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Canyon Fuel Company, LLC.
Sufco Mine
A Subsidiary of Arch Western Bituminous Group, LLC.

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OK Incoming
C/041/0002

April 14, 2008

Mr. Jim Smith
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, UT 84114-5801

RE: Response to March 12, 2008 Letter from Howard Sargent, Forest Supervisor, Manti-La Sal National Forest regarding Sufco Mine's "Summary Report of the 2007 Investigation and Proposed Mitigation Activities, North Water Spring and Joes Mill Pond Areas" November 2007.

Dear Jim:

Canyon Fuel Company, LLC Sufco Mine (Sufco) recently received a copy of a letter from Mr. Howard Sargent, the Manti-La Sal National Forest (Forest) Supervisor, addressed to you regarding the Sufco Mine November 2007 "Summary Report of the 2007 Investigation and Proposed Mitigation Activities, North Water Spring and Joes Mill Pond Areas". In this letter, Mr. Sargent indicates that his staff has reviewed the aforementioned summary report and had five comments on the project. Our review of the Forest's comments indicate there has been either miscommunication between the parties involved or lack of understanding by those parties of the data collected in the process of this project and the latest proposal to mitigate impacts to the North Water Spring area. This letter from Sufco is being forwarded to you, and copied to the Forest, in an attempt to address the Forest's concerns presented in their March 12, 2008 letter.

Response to Comment 1

The first comment presented in the letter indicates the Forest believes there is insufficient data presented in the Sufco 2007 proposed mitigation report to conclude "that the total flow in the East Fork of Box Canyon has been maintained". Furthermore, the Forest indicates that a presentation made at a Coal Manager's Meeting by DOGM hydrogeologist Steve Fluke "indicated that the flow has partially recovered" (no date of the meeting was provided). Since the reference to Steve Fluke's presentation has no date, we cannot discern when this comment was made nor address its validity. However, we can address the comment made by the Forest indicating the 2007 summary report lacks sufficient data to conclude the total flow in the East Fork has been maintained. It is important to keep in mind the November 2007 report is one of several that have been written and submitted to the Division and forwarded to the Forest dealing with the issue of the East Fork of Box Canyon flows and mitigation proposals and subsequent actions in the area.

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To address some of the issues presented in the Forest's letter, Sufco Mine requested Mr. Erik Petersen of Petersen Hydrologic, LLC review the 2000 through 2007 East Fork of Box Canyon flow data collected at site Pines 408. This monitoring site is located on the East Fork of Box a short distance upstream of where it joins the main stem of Box Canyon. Sufco also asked Mr. Petersen to prepare a written summary and interpretation of that flow data. Finally, Sufco asked Mr. Petersen to prepare and include in this summary a list of documents that have been submitted to the Utah Division of Oil, Gas and Mining (DOGM) that included updated flow measurements in the East Fork of Box Canyon and interpretations of that flow data. Sufco understands that copies of these reports have been forwarded to the Forest shortly after receipt by DOGM. A copy of Petersen's summary is attached to this letter.

Mr. Petersen's summary contains data and graphs clearly illustrating that total flows discharging from the East Fork of Box do not appear to have been diminished as a result of mining. Rather, the base flow data clearly indicates changes in discharge are closely related to climatic conditions, exactly what would be expected in an area where aquifers are shallow and respond quickly to changes in precipitation amounts. With the exception of the baseline flow graph, this same information has been provided to the Division, and presumably forwarded to the Forest, in a timely and regular manner.

Response to Comment 2

Sufco generally concurs with comment number two of the Forest's letter. The mine has not claimed their only concern is with the total discharge from the East Fork of Box Canyon. The discharge from the East Fork of Box Canyon is only one issue.

Response to Comment 3

Sufco concurs with comment number three of the Forest's letter that more study is necessary to determine what is causing the drop in the water levels within the alluvium in the North Water Canyon area.

Response to Comment 4

Sufco recognizes the Forest's concerns of how the proposed collection and pipeline system will be maintained. However, as stated in the Sufco November 2007 proposal, the installation of the North Water side canyon ground water collection system is experimental and further action will be proposed based on the outcome of this experiment. It is premature to finalize plans on how this system would be maintained.

