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STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

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September 4, 1986

Mr. Randolph B. Gainer, Project Manager
Earth Fax Engineering, Inc.
7324 South 1300 East, Suite 100
Midvale, Utah 84047

Dear Mr. Gainer:

Re: Small Operators Assistance Program (SOAP), Review of report entitled, "Results of Overburden and Hydrologic Investigations of the Boyer Mine, Summit County, Utah" dated June, 1986, Boyer Mine, PRO/043/~~002~~ 008, Summit County, Utah

Please find enclosed the technical memo outlining the recently completed review of the report entitled "Results of overburden and Hydrologic Investigations of Boyer Mine, Summit County, Utah" (dated June 1986) submitted to fulfill the contract obligations of requisition number 587504. At this time, minimal review was conducted on the conclusions and expected impacts sections of the report due to the bulk of deficiencies and discrepancies noted in the report. The Division will conduct a thorough review of these sections once the enclosed items are addressed.

It is recognized that some of the items in the original contract are subject to interpretation and the Division staff will be willing to discuss any issues you feel necessary. Please respond to these deficiencies prior to October 3, 1986. Please feel free to call me at anytime concerning this review.

The contract for the forthcoming year is currently being written and I look forward to working closely with you in the coming year.

Sincerely,

Rick P. Summers
Reclamation Hydrologist/SOAP
Administrator

jvb
cc: Ken May
Lowell P. Braxton
Susan Linner
Dave Cline
Jim Leatherwood
Dave Darby
0892R

FILE COPY

August 25, 1986

TO: Technical File

FROM: Rick P. Summers, Reclamation Hydrologist

RE: Small Operators Assistance Program (SOAP), Review of report entitled, "Results of Overburden and Hydrologic Investigations of the Boyer Mine, Summit County, Utah" dated June, 1986, Boyer Mine, PRO/043/002, Summit County, Utah

Summary

The draft copy of the above referenced report was reviewed by myself, Dave Cline, Dave Darby, and James Leatherwood of the technical staff pursuant to the conditions of the original contract (number 587504) in order to determine if the contractor has completely met the obligations outlined in that contract. As a result of this review, it has been determined that the final report is not complete and the contractor will be required to conduct further investigations and analysis in order to complete the final phase of the report. The contract is still considered to be in the initial draft phase and at this time the contract should still be considered deficient by one report (see memo of April 23, 1986).

Recommendation

Submit the following delinquent items to the contractor for clarification (allow 30 days for resubmittal). Conduct a meeting with the contractor in order to clarify comments and agree on the avenue to obtain a complete final report.

Body

The following comments need clarification:

Exhibit D, Section D.1.1 Surface Water Baseline Information

The report must state the details used to obtain the curve number values for the site. This information must include vegetation type and cover, land condition, and hydrologic soil group (including references used for determination).

The report should contain a map of the stream channels and man made diversions located in the permit area and within one (1) square mile of the boundaries of the permit area. The channels must be delineated on this map as ephemeral, intermittent, or perennial.

A description of the channels in the area should be included. Channel length, general configuration, morphology patterns, and a statement of losing or gaining reaches should be addressed.

Average annual high and low flow values should be determined and presented for Chalk Creek.

The report should discuss the status of the lack of data for SS-1, SS-2, and SS-3 (i.e. no runoff events).

A reference map depicting the station numbers for the stream gradient profiles must be supplied. Station numbers should be labeled on the x-axis for each profile.

The report must include a map depicting the sampling points used to determine the stream bed and bank material characteristics.

The report must contain a description of the riparian communities for Chalk Creek and the intermittent stream.

A discussion of the geomorphic characteristics for Chalk Creek and the intermittent stream must be supplied.

As discussed on Sept. 2, 1986, the report should contain calculations for the 100 yr. - 24 hr. and 10 yr.- 24 hr. events using the SCS curve number methodology.

Figures 4-11 and 4-12 should be labeled for the stage level and discharge value for each event.

Cross-sections for the channel configuration for the 100 yr - 24 hr. event should be supplied for Chalk Creek. A channel configuration for the 10 yr. - 24 hr. event should be supplied for the intermediate station on Chalk Creek.

Survey data for the channel cross-sections must be supplied in the Appendix.

Watershed maps used in the determination of the flows for Chalk Creek should be supplied.

It appears that SS-1 and SS-2 sample drainage from the watershed labeled WS-3. Additional watershed boundaries should be drawn to define the watershed that each station is designed to sample.

D.1.2. Ground Water Baseline Information

Information obtain at the minesite from mining personnel indicate that there several seeps (or springs) exist in the lower reaches of WS-4. These should be included in the seep and spring inventory and depicted on Plate 4-2.

The report should correlate all water rights with the spring number identified on the inventory on Plate 4-2 and on Tables 4-19 and 4-20.

Springs SP-6 through SP-8 should be depicted on Plate 4-2.

The Morbey well must be added to Figure 4-22 and Table 4-15.

An estimate of the average flow for the wells in the area was not presented. It is recognized that this data may not be available at this stage of the investigation. In that case, the data will be collected and analyzed during the upcoming year of investigation.

A discussion of oil wells and production in the area should be supplied.

Groundwater data obtained is does not meet the conditions of the contract or the intent of a baseline monitoring period. The diameter, total depth, perforated intervals, static water levels, rights and lithology were not supplied for the Morbey well. Monthly water levels were not obtained for the wells. Water quality samples were to be collected quarterly. No single monitoring point meets this requirement. Water levels were to be obtained for each sample. Five of the six samples had cation-anion balances that exceeded five (5) percent. Based on the problems noted above it has been determined that the data does not meet the requirements to define the baseline hydrologic regime for either the SOAP program nor the permitting requirements. It is the Division's current opinion that this data be utilized simply for approximate site characterization, and the groundwater sampling program for baseline requirements begin with the contract currently being processed in this office.

