to June 4, 1977

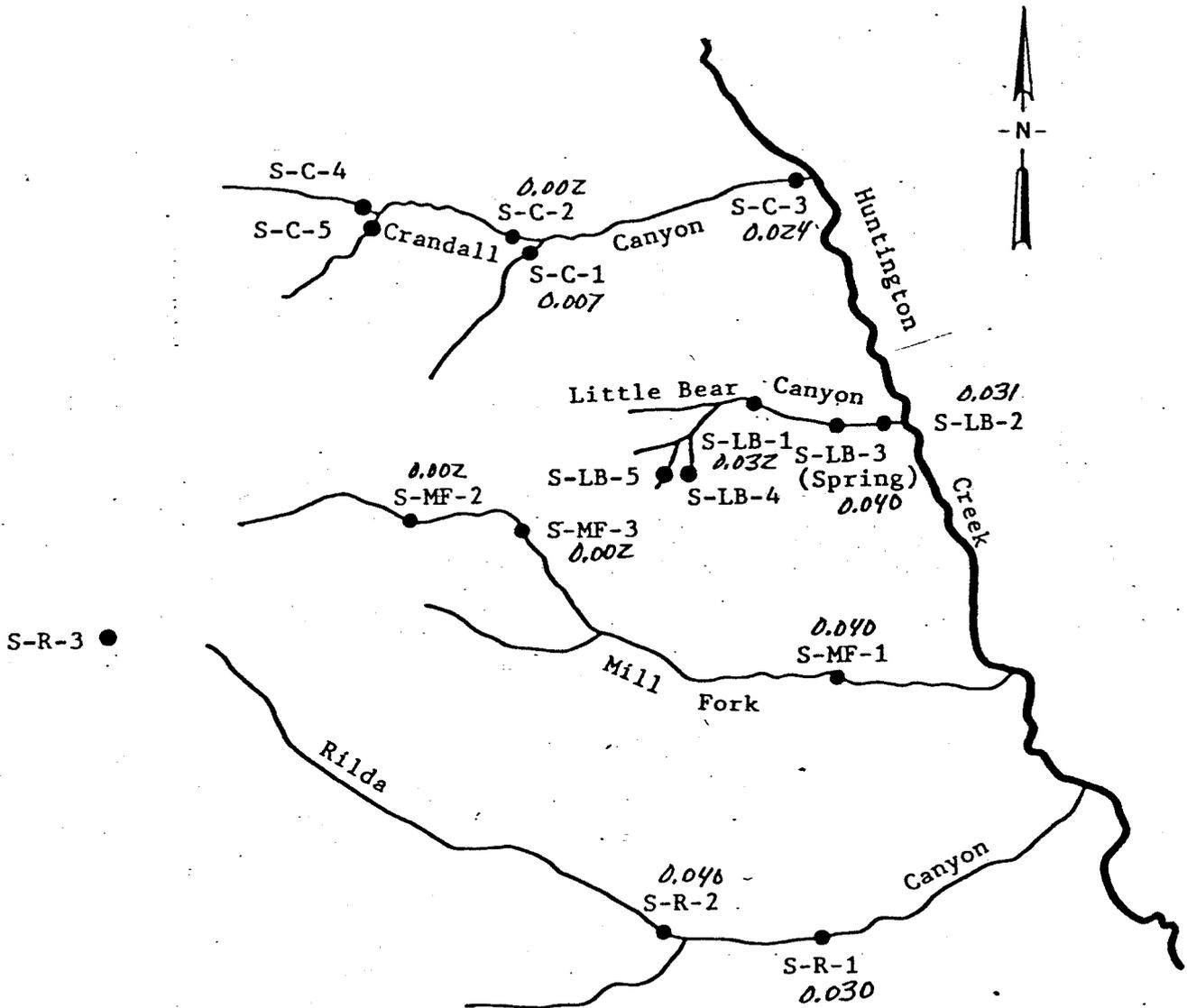
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 250 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

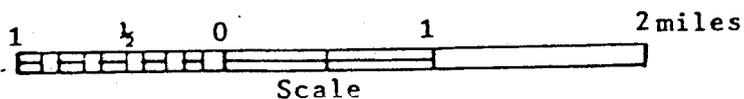


Parameter Copper
Date November 8-12, 1976

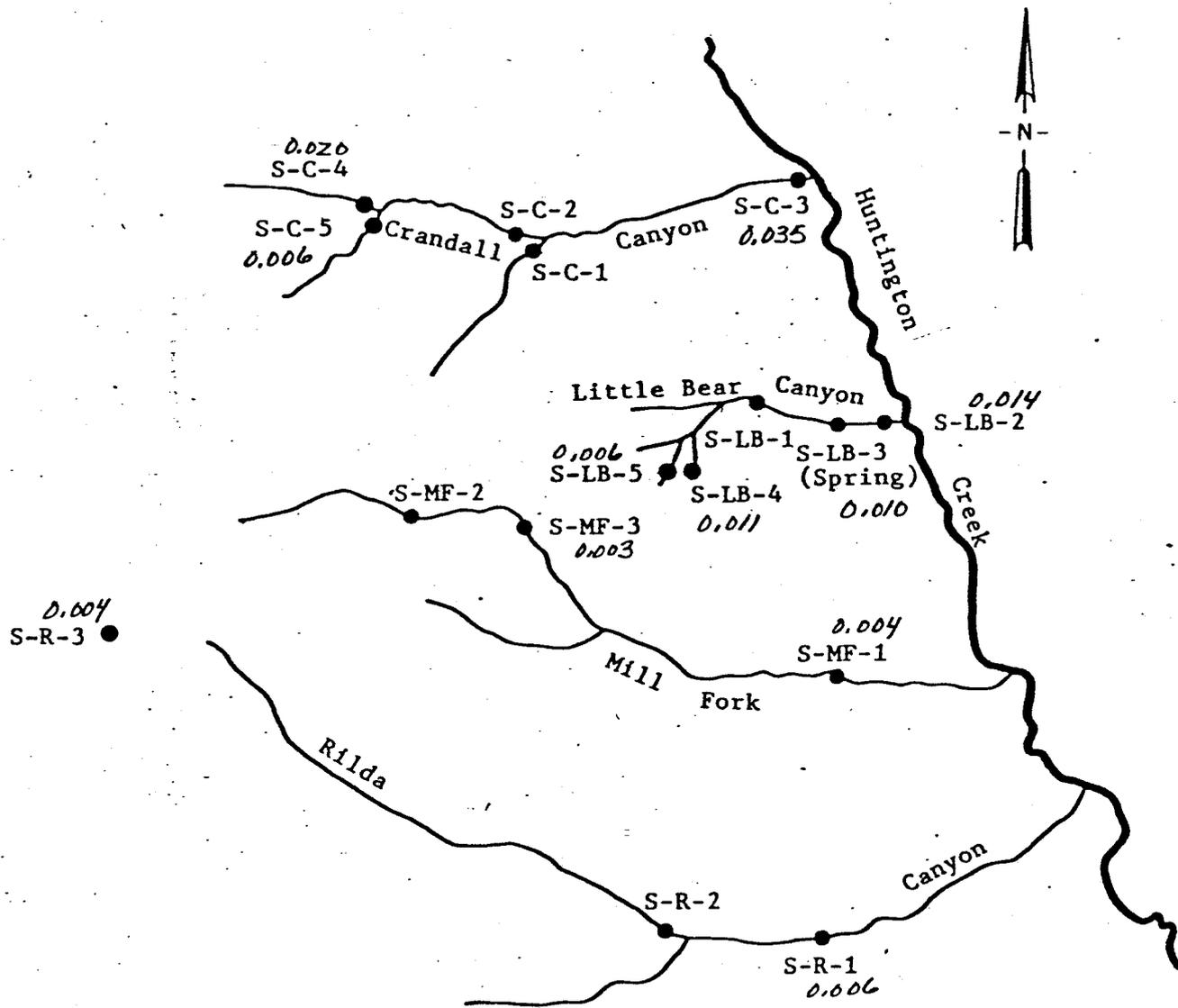
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 1.0 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Copper
Date May 31 to June 4, 1977

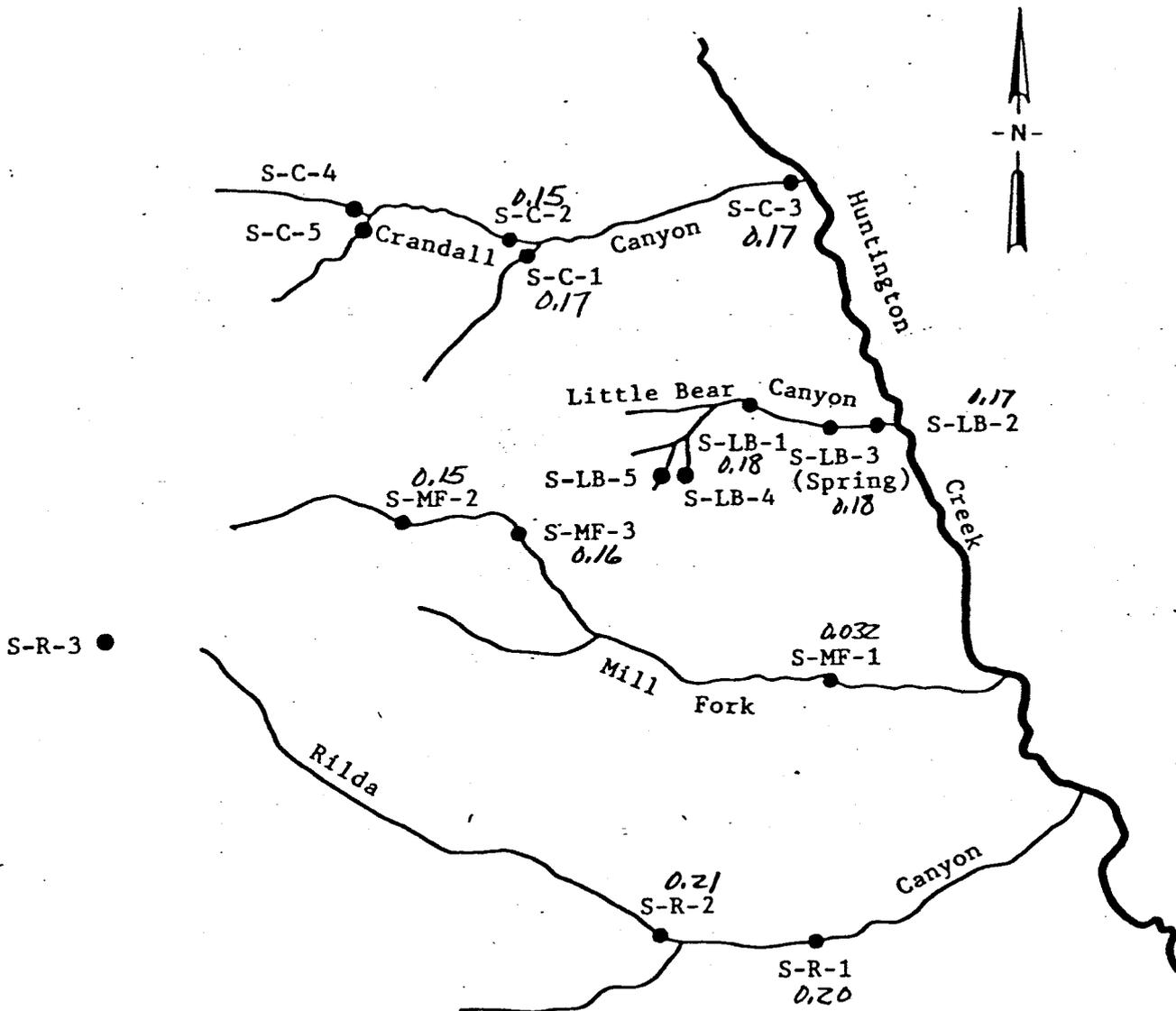
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 1.0 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Fluoride
Date November 8-12, 1976

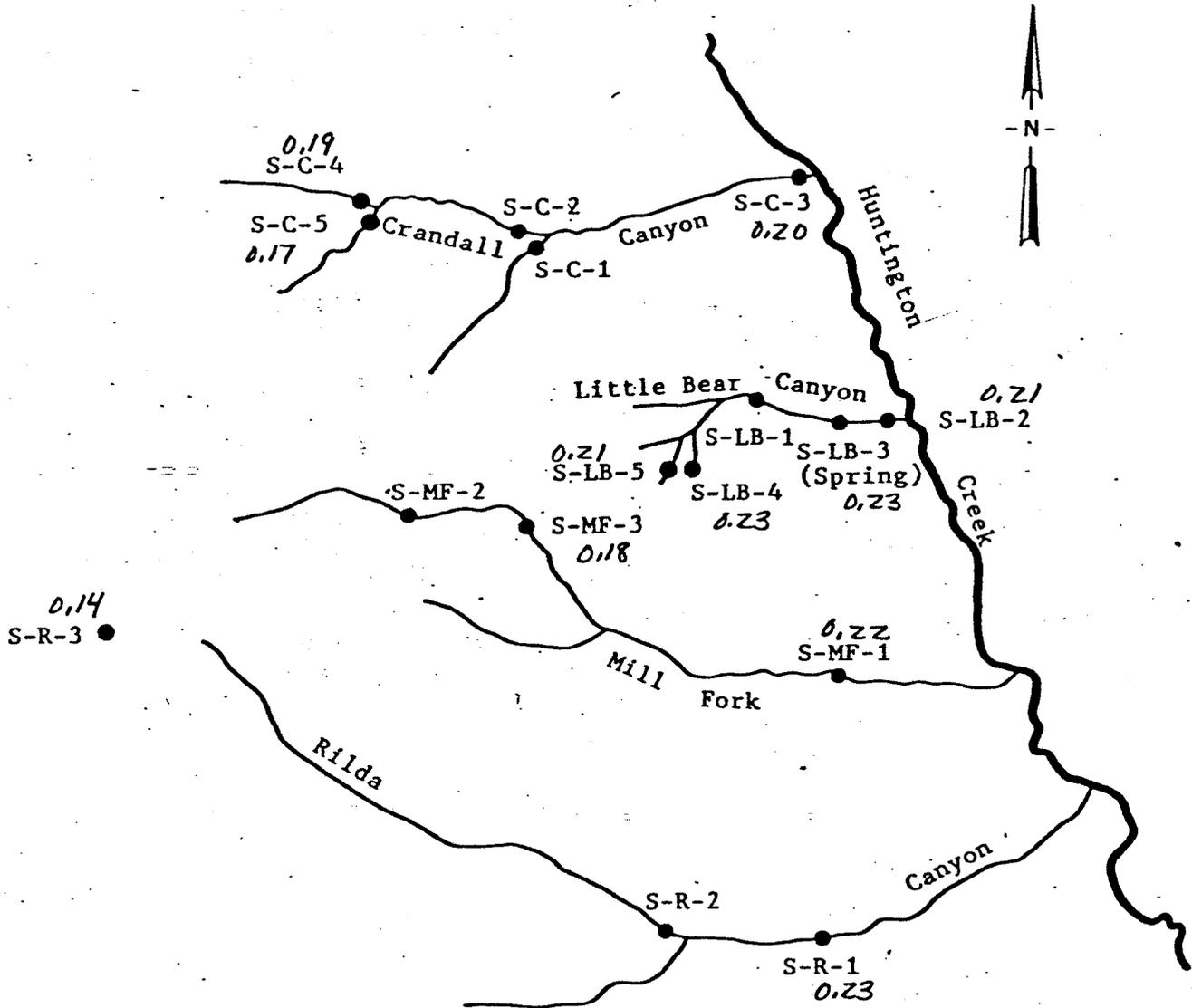
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
upper 1.0 mg/l Recommended
2.0 mg/l mandatory

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Fluoride
Date May 31 to June 4, 1977

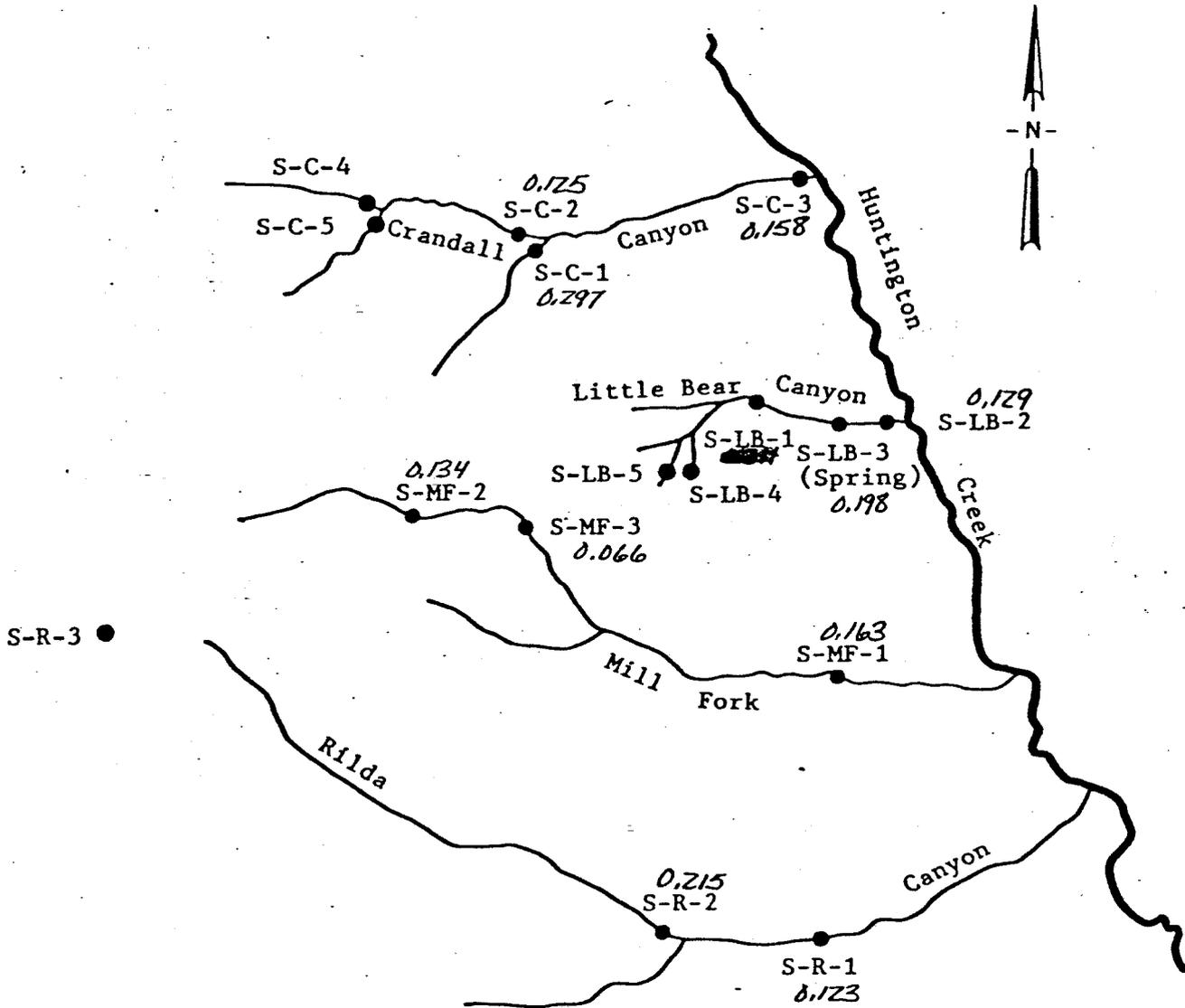
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
upper 1.0 mg/l Recommended
2.0 mg/l Mandatory

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Iron - (Total)
Date November 8-12, 1976

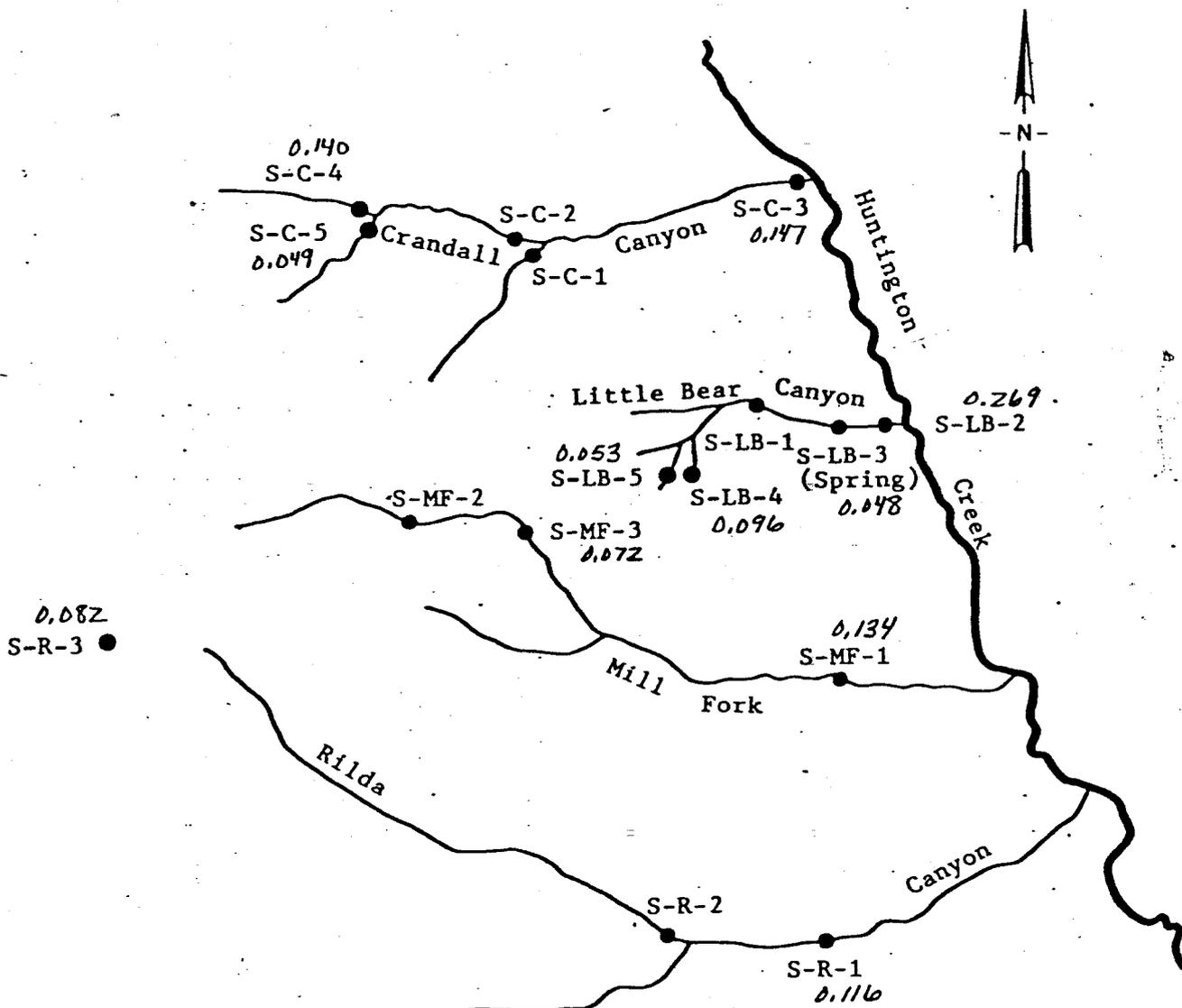
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 0.3 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Iron (Total)
Date May 31 to June 4, 1977

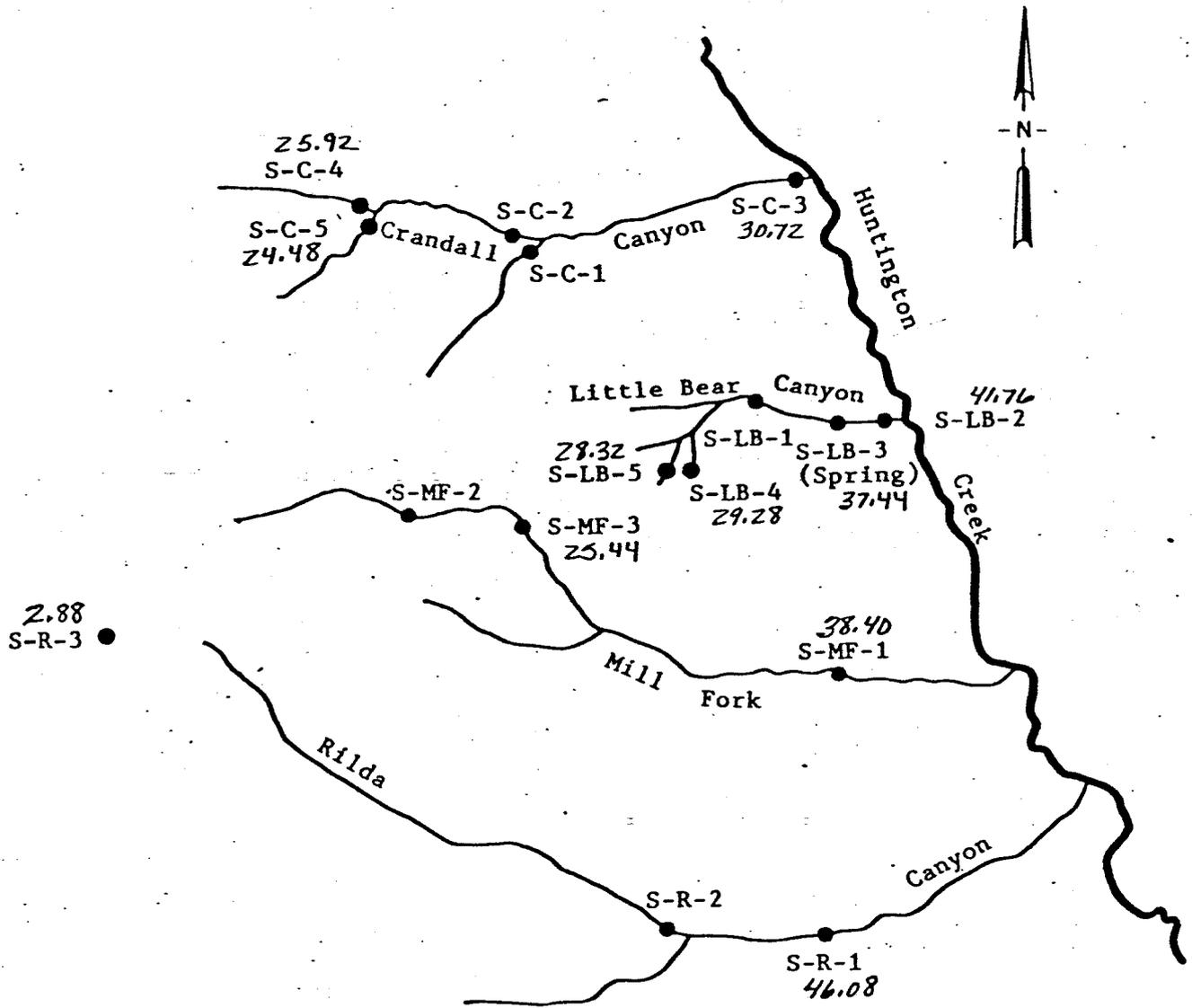
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 0.3 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