Response to Comment 5

Sufco disagrees with part of the information and assertions made in comment number five of the letter. The Forest has erroneously assumed that water has been "lost" from the system due to mining activities. The water has not been diverted outside the hydrologic basin nor "lost" to the mine. The fallacy of this assumption is clearly established by the continued flows at monitoring point Pines 408 in the East Fork of Box Canyon following mining and subsidence (See response

to comment number 1). Sufco has and continues to maintain that ground water that once discharged to the surface at North Water Spring, Pines 311 and 310 lower springs and then disappeared into the shallow alluvium is still moving through the overall shallow aquifer system. The ground water Sufco intends to capture with the collection and piping system, if the North Water side canyon experiment is successful, is part of this same local ground water system that included the spring discharges. The volume of water to be produced by the collection system has not yet been finally determined. Furthermore, since the ground water Sufco intends to bring to the surface through the experimental collection system is from the same general shallow aquifer that previously discharged at the three spring locations, it is very likely to be the same quality.

Sufco appreciates the cooperation and help it has received from both the Division and the Forest in its efforts to prepare and implement a mitigation plan for the North Water springs area. We appreciate the patience exhibited by both agencies in allowing studies to be performed that will ultimately result in successful mitigation. Sufco believes that if the mine and the agencies continue to take informed and measured steps in this process, the mitigation will be successful.

Sincerely,
CANYON FUEL COMPANY, LLC
SUFCO Mine

Kenneth May
General Manager

Encl.: Petersen Hydrologic Summary Letter

cc: Howard Sargent, USFS Manti-La Sal - PRICE

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PETERSEN HYDROLOGIC, LLC

3 April 2008

Mr. Mike Davis
Canyon Fuel Company, LLC
Sufco Mine
397 South 800 West
Salina, Utah 84526

Mike,

At your request we have provided this letter report in response to the statements set fourth by the United States Department of Agriculture, Forest Service, Manti-La Sal National Forest (Forest Service) in a letter to the Utah Division of Oil, Gas and Mining, dated 12 March 2008. Specifically, the purpose of this letter report is to provide additional information regarding the groundwater and surface-water resources in the East Fork of Box Canyon Creek, North Water Canyon, and Joes Mill Pond areas, and the effects of underground coal mining at the Sufco Mine on these resources.

Beginning in mid-November 2003 and continuing through early January 2004, the main stem of the East Fork of Box Canyon Creek was undermined by the 3 Left Pines East longwall panel at the Sufco Mine. During 2005 and 2006, longwall mining beneath the North Water Canyon and Joes Mill Pond areas occurred (4, 5, and 6 Left longwall panels). In conjunction with the undermining of these areas, extensive monitoring of

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hydrologic resources was carried out. A series of reports presenting the monitoring data together with the findings of hydrogeologic investigations based on the data collected have been presented to regulatory agencies. Monitoring data have also been submitted electronically to the Utah Division of Oil, Gas and Mining through the Division's on-line hydrology database (UDOGM, 2008). Subsequent to the undermining of these areas, mitigation activities have been performed where required and descriptions of proposed future mitigation measures have been submitted to regulatory agencies by the Sufco Mine. The reader is referred to the following reports for additional information and hydrogeologic analysis:

- Analysis of responses of springs and streams in the Pines area to coal mining at the Sufco Mine, letter report to Mr. Mike Davis, August 2003.
- Probable Hydrologic Consequences of Longwall Mining of the 3 Left Panel Modification Area at the Sufco Mine, April 2003.
- Investigation of surface-water quality in the East Fork of Box Canyon in the Sufco Mine permit area, letter report to Mr. Mike Davis, July 2004.
- Report of Hydrologic Monitoring of the East Fork of Box Canyon Creek, 2003-2004, Sufco Mine, March 2005.
- Report of Hydrologic Monitoring of the East Fork of Box Canyon Creek, 2005, Sufco Mine, March 2006.
- Results of Drilling and Piezometer/Well Installation in the area of Pines 105, 310, 311 Springs and Joes Mill Pond Spring Area, Canyon Fuel Company, LLC, SUFCO Mine C/041/002, October 2006.
- Pines 105 area drilling proposal, October, 2006.
- Investigation of Subsidence-Related Impacts to Groundwater Systems in the North Water and Joes Mill Pond areas and Proposed Groundwater Mitigation Activities, Sufco Mine, January 2007.
- Report of Hydrologic Monitoring of the East Fork of Box Canyon Creek, 2006, Sufco Mine, March 2007.

