

# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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May 6, 2005

TO: Internal File

THRU: Pamela Grubaugh-Littig, Permit Supervisor

FROM: James D. Smith, Environmental Specialist, Team Lead

RE: Permit Boundary Expansion, Hidden Splendor Resources, Horizon Mine, C/007/0020, Task ID #2215

### **SUMMARY:**

Initial Submittal	May 19, 2004	Assigned Task # 1933	May 21, 2004
		Tech Memo	September 2, 2004
		TA	September 21, 2004
Response to # 1933	January 13, 2005	Assigned Task # 2115	January 14, 2005
		Tech Memo	March 4, 2005
		Deficiency list	March 9, 2005
Response to # 2115	April 7, 2005	Assigned Task # 2215	April 8, 2005
		Tech Memo	May 6, 2005
		TA	

Hidden Splendor Resources (HSR) submitted an amendment to the Horizon Mine MRP on May 21, 2004. This amendment will increase the permitted acreage from 711 acres to 1,577 acres. The additional acreage is the part of federal lease UTU-74804 that lies north of Beaver Creek. There are also some minor changes to the surface facilities. This is a significant revision of the mine plan.

The Horizon Mine permit area includes federal coal lease UTU-74804 (1,272 acres) and fee coal owned by Hidden Splendor Resources (305 acres). Hidden Splendor Resources has been the owner and operator of the Horizon Mine since March 2003, when it acquired the rights to the Horizon Mine from Lodestar Energy, Inc. through the US Bankruptcy Court for the Eastern District of Kentucky.

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**TECHNICAL MEMO**

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Lodestar Energy, Inc. received a permit to expand mine operations into the 406 acres of Federal Lease UTU-74804 located south of Beaver Creek in 2001. Knowledge of the hydrology north of Beaver Creek was not sufficient to allow permitting of the entire federal lease at that time.

Steve and Pete Stamitakis own the surface surrounding Beaver Creek. They have written the Division to express concerns about loss of water in streams and springs due to mining and surface disturbance from subsidence (letter received August 20, 2004). They have expressed these same concerns in the past.

**TECHNICAL ANALYSIS:**

**GENERAL CONTENTS**

**REPORTING OF TECHNICAL DATA**

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

**Analysis:**

Explicit citations in the References identify sources cited in the text. All referenced materials are available to the Division, although some must be obtained through the UGS library.

**Findings:**

Reporting of Technical Data is sufficient to meet the requirements of the R645 Coal Rules.

**ENVIRONMENTAL RESOURCE INFORMATION**

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

**HYDROLOGIC RESOURCE INFORMATION**

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

## **Analysis:**

### **Baseline Information**

Baseline hydrology was based on the Permittee's review of literature and available data obtained from the USGS, the US Forest Service, the State of Utah, Beaver Creek Coal Company, Blue Blaze Coal Company, and mine permit applications for the surrounding mines. Field reconnaissance was performed to confirm the location and characteristics of surface watercourses, springs, and seeps.

Baseline water monitoring points are shown on Plate 7-1, and baseline data are in Appendix 7-2 and the Division's database. From October 1960 to October 1989 the USGS maintained gauging station 09312700 near the mouth of Beaver Creek, approximately 9 miles northeast of the permit area. The USGS monitored SP-9 (Jewkes Spring) during the period of 1979 through 1983, Beaver Creek Coal Company monitored it from 1985 through 1995 (Section 7.1.5), and Horizon has monitored it since 1996. Monitoring points SP-1, -2, and -4 were monitored for baseline information beginning in 1989.

Piezometer HZ-01-06-1 was installed in November 2001 and since then water levels have been measured during the second, third, and fourth quarters, the site usually being inaccessible during the first quarter. Results are tabulated in Table 7-1 in the Annual Reports and in the Division's database. Figures 7-2, -2A, and -2B represent the potentiometric surface as it was in December 1995, September 1996, and June 2002. The 2002 map includes data from HZ-01-06-1, which was installed in November 2001.

Numerous springs and seeps exist in and adjacent to the permit area, especially in the Beaver and Jump Creek areas. Perennial and intermittent springs flow from sandstone units in the Price River Formation and Castlegate Sandstone and from faults and fractures. Ephemeral springs are more likely to flow from shallow, local aquifers in soils, alluvium, or colluvium.

