

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

OK

July 20, 2004

TO: Utah Program Evaluation Team and Internal File

THRU: Susan White, Program Coordinator *SMW*

FROM: *[Signature]* Priscilla Burton, Soil Scientist
[Signature] Gregg Galecki, Hydrologist *see note Pg.13*
[Signature] Jeriann Ernstsens, PhD, Biologist

RE: Eccles/Mud Creek Evaluation, Canyon Fuels Corporation, LLC, Skyline Mine, Permit #C007/0005, Task 1975.

SUMMARY:

This memorandum documents Utah Division of Oil, Gas and Mining (DOG M) findings for offsite impacts due to increased water discharge from the Skyline Mine. The evaluation period is EY 2004, which began on July 1, 2003, and ended on June 30, 2004. DOGM has compiled this information for the Utah Program Evaluation Team.

BACKGROUND:

Canyon Fuel Company's, Skyline Mine encountered significant water inflows in a number of underground locations in March 1999, the largest being in August 2001 (6500 gpm). (Skyline Water Situation report, 2002).

During EY 2002 DOGM required the Permittee to revise the probable hydrologic consequences (PHC) analysis for the mine because of the increased water discharge (Special Conditions on the April 30, May 15, and December 2, 2002 permits are included in Attachment A of this report.) In the October 29, 2002, Utah Offsite Impacts Report for Evaluation Year (EY) 2002, the Utah Program Evaluation Team requested that "Upon approval of the revised PHC, DOGM will, as necessary, revise its cumulative hydrologic impact assessment (CHIA), and discuss the PHC and CHIA determinations with the EY 2003 Utah Program Evaluation Team."

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PERMIT TERM

Regulatory References: 30 CFR 778.17; R645-301-116.

Analysis:

Three separate permits were issued in the year 2002. The special conditions attached to each permit are reprinted below.

ATTACHMENT A, Special Conditions, on permit C/007/005 was included in the April 30, 2002 permit as follows:

- 1) Canyon Fuel Company, LLC must submit water quality data for the Skyline Mine in an electronic format through the Electronic Data Input web site, <http://linux1.ogm.utah.gov/cgi-bin/appx-ogm.cgi>
- 2) Within 45 days of permit renewal, Canyon Fuel Company, LLC must assemble, analyze and submit to the Division all existing data for the PHC. Further, provide all data as required by the Division to update the PHC to comply with R645-301-728 on an ongoing basis.
- 3) Canyon Fuel Company, LLC must submit flow volume data for discharges into Electric Lake and Eccles Creek to be reported on a monthly basis, submitting the data in the first week of the following month. This will require amending the Mining and Reclamation Plan (MRP) to establish two new water monitoring points in the water monitoring plan at the above-noted discharge points.
- 4) Within 45 days of permit renewal, Canyon Fuel Company, LLC must submit all data and all completed reports and data compilations relative to the excess discharges at the Skyline Mine, including but not limited to :
 - All consultant studies relating to the Skyline mine flooding. This includes geologic reports, water analysis, stream analysis, flow records and similar data.
 - All past macroinvertebrate studies on Eccles Creek analyzed and compiled by a qualified person into one report. (Those studies previously committed to must continue.)
- 5) At this time, the Division is unable to make a finding about the potential effects outside the permit area on the continued heavy pumping of water/flooding of Eccles Creek, Mud Creek, Scofield Reservoir and Electric Lake. Therefore within 45 days of the permit renewal, Canyon Fuel Company, LLC must provide funding for the Division to conduct an independent assessment using a Division approved Consultant to determine the potential impacts to the above

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noted waters. If necessary, when the assessment report is completed, Canyon Fuel Company, LLC must mitigate any and all damages identified by the assessment . In lieu of funding an independent assessment, CFC may opt to propose measures to prevent and mitigate the effects of the flooding, as required under R645-301-731.

ATTACHMENT A, Special Conditions, on permit C/007/005 was included in the May 15, 2002 permit as follows:

- 1) Canyon Fuel Company, LLC must submit water quality data for the Skyline Mine in an electronic format through the Electronic Data Input web site, <http://linux.l.ogm.utah.gov/cgi-bin/appx-ogm.cgi>
- 2) Within 45 days of permit renewal, Canyon Fuel Company, LLC must assemble, analyze and submit to the Division all existing studies and data for the update of the PHC as a result of the mine inflows. Further, CFC must continue to provide all data as required to comply with R645-301-728.
- 3) Canyon Fuel Company, LLC must submit cumulative monthly flow data for discharges into Electric Lake and Eccles Creek. The monthly data will be submitted in the first week of the following month . This reporting will require amending the Mining and Reclamation Plan (MRP) to establish two new water monitoring points in the water monitoring plan to measure flow at the above-noted discharge points.
- 4) Canyon Fuel Company, LLC must have a qualified person compile and analyze past macroinvertebrate studies on Eccles Creek into one report . This will be done within 60 days of the Division providing Canyon Fuel Company, LLC with the list of known past macroinvertebrate studies to be included in the report . Skyline may also have studies of which the Division is not aware, and will check for these as well as with the Division of Wildlife Resources.
- 5) At this time, the Division is unable to make a finding about the potential effects outside the permit area on the continued heavy pumping of water to Eccles Creek, Mud Creek, Scofield Reservoir and Electric Lake. Therefore, within 45 days of the permit renewal, Canyon Fuel Company, LLC must initiate an update to, and further evaluation of, the February 27, 2002 Earth Fax Engineering, Inc. study entitled Hydrologic and Channel-Stability Evaluation of Eccles and Mud Creeks. The study will be conducted using input from the Division's technical staff, and it will focus on determining the potential impacts to the above-noted waters . If necessary, when the assessment report is completed, Canyon Fuel Company, LLC must mitigate as required by R645-301-731.

