March 31, 2003

TO: Internal File

THRU: Priscilla Burton, Senior Reclamation Specialist; Co-team Lead; and
Dana Dean, P.E., Senior Reclamation Specialist, Co-team Lead

FROM: James D. Smith, Senior Environmental Scientist, Hydrogeology

RE: Lila Canyon Extension Permit Application Package (PAP), UtahAmerican Energy, Inc., Horse Canyon Mine, C/007/013 PM02B-2

SUMMARY:

UtahAmerican Energy, Inc. (UEI) has proposed to develop new surface facilities near the mouth of Lila Canyon in order to mine coal in six federal leases. The federal leases are contained within the "North Block Logical Mining Unit" as approved by the United States Bureau of Land Management (BLM) January 1, 1994.

The Lila Canyon Extension Permit Application Package (PAP) has been submitted and reviewed as an extension to the existing Horse Canyon Mine Mining and Reclamation Plan (MRP). The current Horse Canyon Mine permit area contains approximately 1,330 acres, and the Lila Canyon extension contains approximately 4,700 acres for a total of 6,030 acres. The current disturbed area is about 74 acres, and approximately 35 acres would be disturbed by the new surface facilities.

The Division first received the Lila Canyon Extension PAP on February 11, 2002. The Division determined the application to be administratively complete on February 25, 2002. An initial review of technical adequacy was sent to UEI on March 26, 2002, and the response from UEI was received on April 24, 2002.

In response to the public notice published in the Sun Advocate in February and March 2002, a number of comments were received from the public, and the Southern Utah Wilderness Alliance (SUWA) requested an informal conference. The informal conference was held May 21, 2002, and the comments and concerns expressed by SUWA and other members of the public were considered in the preparation of Technical Analysis (TA) C/007/013 PM02B-1, dated July 29, 2002. The Permittee's response to that July 2002 TA was received by the Division on December 6, 2002, and is the object of this TA (C/007/013 PM02B-2).

TECHNICAL ANALYSIS:

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The PAP is for an extension to an existing permit, but it is largely formatted as a stand-alone document and could be understood to be a separate mine and mine permit from the Horse Canyon Mine. There are baseline data and other information in the Horse Canyon Mine MRP that are relevant to the Lila Canyon Extension, but these are not reproduced in the Lila Canyon PAP nor are they adequately referenced.

There are two separate water-monitoring plans; one for the Lila Canyon Extension and another for the Horse Canyon Mine. There is a PHC in the Lila Canyon Extension PAP and another in the Horse Canyon Mine PAP, although the Lila Canyon Extension PHC is basically an update of the Horse Canyon Mine PHC and should suffice for both areas. The permittee needs to better integrate the existing Horse Canyon Mine MRP and the Lila Canyon Extension PAP into a more clear, concise, and unified set of documents.

Findings:

R645-301-121.300, The permittee needs to better integrate the existing Horse Canyon Mine MRP and the Lila Canyon Extension PAP into a more clear, concise, and unified set of documents.

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

Resource maps and plans and site-specific information in the Lila Canyon Extension PAP are based on, among other sources, the old PAP for the Kaiser South Lease area. The Permittee has a copy of the Kaiser South Lease PAP (Personal communication, Jay Marshall). Under R-645-301-122, referenced materials are to be provided to the Division by the applicant or be readily available to the Division. The Kaiser South Lease PAP should be appended to the Lila Extension PAP or otherwise be made available to the Division to use in preparing the TA and CHIA.

SUWA has raised concerns that the various terms for coal mine waste that are used in the PAP are confusing. The terminology is explained in Section 536 and in Appendix 5-7 of the PAP. The Permittee has replaced the term “rock-slope material” with "rock-slope material/ mine development waste" in some sections of the PAP.

By the definitions in the Coal Mining Rules, coal-processing waste and underground-development waste - which is waste rock excavated, moved, and disposed of from underground mine workings - are coal mine waste. Coal mine waste deposited on the surface forms a refuse pile. The PAP distinguishes a sub-category of coal mine waste: slope-rock waste or “rock-slope material/ mine development waste” is the coal mine waste to be produced by construction of the entry slopes - material that will be basically free of coal, segregated from other waste in the refuse pile, and used as a base for construction of a shop-warehouse pad. The introductory discussion under Section 536 states that coal mine waste will be deposited in the refuse storage area shown on Plate 5-2. Section 528.320 states that areas for disposal of rock-slope material and underground development waste are adjacent and conjoined and will be treated as one area or structure, one refuse pile. Appendix 5-7 and other sections of the MRP address reclamation of the refuse pile.

SUWA has raised concerns that the treatment of coal mine waste and that the location and extent of coal mine waste is not clear. Some statements in the MRP could be more precise in their language and can seem contradictory and confusing if read outside the context of the entire MRP. For example, it can be inferred from Section 537.200 that some waste might be placed outside the designated refuse pile in indeterminate, undesignated “low areas”; from Section 537.250 that slope rock material might be used in pads other than the shop-warehouse pad, then left there and reclaimed “in place”; and from Section 537.240 that there might be more than one waste pile. In spite of such unfocused language regarding some details, the overall plan for handling, storage and disposal of coal mine waste and reclamation of the refuse pile is sufficiently clear and meets the requirements of the Coal Mining Rules.

The refuse pile capacity is 44,400 cubic-yards (Section 520 – Refuse Pile; Appendix 5-7).

Findings:

R-645-301-122, -725, Referenced materials are to be provided to the Division by the applicant or be readily available to the Division. The Kaiser South Lease PAP should be appended to the Lila Extension PAP or otherwise be made available to the Division to use in preparing the TA and CHIA.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

Geologic information includes a description of the geology of the proposed permit and adjacent areas down to and including the stratum immediately below the lowest coal seam to be mined. The coal seams and adjacent strata include a saturated zone that will almost undoubtedly be intercepted by mining. Geology influences the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground water.

Local, perched bedrock and alluvial aquifers in Little Park Wash and along Patmos Ridge are separated from the saturated zone by a thick section of low permeability strata. These aquifers support small discharges from seeps and springs scattered across ground-water emergence zones and located mostly in the bottoms of various small drainages.

The plan includes geologic information in sufficient detail to assist in determining the PHC of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface- and ground-water monitoring is necessary, and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. Resource maps and plans and site specific information are based on published geologic information, permit plans of the adjacent Sunnyside and South Lease areas, and exploration and drilling records of Kaiser Steel, U. S. Steel Corporation, and Intermountain Power Agency (IPA).

SUWA has raised concerns that there is not sufficient resource information to allow determination of the PHC. In the informal conference, SUWA expressed particular concern that

there is not sufficient resource information for Range Creek drainage to evaluate the potential for adverse impacts.

The Division has determined that it is reasonable not to include the Range Creek drainage in the PHC determination because adverse impacts to resources in Range Creek drainage are not reasonably expected. To clarify for the public record why Range Creek drainage will not be adversely impacted, the Division has required that the Permittee augment geologic and other resource information in the PAP to include the Range Creek drainage. Chapter 7 contains a geologic map and cross-section (Plates 7-1A and 7-1 B) that include Range Creek drainage, and the geology of the Range Creek drainage is discussed in Chapter 7 and the PHC. The PHC includes an evaluation of why adverse impacts to the Range Creek drainage are not probable.

Seeps have recently been found in a deeply incised canyon located at the southwest corner of the Lila Canyon Extension. Geologic information for this area is adequate for the requirements of the Coal Mining Rules.

Boreholes S-1 through S-23 were drilled between 1948 and 1975. S-24 through S-32 were drilled in 1980 and 1981. In 1993 and 1994, IPA-1, IPA-2, and IPA-3 were drilled. IPA-1, IPA-2, and IPA-3 were completed as piezometers in 1994. Copies of borehole logs for IPA-1, IPA-2, IPA-3, S-14, S-27, and S-32 are in Appendix 6-1: logs for the other boreholes are confidential and not available to the public. The borehole logs show lithologic characteristics, including physical properties and thickness of each stratum that may be impacted. In addition to the boreholes, coal seams and adjacent strata were measured at seventeen outcrop locations in 1974 and 1975. Lithology and thickness of the coal seams and adjacent strata, based on the boreholes and measured out-crop sections, are shown on Plate 6-5. Locations of the boreholes and outcrop measurements are on Plate 6-2.

Acid- and Toxic-forming Materials

SUWA has raised concerns that analyses for acid- and toxic-forming materials in the strata above and below the coal seam to be mined have not been done. Because the strata above the Sunnyside Seam - the coal seam to be mined - will not be removed, the Coal Mining Rules require that samples be collected and analyzed from test borings, drill cores, or fresh outcrops (R645-301-624.200).

Drill-logs in Appendix 6-1 note that pyrite was visible in many cutting or core samples, indicating acid- and toxic-forming potential in strata above and below the Sunnyside Seam.

Strata above and below the Sunnyside Seam were sampled in boreholes S-24 and S-25, and results of analyses for potentially acid- or toxic-forming materials are in Appendix 6-2. Two of twenty-one samples had over 1 percent total sulfur, the highest being 1.26 percent. Maximum pyrite content was 0.74 percent, in the sample with the highest total sulfur. All samples had acid-base potentials greater than (–5 tons $CaCO_3$)/(1000 tons of material). The proposed location

for the Lila Canyon Extension access slopes is approximately three miles north of boreholes S-24 and S-25, but the access slopes will pass through lower Blackhawk strata similar to those tested at these two boreholes.

Planned mining will leave a roof and floor of coal, so the analyses of floor and roof material from IPA-1, IPA-2 (roof only), and IPA-3 in Appendix 6-2 are pertinent to the requirement for analysis for acid- and toxic-forming materials in the strata immediately above and below the coal seam to be mined. Appendix 6-2 also contains analysis results for the "middle" coal samples from the three IPA bore holes. For all samples, pyritic sulfur (dry basis) ranged from 0.07 percent to 0.48 percent and total sulfur from 0.70 percent to 1.17 percent (Appendix 6-2).

Characteristics of the Blackhawk Formation are consistent over large areas and do not vary widely or change abruptly; the data on acid- or toxic-forming materials boreholes S-24 and S-25, along with information from other coal mines in the Book Cliffs coal field, provide good indications of expected acid- or toxic-forming characteristics of the rock that will be encountered in constructing the proposed Lila Canyon access slopes.

In a letter dated April 22, 2002, UEI requested exemption from R645-301-624. A copy of the letter is included in Appendix 6-2. The requested exemption is based on the following:

- A statement from the BLM's Environmental Analysis for lease U-32083 that there is no history of problems with acid- or toxic-forming materials at the nearby Sunnyside Mine, which operated for over 80 years;
- Analyses from boreholes S-24 and S-25 located two miles south of the Lila Canyon Extension permit area provide the required information on the strata that will be encountered during construction and operation of the Horse - Lila Canyon Mine;
- All material brought from the mine during construction and operation will be treated by burial as though it is acid- or toxic-forming; and
- Coal-mine waste brought to the surface by mine construction and operation, including slope-rock underground development waste, will be tested for acid- or toxic-forming potential before burial.