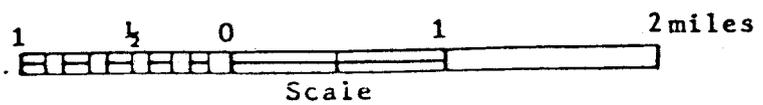


Parameter Magnesium
Date May 31 to June 4, 1977

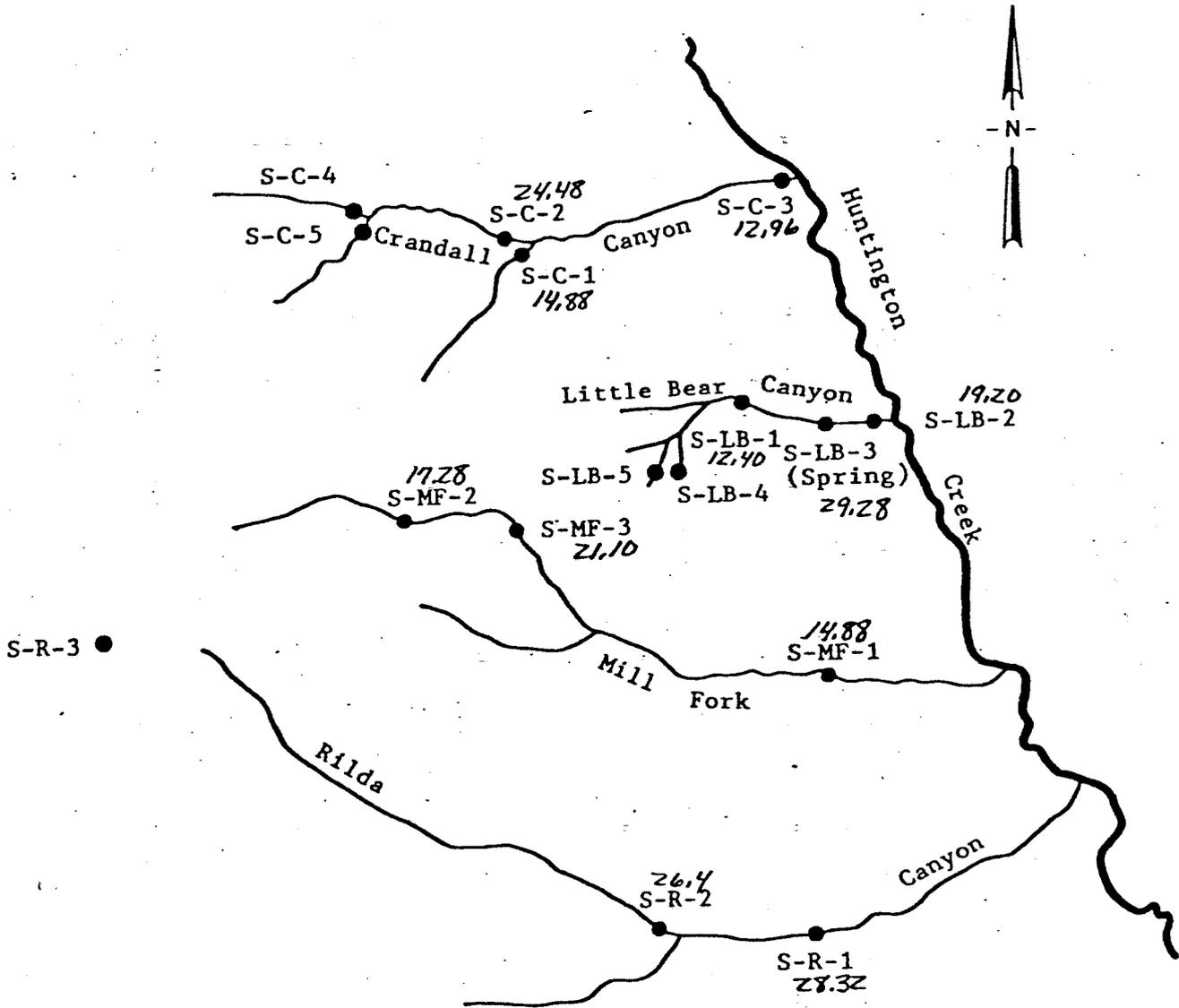
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Magnesium
Date November 8-12, 1976

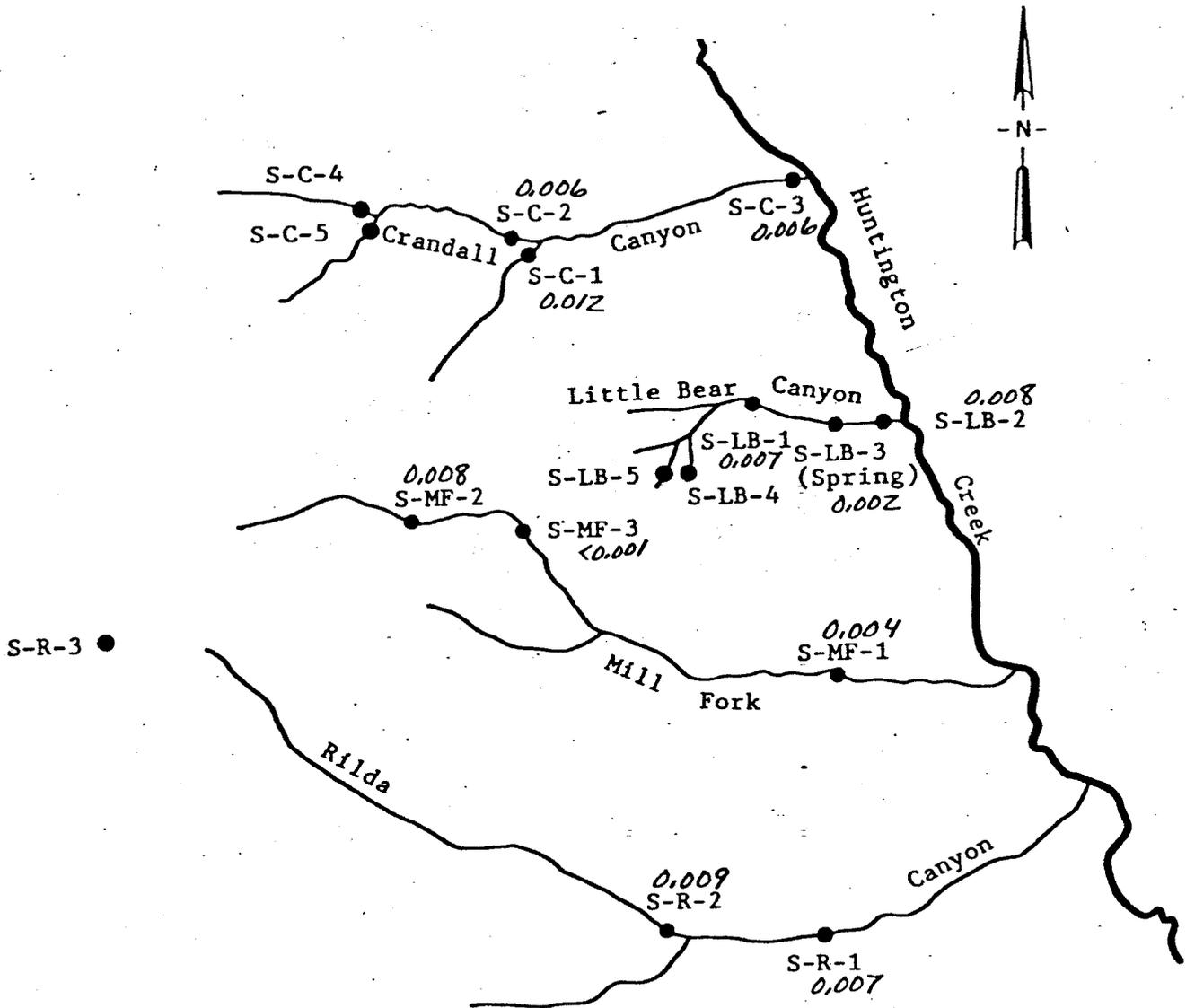
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Manganese
Date November 8-12, 1976

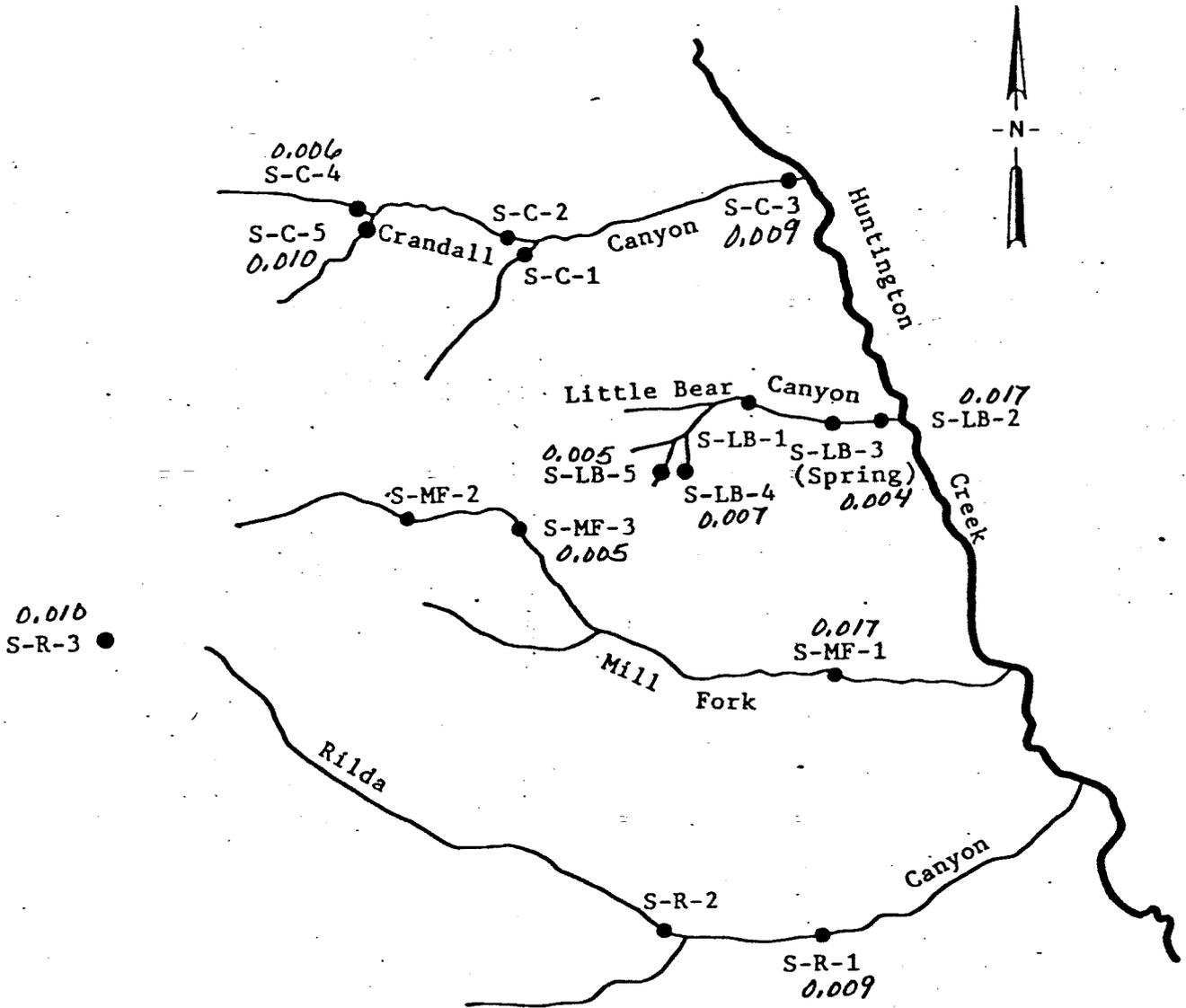
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 0.05 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
 HUNTINGTON CREEK MINE 4
 SWISHER COAL COMPANY



Parameter Manganese
 Date May 31 to June 4, 1977

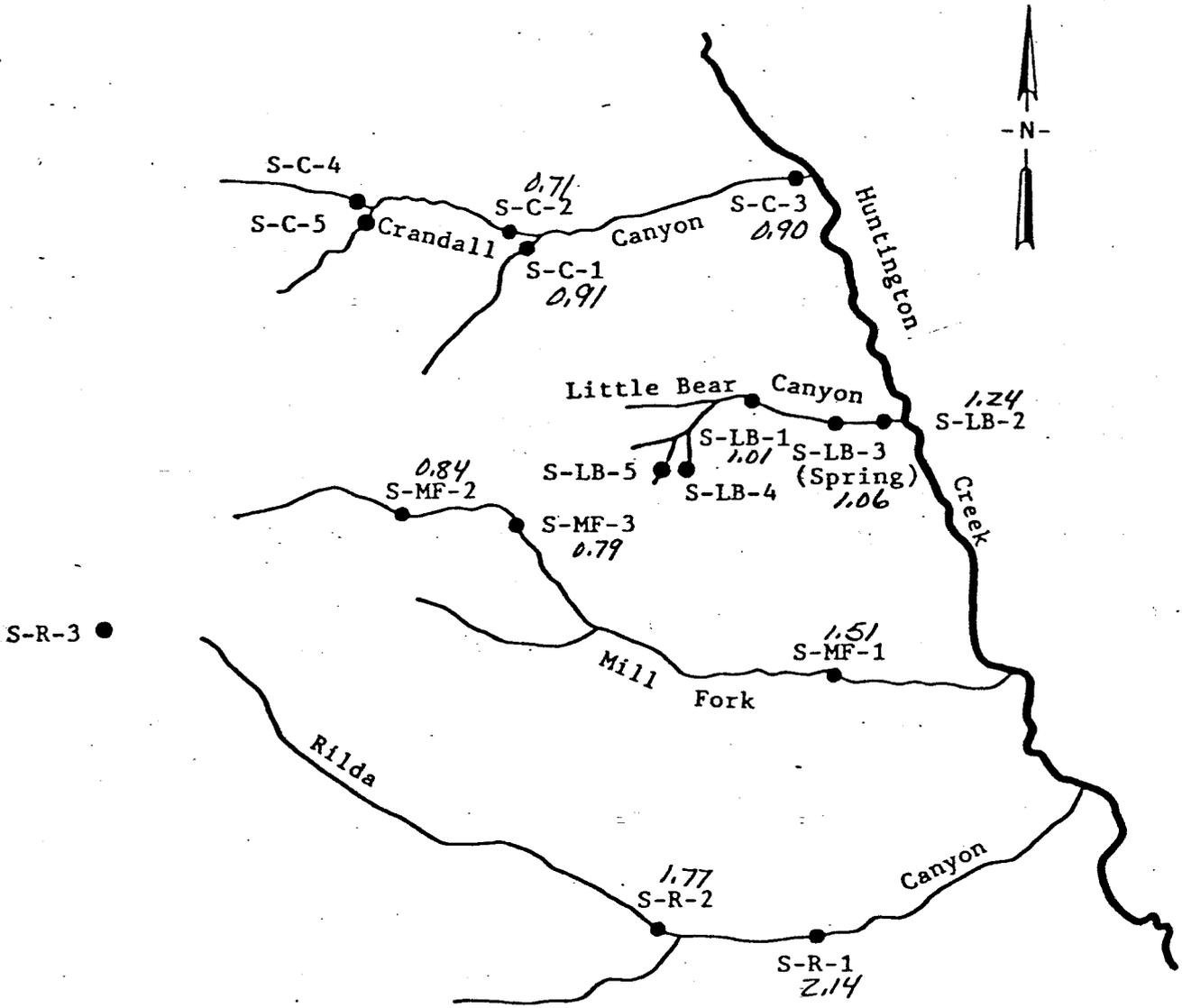
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
 lower _____
 upper 0.05 mg/l Recommended

Vaughn Hansen Associates
 5620 South 1475 East
 Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Potassium
Date November 8-12, 1976

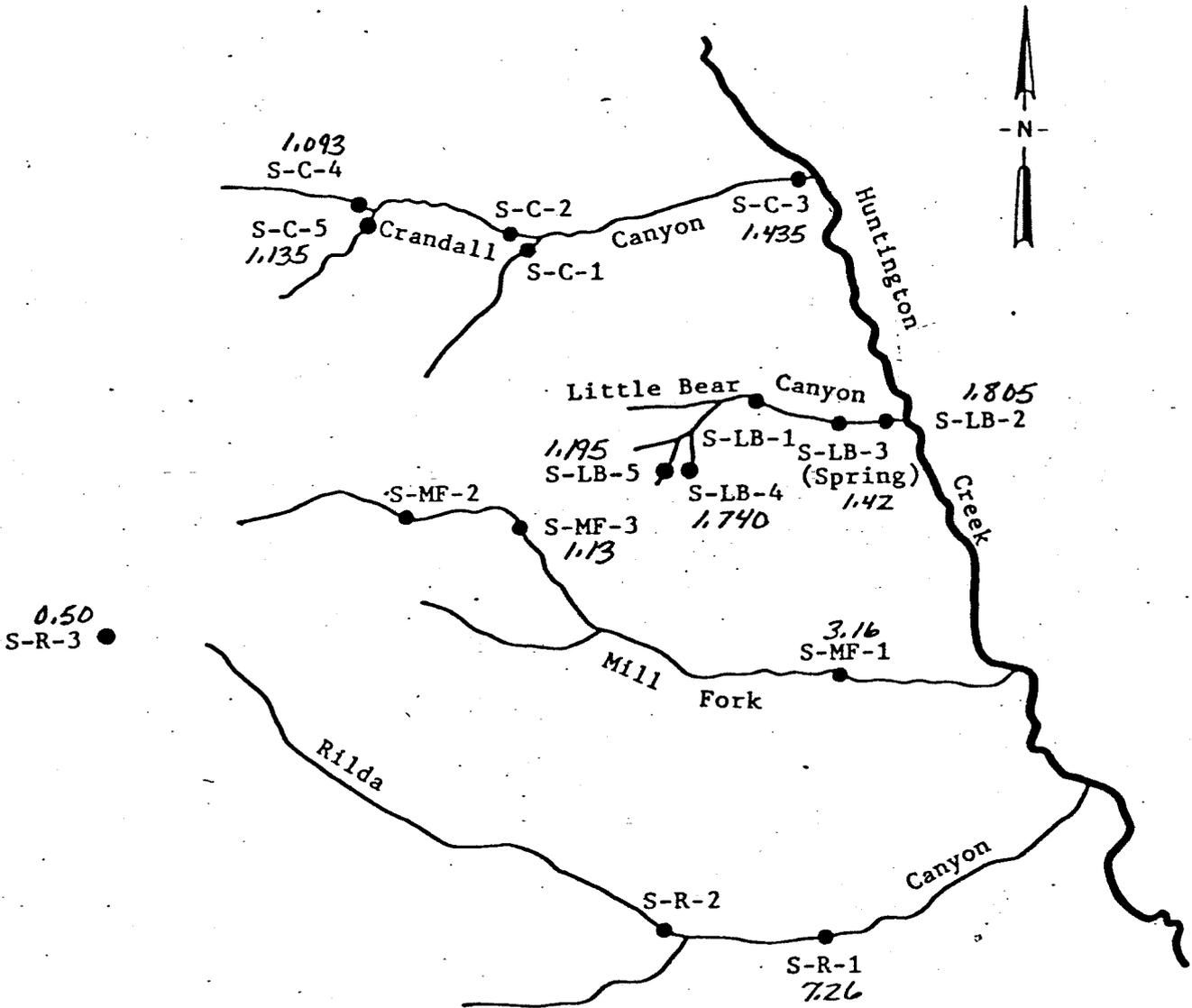
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

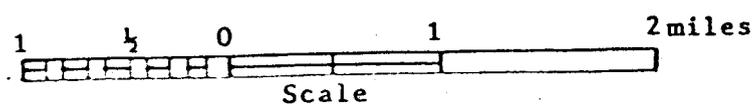


Parameter Potassium
Date May 31 to June 4, 1977

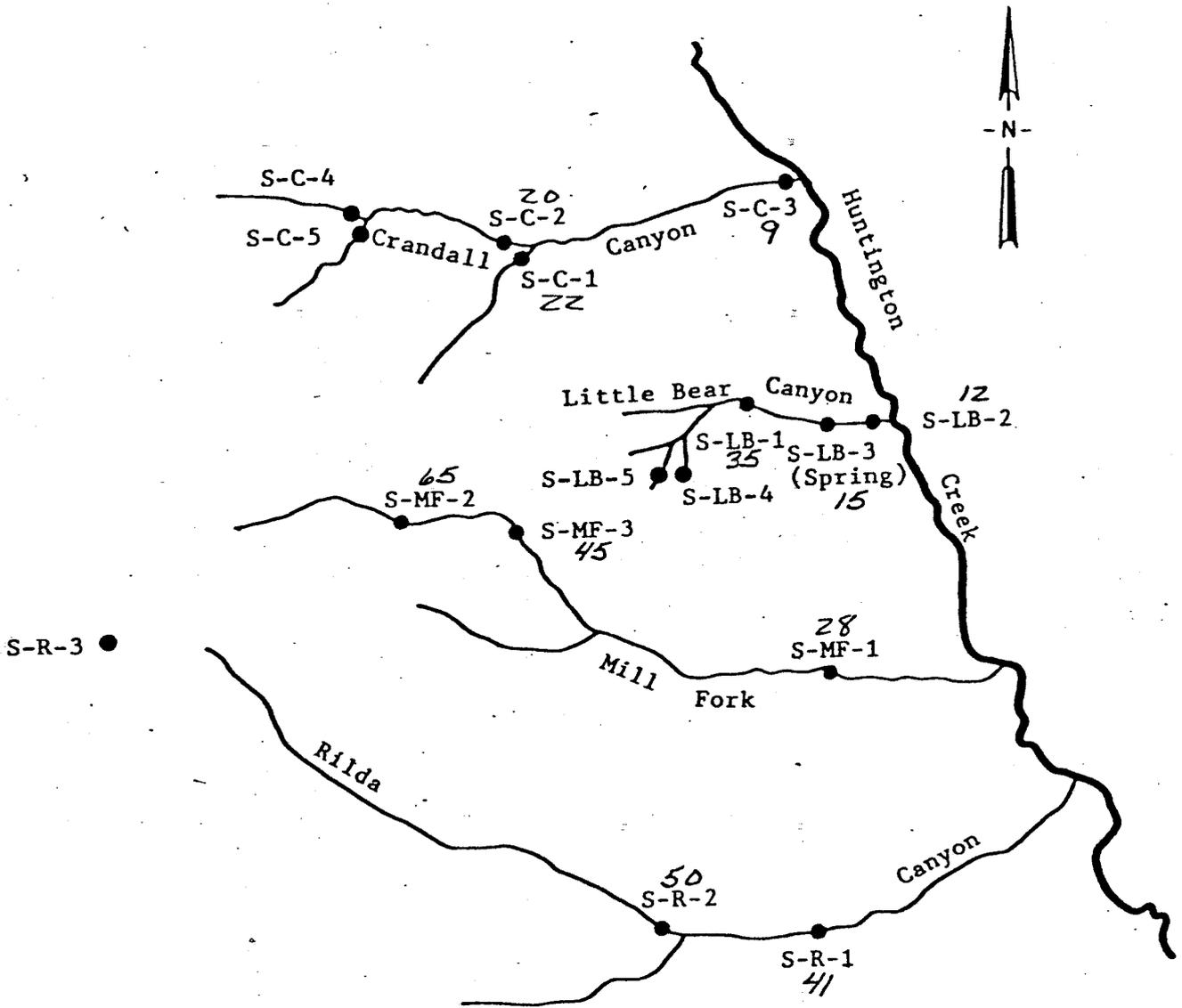
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Sodium
Date November 8-12, 1976

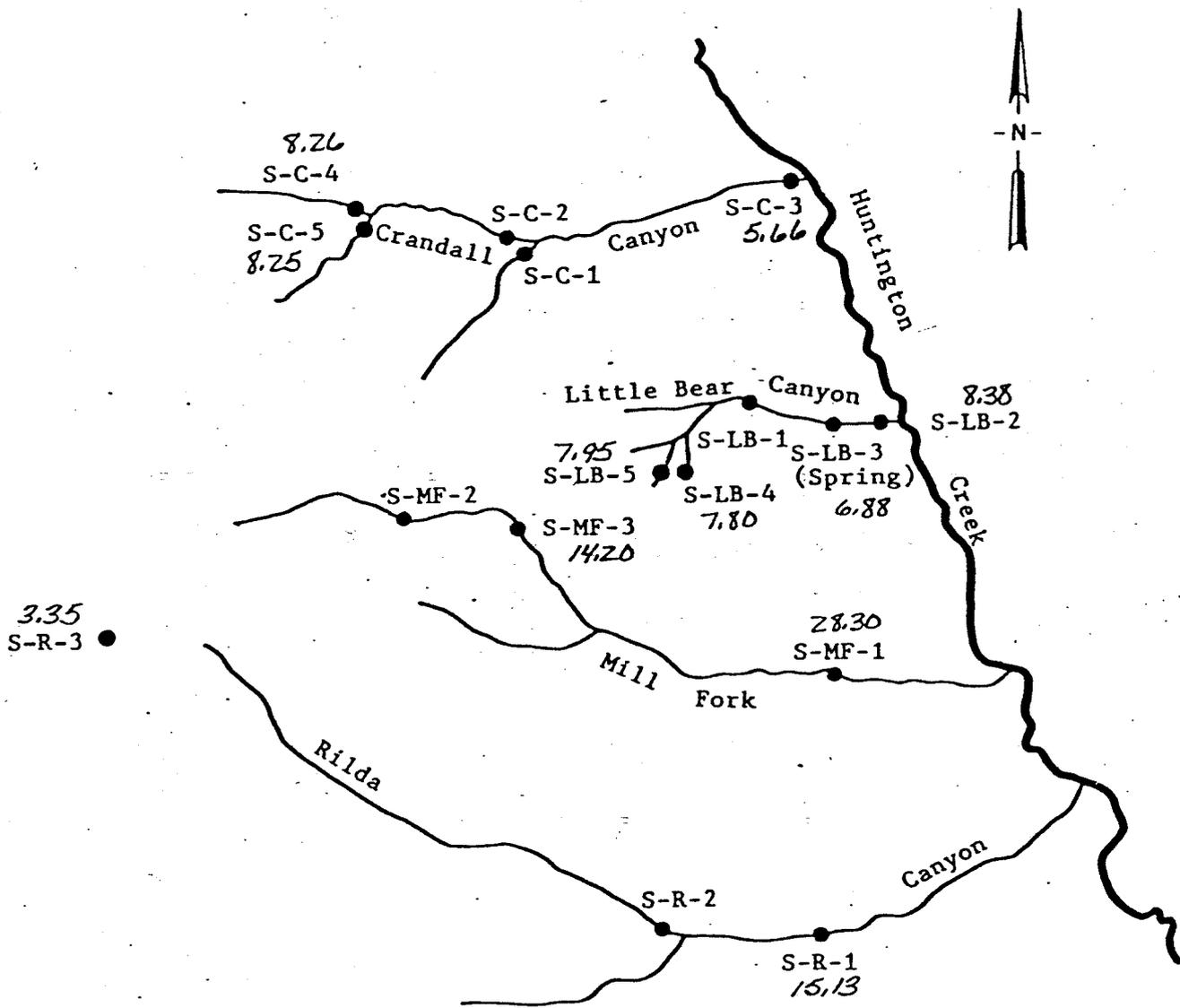
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY

