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DIV. OF OIL, GAS & MINING

Canyon Fuel Company, LLC
Skyline Mines
HC 35 Box 380
Helper, Utah 84526
(435) 448-6463 Fax: (435) 448-2632

February 21, 2005

Coal Regulatory Program
Attn.: Mark Mesch
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

Incoming
C0/007/0005
Copy Mark, Susan,
Wayne H, Dana

RE: Canyon Fuel Company, LLC Skyline Mine's Response to the PacifiCorp July 6, 2004 Appendix to June 26, 2003 Data and Finding Summary for Investigation of Technical Issues Related to the Electric Lake and Huntington Creek Drainage Controversy

Dear Mr. Mesch:

Canyon Fuel Company, LLC Skyline Mine respectfully submits the enclosed response to the PacifiCorp July 6, 2004 Appendix to the June 26, 2003 Data and Finding Summary for Investigation of Technical Issues Related to the Electric Lake and Huntington Creek Drainage Controversy. The report has been reviewed by our staff and consultants for the validity and accuracy of facts and soundness of conclusions. Quite honestly, we find this latest submittal by PacifiCorp to the Division asserting "....our continuing conclusion that mining activities have caused significant water loss from Electric Lake" (first paragraph of the July 6, 2004 Cover Letter for the July 6, 2004 Appendix submittal) fraught with inaccuracies, conjecture, and misapplication of otherwise sound scientific principles. Additionally, the cover letter submitted with the Appendix clearly demonstrates PacifiCorp's single-minded approach to the issue of the lack of water in Electric Lake. This approach is essentially that all the "missing" water from the lake must have gone to Skyline Mine.

The attached response to the PacifiCorp report has been organized by presenting observations and commentary on each of the 15 bullet notes provided in their Executive Summary. Additional responses have been provided for the tritium and dye results and consequent data interpretation provided in the PacifiCorp cover letter. The common thread noted by Canyon Fuel Company's reviewers was the difficulty in responding to the PacifiCorp report without knowing what conceptual hydrogeologic model was used to substantiate their claim that water leaking from Electric Lake was moving directly to Skyline Mine. Their report suggests a "shotgun" approach to this problem where at least two and possibly three models were used to explain the

movement of water. Additionally, the reviewers of the report found it difficult to interpret the dye data PacifiCorp used to, as they claim on page 3 of their report, "...that these dye test affirmatively establish a connection between Electric Lake water loss and the Skyline Mine's mining activities and related discharges of enormous amounts of water from the Mine". Such a forceful and unambiguous claim as this should at least be supported by a comprehensive data set that includes the date of dye detection and whether it was a "positive" or "possible" detection. The dye concentrations and apparent sporadic "hits" used to assert their claim of a connection between the mine and lake **do not** provide any kind of substantial proof of that connection.

Canyon Fuel Company, LLC would appreciate the opportunity to meet with you and your staff to discuss the PacifiCorp Report, the allegations regarding a connection between Electric Lake and the mine, and their request the Division require Skyline Mine to replace water that has been lost from Electric Lake. If you have any questions, please give me a call at (435) 448-2669.

Sincerely:

Chris D. Hansen
Environmental Coordinator
Arch Western Bituminous Group, LLC.

enclosure

The Canyon Fuel Company, LLC Response to PacifiCorp July 6, 2004 Appendix submittal to June 23, 2003, Findings Report – Electric Lake

The following is a Canyon Fuel Company, LLC (CFC), response to conclusions listed in the Executive Summary of the **PacifiCorp – Appendix to June 26, 2003 Data and Finding Summary,** that was submitted to the Utah Division of Oil, Gas, and Mining (DOGM) in July 2004. Conclusions from the report by PacifiCorp are listed first (in bold font), followed by the CFC response.

1) **Water level and volumes within Electric Lake have been artificially increased since 2001 through well pumping and reduced discharges.**

Pumping of water from the Skyline mine into Electric Lake has been a benefit to Water Users in the Huntington Creek basin, providing water during a sustained 5-year drought that would normally not have been available.