Although it is true that there have been no problems with acid- or toxic-forming materials at the nearby Sunnyside Mine, acidic slurry-pond water carrying iron and other minerals seeped from the base of a refuse pile. The environment in the receiving channel raised the pH and reduced the mineral load. Even though there were no offsite problems or impacts because of the buffering environment, the potential for acid and toxic mine drainage clearly exists in coals and waste materials in the Book Cliffs Coal Field.

The Lila Canyon Extension refuse pile is designed for handling and burial of coal mine waste in a manner that will minimize infiltration of water into the pile, minimize the formation of acid or toxic drainage, and minimize acid, toxic, or other harmful infiltration to ground-water

and drainage or discharge to surface-water. Based on the design of the refuse pile, the reclamation plan and the geology, hydrology and climate of the area, the Division has found that the probability of acid- or toxic-impacts from the materials to be placed in the refuse pile is small.

Nevertheless, the Permittee has committed to periodic sampling of the materials to be placed in the refuse pile as a further precaution. Samples will be collected and analyzed five times during construction of the rock-slope tunnels and from every 6,000 tons of waste rock placed on the refuse pile during mine operation: parameters are in Table 2 of Appendix 5-7. The reclamation plan specifies 4 feet of subsoil and topsoil will be placed over the refuse pile. The slope-rock underground development waste used to build the pads will be left in place for final reclamation and buried with 4 feet of subsoil and topsoil (Chapters 2, 5, and 7, and Appendix 5-7).

Because the Permittee uses the Sunnyside Mine as an example of why there is no need to perform further analysis of samples from test borings or cores for acid- and toxic-forming materials, the PAP needs to better or more clearly and concisely explain how the handling and disposal of coal mine waste at the Lila Canyon Extension is designed to avoid acid- and toxic-drainage such as occurred at the base of the Sunnyside Mine refuse pile. This is partially explained in Appendix 5-7 – that the refuse pile will not contain reject from coal washing and is to be placed in a pit and covered with 4 feet of subsoil and topsoil rather than left exposed on the surface. The Permittee identified several differences between the Sunnyside and proposed Lila refuse piles in the cover letter for the December 6, 2002 submittal, but this information needs to be included in Section 6.5.5.1 of the PAP.

As mining proceeds, materials overlying and underlying the coal seam can be exposed to water and oxygen underground, within the mine, and there is some potential to generate acid or toxic products. Rocks of the Mesaverde Group are carbonaceous, so persistence of acids and related toxins in water in the mine and adjacent strata is unlikely: the analyses from boreholes S-24 and S-25 show acid-base potentials from all analyzed zones is greater than –5 tons $CaCO_3$/1,000 tons material. The mine is designed so there will be no natural discharge or drainage from the portals. Discharge pumped from the mine will be subject to federal and state water-quality standards under the UPDES permit, and the discharge will be more thoroughly analyzed quarterly under the proposed operational monitoring plan in the PAP. Adverse impacts, and particularly material damage, from formation of acid or toxic water within the mine are unlikely.

As authorized under R645-301-626, the Division is waiving further analyses of samples from test borings or cores for acid- and toxic-forming materials in the strata immediately above and below the coal seam, although some additional discussion - contrasting refuse piles and related problems at the Sunnyside Mine with proposed refuse disposal at the Lila Canyon Extension - is being required to clarify the record in the PAP.

Engineering Properties

Engineering properties of the strata immediately above and below the coal seam to be mined are listed in Table 6-6. Data are based on core samples from boreholes S-18 and S-22.

Bore Holes

S-32 was drilled in 1981 in SE1/4SW1/4 Sec. 6, T. 17 S., R. 15 E., south of the Lila Canyon Extension area, and completed as a piezometer in the lower Grassy Member and Upper Sunnyside Seam of the Blackhawk Formation. The Permittee has included the drill-log, a Chronology of Development, and Water Pump Tests and Samples in Appendix 6-1. At least four water level measurements and one suite of water-quality analyses were done at S-32 in 1981 and 1982. The Permittee visited this piezometer, attempted to measure water levels, but found S-32 unusable; this is discussed in the cover letter for the December 6, 2002 submittal, but this information has not been included in the PAP.

IPA-1, IPA-2, and IPA-3 were completed as piezometers in 1994. Water levels were measured from 1994 through 1996, and the Permittee resumed measurements in 2000.

The unnamed boring that the Permittee intends to use as a water-supply well (identified by the Division as the Horse Canyon Well), and the Minerals Development Corporation (MDC) Well (Plate 7-1) were bored in Horse Canyon to monitor water in the alluvium (Section 6.5.1). Kaiser Steel installed three piezometers, A-26, A-28, and A-31, which are no longer accessible, in the alluvium of Little Park Wash. The PAP briefly mentions A-26 and A-31 on page 11 (Chapter 7), but there are no hydrologic or geologic data from these piezometers in the PAP. Sites A-26 and A-31 were mentioned in the Horse Canyon Mine Plan; however, these sites were drilled in 1981, and no data are available as to location or water quality. The Permittee considers A-26, A-28, and A-31 non-usable.

Fluid levels were reported for several boreholes. In some cases, the fluid reported in boreholes appears to have been drilling fluid rather than ground water: borehole S-26 was completed as a piezometer in August 1980 but was dry within a month of completion and was subsequently cemented to the surface.

Stratigraphy

Stratigraphy of the Blackhawk Formation is described on pages 3 – 10 of Chapter 6. The Sunnyside Member, which is dominantly sandstone, includes the Upper and Lower Sunnyside Coal Seams, with the Grassy Sandstone above the coals and the Sunnyside Sandstone beneath them. The Horse Canyon Mine operated in the Lower Sunnyside Seam, which is also the seam that is planned to be mined in the Lila Canyon Extension.

Saturated Strata

A large section of the Horse Canyon Mine, including the Geneva exploration tunnel and the rotary dump, are below the water level indicated in the IPA piezometers. The PAP reports that, generally, underground flows from rock slopes and gob areas into the Horse Canyon Mine were small. Only when the mine intercepted the Sunnyside Fault in deeper, down-dip areas was significant water encountered. Prior to suspending operations, the mine pumped water from the workings near the Sunnyside Fault to keep them from flooding. Some of the water was used for mine operations; the rest was discharged intermittently to the surface.

Coal at the Horse Canyon Mine is underlain by the Sunnyside Sandstone, a marine sheet sandstone. Lines (1985) did extensive petrographic work on porosity and permeability in the similar Star Point Sandstone in the Wasatch Plateau; Table 1 of the PHC lists permeability values determined by Lines for the Star Point Sandstone, as well as values for the Blackhawk Formation at the Soldier Canyon Mine.

Much of the Horse Canyon Mine is below the potentiometric surface indicated by the IPA piezometers and the car-dump sump. Because the Sunnyside Sandstone, which underlies the Lower Hiawatha Coal Seam, is known to transmit groundwater in the Sunnyside area, it is occasionally considered as a potential aquifer. No ground water entered the Geneva – Horse Canyon Mine from these underlying sandstones (Page-8, Chapter 6). Rather, water entered the Horse Canyon Mine in large amounts only where the Sunnyside Fault was intercepted in deeper, down-dip areas of the Horse Canyon Mine. The PAP describes the floor under the Sunnyside Seam in the Horse Canyon Mine as containing both sandstone and shale. Possible explanations for the dryness of the Horse Canyon Mine before the Sunnyside Fault was encountered are briefly discussed in the PAP (pages 8 and 9):

- Shales in the mine floor could have impeded ground-water flow into the mine;
- The sandstones under the coal were not saturated;
- They lacked sufficient hydraulic conductivity to transmit water;
- Most of the mine simply was not deep enough to encounter a saturated zone;
- There was unreported inflow where the mine encountered a saturated zone; or
- The east-west faults isolated the mine from saturated zones around the IPA piezometers.

Regardless of the reason, the Horse Canyon mine was relatively dry despite being below the potentiometric surface indicated by the IPA piezometers. This is consistent with experience throughout the Book Cliffs and Wasatch Plateau Coal fields and indicates that the sandstone units are isolated vertically and laterally by low-permeability siltstones and mudstones, with poor interconnectivity and communication between them. The Division anticipates that the Lila Canyon Extension will be similar to the Horse Canyon Mine: there will be little water inflow

from unfractured rock and inflow from east-west trending faults will be localized (the mine is planned to avoid the Sunnyside Fault).

Minor inflows of water are anticipated from the Geneva exploration tunnels (Page-36, Chapter 6). Because underground exploration work performed by BXG in 1993 found water in the Horse Canyon Mine at approximately 5,870 feet, the PHC (Appendix 7-3, p. 8) assumes that the Geneva exploration tunnel is flooded, that the tunnel will be intercepted by mining operations in the Lila Canyon Extension, and the water from the tunnel - in excess of what will be used in coal production - will need to be pumped from the mine.

Saturated strata in the lower Blackhawk Formation are separated from the perched zones in the upper Wasatch Group by upper Blackhawk, Price River and undifferentiated North Horn-Flagstaff Formations, strata that contain approximately 80 percent clays, shales, siltstones, and mudstones. Plastic or swelling clays that can seal faults and fractures and inhibit lateral and vertical flow of ground water are abundant (Hydrology, Page-7-8). *Fisher and others 1960*, which is listed in the References of Chapter 6, is given as the reference for percentage of clay.

Structure

The Sunnyside Fault, other faults, the elevation of the Horse Canyon Mine workings – in particular where the Sunnyside Fault was encountered and water flowed into the Horse Canyon Mine, and other potentiometric, geologic, and hydrologic information relevant to understanding the ground water in the saturated strata of the Blackhawk Formation are discussed in section 724.100 and shown on Plate 7-1. The PAP states that the last observed water elevations are on Plate 7-1 (Section 724.199, p. 11). The 5,870 feet water elevation in the Horse Canyon Mine that is shown on Plate 7-1 was determined from underground work performed by BXG in 1993. This BXG work is briefly discussed in the PHC (Appendix 7-2, p. 8) but not in Section 724.100, so this reference to the "last observed water elevations" - without giving the 1993 date - at the end of the paragraph discussing the 1986 measurement at the rotary car dump in Section 724.100 (p. 11) is confusing. The conclusion that water levels haven't changed since mine operations ceased (Section 724.199, p. 11 and Appendix 7-3, p. 9) is also questionable without including the BXG data in the discussion. Information on the BXG exploration needs to be added to Section 724.100.

Because the water level in the mine in September 1982 (last sampling of 2 Dip) must have been near the elevation (5,827 feet) of 2 Dip sample site and the 1986 level is also very near this elevation (perhaps below it), it appears as though the water level in the mine has changed little since operations ceased.

The PAP states in Section 724.100 on page 6 that there are no observable discharge points in the lower Blackhawk Formation, and on page 9 that there are no springs below the Price River Formation. It states in section 731.520 that no water issues from the strata above or below the coal outcrop (although this is not clear - this statement may refer only to the area

immediately around the proposed portals). The springs in Stinky Spring Canyon issue at the contact of the Blackhawk Formation and Mancos Shale, so these statements need to be updated, corrected, or otherwise clarified.

The coal seam crops out at an elevation of approximately 6,500 feet in the vicinity of the rock-slope tunnels. The plan indicates the tunnels will intercept the coal seam at approximately 6,300 feet (Appendix 8-2 - Figure 7-1).