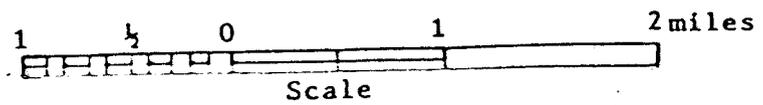


Parameter Sodium
Date May 31 to June 4, 1977

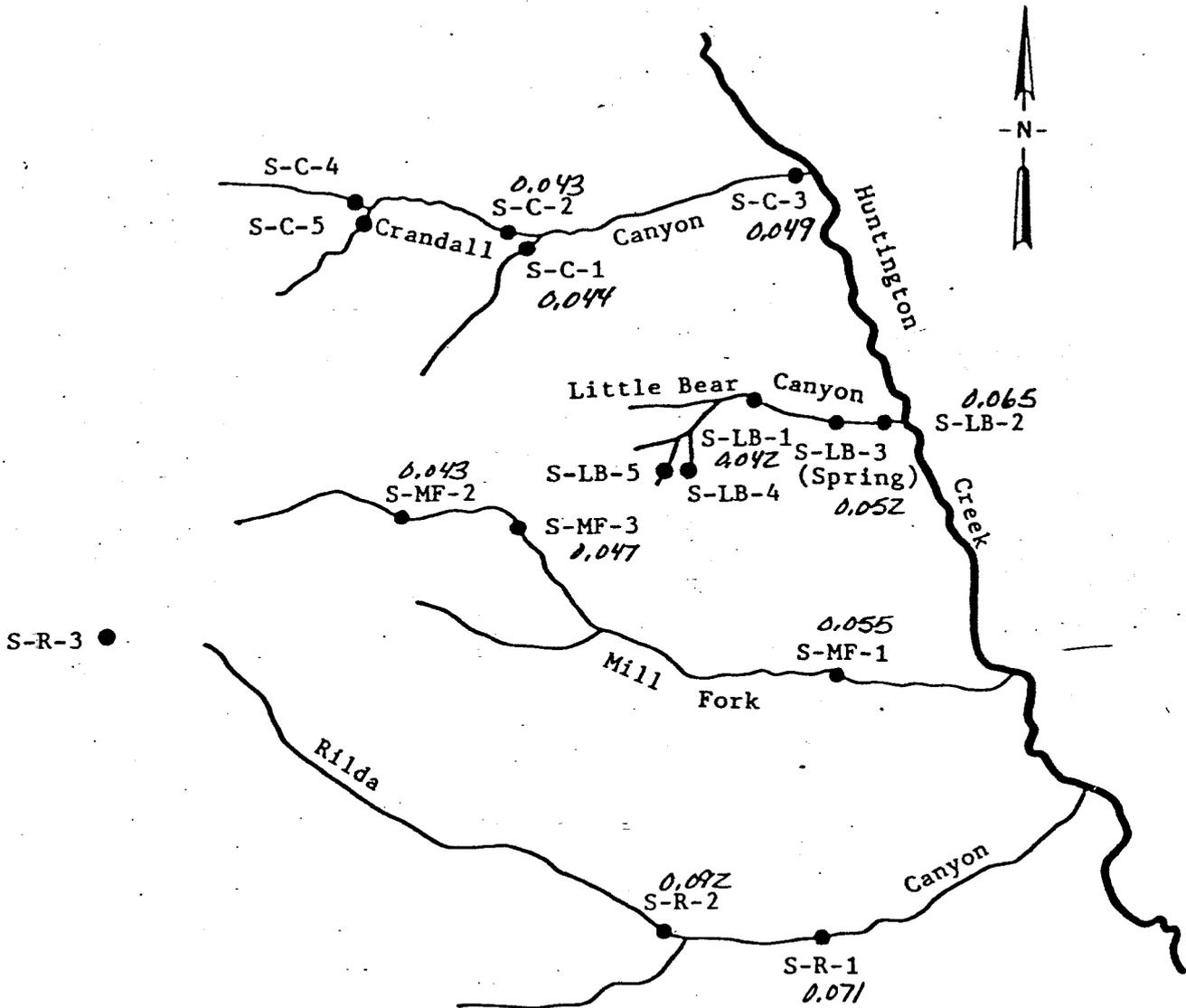
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper _____

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Zinc
Date November 8-12, 1976

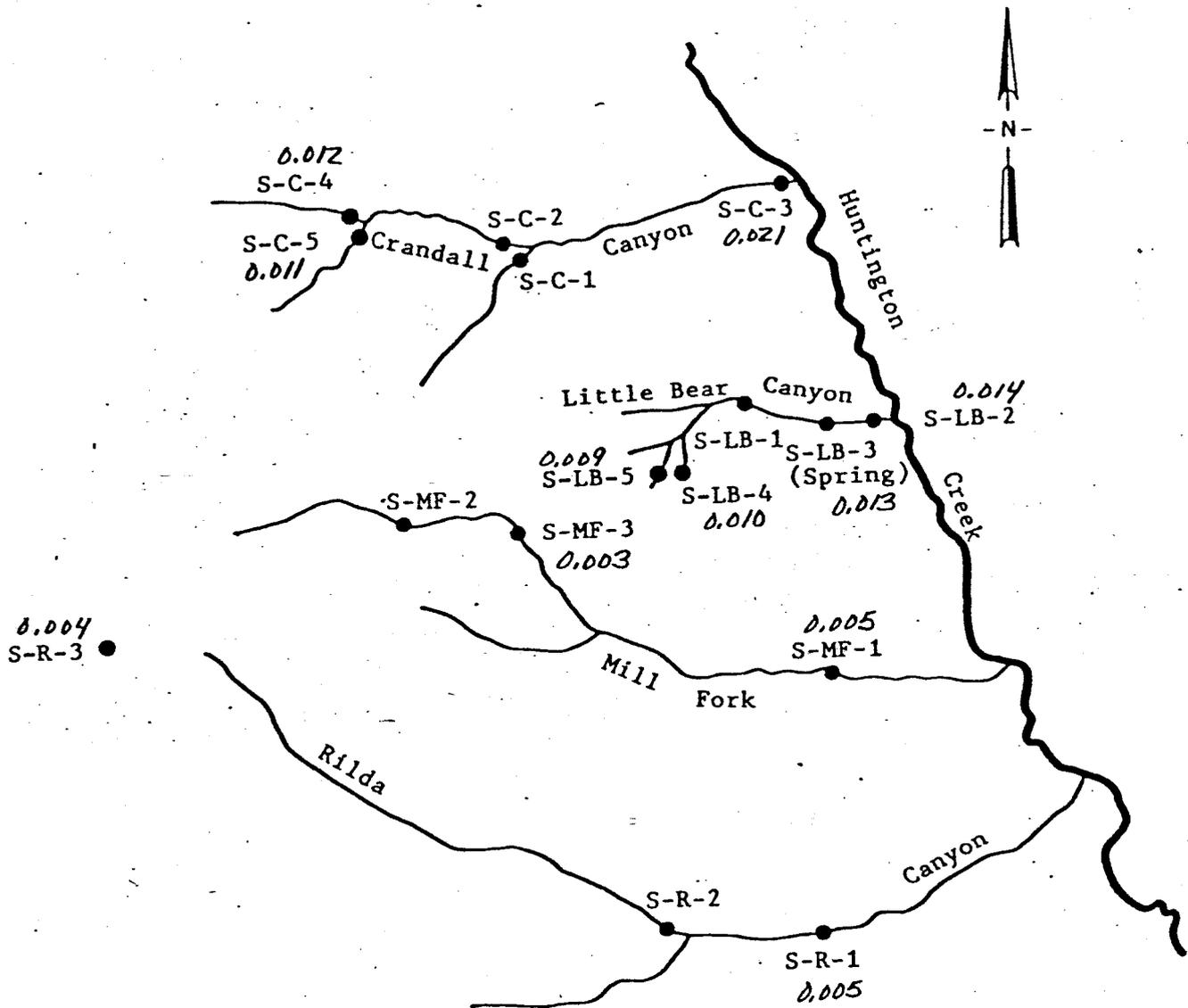
NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:
lower _____
upper 5.0 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121



WATER QUALITY SAMPLING LOCATIONS
HUNTINGTON CREEK MINE 4
SWISHER COAL COMPANY



Parameter Zinc
Date May 31 to June 4, 1977

NOTE: Stations marked in red are outside of state limits for the sample taken during the above sampling period.

LIMITS:

lower
upper 5.0 mg/l Recommended

Vaughn Hansen Associates
5620 South 1475 East
Salt Lake City, Utah 84121





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

File

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

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

March 26, 1982

Ms. Shirley Lindsay
Office of Surface Mining
Brooks Towers
1020 15th Street
Denver, Colorado 80202

RE: Revegetation Seed Mix
Huntington #4 Mine
ACT/015/004

Dear Shirley:

Enclosed are copies of the correspondence that has been generated by our office, ARCO Coal, and the U.S. Forest Service, concerning the final revegetation seed mix at the Huntington #4 Mine.

The contact person at the Forest Service is Reed Christensen, Forest Supervisor of the Manti-LaSal National Forest. His phone number is (801) 637-2817. Please keep us informed of any agreements that are developed between your office and the Forest Service on this issue.

Sincerely,

Susan C. Linner
SUSAN C. LINNER
RECLAMATION BIOLOGIST

Enclosures

SCL/tr

ARCO Coal Company
555 Seventeenth Street
Denver, Colorado 80202
Telephone 303 575 7502

Environmental Services

ACT/015/004
JWE
To MaryAnn



September 30, 1980

Mr. Ronald W. Daniels
Deputy Director
Division of Oil, Gas & Mining
1588 West North Temple
Salt Lake City, Utah 84116

Dear Mr. Daniels:

Enclosed for your review are two copies of reports sent to OSM in response to two special stipulations for the Beaver Creek Coal Company, Huntington Canyon #4 Mine, Mining and Reclamation Plan. Special Stipulation No. 14 addresses description of all springs and surface water courses. Special Stipulation No. 22 addresses revegetation reference areas vegetation survey. A complete vegetation survey will be submitted the first week of November.

Submission of these reports is made by Atlantic Richfield Company on behalf of Beaver Creek Coal Company. The reports are intended to satisfy the attached guidelines to Don Crane's (OSM) letter of January 30, 1980 to Max Robb, President of Beaver Creek Coal Company and yourself.

If you should have any questions concerning this matter, please call myself (303) 575-7404 or Ben Costello, Manager of Permits and Compliance at (303) 575-7525.

Sincerely,

A handwritten signature in cursive script that reads "James A. Ives".

James A. Ives
Principal Environmental
Coordinator

JAI:cdt

SPECIAL STIPULATION NO. 22 - REVEGETATION REFERENCE AREAS
VEGETATION SURVEY
HUNTINGTON CANYON #4 MINE, BEAVER CREEK COAL COMPANY

A revegetation area was selected June 1980 by consultants based on vegetation types which occurred on the site prior to disturbance. Also, similar soils, slope, and aspect were considered in site selection.

The soils, underlying the reference area are a combination of the Patmos, and Podo series. Slopes range from 60-90 percent. The aspect of the area is southfacing. The actual reference area lies directly above and north of the Huntington Canyon #4 mine portal. This locates the reference area in close proximity to the actual area of disturbance (See Exhibit 1).

PRODUCTION DATA

Total dry weight production per square meter in the Reference Area ranged from a high of 71.1 g/m² in sample plot number two to a low value of 2.8 g/m² in sample plot number 14. The mean production value was 24.6 g/m² for this area. Refer to Table 1 for a detailed account.

The range in production in the Sample Area (affected) was from a high of 48.7 g/m² in sample plot number 10 to a low of zero g/m² in plots seven and 15. The mean was 13.5 g/m² for the affected area. Refer to Table 2.

The dominant plant species in each area, in terms of productivity as measured by dry weight, was Elymus salina (Salina wildrye). This species represented 99.5% and 85.7% of the total productivity in the Sample Area and Reference Area, respectively.

TABLE 1
 REFERENCE AREA
 Dry Weight in Grams/m²

Species	Plot Number															Total (1-15)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Grasses																
<i>Elymus Salina</i>	27.4	22.3	23.9	57.1	44.4	23.9	47.7	9.1	11.4	13.1	8.3	11.0		2.7	6.8	309.1
<i>Oryzopsis hymenoides</i>						0.2			0.1				6.3			6.6
TOTAL GRASSES	27.4	22.3	23.9	57.1	44.4	24.1	47.7	9.1	11.5	13.1	8.3	11.0	6.3	2.7	6.8	315.7
Forbs																
<i>Gutierrezia microcephala</i>		43.4														43.4
<i>Lithospermum sp.</i>			0.7													0.7
Unknown Compositae #1														0.1		0.1
Unknown Compositae #2		1.3														1.3
Unknown #3						2.6										2.6
TOTAL FORBS		44.7	0.7			2.6								0.1		48.1
Shrubs																
<i>Mahonia repens</i>		4.1		0.5												4.6
TOTAL SHRUBS		4.1		0.5												4.6
OVERALL TOTAL	27.4	71.1	24.6	57.6	44.4	26.7	47.7	9.1	11.5	13.1	8.3	11.0	6.3	2.8	6.8	368.4

TABLE 2
 SAMPLE AREA
 Dry Weight in Grams/m²

	Plot Number															Total (1-15)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Grasses																
Elymus salina	8.0	8.3	33.1	0.8	4.0	0.5		12.8	20.0	48.7	2.7	12.4	4.8	18.9		175.0
TOTAL GRASSES	8.0	8.3	33.1	0.8	4.0	0.5		12.8	20.0	48.7	2.7	12.4	4.8	18.9		175.0
Forbs																
Lithospermum sp.				0.3												0.3
Unknown Compositae						0.5										0.5
TOTAL FORBS				0.3		0.5										0.8
OVERALL TOTAL	8.0	8.3	33.1	1.1	4.0	1.0		12.8	20.0	48.7	2.7	12.4	4.8	18.9		175.8

ARCO Coal Company
Permits and Compliance Group
635 Seventeenth Street
Mailing Address: Box 5300
Denver, Colorado 80217
Telephone 303 575 7500

File Act/015/004
To Mary Ann
Jim

RECEIVED

NOV 20 1980

DIVISION OF
OIL, GAS & MINING

November 7, 1980

Mr. Donald Crane
Director Region V
Office of Surface Mining
2nd Floor, Brooks Tower
1020 15th Street
Denver, CO 80202

Dear Mr. Crane:

Enclosed please find seven (7) copies of the completed vegetation survey report for the Beaver Creek Coal Company, Huntington Canyon #4 Mine (OSM Reference No. UT 0004). The report extends the information submitted on September 26, 1980 for Special Stipulation No. 22 - Revegetation reference areas vegetation survey.

Submission of the reports is made by Atlantic Richfield Company on behalf of Beaver Creek Coal Company. The reports are intended to satisfy the requirements of a vegetation survey.

If you should have any questions concerning this matter, please call me at 575-7525.

Sincerely,

Benjamin Costello/mab

Benjamin Costello III
Manager
Permits and Compliance

cc: Ron Daniels/Utah Division of Natural Resources
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BC:bea

VEGETATION SURVEY HUNTINGTON CANYON

#4 MINE PRICE, UTAH

SUBMITTED BY ARCO COAL

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DENVER, COLORADO 80217

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INTRODUCTION

This report was prepared by ARCO Coal Company based on vegetation studies performed by Espey, Huston, & Associates. The Huntington Canyon Mine No. 4 is located within the Pinyon-Juniper Vegetation Zone as described by Cronquist, et al. (1972). This forest type occupies extensive areas in the Intermountain Region. Where the valleys are low in elevation these woodlands are restricted to the slopes of mountains. However, they form a continuous expanse from mountain to mountain in eastern Nevada, the Uinta Basin, and the Canyon Lands of eastern Utah where the elevation is higher.

The pinyon-juniper zone is characterized by low evergreen trees which rarely exceed 20 feet in height and are usually spaced so their branches do not touch. The understory is a combination of shrubs and herbaceous plants, often with nearly bare ground. Dominant species vary with elevation and geography. The predominant species are pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*) and western juniper (*Juniperus occidentalis*).

MATERIALS AND METHODS

VEGETATION

A quantitative and qualitative vegetation and floristic survey was conducted on 30 July - 8 August and 24-26 September 1980. The purpose of the floristic survey was to determine and list the plant species by community and to identify any threatened or endangered species resident on the Huntington Canyon No. 4 Lease Area. This was accomplished by a walking reconnaissance of the property noting species occurrence and their distributions in the various communities. The purpose of the vegetation survey was to determine the pattern and distribution of the plant communities by quantitative and qualitative sampling. Sampling was randomly determined. Points were located using numbers obtained from a random number table.

Vegetation Map

A vegetation map (See Exhibit #1) of the Huntington Canyon No. 4 Lease Area and adjacent areas was prepared from black and white aerial imagery obtained from ARCO Coal Company. Visually distinct areas on the photos were inspected on the ground, and the vegetation characterized by community type. Community types were delineated based on two or more dominant species. The vegetative types were also quantified in terms of acreage and percentage of the study area. Sampling locations, both reference and affected area, are also indicated on the map. The community types recognized as being of sufficient extent to warrant separation into individual communities are pinyon-juniper

woodland, Douglas-fir, sagebrush-grassland and oak shrubland. Only the pinyon-juniper woodland community occurs in the area of disturbance. The method used to sample this community is described in the following section.

Pinyon-Juniper Woodland

A line transect composed of 50 0.1 m^2 (20 X 50 cm) quadrats spaced at 1-m intervals was used to sample the ground cover in this community (Daubenmire, 1959). The location and orientation of the line transects were randomly determined. Within each quadrat, the percentage of ground covered by a vertical projection of the foliage of each species was estimated by visual inspection (Oosting, 1956).

The point-centered quarter method of Cottam and Curtis (1956) was used to sample the density of trees and shrubs. This method involves measuring the distance from an objectively selected point to the nearest tree in each of four quadrants and measuring and recording its diameter. The average point-to-tree distance is squared to compute the mean area for individual trees in the stand.

Standing crop biomass measurements were obtained from randomly located circular quadrats. The samples within the quadrats were harvested by clipping the standing vegetation at ground level. The clipped material was placed in paper bags, taken to the laboratory and dried in an oven for 24 hours at 105° C . The material was weighed on a triple beam balance to the nearest 0.1 gm. A quadrat size of 1 m^2 was used.

Data Analysis

Data reduction for the quadrats (20 X 50 cm) and line transects was carried out as follows:

$$\% \text{ Cover} = \frac{\text{areal coverage value}}{\text{total number of plots sampled}}$$

$$\text{Frequency} = \frac{\text{number of plots in which a species occurs}}{\text{total number of plots sampled}}$$

Total Basal Area = the sum of a species basal area

$$\text{Relative Frequency} = \frac{\text{frequency of a species}}{\text{total density of all species}} \times 100$$

$$\text{Relative Density} = \frac{\text{density of a species}}{\text{total density of all species}} \times 100$$

$$\text{Relative Dominance} = \frac{\text{total basal area of a species}}{\text{total basal area of all species}} \times 100$$

$$\text{importance percentage} = \frac{\text{relative frequency} + \text{density} + \text{relative dominance}}{3}$$

In many comparative studies, where the main emphasis is on contrast between two or more stands of approximately similar overall density and dominance, better differentiation is frequently obtained by the use of relative

rather than absolute values, as above. Each of these relative measures indicates one aspect of the importance of the species in the community, but a better measure is obtained by combining them by summation. The total of the relative frequency, density, and dominance when divided by 3 is called the importance percentage and should add to 100 for each stand. Rounding errors often cause this sum to be a little above or below the 100 value (Curtis and Cottam, 1962).

Species Diversity

The Shannon-Wiener Diversity Index was used to calculate diversity for the affected and reference areas. The formula (Cox, 1979) used was:

$$D = 3.3219 \left(\log_{10} N - \frac{1}{N} \sum n_i \log_{10} n_i \right) \text{ where}$$

N = total cover of all species

n_i = cover of the i^{th} species

3.3219 = conversion factor from \log_{10} to \log_2

Sample Adequacy

Since a block design was used to gather cover data, the following formulas (Mendenhall, 1967, 1968) were used to determine an adequate sample size for the number of transects (n_1) and the number of points within a transect (n_2).

$$n_1 = \frac{1}{B} \left(\frac{\sigma^2 \alpha + \sigma^2}{\sqrt{\sigma^2}} \right)$$

$$n_2 = \frac{\sigma}{\sigma_\alpha}$$

where

$$B = (d\bar{x})^2$$

d = amount of reduction it is desired to detect

$$\sigma^2 \propto \frac{MSA - MSB}{n_1 n_2}$$

A completely randomized design was used to collect production data. The following formula (Wyoming DEQ, 1979) was used to determine an adequate sample size.

$$n \geq \frac{1 (s z)^2}{(d\bar{x})^2}$$

where

n = minimum number of quadrats to measure production,

s = sample standard deviation

Z = the Z statistic (0.84)

d = amount of reduction it is desired to detect (0.2)

\bar{x} = sample mean of production per quadrat

RESULTS AND DISCUSSION

VEGETATION

The Huntington Canyon Lease Area is composed of four community types, (Figure 1 and Table 1). Some of the factors that influence the distribution of these communities on the lease area are elevation, slope, aspect, soil, and drainage patterns.

A sagebrush - grassland community occurs on the higher elevated areas. This community occupies the driest sites. The proportions of sagebrush to grasses varies considerably from site to site. The dominant species are sagebrush (Artemisia tridentata) and Salina wild rye (Elymus salina).

The sagebrush - grassland community intergrades with both the Douglas-Fir and oak shrubland. The Douglas-Fir community occurs at the higher elevation, and in the drainage areas. This community is uncommon on south slopes, but dominates a number of northern slopes in the area. Aspen stands occur interspersed throughout the Douglas - Fir community.

The oak shrubland occurs interspersed with the sagebrush-grassland community in numerous areas. The oak shrubland apparently occur in the more moist sites than the sagebrush-grassland community. The dominant species is oak (Quercus gambellii), which ranges from 1-5 m in height. It forms tight dense thickets in some areas.

The pinyon-juniper community occurs on the dry southern slopes below 8000 feet. The dominant species are pinyon pine (Pinus edulis) and Utah juniper (Juniperus osteosperma). The dominant grass in the community is Salina wild rye. The mine and associated facilities are located in this community.

TABLE I
AREAL EXTENT OF VEGETATION ON HUNTINGTON MINE NO. 4
LEASE AREA, EMERY COUNTY, UTAH

Vegetation Type	Acres	Percentages
Pinyon-Juniper	628.97	48.31
Douglas-fir	147.90	11.36
Oak Scrub	113.01	8.68
Sagebrush-Grassland	63.01	4.84
Burned Area	<u>349.05</u>	<u>26.81</u>
TOTAL	1,301.94	100.00

The lease area consists of federal (U.S. Forest Service) and private lands. Livestock (cattle and sheep) currently are utilizing some of the areas on the lease. Sheep have utilized the area surrounding Mill Fork Peak and cattle currently graze the area along Mill Fork Creek.

A portion of the lease area has been burned. This area (Figure 1) burned both in 1952 and 1964. The area formerly consisted of Douglas-Fir stands. The burnt area consists of approximately 349 acres (Table 1). This represents 26.8% of the lease site.

Pinyon-Juniper Community - Affected Area

The pinyon-juniper community makes up 48.3% of the lease area. The elevation of the community ranges between 7500 to 8000. Five species reach tree status in this stand. The community is dominated by two coniferous species, pinyon pine and Utah juniper, which have a combined % Importance of 70.7.

Mountain mahogany (Cercocarpus montanus) is the dominant nonconiferous species with a % Importance of 22.6 (Table 2). The affected area contains 130.6 trees per ha. with a total basal area of 2037.4 dm²/ha.

Six species of shrubs are represented in this stand. The shrub layer is dominated by mountain mahogany and pinion pine (Table 3). Shrub density is only 71.7 per ha. Total shrub cover per ha is 16,565.4 dm².

The dominant ground cover is Salina wild rye with a cover of 18.2% (Table 4). None of the other species present are very common, making up only 2.7% of the total vegetational cover.

The estimated Annual Net Production (ANP) of clipped plots within the ground layer ranges from 1.0/m² to 48.7 g/m² with a mean of 12.3 g/m² (Table 5). Salina Wild rye contained 94% of the ANP occurring in the ground layer.

Pinyon-Juniper Community-Reference Area

The reference area is located (Figure 1) above the entrance to the mine portal. The reference area is 5 acres in size. The canopy vegetation is dominated by pinyon pine with a % Importance of 45.9% (Table 6). Utah juniper has an % Importance of 32.6%. The number of trees per ha. is 145.2 with a total basal area of 1771.4 dm². (decimeters²)

Five species of shrubs make up the shrub layer (Table 7). Pinyon pine and mountain mahogany are the most common shrubs having % Importance values of 47.5 and 25.3, respectively. There are 63.0 shrubs per ha. having a total cover of 17,406.9 dm²/ha.

The ground cover contains 3 graminoid species and 3 forb species (Table 8). Once again, Salina Wild rye dominates the layer, making up 98% of the total herbaceous cover.

Total Dry weight production ranged from 71.1 g/m². Salina wild rye makes up approximately 88% of the NAP in the ground layer.

Species Diversity

The species diversity is highest for the affected area with a diversity index of 0.229. The diversity index for the reference area is 0.226. The lack of large differences between the two indexes is attributable to the homogeneity of the two areas.