D.1.4. Results and Conclusions

Graphs of the average monthly flows for Chalk Creek and the intermittent stream must be supplied.

The report should contain a correlation between all runoff events to precipitation amounts.

An estimate of the soil erosion and soil loss should be conducted using the methodology outlined by PSIAC.

Graphs of seasonal variations for all constituents at each sampling site should be supplied.

High and low water levels were not supplied for each well. A graph of monthly average water levels for each well was not supplied. Again, it is recognized that this data may have not been collected and may not be available at this stage of the investigation. This data may be obtained during the upcoming year of investigation.

Problems experienced with the pumping test indicate the test may be invalid. These concerns are as follows:

1. The current condition of the well (i.e. severely incrusted, unknown well efficiency, extent of perforated zone) results in questionable data and conclusions.

2. The duration of the test was relatively short (128 minutes). It is questionable that the test data was of sufficient quantity to define the transmissivity value T_2 as defined by Schafer (1978).

3. Recovery measurements are questionable due to problems with rust sticking a valve allowing water to drain from the discharge pipe. Conclusions based upon this data should be limited.

4. The formation of well completion is not stated.

Based upon these concerns and discussions held between our office and your representatives, it has been determined that this data should only be used with caution and the limitations of the test and conclusions be clearly explained in the report. Additionally, it has been agreed that another test be conducted on this well. This test should be either a recovery test as outlined by Schafer (1980) or a slug (recovery) test as discussed on September 2, 1986.

A discussion of the recharge characteristics of the area must be supplied.

A discussion of probable sediment pond locations must be supplied.

A discussion of suggested water monitoring locations must be supplied.

All figures, tables and raw data should be clearly labeled with dates of data collection, sites numbers, legends, titles, etc. All material must be clear and legible. All raw data should be supplied to the Division in the form of an Appendix with a table of contents.

Ten of the seventeen water analysis samples submitted had cation-anion balances that were in excess of five (5) percent. This makes conclusions based upon the data questionable, these limitations should be clearly outlined in the report. Additionally, questions have arisen concerning the water quality analysis data in Attachment II. Several values were changed. Was this the result of re-analysis? Changes in the analysis results located in Attachment II should be supplied by the lab conducting the analysis.

General comments relative to the contract and the Proposal.

The report should contain a list of the EPA standards discussed on Page 78 for reader reference.

The report must contain the original pump test data.

Dissolved oxygen analysis for SS-5 and SS-4 was not supplied.

A copy of the data used to develop Figure 2-1 should be supplied.

Locations of points of diversion (if different than water right location) should be depicted on Plate 4-3.

The report should include the items discussed on page 10, paragraph 5 and page 11, section 2.2.2 of the proposal dated April 30, 1985.

Page 9; paragraph 6 - An old slump scarp is present uphill from the new slump that occurred in the spring of 1986. Therefore, at least one slump has occurred in the point boundary.

Page 12; paragraph 7 - Figure 2-3 shows a fault in the permit area northwest of the western boundary. Additionally, the eastern fault should be located on Figure 2-3.

Figure 2-4; There is no reference for this Figure. What source did the cross-section come from? Where is this cross-section located on Figure 2-3?

Page 15; paragraph 1 - This section should describe the aquifer in terms of confined, or unconfined, thickness, gradient, and estimate of transmissivity.

Page 15; A discussion of any hydraulic connection between the Frontier Formation and the alluvium should be included.

Page 20; paragraph 7 - This section conflicts with Section 204.4 that states no other faults other than the two already mentioned are present in the permit area. These faults should be located on a geologic map.

Figures 3-2 through 3-6; The formations that these logs represent should be labeled on the figures.

Page 37; paragraph 2 - The report should reference the seep and spring results in this section.

Page 83; paragraph 5 - This section should state what formation this well is completed in.

Page 96; paragraph 3 - An explanation of what lead has to do with the rust in steel casing should be provided.

Page 102; The possibility of the infiltration of coal leachate, oil and grease or other contaminants into the alluvial aquifer should be discussed.

A clear geologic map should be submitted with a scale of at least 1": 500' for the mine plan and adjacent area.

The geologic map should depict the permit area and adjoining areas to 2000 ft. from the permit area. The coal outcrops should be shown. All faults, anticlinical and synclinal structures, attitudes of formations and structures, and cross-sectional information should be illustrated.

Page 9, paragraph 1 states that numerous folds and faults are evident in the immediate area. These structures should be identified and shown on the geologic map.

The faults described in paragraph 7, page 12 should be shown on the geologic map.

SAR values should be submitted for samples PBO, PBU, BC2O, BC2U, BC3U.

The AWC presented in the report is based upon the subsoil. The report should clarify why the AWC is not based upon the entire soil.

In developing the water budget for the site, the report assumes that precipitation equals potential evapotranspiration (Ppt=PET). This should be clarified.

The use of "pasture grasses" for the crop factor may not be representative of the area based on: 1)the high density of shrubs and trees, 2)the low density of grass cover, and 3) different grass species present at the site. Pasture grasses usually include a thick stand of orchard grass, kentucky bluegrass, etc. in high water supply (i.e. approximately 90 % cover). The grasses present at the site are short lived species that begin their growth early in the year (February-March) and end early in the year (August-September). The report uses a plant coefficient of 0 for March and April, thereby rendering the PET to be 0 for the same period. Even if the plants are not transpiring in this period, the soil is losing water through evaporation (accelerated by wind). The report should clarify these issues.