2) **Without man induced (artificial) inflows from JC-1, JC-3 and from reduced lake outflows, Electric Lake is projected to have dropped below the outlet structure twice since 2002, once between December 2002 and April 2003, and again beginning in December 2003. The significance of these projected events is to say that discharges would have ceased during these periods, leaving PacifiCorp with no available water. Additional data beyond that contained within this report is needed to identify the ending of the second period wherein levels were projected to drop below the outlet structure.**

Using PacifiCorp data, it can be interpreted that Electric Lake has been losing more water now than has been historically assumed since 2001. Mine discharge from JC-1 and JC-3 into the Huntington Creek basin has facilitated the operation of Electric Lake, providing water during a sustained 5-year drought that would normally not have been available. PacifiCorp has not provided any proof demonstrating the water being lost from Electric Lake is reporting to the mine.

3) **A total of 18,016 acre-feet of water has either been pumped into or held back in Electric Lake since 2001. Of this, Electric Lake has only seen a maximum storage benefit of 8, 184 acre-feet in indicating a 55% loss of all pumped or held water. Increased volumes to an already wet lake should have experienced only minor losses, far below those noted.**

Using PacifiCorp data and comparing calculated inflows to measured inflows, there is a difference of almost 10,000 gpm between the two inflows. PacifiCorp's own admission (next bullet item) suggests their "Lost Water" calculations should only be used to describe general trends. Also, the comparison above is assuming that all water leaving the lake is reporting to the mine. No other options were considered. Lastly, CFC is unsure what the 'wet lake' comparison means. Is this suggesting there is an Electric Lake-sourced vertically and horizontally ubiquitous saturated water table in the area surrounding the lake? What is the extent of this water table?

4) Although PacifiCorp's "Lost Water" calculations do not accurately define and calculate all Electric Lake balance components, they are a very good indicator of trends, and very helpful in determining changes which have occurred over time. These calculations must not be over looked nor under estimated.

PacifiCorp data adequately demonstrates the lake basin leaks. The data presented has not demonstrated the water is reporting to the Skyline Mine.

Prior to Skyline Mine encountering significant inflows of ground water to the mine, PacifiCorp did not measure inflows into Electric Lake. Accurate reservoir inflow information is one of the necessary parameters required to calculate "lost water" in the reservoir. In the absence of measured reservoir inflows, the "lost water" calculations are not reliable. Additionally, PacifiCorp has collected reservoir inflow data only during the recent period of severe and prolonged hydrologic drought. It is likely that reservoir inflow characteristics (from both groundwater and surface water) are appreciably different during wetter climatic cycles.

5) Data evaluations included within this report show increasing losses in lake storage at the same time as inflows from wells JC-1 and JC-3 have increased, and discharges have decreased, continuing to indicate a hydraulic connection between the lake and in-mine waters.

The CFC review of the PacifiCorp July 2004 report could not find the data used in the analysis described above (Fig. 3). No supporting evidence could be found. Also, pumping of JC-3 does not represent a 'direct drawdown' of a confined aquifer. JC-3 represents a drawdown of a 'pool' created within the mine workings. Whether JC-3 is pumping or not, that volume of water is leaving the mine (so the discharge is actually constant). This suggests that the Lake is losing water at a rate that is independent of the rate at which water is pumped from the mine

6) Water loss calculations based strictly on differences in recorded versus adjusted lake volumes (taking out JC-1 and JC-3 in flows and reduced outflows) show an average loss trending from 5.8 to 7.9 cfs (2,600 to 3,545 gpm).

PacifiCorp concedes that the "Lost Water" information should be used only to describe general trends since "calculations do not accurately define and calculate all Electric Lake balance components". It is interesting to note that PacifiCorp initially reported a direct connection between the lake and mine inflows in the fall of 2001. Now, after learning that groundwater flowed into the mine at initially large volumes in 1999, they have revised their claim and now say they can trace an impact to the performance of the lake back to 1999.

7) **A comparison of pumped volumes from wells versus resulting volumes changes in Electric Lake shows pumping efficiencies between 48 and 62%. These efficiency numbers indicate that between 38 and 52% of all water pumped into the lake is lost. Since well water is discharged directly into Huntington Creek thereby eliminating channel losses, theses extreme losses are attributed to increased ground water drawdowns which in turn create increased losses in Electric Lake.**

Based on recent Electric Lake inflow and outflow data provided by PacifiCorp, it is apparent that Electric Lake is a leaky reservoir. Reports available at the State Engineers office as well as anecdotal information regarding the necessity of grouting a large number of fractures before the reservoir would initially hold water seem to support this conclusion. However, it is apparent that pumping of groundwater from JC-1 and JC-3 has not had any noticeable effect on discharge rates from shallow groundwater systems in the vicinity of JC-1 and Electric Lake.