Underground mining always has a potential for impacting surface water, ground water, and other surface resources. The PAP states in Section 721 that subsidence effects are expected to be minimal due to the amount of cover and massive rock strata between the mining and the surface. Coal-seam elevations determined from boreholes are on Plate 6-4 - Cover and Structure Map. Geologic information is sufficient to assist in preparing the subsidence control plan.

Faults

SUWA has raised concerns that effects of faults on movement of ground water are ignored, especially in the "regional aquifer". The PAP contains a description of regional geology and hydrology, including faults and their interaction with ground water. Faults can effect direction and magnitude of ground-water flow; however, fault gouge and plastic or swelling clays can seal faults and fractures. Based on experience from the Horse Canyon Mine, little ground-water inflow is expected from the east-west faults. The major inflow was from the Sunnyside Fault, and interception of the Sunnyside fault by mining operations in the Lila Extension is not anticipated.

Fault locations on Plates 6-1, 6-2, and other maps are based on previous mapping, drilling, exposures at the outcrop, fault interceptions in the Horse Canyon Mine and Geneva exploration tunnel, and information from drilling.

Vertical displacements of faults in the area range from 15 feet to more than 275 feet, with displacement diminishing toward the east (Section 6.5.3.3; Table 6-5). Vertical offset at the outcrop is 205 feet on the Central Graben Fault and 195 feet on the Williams Draw fault. The Entry Fault is offset 50 feet in the central part of the lease, but offset may disappear before reaching the outcrop. (Plate 6-2). En-echelon faulting or fracturing near major displacements is common in the Geneva Mine, particularly in the transverse, easterly trending normal-fault systems. Roof falls have been abnormally high in these areas, even though the strata indicate competent roof rock.

Faults may affect flow, direction, and magnitude of both lateral and vertical flows (Section 724.100). Subsurface water inflow associated with fault or fracture systems are possible; however, conditions are not expected to be significantly different than those associated with the Geneva, Columbia, and Sunnyside mines, so ground-water inflow from faults and fractures systems is not expected to be significant in the Lila Canyon Extension (Section 6.6.1).

Ground water conditions in the Lila Canyon Extension are projected to be similar to those in the Geneva and Sunnyside Mines and, where little or no water was observed in the raise areas within .25 to 1mile of the coal outcrop. Flows of water encountered while mining were reduced to seeps or dry up in a short period of time, so this water is thought to have been "in place" with little or no recharge. Drill holes in the South Lease property below Williams Draw did not encounter groundwater within 1 to 1.25 miles of the coal outcrop, so subsurface water is not expected near the cliff escarpment at the Lila Canyon Extension (Section 6.6.3.1).

Findings:

R645-301-731.111, 731.121, Because the PAP uses the Sunnyside Mine as an example of why there is no need to perform further analysis for acid- and toxic-forming materials, the PAP needs to better explain how the handling and disposal of coal mine waste at the Lila Canyon Extension is designed to avoid the acid- and toxic-drainage such as occurred at the Sunnyside Mine refuse pile. This is partially explained in Appendix 5-7 – that the refuse pile will not contain reject from coal washing and is to be placed in a pit and covered with 4 feet of subsoil and topsoil rather than left exposed on the surface. The Permittee identified several differences between the Sunnyside and proposed Lila refuse piles in the cover letter for the December 6, 2002 submittal; this information needs to be included in Section 6.5.5.1 of the PAP.

R645-301-120.122, The PAP states that the last observed water elevations are on Plate 7-1 (Section 724.199, p. 11). The 5,870 feet water elevation in the Horse Canyon Mine that is shown on Plate 7-1 was determined from underground work performed by BXG in 1993. This BXG work is briefly discussed in the PHC (Appendix 7-2, p. 8) but not in Section 724.100, so this reference to the "last observed water elevations" - without giving the 1993 date - at the end of the paragraph discussing the 1986 measurement at the rotary car dump in Section 724.100 (p. 11) is confusing. The conclusion that water levels haven't changed since mine operations ceased (Section 724.199, p. 11 and Appendix 7-3, p. 9) is also questionable without including the BXG data in the discussion. Information on the BXG exploration needs to be added to Section 724.100.

R645-301-120.122, The PAP states in Section 724.100 on page 6 that there are no observable discharge points in the lower Blackhawk Formation, and on page 9 that there are no springs below the Price River Formation. It states in section 731.520 that no water issues from the strata above or below the coal outcrop (although this is not clear - this statement may refer only to the area immediately around the proposed portals). The springs in Stinky Spring Canyon issue at the contact of the Blackhawk Formation and Mancos Shale, so these statements need to be updated, corrected, or otherwise clarified.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Sampling and Analysis

Baseline samples collected in 1993, 1994, and 1995 (Appendix7-6) were analyzed using the methods in Standard Methods or 40 CFR 136. The Permittee commits that all water-quality analyses performed to meet the requirements of R645-301-723 through -724.300, -724.500, -725 through - 731, and -731.210 through -731.223 will be conducted according to the methodology in the current edition of "Standard Methods for the Examination of Water and Wastewater" or the methodology in 40 CFR Parts 136 and 434. Water-quality sampling will be conducted according to either methodology listed above when feasible (Section 723).

Baseline Information

Ground-water Information

Fluid levels were reported in a number of boreholes. Drill holes S-26, S-27, S-28, and S-31 were cased in 3-inch PVC pipe with bottom perforations for water monitoring; however, cement seals were faulty, allowing the PVC pipe to fill with cement. Drill hole S-26 was reported dry the week prior to cementing, so the fluid initially reported in some boreholes might have been drilling fluid rather than ground water. Section 722.100 of the PAP refers to reports by Kaiser stating that, with the exception of drill hole S-32, subsurface water was not detected in holes drilled (using air, mist and foam) within 1.25 miles of the cliff face. No apparent increase in fluid level could be attributed to ground-water inflow from these holes, some of which were open for two weeks.

S-32 was drilled in 1981 in SE1/4SW1/4 Sec. 6, T. 17 S., R. 15 E., south of the Lila Canyon Extension, and completed as a piezometer in the Grassy Member of the Blackhawk Formation. The Permittee has included the drill-log, a Chronology of Development, and Water Pump Tests and Samples in Appendix 6-1 (Section 6.5.1). At least 4 water level measurements and one suite of water-quality analyses were done at S-32. There is no information on the current condition of S-32 in the PAP: the Permittee visited this piezometer, attempted to measure water levels, but found S-32 unusable; this is discussed in the cover letter for the December 6, 2002 submittal, but this information has not been included in the PAP.

IPA-1, IPA-2, and IPA-3 were drilled in 1993 and completed as piezometers in 1994. Water levels were measured from 1994 through 1996, and the Permittee resumed measurements in 2000.

An unsuccessful attempt was made to convert exploratory boreholes S-26, S-28, and S-31, located south of the Williams Draw Fault, to ground-water observation wells or piezometers. Offsetting shallow piezometers were then bored. A-28, the offset to S-28, also was unsuccessful (Table VI-3). A-26 and A-31 were developed to observe ground water in the alluvium of Little Park Wash. Table VI-3 does not indicate that A-26 and A-31 have been plugged and abandoned; however, the Permittee has no data on them (Section 6.5.1, p. 21) and considers them unusable for ground-water monitoring (Section 724.100).

Two borings described as wells are located in the alluvium of lower Horse Canyon. The one identified as the MDC Well has to the best of the Permittee's knowledge been sealed. The MDC Well is associated with water right 91-185 in Table 7-2. The Horse Canyon Well, nearer the old Horse Canyon Mine surface facilities, is planned to be used by the Permittee during mining and reclamation activities as a water-supply well. The PAP contains no information on the water quality or quantity, or of the capacity of the well to serve as a water-supply source. The condition of this well is briefly described in the cover letter for the December 6, 2002 submittal (there is a pump on top of a concrete cap that encloses the well), but this additional information has not been included in the PAP. Horse Canyon is an intermittent drainage with apparently ephemeral flow, similar to other drainages in the area; water-level and water-quality information from this well could be valuable in characterizing the hydrologic balance, especially that of the alluvial aquifers. The Permittee needs to further investigate using this well to monitor quality and quantity of water in the alluvial aquifer in Horse Canyon.

SUWA has raised concerns that extrapolation of the potentiometric surface ignored faults, ignored the car dump, ignores the most recent data, and covers an unacceptably large area based on just three closely spaced data points. The Division notes that the potentiometric surface also does not indicate the postulated ground-water divide described in Section 724.100 nor extend to the 1993 BXG measurement in the Horse Canyon Mine (which is closely congruent with the surface as drawn). In spite of these limitations, the potentiometric surface and the projected water-coal contact on Plate 7-1 give a reasonable approximation of the depth to water in the coal seam and in water-bearing strata above and potentially impacted strata below the coal seam, and this information is sufficient to meet the requirements of the Coal Mining Rules (R645-301-724.100). The Division will evaluate additional information as it is received.

Statements in Section 724.100 (page 9) that no springs occur in or below the Price River Formation or Castlegate Sandstone are not accurate; although there may be no large springs below the Price River Formation, the seeps in Stinky Spring Wash issue at the contact of the Blackhawk Formation and Mancos Shale.

Information in Table 5 (Chapter 7) on the strata from which springs flow does not match statements throughout the PAP and does not match the information on Plates 6-1 and 7-4: there is no separately identifiable Flagstaff formation in this area, and according to Plates 6-1 and 7-4, L-10-G and L-12-G issue from the North Horn Formation.

Regional Aquifer

SUWA has raised several related concerns regarding ground water:

- That there is a regional aquifer;
- That the regional aquifer is not described,
- That there is no information on the discharge area and discharge rates for the regional aquifer; and
- That UEI has not established that the saturated zone is not an aquifer.

The July 2000 Environmental Assessment (EA) of the Lila Canyon Project prepared by the BLM labels the "coal formation" of the Blackhawk Formation as a regional aquifer, and mentions springs issuing from the Blackhawk at lower elevations within the canyons; however, the 1986 survey of the Horse Canyon area by JBR and the 1993 - 1995 survey of the area around Lila Canyon by EarthFax did not identify any seeps or springs issuing from strata below the upper Price River Formation.

Previously unknown seeps, which flow from the contact of the Blackhawk Formation and Mancos Shale, were discovered in 2000 in an unnamed canyon at the southwest corner of the Lila Canyon Extension area, inside the coal lease boundary but just outside the proposed permit area. The Permittee initiated monitoring of these seeps (L-16-G and L-17-G) in 2002. This intermittent drainage, located east and south of Coleman Wash - mainly in Sections 14, 23, and 26, T. 16 S., R. 14 E., had been identified by Utah DWR as an area where bighorn ewes and lambs congregate, their presence indicating a water supply.

The Permittee surveyed the drainages in the permit area in 2002. Results are in Appendices 7-6 and 7-7.