- Comparison of Weather Data and Stream Discharge at the Sufco Mine, 2006.
- Summary Report of the 2007 Investigation and Proposed Mitigation Activities, North Water Spring and Joes Mill Pond Areas, November 2007.
- Hydrologic information for the Sufco Mine submitted quarterly to the Division of Oil, Gas and Mining on-line hydrology database, 2008.

The hydrologic conditions and the hydrologic responses of groundwater and surface-water systems to coal mining in the East Fork of Box Canyon Creek, North Water Canyon, and Joes Mill Pond areas have been thoroughly documented in these reports.

In their 12 March 2008 letter, the Forest Service states that the overall flow in the East Fork of Box Canyon drainage has not recovered since a high in 2002. However, an analysis of monitoring data collected from the area does not support this conclusion. The basis of this statement is provided below.

Discharge in the East Fork of Box Canyon Creek, both prior to and subsequent to its undermining has not been large (Figure 1). Since 2000, discharge monitored at Pines 408 has ranged from a maximum of about 40 gpm during wet years, to less than one gallon per minute during the warm, dry late summer months in dry years. It is noteworthy that the lowest flow rates measured at Pines 408 commonly occur in the late summer months and that there is more discharge measured at Pines 408 in the 4th quarter than during the 3rd quarter (UDOGM, 2008). This phenomenon is likely the result of evapotranspiration losses in the drainage during warm periods when evaporation rates and plant transpiration rates are appreciable. Diurnal variations in discharge rates have been noted historically in automated recording devices at the flume at Pines 408. These diurnal fluctuations in discharge are attributed to evapotranspiration losses in the drainage during the daytime hours, demonstrating the significance of this effect on stream discharge rates in the East Fork. Because of the small surface-water flows in the drainage (which occur mostly under shallow flow conditions), the loss of even a small amount of water to evapotranspiration would represent a large percentage of the total flow present in the

stream (i.e. if the flow in the East Fork headwaters area was 15 gpm and summertime losses to evaporation and/or plant uptake in the approximately 0.6 mile long, heavily vegetated lower portion of the drainage were a modest 10 gpm, then only 5 gpm (33% of the upstream flow) would be present in the creek at Pines 408.)

In contrast, flow rates measured in the upper reaches of the creek (which are gaining stream reaches resulting from discharge from surrounding shallow Castlegate Sandstone groundwater systems) are usually greatest in the springtime and wane gradually over the reminder of the season. This condition is consistent with seasonal discharge from shallow groundwater systems elsewhere in the Wasatch Plateau coal district. The upper portion of the East Fork of Box Canyon Creek is a gaining section of stream between Sufco monitoring sites EFB-7 and EFB-11 (see UDOGM, 2008). The stream continued uninterrupted to gain flow in these areas during and after the area was undermined. This observation is important because it demonstrates that the Castlegate Sandstone groundwater system in the canyon has continuously discharged to the creek, (before, during, and after the undermining of the creek). In other words, the Castlegate Sandstone groundwater system is still functioning. There is no indication that the groundwater system has been drained away to deep horizons. (It is likely for this reason that, as discussed below, subsequent to the undermining of the drainage, the baseflow discharge in the East Fork of Box Canyon Creek has remained at levels consistent with pre-mining levels.)

Discharge in the East Fork during the springtime is largely a function of the magnitude and timing of the spring snowmelt event, which can be highly variable from year to year. Additionally, because the increased discharge in the creek associated with the snowmelt event may be short-lived, the timing of the monitoring event (i.e. whether it occurred prior to, during, or after the peak) can have a large influence on the magnitude of the 2nd quarter discharge measurement. (It is noteworthy that the 2nd quarter 2002 discharge measurement at Pines 408 occurred on 9 May 2002, which is somewhat earlier than what

is typical at the site and probably nearer the peak of the springtime high-flow event that year than is typical.)