Discharge hydrographs for springs and streams in the vicinity of JC-1 are shown in Figure A. Also shown on Figure A is a plot of the Palmer Hydrologic Drought Index for Utah Region 5. It is apparent in Figure A that discharges from springs and streams vary according to season and climate as reflected by the PHDI. Stream monitoring stations F-9 and F-10 are situated on James Canyon Creek near and below JC-1. While the discharge in the creek shows seasonal and climatic variability, there is no indication that pumping of JC-1 and JC-3 has resulted in any measurable decrease in discharge in the creek. It should be noted that James Canyon Creek runs within a few tens of feet of wells JC-1 and JC-3 and overlies the fracture in which the wells are completed. Likewise, discharge from spring 2-413, which shows both seasonal and climatic variability, does not show any decreases in discharge that could be attributed to pumping of JC-1 and JC-3. Additionally, it has been observed during numerous traverses of the hillside in James Canyon between JC-1 and Electric Lake during the current period of drought that the springs in that area have not diminished noticeably since 2001. Likewise, spring S34-12, which discharges from a bedrock groundwater system on the shoreline of Electric Lake west of JC-1, does not show any decreases in discharge rate that could be related to pumping of JC-1 and JC-3. Discharge from spring S35-8, which is located very near monitoring well W35-1A, shows marked seasonal and climatic variability (Figure A). While water levels in monitoring well W35-1A, which is a deep well completed in the Star Point Sandstone, have been drawn down considerably since pumping of JC-1 began, there have not been any measurable decreases in discharge from S35-8 that could be attributed to pumping of wells JC-1 and JC-3. These facts strongly suggest that shallow groundwater systems and surface water systems in the vicinity of JC-1 and Electric Lake are isolated from the deep Star Point Sandstone groundwater systems encountered in the Skyline Mine. Pumping of wells JC-1 and JC-3 has not had any measurable effects on discharge rates from shallow groundwater and surface water systems in the region.

In contrast, water levels measured in deep wells completed in the Star Point Sandstone up to several miles from JC-1 have declined significantly in response to

the encountering of fault-related groundwater systems underground in the Skyline Mine. The large cone of depression in the deep system indicates that water entering the Skyline Mine is being removed from the fractured Star Point Sandstone groundwater system. If the water encountered in the Skyline Mine were being derived from Electric Lake, such a cone of depression in the Star Point Sandstone would not be anticipated (i.e., the lake would essentially act as a constant head boundary and significant, widespread drawdown in the Star Point Sandstone would not occur).

8) **Water levels within Electric Lake continue to decline in spite of 1) significant action taken to increase inflows (wells JC-1 and JC-3) and reduced outflows (lake discharges over the last two years have been lower than any previously recorded time period), and 2) the fact that the current drought is similar in nature to the five year drought of 1986-1991.**

Electric Lake is a leaky reservoir. The extent to which inflows to Electric Lake in the recent period of drought have been similar to those that occurred in previous years is not possible to determine because PacifiCorp did not collect historic reservoir inflow data. However, it is noteworthy that the recent period of drought is different from that of 1986 – 1991 in that the previous drought occurred shortly after the prolonged wet spell from 1982 – 1986 (that included the extreme, record period of wetness during 1983 and 1984). In contrast, the recent drought has occurred after a period characterized by periods of wet and dry cycles of short duration.

9) **A comparison of average annual changes in lake volume for the comparable drought period of 1988-1991 to the current drought period (1999 – present), shows that average losses have increased from 2,175 to 5,526 acre-feet/year. This total average change in losses converts to an average flow of 4.6 cfs (2,065 gpm).**

Electric Lake is a leaky reservoir. Prior to the fall of 2001, PacifiCorp did not measure inflows into Electric Lake. Accurate reservoir inflow information is one of the necessary parameters required to calculate "lost water" in the reservoir. Consequently, in the absence of measured reservoir inflows, the "lost water" calculations are not reliable. Because PacifiCorp prior to fall of 2001 did not make reservoir inflow measurements, it is not possible to compare recent inflows with inflows to Electric Lake during 1988 – 1991 when inflow data do not exist.