TABLE 2

CANOPY COMPOSITION OF A PINYON - JUNIPER WOODLAND COMMUNITY,
HUNTINGTON CANYON NO. 4 (AFFECTED AREA), EMERY COUNTY, UTAH

Species	No. Point of Occurrence	Count	Total Basal Area (dm ²)	Density (No./ha)	% Frequency	% Relative Density	% Relative Frequency	% Relative Basal Area	% Importance
<u>Cercocarpus montanus</u>	14	19	137.72	34.5	77.8	26.4	29.2	12.3	22.6
<u>Juniperus oosteosperma</u>	15	23	580.31	41.7	83.3	31.9	31.3	51.8	38.3
<u>Juniperus scopularum</u>	2	2	16.79	3.6	11.1	2.8	4.2	1.5	2.8
<u>Pinus edulis</u>	15	26	333.57	47.2	83.3	36.1	31.3	29.8	32.4
<u>Psuedotsuga menziesii</u>	2	2	52.22	3.6	11.1	2.8	4.2	4.7	3.9
TOTAL	48	72	1,120.61	130.6		100.0	100.2	100.1	100.0
Total Distance = 629.7 m			Trees per Hectare = 130.6		Average Basal Area per Tree = 15.6 dm ²				
Average Distance = 8.8 m			Total Basal Area = 1,120.6 dm ²		Total Basal Area per Hectare = 2,037.4 dm ² /ha				

TABLE 3

SHRUB COMPOSITION OF A PINYON - JUNIPER WOODLAND COMMUNITY,
HUNTINGTON CANYON NO. 4 (AFFECTED AREA), EMERY COUNTY, UTAH

Species	No. Point of Occurrence	Count	Total Cover (dm ²)	Density (No./ha)	% Frequency	% Relative Density	% Relative Frequency	% Relative Cover	% Importance
<u>Artemisia tridentata</u>	1	1	33.18	1.0	5.6	1.4	2.0	0.2	1.2
<u>Cercocarpus montanus</u>	17	25	7,363.78	24.9	94.4	34.7	34.0	44.3	37.7
<u>Chrysothamnus sp.</u>	1	1	19.64	1.0	5.6	1.4	2.0	0.1	1.2
<u>Juniperus oosteosperma</u>	11	15	2,133.15	14.9	61.1	20.8	22.0	12.8	18.6
<u>Pinus edulis</u>	17	26	6,122.69	25.9	94.4	36.1	34.0	36.8	35.6
<u>Pseudotsuga menziesii</u>	3	4	964.89	4.0	22.2	5.6	6.0	5.8	5.8
TOTAL	50	72	16,637.33	71.7		100.0	100.0	100.0	100.1
Total Distance = 850.2 m			Shrubs per Hectare = 71.7		Average Cover per Shrub = 231.1 dm ²				
Average Distance = 11.8 m			Total Cover = 16,637.3 dm ²		Total Cover per Hectare = 16,565.4 dm ² /ha				

TABLE 4
 SUMMARY OF GROUND COVER DATA IN
 PINYON-JUNIPER WOODLAND, HUNTINGTON CANYON NO. 4
 (AFFECTED AREA), EMERY COUNTY, UTAH

	% Frequency	% Cover
GRAMINOIDS		
<u>Carex sp.</u>	1.3	*
<u>Elymus salina</u>	73.3	18.2
<u>Oryzopsis hymenoides</u>	1.3	<u>0.1</u>
Total Graminoids		18.3
FORBS		
<u>Cercocarpus montanus</u>	2.0	0.2
<u>Cryptantha abata</u>	4.0	*
<u>Cymopterus fendleri</u>	1.0	*
<u>Cynoglossum officinale</u>	2.0	0.1
<u>Mahonia repens</u>	2.7	0.1
<u>Pinus edulis (seedling)</u>	1.3	<u>*</u>
Total Forbs		0.4
Total % Herbaceous Vegetation		18.7
Rock	49.3	17.7
Litter	73.3	17.8

*Less than 0.1%

TABLE 5
 PRODUCTION DATA, (G/M²) PINYON-JUNIPER GROUND LAYER, HUNNINGTON CANYON NO. 4
 (AFFECTED AREA), EMERY COUNTY, UTAH

Species	Plot Number														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
GRASSES															
<u>Elymus salina</u>	8.0	8.3	33.1	0.8	4.0	0.5	15.6	12.8	20.0	48.7	2.7	12.4	4.8	18.9	11.8
Total Grasses	8.0	8.3	33.1	0.8	4.0	0.5	15.6	12.8	20.0	48.7	2.7	12.4	4.8	18.9	11.8
FORBS															
<u>Lithospermum sp.</u>				0.3											
<u>Gutierrezia sarothrae</u>						0.5									
Total Forbs				0.3		0.5									
SHRUBS															
<u>Mahonia repens</u>															
Total Shrubs															
TOTAL	8.0	8.3	33.1	1.1	4.0	1.0	15.6	12.8	20.0	48.7	2.7	12.4	4.8	18.9	11.8

TABLE 5 (Concluded)

Species	Plot Number															Total
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
GRASSES																
<u>Elymus salina</u>	2.3	8.6	13.8	16.5	12.3	16.1	8.1	9.7		3.5	12.2	10.8	14.2	9.8	6.7	347.0
Total Grasses	2.3	8.6	13.8	16.5	12.3	16.1	8.1	9.7		3.5	12.2	10.8	14.2	9.8	6.7	347.0
FORBS																
<u>Lithospermum sp.</u>																0.3
<u>Gutierrezia sarothrae</u>		6.2								7.3						14.0
Total Forbs		6.2								7.3						14.0
SHRUBS																
<u>Mahonia repens</u>										8.5					8.5	
Total Shrub										8.5						8.5
TOTAL	2.3	14.8	13.8	16.5	12.3	16.1	8.1	9.7	8.5	10.8	12.2	10.8	14.2	9.8	6.7	369.8

TABLE 6
CANOPY COMPOSITION OF A PINYON - JUNIPER WOODLAND COMMUNITY,
HUNTINGTON CANYON NO. 4 (REFERENCE AREA), EMERY COUNTY, UTAH

Species	No. Point of Occurrence	Count	Total Basal Area (dm ²)	Density (No./ha)	% Frequency	% Relative Density	% Relative Frequency	% Relative Basal Area	% Importance
<u>Cercocarpus montanus</u>	8	9	26.03	18.2	44.4	12.5	18.2	3.0	11.2
<u>Juniperus oestesperma</u>	13	20	355.61	40.4	72.2	27.8	29.5	40.6	32.6
<u>Juniperus scopularum</u>	6	6	77.80	12.1	33.3	8.3	13.6	8.9	10.3
<u>Pinus edulis</u>	<u>17</u>	<u>37</u>	<u>416.98</u>	<u>74.6</u>	<u>94.4</u>	<u>51.4</u>	<u>38.6</u>	<u>47.6</u>	<u>45.9</u>
TOTAL	44	72	876.42	145.3		100.0	99.9	100.1	100.0
Total Distance = 597.9 m			Trees per Hectare = 145.2		Average Basal Area per Tree = 12.2 dm ²				
Average Distance = 8.3 m			Total Basal Area = 876.42 dm ²		Basal Area per Hectare = 1771.4 dm ² /ha				

TABLE 7

SHRUB COMPOSITION OF A PINYON - JUNIPER WOODLAND COMMUNITY,
HUNTINGTON CANYON NO. 4 (REFERENCE AREA), EMERY COUNTY, UTAH

Species	No. Point of Occurrence	Count	Total Cover (dm ²)	Density (No./ha)	% Frequency	% Relative Density	% Relative Frequency	% Relative Cover	% Importance
<u>Cercocarpus montanus</u>	11	16	6,049.59	14.0	61.1	22.2	23.4	30.4	25.3
<u>Juniperus oosteosperma</u>	14	15	1,788.62	13.1	77.8	20.8	29.8	9.0	19.9
<u>Juniperus scopularum</u>	3	3	1,370.72	2.6	16.7	4.2	6.4	6.9	5.8
<u>Physocarpus capitatus</u>	1	1	201.06	0.9	5.6	1.4	2.1	1.0	1.5
<u>Pinus edulis</u>	<u>18</u>	<u>37</u>	<u>10,485.40</u>	<u>32.4</u>	100.0	<u>51.4</u>	<u>38.3</u>	<u>52.7</u>	<u>47.5</u>
TOTAL	47	72	19,895.39	63.0		100.0	100.0	100.0	100.0
Total Distance = 906.4 m			Shrubs per Hectare = 63.0		Average Cover per Shrub = 276.3 dm ²				
Average Distance = 12.6 m			Total Cover = 19,895.39 dm ²		Cover per Hectare = 17,406.9 dm ² /ha				

TABLE 8
 SUMMARY OF GROUND COVER DATA IN
 PINYON-JUNIPER WOODLAND, HUNTINGTON CANYON NO. 4
 (REFERENCE AREA), EMERY COUNTY, UTAH

	% Frequency	% Cover
GRAMINOIDS		
<u>Carex sp.</u>	1.0	0.1
<u>Elymus salina</u>	71.3	23.3
<u>Oryzopsis hymenoides</u>	2.0	<u>0.1</u>
Total Graminoids		23.5
FORBS		
<u>Cryantha abata</u>	2.0	0.1
<u>Echinocereus triglochidiatus</u>	1.0	0.2
<u>Juniperus oosteosperma</u> (seedling)	1.0	<u>0.1</u>
Total Forbs		0.4
Total % Herbaceous Vegetation		23.9
Rock	33.3	11.5
Litter	88.0	19.3

FLORISTICS

The plant list resulting from the survey is presented in Table 10. Species are identified in the table according to common name, scientific name, growth form, and occurrence in pinyon-juniper, Douglas-Fir, sagebrush-grassland, and oak shrubland communities.

ENDANGERED PLANTS

No plant species cited by the U.S. Fish and Wildlife Service (USFWS, 1980) as threatened or endangered were observed on the Huntington Canyon No. 4 Lease Area.

TABLE 9
 PRODUCTION DATA, (G/M²) PINYON-JUNIPER GROUND LAYER,
 HUNTINGTON CANYON NO. 4 (REFERENCE AREA), EMERY COUNTY, UTAH

Species	Plot Number														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
GRASSES															
<u>Elymus salina</u>	27.4	22.3	23.9	57.1	44.4	23.9	47.7	9.1	11.4	13.1	8.3	11.0		2.7	6.8
<u>Oryzopsis hymenoides</u>						0.2			0.1				6.3		
Total Grasses	27.4	22.3	23.9	57.1	44.4	24.1	47.7	9.1	11.5	13.1	8.3	11.0	6.3	2.7	6.8
FORBS															
<u>Gutierrezia sarothrae</u>		43.4													0.1
<u>Lithospermum sp.</u>			0.7												
<u>Machaeranthera grindelioides</u>		1.3													
<u>Cryptantha abata</u>						2.6									0.1
Total Forbs		44.7	0.7			2.6									
SHRUBS															
<u>Mahonia repens</u>		4.1		0.5											
Total Shrubs		4.1		0.5											
TOTAL	27.4	71.1	24.6	57.6	44.4	26.7	47.7	9.1	11.5	13.1	8.3	11.0	6.3	2.8	6.8

TABLE 9 (Concluded)

Species	Plot Number										Total	
	16	17	18	19	20	21	22	23	24	25		
GRASSES												
<u>Elymus salina</u>	16.2	8.9	14.6	15.3	26.5	30.2	18.8	19.3	16.5	15.3		490.7
<u>Oryzopsis hymenoides</u>			1.8					1.1				9.5
Total Grasses	16.2	8.9	16.4	15.3	26.5	30.2	18.8	20.4	16.5	15.3		500.2
FORBS												
<u>Gutierrezia sarothrae</u>												43.5
<u>Lithospermum sp.</u>								1.8				0.7
<u>Machaeranthera grindelioides</u>												3.1
<u>Cryptantha abata</u>			0.8									3.4
Total Forbs			0.8					1.8				50.7
SHRUBS												
<u>Mahonia repens</u>			4.3									8.9
Total Shrubs			4.3									8.9
TOTAL	16.2	14.0	16.4	15.3	26.5	30.2	20.6	20.4	16.5	15.3		559.8

TABLE 10

PLANT SPECIES OBSERVED ON THE
HUNTINGTON CANYON 4 PERMIT AREA,
EMERY COUNTY, UTAH

Common Name	Family/Scientific Name	Growth Form	Plant Community			
			Pinyon-Juniper Woodland	Sagebrush-Grasslands	Oak Scrub	Douglas Fir
BARBERRY FAMILY	BERBERIDACEAE					
Oregon grape	<u>Mahonia repens</u>	Shrub	X	X	X	X
BORAGE FAMILY	BORAGINACEAE					
Houndstongue	<u>Cynoglossum officinale</u>	Forb	X	X	X	
Stickseed	<u>Lappula occidentalis</u>	Forb	X	X	X	X
CACTUS FAMILY	CACTACEAE					
Aggregate cactus	<u>Echinocereus triglochidiatus</u> var. <u>melanocanthus</u>	Shrub	X	X		
HONEYSUCKLE FAMILY	CAPRIFOLIACEAE					
Elderberry	<u>Sambucus coerulea</u>	Shrub	X			X
Snowberry	<u>Symphoricarpos vaccinioides</u>	Shrub			X	X
GOOSEFOOT FAMILY	CHENOPODIACEAE					
	<u>Halogeton glomeratus</u>	Forb	X			
Summer cypress	<u>Kochia scoparia</u>	Forb	X			
SUNFLOWER FAMILY	COMPOSITAE					
Yarrow	<u>Achillea millefolium</u>	Forb		X	X	X
Big sagebrush	<u>Artemisia tridentata</u>	Shrub		X		
Rabbitbrush	<u>Chrysothamnus</u> sp.	Forb		X	X	
Rabbitbrush	<u>Chrysothamnus vicidiflorus</u>	Shrub		X	X	
	<u>Cirsium undulatum</u>	Forb	X	X	X	
Snokeweed	<u>Gutierrezia sarothrae</u>	Shrub	X	X	X	
CYPRESS FAMILY	CUPRESSACEAE					
Utah juniper	<u>Juniperus osteosperma</u>	Tree	X			
Rocky Mountain juniper	<u>Juniperus scopulorum</u>	Tree	X		X	X
HEATH FAMILY	ERICACEAE					
Greenleaf manzanita	<u>Arctostaphylos patula</u>	Shrub			X	
BEECH FAMILY	FAGACEAE					
Gambel oak	<u>Quercus gambelii</u>	Tree			X	

TABLE 10 (Concluded)

Common Name	Family/Scientific Name	Growth Form	Plant Community			
			Pinyon-Juniper Woodland	Sagebrush-Grasslands	Oak Scrub	Douglas Fir
WILLOW FAMILY Aspen	SALICACEAE <u>Populus tremuloides</u>	Tree				X
SAXIFRAGE FAMILY Gooseberry	SAXIFRAGACEAE <u>Ribes cereum</u>	Shrub	X		X	X
CARROT FAMILY	UMBELLIFERAE <u>Cymopterus fendleri</u>	Forb	X			

REFERENCES

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ARCO Coal Company,
555 Seventeenth Street
Denver, Colorado 80202
Telephone 303 575 7502
Environmental Services

File



March 16, 1982

ACT/007/022

ACT/007/017

ACT/007/016

ACT/015/004

Copy to Lynn
for response

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

JIM

MAR 19 1982

Dear Mr. Smith:

In regards to your February 26 and March 8 letters concerning Raptor Protection on powerlines, David Chenoweth has informed me that we have already exercised Option No. 2 for all of the mine sites except C.V. Spur. We would like to have the U.S. Fish and Wildlife Service (USFWS) survey the powerpoles at C.V. Spur at their earliest convenience. Therefore, we are requesting that the Division arrange for the survey to be done.

In order to facilitate the USFWS survey of C.V. Spur I or my alternate should be present on the day of the survey to discuss our records of raptor activity around the area. Please feel free to contact me if you should have any questions concerning this matter. My telephone number is (303) 575-7590.

Sincerely,

G. R. Squire
Senior Environmental
Coordinator

GRS:psh

cc: J. A. Ives
D. R. Chenoweth
D. R. Maxwell
D. W. Guy

March 12, 1982

Inspection Memo
to Coal File:

RE: Beaver Creek Coal Company
Huntington #4 Mine
ACT/015/004
Emery County, Utah

DATE: March 3, 4, 5, 1982
TIME: 4:00 p.m.-5:30 p.m.; 9:00 a.m.-11:30 a.m.; 8:30 a.m.-
9:30 a.m., respectively
WEATHER: Partly Cloudy, Cold
COMPANY OFFICIAL: Dave Meyers
STATE OFFICIALS: Ken Wyatt, Sandy Pruitt
ENFORCEMENT ACTION: Issuance of NAOC 82-7-2-3

Compliance With Permanent Performance Standards

771 et al Permits

Approval to mine under the Utah Mined Land Reclamation Act of 1975 was given in a letter dated August 25, 1977, from Ron Daniels of DOGM. This approval also covered the Huntington #5 Mine. The #5 Mine was never bought by Beaver Creek Coal Company, instead ownership was retained by General Exploration (GEX) who recently sold the mine. This mine will be called the Rigby Mine in the future.

Two Manti-LaSal National Forest, Special Use Permits were observed. The first, from Ralph E. Butler dated March 16, 1977, allowed the installation of the cyclone pump on 1.15 acres of Forest Service land located along Mill Fork Creek. Pertinent to the pump facility, a Water Rights Certificate, #A-730, dated May 21, 1975, indicated that Beaver Creek Coal Company owned 800 shares of Class A capitol stock in the Huntington-Cleveland Irrigation Company. This equates to 80 acre feet of water per year from Mill Fork Creek. An application dated December 14, 1976, was observed requesting coal mining to be added to the already existing water uses of irrigation and domestic stock watering.

The second Forest Service Special Use Permit was from Reed Christiansen, Forest Supervisor, dated November 20, 1979. This permit allowed the construction of the sediment pond on .225 acres of Forest Service land.

817.11 Signs and Markers

The mine entrance sign was posted as required. Two buffer zone markers were observed on the south side of Mill Fork Canyon Road (U. S. 31) by the cyclone pump house and the sediment ponds.

817.21-.25 Topsoil

No new developments have been undertaken requiring topsoil removal, storage and protection. The topsoil stockpile located adjacent to the septic tank drain field is marked as required and vegetated to prevent wind erosion.

817.41-.52 Hydrologic Balance

Waste water from the minesite is treated through a septic tank/leachfield system. At the time of this inspection, water was observed ponding above the leachfield. The inspector noted a sewage odor from these puddles. NAOC #82-7-2-3, #1 of 3 was issued for failure to maintain water treatment methods used to control and minimize water pollution. Remedial action required an investigative report submitted to the Division by April 4, 1982, summarizing the causes and corrective actions to the ponding problem.

The undisturbed diversion ditches on the upper pad were obstructed in several areas due to slumpage of the highwall. NAOC #82-7-2-3, #2 of 3 was issued for failure to maintain undisturbed diversion drainages. Particular problem areas are adjacent to the powder house, behind the office and parts shed, and west of the terminal end of the conveyor. Abatement work to be completed by April 4, 1982, required the maintenance of the channels to properly convey undisturbed runoff around the disturbed area.

NAOC #82-7-2-3, #3 of 3 was issued for lack of maintenance of the disturbed area drainage system, particularly in three areas. Culverts draining disturbed area runoff from the upper pad were obstructed due to snow removal waste piled at their inlets. Mr. Meyers maintained these culverts still function as intended. Remedial actions required the inlets of the culverts to be cleared of all obstruction.

The second area was the fill portion of the upper pad east of the conveyor and south of the water bar. Here, the pad is graded in such a way that water drains to the southeast and over the downslope. Some erosion has already occurred but a potential exists for excessive erosion due to the nature and steepness of this downslope. Mitigation will involve elevating the pad to drain northwest towards the water bar or retaining drainage from the downslope to minimize erosion.

Finally, the diversion draining disturbed area runoff from the truck turnaround pad to the bathhouse pad showed signs of erosion. Here, a series of straw dikes are utilized to retain sediment before reaching the sediment pond. Water had been eroding around and below these dikes. Maintenance of these erosion and sediment control structures is required to avoid channel widening and deepening. An April 4, 1982, deadline was given for this NAOC.

INSPECTION MEMO TO COAL FILE

ACT/015/004

March 12, 1982

Page 3

817.52 Surface and Ground Water Monitoring

A NPDES permit, #UT-0023116, was issued October 11, 1977, and expires June 30, 1982. This allows discharge from the sediment pond into Mill Fork Creek. A second NPDES permit, #UT-0023132, was available for the cyclone pump station located on Mill Fork Creek. This permit issued July 26, 1978, expires June 30, 1983, and allows discharge into Mill Fork Creek.

Water monitoring data were examined for compliance for the fourth quarter 1981. As of this inspection, there has been no discharge of mine water from the two underground sumps as approved by the Division on December 1, 1981.

817.89 Disposal of Noncoal Waste

Noncoal waste is temporarily stored in dumpsters on the upper pad and periodically hauled by Carbon-Energy Disposal Company to a landfill in the Huntington area. At the time of this inspection, Mr. Meyers stated that due to weather conditions, the hauling trucks could not get up the hill to the dumpsters. Two dumpsters were full and some noncoal waste was piled to the side. Inspectors were informed that the operator would request that these dumpster be hauled as soon as possible.

817.111-.117 Revegetation

The disturbance created by accessing the topsoil stockpile will be revegetated this spring.

817.121-.126 Subsidence Control

Subsidence is monitored annually by the U. S. Forest Service using aerial photogrammetric techniques.

817.150-.176 Roads

Roads in the permit area are withstanding the adverse winter conditions. Some maintenance will be needed to re-establish drainage patterns from the upper pad as vehicular travel there creates problems with mud.

KEN WYATT
RECLAMATION OFFICER



cc: Tom Ehmett, OSM
David Meyers, Beaver Creek Coal Company
Inspection Staff

KW/btb

Statistics:

See Utah #2 Mine memo dated March 8, 1982
Grant: A & E

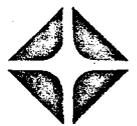
BEAVER CREEK Coal Company

P. O. Box AU

Price, Utah 84001

Telephone 801 637-5050

HCT/015/004



March 22, 1982

Mr. Darrell Leamaster
Castle Valley Special Service Dept.
P. O. Box 553
Castle Dale, Utah 84513

Re: Water Monitoring - February 1982
Little Bear Canyon

Dear Mr. Leamaster:

Enclosed are the results of the Beaver Creek Coal Company water monitoring at Little Bear Canyon for the month of February 1982.

If you have any questions or need any additional information, please contact me.

Respectfully,

BEAVER CREEK COAL COMPANY

David R. Meyer
Assoc. Environmental Coordinator

DRM/daf

Enclosures

cc: Mr. Wayne Hedberg
Utah Division of Oil, Gas & Mining

cc: Office of Surface Mining

cc: Mr. Greg Squire/DLT 1131

cc: File

HYDROLOGIC MONITORING PROGRAM
DATA REPORT FORM

WELL ID	LOCATION	TYPE	FREQUENCY	FLOW	PH STD. UNIT	TEMP °C	SPEC. COND.	TDS	TSS	IRON	MANGANESE	NITRATE	SULFATE	CHLORIDE	OIL & GREASE	REMARKS
4-1-W	Upper Little Bear	Spring	Monthly	290-300 GPM	7.80	10°	450	286	1.0	.030	<.001	<.01	6.0	4.60	--	
4-2-W	Lower Little Bear	Spring	Monthly												--	Snow Unable to Locate
4-3-W	Upper Mill Fork	Perennial Stream	Monthly												--	Snow/Dry
4-4-W	Mill Fork above Sed Pond	Stream	flow/biwk other/mo	2-3 GPM	7.80	5°	660	434	124	2.59	.075	<.01	30.0	10.60	--	Iron Oxides Accumulating In Stream
4-5-W	Mill Fork below Sed Ponds	Stream	Monthly		7.90	4°	610	394	17.0	.34	.04	<.01	63.0	11.90	--	Depth At Weir=1½"
4-6-W	Inflow to Sed Pond	Runoff	w/in 12hr of storm or monthly													DRY
4-7-W	Outflow from Sed Pond	Discharge	when discharging													DRY
4-8-W	Mill Fork above Hunt Crk	Stream	Monthly													FROZEN
4-9-W	Head of Little Bear	Seep	Spring & Fall													Not Sampled This Month
4-10-W	Mill Fork Pump	Cyclone Discharge	Monthly													Under Snow & Ice Unable To Locate

SWISHER COAL CO.
P.O. BOX AU
PRICE, UTAH 84501

DATE SAMPLED: 2/17/82 - 2/22/82

DATE ANALYZED: 2/25/82

SAMPLED BY: D. R. MEYER

ANALYZED BY: FORD CHEMICAL LAB.

SURFACE COAL MINING AND RECLAMATION OPERATIONS

PERMANENT REGULATORY PROGRAM

JULY 21, 1978

784.12 (a) Within three months after termination of the underground mining operation, the following reclamation efforts will be started:

- 1) Remove all buildings, steel structures and other surface facilities 4 weeks
- 2) Clean up all trash and debris 1 week
- 3) Seal up all mine openings to the surface 2 weeks
- 4) Regrade mine yard to a smooth surface and reestablish principle drainage features to their original horizontal alignment 2 weeks
- 5) Spread topsoil 1 week
- 6) Plant approved seed mix to reestablish vegetation 1 week

784.12 (b) At this time the company is making no estimate of the cost of reclamation because such reclamation may not take place for another 40 years if the underground operation lasts that long. Because the rate of inflation over the next 40 years is anybody's guess an estimate based on today's dollar would be totally inappropriate at the time of reclamation.

784.12 (c) Signs, as prescribed by Subchapter K will be placed at the two entrances to the yard facilities as shown on Exhibit #3.

784.12 (d) As described in the answer to 784.12 (a) major drainage features will be restored to their original horizontal alignment to the extent practical. It will be impossible to restore the mine yards to the approximate original contour because these yards were dozed out of very steep, rugged, and rocky canyon walls. Nearly all fill material escaped over the edge of the canyon walls and cannot be retrieved. To fill the cuts would require making further cuts up-bank from the yards which would result in far greater environmental damage than now exists. Terracing and leveling is impossible due to the rocky steep nature of the terrain. Instead the area will be smoothed and contoured to a pleasing appearance and topsoil will be drifted over the area to assure the success of the revegetation efforts.

784.12 (e) Topsoil as needed to cover the disturbed area will be brought up from the canyon bottom where it is more plentiful. It will be smoothed out to a uniform thickness with a grader and compacted by wheel pressure to prevent the topsoil from blowing and/or washing away.

784.12 (e)(1) The placing, spreading, and compacting of the topsoil will be completed within 10 weeks after reclamation begins. Seeding will be done within a week after that.

784.12 (e)(2) The following seed mix has been prescribed by the Forest Service for revegetation in this area:

- 3 lb. Smooth Brome
- 3 lb. Timothy Grass
- 2 lb. Orchard Grass
- 2 lb. Chested Wheat Grass
- 1 lb. Kentucky Blue Grass
- 1 lb. Ranger Alfalfa
- 1 lb. Meadow Foxtail

13 lbs. per acre

784.12 (e)(3) See answer to 784.12 (e)(2)

784.12 (e)(4) Revegetation efforts can likely be completed successfully without mulching; however, mulching will be used where necessary to insure revegetation.

784.12 (e)(5) There will be no irrigation needed to encourage revegetation. Pest and disease control, if deemed necessary will be done under the directive of the U.S. Forest Service.

784.12 (e)(6) In as much as the Forest Service will prescribe the seed mix to rise and will monitor the success of the revegetation effort to their satisfaction the reference-area concept will not be utilized.

784.12 (f) It is in the interest of the company, both economically and operationally, to maximize full utilization of the coal resource. Mining plans are drawn up to allow extraction of pillars to maximize recovery to the greatest extent practicable. This plan is subject to the approval of the U.S. Geological Survey. (See Supplement)

784.12 (g)(1) Materials which constitute a fire hazard will be burned in an approved manner prior to reclamation. There is no reason to believe that any toxic or acid-forming material will have to be disposed of during reclamation since the coal has a very low sulfur content. However, all the yard will be regraded and covered with topsoil as a part of reclamation which will in itself dilute and render harmless any suspect toxic or acid forming material.

784.12 (g)(2) See answer to 784.12 (g)(1)

784.12 (h) After the extraneous steel is removed from the portals the mine openings will be sealed with a double thickness of 8" solid concrete blocks in the location shown on Exhibit #3.

784.12 (i) All mining equipment will be hauled away and re-used in other company application or else scrapped out depending on the condition of the equipment.

784.12 (j) Swisher is the holder of two NPDES permits issued by The Environmental Protection Agency for the #4 Mine. See Exhibit #14.

784.12 (k) All permits and approved plans issued by those agencies responsible for the enforcement of air, water, and other environmental resources stipulate reporting procedures and other remedial measures.

784.13 (a)(1) Complete information can be obtained from the Vaughn Hansen Report (Exhibit #6) and the USGS Water Resources Report (Exhibit #5).

784.13 (a)(2) The only surface water on the mine property is in Mill Fork Creek. The company presently has rights to 300 shares of this water as evidenced by the following documents:

- 1) Certificate of water stock-Exhibit #15
- 2) Approved right to divert water at the mine site approved by stub water engineer-Exhibit #17
- 3) Special use permit to construct diversion facilities from Forest Service-Exhibit #18

784.13 (a)(3) See answer to 784.13 (a)(2)

784.13 (b)(1),(2) Surface drainage shall be treated in a settling pond as described in Exhibit #19.

784.13 (b)(4) Refer to Exhibit #20

784.13 (c) Refer to Exhibits #5 and #6

784.13 (e) Exhibit 21 shows the only section of road in which grades are in excess of those outlined in CFR 717.17 (5)(2)(ii)(A). However, the Division of Oil, Gas, and Mining is now making a determination of whether this section of road must be reconstructed. Their decision will become part of this plan. See Exhibit #22.