The coal seams and adjacent strata of the Blackhawk Formation are saturated, at least in the vicinity of the IPA piezometers. The PAP asserts that the Mesa Verde Group – the Price River Formation, Castlegate Sandstone, and Blackhawk Formation - is not an aquifer because the group does not transmit ground water to supply any water sources, the water has no potential to be used or developed, and it is not elemental to preserving the hydrologic balance in the permit and adjacent area, and that there are no observable discharge points in the permit and adjacent areas (Section 724.100). Such statements in the PAP need to be clarified because the seeps in Stinky Spring Wash, adjacent to the southwest corner of the Lila Canyon Extension area, issue at the contact of the Blackhawk Formation and Mancos Shale. Although these seeps are not a water supply and have limited use, they appear to be an important source of water for Bighorn sheep, specifically in the early spring. Plate 7-1 indicates the source for the water flowing from these seeps could be connected to the saturated zone, evident in the IPA piezometers, that will be intercepted by the proposed mine. The Permittee needs to evaluate the hydrogeology of these seeps, whether their source is regional, intermediate, or local in extent, and what impacts the proposed coal mining might have on them.

Lines' model applied to Range Creek

SUWA has raised concerns that the cross-section in Figure 8 in Lines (1985, The ground-water system and possible effects of underground coal mining in the Trail Mountain area, central Utah, USGS Water-Supply Paper 2259) is a model for Range Creek and that it clearly supports discharge to Range Creek from a regional aquifer. The study by Lines provides valuable insight into ground-water systems in the Wasatch Plateau, specifically to the Trail Mountain area. Much of the information can be applied to the Book Cliffs coalfield also.

However, the situation presented diagrammatically in Lines' cross-section differs from the reality of the hydrogeologic environment at Lila Canyon and Range Creek in at least two important aspects discussed in the PAP: 1) Along its entire course, Range Creek has not eroded deeper than the upper Price River Formation, so a thick section of low-permeability rock isolates the creek from the projected saturated zone in the lower Mesa Verde group; and 2) Range Creek is approximately 6 miles from the Lila Canyon Mine (Section 724.200): the cross-section in Lines has no scale, but proximity of the stream and saturated coal seam is implied. In addition, in the reaches nearest Lila Canyon, Range Creek is significantly higher in elevation than the potentiometric surface of the saturated strata, as shown on Plate 7-1B.

Mine Inflow

Except for water that flowed into the Horse Canyon Mine and was used as part of the coal-mining operation, there has been no diversion of this water for beneficial use (water rights were filed on this in-mine water by IPA: water encountered by mining and used underground is not subject to appropriation through water-rights; water encountered by mining that is brought to the surface for beneficial use is subject to appropriation through water rights). The PAP states that underground water from the saturated zone will probably be encountered and used during development and operation of the mine in the Lila Canyon Extension. Water that cannot be used or stored underground will be discharged to the surface if it meets applicable effluent limitations (742.146).

Information on inflow to the Horse Canyon Mine is sparse. Generally, underground flows from rock slopes and gob areas into the Horse Canyon Mine were small. Only when the mine intercepted the Sunnyside Fault in deeper, down-dip areas was significant water encountered. Prior to suspending operations, the Horse Canyon Mine pumped water from the workings near the Sunnyside Fault to keep them from flooding. Some of the water was used for mine operations; the rest was discharged intermittently to the surface in Horse Canyon. According to sources referenced in Chapter 7, the estimated average discharge rate was 0.2 cfs, but there was no estimate of in-mine consumption.

A large section of the Horse Canyon Mine, including the Geneva exploration tunnel and the rotary dump, is below the potentiometric surface that is indicated on Plate 7-1. Because underground exploration work performed by BXG in 1993 found water in the Horse Canyon

Mine at approximately 5,870 feet, the PHC (Appendix 7-3, p. 8) includes the assumption that the Geneva exploration tunnel is flooded, that the tunnel will be intercepted by mining operations in the Lila Canyon Extension, and the water from the tunnel - in excess of what will be used in coal production - will need to be pumped from the mine.

The Lila Canyon Mine will eventually intercept these entries on a limited basis, which will provide a water source for mining. Water may then have to be pumped from the mine. Because of undulating floor and unknown void areas, it is impossible to determine the amount of water that would be pumped (PHC, p. 8).

In-mine flows within the Horse Canyon mine were monitored for quantity and quality at several locations that are shown on Plate 7-1. There are also data from S-32, located to the south of the Lila Canyon Extension area (Appendix 6-1). This information on water from the saturated zone is discussed in the PHC.

Based on the current Horse Canyon Mine MRP, the Lila Canyon Extension PAP repeats an unclear description of a ground-water divide in the deep-saturated zone between Horse Canyon and Range Creek and extending between Lila and Little Park drainages; this is not shown on Plate 7-1. If such a divide exists, it indicates water is flowing in different directions in the deep saturated zone. According to the cover letter for the December 6, 2002 submittal, the conjecture as to presence of this divide appears to be based on earlier work done by EarthFax. Although the existence of such a divide appears speculative and questionable, this mention of it in the PAP is not consequential.

SUWA has raised concerns that UEI has not described seasonal variation in groundwater – especially with maps or cross sections. Water-level elevation contours are on Plate 7-1. Seasonal variation in the water levels is tabulated in Appendix 7-1 and 7-2 for the IPA piezometers, but there are no cross-sections and contour maps showing seasonal differences of head. Although the Division sees little value in doing so, the Permittee needs to portray seasonal variations of head on contour maps or cross-sections to satisfy Coal Mining Rule R645-301-722.100.

Baseline Data Adequacy

SUWA has raised concerns that the PAP contains numerous water samples from the mined area of the Horse Canyon Mine that do not represent pre-mining conditions, that the JBR data are not pre-mining, and that the JBR data provide no baseline for the permit area. The Division considers the JBR data as valid pre-disturbance, pre-mining baseline in relation to the Lila Canyon Extension and as an important part of the required description of the existing, pre-mining hydrologic resources of the permit and adjacent areas. The JBR data alone are not sufficient baseline data, but they are useful and valid baseline data.

SUWA has raised concerns that there are no baseline ground-water monitoring data on the springs to be monitored, and that IPA data are sporadic – not adequate baseline. The Division considers the data collected in 1993, 1994, and 1995 for the springs and 1994, 1995, and 1996 for the piezometers as valid pre-disturbance, pre-mining baseline in relation to the Lila Canyon Extension and as an important part of the required description of the existing, pre-mining hydrologic resources of the permit and adjacent areas. In addition, the PAP contains at least one year of current quarterly baseline data from the springs, streams, and piezometers – sufficient for a PAP submittal under the guidelines in the Division's Directive Tech 004.

SUWA has raised concerns that IPA-1 –2, and –3 are the only potential source of information on water quality in the saturated zone. There is information on ground-water quality and quantity in the analyses of in-mine flows at the Horse Canyon Mine. There are also data from S-32, located to the south. This information on water from the saturated zone is discussed in the PHC.

Because of depth to water and the small diameter of the casing in the IPA piezometers, the Permittee has determined that it would be impossible to obtain valid water-quality samples from these boreholes. The Division does not share the opinion that obtaining valid samples from these boreholes would be impossible, but considering the cost and other difficulties that would probably be involved under such conditions; the availability of water-quality information from other sources; and the low probability of adverse impacts to this water, water-quality monitoring from these boreholes is not necessary to satisfy the requirements of the Coal Mining Rules.

Ground-water data have been collected at some designated locations since July 2000, and additional sites were added in 2001 and 2002. The IPA piezometers have been monitored since 2000.

The first page of the 1989 Water Monitoring Data in Appendix 7-2 is illegible, and the Permittee needs to provide a legible copy. If a better original version is not available for reproduction, the table should be redone so the information is usable.

Monitoring - Inside Vs. Outside the Permit Area Boundary

SUWA has raised concerns that fourteen EarthFax data points are within the permit area, but data were collected for only one. During the EarthFax survey in 1993 – 1995, data were collected for all fourteen seeps and springs located inside the permit boundary, which is why their existence is documented in Appendix 7-1. Not every site had flow sufficient to obtain valid water-quality samples: many of the fourteen locations SUWA refers to were no more than wet spots some years, and were dry other years. Where flow was sufficient and consistent, water-quality analyses were done for sites representative of water rights and ground-water discharge zones.

The number of springs monitored on one side or the other of the permit area boundary is not relevant: the permit and adjacent areas are to be monitored, and impacts are to be minimized both inside and outside the permit boundary.

SUWA has raised concerns that five seeps and springs are not sufficient, that four of them are outside the permit, and that one spring in the permit area is not sufficient baseline. Determination of the permit area is not based on hydrologic systems. The Coal Mining Rules require protection of resources both within and outside the permit area and baseline and operational monitoring of both the permit area and adjacent areas. The Division notes that expanding the permit area to include more springs would actually lower the performance standard for protection of the added springs from; "minimize impact" and "prevent material damage", to simply "minimize impact".

Ground-water Emergence Zones – Groups of Springs and Seeps

SUWA has raised concerns that baseline data need to be collected at all springs and seeps, starting immediately. The Coal Mining Rules require a description of the ground-water hydrologic resources: location; extent; ownership; seasonal quantity and quality; discharge, depth, or usage; and additional information deemed necessary and required by the Division. Baseline data sufficient to make this description are in the PAP. Additional, detailed investigation of every aspect of every component of the hydrologic resources is not needed to describe the resources and minimize impacts, or to comply with the Coal Mining Rules.

Water-quality analyses done by EarthFax were representative of the groups of springs and seeps in the ground-water discharge zones. Springs selected by the Permittee for operational monitoring typically have baseline water-quantity and -quality data from the EarthFax survey, have been developed for use by the water right holder, and have the greatest or most consistent flow of the group. At sites that have been selected for operational monitoring, monitoring was resumed in 2001 to establish a continuous record from pre-mining into operational conditions.

SUWA is asserting additional baseline data are needed for every site, irrespective of use, location, flow, and other existing information about the site and the potential of being impacted. Additional baseline monitoring of every point source would provide, at best, marginal information to further describe or define the hydrologic resources of the Lila Canyon Extension. The EarthFax survey was done during a three-year period during which the Palmer Hydrologic Drought Index (PHDI) for the region around the Lila Canyon Extension went from wet (1993) to drought (1994) and back to wet (1995). The area is currently in the fourth year of a drought, so, particularly at this time, repeating baseline monitoring for all the sites would be unlikely to produce additional, useful information: the springs that will be monitored during mine operations are currently being monitored to provide continuity of data from pre-mining through reclamation.

SUWA has raised concerns that seeps and springs cannot be treated as systems or groups – each source is a separate resource as regards hydrology, wildlife, and vegetation. The survey results from 1993, 1994, and 1995 in Appendix 7-5 document the seasonal, ephemeral nature of individual discharge locations within a ground-water discharge zone or area: discharge appeared at new, previously dry locations and diminished at some older sites during the three years the EarthFax survey was in progress. This is a typical pattern and has been documented throughout the Book Cliffs and Wasatch Plateau coalfields and many other locations. The springs selected by the Permittee for monitoring have had relatively consistent flow: some have been developed by water-right holders to concentrate flow or maintain more consistent flow.

SUWA has raised concerns that L-6-G is adjacent to the Horse Canyon Mine and is not a useful monitoring point. L-6-G has provided pre-disturbance, pre-mining baseline in relation to the Lila Canyon Extension and contributes to the required description of the existing, pre-mining hydrologic resources for the permit and adjacent areas. Because L-6-G has been frequently dry, L-11-G, located approximately 100 yards upstream of L-6-G and representative of the same ground-water emergence zone, was added to the monitoring plan in 2001, and L-6-G was dropped from the monitoring plan in 2003.