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ATTACHMENT A, Special Conditions, on permit C/007/005 was included in the December 2, 2002 permit as follows:

- 1) Canyon Fuel Company, LLC must submit water quality data for the Skyline Mine in an electronic format through the Electronic Data Input web site, [http://linux 1 .ogm .utah .gov/cgi-bin/apex-ogm.cgi](http://linux1.ogm.utah.gov/cgi-bin/apex-ogm.cgi)
- 2) Canyon Fuel Company, LLC must continue to submit to the Division all studies and data to update the PHC/MRP as a result of the mine inflows . As water studies are finalized, they must be submitted to the Division within 14 days of completion .
- 3) Canyon Fuel Company, LLC must submit cumulative monthly flow data for discharges into Electric Lake and Eccles Creek . This monthly data must be submitted in the first week of the following month.
- 4) Canyon Fuel Company, LLC may not commence underground coal mining and reclamation activities in federal coal lease UTU-78562 until approval of the mining plan is authorized by the Secretary of the Interior .
- 5) Canyon Fuel Company, LLC may "development" mine only in federal coal lease UTU-78562 until full extraction mining is approved by the Division .

Findings:

Although the wording of Special Conditions varied slightly over time, the Division has continued to require monitoring of in-mine flows and their effects on surface and groundwater downstream.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Baseline Cumulative Impact Area Information

Scofield Reservoir is classified (latest classification December 7, 2001) by the Utah Division of Water Quality as:

- 1C - protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.
- 2B - protected for secondary contact recreation such as boating, wading, or similar uses.
- 3A - protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
- 4 - protected for agricultural uses including irrigation of crops and stock watering.

Scofield Reservoir is:

- A culinary water source.
- One of the top four trout fishing lakes in Utah.
- Has over a one million dollar annual recreational fishing value.
(E-mail from Louis Berg, Utah Division of Wildlife Resources, to DOGM dated February 4, 2002).

Electric Lake is classified (latest classification December 7, 2001) by the Utah Division of Water Quality as:

- 2B - protected for secondary contact recreation such as boating, wading, or similar uses.
- 3A - protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
- 4 - protected for agricultural uses including irrigation of crops and stock watering.

Streams in both basins are classified as:

1C, 3A, and 4.

Furthermore, surface waters located within the outer boundaries of a USDA National Forest, with specific exceptions, are designated by the Utah Division of Water Quality as High Quality Waters - Category 1 and are subject to the state's anti-degradation policy. This anti-degradation policy is that waters shall be maintained at existing high quality and new point source discharges of wastewater, treated or otherwise, are prohibited (Utah Administrative Code, R317-2-3.2 and R317-2-12.1). All of the upper Huntington Creek drainage and most of the headwater drainages of east-flowing tributaries to Mud Creek, including the Skyline mines disturbed area, are within USDA Forest Service boundaries. However, Electric Lake has been reclassified as High Quality Waters - Category 2, which is defined as "...designated surface water segments which are treated as High Quality Waters - Category 1 except that a point source discharge may be permitted provided that the discharge does not degrade existing water quality." Both the effluent

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and the lake must be sampled for a period of two years for a full suite of metals and nutrients to ensure the mine water is not of a lower quality of water than exists in Electric Lake. During this period, should the water quality of the mine discharge found to be degrading Electric Lake, the discharge could be stopped due to poor water quality (August 2003 CHIA).

Probable Hydrologic Consequences Determination

The PHC has been under review over the course of the last year by OSM and DOGM staff (Tasks 1752, 1871, 1961) a final version has not yet been incorporated into the MRP. The OSM and DOGM reviewers recommended the inclusion of several details to the PHC as being necessary for DOGM's evaluation of impacts to the hydrologic balance (2004/Outgoing/0017.pdf). Among the recommendations made was that the PHC evaluate the water quantity impacts associated with drawdown of the Starpoint Aquifer. Specifically, water quantity diminution to (a) Mud Creek, (b) Fish Creek, (c) Upper Huntington Creek/Electric Lake, (d) Huntington Creek below Electric Lake, and (e) Left Fork should be projected and presented as part of the PHC determination. The reviewers of task 1871 also requested that the PHC project post pumping aquifer recovery, and project to the year 90% or more recovery is achieved.