784.14 (a) The land on which the mine is located has long been used for coal mining. The canyon has supported three underground operations in the past and the surface facilities of the #4 Mine are located in exactly the same area as those of the old Leamaster Mine which operated nearly a quarter of a century ago. Other than coal mining the only other use of the land has been deer hunting although this use has been only on a limited basis since the rocky terrain of the canyon walls is not as inviting to deer as the higher country which offers a more lush browse. After termination of mining operations, the disturbed areas will be revegetated to a degree acceptable by the U.S. Forest Service and the land will once again support its principle pre-mining use, ie: deer forage.

784.14 (b)(1) The proposed post-mining use of the land is to be achieved by regrading the yards, spreading topsoil, planting the area and monitoring the revegetative effort to the satisfaction of the U.S. Forest Service.

784.14 (b)(2) After the area has been reclaimed to range condition, the management of the area will be according to the Forest Service's master management plan.

784.14 (b)(3) The proposed post-mine use of the land does not differ from the pre-mining use.

784.14 (b)(4) Reclamation plans will be consistent with the uses as determined by the U.S. Forest Service, the U.S. Geologic Survey, and the State Division of Oil, Gas, and Mining.

784.14 (c) Other than surface owned by the company all facilities are on lands controlled by the Forest Service and have been approved by special use permits.

784.15 (a) See Exhibit #19. The dam will be constructed upon final design approval. Provisions can be made to clean the facility with a clam shell. After reclamation is complete, the dam and ponding facilities will be regraded to the approximate original contour and revegetated according to Forest Service specifications.

784.15 (b) Plans do not conflict with Mine Health and Safety Administration Section 77.216-2.

784.15 (b)(i) From visual observation and past excavation of the area there is no doubt concerning the presence of bedrock (massive sandstone) at the base of the proposed dam. No adverse geologic conditions occur in the area.

784.15 (b)(i)(A) The bedrock is solid sandstone and no adverse geologic conditions occur.

784.15 (b)(i)(B) There has been no past mining nor will there be any further mining in the area of the dam since it is located stratigraphically below the coal horizons.

784.15 (b)(ii) There are no seeps, spring, or ground water flow in the vicinity of the dam.

784.15 (b)(iii) The dam will not incorporate a subdrainage system.

784.15 (b)(iv) Material for construction will depend upon final approval design. Density, water content, shear strength, consolidation and permeability will be determined by a registered engineer to assure proper construction of the facility.

784.15 (b)(v) See Exhibit #19

784.15 (b)(vi) See Exhibit #19

784.15 (b)(vii) See Exhibit #19

784.15 (b)(ix) See Exhibit #19

784.15 (b)(x) See Exhibit #19

784.16 There are no public parks or historic places in the mining area.

784.17 There is no public road to be relocated as a result of the mine operation.

784.18 There is, nor will be, any waste or refuse disposal areas in this area. Any waste brought out of the mine will be hauled to our refuse pile at C.V. Spur where it will be disposed of in an area designed and approved for refuse disposal.

784.19 Subsidence Monitoring

See Exhibit #23 Detailed Monitoring Plan

See Exhibit #24 Letter of Explanation from Forest Service

See Exhibit #25 Map Showing Location of Set Control Points

784.20 It is the intent of reclamation to provide a browse cover equal to or greater than that which exists naturally in the native area. This would tend to enhance the environment for deer and other wildlife animals. There are no fish in Mill Fork Stream so nothing of the reclamation effort will either enhance nor detract fish.

784.21 There will be no blasting associated with the surface effects of the mine operation.

Sections 507 and 508

Public Law 95-87

- 507 (b)(1)(A) Swisher Coal Company
P.O. Box AU, Price, Utah 84501
- 507 (b)(1)(B) Map #1 shows the property involved in the #4 Mine operation and the surface ownership.
- 507 (b)(1)(C) Map #1 shows the holders of record of leasehold interest.
- 507 (b)(1)(D) DNA
- 507 (b)(1)(E) DNA
- 507 (b)(1)(F) DNA
- 507 (b)(2) All property adjacent to the mine property is controlled by the federal government (surface: Forest Service, subsurface: Geological Survey)
- 507 (b)(3) Applicant does not hold any previous or current surface coal mining permits.
- 507 (b)(4) See attached Exhibit #2
- 507 (b)(5) Swisher Coal Company, nor any of its affiliates, has never had a mining permit suspended or revoked.
- 507 (b)(6) Advertisement will be published in the Sun Advocate (local paper serving southeastern Utah) on dates determined by the Division of Oil, Gas, and Mining after review of the plans.
- 507 (b)(7) The operation consists of an underground coal mine using the room-and-pillar method of mining. Mining equipment used includes continuous miners, shuttle cars, roof bolters, feeder-breakers, conveyor belts, and support machinery.
- 507 (b)(8) The mine began production in February 1977. The life of the mine is indefinite, depending upon acquisition of surrounding federal coal. Total acreage involved in surface facilities is 6.8 acres.
- 507 (b)(9) Enclosed is a map of the surface facilities (Exhibit #3). Authority to mine in this area is given by the lease assignments which are attached as Exhibit #4.
- 507 (b)(10) The mine is located in the water shed of Mill Fork Creek, a tributary of Huntington Creek, a tributary of the San Rafael River, a tributary of the Colorado River.
- 507 (b)(11) Enclosed are copies of the following reports which deal exclusively with the possible hydrologic impacts of the mining operation.

a) Environmental Impact Analysis for Swisher Coal Company Proposed Huntington Canyon #4 Underground Coal Mine. Prepared by the Water Resources Branch of the U.S. Geologic Survey Exhibit #5

b) Water Quality and Hydrologic Study in Vicinity of Huntington Creek Mine #4 and Little Bear Spring. Prepared by Vaughn Hansen Associates, consulting engineers. Exhibit #6

507 (b)(12) Climatological data of the area can be found in the Environmental Analysis Report prepared by the U.S. Forest Service. Applicable sections of this EAR are included as Exhibit #7.

507 (b)(13) Enclosed is a topographic map of the mine area showing property boundaries, man-made features, etc. Exhibit #8

507 (b)(14) Enclosed is a map of the surface configuration with three cross-sections showing representative slices thru the mine yards, showing overburden strata, elevations, coal seams, and other geologic factors (Exhibit #9). Also enclosed is a map showing the location of all drill holes, the outcrop line, strike and dip of the coal seam, old works in the area, etc. (Exhibit #10)

507 (b)(15) Enclosed are drill hole logs and analysis sheets for the coal. (Exhibit #11)

507 (b)(16) There is no farm land, not to mention prime farmland, in the area of the minesite.

507 (b)(17) DNA

507 (c) DNA

507 (d) Enclosed is a Reclamation Plan (Exhibit #12)

507 (e) A copy of this application will be made available at the Carbon County Court House, Price, Utah.

507 (f) Enclosed is a certificate of insurance from the Fidelity and Casualty Insurance Company certifying that Swisher Coal Company has a public liability insurance policy in force for the mining and reclamation operations outlined in the plan. (Exhibit #13)

507 (g) There will be no blasting for this operation and therefore no blasting plan is submitted.

508 (a)(1) All lands in the underground portion of the mining operation are shown on Exhibit #1. The surface effects of the operation will not be extended beyond the existing surface improvements.

508 (a)(2)(A) The land is presently used for underground coal mining and associated surface facilities. The land in the past has also been used for coal mining. In fact, the surface facilities of the Huntington Canyon #4 Mine are in the exact same area of those of the old Leamaster Mine and some of the older structures associated with the past operation can still be seen today in the area. Other than coal mining, the areas only other use has been deer hunting. The canyon walls are much too steep and rocky to support farming, domestic livestock grazing, logging, or any other use.

508 (a)(2)(B) See answer to 508 (a)(2)(A)

508 (a)(2)(C) See answer to 508 (a)(2)(B)

508 (a)(3) At such time as the land is no longer used for the purpose of coal mining it shall be regraded and revegetated to be suitable to deer grazing which was the principle pre-mining use of the land. Enclosed is a pertinent section of the multiple hand use plan for the mine area prepared by the U.S. Forest Service.

508 (a)(4) Post-mining land use will be achieved by regrading the mine site area, and covering such area with native topsoil sufficient to sustain a healthy growth of grasses and forbs as prescribed by the U.S. Forest Service. The growth will be checked and replanted periodically as needed to insure that the revegetation efforts are successful.

508 (a)(5) Mining will be done, and is being done, by underground room-and-pillar methods using continuous mining machines, shuttle cars, feeder breakers, and conveyor belts. Reclamation will be done using a D-8 Caterpillar Dozer, a 988 front end loader, and a G16 road grader. All surface irregularities will be smoothed out and graded so that drainage is slow and even over the disturbed areas. Topsoil will be hauled from the canyon bottom and spread over the recontoured yard and compacted with the wheels of the loader. Topsoil will be spread in sufficient depth to insure a successful revegetation effort. Surface drainage will be controlled by reestablishing to the extent practicable, the original drainage features. It is estimated that it will cost nearly \$2,000 per acre to reclaim the mine yard.

508 (a)(6) It is in the interest of the company, both economically and operationally, to maximize full utilization of the coal resources. Mining plans are drawn up to allow extraction of pillars to maximize recovery to the greatest extent practicable.

<u>508 (a)(7)</u>	Removal of surface structures	4 weeks
	Regrading and recontouring	2 weeks
	Topsoil covering	2 weeks
	Seeding	1 week
	TOTAL	9 weeks

508 (a)(8) Swisher is the surface owner.

508 (a)(9) Swisher is the holder of two NPDES permits issued by the Environmental Protection Agency for the #4 Mine. Exhibit #14

508 (a)(10) The entire mine area is located on extremely steep, rugged, rocky, ledgy terrain which makes obtaining original contour impossible. The reclamation plan strives to most effectively reinitiate pre-mining use to post-mining application.

508 (a)(11) See Exhibit #1

508 (a)(12) Results of test boring are shown on Exhibit #11

508 (a)(13)(A) Surface water and ground water systems are fully explained
in Exhibits #5 and #6

508 (a)(13)(B) Enclosed is a copy of the certificate of water shares owned
by Swisher Coal Company in the Huntington Area (Exhibit #15)

508 (a)(13)(C) Enclosed is a copy of an agreement reached between the City
of Huntington and Swisher wherein Swisher agrees to replace any waters lost
from the City's culinary source as a result of mining operations. Exhibit #16

List of Exhibits

- Exhibit #1 : Property map showing ownership interest
- Exhibit #2 : Articles of incorporation
- Exhibit #3 : Map of the surface facilities
- Exhibit #4 : Lease assignments
- Exhibit #5 : Report on the hydrologic impact of operations prepared by the Water Resources Division of the U.S. Geological Survey
- Exhibit #6 : Hydrologic Report prepared by Vaughn Hansen Associates
- Exhibit #7 : Environmental Analysis Report prepared by the U.S. Forest Service
- Exhibit #8 : Topographic map showing property boundaries, man-made features, etc.
- Exhibit #9 : Cross-section of surface showing overburden, geology, coal seams, elevations, etc.
- Exhibit #10: Drill hole map
- Exhibit #11: Drill hole logs, analysis sheets
- Exhibit #12: Reclamation plan as approved by the Division of Oil, Gas, and Mining
- Exhibit #13: Certificate of Insurance
- Exhibit #14: NPDES permits issued by the Environmental Protection Agency
- Exhibit #15: Certificate of Water Shares
- Exhibit #16: Agreement with City of Huntington
- Exhibit #17: Approved change of point of diversion from State Division of Water Rights
- Exhibit #18: Special use permit for pumping facilities
- Exhibit #19: Plan for construction and maintenance of settling pond facility
- Exhibit #20: Hydrologic monitoring plan
- Exhibit #21: Road reconstruction information
- Exhibit #22: Notice of hearing on road reconstruction

- Exhibit #23: Detailed subsidence monitoring plan
- Exhibit #24: Letter of concurrence from Forest Service about subsidence monitoring plan
- Exhibit #25: Map of subsidence monitoring control points
- Exhibit #26: Cover letter, U.S. Geological Survey mine plan and reclamation approval
- Exhibit #27: Cover letter, Division of Oil, Gas, and Mining mine plan and reclamation approval
- Exhibit #28: Plan for controlling drainage at C.V. Spur Preparation and Loading Facility
- Exhibit #29: Map of proposed drainage control at C.V. Spur
- Exhibit #30: Mining plan checklist (Added as supplement from mining plan submitted to U.S.G.S.)
- Exhibit #31: Mine plan for Huntington Canyon #4 Mine (Added as supplement from mining plan submitted to U.S.G.S.)

N O T I C E

The following information is submitted to the State of Utah Division of Oil, Gas, and Mining as agents for the Office of Surface Mining to fulfill the requirements for obtaining a mining and reclamation permit as required by Public Law 95-87 for the Huntington Canyon #4 Mine located in Mill Fork Canyon, a tributary of Huntington Canyon, Emery County, Utah. All persons who read the information submitted herein should be aware of the fact that the #4 Mine is an existing underground operation which began production in April 1977. All surface facilities needed in conjunction with the mine operation have been constructed. The mine is presently operating under a plan approved by the U.S. Geological Survey on 2-16-77 which plan encompasses the 211 regulations. The mine is also operating under a mining and reclamation plan approved by the Division of Oil, Gas, and Mining on 8-10-76. Cover letters for the plans are enclosed in the appendix as exhibit #26 and #27 respectively. The bodies of these plans are large and voluminous and are not included as part of this submittal. They are however, available upon request.

Even though the #4 Mine is an existing underground operation working under approved mining and reclamation plans, the company hereby submits the following information in a spirit of full cooperation with the governing agencies. In as much as the format for submitting information required for the permit is not yet specified and the final regulations are not yet in effect, information submitted herein follows in two forms: 1) Comments related to sections 507 and 508 of public law 95-87 and 2) Comments related to part 784 of the Surface Coal Mining and Reclamation Operations Permanent Regulatory Program as issued July 21, 1978. Much information is duplicated between the two but, for the sake of completeness, all items of each have been completed.

SURFACE COAL MINING AND RECLAMATION OPERATIONS
PERMANENT REGULATORY PROGRAM

July 21, 1978

784.12 (a) Within three months after termination of the underground mining operation, the following reclamation efforts will be started:

- 1) Remove all buildings, steel structures and other surface facilities4 weeks
- 2) Clean up all trash and debris1 week
- 3) Seal up all mine openings to the surface2 weeks
- 4) Regrade mine yard to a smooth surface and re-establish principle drainage features to their original horizontal alignment2 weeks
- 5) Spread topsoil1 week
- 6) Plant approved seed mix to re-establish vegetation1 week

784.12 (b) At this time the company is making no estimate of the cost of reclamation because such reclamation may not take place for another 40 years if the underground operation lasts that long. Because the rate of inflation over the next 40 years is anybody's guess an estimate based on today's dollar would be totally inappropriate at the time of reclamation.

784.12 (c) Signs, as prescribed by Subchapter K will be placed at the two entrances to the yard facilities as shown on Exhibit #3.

784.12 (d) As described in the answer to 784.12 (a) major drainage features will be restored to their original horizontal alignment to the extent practical. It will be impossible to restore the mine yards to the approximate original contour because these yards were dozed out of very steep, rugged, and rocky canyon walls. Nearly all fill material escaped over the edge of the canyon walls and cannot be retrieved. To fill the cuts would require making further cuts up-bank from the yards which would result in far greater environmental damage than now exists. Terracing and leveling is impossible due to the rocky steep nature of the terrain. Instead the area will be smoothed and contoured to a pleasing appearance and topsoil will be drifted over the area to assure the success of the revegetation efforts.

784.12 (e) Topsoil will be recovered to the extent possible, from future surface disturbance (sedimentation ponds, etc.), and stored on the upper mine terrace. Upon reclaiming the area, it will be smoothed out to a uniform thickness with a grader, and compacted by wheel pressure to prevent it from blowing or washing away.

784.12 (e)(1) The placing, spreading, and compacting of the topsoil will be completed within 10 weeks after reclamation begins. Seeding will be done within a week after that.

784.12 (e)(2) The following seed mix has been prescribed by the Forest Service for revegetation in this area:

- 3 lb. Smooth Brome
 - 3 lb. Timothy Grass
 - 2 lb. Orchard Grass
 - 2 lb. Chested Wheat Grass
 - 1 lb. Kentucky Blue Grass
 - 1 lb. Ranger Alfalfa
 - 1 lb. Meadow Foxtail
- 13 lbs. per acre

784.12 (e)(3) See answer to 784.12 (e)(2)

784.12 (e)(4) Revegetation efforts can likely be completed successfully without mulching; however, mulching will be used where necessary to insure revegetation.

784.12 (e)(5) There will be no irrigation needed to encourage revegetation. Pest and disease control, if deemed necessary will be done under the directive of the U.S. Forest Service.

784.12 (e)(6) In as much as the Forest Service will prescribe the seed mix to rise and will monitor the success of the revegetation effort to their satisfaction the reference-area concept will not be utilized.

784.12 (f) It is in the interest of the company, both economically and operationally, to maximize full utilization of the coal resource. Mining plans are drawn up to allow extraction of pillars to maximize recovery to the greatest extent practicable. This plan is subject to the approval of the U.S. Geological Survey. (See Supplement)

784.12 (g)(1) Materials which constitute a fire hazard will be burned in an approved manner prior to reclamation. There is no reason to believe that any toxic or acid-forming material will have to be disposed of during reclamation since the coal has a very low sulfur content. However, all the yard will be regraded and covered with topsoil as a part of reclamation which will in itself dilute and render harmless any suspect toxic or acid forming material.

784.12 (g)(2) See answer to 784.12 (g)(1)

784.12 (h) After the extraneous steel is removed from the portals the mine openings will be sealed with a double thickness of 8" solid concrete blocks in the location shown on Exhibit #3.

784.12 (i) All mining equipment will be hauled away and re-used in other company application or else scrapped out depending on the condition of the equipment.

784.12 (j) Swisher is the holder of two NPDES permits issued by The Environmental Protection Agency for the #4 Mine. See Exhibit #14.

784.12 (k) All permits and approved plans issued by those agencies responsible for the enforcement of air, water, and other environmental resources stipulate reporting procedures and other remedial measures.

784.13 (a)(1) Complete information can be obtained from the Vaughn Hansen Report (Exhibit #6) and the USGS Water Resources Report (Exhibit #5).

784.13 (a)(2) The only surface water on the mine property is in Mill Fork Creek. The company presently has rights to 300 shares of this water as evidenced by the following documents:

- 1) Certificate of water stock-Exhibit #15
- 2) Approved right to divert water at the mine site approved by stub water engineer-Exhibit #17
- 3) Special use permit to construct diversion facilities from Forest Service-Exhibit #18

784.13 (a)(3) See answer to 784.13 (a)(2)

784.13 (b)(1),(2) Surface drainage shall be treated in a settling pond as described in Exhibit #19.

784.13 (b)(4) Refer to Exhibit #20

784.13 (c) Refer to Exhibits #5 and #6

784.13 (e) Exhibit 21 shows the only section of road in which grades are in excess of those outlined in CFR 717.17 (5)(2)(ii)(A). However, the Division of Oil, Gas, and Mining is now making a determination of whether this section of road must be reconstructed. Their decision will become part of this plan. See Exhibit #22.

784.14 (a) The land on which the mine is located has long been used for coal mining. The canyon has supported three underground operations in the past and the surface facilities of the #4 Mine are located in exactly the same area as those of the old Leamaster Mine which operated nearly a quarter of a century ago. Other than coal mining the only other use of the land has been deer hunting although this use has been only on a limited basis since the rocky terrain of the canyon walls is not as inviting to deer as the higher country which offers a more lush browse. After termination of mining operations, the disturbed areas will be revegetated to a degree acceptable by the U.S. Forest Service and the land will once again support its principle pre-mining use, ie: deer forage.

784.14 (b)(1) The proposed post-mining use of the land is to be achieved by regrading the yards, spreading topsoil, planting the area and monitoring the revegetative effort to the satisfaction of the U.S. Forest Service.

784.14 (b)(2) After the area has been reclaimed to range condition, the management of the area will be according to the Forest Service's master management plan.

784.14 (b)(3) The proposed post-mine use of the land does not differ from the pre-mining use.

784.14 (b)(4) Reclamation plans will be consistent with the uses as determined by the U.S. Forest Service, the U.S. Geologic Survey, and the State Division of Oil, Gas, and Mining.

784.14 (c) Other than surface owned by the company all facilities are on lands controlled by the Forest Service and have been approved by special use permits.

784.15 (a) See Exhibit #19. The dam will be constructed upon final design approval. Provisions can be made to clean the facility with a clam shell. After reclamation is complete, the dam and ponding facilities will be regraded to the approximate original contour and revegetated according to Forest Service specifications.

784.15 (b) Plans do not conflict with Mine Health and Safety Administration Section 77.216-2.

784.15 (b)(i) From visual observation and past excavation of the area there is no doubt concerning the presence of bedrock (massive sandstone) at the base of the proposed dam. No adverse geologic conditions occur in the area.

784.15 (b)(i)(A) The bedrock is solid sandstone and no adverse geologic conditions occur.

784.15 (b)(i)(B) There has been no past mining nor will there be any further mining in the area of the dam since it is located stratigraphically below the coal horizons.

784.15 (b)(ii) There are no seeps, spring, or ground water flow in the vicinity of the dam.

784.15 (b)(iii) The dam will not incorporate a subdrainage system.

784.15 (b)(iv) Material for construction will depend upon final approval design. Density, water content, shear strength, consolidation and permeability will be determined by a registered engineer to assure proper construction of the facility.

784.15 (b)(v) See Exhibit #19

784.15 (b)(vi) See Exhibit #19

784.15 (b)(vii) See Exhibit #19

784.15 (b)(ix) See Exhibit #19

784.15 (b)(x) See Exhibit #19

784.16 There are no public parks or historic places in the mining area.

784.17 There is no public road to be relocated as a result of the mine operation.

784.18 There is not, nor will there be, any waste or refuse disposal areas in this area.

784.19 Subsidence Monitoring
See Exhibit #23 Detailed Monitoring Plan
See Exhibit #24 Letter of Explanation from Forest Service
See Exhibit #25 Map Showing Location of Set Control Points

784.20 It is the intent of reclamation to provide a browse cover equal to or greater than that which exists naturally in the native area. This would tend to enhance the environment for deer and other wildlife animals. There are no fish in Mill Fork Stream so nothing of the reclamation effort will either enhance nor detract fish.

784.21 There will be no blasting associated with the surface effects of the mine operation.

784.22 The underground mine is using room-and-pillar techniques of extraction. Major equipment consists of continuous mining machines, shuttle cars, feeder breakers, roof bolters, and conveyor belts. The mine is projected to produce approximately 500,000 tons per year reaching a maximum of 750,000 tons per year as addition federal leases are acquired.

Sections 507 and 508
Public Law 95-87

507 (b)(1)(A) Swisher Coal Company
P.O. Box AU, Price, Utah 84501

507 (b)(1)(B) Map #1 shows the property involved in the #4 Mine operation and the surface ownership.

507 (b)(1)(C) Map #1 shows the holders of record of leasehold interest.

507 (b)(1)(D) DNA

507 (b)(1)(E) DNA

507 (b)(1)(F) DNA

507 (b)(2) All property adjacent to the mine property is controlled by the federal government (surface: Forest Service, subsurface: Geological Survey)

507 (b)(3) Applicant does not hold any previous or current surface coal mining permits.

507 (b)(4) See attached Exhibit #2

507 (b)(5) Swisher Coal Company, nor any of its affiliates, has never had a mining permit suspended or revoked.

507 (b)(6) Advertisement will be published in the Sun Advocate (local paper serving southeastern Utah) on dates determined by the Division of Oil, Gas, and Mining after review of the plans.

507 (b)(7) The operation consists of an underground coal mine using the room-and-pillar method of mining. Mining equipment used includes continuous miners, shuttle cars, roof bolters, feeder-breakers, conveyor belts, and support machinery.

507 (b)(8) The mine began production in February 1977. The life of the mine is indefinite, depending upon acquisition of surrounding federal coal. Total acreage involved in surface facilities is 6.8 acres.

507 (b)(9) Enclosed is a map of the surface facilities (Exhibit #3). Authority to mine in this area is given by the lease assignments which are attached as Exhibit #4.

507 (b)(10) The mine is located in the water shed of Mill Fork Creek, a tributary of Huntington Creek, a tributary of the San Rafael River, a tributary of the Colorado River.

507 (b)(11) Enclosed are copies of the following reports which deal exclusively with the possible hydrologic impacts of the mining operation.

a) Environmental Impact Analysis for Swisher Coal Company Proposed Huntington Canyon #4 Underground Coal Mine. Prepared by the Water Resources Branch of the U.S. Geologic Survey Exhibit #5

b) Water Quality and Hydrologic Study in Vacinity of Huntington Creek Mine #4 and Little Bear Spring. Prepared by Vaughn Hansen Associates, consulting engineers. Exhibit #6

507 (b)(12) Climatological data of the area can be found in the Environmental Analysis Report prepared by the U.S. Forest Service. Applicable sections of this EAR are included as Exhibit #7.

507 (b)(13) Enclosed is a topographic map of the mine area showing property boundaries, man-made features, etc. Exhibit #8

507 (b)(14) Enclosed is a map of the surface configuration with three cross-sections showing representative slices thru the mine yards, showing overburden strata, elevations, coal seams, and other geologic factors (Exhibit #9). Also enclosed is a map showing the location of all drill holes, the outcrop line, strike and dip of the coal seam, old works in the area, etc. (Exhibit #10)

507 (b)(15) Enclosed are drill hole logs and analysis sheets for the coal. (Exhibit #11)

507 (b)(16) There is no farm land, not to mention prime farmland, in the area of the minesite.

507 (b)(17) DNA

507 (c) DNA

507 (d) Enclosed is a Reclamation Plan (Exhibit #12)

507 (e) A copy of this application will be made available at the Carbon County Court House, Price, Utah.

507 (f) Enclosed is a certificate of insurance from the Fidelity and Casualty Insurance Company certifying that Swisher Coal Company has a public liability insurance policy in force for the mining and reclamation operations outlined in the plan. (Exhibit #13)

507 (g) There will be no blasting for this operation and therefore no blasting plan is submitted.

508 (a)(1) All lands in the underground portion of the mining operation are shown on Exhibit #1. The surface effects of the operation will not be extended beyond the existing surface improvements.

508 (a)(2)(A) The land is presently used for underground coal mining and associated surface facilities. The land in the past has also been used for coal mining. In fact, the surface facilities of the Huntington Canyon #4 Mine are in the exact same area of those of the old Leamaster Mine and some of the older structures associated with the past operation can still be seen today in the area. Other than coal mining, the areas only other use has been deer hunting. The canyon walls are much too steep and rocky to support farming, domestic livestock grazing, logging, or any other use.

508 (a)(2)(B) See answer to 508 (a)(2)(A)

508 (a)(2)(C) See answer to 508 (a)(2)(B)

508 (a)(3) At such time as the land is no longer used for the purpose of coal mining it shall be regraded and revegetated to be suitable to deer grazing which was the principle pre-mining use of the land. Enclosed is a pertinent section of the multiple hand use plan for the mine area prepared by the U.S. Forest Service.

508 (a)(4) Post-mining land use will be achieved by regrading the mine site area, and covering such area with native topsoil sufficient to sustain a healthy growth of grasses and forbs as prescribed by the U.S. Forest Service. The growth will be checked and replanted periodically as needed to insure that the revegetation efforts are successful.

