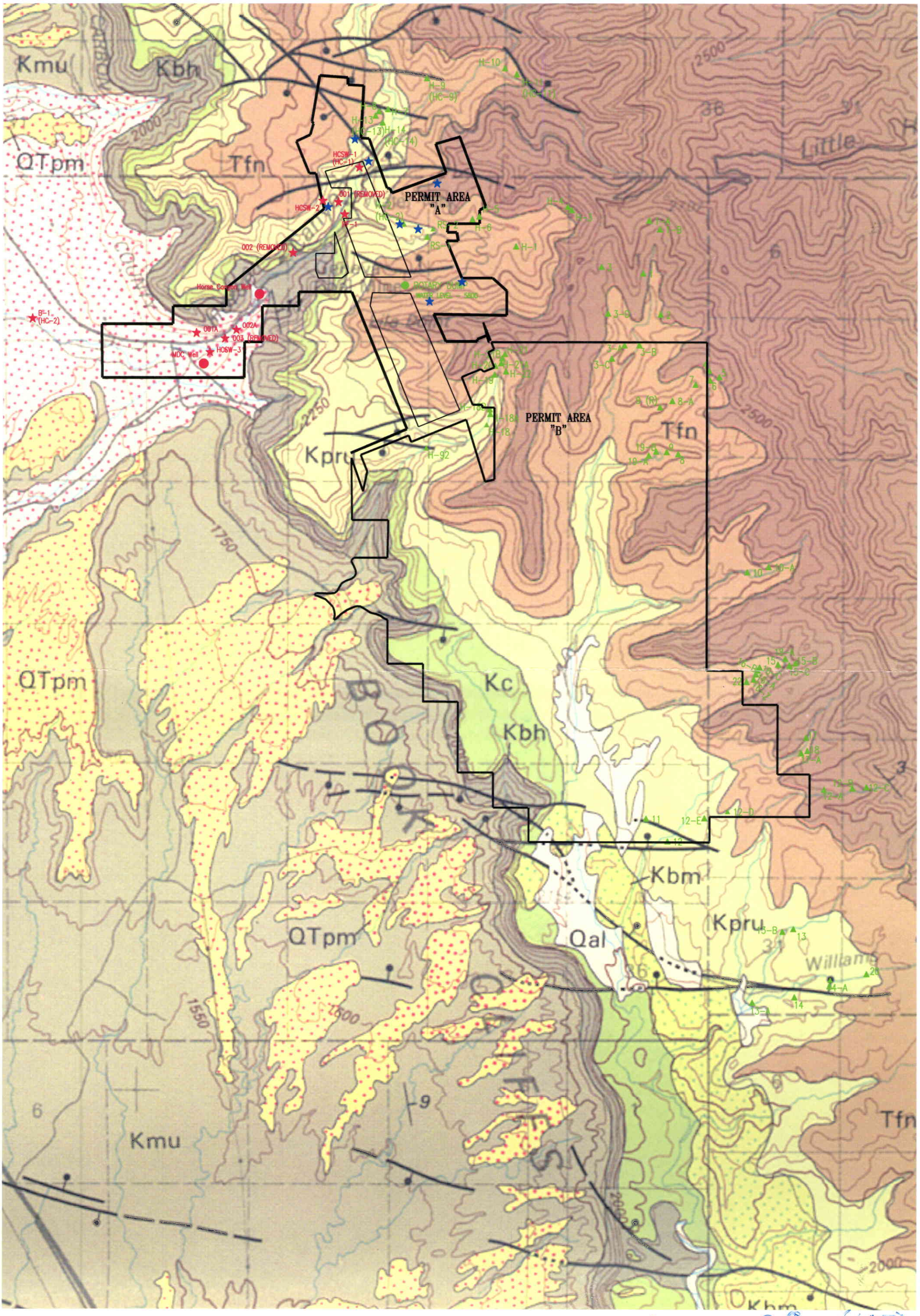

Exhibit 28 (45)

UtahAmerican Energy, Inc.