For these reasons, it is our opinion that in analyzing long-term discharge trends in the East Fork, it is most meaningful to evaluate the late-season baseflow discharge trends. During the late season (4th quarter) monitoring event, the influences of evapotranspiration are usually minimal because of the lower air and water temperatures, and because the vegetation is then largely dormant. Stream flows in the creek during the late season are dominated by contributions from groundwater sources.

A plot of the baseflow (4th quarter) discharge in the East Fork of Box Canyon Creek as monitored at Pines 408 for the period 2000-2007 is presented in Figure 2. It is apparent that the baseflow in the creek averaged about 17 gpm for the period 2000-2004. In response to the extremely wet conditions the region experienced during 2005 (see PHDI plot in Figure 2), the late season discharge in the creek rose to about 40 gpm. During 2006 and 2007, as the region gradually transitioned into drought conditions, the baseflow in the creek has decreased correspondingly (Figure 2). What is immediately evident in Figure 2 is that the baseflow discharge in the creek after 2003 (after longwall mining under the stream commenced) is not less than that that occurred during 2000, 2001, 2002, and 2003 before the East Fork was undermined. It is obviously not possible with the existing data to affirmatively demonstrate that *absolutely no* surface water has been diverted as a result of mining activities. However, based on the data presented in Figure 2, it is my professional opinion, that there is no substantial diminution in the baseflow discharge from the drainage as monitored at Pines 408 subsequent to mining. The complete discharge hydrograph for Pines 408 (2000-2007) as shown in Figure 1 (together with a plot of discharge at Pines 407 and a plot of the PHDI) also supports the conclusion that discharge rates in the stream are primarily a function of seasonal and climatic variability. That the overall discharge trends at Pines 407 (main fork of Box Canyon Creek) and Pines 408 (East Fork of Box Canyon Creek) show good correlation with each other, while being in different mining areas, supports the conclusion that discharge rates

in the East Fork are primarily controlled by climatic factors rather than mining-related factors.

This conclusion also has important implications to the evaluation of existing hydrogeologic conditions in the North Water Canyon and Joes Mill Pond areas. As described in the reports submitted previously to the regulatory agencies listed above, it has been concluded that there was likely no appreciable loss of water from the basin as a result of undermining the main stem of the East Fork of Box Canyon (i.e. with the 3 Left Pines East longwall panel). While some spring locations were moved short distances down gradient, and there were some reaches of the creek that temporarily were dry after the region was undermined, there was no indication that the water was diverted to deep underlying strata or to the Sufco Mine workings. Rather, the fact that there was no substantial loss of baseflow subsequent to mining indicates that the water was not "lost" or removed from the drainage. It was apparent in field observations that surface waters in the East Fork entered into cracked or buckled silty sandstone bedrock substrate, only to reemerge at nearby downstream locations where the sandstone units are underlain by more ductile, low-permeability claystone or shaley strata. The movement of spring discharge locations in the East Fork subsequent to the undermining and subsidence of the drainage likely occurred under similar conditions. As a result of subsidence, the brittle, jointed Castlegate Sandstone strata from which the springs discharge was fractured (or pre-existing fractures were dilated), resulting in a stratigraphic and topographic lowering of the discharge locations. Appreciable downward migration of the groundwater in the fractures was impeded by the presence of underlying claystone or shaley strata lower in the stratigraphic sequence, where the groundwater was then forced to discharge to the surface as a spring or seep, or as stream bank seepage. Thus, the spring discharge locations were moved to locations somewhat lower topographically in the canyon, but the spring water was not lost from the hydrologic balance.

Subsequent to the undermining of the North Water Canyon and Joes Mill Pond areas, discharges to the surface from a few springs ceased. (It is noteworthy that not all of the