Findings:

The PHC has been under review over the course of the last year by OSM and DOGM staff (Tasks 1752, 1871, 1961) a final version has not yet been incorporated into the MRP.

OPERATION PLAN

FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

Wetlands and Habitats of Unusually High Value for Fish and Wildlife

Dennis Shiozawa of Mt. Nebo Scientific, Inc. conducted the macroinvertebrate and fish surveys for 2002. The contractor conducted the survey in November 2001 and July 2002. The Annual Report 2002 provides the results of a benthic invertebrate monitoring program. The

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results suggest that the Eccles creek community is beginning to adjust to the new discharge regime.

The majority of the taxa are vagrants (weedy-like), however, there are signs of recovery of more desired species. Recovery of the system may include a change in representative animal species from those measured in 1979.

Total taxa increased from 5 (2001) to 6-13 (2002). The consultant suggests that total taxa may increase at least an additional two fold from the increases measured in 2002. Furthermore, that the number of densities may increase at least an additional three fold from the increases measured in 2002.

Two years of data are summarized in the July 2004 Mt. Nebo Scientific, Inc report entitled, "Baseline Monitoring Riparian Plant Communities at Eccles Creek & Mud Creek 2002-2003." Field work was conducted in August for both sample years. Sample transect locations were placed every 400 feet in Eccles Creek (29 locations) and every 800 feet in Mud Creek (20 locations). The transects were long enough to cover the entire stream and its riparian communities, plus an additional 10 ft on each side of the stream to record the existing adjacent upland communities. The line-intercept method was used to measure the extent of each plant community. In this report, Mr. Collins cautions that both years represent high water flow years and there is no baseline data for comparison. He summarizes his findings for the two year period as follows:

- the width of the riparian corridor is increasing somewhat, as documented by expanded riparian vegetation and decrease in upland vegetation.
- There are some changes in species composition
- Although some banks are labeled as unstable, no major catastrophic changes to the banks or the riparian communities near them were noted, with the exception of sample site M20.
- Riparian communities are influenced by water sources other than Mud Creek at many sample locations, i.e. springs and base flow.

The Division would add the following notes about the July 2004 Mt. Nebo Scientific report:

- Cut banks were noted to be 36 – 60 inches.
- The stream width remained the same for all but one sample location.
- The number of sample locations with one or more unstable banks was listed as 19 out of 49.
- Most of the unstable banks were in the lower Mud Creek sites.
- In 2002, the Permittee and landowner worked on stabilizing banks using dead trees and boulders and as a result the banks look more stable.

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Increased bank erosion along Mud Creek may deliver increased amounts of phosphorus-laden sediment to Scofield Reservoir, a serious concern for water quality and the fishery there. The erosional stability of the Mud Creek channel beds and banks was evaluated and found to fall within the allowable velocity using the techniques of evaluation described by the Soil Conservation Service (Table 3 of Appendix D July 2002 Addendum to the Skyline Mine PHC).

A stability evaluation of the channel concluded that well vegetated slopes (grasses and willows) are able to handle the increased flow without erosion (Appendix D of the July 2002 Addendum to the Skyline Mine PHC). However, there are channel banks of Mud Creek that are not well vegetated. The July 2002 Addendum to the Skyline Mine PHC (page PHC A-21) commits to armoring stream channel banks, planting of stream bank stabilizing vegetation or redirection of some flows should monitoring reveal that deterioration of stream chemistry or stream morphology or vegetative community is related to mine water discharge. To help mitigate any potential erosion of the streambanks in Mud Creek, Canyon Fuel Company has provided time and materials to a private landowner owning land on Mud Creek to establish additional armoring along the steeper cutbanks located along the creek.

The cover letter accompanying the 2003 Annual report indicates that the Utah Division of Fish and Game requested that the mine not perform electro-shock survey of the fish in two consecutive years, as they were concerned about mortality rates due to the survey.

Findings:

There have been no detrimental impacts associated with the high mine water discharge reported to date, that would affect fish and wildlife. However, the Division should continue to encourage the monitoring of water quantity, quality, macroinvertebrates and conduct fish surveys of the streams.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Groundwater Monitoring

No springs or wells being monitored in the permit area have been adversely affected by the pumping of water from the Skyline Mine. Groundwater wells completed below the mine workings in the Starpoint Sandstone have seen significant drawdown in the vicinity of the mine.

However in no areas where water from the Starpoint Sandstone is being used, has any decrease in flow been documented.

Surface Water Monitoring

Surface water monitoring sites continue to be monitored to document any adverse affects from increased flows due to mine discharge or decreased flows due to pumping. No decreases in flow have been observed due to the pumping, and a two-year study was recently completed in the Eccles Creek / Mud Creek drainage evaluating the impacts due to increased flows. The study did not document any adverse impacts.