Surface Water Information

SUWA has raised concerns that seasonal variation of Lila and Little Park Wash must be shown, and that remote samplers and crest-stage gauges should be used to monitor the intermittent channels.

Channels that drain more than one square mile but have ephemeral flow are included in the intermittent stream definition because the potential flood volumes necessitate application of the stream channel diversion criteria of the Coal Mining Rules. Classification is to be made at the time of permit application, based on collected data and probable conditions, which helps eliminate skewing by data from unusually wet or dry periods (Preamble to the Federal Rules).

Horse Canyon is an intermittent drainage. Little Park Wash, Lila Canyon, and several other channels in the Horse - Lila Canyon area are intermittent by definition under the Coal Mining Rules because, even though flow is sporadic and typically flashy and characteristically ephemeral, they drain an area greater than one square-mile. No facilities are planned for these intermittent drainages, and there will be no diversions. The sedimentation pond is to be built in an ephemeral drainage.

Kaiser installed crest-stage gauges CSG-1, CSG-2, and CSG-3 in Little Park (Page 14, Chapter 6) because mine facilities were to be built in or near the channel and information on flow was critical. Appendix 7-2 contains reports on CSG-1, CSG-2, and CSG-3 from 3rd and 4th quarter 1981. Using remote samplers and crest-stage gauges in the Lila Canyon Extension area would not provide information relevant to meeting the requirements of the Coal Mining Rules,

preventing off-site impacts, facilitating reclamation, or otherwise protecting the hydrologic balance and environment.

Baseline Cumulative Impact Area Information

SUWA has raised concerns that there are insufficient data to prepare the CHIA. Information needed to meet the regulatory requirements of R645-301-725 is available from federal, state, and a number of sources. The Permittee is not required to provide data specifically for the CHIA determination unless none is available from other sources. The Division is not limited to information in the PAP in preparing the CHIA; however, the Division anticipates that data in the PAP will be used along with other information in preparation of the CHIA.

Probable Hydrologic Consequences Determination

Section R645-301-728 of the Coal Mining Rules requires that the PAP contain specific findings. Section 728 of the PAP refers to Appendix 7-3 for many of the findings. Potential adverse impacts identified in the PHC are: increased sediment loading, diminution or interruption of water supplies on water rights, discharge of contaminated ground water by pumping, erosion and streamflow alteration, and deterioration of water quality (Section 728.310). Information from the Columbia and Horse Canyon Mines is used along with baseline data collected for the Lila Canyon Extension.

728.300. The PHC determination will include findings on:
728.310. Whether adverse impacts may occur to the hydrologic balance;

SUWA expressed concerns that relate to the determination of the PHC, including that there are inadequate baseline data to prepare the PHC and that potential adverse impacts to a regional aquifer and Range Creek have not been addressed in the PHC.

Climatological information on average seasonal precipitation, average direction and velocity of winds, and seasonal temperature ranges that is representative of the permit and adjacent areas is presented in the PAP. Overall, information on geology and hydrology is adequate to prepare the PHC. Maps and cross-sections that include the Range Creek drainage have been added to the PAP, and a discussion of the Range Creek drainage has been added to the PAP (Section 724.200) and Appendix 7-3 (p. 6-7) to help clarify for the public why regional impacts, particularly adverse impacts to Range Creek drainage, are not expected.

728.320. Whether acid-forming or toxic-forming materials are present that could result in the contamination of surface- or ground-water supplies;

As mining proceeds, materials overlying and underlying the coal seam can be exposed to water and oxygen, both underground and at the surface. There is some potential for generation of acid or toxic drainage; however, rocks of the Mesaverde Group are carbonaceous and

persistence of acids and related toxins is unlikely. The refuse pile is designed to handle potentially acid- or toxic-forming materials brought to the surface and minimize the formation of acid- and toxic-forming drainage. Based on the hydrology, geology, and climate of the area and the design of the refuse pile, acid or toxic impacts from materials removed from the mine or from mine water discharge are unlikely (PHC, p. 14).

728.330. What impact the proposed coal mining and reclamation operation will have on:
728.331. Sediment yield from the disturbed area;

Sediment controls and a sediment pond will be constructed at the new mine site to minimize impacts, as indicated in the Sediment Control Plan, Appendix 7-4. Drainage ditches and sediment control structures will be constructed according to methodologies and specifications in Appendix 7-4. All construction and upgrading activities will be undertaken during periods of dry weather, commencing in late spring and lasting through fall. For both the mining and reclamation periods, it is expected that construction, upgrading, or regrading activities would cause an increase in sediment load to the stream. Temporary sediment controls will be used whenever possible to lessen the impact of construction activities (PHC, p. 12).

728.332. Acidity, total suspended and dissolved solids and other important water quality parameters of local impact;

Hydrologic resources that might be impacted at the Lila Canyon Extension are identified. The springs and stream channels being monitored in the Lila Canyon Extension area are discussed in the PHC.

Water rights are identified in Section 645-301-727and Table 7-2. Contrary to the statement in Section 727, although UtahAmerican Energy does claim the largest volume of water, it does not hold the majority of water rights in the Horse Canyon – Lila Canyon Extension area. The BLM holds the majority of water rights in the area, and the State of Utah and ranchers claim as many water rights, or more, than UtahAmerican. Most of the water claimed by UtahAmerican is either from Horse Canyon Creek or underground water from the Horse Canyon Mine, so it is not readily available for replacement of other water supplies in the area, which are mostly springs along Patmos Ridge. Water rights 91-4959 (Redden Spring), 91-183 (Horse Canyon Creek), and 91-185 (MDC well), all held by UtahAmerican Energy, are not shown on Plate 7-3.

Surface waters flow only during a limited part of year, and these waters will be protected by sedimentation ponds and other control structures. Data from the Horse Canyon Mine indicate the main effect of the mine discharge on water quality in the receiving Horse Canyon channel was a decrease in TSS and an increase in TDS (PHC, p. 4).

The major usable water resources that could potentially be effected in the area are springs that are used by wildlife and livestock . Most of these springs are located upstream of the permit

area, or are in areas where subsidence resulting from post-1977 mining is not documented nor expected from operations in the Lila Canyon Extension. The PHC states that, although pre-mining data are not available for the Horse Canyon Mine, based on available data (Appendices 7-1 and 7-2), there has been no depletion of quantity or quality of surveyed springs in the Horse Canyon permit area, and none is expected in the Lila Canyon area (PHC, p. 14).

728.333. Flooding or streamflow alteration;

There is no PHC determination of what impact the proposed operation will have on flooding and streamflow alteration. The Coal Mining Rules require this determination to be in the permit application, to be provided before the permit is issued.

Based on reasonable estimates of mine-water discharge, the capacity of the existing channel needs to be evaluated to determine if flooding will be a PHC of discharging to this channel.

SUWA has raised concerns that there is no baseline characterization of the receiving channel for mine water discharge against which to compare impacts of discharging to this channel. The PAP contains a commitment to evaluate the channel before water is discharged (Section 728.333) and to take additional steps to evaluate the before- and after-pumping stream morphology below Lila Canyon Mine, which will allow the permittee to make any necessary changes to reduce or eliminate negative impacts; however, this does not meet the requirements of R645-301-728.333.

The PHC states that it is expected that downstream impacts from pumping water from the mine would be very similar to those experienced in the adjacent Horse Canyon Mine. The PHC notes that "before pumping" stream characteristics for Horse Canyon are not available: the primary basis for determining that there have been no "known impacts" to the channel from the Horse Canyon Mine is a lack of documented negative impacts.

Even though there are no pre-pumping data on Horse Canyon Creek, there are similar channels flowing from the Book Cliffs escarpment that would probably provide a reasonable model of what Horse Canyon Creek was like prior to pumping - most notably, for the purposes of the Lila Canyon Extension, the two forks of Lila Wash that border the disturbed area. A comparison between such undisturbed channels and Horse Canyon Wash could help determine the nature and extent of probable impacts from discharging mine water into Lila Wash.

728.334. Ground-water and surface-water availability;

Contamination, diminution, or interruption of water resources would not likely occur within the mine permit area. Surface waters flow only a limited part of year and will be provided protection by use of sediment controls. The major water resources that could potentially be effected are the springs that are currently used by wildlife and livestock . Most of

these springs are located upstream of the permit area or are in areas where subsidence resulting from post-1977 mining is not documented or expected. No known depletion of flow and quality of surveyed springs exists in the Horse Canyon permit area, and none is expected in the Lila Canyon area. It is unlikely an alternative water supplies will be needed, although they have been identified in Section R645-301-727 (PHC, p.14).

The springs and stream channels being monitored in the Lila Canyon Extension area are discussed in the PHC and current data have been evaluated in determining the PHC. Water monitoring data for the Horse Canyon Mine - Lila Canyon Extension are in Appendices 7-1 and 7-2 of this application and Appendix VII-1 of the Horse Canyon MRP.

Perched ground-water systems in the Colton and undifferentiated Flagstaff - North Horn Formations are unlikely to be affected because of the thick section of low-permeability rock, rich in plastic clays that can seal fractures, that lies between them and the coal seam. These perched zones are not extensive or interconnected, so if a fracture does drain one, there will be little or no impact on adjacent zones (PHC, p. 12). These perched zones are also typically outside the areas most likely to be subsided.

L-16-G and L-17-G, in Stinky Spring Canyon, issue from the Mancos Shale or lowermost Blackhawk Formation. They are outside the permit area, outside the limit of subsidence, separated from the proposed mine workings by a fault, and lie several hundred feet below the coal seam. There is no potential for Lila Canyon Mine to negatively impact these springs or their recharge sources (PHC, p. 14). At an elevation of approximately 6,000 feet, they are above the water levels measured in the IPA piezometers and roughly at-grade with the projected potentiometric surface on Plates 7-1 and 7-1B.

Although the drainages might be intermittent under the definitions in the Coal Mining Rules, flow in the channnels of Lila Canyon Wash, Little Park Wash, Right Fork of Lila Canyon, and Stinky Spring Wash has been determined to be ephemeral. Streams in the Lila Canyon Extension have been monitored since December 2000 and there has been no flow observed except in response to precipitation runoff or snow melt. There are no field data or laboratory reports for water quality and quantity for these runoff and snowmelt events. These data need to added to the PAP and used in determining the PHC.

Data from the right fork of Horse Canyon during the period when the mine was discharging to the stream indicate a large difference in flow rates between at HC-1 and B-1, respectively representative of the upper and lower reaches of Horse Canyon Creek. Chemical analyses show no significant differences between the HC-1 and B-1 during this period with two exceptions. First, TSS is noticeably less in the lower stream, which the PHC attributes to probable prior deposition of suspended load (but which may be simply dilution of the sediment load in the natural flow by low-sediment mine discharge). Secondly, average TDS is higher downstream because mine water that was discharged to Horse Canyon had been in contact with saline marine shales in the Blackhawk Formation (PHC, p. 4).