The three principal surface water courses in and adjacent to the mine permit area are Beaver Creek, which bisects the federal coal lease, Jewkes Creek through the fee coal area, and North Fork Gordon Creek to the south of the property. Streamflow within the permit and adjacent areas is typical of the region, with maximum streamflow occurring in late spring and early summer as a result of snow melt runoff.

Both Jewkes Creek and Beaver Creek generally flow throughout the year, but flows decrease significantly during the autumn and winter months. Both streams have experienced periods of no-flow, primarily in the winter and late summer.

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TECHNICAL MEMO

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Small seeps and springs help maintain the flow in Beaver Creek and it is considered a perennial stream in spite of the frequent no-flow periods. Downstream decreases in flow have been observed in Beaver Creek between the upstream monitoring station SS-7 and the downstream station SS-8. This is most prevalent during the low-flow season; however, even during periods of high flow, higher discharge rates are occasionally observed at SS-7 as compared with SS-8.

During the 29-year period of USGS measurements, the minimum annual discharge of Beaver Creek at gauging station 09312700 was 254 acre-feet during water year 1981, and the maximum annual discharge was 9,950 acre-feet in water year 1983, only two years later (Appendix 7-7). The average annual discharge was 3,310 acre-feet. The Permittee has determined the coefficient of variation for the station to be 74 percent, indicating high variability of flow.

Jewkes Creek is an intermittent stream that drains an area slightly greater than 1 square-mile. Portal Canyon Creek, a small drainage that discharges into Jewkes Creek from the northeast, contains the mine facilities and surface operations. Jewkes Creek empties into North Fork Gordon Creek. Flow data in Appendix 7-3 indicate that Jewkes Creek occasionally ceases flowing at station SS-3 even though it continues to flow at low rates upstream at station SS-5. This lost surface flow probably continues through the streambed sediments and contributes baseflow to North Fork Gordon Creek.

North Fork Gordon Creek flows next to County Road 290 southeast of the permit area. The elevation of the creek is lower than the Hiawatha coal seam. Proposed mining operations will occur north of the creek and should not significantly affect the quantity or quality of the flow in North Fork Gordon Creek.

Adjacent drainages such as Sand Gulch and Jump Creek flow during spring snowmelt and summer thunderstorms. The limited drainage area and high elevation of some of the canyons shortens the duration of the snowmelt runoff and limits it to very early spring.

Surface-water quality data have been collected from the permit and adjacent areas since 1989, when sample sites have been accessible. SS-7 and SS-8 along Beaver Creek have been monitored since 1992, and SS-11 in Sand Gulch and SS-12 on Beaver Creek since 1996. Prior to 1996 data were generally collected in accordance with the Division's guidelines published in 1986. Since 1996, data have been collected, where feasible, in accordance with the Division's guidelines published in April 1995. The data collected from the monitored sites, together with tables outlining the parameters that have been monitored, are presented in Appendix 7-3 (page 7-37). Data are also in the Division's database.

Water rights information is in Appendix 3-5. Points of diversion are shown on Plate 7-3. The operator has indicated that the area is almost exclusively used for stock watering (page 7-29).

### **Probable Hydrologic Consequences Determination**

Only sections of the PHC that are affected by the proposed amendment are discussed. Subsection titles used in the following discussion match titles in the PHC, Section 7.3.2 of the MRP.

#### *Impacts to the Regional Aquifer System*

(The term *regional aquifer* is commonly used to describe the saturated portions of the Blackhawk Formation and Star Point Sandstone - and sometimes other strata - in the Book Cliffs and Wasatch Plateau Coal Fields. However, ground-water storage and movement in these areas is typically of a local or intermediate nature and the Division feels there is little or no basis for generally describing these as regional systems.)

The Permittee anticipated that the coal in the Horizon No. 1 Mine would be saturated essentially from the beginning of mining and that inflow to the mine would be in the range of 36 to 90 gpm, the latter number representing inflow as mining expanded north of Beaver Creek. Under the anticipated future conditions, approximately 300 gpm of water might have been discharged from the mine during average operating periods.