Mine Water Discharge

Beginning in January 1999 Skyline Mine has documented discharges from the mine. Prior to September 2001 when Well JC-1 was developed to pump water into Electric Lake, all water discharged from the mine flowed into Eccles Creek. In July 2003, Well JC-3 was also developed to pump additional water into Electric Lake. JC-1 pumps water from below the mine, prior to the water entering the mine; JC-3 pumps water directly from the mine workings. The Skyline mine has stopped mining and is currently flooding the portions of the mine where the majority of mine inflows were encountered. The portions of the mine to be flooded should be completed by August 2004, and the discharge to Eccles Creek is anticipated to stabilize between approximately 900-2000 gpm.

Eccles Creek

From July 1, 2003, through June 30, 2004, a total of 4,825 acre-feet of water was pumped from the Mine into Eccles Creek at average monthly rates ranging from approximately 9000 gpm to the current rate of 870 gpm. The average discharge rate for the year was approximately 2970 gpm. In comparison, from July 2002 - June 2003 a total of 14,680 acre-feet of water was pumped from the Mine into Eccles Creek at an average rate of 9000 gpm. In 2002-2003 no adverse impacts were noted downstream of the Mine due to the discharge. Similarly for 2003-2004, with discharges to Eccles Creek being approximately 1/3 of the previous year, no adverse offsite impacts were noted. Utah is in the sixth year of a drought cycle; during the last two (2) years the Palmer Hydrologic Drought Index for the area has averaged -2.75, which is classified as a severe to extreme drought. The addition water supplied by the mine discharge has been viewed as a positive impact to downstream users.

Water quality has consistently been acceptable with Total Dissolved Solids (TDS) values averaging 518 mg/l. Skyline Mine's UPDES permit requires that TDS remain below 500 mg/l for unlimited discharge into Eccles Creek. Should TDS concentrations rise above 500 mg/l, a maximum daily load of 7-tons TDS/day is imposed. The Mine continues to remain compliant with the UPDES permit requirements.

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Electric Lake

From July 1, 2003, through June 30, 2004 a total of approximately 10,100 acre-feet of water has been pumped from the Mine into Electric Lake from the JC-1 and JC-3 wells. JC-1 consistently pumps at a rate of approximately 4,100 gpm. JC-3 began pumping in July 2003 and pumps at rates ranging from 1,200 – 5,000 gpm. JC-3 is restricted by the UPDES permit requirement of TDS concentrations remaining below 255 mg/l to remain compliant. In Spring 2004 the JC-3 UPDES permit was modified to include water being pumped from JC-1. TDS concentrations from JC-1 range from 213-234 mg/l, which assists JC-3 to remain compliant when the two are blended.

Electric Lake continues to be the focus of extensive investigations to determine whether Electric Lake is the primary source of the water being encountered in the Mine. Current investigations included accurate Lake inflow and outflow data, age-dating of water in the JC wells, dye tracer studies in Electric Lake, and groundwater modeling. The combination of Mine inflows decreasing to approximately 1/3 of their initial rates, the flooding of the mine workings, accurate inflow and outflow performance of Electric Lake, and continued water analysis should provide valuable information in the coming months. PacifiCorp – owner and operator of Electric Lake provided the Division an updated report of their studies surrounding Electric Lake on 6Jul04 that will be reviewed in the near future. To date, no conclusive data has been provided that indicates a direct link between Electric Lake and Skyline mine exists. Current data suggests that if any surface water is being encountered in the Mine, water supplied by the JC wells to Electric Lake is in excess of the water being encountered. The water being supplied by the JC wells is considered a positive impact to Electric Lake.

Findings:

Current studies indicate all water being discharged from the Skyline Mine is having a positive impact to both of the receiving basins.

OPERATIONS IN ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR Sec. 822; R645-302-324.

Analysis:

Skyline Mine discharge waters flow down Eccles Creek and then to Mud Creek. Mud Creek flows through Pleasant Valley, an alluvial valley floor.

The gradient of Mud Creek is approximately 0.0091 ft/ft with a sinuosity ratio of 1.6. These figures were derived from aerial photographs (personal communication, November 15, 2002, between Rich White, Earth Fax Engineering, and Priscilla Burton). The channel flattens on approach to Scofield Reservoir with an average gradient of 0.02 to 0.1 ft/ft. Channel subsoils are silty sands and clayey silts, classified by the 1988 Carbon County Soil Survey as Silas and Silas Brycan series. The results of laboratory analysis on the physical properties of the soils in the creek are found in Appendix B of Appendix D of the July 2002 Addendum to the Skyline Mine PHC. Cross sections of the channel describe a channel bed that is 96% cobbles and gravels and side slopes that are 100% sand, silt and clay (Appendix E of Appendix D of the July 2002 Addendum to the Skyline Mine PHC). Low flow terraces are limited in extent and the channel is incised. There is no broad flood plain.