springs in the East Fork drainage or in the North Water Canyon area were effected by the undermining of the areas. Some springs in both areas have continued to discharge at or near pre-mining levels, suggesting that there was not a regional effect on the Castlegate Sandstone groundwater systems that support these springs.) These springs discharged from Castlegate Sandstone bedrock adjacent to thick sequences of sandy alluvial sediments that filled the valley floor in these canyon areas. While the springs adjacent to the main stem of the East Fork discharged from steep hillsides above the stream, the discharge locations of springs in the North Water Canyon and Joes Mill Pond areas are typically situated near the transition between the Castlegate Sandstone bedrock and the adjacent thick alluvial sediments in the valley bottoms. The hydrogeologic conditions in the North Water Canyon and Joes Mill Pond areas are fundamentally similar to those in the main stem of the East Fork of Box Canyon (i.e. regionally jointed Castlegate Sandstone bedrock aquifer matrix overlying the Blackhawk Formation with similar regional dip and surface topography and similar recharge mechanisms). Consequently, it seems very likely that the effects that occurred to the hydrogeologic system in the North Water Canyon and Joes Mill Pond areas as a result of longwall undermining are similar to those that occurred as are result of the undermining of the main stem of the East Fork of Box Canyon Creek (i.e. shallow diversion of groundwater flow paths without loss of appreciable water to deeper horizons or the mine workings). However, as a result of the presence of the thick (~30-40 feet) deposits of alluvium in the bottoms of the North Water Canyon and Joes Mill Pond canyon areas adjacent to the spring areas, the movement of shallow groundwater in the alluvium in these canyon areas is obscured. Consequently, the determination of precise groundwater flow path locations through the shallow subsurface in these areas is somewhat problematic. Groundwater discharging from Castlegate Sandstone bedrock groundwater systems a few feet or perhaps a few tens of feet below the pre-existing spring discharge locations would emerge into the alluvial sediments in the valley bottoms (or possibly into shallow fractures in the weathered Castlegate Sandstone bedrock beneath the canyon) rather than at the surface in that location. Because the surface topographic gradients are lower in the alluvium-filled canyons in the North Water Canyon and Joes Mill Pond areas than in the East Fork

drainage, determinations of the new post-subsidence down-gradient discharge locations for groundwaters previously discharging at the surface from the springs is also somewhat problematic. However, based on the approximately northwest direction of stratigraphic dip and, similarly, the approximately northwest direction of the topographic gradients, it seems likely that groundwater in the North Water Canyon and Joes Mill Pond areas currently continues to flow in a northwest direction toward the East Fork of Box Canyon Creek. As discussed above, the fact that there has been no apparent loss of baseflow discharge from the East Fork drainage subsequent to the undermining and subsidence of the drainage seems to support this conclusion.

As indicated in the Forest Service letter dated 12 March 2008, after initial declines were noted during 2006 in rapid response to the undermining of the region, water levels in most wells completed in the alluvial sediments in both the North Water Canyon and Joes Mill Pond areas showed moderate declines during 2007. It is possible that the water level declines noted during 2007 are related to interception of shallow groundwater by fractures (newly formed or dilated pre-existing) in the bedrock substrate underlying the alluvium. However, it is also possible that the observed declines in alluvial water levels are a natural response to the drought conditions the region experienced during 2007 and the lack of a significant snowmelt event during the year. In order to determine the extent to which drought and/or mining activities have influenced alluvial groundwater saturation levels in the North Water Canyon and Joes Mill Pond areas, continued monitoring of hydrologic conditions in these areas is recommended.

Because of the nature of the hydrogeologic systems in the East Fork of Box Canyon area and the observed responses to longwall undermining in the region, we are confident in asserting that the shallow groundwater in the vicinity of the North Water Canyon and Joes Mill Pond areas likely is not "lost". While the shallow groundwater flow mechanisms may have been altered, it would in my professional opinion, be considered very unlikely that the shallow groundwater resources in the region have been diverted into deep horizons or into the Sufco Mine workings.

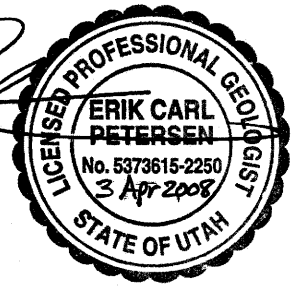
Recharge areas for the Castlegate Sandstone groundwater system in the North Water Canyon and Joes Mill Pond areas must occur in higher-elevation areas up-dip of the canyon. These areas are located on the Pines plateau south and east of the North Water Canyon area. Because these areas have not been undermined and because precipitation in the area continues, it may confidently be stated that recharge to the groundwater systems up-gradient of the North Water Canyon and Joes Mill Pond areas continues.

References Cited

UDOGM, 2008, Utah Division of Oil, Gas and Mining on-line hydrology database, http://ogm.utah.gov/coal/edi/wqdb.htm.