The PHC states, "Soon after initiating mining it became evident that far more than 36 to 90 gpm was flowing into the mine. The old workings had intercepted a fault that was conveying a large volume of groundwater into the workings," perhaps the same fault encountered in the Beaver Creek Coal Company No. 3 Mine or a fault connected to it. The PHC continues,

The North Mains and a panel were extended to the north until the same water-bearing fault was encountered. When mining first encountered the fault the inflow was greater than 450 gpm. After the initial surge of groundwater, which lasted approximately 2 months, the fault produced between 200 and 300 gpm. During a period when the mine was shutdown in 2002 and 2003 the mine pumped an average of 279 gpm from the mine. During the period of shutdown the pumping data shows a slight decrease in the pumping rate over time. During the period of shutdown in 2002 the average pumping rate was 294 gpm. During the period of shutdown in 2003 the average pumping rate was 269 gpm. Thus the formation is slowly being de-watered and is producing less water with time. Upon resuming mining in the West Mains in August of 2003 the average pumping rates increased due to groundwater encountered at the mining face. Operators estimate the inflow at the face to be approximately 30 gpm ...

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TECHNICAL MEMO

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...based on the mining plan, mining can be expected to intercept the fault in the future. The maximum inflow to the mine can be expected to be similar to the maximum inflow rate encountered when the water bearing fault was first encountered plus whatever ground water is being produced by the mine workings in unfractured areas. Based on the highest monthly average pumping rate from March of 2002 of 473 gpm and the maximum estimated inflow based on Lines (1985) methods the maximum inflow would be approximately 560 gpm. This is considered a conservative estimate since the formation is being further de-watered as mining continues. Also an inflow of this magnitude would be expected to only last a short period of time before returning to an average inflow between 200 and 300 gpm.

Approximately 25 gpm (41 acre-feet per year) of groundwater will be removed with the mined coal based on average moisture content of 7.99 percent in the coal and maximum production of 700,000 tons per year. Dust suppression and similar uses will consume 6 gpm. Data in Appendix 7-9 indicate that the net loss of water by evaporation due to mine ventilation will be approximately 6 gpm (10 acre-feet per year), so the total consumptive loss to the hydrologic system will be 37 gpm (60 acre-feet per year):

- 6 gpm for surface consumptive uses,
- 25 gpm as moisture in the coal, and
- 6 gpm as evaporative loss in the mine ventilation system.

With an average consumptive use of 37 gpm, it is likely that ground water will be discharged from the mine, approximately 300 gpm during average operating periods and exceeding 500 gpm for short periods of time after mining intercepts the water-bearing fault.

In November 2001, monitoring well HZ-01-06-1 was installed to provide potentiometric data for the area north of Beaver Creek. Water levels have been measured and results are tabulated in Table 7-1 in the Annual Reports and in the Division's database. The potentiometric surface dropped 85 feet between the first and second readings. It is not clear to the Permittee whether the drop was due to the mine de-watering the aquifer or if the initial reading was inaccurate. Circulation was lost numerous times during drilling, resulting in drilling fluid flowing into the formation, and drilling fluid flowing back into the borehole may have artificially elevated the potentiometric surface for the first reading. However, HZ-95-1 experienced a 104-foot drop in a similar time period between the fall of 1999 and spring of 2000. "Due to the rapid drop in the potentiometric surface and the magnitude of the drop at HZ-95-1", the Permittee feels it can be concluded that the influence of the water-bearing fault extends "at least as far north as Beaver Creek", and if the initial water level reading for HZ-01-06-1 is valid then the influence of the water-bearing fault on the potentiometric surface may extend "at least to the northern permit boundary".

## TECHNICAL MEMO

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The Permittee states in the PHC that water-level monitoring indicates mining will depress the regional aquifer to the maximum depth of the mined entries, and that due to the large amount of water being transported by faulting, the potentiometric surface will be depressed in an area much larger than the permit area; however, when pumping ceases the potentiometric surface will return to pre-mining conditions. Beaver Creek Coal Company No. 3 Mine had previously intercepted the water-bearing fault. Inflows of approximately 400 gpm occurred when this fault was encountered (according to Roger Skaggs of the Blue Blaze Coal Company) and dropped the potentiometric surface, but when mining ceased in these old workings the potentiometric surface recovered, as shown by the water-level measurements taken prior to initiating mining at the Horizon Mine. Therefore, the impact to the regional aquifer is expected to be temporary and the potentiometric surface will return to pre-mining conditions “as soon as pumping ceases”.