Range Creek is the perennial stream closest to the Horse Canyon Mine – Lila Canyon Extension. Subsidence is projected to remain within the permit boundary, making it improbable that subsidence would effect any part of the Range Creek drainage. Due to the distance of several miles between the proposed permit area and Range Creek, and the roughly 1,000-feet of low permeability strata between the coal seam and Range Creek, Lila Canyon extension does not present any Probable Hydrologic Consequences to Range Creek (PHC, p. 7).

728.335. Other characteristics as required by the Division;

SUWA has raised concerns that the impacts of increased salinity from the solution of salts from the Mancos Shale are not evaluated: this concern is also addressed in other Tech Memos and is not further discussed here.

728.340. NA

728.350. Whether the UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES conducted after October 24, 1992 may result in contamination, diminution or interruption of State-appropriated Water in existence within the proposed permit or adjacent areas at the time the application is submitted.

State appropriated water in and adjacent to the proposed permit area is identified in Table 7-2. Some of the appropriated water is within the old workings of the Horse Canyon Mine, other water flows from springs in Horse Canyon and Little Park Wash, particularly along Patmos Ridge. There are also water rights on surface water in Horse Canyon and Little Park Wash.

The PHC states that it is unlikely contamination, diminution or interruption of any water resources will occur within the permit area (p. 14). The PHC needs to contain an explicit determination regarding contamination, diminution or interruption of State-appropriated Water not only for the permit area, but also for the adjacent area. Somewhere in the PAP, preferably in the PHC itself, the basis on which this determination is based needs to be clearly presented. If there is a possibility of contamination, diminution or interruption of State-appropriated Water in the permit or adjacent areas, a water replacement plan under R645-301-525.400 and –525.480 is needed.

Findings:

R645-301-722, Water rights 91-4959 (Redden Spring), 91-183 (Horse Canyon Creek), and 91-185 (MDC well), all held by UtahAmerican Energy, are not shown on Plate 7-3.

R645-301-722.100, The Permittee needs to portray seasonal variations of head on contour maps or cross-sections.

R645-301-121.200, -724.300, Information in Table 5 (Chapter 7) on the strata from which springs flow does not match statements throughout the PAP and does not match the information on Plates 6-1 and 7-4: there is no separately identifiable Flagstaff formation in this area, and according to Plates 6-1 and 7-4, L-10-G and L-12-G issue from the North Horn Formation.

R645-301-724.200, -728.344, Streams in the Lila Canyon Extension have been monitored since December 2000 and there has been no flow observed except in response to precipitation runoff or snow melt. There are no field data or laboratory reports in the PAP for water quality and quantity for these runoff and snowmelt events. These data need to added to the PAP and used in determining the PHC.

R645-301-728.350, The PHC states that it is unlikely contamination, diminution or interruption of any water resources will occur within the permit area (p. 14). The PHC needs to contain an explicit determination regarding contamination, diminution or interruption of State-appropriated Water not only for the permit area, but also for the adjacent area. Somewhere in the PAP, preferably in the PHC itself, the basis on which this detemination is based needs to be clearly presented. If there is a possibility of contamination, diminution or interruption of State-appropriated Water in the permit or adjacent areas, a water replacement plan under R645-301-525.400 and –525.480 is needed.

R645-301-724.100, At least four water level measurements and one suite of water-quality analyses were done at S-32, but there is no information on the current condition of S-32 in the PAP. The Permittee visited this piezometer, attempted to measure water levels, but found S-32 unusable; this is discussed in the cover letter for the December 6, 2002 submittal, but this information has not been included in the PAP.

R645-301-121.200, The first page of the 1989 Water Monitoring Data in Appendix 7-2 is illegible, and the Permittee needs to provide a legible copy. If a better original version is not available for reproduction, the table should be redone so the information is usable.

R645-301-121.200, The Permittee needs to clarify statements in Section 724.100 (page 9) that no springs occur in or below the Price River Formation or Castlegate Sandstone are not accurate; although there may be no large springs below the Price River Formation, the seeps in Stinky Spring Wash issue at the contact of the Blackhawk Formation and Mancos Shale..

R645-301-722.100, -624.100, The PAP asserts that the Mesa Verde Group – the Price River Formation, Castlegate Sandstone, and Blackhawk Formation - is not an

aquifer because the group does not transmit ground water to supply any water sources, the water has no potential to be used or developed, and it is not elemental to preserving the hydrologic balance in the permit and adjacent area, and that there are no observable discharge points in the permit and adjacent areas (Section 724.100). Such statements in the PAP need to be clarified because the seeps in Stinky Spring Wash, adjacent to the southwest corner of the Lila Canyon Extension area, issue at the contact of the Blackhawk Formation and Mancos Shale. Although these seeps are not a water supply and have limited use, they appear to be an important source of water for Bighorn sheep, specifically in the early spring. Plate 7-1 indicates the source for the water flowing from these seeps could be connected to the saturated zone, evident in the IPA piezometers, that will be intercepted by the proposed mine. The Permittee needs to evaluate the hydrogeology of these seeps, whether their source is regional, intermediate, or local in extent, and what impacts the proposed coal mining might have on them.

R645-301-130, In Section 724.100 (p.11), "(personnel communication, 1990)" is given as a reference, but the individual is not identified. Is this a direct quote from the Horse Canyon Mine plan? The Permittee needs to provide the name of the individual who provided this information.

R645-301-728.333, There is no PHC determination of what impact the proposed operation will have on flooding and streamflow alteration. The Coal Mining Rules require this determination to be in the permit application, that is, this information must be provided before the permit is issued.

R645-301-727, Water rights 91-4959, 91-183, and 91-185, held by UtahAmerican Energy, are not shown on Plate 7-3. Contrary to the statement in Section 727, UtahAmerican Energy does not hold the majority of water rights in the Horse Canyon Mine – Lila Canyon Extension area.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Coal Resource and Geologic Information Maps

Depth to the Sunnyside Seam, the seam to be mined, is shown on the Cover and Structure Map on Plate 6-4. Thickness of the Sunnyside Seam is shown on the Coal Thickness Isopach map on Plate 6-3. Thickness and nature of the Sunnyside Seam, of coal or rider seams above the

Sunnyside Seam, and of the stratum immediately below the Sunnyside Seam are shown on the Coal Sections on Plate 6-5. The cross section on Figure 7-1 shows the rock tunnels, the dip of the strata, stratigraphy, and expected ground-water elevation.

Figures VI-1 and VI-2 portray the general stratigraphy of the permit and adjacent areas. Plate 6-1 shows surface geology, including coal crop lines, and the strike and dip of the Sunnyside Seam within the proposed permit area.

Elevation contours on the Sunnyside Seam as determined from the outcrop and bore holes are on Plates 6-2, 6-3, and 6-4. The plates indicate that the coal seam crops out at approximately 6,500 feet in the vicinity of the rock-slope tunnels. The tunnels will intercept the coal seam at approximately 6,300 feet (Appendix 8-2 - Figure 7-1).

Depth of cover ranges from approximately 500 feet near the escarpment to 2,300 feet (Section 525.120 and Plate 5-5). Overburden is, for the most part, around 1,500 feet. Because of the flat topography of Little Park Wash, the deeper coal is generally to the east and north (Section 6.3.)

Fault locations and offsets are shown on Plate 6-1 and discussed in the text. Fault traces are not always visible at the surface, and fault locations on Plates 6-1 and 6-2 are also based on exposures at the outcrop and information from drilling (Geology, Page 24). Interpretations of fault alignments, which are based on detailed mapping by Kaiser Corporation consultants, differ slightly from those on maps published by the others, notably the USGS (Geology, Page 10). Aside from differences in detail, these different sources generally agree on location, extent, and magnitude of the faults.

The Sunnyside Fault, shown on Plates 6-1 and 6-2 of the Lila Canyon PAP and Plate II-2 of the current MRP, limited mining to the east in the Horse Canyon Mine but is not expected to extend into the Lila Canyon area, so is not expected to limit coal recovery at the Lila Canyon Extension.

Many maps and cross sections in the PAP extend as far as Patmos Ridge but include only a small portion of the Range Creek drainage. Geologic maps and cross sections that extend from the Book Cliffs to the Range Creek drainage have been added to the PAP.

Mine Workings Maps

Plate 5-1 shows the mine workings in and adjacent to the permit area, including the Horse Canyon, the Old Book Cliffs mine and the Lila Canyon project. The DOGM Abandoned Mine Reclamation program inspected the area in and around the Lila Canyon site and found no evidence of underground workings not shown on Plate 5-1.

Monitoring and Sampling Location Maps

Elevations and locations of test borings are on Plates 6-2, 6-3, and 6-4. Elevations of core samples are tabulated in Tables VI-1 and VI-3. Piezometers IPA-1, IPA-2, and IPA-3 are shown on Plates 7-1 and 7-4. Elevations and locations of seeps and springs monitored in 1989 by JBR and in 1993-1995 by EarthFax are on Plate 7-1.

Horse Canyon Mine UPDES discharge points UT022926 - 001, - 002, and - 003 (monitored from 1979 to 1991) are on Plates 7-1 and 7-4. Currently monitored UPDES discharge points, UT040013- 001A and - 002A are also shown. Proposed UPDES points L-4-S and L-5-G are on Plate 7-4.

Locations for surface-water monitoring points HCSW-1 (HSW-1, HC-1), HCSW-2, HCSW-3, B-1 (HC-2), and RF-1 are shown on Plate 7-1. Locations for baseline and operational water-monitoring sites added for the Lila Canyon Extension are on Plate 7-4.

Subsurface Water Resource Maps

Many maps and cross sections in the PAP include only a small portion of the Range Creek drainage. Geologic maps and cross sections that extend from the Book Cliffs to the Range Creek drainage have been added to then Lila Canyon Extension PAP. *Maps showing water rights need to be extended at least as far as the channel of Range Creek.*

Water-level elevation contours are on Plate 7-1. Seasonal variation in the water levels is tabulated in Appendix 7-1 and 7-2 for the IPA piezometers, but there are no cross sections and contour maps showing seasonal differences of head. The Permittee needs to portray seasonal variations of head on maps or cross-sections.

The MDC Well in NW Section 9 of T. 16 S., R. 14 E., near the road junction, is listed in Table 7-2 - Water Rights. The Horse Canyon Well is located nearer the Horse Canyon Mine surface facilities (Section 722.400). These wells were installed for observation of ground water in the alluvium in Horse Canyon and therefore may have been merely piezometers. They are discussed in Sections 6.5.1 and 724.200 and shown on Plate 7-1.

The ground-water elevation in the Horse Canyon Mine, at the rotary car dump at the intersection of the Main slope and 3rd level, is described in Section 724.100 (page 11); it was approximately 5,800 feet in 1986 and the PAP states that it probably has remained at this level since operations ceased in the Horse Canyon Mine. This projected ground-water elevation was used in projecting where mining will intercept water, but not in mapping the approximate piezometric surface on Plate 7-1. The location of the dump is described in the text and is shown on Plate 7-1. Underground exploration work performed by BXG in 1993 found water in the Horse Canyon Mine at approximately 5,870 feet (Appendix 7-2, p. 8). A location for the

measurement is on Plate 7-1. The potentiometric surface on Plate 7-1 is closely congruent to the 1993 BXG measurement in the Horse Canyon Mine, although this point does not appear to have been used projecting this surface.