Please feel free to contact me should you have any questions in this regard.

Sincerely,



Erik C. Petersen, P.G.
Principal Hydrogeologist
Utah PG #5373615-2250

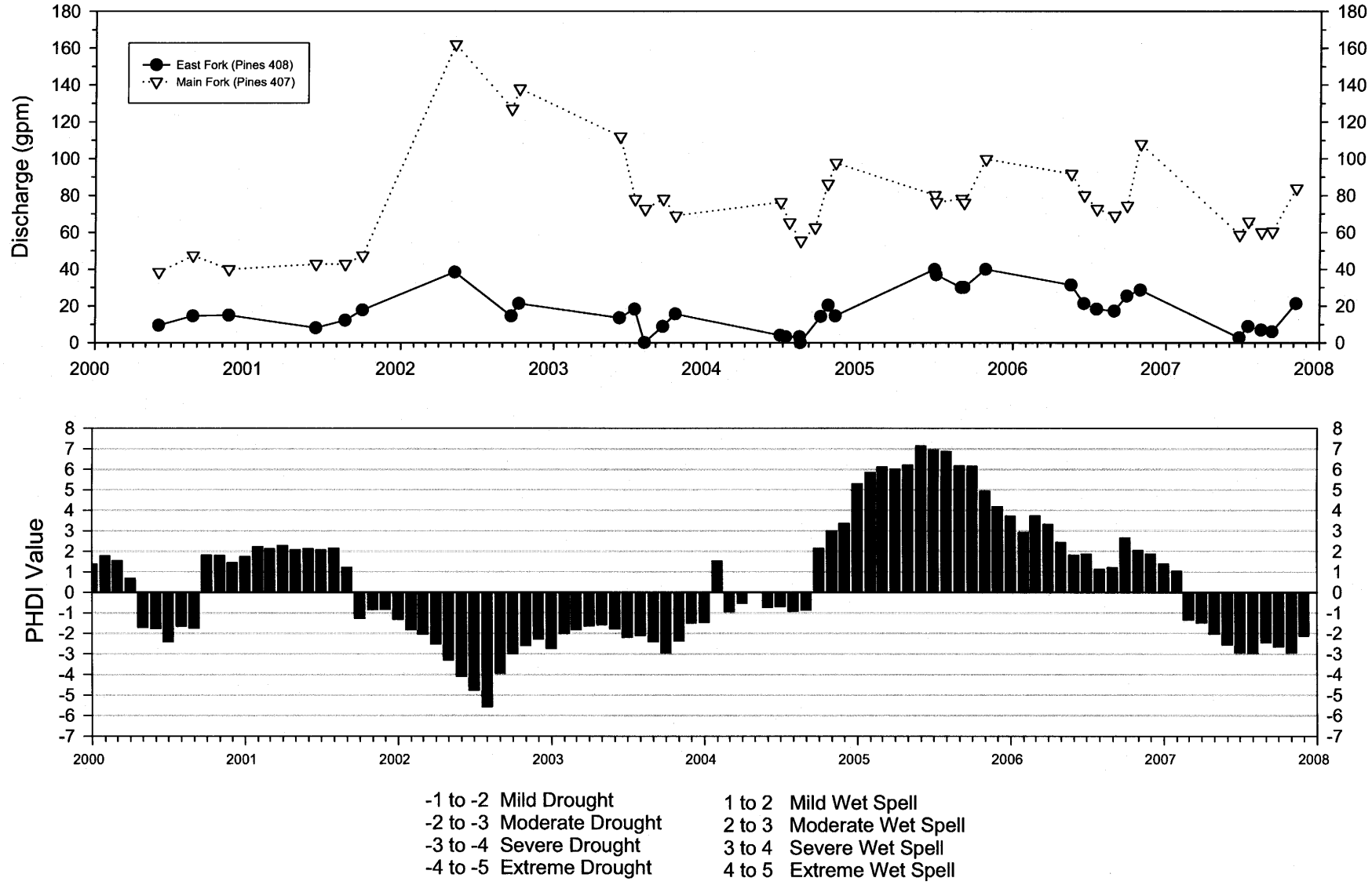


Figure 1 Discharge hydrographs for Pines 407 (main fork) and Pines 408 (East Fork) and PHDI for Utah Region 4 (2000-2007).