### *Impacts to the Hydrologic System Resulting From Subsidence*

The Permittee refers to Gentry and Abel (1978), who apparently have concluded that topographic lows tend to be protected by upwarping of adjacent slopes during subsidence, and if this is so then “mining-induced surface fracturing should be very limited (or nonexistent) within the Beaver Creek stream channel area”. The Permittee also states that as overburden is approximately 1,000 feet and coal thickness 7.5 feet, there is little potential for subsidence cracks to propagate to the surface. Also, any fracturing that does occur in the stream channel is likely to fill rapidly as a result of sedimentation.

Appendix 7-13 contains a copy of the US Forest Service study of the impacts of subsidence caused by full-extraction mining beneath Burnout Canyon at the Skyline Mine. The study was carried out from 1992 to 1998 by the Forestry Sciences Laboratory, Rocky Mountain Research Station in conjunction with the Manti-Lasal National Forest and Arch Coal Company/Canyon Resources LLC. The study was completed where both the Upper and Lower O’Conner Seams were extracted by longwall mining beneath the perennial stream in Burnout Canyon. The O’Conner Seams and the Hiawatha Seam are in the Blackhawk Formation and the general stratigraphy and lithology at the Skyline and Horizon Mines are similar.

Based on the Burnout Canyon study, the Permittee has concluded that with 800 feet of cover or more, with panels oriented perpendicular to the stream, and with full extraction of the coal, some short-term effects occurred to the stream, but after three years the stream had reverted to a pre-mining configuration. Other conclusions in the Burnout Canyon study are:

- There were no “measurable” significant impacts due to subsidence on stream flow, silt, or vegetation.
- There was year-to-year variability in the stream, but it was less than the year-to-year variability of the nearby control stream.

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TECHNICAL MEMO

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- There were temporary changes during the first year after mining in the number of pools, stream drops, and stream width, but the stream had reverted to normal by the third year after mining.

If the same conditions exist at Beaver Creek as exist at Burnout Creek, it would be reasonable to conclude that the impacts from mining beneath Beaver Creek would be similar, that is, minimal and without lasting effect.

Based on a statement from Von Schonfeldt and others (1980) that uniform subsidence "rarely causes problems to renewable resources such as aquifers, streams, and ranch lands." the Permittee anticipates that subsidence will not significantly affect springs within the permit and adjacent areas, and that, because second mining will occur uniformly across the permit area [there will be no buffer zones], the resulting subsidence should also be uniform, minimizing the potential impacts to overlying springs.

The Permittee states, "As noted in the Cumulative Hydrologic Impact Assessment, mining in the area adjacent to the proposed Horizon permit area has not resulted in hydrologic impacts due to subsidence ", and that "Given the lack of extensive aquifer systems in lithologic units that overlie the coal within the permit and adjacent areas, it is not anticipated that groundwater will be significantly affected by subsidence. Thus, subsidence caused as a result of mining by Hidden Splendor Resources, Inc. should not cause significant surface or groundwater impacts within the permit or adjacent areas."

#### *Potential Hydrocarbon Contamination*

In addition to the discussion on containment of spills, the Permittee has added a statement that there is no intention of abandoning equipment underground. Should it be necessary to abandon any equipment underground, the Permittee commits to drain all petroleum products from the equipment, and show locations of abandoned equipment on a mine map that will be submitted to the Division.

#### *Flooding Potential of Downstream Areas and Streamflow Alteration*

All disturbed-area runoff will flow through the sedimentation pond or other sediment-control device. Sediment-control devices will minimize flooding impacts to downstream areas because the sediment-control devices are designed to be stable, minimizing the potential for breaches that could cause downstream flooding; sediment is retained on-site, so bottom elevations of stream channels downstream from the disturbed areas are not artificially raised and the hydraulic capacity of the stream channels is not altered; and flow routing through the sediment control devices reduces peak flows from the disturbed areas, precluding flooding

**TECHNICAL MEMO**

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impacts to downstream areas. Following reclamation, stream channels will be returned to a stable state, minimizing detrimental effects that may result from flooding.