Water rights are listed in Table 7-2. The list includes Redden Spring, plus springs identified as Mont, Leslie, Cottonwood, Williams, Kenna, and two Pine springs (Kenna Spring is in the Range Creek drainage.) In addition, there are eleven unnamed springs listed, plus the MDC well and three rights associated with underground tunnels of the Horse Canyon Mine. Locations are on Plate 7-3. Water rights 91-4959 (Redden Spring) and 91-185 (MDC well), both held by UtahAmerican Energy, are not shown on Plate 7-3.

Surface Water Resource Maps

Locations of streams and seeps and springs are shown on Plate 7-1. There are no known perennial streams, lakes or ponds within the permit and adjacent areas. Table 7-2 lists water rights and Plate 7-3 shows locations of these water rights. Water right 91-183 (Horse Canyon Creek), held by UtahAmerican Energy, is not shown on Plate 7-3. Text in Section 724.200 refers to Plate 7-1 for the location of Horse Canyon Creek and Lila Canyon drainage and Little Park Wash. Range Creek drainage is mentioned in the PAP: Range Creek lies several miles east of the Lila Canyon area. Many maps and cross sections in the PAP include only a small portion of the Range Creek drainage, but the Range Creek drainage is included on Plates 7-1A and 7-1B. Maps showing water rights need to be extended at least to the channel of Range Creek.

Well Maps

Three exploration boreholes, IPA-1, IPA-2 and IPA-3, were converted to piezometers to monitor water levels in the area. Casing was perforated at the coal seam. Locations are shown on Plate 7-1.

Two borings were done for observation of ground water in the alluvium in Horse Canyon. The MDC Well, which has been sealed, and the Horse Canyon Well located nearer the Horse Canyon Mine surface facilities are shown on Plate 7-1.

One oil exploration hole was drilled south of the proposed Lila Canyon permit area, in Section 25, T. 16 S., R 14 E., SLM, by Forest Oil Company. The location of the hole is shown on Plate 6-2. According to the Division's records, the well was completed in October 1959. No oil, gas, or water was reported. The well was drilled to a depth of 12,602 feet. It spudded in the Price River Formation and was in that formation to a depth of 370 feet then passed through the Blackhawk Formation from 370 feet to 906 feet, a thickness of 536 feet.

Exploratory boreholes S-26, S-28, and S-31, located south of the Williams Draw Fault, were offset with shallow piezometers A-26, A-28, and A-31 intended for ground water in the alluvium of Little Park (Table 6-3). These piezometers have been plugged and abandoned.

These piezometers are not shown on Plate 7-1, although they would have been at the approximately the locations shown for S-26, S-28, and S-31 on several maps in the PAP.

Findings:

R645-301-622, -722, Resource maps showing water rights, need to be extended at least as far as the channel of Range Creek to help evaluate potential impacts in the Range Creek drainage.

R645-301-622, -722, Water rights 91-4959 (Redden Spring), 91-183 (Horse Canyon Creek), and 91-185 (MDC well), all held by UtahAmerican Energy, are not shown on Plate 7-3.

OPERATION PLAN

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:

General

The Permittee has based the ground-water and surface-water monitoring plans on the PHC determination and the analysis of baseline hydrologic, geologic, and other information in the proposed amendment. The surface- and ground-water monitoring sites will be monitored quarterly through the operational and reclamation periods to document any diminution or damage to the hydrologic balance. Water samples from seeps, springs, and streams will be analyzed for the parameters listed in Tables 7-4 and 7-5. The parameters in Tables 7-4 and 7-5 match the operational parameters in the Division's Directive Tech 004. Monitoring reports will be submitted to the Division at least every three months, within 30 days following the end of each quarter (Section 731.212).

The proposed Lila Canyon Extension includes a commitment to analyze ground- and surface-water samples for baseline parameters preceding each 5-year permit renewal (Section 731.200). These permit-renewal baseline analyses will be done for the surface-water samples collected at either high or low flow and for the spring samples collected at low flow during that year.

The Permittee's water-monitoring plan is intended to provide data to show impacts to potentially affected springs, seeps, impoundments and drainages within and adjacent to the permit area by comparison with relevant baseline data and with applicable effluent limitations. The Permittee has selected monitoring locations and frequencies, described in Table 7-3, so that significant springs, seeps, impoundments and drainages that could potentially be impacted by the mining and reclamation operations will be monitored on a regular basis (Section 731.222.1).

Groundwater Monitoring

Section 731.211 discusses the ground-water monitoring plan. It makes reference to water rights on several of the springs to be monitored. Section 731.212 states that when analyses of ground water indicate non-compliance with permit conditions, the operator will promptly notify the Division and take the actions provided for in (R645-300-)145 and (R645-301-)731:

- Minimizing surface disturbance and proper handling of earth materials to minimize acidic, toxic or other harmful infiltration to ground-water systems;
- Testing (as-necessary) to ensure stockpiled materials are non-acid and non-toxic;
- Controlling and treating disturbed area runoff to prevent discharge of pollutants into ground-water, by the use of diversions, culverts, silt fences, sediment ponds and by chemical treatment if necessary
- Minimizing and/or treating mine water discharge to comply with U .P.D.E .S . discharge standards;
- Establishing where ground-water resources exist within or adjacent to the permit area through a Baseline Study (done) and monitoring quality and quantity of significant sources through impletation of a Water Monitoring Plan (proposed);
- Proper handling of potentially harmful materials (such as fuels, grease, oil, etc.) in accordance with an approved Spill Prevention Control and Countermeasure Plan (SPCC).

It states in Section 731.211 that there is a total of 17 ground water monitoring sites proposed for this property, and refers to Table 7-3. Including mine-water discharge at L-5-G and the IPA piezometers, Table 7-3 shows only 13 ground-water monitoring sites. This needs to be clarified.

No ground-water system underlies the planned surface facilities, which are to be built on fill placed on Mancos Shale, a shale formation several hundred feet thick that greatly restricts vertical and horizontal movement of water (Section 724.100). All potential acid and toxic material will be disposed of in a confined, stable area and covered with at least 4 feet of soil. Contamination of perched ground water in the Price River and Colton Formations is unlikely because the perched zones are several hundred feet above the Lower Sunnyside Coal Seam, and low-permeability strata separate the perched ground-water zones from the coal seam. The perched ground water will not be intercepted by mining activities

SUWA has raised concerns that the number of seeps and springs being monitored is not sufficient, that most of them are outside the permit, and that one spring in the permit area is not sufficient. Determination of the permit area is not based on hydrologic systems. The Coal Mining Rules require protection of resources both within and outside the permit area and baseline and operational monitoring of both the permit area and adjacent areas. The Division notes that expanding the permit area to include more springs would actually lower the performance standard for protection of the added springs from; "minimize impact" and "prevent material damage", to simply "minimize impact".

The seeps and springs selected by the Permittee for monitoring are representative of the springs and seeps in the ground-water emergence zones located over or adjacent to the area of proposed mining. Additional, detailed investigation of every aspect of every component of the hydrologic resources is not needed to monitor the resources and minimize impacts, or to comply with the Coal Mining Rules. Springs initially selected typically have baseline water-quantity and -quality data from the EarthFax survey, have been developed for use by the water right holder, and have the greatest or most consistent flow of the group or zone. As the mine plan has developed, springs have been added or removed to optimize the effectiveness of monitoring.

Monitoring was resumed at spring locations L-6-G through L-10-G in 2001 to establish a continuous record from pre-mining into operational conditions. Baseline monitoring for L-11-G and L-12-G was initiated in October 2001. L-11-G has replaced L-6-G, which was dropped from the plan in 2003. Seeps in Stinky Spring Canyon at the southwest corner of the Lila Canyon Extension area were added to the monitoring plan in 2002 (L-16-G and L-17-G). Monitoring of L-10-G ceased in the first quarter of 2003 because it was considered too far outside the permit area to be of any benefit.

Sites L-5-G, L-7-G, L-8-G, L-9-G, L-11-G, and L-12-G, and IPA-1, -2, and –3 are the sites currently proposed for ground-water monitoring. These are described in Section 731.211 and listed in Table 7-3. Locations are shown on Plate 7-4. Data collected up through October 2002 are in Appendix 7-1. Seeps and springs will be monitored quarterly for parameters listed in Table 7-5. Station L-5-G is the potential mine discharge point and will be monitored in accordance with UPDES Permit requirements. IPA-1, -2, and -3 will be monitored quarterly for depth.

L-7-G, L-8-G, L-9-G (Pine Spring), and L-10-G (William's Draw Spring), correspond with the springs monitored by EarthFax as 9, 10, 16(Z), and 14, respectively. L-12-G corresponds roughly with EarthFax springs 11 and 12, but does not coincide exactly with either one. Appendices 7-1 and 7-6 of the Lila Canyon Significant Revision contain water-quality data on springs 9,10, 14, and 16(Z) from 1993, 1994, and 1995, when they were monitored for baseline for the South Lease by IPA. There are field data on springs 11 and 12 but no water-quality analyses were done.

L-6-G is in the vicinity of Mont Spring, water right 91-617, and Leslie Spring, water right 91-618. These water rights correspond closely to JBR sample sites H-21 and H-19 and are near H-20, H-21A, H- 21B, and H-22; H-18 was selected by the Permittee as L-6-G to monitor ground water in this area because it is the lowest spring in the stratigraphic sequence. However, this spring has been dry during recent monitoring, so L-11-G – located approximately 100 yards upstream - has been added to the monitoring plan to replace L-6-G. Spring L-11-G corresponds with springs H-18A and H-18B. There are no data in the PAP on H-18A and H-18B, but from Plate 7-1, these appear to be the same alluvial water system that was monitored at H-18 (L-6-G).

The spring to be monitored by the Permittee as L -7-G was monitored as 9 (S-9) from 1993 to 1995. Spring 9 is near springs 8, 19-A, and 19-B and has had the most consistent flow of the group. Baseline data for Spring 9 are in Appendices 7-1 and 7-6. Monitoring resumed in July 2000. The Permittee identifies Spring 9 as Cottonwood Spring, which is associated with water right 91-2521 in Table 7-2; however, the location described for water right 91-2521 in Table 7-2 (NE/4 Sec. 13, T. 16 S., R. 14 E.) is evidently very general: the designated quarter-section is on a topographic high and there are no identified springs at that location. Water rights 91-399 and 91-2537 are closer to springs 8, 9, 19-A, and 19-B.

A water-monitoring program was implemented in July 2000 to determine if the springs proposed for operational monitoring were still viable and to establish a current baseline that would be continuous with operational monitoring, and additional sites were added in 2001 and 2002. Data collected through October 2002 are in Appendix 7-1.

Baseline water levels for 1994, 1995, and 1996 have been established at three points: IPA-1, IPA2, and IPA3. The MRP contains a commitment to monitor these three piezometers quarterly for water levels. In December 2000, UEI was able to measure the water level in IPA-2, but at IPA-1 and IPA-3 the probe was not able to go far enough into the piezometers to reach water. Water monitoring reports indicate the piezometers were not accessible in February 2001. All three piezometers were successfully measured by UEI on May 15, 2001 and each quarter since. The information is reported in Appendix 7-1.