Cross sections of the Mud Creek channel were measured at six different stations. The piezometric surface was measured at four of those stations. At Station 7300, in the vicinity of Green Canyon, the groundwater is four feet below the surface. In the area of Station 14480, the groundwater level is eight feet below the surface, reflecting the rolling nature of the land and the incised nature of the stream channel. The ground water rises back up to four feet below the surface at Station 17340. Station 17340 is located at the site of an irrigation diversion, so as a result, the depth to groundwater at a point 400 feet distant from the stream is closer to the surface than that along the stream channel. This is due to irrigation return flow as well as stream channel entrenchment. (Section 2.12 of the Skyline Mine MRP)

Measurements of flows taken on November 26, 2001 (Appendix D, Skyline Mine MRP) recorded 18.4 cfs in Mud creek after the confluence with Eccles Creek and 24.44 cfs after the confluence with Winter Quarters Creek. The gain in flow downstream was attributed to contributions from springs and side streams (2 – 3 cfs) and re-emerging base flow from the alluvium of 3 – 4 cfs (Section 2.12 and Appendix D July 2002 Addendum to the Skyline Mine PHC).

Protection of Agricultural Activities

There are four landowners along Mud Creek. The land is used for grazing. Ray Jensen, Range Specialist for the Bureau of Land Management (BLM) describes the area as sub-irrigated, grazed land with an historical yield of 4000-6000 pounds/acre. The predominant vegetation type is grass. The number of animals grazed on the pastures by each landowner is variable with time.

Canyon Fuel Company has evaluated the value of the pasture ground in terms of the replacement cost for feed. At a consumption rate of 0.5 Tons/mo and a cost of \$100/Ton hay, the replacement cost is \$50/animal/month. The replacement of feed is not likely, however, since grazing will not be impeded by high flows along Mud Creek and the reduction in available grazing area is limited to stream banks eroded by the high water.

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Mud Creek stream channel vegetation was assessed in December 2001 by Dr. Patrick Collins of Mt. Nebo Scientific (Appendix A of Appendix D July 2002 Addendum to the Skyline Mine PHC). A level II investigation was conducted using the methods of the USDA Forest Service. Two reaches were located on Mud Creek. Reach #4 is located just below the confluence of Eccles and Mud Creeks. The riparian community was approximately 91 feet wide and consisted of willows, sedge and rush grasses. Approximately 80% of the banks were vegetated and stable. Downstream, at Reach #5, the width of the riparian community broadened to 120 feet and consisted mostly of willows growing in both riparian and wetland communities. Approximately 60% of the bank was vegetated and stable. (February 27, 2002 EarthFax report in Appendix D of July 2002 Addendum to the PHC). Additional field work observations were conducted in the summers of 2002 and 2003 (July 2004 Mt. Nebo Scientific, Inc report entitled, "Baseline Monitoring Riparian Plant Communities at Eccles Creek & Mud Creek 2002-2003"). According to the July 2004 report, there may be some increase of the riparian communities along the stream channel. Weak or unstable banks were found at 19 out of 49 locations in Eccles and Mud Creeks. However, no major catastrophic changes to the banks or the riparian communities near them were noted. The Permittee has been pro-active in stabilizing banks with dead wood and boulders. In these locations, the July 2004 study notes the banks are beginning to recover.

Monitoring

The mine waters being discharged had an average Total Dissolved Solids (TDS) level of 600 mg/L in July of 2000. With continued pumping, the concentration of TDS has decreased to less than 400 mg/L as of March 2002 and averaged 518 mg/L in 2003. Above the mine, the average concentration of TDS is 300 mg/L (July 2002 Addendum to the PHC).

Stations along Mud Creek will be monitored four times a year (seasonally) for a period of one year following a reduction in discharge to 350 gpm or less. Sediment loading in Mud Creek will be computed from the TSS and flow data collected. Annual evaluations of the stream will be summarized in a report to be submitted to the Division with the Skyline Mine Annual Report. The monitoring plan will also evaluate the changes in stream morphology and vegetation at the stations over the same time period.

Findings:

The increased mine discharge has had no negative impact on agricultural activity along Mud Creek. Instability in the channel banks and increased erosion of the stream channel in reaches of the channel that are not well vegetated are very small in relation to the acreage being pastured and are negligible to the total production of the pastures.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

Using the available information, the Mud Creek Basin and Upper Huntington Creek Basin CHIA was revised on August 26, 2003. The CHIA includes Electric Lake, Scofield Reservoir, Mud Creek and Eccles Creek. The CHIA documents that before March 1999 mine discharges were on the order of 300 to 400 gallons per minute (gpm). From March 1999 through June 2003 Skyline Mine discharges increased incrementally to approximately 12,900 gpm. Of the 12,900 gpm, approximately 8,700 gpm reported to Eccles Creek and 3,200 gpm reported to Electric Lake.

In an attempt to reduce inflows, wells were drilled in James Canyon and groundwater from a fault was pumped into Electric Lake. From September 2001 until September 2002 water was pumped at about 2,200 gpm from Well JC-1. In October 2002 the pumping rate in JC-1 increased to about 4,200 gpm by installing a higher capacity pump. In late July 2003, Well JC-3 began pumping directly from the mine workings at approximately 5,100 gpm, bringing the total discharge to Electric Lake to approximately 9,100 gpm. After that mine operations and drought or non-drought conditions will determine if the pumping continues. Through July 30, 2003, 7,900 acre-feet of water had been pumped into Electric Lake and therefore, the Huntington Creek drainage. The combined discharge of the JC-1 and JC-3 (at ~ 9,100 gpm) is contributing approximately 40.21 acre-feet per day to Electric Lake (~14,680 acre-feet/year) (August 2003 CHIA document).