10) **By taking into account artificial or man induced inflows, Electric Lake losses increase to an average of 8,000 ac-ft/yr since 1999, a value +/- 6,000 ac-ft/yr higher (400% higher) then that for the 1986 – 1991 time period.**

Our response to this item is the same as above in item #9.

11) A comparison of lake levels with the Palmer Drought Index shows that although the droughts of 1986 – 1991 and 1999 – present are of similar nature, the lake has responded in a significantly different way. Two very clear observations are that first, lake levels started dropping almost immediately following the start of the drought, and second, lake levels and volumes have decreased far below any prior historic event, in spite of mans attempt to stabilize levels.

The drought of 1986 – 1991 is different from the recent drought in that the previous drought occurred shortly after the prolonged wet spell from 1982 – 1986 (that included the extreme, record period of wetness during 1983 and 1984). In contrast, the recent drought has occurred after a period characterized by periods of wet and dry cycles of short duration. These differences are reflected in the quarterly low-flow measurements in Huntington Creek above Electric Lake (monitoring site UPL-10) performed by Skyline Mine. The annual quarterly low-flow measurements during the period 1986 – 1991 averaged 539 gpm, while the low-flow measurements during the period from 1999 – 2004 average only 276 gpm.

12) Historic data shows very consistent summer depletion trends throughout the history of Electric Lake up through the year 1999, in spite of small fluctuations in rainfall and discharge variations. The consistency of these summer use trends shows and documents the consistency of lake management. Comparisons of the rate of lake level and volume changes during summer use periods since 2001 however show drastic variations from any prior time period. A close look at volume changes since 1999 has also now shown that impacts potentially started as early as the year 1999. It is critical to understand that these changes in use patterns are not a response to the drought since the drought only started in 1999. It takes time for drought impacts to show significant impact as is evidenced by historic summer use pattern and lake level data.

As indicated in item 11 above, the droughts of 1986 – 1991 and the current drought are not necessarily similar. The drought of 1986 – 1991 followed a period of record wetness from 1982 – 1986. Additionally, the region was rapidly transitioning into the current drought in late 1999. By December 1999, the region was in a period of moderate drought.

Figure B illustrates Electric Lake discharge on an annual basis when compared to the Electric Lake Storage Volume and the Surface Water Supply Index. The graph uses data supplied to DOGM from PacifiCorp. Comparing the Electric Lake annual discharge from 1987-1991 to 1997-2001, it is apparent that the annual discharge is significantly greater during 1997-2001. From 1987 through 1991 annual discharges averaged 12,175 ac-ft/yr, while from 1997 through 2001 annual discharges averaged 19,430 ac-ft/yr; an increase of almost 37%. This increase was noted during a period when the available water supply (SWSI) was also low. The combination of increased annual discharge with low water availability likely contributed to the significant drop in

the Storage Volume of the lake. This graph contradicts PacifiCorp's claim of "very consistent summer depletion trends".

13) Comparisons of estimated (via mass balance equations) versus recorded flows within Huntington Creek (since flumes were installed) shows that the error between estimated and recorded flows increases as man induced inflows increase. This increasing error is the result of increased un-measurable lake losses which in turn result from increased ground water withdrawals via in-mine or well pumping.

It is difficult to evaluate this assertion without more information concerning PacifiCorp's conceptual model of the interaction between the geology and flow patterns. The JC-1 well has consistently pumped at one of two constant rates; first at approximately 2,000 gpm and then at 4,000 gpm. The JC-3 well pumps from the mine workings. Independent of whether JC-3 pumps water from the mine, water is removed from the mine. JC-3 merely re-routes pooled water to Eccles Creek that would otherwise be sumped within the mine. Mine inflow has been persistent for the past several years – but inflow rates have been decreasing with time. For PacifiCorp to observe increased lake losses through a period of time when inflows to the mine have decreased and pumping from the Star Point Sandstone has remained constant appears to support the concept that the water leaking from the lake is not the same water as the water flowing into the mine nor the water being pumped from JC-1 going somewhere other than the mine.