508 (a)(5) Mining will be done, and is being done, by underground room-and-pillar methods using continuous mining machines, shuttle cars, feeder breakers, and conveyor belts. Reclamation will be done using a D-8 Caterpillar Dozer, a 988 front end loader, and a G16 road grader. All surface irregularities will be smoothed out and graded so that drainage is slow and even over the disturbed areas. Topsoil will be hauled from the storage pile and spread over the recontoured yard and compacted with the wheels of the loader. Topsoil will be spread in sufficient depth to insure a successful revegetation effort. Surface drainage will be controlled by reestablishing to the extent practicable, the original drainage features. It is estimated that it will cost nearly \$2,000 per acre to reclaim the mine yard.

508 (a)(6) It is in the interest of the company, both economically and operationally, to maximize full utilization of the coal resources. Mining plans are drawn up to allow extraction of pillars to maximize recovery to the greatest extent practicable.

<u>508 (a)(7)</u>	Removal of surface structures	4 weeks
	Regrading and recontouring	2 weeks
	Topsoil covering	2 weeks
	Seeding	<u>1 week</u>
	TOTAL	9 weeks

508 (a)(8) Swisher is the surface owner.

508 (a)(9) Swisher is the holder of two NPDES permits issued by the Environmental Protection Agency for the #4 Mine. Exhibit #14

508 (a)(10) The entire mine area is located on extremely steep, rugged, rocky, ledgy terrain which makes obtaining original contour impossible. The reclamation plan strives to most effectively reinitiate pre-mining use to post-mining application.

508 (a)(11) See Exhibit #1

508 (a)(12) Results of test boring are shown on Exhibit #11

508 (a)(13)(A) Surface water and ground water systems are fully explained
in Exhibits #5 and #6

508 (a)(13)(B) Enclosed is a copy of the certificate of water shares owned
by Swisher Coal Company in the Huntington Area (Exhibit #15)

508 (a)(13)(C) Enclosed is a copy of an agreement reached between the City
of Huntington and Swisher wherein Swisher agrees to replace any waters lost
from the City's culinary source as a result of mining operations. Exhibit #16

List of Exhibits

- Exhibit #1 : Property map showing ownership interest
- Exhibit #2 : Articles of incorporation
- Exhibit #3 : Map of the surface facilities
- Exhibit #4 : Lease assignments
- Exhibit #5 : Report on the hydrologic impact of operations prepared by the Water Resources Division of the U.S. Geological Survey
- Exhibit #6 : Hydrologic Report prepared by Vaughn Hansen Associates
- Exhibit #7 : Environmental Analysis Report prepared by the U.S. Forest Service
- Exhibit #8 : Topographic map showing property boundaries, man-made features, etc.
- Exhibit #9 : Cross-section of surface showing overburden, geology, coal seams, elevations, etc.
- Exhibit #10: Drill hole map
- Exhibit #11: Drill hole logs, analysis sheets
- Exhibit #12: Reclamation plan as approved by the Division of Oil, Gas, and Mining
- Exhibit #13: Certificate of Insurance
- Exhibit #14: NPDES permits issued by the Environmental Protection Agency
- Exhibit #15: Certificate of Water Shares
- Exhibit #16: Agreement with City of Huntington
- Exhibit #17: Approved change of point of diversion from State Division of Water Rights
- Exhibit #18: Special use permit for pumping facilities
- Exhibit #19: Plan for construction and maintenance of settling pond facility (Revised 2-79)
- Exhibit #20: Hydrologic monitoring plan (Revised 2-79)
- Exhibit #21: Road reconstruction information
- Exhibit #22: Notice of hearing on road reconstruction

- Exhibit #23: Detailed subsidence monitoring plan (Revised 2-79)
- Exhibit #24: Letter of concurrence from Forest Service about subsidence monitoring plan
- Exhibit #25: Map of subsidence monitoring control points
- Exhibit #26: Cover letter, U.S. Geological Survey mine plan and reclamation approval
- Exhibit #27: Cover letter, Division of Oil, Gas, and Mining mine plan and reclamation approval
- Exhibit #28: Plan for controlling drainage at C.V. Spur Preparation and Loading Facility
- Exhibit #29: Map of proposed drainage control at C.V. Spur
- Exhibit #30: Mining plan checklist (Added as supplement from mining plan submitted to U.S.G.S.)
- Exhibit #31: Mine plan for Huntington Canyon #4 Mine (Added as supplement from mining plan submitted to U.S.G.S.)
- Exhibit #32: November 22, 1978
Mining Plans and typical illustrations for Huntington Canyon #4 Mine - both seams
(Added as supplement at request of U.S.G.S.)
- Exhibit #33: Response to: Division of Oil, Gas, and Mining, Conditional Approval of Huntington Canyon #4 Mining and Reclamation Plan
- Exhibit #34: Vicinity Map
- Exhibit #35: Regional Features and Descriptions
- Exhibit #36: Wilderness Study Area
- Exhibit #37: Map and Description of Additional Surface Facilities and/or Disturbance Anticipated Over Life of Mine
- Exhibit #38: Lower Seam Road Details
- Exhibit #39: Description of Final Configuration of Surface Areas
- Exhibit #40: Typical of Reclaimed Roads
- Exhibit #41: Typical of Reclaimed Pad Areas
- Exhibit #42: Description & Sketch of Sign Design
- Exhibit #43: Land Use
- Exhibit #44: Disposal of Spoil & Wase Materials

Exhibit #45: Letter of Request to E.P.A. to amend N.P.D.E.S. Permit
#UT-0023116 & Amendment Approval by E.P.A.

Exhibit #46: Ground Water Systems

Exhibit #47: Hydrologic Impact of Roads

Exhibit #48: Soils

Exhibit #49: Vegetation

Exhibit #50: Wildlife

Exhibit #51: Dust Control

N O T I C E



The following information is submitted to the State of Utah Division of Oil, Gas, and Mining as agents for the Office of Surface Mining to fulfill the requirements for obtaining a mining and reclamation permit as required by Public Law 95-87 for the Huntington Canyon #4 Mine located in Mill Fork Canyon, a tributary of Huntington Canyon, Emery County, Utah. All persons who read the information submitted herein should be aware of the fact that the #4 Mine is an existing underground operation which began production in April 1977. All surface facilities needed in conjunction with the mine operation have been constructed. The mine is presently operating under a plan approved by the U.S. Geological Survey on 2-16-77 which plan encompasses the 211 regulations. The mine is also operating under a mining and reclamation plan approved by the Division of Oil, Gas, and Mining on 8-10-76. Cover letters for the plans are enclosed in the appendix as exhibit #26 and #27 respectively. The bodies of these plans are large and voluminous and are not included as part of this submittal. They are however, available upon request.

Even though the #4 Mine is an existing underground operation working under approved mining and reclamation plans, the company hereby submits the following information in a spirit of full cooperation with the governing agencies. In as much as the format for submitting information required for the permit is not yet specified and the final regulations are not yet in effect, information submitted herein follows in two forms: 1) Comments related to sections 507 and 508 of public law 95-87 and 2) Comments related to part 784 of the Surface Coal Mining and Reclamation Operations Permanent Regulatory Program as issued July 21, 1978. Much information is duplicated between the two but, for the sake of completeness, all items of each have been completed.

*Copy sent to OSM
10/30/78 - EUS*

*11/6/78 - OSM informed
us that they were
getting copies directly
and was retained
Ra*

BEAVER CREEK Coal Company
P. O. Box AU
Price, Utah 84501
Telephone 801 637-5050

FILE COPY
SWISH # ~~3~~
4



February 29, 1980

Mr. Don Crane
Director, Region V
Office of Surface Mining
1020 Fifteenth Street
Brooks Towers
Denver, Colorado 80202

Re: Huntington Canyon #4 Mine
Mining and Reclamation Plan
Special Stipulation #8

Dear Mr. Crane:

Enclosed herein are seven (7) copies of the #4 Mine drill hole locations with narrative. This material is being submitted to fulfill the requirement of Special Stipulation #8 of the #4 Mine Mining and Reclamation Plan Approval dated January 30, 1980.

Respectfully,

Dan W. Guy, P.E.
Chief Engineer

DWG/rh

Enclosures

Special Stipulation #8: Huntington Canyon #4 Mine
Mining and Reclamation Plan

HUNTINGTON CANYON #4 MINE
MINING AND RECLAMATION PLAN
SPECIAL STIPULATION #8

General - The enclosed map shows the location of all existing and currently proposed drill holes.

Existing Holes - Two of the existing holes are known to have been cased; #10=30' casing; and #12=15' casing. None of the other holes were recorded as cased or plugged. Upon inspection of the drill sites, few holes could actually be found, indicating that they may have been covered or naturally closed or plugged. Core sizes were of the NX type, or approximately 2-inches in diameter, leaving a very small surface hole. Water was not recorded as encountered during drilling; therefore, no sealing or other casing measures were employed to prevent water pollution.

Proposed Actions - Sites will be reinspected during the summer of 1980 and any holes that can be located and that are open, will be plugged or otherwise sealed off to prevent any possibility of injury to wildlife or to the public.

Proposed Drilling - Proposals for additional drilling are presently being formulated. Since specific approvals will be necessary for this drilling, complete plans for casing, sealing or otherwise managing these new holes will be presented to the regulatory authority at that time.

Mining and Reclamation Plan
Huntington Canyon No. 4 Mine Permit Application

LIST OF APPLICABLE U.S. GEOLOGICAL SURVEY 30 CFR 211 REGULATIONS
[with Permit Application cross-references]

- 211.10(c)(1) - Sections 1.4.1, 2.2.1, 2.2.2, 2.4, 4.3
- 211.10(c)(2) - Sections 6.3, 6.4, 6.5
- 211.10(c)(6)(i) - Section 6.5.5
- 211.10(c)(6)(ii) - Sections 3.3.1, 3.3.6
- 211.10(c)(6)(iv) - Sections 3.3.1, 3.3.2, Appendix 3
- 211.10(c)(6)(v) - Section 3.3.4
- 211.10(c)(6)(vii) - Sections 3.3.1, 3.3.2, 3.3.3, 3.4, 3.5
- 211.10(c)(6)(viii) - Sections 3.3.1, 3.3.7, 3.3.8
- 211.10(c)(6)(x) - Sections 3.3.1, 3.3.2, 3.3.3, 6.5
- 211.10(c)(6)(xi) - Sections 3.5.3, 3.5.4, 3.5.5
- 211.10(c)(6)(xii) - Plates 6-11 - 6-16
- 211.10(c)(6)(xiv) - Sections 3.3.2.1, 3.4.3, 7.1.5, 7.1.6
- 211.10(c)(6)(xv) - Section 3.3.3.2
- 211.10(c)(7)(i) and (ii) - Plate 3-7
- 211.10(c)(7)(iii) - Plates 3-3, 3-4, 6-1, 6-2, 6-3, 6-4, 6-5,
6-6, and Section 4.3
- 211.10(c)(7)(iv) - Section 3.2
- 211.10(c)(7)(v) - Section 3.3.1, 3.3.2, Appendix 3, Plate 6-6,
Section 3.4.8

*File MRP
(all copies)
ACT/015/004*

Mining and Reclamation Plan
Huntington Canyon No. 4 Mine Permit Application

LIST OF APPLICABLE U.S. GEOLOGICAL SURVEY 30 CFR 211 REGULATIONS
[with Permit Application cross-references]

- 211.10(c)(1) - Sections 1.4.1, 2.2.1, 2.2.2, 2.4, 4.3
- 211.10(c)(2) - Sections 6.3, 6.4, 6.5
- 211.10(c)(6)(i) - Section 6.5.5
- 211.10(c)(6)(ii) - Sections 3.3.1, 3.3.6
- 211.10(c)(6)(iv) - Sections 3.3.1, 3.3.2, Appendix 3
- 211.10(c)(6)(v) - Section 3.3.4
- 211.10(c)(6)(vii) - Sections 3.3.1, 3.3.2, 3.3.3, 3.4, 3.5
- 211.10(c)(6)(viii) - Sections 3.3.1, 3.3.7, 3.3.8
- 211.10(c)(6)(x) - Sections 3.3.1, 3.3.2, 3.3.3, 6.5
- 211.10(c)(6)(xi) - Sections 3.5.3, 3.5.4, 3.5.5
- 211.10(c)(6)(xii) - Plates 6-11 - 6-16
- 211.10(c)(6)(xiv) - Sections 3.3.2.1, 3.4.3, 7.1.5, 7.1.6
- 211.10(c)(6)(xv) - Section 3.3.3.2
- 211.10(c)(7)(i) and (ii) - Plate 3-7
- 211.10(c)(7)(iii) - Plates 3-3, 3-4, 6-1, 6-2, 6-3, 6-4, 6-5,
6-6, and Section 4.3
- 211.10(c)(7)(iv) - Section 3.2
- 211.10(c)(7)(v) - Section 3.3.1, 3.3.2, Appendix 3, Plate 6-6,
Section 3.4.8

Mining and Reclamation Plan
Huntington Canyon No. 4 Mine Permit Application

LIST OF APPLICABLE U.S. GEOLOGICAL SURVEY 30 CFR 211 REGULATIONS
[with Permit Application cross-references]

- 211.10(c)(1) - Sections 1.4.1, 2.2.1, 2.2.2, 2.4, 4.3
- 211.10(c)(2) - Sections 6.3, 6.4, 6.5
- 211.10(c)(6)(i) - Section 6.5.5
- 211.10(c)(6)(ii) - Sections 3.3.1, 3.3.6
- 211.10(c)(6)(iv) - Sections 3.3.1, 3.3.2, Appendix 3
- 211.10(c)(6)(v) - Section 3.3.4
- 211.10(c)(6)(vii) - Sections 3.3.1, 3.3.2, 3.3.3, 3.4, 3.5
- 211.10(c)(6)(viii) - Sections 3.3.1, 3.3.7, 3.3.8
- 211.10(c)(6)(x) - Sections 3.3.1, 3.3.2, 3.3.3, 6.5
- 211.10(c)(6)(xi) - Sections 3.5.3, 3.5.4, 3.5.5
- 211.10(c)(6)(xii) - Plates 6-11 - 6-16
- 211.10(c)(6)(xiv) - Sections 3.3.2.1, 3.4.3, 7.1.5, 7.1.6
- 211.10(c)(6)(xv) - Section 3.3.3.2
- 211.10(c)(7)(i) and (ii) - Plate 3-7
- 211.10(c)(7)(iii) - Plates 3-3, 3-4, 6-1, 6-2, 6-3, 6-4, 6-5,
6-6, and Section 4.3
- 211.10(c)(7)(iv) - Section 3.2
- 211.10(c)(7)(v) - Section 3.3.1, 3.3.2, Appendix 3, Plate 6-6,
Section 3.4.8

Mining and Reclamation Plan
Huntington Canyon No. 4 Mine Permit Application

LIST OF APPLICABLE U.S. GEOLOGICAL SURVEY 30 CFR 211 REGULATIONS
[with Permit Application cross-references]

- 211.10(c)(1) - Sections 1.4.1, 2.2.1, 2.2.2, 2.4, 4.3
- 211.10(c)(2) - Sections 6.3, 6.4, 6.5
- 211.10(c)(6)(i) - Section 6.5.5
- 211.10(c)(6)(ii) - Sections 3.3.1, 3.3.6
- 211.10(c)(6)(iv) - Sections 3.3.1, 3.3.2, Appendix 3
- 211.10(c)(6)(v) - Section 3.3.4
- 211.10(c)(6)(vii) - Sections 3.3.1, 3.3.2, 3.3.3, 3.4, 3.5
- 211.10(c)(6)(viii) - Sections 3.3.1, 3.3.7, 3.3.8
- 211.10(c)(6)(x) - Sections 3.3.1, 3.3.2, 3.3.3, 6.5
- 211.10(c)(6)(xi) - Sections 3.5.3, 3.5.4, 3.5.5
- 211.10(c)(6)(xii) - Plates 6-11 - 6-16
- 211.10(c)(6)(xiv) - Sections 3.3.2.1, 3.4.3, 7.1.5, 7.1.6
- 211.10(c)(6)(xv) - Section 3.3.3.2
- 211.10(c)(7)(i) and (ii) - Plate 3-7
- 211.10(c)(7)(iii) - Plates 3-3, 3-4, 6-1, 6-2, 6-3, 6-4, 6-5,
6-6, and Section 4.3
- 211.10(c)(7)(iv) - Section 3.2
- 211.10(c)(7)(v) - Section 3.3.1, 3.3.2, Appendix 3, Plate 6-6,
Section 3.4.8

Mining and Reclamation Plan
Huntington Canyon No. 4 Mine Permit Application

LIST OF APPLICABLE U.S. GEOLOGICAL SURVEY 30 CFR 211 REGULATIONS
[with Permit Application cross-references]

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- 211.10(c)(2) - Sections 6.3, 6.4, 6.5
- 211.10(c)(6)(i) - Section 6.5.5
- 211.10(c)(6)(ii) - Sections 3.3.1, 3.3.6
- 211.10(c)(6)(iv) - Sections 3.3.1, 3.3.2, Appendix 3
- 211.10(c)(6)(v) - Section 3.3.4
- 211.10(c)(6)(vii) - Sections 3.3.1, 3.3.2, 3.3.3, 3.4, 3.5
- 211.10(c)(6)(viii) - Sections 3.3.1, 3.3.7, 3.3.8
- 211.10(c)(6)(x) - Sections 3.3.1, 3.3.2, 3.3.3, 6.5
- 211.10(c)(6)(xi) - Sections 3.5.3, 3.5.4, 3.5.5
- 211.10(c)(6)(xii) - Plates 6-11 - 6-16
- 211.10(c)(6)(xiv) - Sections 3.3.2.1, 3.4.3, 7.1.5, 7.1.6
- 211.10(c)(6)(xv) - Section 3.3.3.2
- 211.10(c)(7)(i) and (ii) - Plate 3-7
- 211.10(c)(7)(iii) - Plates 3-3, 3-4, 6-1, 6-2, 6-3, 6-4, 6-5,
6-6, and Section 4.3
- 211.10(c)(7)(iv) - Section 3.2
- 211.10(c)(7)(v) - Section 3.3.1, 3.3.2, Appendix 3, Plate 6-6,
Section 3.4.8

BEAVER CREEK Coal Company
P. O. Box AU
Price, Utah 84501
Telephone 801 637-5050



November 16, 1981

JIM

NOV 30 1981

Mr. Jackson Moffitt
Area Mining Supervisor
U. S. Geological Survey
2040 Administration Building
1745 West 1700 South
Salt Lake City, Utah 84104

RECEIVED

NOV 30 1981

Re: Huntington Canyon #4 Mine
Federal Leases: SL-064902 & U-33454

DIVISION OF
OIL, GAS & MINING

Dear Mr. Moffitt:

Please find enclosed three (3) copies of our proposed mine plan for the east side of the Hiawatha Seam at the Huntington #4 Mine. These plans are being submitted for your approval as a minor modification to our approved Huntington Canyon #4 Mining and Reclamation Plan, #UT-004. The plan as shown will not require any additional surface facilities nor create any additional surface disturbance.

The present plan will be confined to the east side of the fault graben in #4 Mine. The lower seam will be accessed by two (2) rock slopes for material and conveyor haulage at -10% and -25%, respectively, and one (1) 10' diameter by 100' deep return air shaft. Due to the exploratory, weaving nature of the upper seam main entries, it will not be feasible to columnize the workings; however, the average 100'+ of interburden between the seams in this area should minimize mining problems. Approximately 80% of the interburden is made up of sandstone units, which will further reduce problems in multiple seam recovery. Second mining will not be initiated under or northeast of the upper seam main entries as long as those entries are in use.

It is our hope this plan will meet with your approval. If you have any questions or need any further information, please let me know.

Respectively,

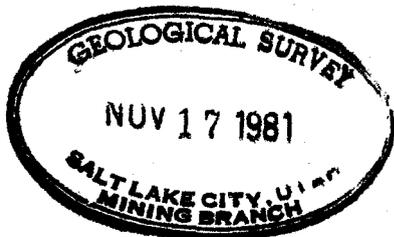
BEAVER CREEK COAL COMPANY

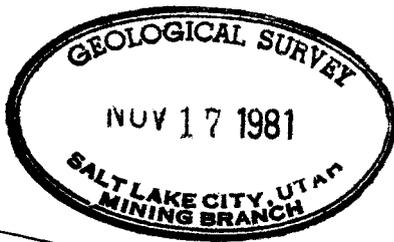
Dan W. Guy, P.E.
Manager of Engineering

DW/daf
cc: Max Robb
Tom Parker
Charles McGlothlin
Ken Wangerud
Dave Chenoweth

BEAVER CREEK Coal Company is a Subsidiary of AtlanticRichfieldCompany

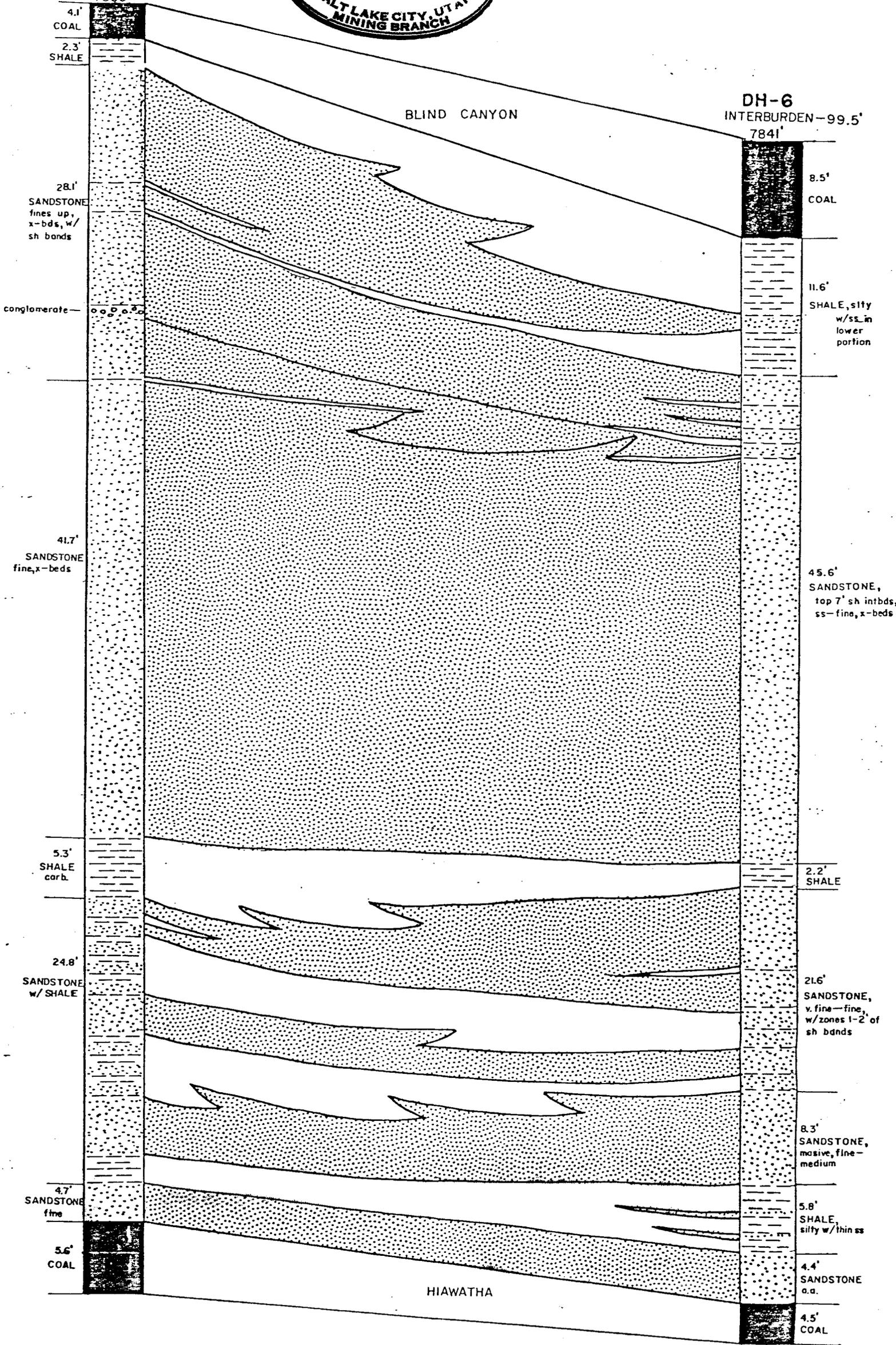
cc: File





DH-8
INTERBURDEN - 106.9
7853'

DH-6
INTERBURDEN - 99.5'
7841'



BLIND CANYON

HIAWATHA

4.1'
COAL

2.3'
SHALES

28.1'
SANDSTONE
fines up,
x-bds, w/
sh bands

conglomerate

41.7'
SANDSTONE
fine, x-beds

5.3'
SHALES
carb.

24.8'
SANDSTONE
w/ SHALES

4.7'
SANDSTONE
fine

5.6'
COAL

8.5'
COAL

11.6'
SHALES, silty
w/ss in
lower
portion

45.6'
SANDSTONE,
top 7' sh intbds,
ss-fine, x-beds

2.2'
SHALES

21.6'
SANDSTONE,
v. fine-fine,
w/zones 1-2 of
sh bands

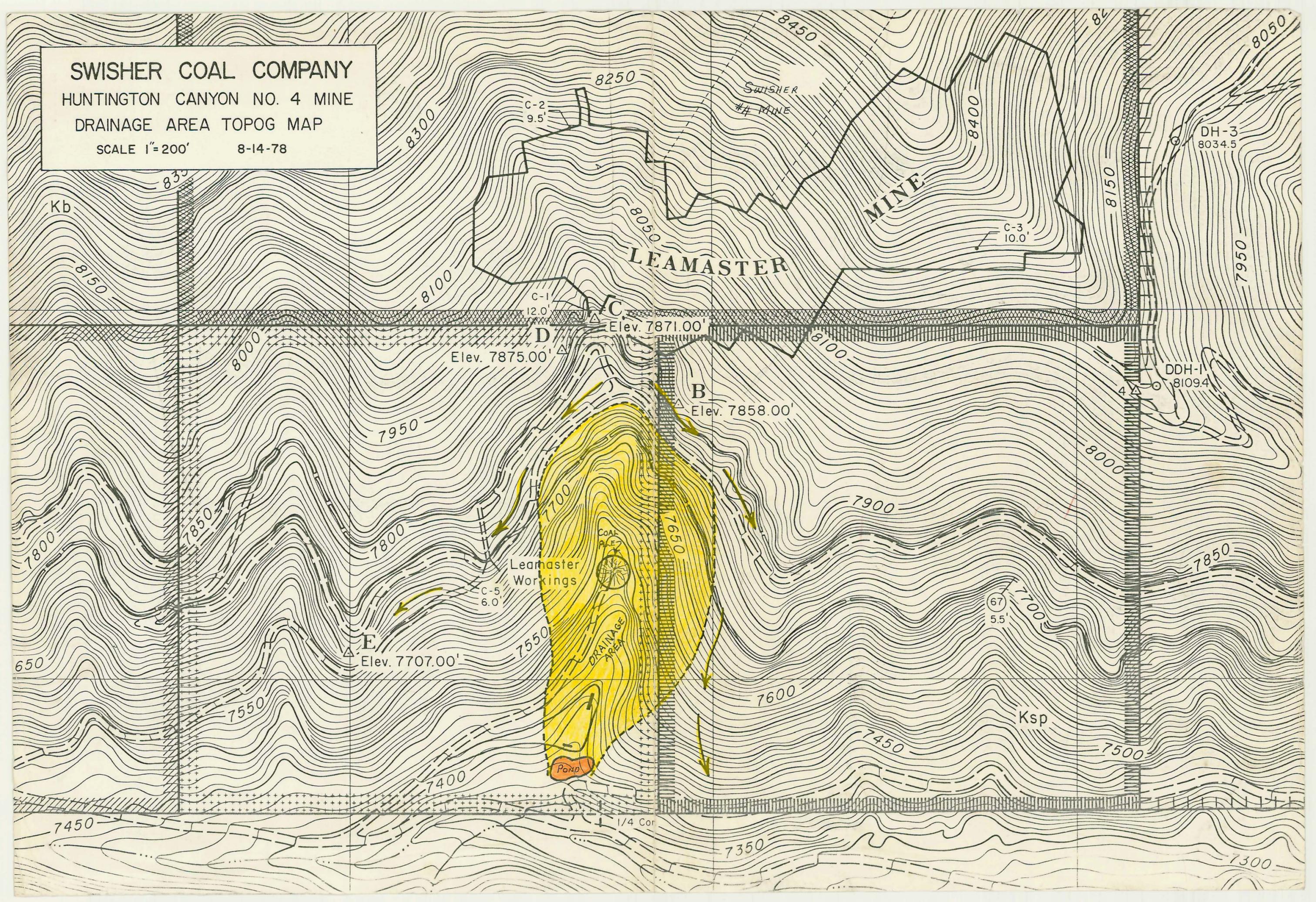
8.3'
SANDSTONE,
massive, fine-
medium

5.8'
SHALES,
silty w/thin ss

4.4'
SANDSTONE
o.a.