Mine inflows have also been pumped out of the mine into Eccles Creek. These flows have varied from 4,500 gpm to 10,500 gpm, with an average of about 8,365 gpm through July 2003. This has increased the normal flows in Eccles Creek to about 10 times normal amounts and increased the normal flows in Mud Creek about 3 times normal amounts (August 2003 CHIA document).

Calculations made in October 2002 estimate the flow into Mud Creek will drop off to approximately 6.0 cfs by the end of 2004 (Appendix F – July 2002 Addendum to the PHC). This 6.0 cfs represents a 38 percent increase over the average flow observed in Mud Creek from 1978 through 2001 and twice the normal flow to Eccles Creek. Field observations indicate the additional water makes the flow at, or just below bank-full capacity of Eccles Creek. However, Eccles Creek appears to be well-armored and able to handle the additional flow. Mud Creek is larger than Eccles Creek and flows are approximately 4-times larger than normally observed, however the flow is not as close to bank-full capacity (August 2003 CHIA).

*Dated
not current
for July 2004*

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Due to the increased mine inflows and subsequent discharges, Skyline was exceeding their UPDES daily tonnage limit for TDS (7.1 tons/day). However the milligrams per liter values have receded to background levels. In May 2003, the UPDES permit was changed to reflect a maximum of 500 mg/l 30-day average with no associated flow limitation. Should the 500 mg/l 30-day average be exceeded, the 7.1 tons/day limit goes back into effect.

TSS and flow at sample locations on Eccles and Mud Creeks show the average sediment yield carried by Eccles and Mud Creek prior to 1999 was 2,710 Tons/yr. The average sediment yield carried by Eccles and Mud Creek between 1999 and 2002 was 2,908 Tons/yr, which was an increase of 7% annually.

Stations along Mud Creek will be monitored four times a year (seasonally) for a period of one year following a reduction in discharge to 350 gpm or less. Sediment loading in Mud Creek will be computed from the TSS and flow data collected. Annual evaluations of the stream will be summarized in a report to be submitted to the Division with the Skyline Mine Annual Report. The monitoring plan will also evaluate the changes in stream morphology and vegetation at the stations over the same time period.

Table 13 of the CHIA (reproduced below) outlines potential hydrologic impacts in the mud creek and upper Huntington creek basins. The parameters of importance and other indicators for predicting future impacts are listed as sediments, fish and macroinvertebrates, flow, TDS, pH, nutrients, specific cations and anions, and oil and grease concentrations. Five new monitoring sites were added to Mud Creek and two on Eccles Creek in the year 2002 to determine if the mine discharge flows are having a negative impact on Mud Creek and Scofield Reservoir. These sites were monitored for total flow, TDS, TDS, and total phosphorous and for changes to stream morphology.

The Class 3A streams in the CHIA are protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain. The drainages of upper Huntington Creek and Mud Creek have both been identified as habitat for naturally reproducing populations of cutthroat trout. When runoff is low, fine sediments may remain and spawning gravels become unavailable. Fine sediments increase trout egg and fry mortality through suffocation. Invertebrates are also impacted by sedimentation through loss of habitat or mortality. Invertebrate diversity may decrease but resistant or adaptive species will remain. Impacts on invertebrates may reduce the supply of food for the trout. Ordinarily, mining activities produce the same negative impacts by decreasing flow or increasing sedimentation beyond the capacity of the stream to flush itself. However, the increased flow in Eccles and Mud Creeks, resulting from the pumping from the Skyline Mine, has had a beneficial impact by flushing more fine sediment from these streams.

Sediment, total nitrate, phosphorous, and dissolved oxygen have been identified as water quality concerns for Scofield Reservoir. High nitrogen and phosphorus levels lead to increases

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in algae and aquatic vegetation, which in turn leads to a deterioration of water quality. The reservoir may become eutrophic unless measures are taken to limit nutrient inflow (Waddell and others, 1983a). The increased flow in Eccles and Mud Creeks, resulting from the pumping from the Skyline Mine, may have had a beneficial impact by increasing the inflow of low TDS water into the reservoir; however, the volume of nutrients being added by this flow has not been determined yet.