There has been no reported discharge from the sedimentation pond (UTG040019-001) since May 2000. Reported discharge from the mine directly to Gordon Creek (UTG040019-002) has averaged 200 to 300 gpm since January 2000.

The Permittee estimates maximum discharge directly to Jewkes Creek will be 523 gpm (1.17 cfs) with an average discharge of 200 to 300 gpm (0.45 to 0.67 cfs). Maximum discharge is expected to occur only for short periods of time as water-bearing faults are intercepted. Channel capacity for Jewkes Creek is 38.7 cfs and peak flow from the 100-year 6-hour storm event below the mine facilities is 28.9 cfs, including a mine water discharge of 1 cfs (Appendix 7-4). The maximum discharge from the mine is only about 3% of the natural channel capacity and the average discharge is less than 2% of the natural channel capacity. The natural channel downstream of the mine has a capacity nearly 10 cfs greater than the peak flow and even the maximum discharge from the mine during the 100-year 6-hour storm event would not cause Jewkes Creek below the mine facilities to exceed its channel capacity. The addition of the discharged mine water is not expected to alter the natural channel and the potential for stream channel alteration is minimal.

If subsidence does occur, the Permittee expects it to be uniform with little to no impact on Beaver Creek or other drainages in the area. However, at the edges of the graben that bounds the mine workings there is potential for a sharp drop at the faults. A sharp drop at the upstream fault could cause headcutting in the channel and loss of streamflow into the fault, and at the downstream fault a sharp drop could cause ponding and loss of flow into the fault. The Permittee commits that if sharp drops occur at the faults, the impacted sections will be reconstructed to prevent erosion and loss of topsoil; to stop flow being lost into the fault, the channel area would be excavated and backfilled with clay prior to reconstructing the channel. If subsidence fractures occur in Beaver Creek without vertical displacement but flow is lost into the fracture, a mixture of soil and bentonite will be used to seal the fracture. In the event that stream channel mitigation is required, the Permittee commits to submitting designs to the Division for approval prior to commencing any construction activities. The need for mitigation activities will be assessed during each subsidence monitoring event.

Projected limits of subsidence are shown on Plate 3-3. This map also shows the relationship of the planned mine workings and projected subsidence to the faulted zones bounding the graben.

**Findings:**

The Probable Hydrologic Consequences Determination is adequate to meet the requirements of the Coal Mining Rules.

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TECHNICAL MEMO

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## 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

Plate 6-1 shows the surface geology and surface hydrology. Overburden isopach thickness and coal seam thickness are shown on Plate 3-3.

### Findings:

Maps, Plans, and Cross Sections of Resource Information are adequate to meet the requirements of the Coal Mining Rules.

## 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:

Steve and Pete Stamatikis stated in their letter to the Division that monitoring had not been done “since Horizon left”; it isn’t clear what date or event this refers to, but some of the monitoring was not done in 2000. There have also been quarters when there was no access for some monitoring sites because of snow cover. Data in the Division’s database indicate that the monitoring plan described in the MRP has basically been followed and reporting to the Division is up-to-date.

The Permittee has committed to monitor significant surface- and ground-water sources, including drainages above and below the disturbed mine site area, and all point-source discharges.

#### Groundwater Monitoring

## TECHNICAL MEMO

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The Ground Water Monitoring Plan is in Chapter 7. Operational and reclamation ground-water monitoring parameters are in Table 7-2. Groundwater monitoring during operation of the mine will be conducted in accordance with R645-301-723 and will consist of:

- Collection of flow and water-quality data from springs SP-1, -2, -4, -9, 2-6-W (Homestead Spring), and GV-70;
- Collection of flow and water-quality data from sustained inflows to the mine and mine water discharge quantities (temporary or permanent); and
- Collection of water-level data from the HZ monitoring wells (Section 7.1.5).

In November 2001, monitoring well HZ-01-06-1 was installed to provide potentiometric data for the area north of Beaver Creek. Water levels have been measured in the second, third, and fourth quarters and results are tabulated in Table 7-1 in the Annual Reports and are in the Division's database. The potentiometric surface dropped 85 feet between the first and second readings. It is not clear to the Permittee as to whether the drop was due to the mine de-watering the aquifer or if the initial reading was inaccurate. Circulation was lost numerous times during drilling, resulting in drilling fluid flowing into the formation, and drilling fluid flowing back into the borehole may have artificially elevated the potentiometric surface for the first reading. However, HZ-95-1 experienced a 104-foot drop in a similar time period between the fall of 1999 and spring of 2000.