14) It is our understanding that mine personnel have indicated that the fault/fracture system penetrated by well JC-1 is not directly or significantly connected to 10 Left mine workings. This assumption is understood to be based on the fact that pumping 4,200 gpm from well JC-1 only reduced in-mine flows by approximately 600 gpm. As a first order approximation to better understand this issue, the Theis well equation was used to demonstrate that the reduction in flows noted by the mine are in the order of magnitude which would be expected due to well drawdown influence. These relationships show that the existing connection between JC-1 and the mine are not out of line, and are as would be expected.

CFC does not understand this conclusion. Skyline Mine has stated repeatedly that JC-1 intercepts the fracture that feeds water to the mine in the 10 Left area. However, the interception point between the well and the fracture is <u>below</u> the mine workings. The artesian pressure of the groundwater in the fracture intercepted in 10 left inhibits JC-1 from producing water from 10 Left. Due to the significant head within the Star Point aquifer, Skyline Mine was unfortunately unable to intercept a more significant portion of the water supplied to the fracture system from the sandstone. It became obvious after drilling JC-1 the Star Point aquifer and associated fracture system had a much greater thickness and areal extent than the mine personnel originally believed.

Application of the Theis equation, as used in Table 1, in a fault/fracture flow system is highly suspect, even being used as a first order approximation. The primary assumptions of the Theis equation state, 'the aquifer is homogeneous, isotropic (properties are same in all directions), uniformly thick, and of infinite areal extent'; none of which is applicable in the geology surrounding JC-1. Also, the Theis equation is typically used for a confined aquifer, not a fracture flow system. There is no indication that fracturing is widespread and uniform enough to allow for the use of the Theis equation to predict flow within the Star Point. PacifiCorp's use of the Theis equation suggests their belief the groundwater flow in the vicinity of the mine and JC-1 is through a porous medium.

15) **Using orifice flow equations, we have approximated future flows based on current flow, current head, and anticipated future head conditions. Following this approach we have determined that:**

- **Because of the interconnected nature of abandoned mine workings, post mining potentiometric heads will be significantly lower that pre-mined conditions.**

- **Post mining flows through fractures will be significantly different than pre-mined conditions. Some fracture sets previously isolated will now be hydraulically connected, and under post mining conditions, some existing fracture inflows are shown to have reversed flow, and will thereby be points of discharge rather than sources of recharge. Under post mining conditions, water levels will stabilize at a point where inflows balance outflows. This has been projected to be at an elevation below pre-mined water levels, which will have a continued significant and permanent impact on the local and regional aquifer system.**

It is difficult to evaluate this assertion without more information concerning PacifiCorp's conceptual model of the interaction between the geology and flow patterns. Addressing post-mining potentiometric head, independent of numeric hydrologic modeling conducted by CFC, the portals are 5-feet above the riser elevation of the Electric Lake (8580.9 vs. 8575, respectively). The elevations suggest once the mine workings are completely flooded, there is sufficient potentiometric head to compensate Electric Lake – assuming a connection between the two exists.

The percent error and outdated flow information provided in Tables 2 and 3 of the report illustrate the inherent problems with trying to apply simple equations (orifice flow) to the dynamic and complex conditions experienced at the Skyline Mine. It has not been demonstrated that orifice flow is an important governing factor in mine in-flow rates. Use of orifice flow calculations relies on accurate initial hydraulic head values. The method employed to establish the head values is questionable. It is apparent this method does not provide correct results when applied in the mine. As an example, on page 16 the predicted current flows from East Sub XC5 were calculated at 718 gpm. The error between the calculated and mine estimated flows was 94% and attributed in part to inaccurate in-mine flow estimates. However,

accurate flow measurements were made at this site using a current flow meter and reported in the Mine's PHC. It is obvious that PacifiCorp disregarded this accurate flow measurement data and inappropriately assigned part of their calculation error to the mine measurements.

Table 4 goes on to illustrate that in a balanced condition 11 Left will act as a drain, taking almost 7,000 gpm from the system – much more than was flowing out of it under high-pressure artesian conditions. CFC would like to understand where this water is going to go – is it possible that it will flow back to the lake, or will it flow into an aquifer from which, according to PacifiCorp, the water is not now issuing? For Table 4 to create a balanced condition, inflows to the 14-Left, 16-Left, and the southwest portion of the mine have been increased to values higher than are currently being recorded.