4.5'
COAL

SWISHER COAL COMPANY
HUNTINGTON CANYON NO. 4 MINE
DRAINAGE AREA TOPOG MAP
SCALE 1"=200' 8-14-78





STAFF NOTES For Swisher's
Proposed Sediment Pond at the
Huntington # 4 Mine.

Mike Thompson

1. There needs to be a primary discharge structure constructed so that the pond may be drained from the top of the proposed sediment storage level. The purpose of this is to drain the treated water in case of a subsequent storm. As designed there is no means of draining water to allow for storage volume for subsequent storms. The 2 foot diameter culvert should be retained as an emergency spillway.
2. Sediment ponds are to be designed to contain runoff ~~to~~ resulting from the 10 year 24 hour precipitation event ~~to~~ plus an additional sediment storage volume of the accumulated predicted sediment production of three years; or, 0.1 acre-foot for each acre of disturbed area and the ~~predicted~~ yearly sediment production from any underground discharge.

Required volume computations are as follows:

a. Runoff

10 year 24 hour precipitation ----- 2.5 inches

Curve number ----- 81

$$S = \frac{1000}{CN} - 10 = 2.346$$

$$Q_{(in)} = \frac{(P_{(in)} - 0.2S)^2}{P_{(in)} + 0.8S} = \boxed{0.94 \text{ inches}}$$

Area ----- 8.26 acres

$$\frac{9.4 \text{ inches}}{12 \text{ inches/ft}} * 8.26 \text{ acres} = \boxed{0.65 \text{ Acre-Feet}}$$

~~Sediment Production - USLE
A = RKLSCP
R = 16, See Isoerodent map for Utah
K =~~

b. Additional Sediment Storage Volume

$$0.1 \text{ AF} * 8.26 \text{ acres} = \boxed{0.83 \text{ acre-feet}}$$

Total Required Volume

$$0.65 \text{ Acre-Feet} + 0.83 \text{ Acrefeet} = \boxed{1.48 \text{ Acre-Feet}}$$

From the desk of...

Dan Guy

Ron:

Here's the copy
of the proposed
dam, as presented to
Bill Boley of U.S.F.D.
I have added the
topo map on this set.

2 Dan



HUNTINGTON #4 MINE
SEDIMENTATION POND SPECIFICATIONS

Location: The dam will be constructed in an existing drainage directly below the coal stockpile/loading area. Runoff from this area is minimal; however, the pond location will collect any contamination from the coal handling area of the mine.

Purpose: To comply with requirements from the Office of Surface Mining for the control of sedimentation as listed under the Underground Mining General Performance Standards. The pond is to be constructed in a manner to facilitate the holding and settling of contaminated water from the mine site. An overflow is to be provided in the event of a massive inflow of surface water exceeding the capacity of the pond. The pond will be cleaned as necessary and the waste material placed in an approved disposal site.

Construction: The large boulders located in the existing drainage shall be placed in the core of the dam. The fill material for the dam shall be removed from the pond area (see maps) and placed in lifts not to exceed 18 inches, and compacted between lifts. The overflow culvert will be placed to drain into the existing drainage as shown on the section drawing. Rip-rap will be placed on the face of the dam to prevent scouring. The back of the dam will be planted for stability and to provide a more pleasing appearance.

Environmental

Considerations: The proposed pond site is on Swisher property; however, since it is adjacent to the U.S. Forest land, Swisher Coal has made every effort to place the site in an area that will provide maximum retention efficiency and minimum disturbance to the environment. Mr. Barry Johnson of the U.S. Forest Service has reviewed the proposal on-site and has agreed upon the location. The attached maps will verify that a very few trees will be destroyed as a result of the pond construction and the resultant cleaning of surface drainage should be very effective.

Capacity: The pond will overflow at an elevation of 7422.0, allowing for approximately 220,000 gallons of storage. It is estimated that this size will be adequate to store runoff from the disturbed areas. (SEE SEDIMENTATION POND CALCULATION SHEET.)

Depth: At overflow capacity the pond will have a maximum depth of 16 feet at the dam. While it is not expected that the pond will contain water for long periods (due to evaporation), means will be provided to prevent animals or persons from

Huntington #4 Mine
Sedimentation Pond Specs
Page Two

accidentally falling into the pond.

Safety

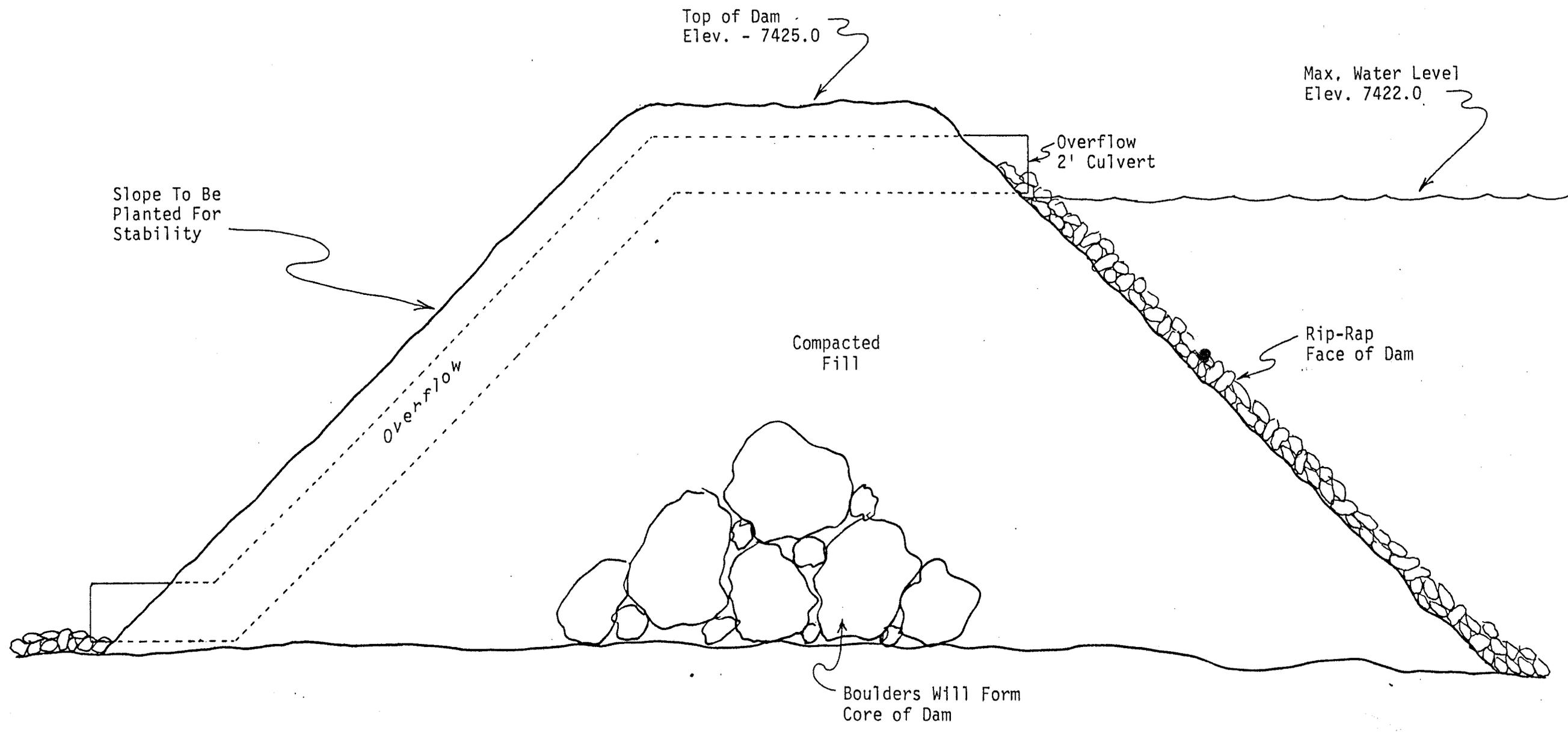
Precautions: The pond will be regularly inspected by a licensed individual as required by law. As previously mentioned the pond will be cleaned as necessary and access to the area will be restricted. Any weakness or other defects in the structure will be immediately corrected.

HUNTINGTON #4 MINE SEDIMENTATION POND

CROSS SECTION OF DAM

SCALE 1/4" = 1'

8/1/78 DG



HUNTINGTON NO. 4 MINE
SEDIMENTATION POND
CALCULATIONS

- * A. Use 2" figure for 6 hr. - 25 yr. precipitation event.
- **B. Table A-4 p. 538 - Runoff Curve No. (CN) = 81
Cover - Herbaceous
Condition - Fair
Soil Group - C (Slow infiltration rate)
- **C. From fig. A-4 p. 541, the direct runoff is found to be .6 inches.
- D. Drainage area - 8.26 acres. Total runoff will be .6" x 8.26 acres
= 4.96 acre-inches or .41 acre ft.
- E. The area of the sedimentation pond is 4160 ft.² or .096 acres.
Ultimate capacity of the pond is 220,000 gallons or .67 acre ft.;
therefore, the maximum expected depth of water in the pond from
such an event will be 4.27 ft.
- F. Overflow capacity required from a 25 year precipitation event is
estimated at 375 gpm; therefore, a 2' diameter culvert will be
adequate.
- G. Conclusion: the pond size is adequate to contain the expected
runoff from the disturbed area during a 24 hr. - 10 yr. or 6 hr. -
25 yr. precipitation event, as required.
- * Taken from the U.S.G.S. "Assessment of the potential geologic impact
of the proposed Leamaster Mine (reopened), coal leasehold U-064903
Emery County, Utah," April 2, 1976.
- ** Calculations made using the reference "Design of Small Dams" by the
Bureau of Reclamation, Appendix A, "Estimating Rainfall Runoff from
Soil and Cover Data".

WATER MONITORING PROGRAM
HUNTINGTON NO. 4 MINE

Surface Water Monitoring

A monitoring station has been established in Mill Ford Creek below the mine yards. (See Map) This station will be monitored on a monthly basis for flow, PH, total iron, total manganese, and total suspended solids. Results of the monitoring shall be reported to the Division of Oil, Gas, and Mining within 60 days of sample collection. Standard methods of analysis, such as those specified in 40 CFR 136, shall be used in all tests.

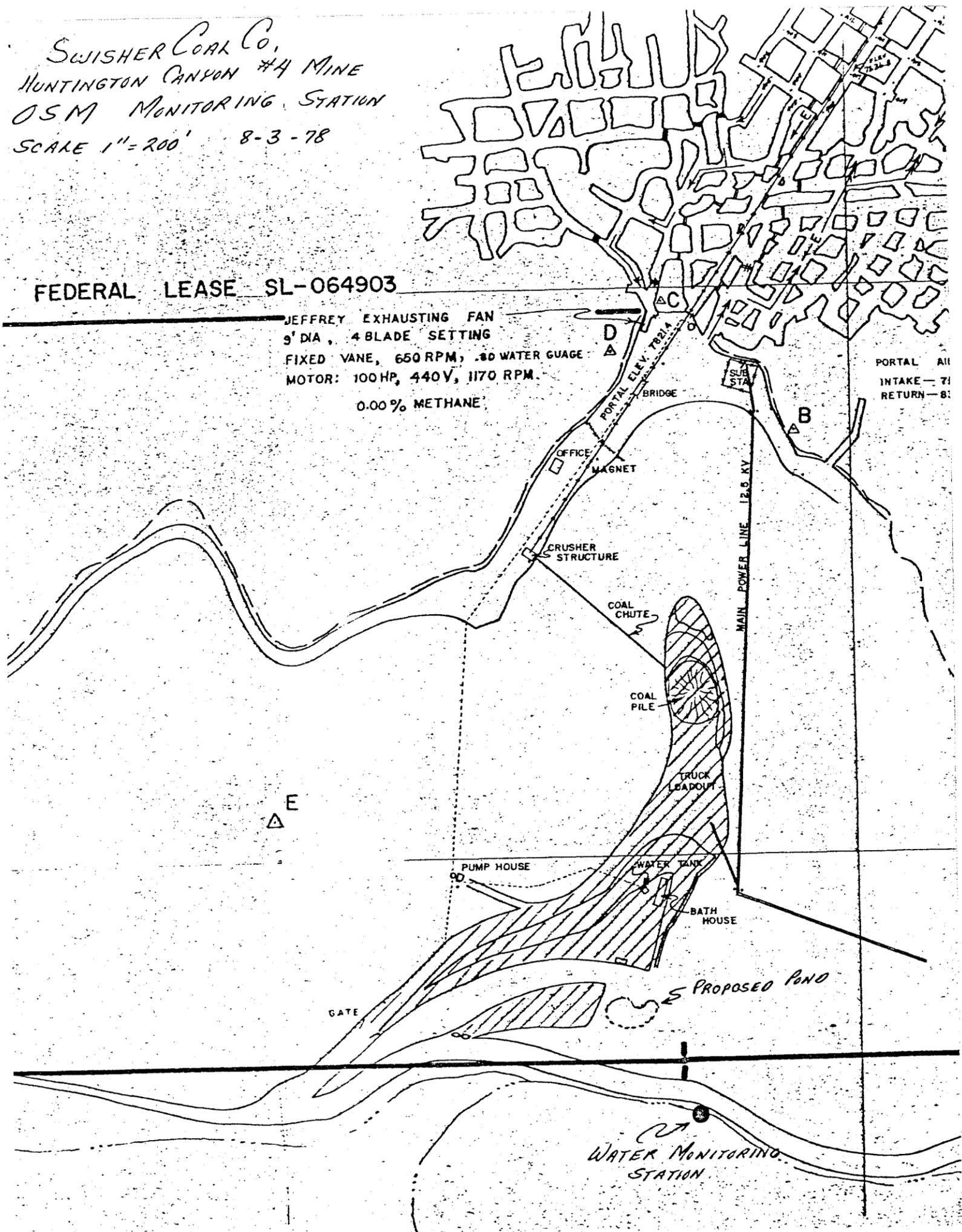
Sedimentation Pond

A sedimentation pond will be constructed below the mine yards, and will contain the drainage from the disturbed areas above. This will be a containment pond with no discharge, with the exception of a possible overflow from a precipitation event larger than a 10 year, 24-hour event. Once this pond is constructed, there will be no discharge from the mine surface area to the stream; however, the station in Mill Ford Creek will still be monitored to assess the effectiveness of the pond.

SWISHER COAL CO.
HUNTINGTON CANYON #4 MINE
OSM MONITORING STATION
SCALE 1"=200' 8-3-78

FEDERAL LEASE SL-064903

JEFFREY EXHAUSTING FAN
9' DIA, 4 BLADE SETTING
FIXED VANE, 650 RPM, .80 WATER GAUGE
MOTOR: 100HP, 440V, 1170 RPM.
0.00% METHANE



PORTAL ALL
INTAKE - 71
RETURN - 81

MAIN POWER LINE 12.5 KV

PROPOSED POND

WATER MONITORING
STATION

SWISHER COAL CO.

P. O. BOX AU
PRICE, UTAH 84501
PHONE 801-637-5050

September 11, 1979

Mr. Don Crane
Office of Surface Mining
Denver Regional Office
Post Office Building, Room 270
1823 Stout Street
Denver, Colorado 80202

Attn: Mr. John Hardaway

Re: Huntington Canyon #4 Mine
Mine Plan Approval



Dear Mr. Crane:

Enclosed are seven (7) copies of Addendums to our Huntington Canyon #4 Mine Plan. These addendums are submitted to comply with the Special Stipulations received from your office on July 16, 1979, which require compliance or approval prior to mining of coal.

During a recent on-site visit with John Hardaway, certain additional data was requested. These additions are included with this submittal. There were also some proposed stipulation changes discussed during this meeting. Requests for these changes are also herein submitted along with supporting data.

It is Swisher Coal Co.'s intent to accept the stipulations to this mine plan, providing the proposed alterations are made. It is our hope that you will find these addendums to be satisfactory and that this plan can finally be sent to Washington for final approval.

Since the stipulations were received on July 16, 1979, and two months have now passed without approval, an extension of all deadline dates is requested to compensate for this time lag. Many of the stipulations require submittals by December 31, 1979; it would be very helpful if this date could be extended to March 31, 1980, or to read "within six (6) months of final approval".

We will appreciate any effort your office can make to expedite this approval. If you have any questions or need any further information, please let me know as soon as possible.

Respectfully,

A handwritten signature in cursive script that reads "Dan W. Guy".

Dan W. Guy, P.E.
Chief Engineer

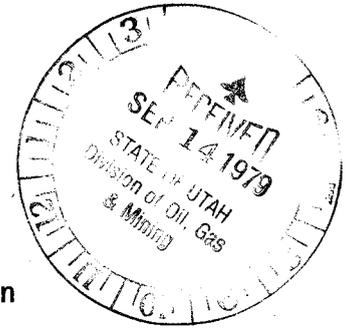
DWG/rh

Enclosures

Industrial and Domestic Coals

cc: Ron Daniels,
Oil, Gas & Mining

Addendums
to
Huntington Canyon #4 Mining & Reclamation Plan



The following addendums to the Huntington Canyon #4 Mining and Reclamation Plan are submitted to satisfy the pre-mining requirements of the Special Stipulations for the approval of this mine plan. The addendums are numbered to correspond with the Special Stipulation numbers; numbers not included at this time are for data required to be submitted by Swisher Coal Co. at a later date, or are for stipulations requiring only compliance with no additional data needed:

Addendum #:

5. Mine Plan Addendum on Top Coal
7. Permit Area Map
9. Topsoil Protection Plan
11. Sedimentation and Erosion Control Plan Addendum
12. Proposed Locations of Buffer Zone Signs
21. Division of Wildlife Resources' Request to Alter Stipulation
26. U.S. Forest Service & Oil, Gas & Mining Request to Alter Stipulation
30. Reclamation Bond Support Data
31. Road Drainage Modifications

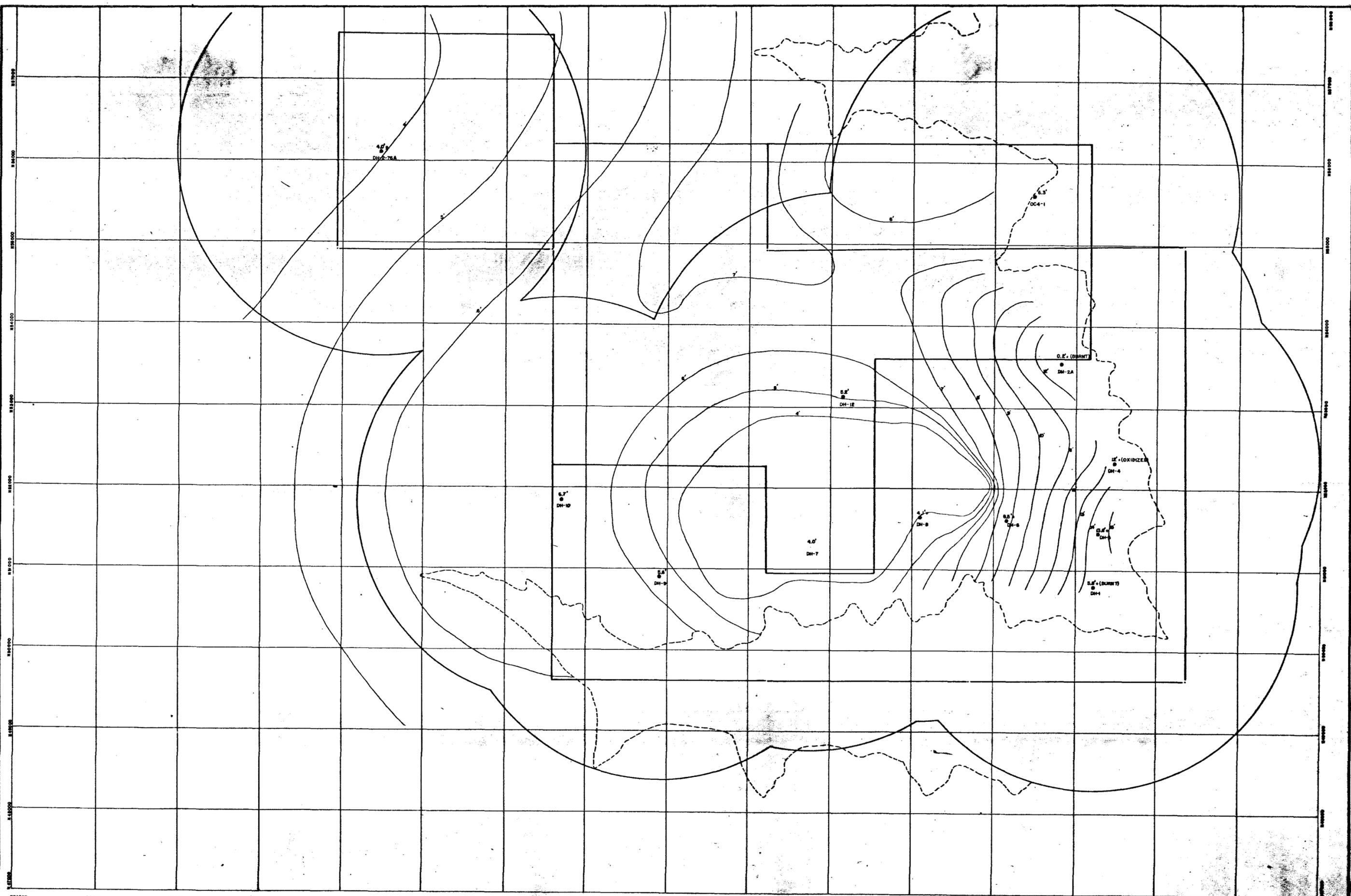


Addendum #5: Mine Plan Addendum on Top Coal

Addendum #5
Mine Plan Addendum

As per the requirements of Special Stipulation #5, the following is submitted as a mine plan addendum to permit the regulatory authority to determine when top coal should be left in the mine roof.

1. The attached isopach map is constructed basically from drill hole information. As can be seen, the areas of thicker coal were in the early development of the mine and no such areas are expected in future development.
2. The immediate roof is a massive sandstone and roof control is accomplished by a full bolting plan or a conventional timbering plan, depending on roof conditions.
3. NO TOP COAL IS PRESENTLY BEING LEFT, NOR DO WE ANTICIPATE LEAVING ANY TOP COAL IN FUTURE MINING IN THE HUNTINGTON CANYON #4 MINE. If the roof conditions should change drastically, or if the coal height should increase to the point that leaving top coal would be desirable, Swisher Coal will then request approval of such action from the regulatory authority prior to initiating same.



RECEIVED
SEP 14 1979
STATE OF UTAH
DIVISION OF OIL, GAS
& MINING

CONTROL POINTS BLIND CANYON SEAM

Addendum #7: Designated Permit Area



Addendum #7
Designated Permit Area

The attached map will accurately show the boundaries of the designated Huntington Canyon #4 Mine Permit Area.

The additional acreage for the pumping facilities is 0.46 acres and is covered by a Special Use Permit from the U.S. Forest Service.

Swisher Coal Co. concurs with the designated permit area; however, the description in all cases should be changed to reflect Township 16 South, Range 7 East, rather than Range 1 East, as shown in Special Stipulation #7.

Addendum #9: Topsoil Protection Plan





SAMPLING @ SEDIMENTATION
POND SITE BY MR. DAN LARSEN,
U.S. FOREST SERVICE - 9/6/79.

Addendum #9
Topsoil Protection Plan

Sedimentation Pond Construction:

1. The sedimentation pond construction will disturb an estimated .22 acres and remove some 700 cubic yards of "topsoil" and approximately 700 cubic yards of other unconsolidated material.
2. The attached map will show the area of the proposed disturbance and the new proposed topsoil storage area.
3. The attached drawing will show the section view of the typical test hole placed in this area, along with the sample point locations. Four samples were taken: One at a depth of one foot; another from one foot to two feet; and a third at thirty-five to forty-five inches. A fourth sample was taken in the lower portion of the hole for compaction tests. These samples were analyzed for revegetation potential and any possible toxic elements. The results of these tests are to be included in this addendum upon their completion.
4. It is proposed to remove the top two feet of soil in this area and store it as topsoil in the proposed location. The additional material to be removed will be used in the dam and berm construction as possible. Any of this material left will also be stored in a separate pile in the general area of the topsoil pile. This material will be used as necessary in the final reclamation of the mine and road areas.
5. The topsoil and soil piles will be placed in lifts not to exceed twelve inches and compacted by wheel or track pressure. Upon completion of the storage procedure, the piles will be planted with the temporary seed mixture specified in the plan.
6. Protection of the topsoil pile will be accomplished by compaction, seeding, and drainage protection around the piles. Any runoff from the piles will be directed to the sedimentation ponds.

SWISHER COAL CO.

P. O. BOX AU
PRICE, UTAH 84501
PHONE 801-637-5050

September 7, 1979

Soil Testing Laboratory
Utah State University
UMC 48
Logan, Utah 84322

Gentlemen:

Please find enclosed four (4) soil samples for testing. On samples #1, #2 and #3, please run the following:

1. Standard Fertility Test: pH, salinity, phosphorus, potassium, texture, lime, recommendations.
2. Organic Carbon

On sample #4, please run only the following:

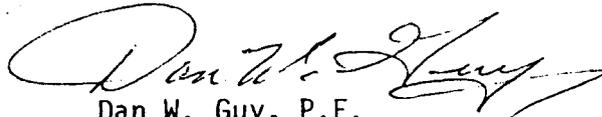
1. Moisture - Density (compaction)

Please charge the analysis work to Swisher Coal Co., Purchase Order #04-5088, and send the results and billing to me at the above address. As indicated on the attached sheet, please also send a copy of the results to:

Mr. Dan Larson
U.S. Forest Service
Manti-LaSal National Forest
350 East Main Street
Price, Utah 84501

Thank you for your assistance. If you have any questions or need any further information please let me know.