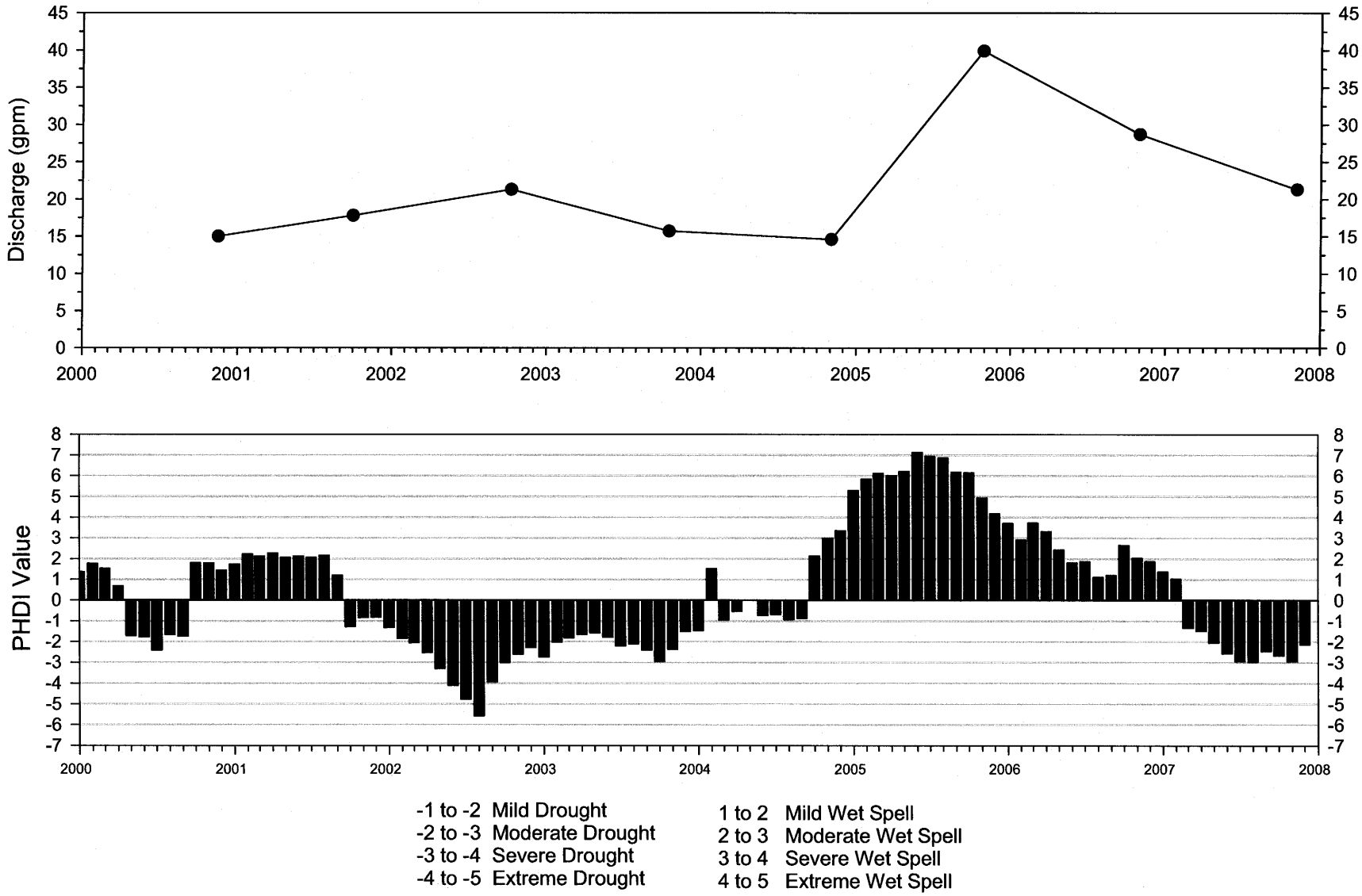


Figure 2 Pines 408 (East Fork of Box Canyon Creek) baseflow discharge (4th quarter meaasurement) and PHDI for Utah Region 4 (2000-2007).