### **Stream Buffer Zones**

Under R643-301- 731.610, no land within 100 feet of a perennial stream or an intermittent stream will be disturbed by coal mining and reclamation operations, unless the Division specifically authorizes coal mining and reclamation operations closer to, or through, such a stream. The Division may authorize such activities only upon finding that:

- 731.611. Coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water quality standards and will not adversely affect the water quantity and quality or other environmental resources of the stream; and
- 731.612. If there will be a temporary or permanent stream channel diversion, it will comply with R645-301-742.300.

No diversion of Beaver Creek or other streams to the north is planned, so 731.612 does not apply for this Permit Boundary Expansion. Diversion culverts in Jewkes Creek and Portal Canyon have been approved in previous permit reviews.

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TECHNICAL MEMO

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Mining is planned beneath Beaver Creek, a perennial stream. The Permittee believes that no damage will occur to Beaver Creek with the planned mining. There are no plans for a buffer zone. Subsidence protection is planned for Beaver Creek by orienting the panels perpendicular to the stream and using full extraction pillaring. There will be no surface mining activity in the Beaver Creek watershed, so no stream buffer zone is needed along Beaver Creek to protect structures from surface activity.

The Permittee states in the PHC (Section 7.3.2) that retreat mining results in uniform downwarping and lowering of strata above the mined interval. This uniform downward movement is generally not accompanied by a significant degree of fracturing. As a result, the original attitude and integrity of the strata are maintained. Little impact on the perched aquifers of the overburden is expected to result from downwarping.

Appendix 7-13 contains a copy of the US Forest Service study of the impacts of subsidence caused by full extraction mining beneath Burnout Canyon at the Skyline Mine: this study and its conclusions have already been discussed under Probable Hydrologic Consequences Determination - *Impacts to the Hydrologic System Resulting From Subsidence*. If the same conditions exist at Beaver Creek as exist at Burnout Creek, it would be reasonable to conclude that the impacts from mining beneath Beaver Creek would be the same, that is minimal and without lasting effect.

Overburden isopach and coal seam thickness are shown on Plate 3-3. Table 6-2 lists depths to the top of the Hiawatha Seam as measured in five bore holes: depths range from 215 feet to 1,149 feet, and only two of the five are greater than 800 feet, so an average based on these data indicate the overburden is thinner than 800 feet. However, boreholes LMC-1 and HZ-95-1 are located adjacent to Beaver Creek and indicate the Hiawatha overburden thickness in the graben is at least 800 feet beneath the creek. Plate 3-3 and the cross section on Plate 6-2 also indicate a thickness greater than 800 feet. Therefore, the conclusions from Burnout Creek, which relate to overburden being over 800 feet thick, could be used to predict that subsidence will cause only minor and temporary impacts to Beaver Creek.

One factor that is different from the Skyline Mine and Burnout Canyon is that mining at Horizon will be done in a graben, and activation of the bounding faults by subsidence needs to be considered. Creation of scarps across Beaver Creek would create ponding on the downstream side of the permit and headcutting on the upstream side. Erosion would eventually cut through the downstream scarp, removing topsoil, forming a gully, and increasing sedimentation downstream outside the permit area. At the end of Section 7.3, the plan addresses mitigation for these potential effects of subsidence at the margins of the graben. Plate 3-3 shows projected limits of subsidence and the relationship of the planned mine workings and projected subsidence to the faults bounding the graben.

## TECHNICAL MEMO

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The Permittee notes in Section 3.3.2.2 that no surface structures exist within the zone of potential subsidence. There are, however, private unpaved roads adjacent to Beaver Creek, in Sand Gulch, and in an unnamed side canyon to Jump Creek that could be affected by subsidence. Surface owners Steve and Pete Stamatakis have expressed concern over damage to their property from subsidence. Subsidence of roads is allowed by the Coal Mining Rules, but it is reasonably foreseeable that damage to these roads from subsidence could result in diminished use. Section 3.2.3.4 discusses potential damage to these roads and includes a commitment to maintain and repair these roads.