Respectfully,



Dan W. Guy, P.E.
Chief Engineer

DWG/rh

Enclosures

SOIL TESTING LABORATORY

Utah State University UMC 48
Logan, Utah 84322

Location of land: County Emery
Nearest town Huntington
Direction and miles from town 10 mi N.W.
Source of water: Well
Name stream or canal Mill Fork

Special problems:
This soil will be used for
mine reclamation. #4 for
small dam construction.

Date: September 7, 1979

Irrigation method: Sprinkle
Furrow n/a
Flood

Your mailing address:

Name Swisher Coal Co.
Street or RFD P.O. Box AU
City Price, Utah State 84501 Zip

- Dry Farm
- Range Land
- Irrigated Farm Water ample
- Garden Water limited
- Lawn

Send extra copy of results to:
Mr. Dan Larson
U.S. Forest Service
Manti-LaSal National Forest
350 East Main Street
Price, Utah 84501

CROP TO BE GROWN 19 <u> </u>					
Sample No.	Sample Depth	Acres	Crop	Yield Goal*	Manure to be Applied tons/A
1	0"-13"				
2	13"-23"				
3	35"-45"				
4	35"-45"				

Next Crop 19 <u> </u>

*Use realistic yield goals for your conditions.

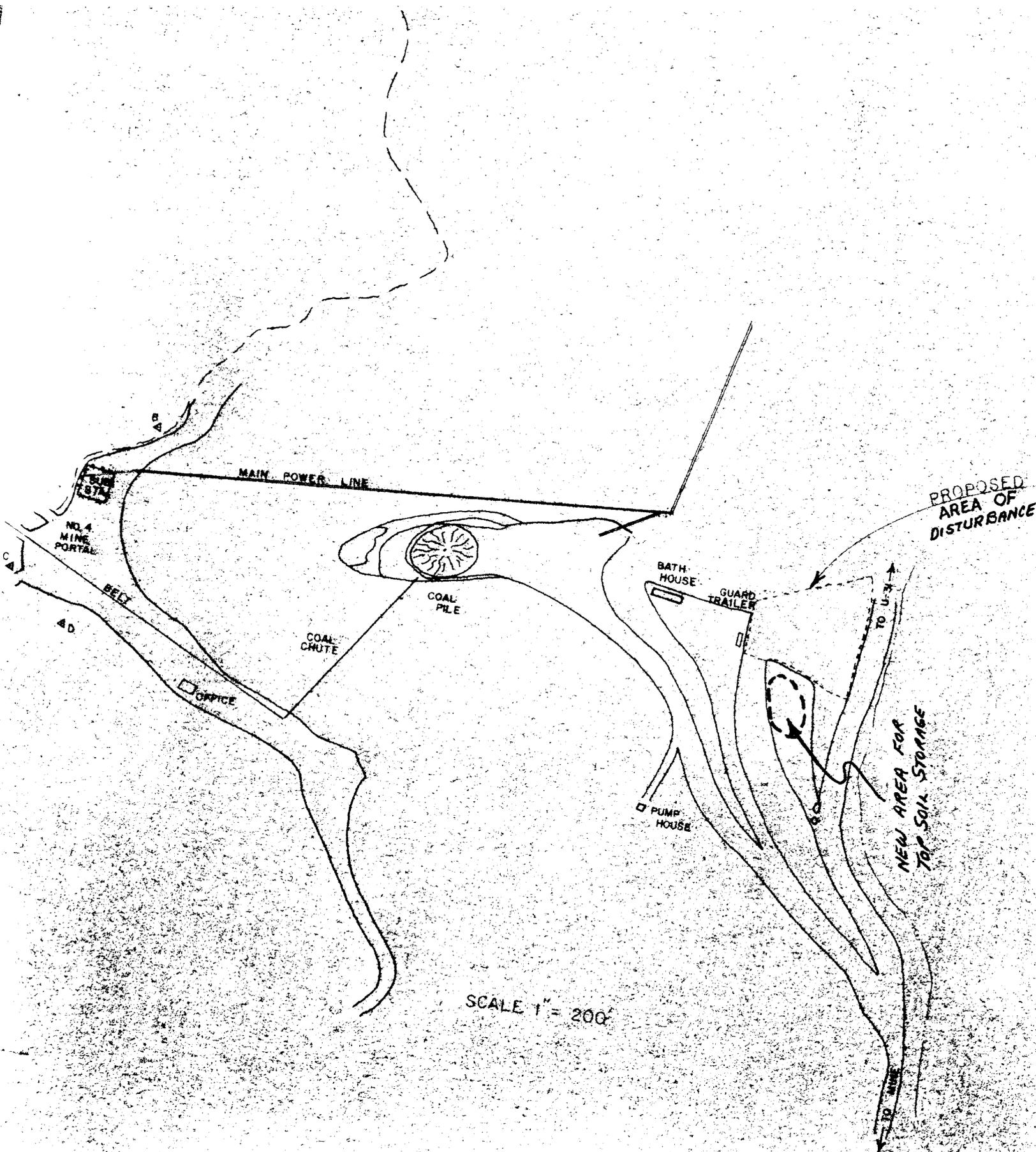
Test Desired	CROP AND FERTILIZER HISTORY (2 Years)					
	CROP LAST GROWN 19 <u> </u>				Was Stubble removed?	Crop 2 Years Ago 19 <u> </u>
	Crop	Yield	Fertilizer Applied Amount/A	Kind		

* (A, B, C. etc. See price list)

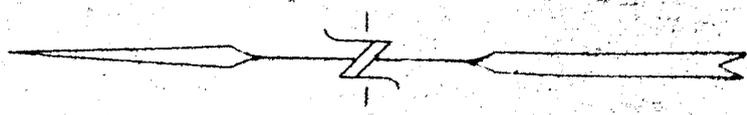
Hay or Pasture Composition (Check one)			
Alfalfa	All grass	Mixtures	
		1/3 Legume	2/3 Legume

Number of subsamples mixed together to form each sample listed above _____

Send samples prepaid by parcel post or express to the address above.
Send this Description Form and check payable to the Soil Testing Laboratory.
Payment enclosed \$ _____.

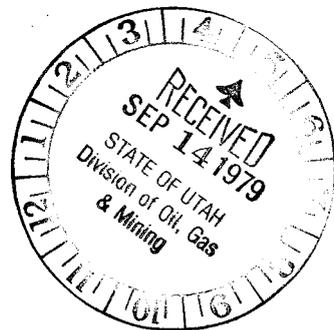


SCALE 1" = 200'



SEC. 16 T. 16 S. R. 7 E.

Addendum #12: Buffer Zone Signs



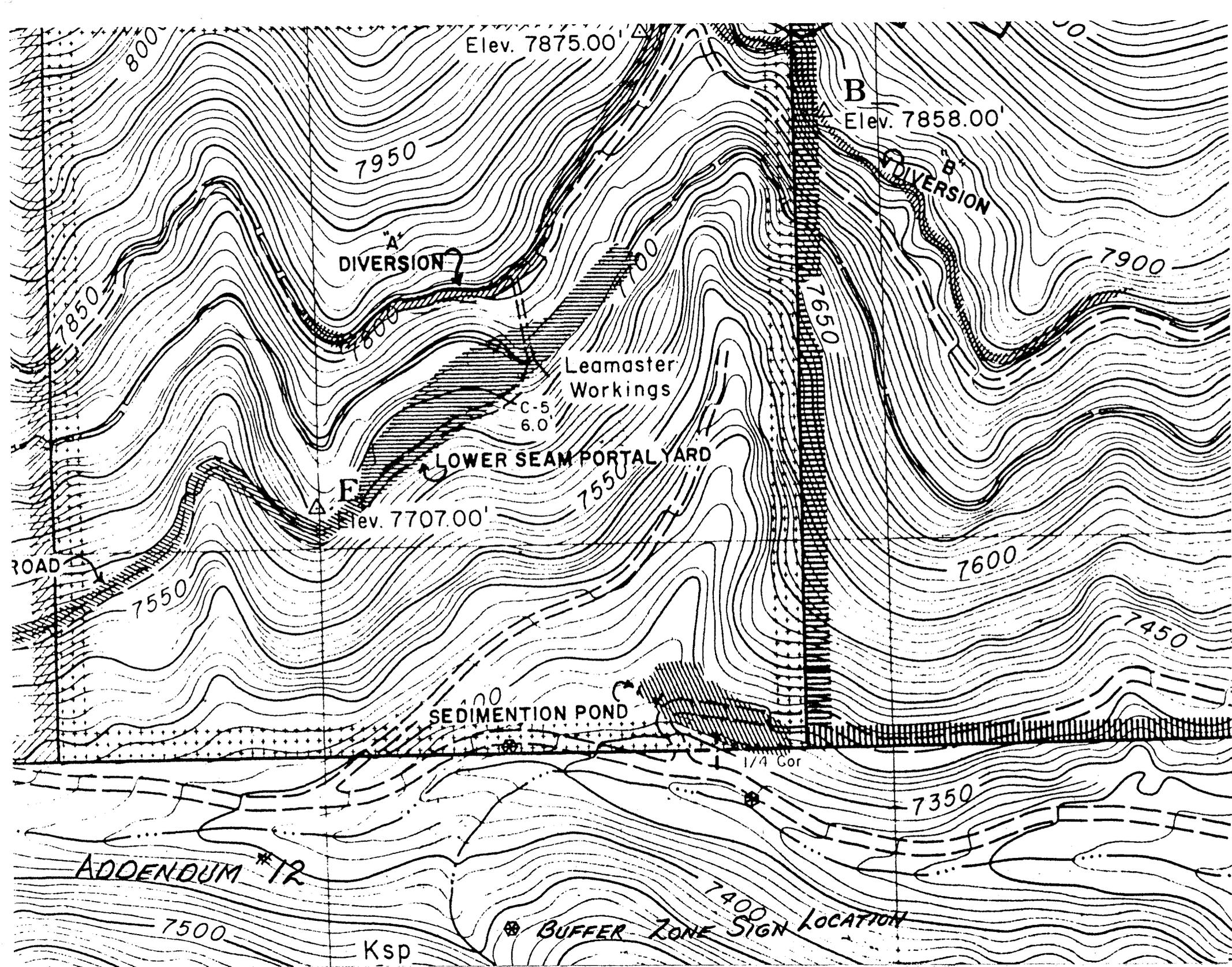
Addendum #12
Buffer Zone Signs

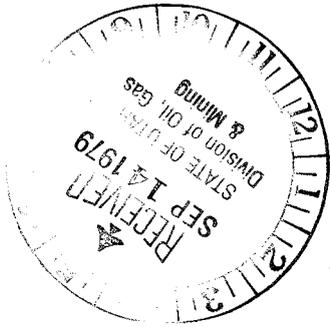
- A. Buffer Zone signs shall be installed between the access road and the Mill Fork Creek in the immediate vicinity of the sedimentation ponds (see attached map for proposed location).
- B. Signs shall be made of a durable material and placed in such a manner as to be easily read and understood (see attached drawing for sign typical).

ADDENDUM *12

12" X 18"

BUFFER ZONE
DO NOT DISTURB





Addendum #21: Wildlife Protection (Haulage)

Addendum #21
Wildlife Protection (Haulage)

Please refer to the attached letter from Mr. Larry Wilson, Supervisor of Southeastern Region of the Utah Division of Wildlife Resources, requesting the alteration of Special Stipulation #21. Mr. Clark Johnson of the U.S. Fish and Wildlife Service, originator of the stipulation, has discussed this change with the Division of Wildlife Resources and concurs with the proposal revision.

Swisher Coal Co. does hereby request Special Stipulation #21 be changed as per the recommendation of the Utah Division of Wildlife Resources, with concurrence of the U.S. Fish and Wildlife Service, to read as follows:

"Coal haulage should be disallowed from midnight to daybreak (one-half hour before sunrise) during the winter period when deer are physically on their winter ranges between November 1 and May 15 each year as determined by Utah Division of Wildlife Resources. It is important to note that this stipulation should only apply when mule deer are actually on their winter ranges. It will be the responsibility of the permittee to regularly contact the Price, Utah, Office of the Utah Division of Wildlife Resources during the winter period for determination as to whether the stipulation is in effect or not."



DIVISION OF WILDLIFE RESOURCES

DOUGLAS F. DAY 1596 West North Temple/Salt Lake City, Utah 84116/801-533-9333

Director

Reply To

SOUTHEASTERN REGIONAL OFFICE

455 West Railroad Avenue, Box 840, Price, Utah 84501

(801) 637-3310

August 31, 1979

Mr. Dan Guy

Swisher Coal

P.O. Box AV

Price, Utah 84501

Dear Mr. Guy:

In reference to special stipulation No. 21 in Swisher Coal Company's mine-reclamation plan for Huntington No. 4 mine, it is recommended that the stipulation be adjusted to read as follows:

No. 21. Coal haulage should be disallowed from midnight to

daybreak (one-half hour before sunrise) during the

winter period when deer are physically on their

winter ranges between November 1 and May 15 each

year as determined by Utah Division of Wildlife

Resources. It is important to note that this

stipulation should only apply when mule deer are

actually on their winter ranges. It will be the

responsibility of the permittee to regularly

contact the Price, Utah, office of Utah Division

of Wildlife Resources during the winter period for

determination as to whether the stipulation is in

effect or not.

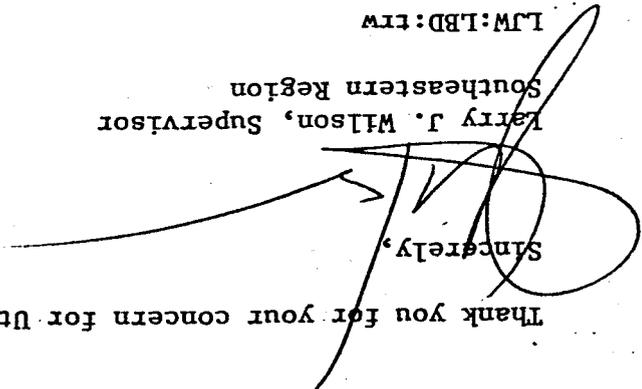
This stipulation will mitigate for disturbance and the resultant loss of crucial energy reserves for individual mule deer during the winter period. It will also lessen the potential for accidental collisions between motor vehicles and mule deer during the season when the animals are concentrated and during the time period when they are most active. It is believed that the stipulation will allow maximum coal production with minimal impacts on the mule deer herd.

As Larry Dalton has indicated, Utah Division of Wildlife Resources will prepare the "wildlife resource information" and recommendations for a "wildlife plan" that will assist Swisher Coal Company comply with the final OSM regulations for coal mining and reclamation. At that time reasonable alternatives to the above stipulation will be recommended for your consideration. Mr. Dalton has indicated that you have discussed OSM compliance and other facets concerning wildlife in relation to the Swisher No. 4 mine.

Mr. Dan Guy
August 31, 1979
Page 2

Thank you for your concern for Utah's wildlife resource.

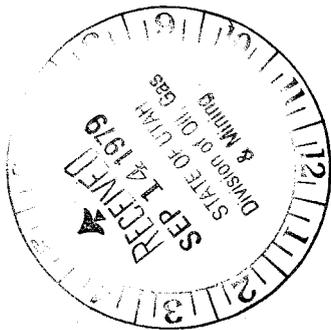
Sincerely,



Larry J. Wilson, Supervisor
Southeastern Region

LJM:LBD:trw

cc: Darrell Nish
Castle Dale Conservation Officer
Clark Johnson
Cleon Feight



Addendum #26: Fugitive Dust Control

Addendum #26
Fugitive Dust Control

The complete Fugitive Dust Control Plan will be submitted at a later date (as required) for attachment to this addendum.

This is a request from Swisher Coal Co. to alter the last sentence of Special Stipulation #26 to read: "The operator shall review and make use of available chemical dust suppressants where demonstrated to be necessary."

This request is also supported by the U.S. Forest Service and the Utah Division of Oil, Gas & Mining (see attached letters).

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Manti-LaSal National Forest
350 East Main Street
Price, Utah 84501

2820

August 24, 1979*



REC:
8-28-79
BA

Mr. Don Crane
Office of Surface Mining
Denver Regional Office
Room 270, Post Office Bldg.
1823 Stout Street
Denver, Colorado 80202

Reference: Stipulations on Swisher No. 4 Mine Plan Approval

Dear Don:

We have reviewed the State of Utah's memorandum of August 2, 1979, covering the stipulations for Swisher's No. 4 Coal Mine, as pertains to the mine plan approval.

Evidently there is some question on what the objective is for subsidence, hydrologic and vegetative monitoring, and how those objectives can be accomplished. In the Forest Service environmental assessment for Swisher No. 4 Mine, dated 9/20/77, we established the objectives of monitoring the effects of underground mining on the topography, specifically related to subsidence, underground and surface hydrology, and the corresponding effects on the vegetation. To accomplish this objective, we have developed a plan utilizing aerial photography coupled with the corresponding ground observations and control.

We have patterned the vegetative portion of the study from range analysis practices developed in the Forest Service. Attached are copies of a typical vegetative map produced from aerial photographs. The range analysis process provides information on forage production, species composition, and vegetative and soil trends. These data are used in determining livestock carrying capacity over the whole area. On selected sites within the area, permanent study transects are located. These transects are coordinated with the photogrammetric data and are used to determine the long-term soil and vegetative trend resulting from use of the area. These evaluations and studies are repeated at intervals as dictated by need. It is our intent that the effects of coal mining on vegetation be monitored using existing range transects and installing additional ones as necessary.

vehicles utilizing the road, without the identification of a specific problem. We will hold this item in abeyance until we hear from you. We do request that the mining operator be required to report and make record of all road kills in conjunction with his operation, as an aid in quantifying any potential problem.

Item 25. A portion of the wildlife study as pertains to habitat will be done, as explained in the preceding paragraphs, using photoimagery. Pellet counts and browse utilization are also recorded as part of the wildlife studies. Although the operator has a primary responsibility for any studies associated with his operation, the Forest Service will make any data they collect available to the operators for their use. In some cases, the requirement for data for studies may be a portion of our regularly scheduled work associated with a Forest program.

Item 26. Item 9a of the Road Use Permit speaks to dust control on the Forest Development Road. We have required that dust be controlled to the extent possible, using water as an agent. This is an interim measure. An adequate bituminous surface must be provided over the entire haul route, as per the agreement. We do not favor the use of chemical agents as dust suppressants on this particular road. We have also restricted the use of coal dust for wintertime operations. Please advise us if this measure meets with the intent of this stipulation.

Item 31. Since a Forest Development Road is a permanent part of the Forest Transportation System, no plans for obliteration will be necessary. In some cases on Forest Development Roads where the road is extremely large to accommodate coal haul traffic, it may be necessary to reduce the size of a road at the termination of the coal hauling operation to a size compatible with other resource uses. We understand that this decision may be delayed until the end of the coal mining activity.

The items discussed under Forest Development Roads do not pertain to temporary roads or roads associated with the exclusive use of the mining operation. In some instances, where a road must be authorized under a special use permit, we will need to closely coordinate the terms of a permit with the OSM regulations.

We appreciate the opportunity to review with you these stipulations and will welcome any comments and questions you may have concerning our procedures or recommendations.

Sincerely,

W. H. Boley

for
REED C. CHRISTENSEN
Forest Supervisor

Enclosures

cc:

RO - Minerals

RO - Engineering

D-3

Swisher ✓

Utah State Oil, Gas, and Mining

cc'd to Dan Guy &
U.S.F.S. - Bill Boley

Route
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August 2, 1979

Mr. Don Crane
Office of Surface Mining
Denver Regional Office
Room 270, Post Office Bldg.
1823 Stout Street
Denver, Colorado 80202

Re: Stipulations on
Swisher #4
Mine Plan Approval

Dear Don:

The Division has completed its review of the stipulations proposed by the Office of Surface Mining for developing Federal Coal Leases SL 064903 and U-33454 by Swisher Coal Company. The review was conducted on the final O.S.M. stipulations which were received in this office on July 10, 1979.

There are several areas where a disagreement with the stipulations exists on the part of the State. Those areas are outlined below and are followed by a reasoning for such disagreement and suggested modifications.

I hope that we can resolve our difference of opinion on these matters and reach a joint recommendation without proceeding under paragraph 12 of the Protocol to the Cooperative Agreement for a review by the Director, Office of Surface Mining.

Standard Stipulations

Number Four

A. Issue - The State's difference of opinion on this stipulation centers on the degree of monitoring equipment that can be required of the operator.

In the State's opinion, the operator has already provided a mitigative measure to this problem by limiting truck speeds to 25 miles per hour. It discriminates in that State and Federal highways that pass through other mine permit areas all are speed limited at 55 m.p.h. through very similar terrain, including big game winter range.

During critical periods for big game wildlife the days are shortest. These are the winter months. To restrict coal haulage at these times would unduly limit the productive capacity of the mine, especially if double shifts are needed.

C. Suggested Modifications -

Line one - Delete the word "restrict" and replace it with the word "inform". Delete the word "traffic" and replace it with the words "drivers hauling".

Line two - Delete the entire line except for the last two words. Insert in place of the deletion the phrase "to exercise caution".

Number Twenty-five

A. Issue - The proposed stipulation requires more of the operator than that called for in the permanent program.

B. Reason - The State has determined that the area does not warrant a study to any more detail than that normally required for a mine plan approval. Specifically, a quantitative survey does not appear to be needed at this time.

C. Suggested Modifications -

Line one - Delete the word "survey" and replace it with the word "study".

Lines four, five and six - Delete all of the remaining portion of the section following the word "submit" in line four. Replace it with "the results of that study of fish and wildlife and their habitats within the proposed mine plan area where surface facilities are located and the portions of the adjacent areas where effects on such resources may reasonably be expected to occur".

Number Twenty-six

A. Issue - The use of chemical dust suppressants should not be required.

B. Reason - Only if it is demonstrated by the operator's review should chemical dust suppressants be used.

C. Suggested Modifications -

Delete the period at the end of this stipulation and add the phrase "if demonstrated to be necessary."

Number Twenty-eight

A. Issue - The State does not support the operator's being forced into a particular performance mode to achieve adequate subsidence monitoring.

B. Reason - The subsidence monitoring program which is described in Applicant exhibit 23, and utilizes conventional survey techniques, achieves the objective of the regulations. The operator should have the option of choosing his level of expenditure for subsidence monitoring. If he deems that the proposed aerial photogrammetric method of monitoring subsidence can be used by him then the State's position is that he can employ its use for this mine.

C. Suggested Modifications -

Delete this stipulation in its entirety.

Number Thirty

A. Issue - A performance bond in the amount of \$221,000 for this size of underground mine seems excessive, based on the State's experience.

B. Reason - Underground mines usually disturb small surface acreage, this mine is no exception. No written itemization of the estimated costs has been received by the State, it therefore is at a disadvantage to evaluate the accuracy of the bond estimate.

C. Suggested Modifications -

Since very little data is available, an experience estimate of the bond by the State was made. An underground coal mine of the size and nature of the Swisher #4 would require approximately \$50,000 in bond for reclamation.

Number Thirty-one

A. Issue - The stipulation as presented is duplicatory, in conflict with State regulatory determinations and has the potential to cause additional hydrologic and ecologic degradation.

B. Reason - The attached Board Order in cause # OSM-004 found that the existing road to the mine was stable and should not have been modified under the interim program. It should be noted in the attached Order that the finding was made conditional upon approval by the Office of Surface Mining.

This stipulation calls for the same information that was called for in stipulation number 16 on backfilling and reclaiming roads. Sedimentation and erosion control on the road is addressed in stipulation 11.

C. Suggested Modifications -

Since the Order requires concurrence by the Office of Surface Mining, this suggested modification is flexible. If O.S.M. agrees with the Findings and Order and agrees that the road should not be re-constructed, delete the stipulation in its entirety.

If O.S.M. does not agree with the Findings and Order then delete the last sentence of this stipulation to reduce the duplication mentioned under paragraph B, above.

This concludes the State's position on the Swisher #4 stipulations. If your staff can incorporate the above suggested modifications into the stipulations the State would have no problem in endorsing a joint recommendation.

Please let me know if I can answer any question on the State's position. If there still are differences I am sure we can resolve them.

Sincerely,



RONALD W. DANIELS
COORDINATOR OF MINED
LAND DEVELOPMENT

RWD/sp

Enc: Order - Cause # OSM-004
Marked up copy of stipulations

Addendum #30: Reclamation Bond



Addendum #30
Reclamation Bond

Swisher Coal Co. does hereby request that Special Stipulation #30 be changed to read: "The applicant, prior to conducting any coal mining or reclamation operations, shall submit to the regulatory authority and to the State Director, Bureau of Land Management, for approval, a bond executed in the amount of \$75,000 to ensure adequate reclamation of the mine plan area."

The request for this change is supported by the attached "Cost Estimate for Final Reclamation". These figures were compiled by Swisher Coal Co. and represent the company's most accurate estimate of the final reclamation work, based on the proposed method of reclamation and final land use.

This request is further supported by the Utah Division of Oil, Gas & Mining in its comments on the Office of Surface Mining's Stipulations for Huntington Canyon #4 Mine addressed to Mr. Don Crane on August 2, 1979.

Huntington Canyon #4 Mine
 Cost Estimate
 for
 Final Reclamation

<u>Procedure</u>	<u>Cost</u>	<u>Total Cost</u>
1. Seal Portals 2 men (4 days) + material	\$ 1,500	\$ 1,500
2. Remove Structures		
a. Fan 2 men (2 days) + hauling	500	
b. Conveyor (see 'd')		
c. Block Building & Tank 2 men (3 days) + hauling	750	
d. Chute & Conveyor 3 men (4 days) + hauling	1,500	
e. Bathhouse 2 men (1 day) + hauling	300	
f. Lower Water Tank & House 2 men (2 days) + hauling	500	
g. Creek Water System 2 men (1 day) + hauling	300	
h. Clean Up 2 men (4 days) + hauling	<u>1,000</u>	4,650
3. Reclaim		
a. Upper Pad & Diversions (5.35 ac) Backhoe + Operator (10 days) @ \$700/day	7,000	
Cat + Operator (10 days) @ \$700/day	7,000	
b. Upper Road (2.58 ac) Backhoe + Operator (20 days) @ \$700/day	14,000	
c. Coal Storage Pad (2.47 ac) Backhoe + Operator (3 days) @ \$700/day	2,100	
Cat + Operator (3 days) @ \$700/day	2,100	
d. Lower Pad (1.37 ac) Backhoe + Operator (2 days) @ \$700/day	1,400	
Cat + Operator (2 days) @ \$700/day	1,400	
e. Drainfield Pad (.052 ac) Backhoe + Operator (2 days) @ \$700/day	1,400	
Cat + Operator (2 days) @ \$700/day	1,400	
f. Sedimentation Pond Site (0.22 ac) Backhoe + Operator (2 days) @ \$700/day	1,400	
Cat + Operator (2 days) @ \$700/day	<u>1,400</u>	40,600
4. Restoration of Natural Drainage Backhoe + Operator (5 days) @ \$700/day	3,500	
2 men (5 days)	<u>1,000</u>	4,500
5. Topsoil Replacement (12.5 ac) Estimate \$100/acre with labor	1,250	1,250
6. Reseeding (12.5 ac) Estimate \$100/acre with labor	1,250	1,250

Cost Estimate for Final Reclamation
Page Two

7. Mulching (if required) (12.5 ac) Estimate \$200/acre	2,500	2,500
8. Protective Fencing (if required) Estimate \$1000 lump sum	1,000	1,000
9. Continued Subsidence Monitoring (if required) 5 years @ \$2500/year	10,500	<u>10,500</u>
SUBTOTAL		67,750
10% Contingency		<u>6,775</u>
TOTAL		<u>74,725</u>
	USE	\$75,000