0004

041/002 #2

FAX TRANSMITTAL

STATE OF UTAH
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY

Location Address:
288 North 1460 West
Salt Lake City, Utah 84116

Reply to Address:
Division of Water Quality
Department of Environmental Quality
288 North 1460 West
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Confirmation #: (801) 538-6146

FAX #: (801) 538-6016

TO: Randy Harden **FAX #:** 359-3940

AGENCY/FIRM: DOGM

PHONE #: 538-5340

NUMBER OF PAGES TO FOLLOW: 7

SUBJECT: SurCo response to Administrative Order

FROM: Mike Herkimer

AGENCY/FIRM: Div of Water Quality

PHONE #: 538-6146.

Coastal
The Energy People

Kenneth ...
Vice President &
General Manager
Southern Utah Fuel Company

March 3, 1993

Don A. Ostler, P.E.
Executive Secretary
Department of Environmental Quality
Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870

RE: Administrative Order I93-01 UT0022918

Dear Mr. Ostler:

Southern Utah Fuel Company has experienced exceedances of its UPDES Permit No. UT0022918 at effluent point 003 over the past year with respect to the 30 day average for TDS. These exceedances have been less than 10 percent of the permit limit of 800 mg/l. The exceedance history began in November 1991 with a TDS average of 820 mg/l. The highest value for the 30 day average was in November 1993 at a value of 870 mg/l. The January 1993 30 day average for TDS was 820 mg/l.

A comprehensive study of the TDS problem at the SUFCo mine is well underway. The enclosed Water Sample Location Map shows the location of underground waters and their associated quality. This map is the result of a concerted effort to identify the source of the TDS problem at the SUFCo Mine.

Sources of TDS identified include:

1) dissolving of the gypsum rock dust used to dust the mine to comply with MSHA requirements;
2) fugitive emulsion fluid from the longwall;
3) use of magnesium chloride as a dust control agent along haulage ways; and
4) higher natural TDS levels in the Quitchupah Lease mining area.

Southern Utah Fuel Company is continuing to investigate alternatives to using the soluble gypsum rockdust such as using more insoluble limestone. The pneumatic rockdust transfer system at the mine will not transfer limestone dust. Remodeling options are under investigation.

Southern Utah Fuel Company
A SUBSIDIARY OF THE COASTAL CORPORATION
397 SOUTH 800 WEST • SALINA UT 84654 • 801/637-4880

Southern Utah Fuel Company has installed an emulsion collection system on the longwall face that has been instrumental in reducing the amount of fugitive emulsion fluid in the discharge water. This system began operation during June 1992 and became fully operational in August 1992.

The use of magnesium chloride for dust control along underground haulage ways has ceased. Until a suitable alternative can be found, dust will be controlled with the use of water. Leaching of the in-place magnesium chloride will continue, but these levels will drop to natural background levels rapidly.

The mining activity before January 1992 was concentrated in the 2 West/3West mining block on the west side of the property. The TDS level of virgin water in this area is in the 290 to 410 mg/l range. Development in the Quitchupah Lease area began in December 1989 with one continuous miner developing the North Mains. A second continuous miner began developing in the 4 East area in October 1990 after an absence of several years from the area. The longwall moved to the Quitchupah Lease mining block in January 1992. This concentrated all the mining activity in the Quitchupah Lease area (Northeastern extent of the mine). The TDS level of virgin water in this area is in the 420 to 660 mg/l range. An increase in TDS levels in the discharge waters began in late 1989 and continued until it leveled off for a period in late 1990. The TDS concentration then increased rapidly in late 1990 and early 1991 until it exceeded the 800 mg/l limit. Southern Utah Fuel Company believes this increase in background TDS is in large part responsible for the noncompliance with respect to TDS since November 1991.

Dr. Alan Mayo a professor at Brigham Young University has been retained by Southern Utah Fuel Company as a consultant to help identify the source of the increasing TDS. The enclosed preliminary report discusses his findings. His study of TDS will continue and will be completed by August 1, 1993.

A large, sealed area is located in the middle area of the mine on the east side of our main entry system. The area is sealed because all the coal has been mined. Although mined out, the area still liberates water and an impoundment of water has built up behind the seals. The water coming from the 1L6E north seal drain pipe has a high TDS level of more than 2200 mg/l. This water will be intercepted and routed so it can be used for process water. Diversion of this water into process water should lower the TDS level at the discharge point enough to insure compliance with the 800 mg/l level.

Additional measures will be undertaken to lower the TDS contribution from the mining activity as the cause is isolated and a feasible solution is identified.

Compliance is expected by July 1, 1993, if the TDS level in virgin waters encountered in mining development do not increase.