Map 7-1, based on data from several sources, shows potential ground-water levels and where the Permittee anticipates the mine workings will intercept ground water. The amount of ground water that will actually enter the mine workings depends on the storage capacity of the surrounding formation, the permeability, and type of structure at the mining face. If mine water interception occurs, the water will be stored in sumps and used in the mine and, if necessary, discharged from the mine. Eventually, the three IPA piezometers may be intercepted by the mine, so in addition to the three piezometers, the Permittee commits in Section 731.513 to the monitoring of underground usage and discharge to more accurately define potential impacts on ground water.

Ground water will be monitored and data will be submitted at least every three months for each monitoring location. Monitoring submittals will include analytical results from each

sample taken during the approved reporting period. When the analysis of any ground-water sample indicates noncompliance with the permit conditions, then the operator will promptly notify the Division and immediately take the actions provided for in 145 and 731 (Section 731.212). Ground-water monitoring will continue through mining and reclamation until bond release (Section 731.214).

Equipment, structures and other devices used in conjunction with monitoring the quality of ground water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator and when no longer needed (Section 731.215).

Surface Water Monitoring

Section 731.222 discusses the surface-water monitoring plan. The monitoring data will be used to determine the impacts of mining on the hydrologic balance by comparison with relevant baseline data and applicable effluent limitations.

Sediment pond and mine discharges will be monitored monthly or as frequently as discharges occur (Table 7-3). Appendix 7-5 contains a copy of the UPDES permit for the Lila Canyon Extension. The UPDES permit was issued in 1999.

Drainages in the area flow in response to snowmelt and precipitation events. The proposed surface-water monitoring program will monitor the Lila Canyon drainage both above and below the disturbed mine site area at L-1-S, L-2-S, and L-3-S and the sediment pond discharge at L-4-S.

L-1-S, L-2-S, L-3-S, and L-4-S have been monitored monthly since July 2000, and a summary of field observations through October 2002 is in Appendix 7-1. Most reports are “no flow”. "No access" is frequently reported December through February. Once the mine begins operation, all sites will be more accessible. In any quarter, a minimum of three attempts will be made to access water monitoring sites, using either 4-wheel drive vehicles or ATVs, before reporting "No access"; however, safety and common sense will prevail while making such attempts (Section 731.220).

Locations of all monitoring sites are shown on Plate 7-4, "Water Monitoring Location Map." Proposed monitoring methods, parameters and frequencies are described in Table 7-3, "Water Monitoring Stations," and Table 7-4, "Water Monitoring Parameters." Monitoring reports will be submitted to the Division at least every 3 months, within 30 days following the end of each quarter. The operational water-monitoring plan will be implemented upon approval of the MRP.

The proposed surface-water monitoring plan is detailed in Section 731.220. This plan is based on PHC determination and analysis of all baseline hydrologic, geologic and other information in this permit application. The plan provides for monitoring of parameters that

relate to the suitability of the surface water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance as set forth in R645-301- 751 (see Table 7-4).

The BLM originally proposed that the Permittee develop a water-monitoring plan for Range Creek, a perennial stream several miles northwest of the mine, to assess any potential impacts from mining to the perennial stream. The BLM later determined that Range Creek was separated from the mine by several miles, that impacts from mining activities were unlikely, and that it did not have to be monitored for impacts. The Division concurs with the BLM. No monitoring plan has been proposed by the operator for Range Creek. However, in response to comments received from SUWA, the PHC has been expanded to include Range Creek. There are no indications from the PHC that adverse effects might occur to Range Creek or the Range Creek drainage.

Discharges of water from this operation will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining promulgated by the Environmental Protection Agency (EPA) set forth in 40 CFR Part 434 (see Sections 731 and 742).

Monitoring reports will be submitted to the Division at least every 3 months, within 30 days following the end of each quarter (Section 731.220). Surface-water monitoring will continue through mining and reclamation until bond release (Section 731.224).

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of surface water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator when no longer needed (Section 731.225).

Acid- and Toxic-Forming Materials and Underground Development Waste

The Permittee has committed to periodic sampling of the materials to be placed in the refuse pile; samples will be collected and analyzed five times during construction of the rock-slope tunnels and from every 6,000 tons of waste rock placed on the refuse pile during mine operation: parameters are in Table 2 of Appendix 5-7. The reclamation plan specifies 4 feet of subsoil and topsoil will be placed over the refuse pile. The slope-rock underground development waste used to build the pads will be left in place for final reclamation and buried with 4 feet of subsoil and topsoil (Chapters 2, 5, and 7, and Appendix 5-7).

The Division requires that the slope-rock underground development waste be disposed of in a refuse pile. At a minimum, the material in the refuse pile must be covered with 4 feet of non-acid and non-toxic forming material. (See Chapters 2, 5, and 7, and Appendix 5-7 for details.)

Coal Mine Waste

Access to the underground workings of the Lila Canyon Mine will be provided by two rock slopes driven upward from the base of the Book Cliffs to the coal seam. Rock that will be removed from the tunnels will be called " rock-slope material/ mine development waste ", and it fits most closely into the classification of underground development waste. Rock-slope material/ mine development waste will contain mostly shale, sandstone, and mudstone. Traces of coal may be found. Rock-slope material/ mine development waste will be used to fill in some low areas to be used as pads (Section 537.200).

Some statements in the MRP could be more precise in their language and can seem contradictory and confusing if read outside the context of the entire MRP. For example, it can be inferred from Section 537.200 that some waste might be placed outside the designated refuse pile in indeterminate, undesignated “low areas”; from Section 537.250 that slope rock material might be used in pads other than the shop-warehouse pad, then left there and reclaimed “in place”; and from Section 537.240 that there might be more than one waste pile. In spite of such unfocused language regarding some details, the overall plan for handling, storage and disposal of coal mine waste and reclamation of the refuse pile is sufficiently clear and meets the requirements of the Coal Mining Rules.

To ensure surface and ground waters will not be polluted by acid or toxic materials, the underground development waste (slope-rock material) will be examined and tested as necessary to determine acid- and toxic-forming potential (Section 536 of the plan). In Appendix 5-7, the Permittee commits to take a sample of coal processing waste for every 6,000 tons of waste disposed of in the refuse pile. These samples will be analyzed according to the parameters listed in Table 2 of Appendix 5-7. The Division requires that the underground development waste be disposed of in a refuse pile. At a minimum, the material in the refuse pile must be covered with 4 feet of non-acid and non-toxic forming material. (See Chapters 2, 5, and 7, and Appendix 5-7 for details.)

Coal processing waste from the crusher will be placed in the refuse pile within the permit area. The refuse pile has been designed as a location for the storage of underground development waste that is brought to the surface, including any excess slope-rock underground development waste not used as fill; it is not anticipated by the Permittee that any underground waste other than the slope-rock will be brought to the surface. The capacity of the pile is designed for 150,000 tons, which is in excess of projected needs. Material not transported to the surface, such as overcast material, rock falls, and slope material may be disposed of underground according to the appropriate MSHA regulations. Because this will be an underground mine there will be no spoil.

Gravity Discharges From Underground Mines

The proposed access portals are below the coal outcrop, as shown on Plates 5-2 and 7-5. The fan is to be located above the outcrop. The two 1,227-foot access tunnels will slope up at approximately 12 percent, from a starting elevation at the surface of approximately 6,150 feet. The intersection of the coal seam and the rock slope will take place at approximately 6,300 feet elevation. Maximum ground-water elevation measured in the three IPA piezometers is 5,975 feet, and maximum projected elevation in the vicinity of the rock-slope tunnels is approximately 6,000 feet (Plate 7-1). Ground-water levels would need to rise approximately 150 feet just to reach the starting elevation of the tunnels at the base of the Book Cliffs (6,150 feet) and approximately 300 feet to reach the intersection of the tunnels with the coal seam (6,300 feet), so it is unlikely water levels will ever reach the intersection of the tunnel and coal seam. It is also unlikely the rock slopes will intercept ground water in the Blackhawk Formation. Therefore, gravity discharge from the mine is unlikely.

Water-Quality Standards And Effluent Limitations

Water monitoring parameters are shown in Table 7-4. Water monitoring locations and sample frequencies are described in Table 7-3 and on Plate 7-4.

The surface-water monitoring point-source discharge will be conducted in accordance with 40 CFR Parts 122 and 123, R645-301-751 and as required by the Utah Division of Water Quality (UDWQ) for UPDES permits. A UPDES discharge permit has been issued by the UDWQ for the proposed sediment pond and mine water for the Lila Canyon operation.

As indicated in Section 731.220, surface-water monitoring data will be submitted to the Division at least every three months. Discharge monitoring reports will be submitted to UDWQ monthly. When analysis of any surface-water sample indicates non-compliance with the permit conditions, the Permittee will promptly notify the Division and immediately take action to identify the source of the problem, correct the problem and, if necessary, to provide warning to any person whose health and safety is in imminent danger due to the non-compliance.

Casing and sealing of wells

IPA-1, -2, and –3 will be reclaimed according to the performance standards of the Coal Mining Rules. If any wells are installed in the future, the requirements of R645-301-765 will be met (Section 765).

Findings:

R645-301-121.200, It states in Section 731.211 that there is a total of 17 ground water monitoring sites proposed for this property, and refers to Table 7-3. Including mine-water discharge at L-5-G and the IPA piezometers, Table 7-3 shows only 13 ground-water monitoring sites. This needs to be clarified.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Monitoring and Sampling Location Maps

Operational ground-water and surface-water monitoring sites are listed in Table 7-3, and locations are shown on Plate 7-4. The proposed surface-water monitoring program was established to collect data around the Lila Canyon Mine both above and below the disturbed site at L-1-S, L-2-S, and L-3-S. The sedimentation pond discharge point, L-4-S, and the potential mine discharge point, L-5-S, will be monitored in accordance with UPDES permit requirements. Current UPDES discharge points UT040013-001A and -002A are also shown on Plate 7-4. Locations of seep and spring ground-water monitoring sites L-6-G through L-17-G and piezometers IPA-1, -2, and -3 are shown on Plate 7-4.

Findings:

The Permittee met the minimum requirements for maps, plans and cross sections of mining operations of the Coal Mining Rules.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

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

Analysis:

SUWA has raised concerns that the regional aquifer is not covered in the CHIA. The CHIA for this submittal has not been prepared yet.

SUWA has raised concerns that there are insufficient data to prepare the CHIA. Data are available from federal, state, and a number of sources. The Permittee is not required to provide

data unless none is available from other sources. The Division is not limited to information in the PAP in preparing the CHIA; however, it is anticipated that data in the PAP will undoubtedly be used along with other information in preparation of the CHIA.

SUWA has raised concerns that the discharge area for the regional aquifer is not identified. The potential for discharge from a regional aquifer will be considered in the CHIA.

The Division will provide an assessment of the probable cumulative hydrologic impacts (CHIA) of the proposed operation, and all anticipated mining, upon surface- and ground-water systems in the cumulative impact area. The CHIA will be sufficient to determine, for purposes of permit approval, whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The Division will use data and analyses from several sources, including those submitted by the Permittee in the Lila Canyon Extension PAP.

Findings:

The CHIA for this submittal has not been completed yet.

RECOMMENDATIONS:

The permit for the Lila Canyon Extension should not be approved until the deficiencies stated above have been satisfactorily addressed.