POTENTIAL HYDROLOGIC IMPACTS	
	<ul style="list-style-type: none"> • <i>Increased sediment yield from disturbed areas</i> - Alteration or loss of fisheries in streams and reservoirs. Increased rate of sedimentation in reservoirs. Coal spillage from hauling operations and storage. Loss of riparian habitat.
	<ul style="list-style-type: none"> • <i>Flooding or streamflow alteration</i> - increase or decrease in streamflow.
	<ul style="list-style-type: none"> • <i>Contamination of ground and surface water from acid- or toxic-forming or toxic materials</i> - Contamination of surface water from coal hauling operations and storage. Hydrocarbon contamination from above-ground storage tanks or from the use of hydrocarbons in the permit area. Contamination from road salting. Gypsum used in dust control contaminating mine discharge. Nutrients in mine discharge.
	<ul style="list-style-type: none"> • <i>Subsidence damage to springs and streams</i> - increased sediment load, diminution of flow, physical barrier to fish migration.
	<ul style="list-style-type: none"> • <i>Alteration or destruction of fisheries and aquatic habitats</i> - loss of flow, loss of access to stream, loss of fish spawning habitat, increased sediment load, acute or chronic toxicity, eutrophication, loss of food supply.
	<ul style="list-style-type: none"> • <i>Loss of ground water or surface water availability</i> - water rights, wildlife uses.
	<ul style="list-style-type: none"> • <i>Reduction of flow due to interbasin transport of intercepted water.</i>

Table 13

TECHNICAL MEMO

Findings:

The CHIA concludes, "No evidence of material damage from the actual mining operations has been found. No probability of material damage from actual or anticipated mining operations has been found....Additionally, the increased flows increase the water volumes to the reservoir and provide considerably more water to the Price River drainage than natural runoff. Other than increased water, it's believed no other hydrologic impacts will be felt downstream of Scofield Reservoir."

RECOMMENDATIONS:

Based on the information provided and assessed during EY 2004, Canyon Fuel Company, Skyline Mine should be classified as having no adverse Offsite Impacts to the environment outside the permitted area.

Although there have been no reported impacts to date, continued monitoring of stream banks, macroinvertebrates, and water quality/quantity is warranted due to the importance of the downstream waters.