Another inherent problem with Table 4 is how it handles inflow and outflow at 11 Left HG XC 24. In the "Post Mining Conditions with Spill to the North" column, this site is draining 392 gpm when the water elevation is 8260. However in the "Balanced Flow Conditions" column, the site becomes an inflow source at a rate of 479 gpm when the water elevation is 8328. How can increasing the head at this location cause it to change from a drain to a source? A similar question arises for the description of flow at East Sub XC 5 where the flow increases as the elevation of water in the mine increases. Without a PacifiCorp conceptual model of the ground water system, we are at a loss to explain this situation.

Several points of clarifications need to be made in Table 4. The Initial Flow numbers are summed at the bottom of that column. This implies all of these inflow points were discharging at the rates indicated simultaneously. This was never the case.

Figure 11 is another illustration where an understanding of the PacifiCorp conceptual model would be helpful. Two distinct potentiometric surfaces exist in the area surrounding the Skyline Mine - Blackhawk Formation and Star Point sandstone, respectively. As illustrated in Figure 11, the potentiometric surface noted in the vicinity of the lake is approximately 400-ft below the lake – suggesting no communication between the two. Assuming there is only one aquifer in the mine area as illustrated in Figure 11, why is the potentiometric surface not directly connected to Electric Lake in the "Measured Potentiometric Surface Elevation April 2003" line illustrated on Figure 11? Or the "Projected Post-mine Potentiometric Surface" line? We agree with Figure 11 illustrating no connection between Electric Lake and the pre-mining potentiometric surface. We do not understand how PacifiCorp can claim there is a connection between the mine/fracture system and the lake when no part of Electric Lake was undermined or lies within the angle of draw of subsidence.

The thought that orifice flow is a significant factor in controlling mine in-flow rates has not been demonstrated to be correct. Reliance upon an orifice flow theory would need to be based on a conceptual model where the majority of the water would flow from the lake to the mine through significant fractures.

Although PacifiCorp's 2004 Appendix did not present any information concerning either tritium or dye tracing, the cover letter to the 2004 Appendix contained assertions regarding both subjects. The following brief comments are presented to resolve any confusion on these two topics and Canyon Fuel Company, LLC if desired, can present additional information to the Division.

Tritium

The presence of tritium in groundwater from JC-1 does not indicate a connection with Electric Lake. Tritium concentrations do not indicate rates or directions of groundwater flow. Likewise, in no way does the presence of some tritium in JC-1 demonstrate that mining activities have redirected Electric Lake water to the Skyline Mine. Rather, the presence of tritium indicates only that the groundwater system intercepted by JC-1 has a component of groundwater that recharged in the past approximately 50 years. The modern groundwater component could have recharged the fracture network at any location where the fracture intersects an active groundwater or surface water system containing tritium. The increasing tritium concentrations in JC-1 could be the result of one or more of the following mechanisms:

1) The relative amount of modern water in the groundwater system is increasing;
2) The relative amount of tritium-free (old) groundwater is decreasing;
3) The water bodies(s) from which the tritiated water originates is not homogeneous (i.e., there is temporal and/or spatial variability in the tritium concentration of the modern recharge water).

It is important to note the fractured Star Point Sandstone inflow rates into the Skyline Mine have all decreased over time. This includes groundwater inflow rates at the 10 Left sump/JC-3 area (as measured by Skyline Mine and as evidenced by the inability of JC-3 to produce low TDS water from the 10 Left sump area at anticipated rates).

It is also interesting that tritium concentration in the groundwater produced from JC-1 is higher than in the water from the flooded mine workings in the 10 Left area produced from JC-3.

Dye Tracing

Skyline Mine has performed dye sampling at locations in and around Electric Lake subsequent to the initial dye injection in Electric Lake. As indicated by laboratory dye analysis by the Ozark Underground Laboratory, no fluorescein or eosine dye was detected in either JC-1 or JC-3 during the first dye test. However, low concentration confirmed and unconfirmed dye detections have occurred in many locations in the Huntington Creek drainage. Additionally, minor amounts of fluorescein dye have been detected in Eccles Creek below the Skyline Mine. However, it was demonstrated previously that this fluorescein dye originated from dye (likely from antifreeze) in the mine sedimentation ponds and is not related to mine discharge.