### Water Replacement

Under R645-301-525.480 and R645-301-731.530, there needs to be a plan in the MRP, before any damage actually occurs, to repair damage to surface facilities and promptly replace state-appropriated water supplies. Section 7.1.6 is given as the location for the water replacement plan. There the Permittee has committed to

... promptly replace the water supply if such a water supply proves to be contaminated, diminished or interrupted as a result of the mining operations...

.... Specific methods to promptly replace a water supply impacted by mining operations would include (but not be limited to): repair or replacing a pond damaged by mining operations, hauling water by truck to replace water impacted by mining operations, drilling a new water well, or transfer of water rights to the damaged party.

However, between the two statements quoted above, the Water Replacement plan also says:

...First, a determination will be made in accordance with R645-301-731.530 as to whether or not material damage has occurred. Then, in accordance with Regulation R645-301-525.510, Horizon Mine will correct any material damage resulting from subsidence caused to surface lands (which includes water rights), to the extent technologically and economically feasible, by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses that it was capable of supporting before subsidence damage. Negotiations will be held with the water right holders to determine the best plan of action and implementation of water replacement.

This can be construed as meaning “prompt” water replacement will not be done until and unless there is a determination of material damage, which is not in accordance with R645-301-731.530. The Division has clearly informed the Permittee in previous Technical Memos, Technical Assessments, and through personal communications, and restates it again, that water replacement required under R645-301-731.530 is not contingent on a determination of material damage, but simply on a determination of contamination, diminution, or interruption as determined from baseline hydrologic and geologic information.

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TECHNICAL MEMO

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In section 3.4.8.2 is the following statement regarding long-term mitigation:

...Should a substantial inflow of groundwater occur, mitigation measures may include: attempts to seal off the inflow, increased monitoring efforts, lining of the stream bed through the affected area if it is determined to be surface water, and replacement of lost water if the groundwater does not rebound. Replacement of water lost due to mining is addressed in 7.1.6.

An extended mitigation plan will be enacted should a measurable impact occur to surface water due to mining activity. The mitigation plan will be correlated with Water Rights and UDOGM.

**Findings:**

Operation Plan Hydrologic Information is not adequate to meet the requirements of the Coal Mining Rules. Prior to approval the applicant needs to provide the following in accordance with:

**R645-301-525.480, -731.530**, The statement "...First, a determination will be made in accordance with R645-301-731.530 as to whether or not material damage has occurred. Then, in accordance with Regulation R645-301-525.510, Horizon Mine will correct any material damage resulting from subsidence caused to surface lands (which includes water rights), ..." in Section 7.1.6 can be construed as meaning prompt replacement of state-appropriated water supplies will not be done until and unless there is a determination of material damage, which is not in accordance with either R645-525.480 or R645-301-731.530. The statement regarding determination of material damage in R645-301-525.480 applies only to subsidence related damage to the land and protected structures, not to water supplies. The replacement of State-appropriated water supplies required under R645-301-525.480 and R645-301-731.530 is not contingent on a determination of material damage, but simply on a determination of contamination, diminution, or interruption as determined from baseline hydrologic and geologic information. The Permittee must clarify that its water replacement plan is not contingent on a determination of material damage.

**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:**

### **Mine Workings Maps**

The mine-workings map, Plate 3-3, shows the projected angle-of-draw and the positions of the bounding faults of the graben.

### **Certification Requirements**

See Wayne Western's Technical Memorandum. Mark Wayment, a professional engineer registered in Utah, will certify final copies of plates in this submittal: he is not yet licensed in the State of Utah.

### **Findings:**

The information contained in this section of the proposed amendment is not adequate to meet the requirements of the regulations. See Wayne Western's Technical Memorandum.

## **CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT**

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

### **Analysis:**

The CHIA was updated when the south part of Federal Lease UTU-74804 was added to the permit in 2001. That revision included assessment of the entire federal lease UTU-74804. The Division is updating the CHIA for this significant revision, but major changes are not anticipated.

### **Findings:**

The Division will update the CHIA as needed for this permit extension, a significant revision to the mine plan.

### **RECOMMENDATIONS:**

This amendment to the MRP should not be approved until deficiencies identified in the Division's technical reviews have been adequately addressed.