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Discharge = 8,700 gpm



Discharge = 1,700 gpm



Photograph 12 - EC-3 View Downstream

Discharge = 9,100 gpm

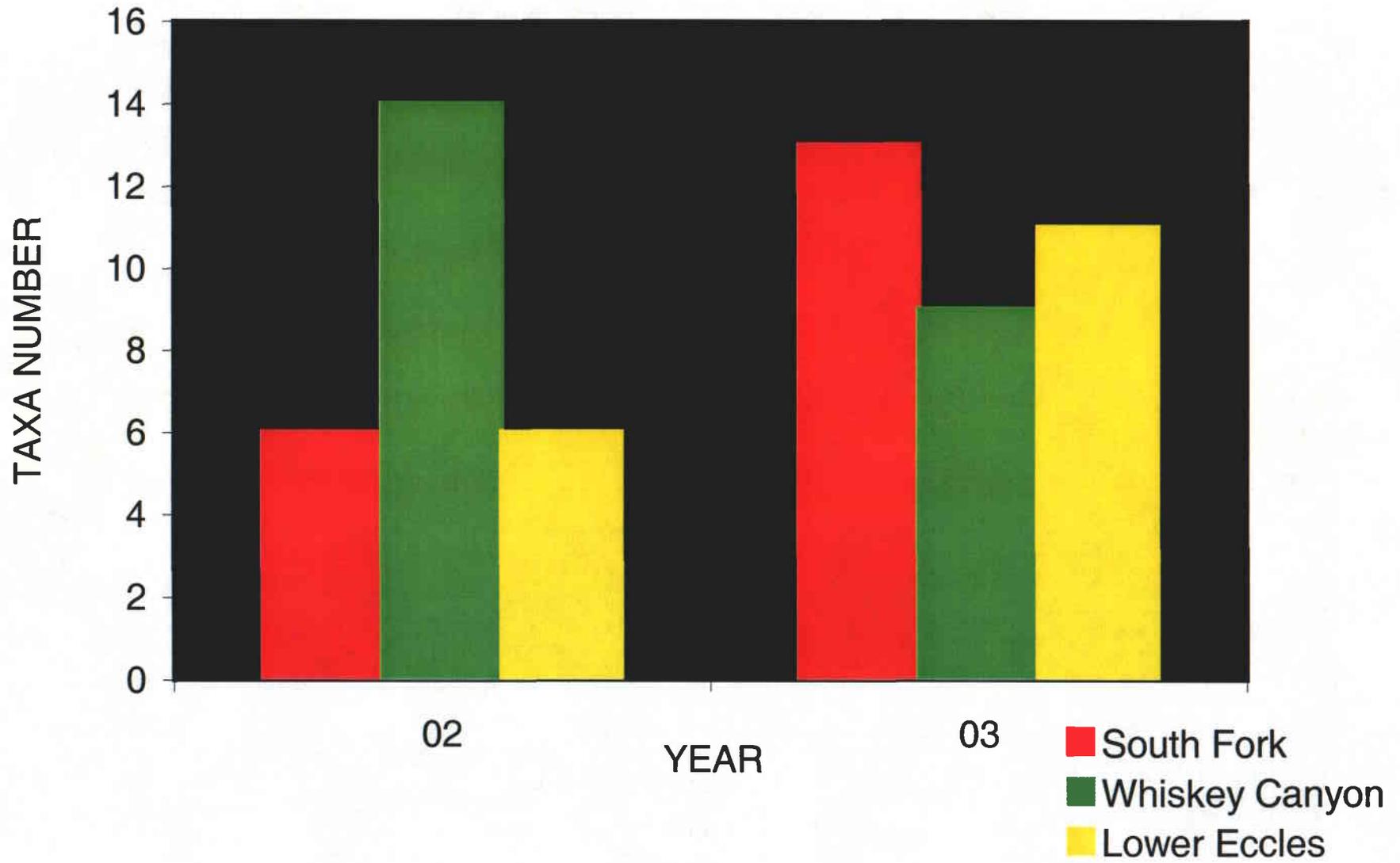




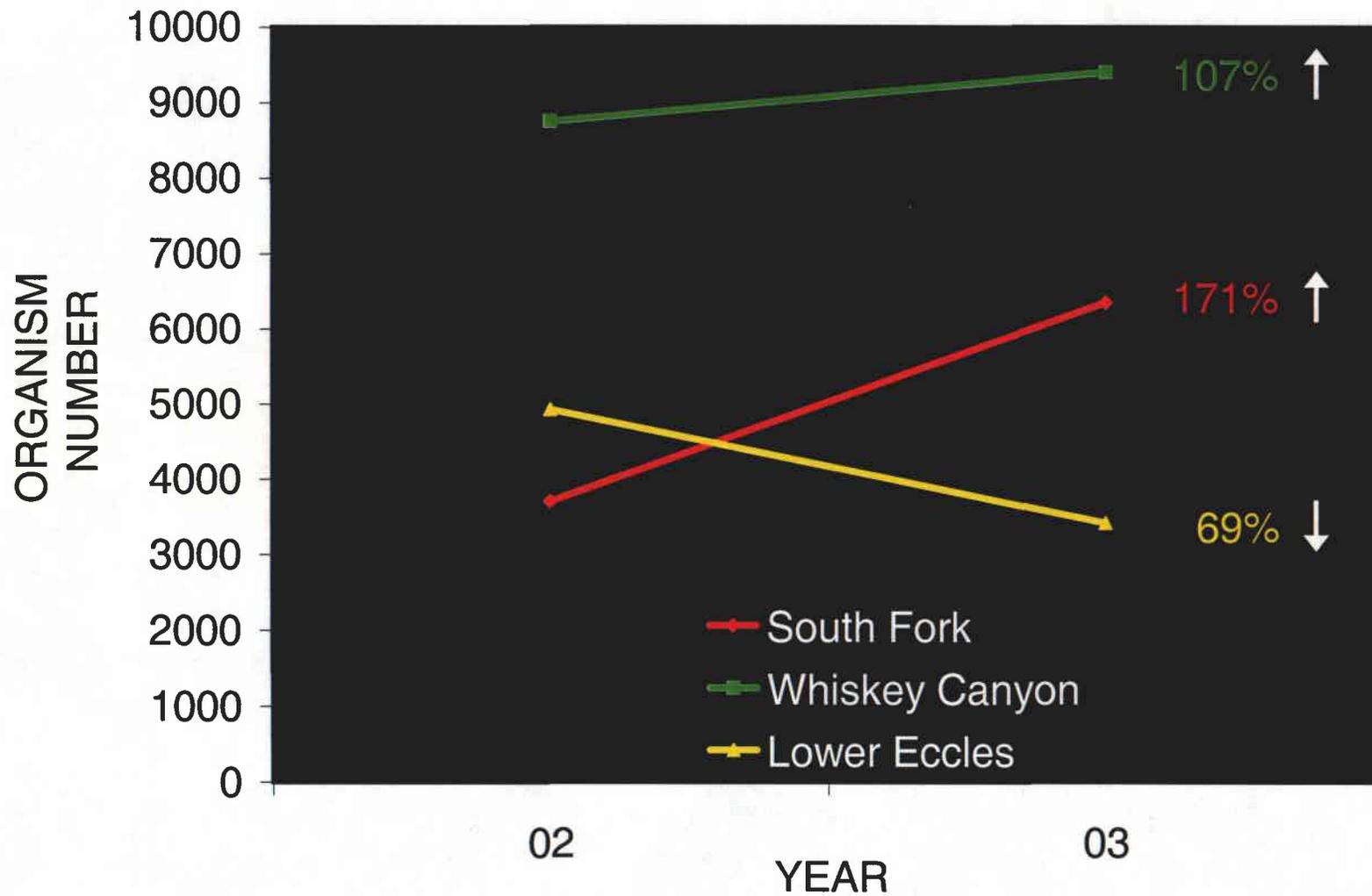
Photograph 16 - MC-1 View Downstream



ECCLES CREEK
MAROINVERTIBRATE



ECCLES CREEK MAROINVERTIBRATE



ECCLES CREEK MAROINVERTIBRATE