It is Skyline Mine's belief that if a strong connection between Electric Lake and the Skyline Mine were present, a consistent, repeatable pattern of dye detections in JC-1 and JC-3 would occur. Given the enormous volume of dyed water in Electric Lake (that persisted for months after the dye injection at detectable levels in the reservoir outflow) and PacifiCorp's assertion that a direct and rapid connection between the lake and the mine exists, dye detections in JC-1 should have been almost immediate and sustained for months. That this did not occur suggests there is no significant connection between Electric Lake and the Skyline Mine.

While it is unfortunate that Electric Lake continues to leak water, the data presented by PacifiCorp do not demonstrate that mining operations at the Skyline Mine are the cause of the losses from Electric Lake.

FIGURES

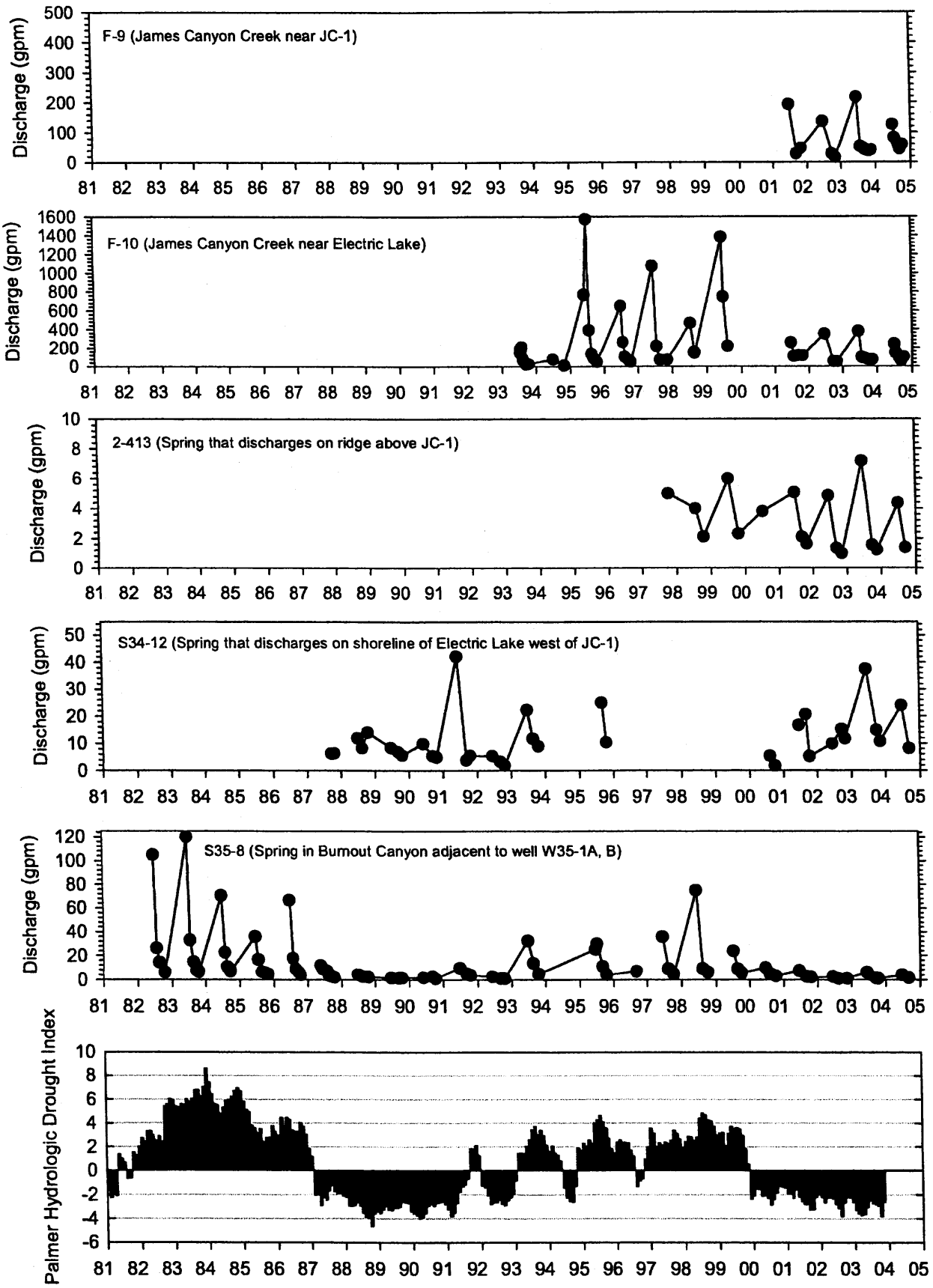

Figure A Discharge hydrographs for springs and streams in the vicinity of JC-1 and Electric Lake and a plot of the PHDI for Utah Region 5.
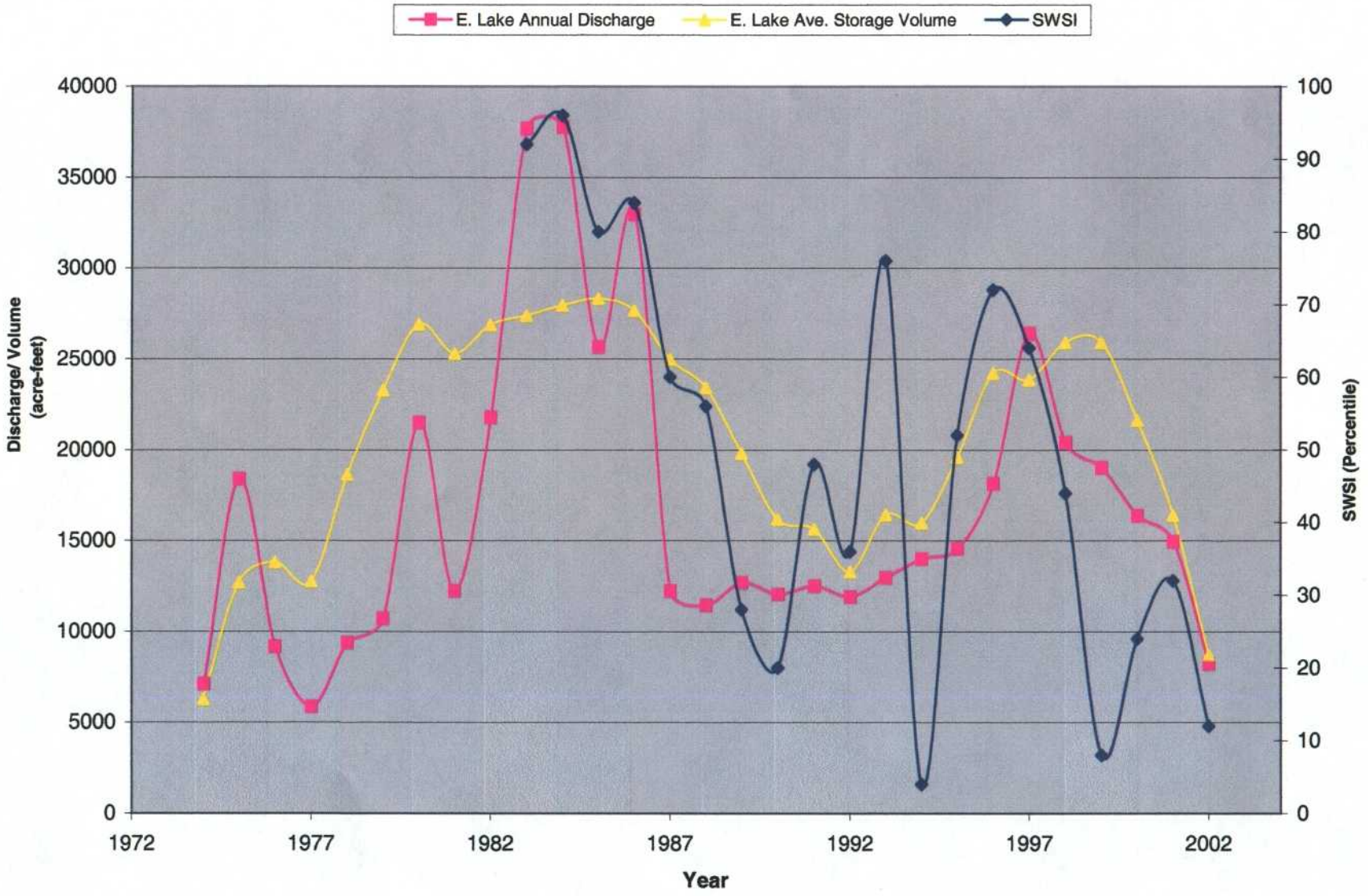
Fig. B - Electric Lake Operation vs. Water Availability