Sincerely,
SOUTHERN UTAH FUEL COMPANY

Ken M. Payne
Vice President and General Manager

KMP/WKS:jad

MAYO AND ASSOCIATES

CONSULTANTS IN HYDROGEOLOGY

P.O. Box 1960
Orem, UT 84059

Tel # (801) 224-7402
Fax # (801) 226-4009

March 3, 1993

SUFCO WORK PLAN

Evaluation of Factors Controlling Elevated TDS in Mine Discharge Waters and Development of Remediation Options

Introduction

The Total Dissolved Solids (TDS) in discharge waters sampled from the SUFCO Mine discharge point PT003 have been steadily increasing since 1986 (Figure 1). During the fall of 1991 TDS levels began to consistently exceed the 800 mg/L UPDES discharge limit. SUFCO personnel completed a spatial water quality sampling program of various inflows through the roof, flows along the mine floor waters, and other potential mine waters to locate the sources of the elevated TDS waters. Many of the water analyses had cation-anion balance errors exceeding 5%. The errors in the cation-anion balances were investigated in January and February of 1993 and have been resolved. The TDS measurements appear to be accurate.

Several potential sources which may may be responsible for the increased TDS content in the discharge water include:

1. the influx of higher TDS water from roof drips in the newer sections of the mine relative to the lower TDS water from roof drips in the older sections of the mine,

2. the dissolution of greater quantities of gypsum rock dust and or use of rock dust with minor anhydrite in the newer sections of the mine relative to the amount dissolved in the older sections of the mine. Rock dust is sprayed on mine walls, floors and ceiling to reduce the risk of fire and explosion as required by federal law.

   An increase in the quantity of gypsum rock dust dissolved could be due to increased water contact with available gypsum rock dust or to increased amounts of

gypsum rock dust applied to mine surfaces. Increased water contact could be due to either hydrogeological factors or changes in mining methods. Increased amounts of gypsum rock dust could be due to more frequent or thicker applications.

3. Additional sources of poor quality water such as emulsion leakage from the long wall mining machine.

Design and implementation of a program to bring the SUFCO mine TDS discharge back into compliance requires an accurate understanding of the factors which have resulted in the increased TDS. Potential remediation actions could include:

1. Increasing the SUFCO UPDES discharge limit,
2. Changes in the types and applications of rock dust, and
3. Construction of a water quality treatment facility.

Proposed Work Plan

The proposed work plan consists of three phases:

1. Characterization of the factors which contribute to the increased TDS in SUFCO mine discharge water,
2. Selection and design of an appropriate remediation plan,
3. Implementation of the remediation plan.

Because phases 2 and 3 are dependent upon the results of phase 1, the work plan described herein is only for phase 1.

Phase 1 Scope of Work

Although much of the data from the spatial water quality sampling program have balance errors, the data do provide good insight into the potential factors which have caused the increase in TDS. The spatial distribution of cations and anions, combined with the spatial distribution of TDS, suggests that the increase in TDS may be largely due to poorer quality inflow water. This seems plausible because waters from roof drips in the more recent mining areas have much higher TDS levels compared to those in the older (prior to 1991) mining areas. However, other factors can not be eliminated on the basis of the limited available data.

The proposed Phase 1 work plan is to qualitatively and quantitatively characterize the TDS contribution from the major sources in the mine. The water quality data will be used to determine the spatial distribution of TDS contributions form each source. Once the TDS level of each source is known an appropriate remediation plan can be designed and implemented. The proposed Phase 1 work plan follows:

1. Preparation of a detailed water budget for the mine. The water budget will detail quantities and locations of mine inflow waters (e.g roof drips, wall seeps). Flow paths and quantities of water flowing on the mine floor will be determined. Areas where water flowing on the floor has contact with gypsum rock dust and coal will be mapped as well as areas where mine water is piped.

2. Preparation of a detailed water quality budget for the mine. This budget will consists of several components:

   a. Determine the spatial distribution of natural inflow water quality which enters the mine from the roof rocks. Sample will be collected for laboratory analysis at an adequate number of locations.

   b. Determine the spatial distribution of the quality of water flowing on the mine floor. Samples will be collected from representative locations where water has the opportunity to come into contact with mine rock and gypsum rock dust (i.e. near roof drips and wall seepage locations, in areas where the water runs along the floor, and from temporary storage ponds).

      The water will be analyzed for major ions, TDS, and selected isotopes. Several roof drip and floor water samples are now being analyzed for $\delta^{18}O$, $\delta^{2}H$, $\delta^{13}C$, $\delta^{34}S$, ^{3}H, and ^{14}C. The $\delta^{34}S$ content will also be determined for the gypsum rock dust to help determine its contribution to TDS levels.

   c. Determine potential differences in the mineralogy of overburden rocks along the flow paths of ground waters which enter older and newer portions of the mine.

3. A water quality mass balance for various TDS sources will be determined. This mass balance will be performed by integrating the water budget data with the water quality data. We anticipate that isotopic data, combined with the solute data, will enable us to quantitatively determine contributions of TDS from each potential source and for each location in the mine. The geochemical evolution of the mine water will be evaluated by graphical as well as thermodynamic computer codes, such as WATEQF, PHREEQE and BALANCE. Understanding the geochemical evolution of mine waters is necessary to: 1) determine the sources of elevated TDS levels, and 2) evaluate the potential effectiveness of some remediation alternatives.

Timing of Phase 1

Phase 1 will require about 100 days to complete.