RECEIVED
MAY 21 2002
DIV OF OIL GAS & MINING

May 21, 2002

Mr. Lowell Braxton
Director
Utah Division of Oil, Gas & Mining
1594 West North Temple
Salt Lake City, Utah 84106

RE: New Permit Application, UtahAmerican Energy, Lila Canyon Mine, C/007/013

Dear Director Braxton:

This letter sets forth UtahAmerican Energy, Inc.'s ("UEI's") response to the letter dated April 22, 2002, summarizing the issues which Southern Utah Wilderness Alliance ("SUWA"), plans to address at the informal conference scheduled for May 21, 2002. Many of the issues SUWA identifies go beyond the "completeness" of UEI's permit application package ("PAP"), to address the technical adequacy of the application. In particular, claims 1-6, 11, 14-17, 25, 28-29, appear to involve issues of PAP completeness. *See* R645-300-121.100. The remaining claims, however, merely express SUWA's opinions as to how the technical analysis should proceed. These claims are premature until the Utah Division of Oil, Gas & Mining ("DOGM"), has issued its technical adequacy determination. Nonetheless, UEI hereby addresses SUWA's comments with the understanding that these are the only issues which will be raised by SUWA during the informal conference, consistent with R645-300-122.

I. HYDROLOGY

A. UEI has submitted accurate and complete baseline information.

1. Acid or Toxic-Forming Material

With respect to testing acid and toxic forming materials, the regulations allow an applicant to request that the Division "waive in whole or in part the requirements of R645-301-624.200 and R645-301-624.300." See R645-301-626. By letter dated April 22, 2002, attached as Exhibit 1, and based upon other information available to DOGM of equal value and effect, UEI has requested that the requirements of R645-301-624.300 be waived. The requested waiver is included in PAP, Appendix 6-2. Other information of equal value or effect consists of:

a. Over 100 years of experience mining the Sunnyside seam. (*See* page 39 of PAP, Chapter 6), attached as Exhibit 2.

P.O. Box 986 Price, Utah 84501 Telephone (435) 637 5032 x 724 Fax (435) 613 0805 email: jmarshall@coalsource.com

b. Acid and toxic analysis from two drill holes located two miles south of UEI's lease area. A report titled "Analyses of Various Rock Types" is included in Appendix 6-2, attached as Exhibit 3. The report includes a chemical analysis (including acid and toxic forming materials) for S-24 and S-25. Plate 6-2, attached as Exhibit 4, shows the locations of S-24 and S-25. *See also* Plates VI-13 and VI-14, attached as Exhibits 5 and 6.

c. UEI's commitment to treating all underground mine waste including the rock slope material as if it contains acid-toxic forming materials (even if tests are negative.) (*See* PAP, Appendix 5-7, attached as Exhibit 7.)

d. UEI's commitment to test all slope material as necessary to determine acid-toxic potential. (*See* Appendix 5-7, attached as Exhibit 8.)

e. An approved plan for operation and reclamation of the refuse pile that includes:

(i) burial of all coal mine waste with a minimum of four feet of subsoil and topsoil; and

(ii) design and construction that will prevent or limit infiltration of precipitation and contamination of runoff and groundwater. (*See* PAP Chapters 2, 5, and 7 and Appendix 5-7 for details on the refuse pile.)

2. <u>The PAP contains the required subsurface water resource maps</u>.

In accordance with R645-301-722.100, UEI has submitted, PAP, Plate 7-1, attached as Exhibit 9, which shows the locations of baseline data points and elevations of subsurface water. Specifically, the map shows the aerial and vertical distribution of springs and seeps as well as the aerial and vertical distribution of the saturated zone as demonstrated by the contour lines. The lack of seasonal variation in the saturated zone is demonstrated by analyzing the data from Piezometers IPA#1, IPA#2 and IPA#3 shown in table form as well as graphically in PAP, Appendix 7-1, attached as Exhibit 10.

3. <u>The PAP contains the required surface water information</u>.

R645-301-724.200 requires the submission of the name, location and ownership information of surface water bodies within the permit and adjacent areas as determined by the DOGM. In addition, the regulation requires the submission of seasonal flow data as well as testing to show baseline water quality.

UEI's PAP contains all the required data for the only two intermittent washes in the area, Lila Canyon and Little Park. The "no flow" data submitted to DOGM reveals that these washes are dry most of the year, with the exception of spring snow melt and summer thunderstorms.

Surface water resources baseline information on seasonal flow rates is provided with dates of observation in PAP Appendix 7-1, attached as Exhibit 11. Historical baseline data are also being added to the database by DOGM. There is no substance to SUWA's claim that seasonal and quality information has not been submitted. The "no flow" data reveal that these washes, located in an extremely arid region, are dry most of the year.

4. Ground Water Quantity in the Saturated Zone.

No water quantity data is required for the saturated zone. The regulations require monitoring of water quality and quantity for groundwater resources such as aquifers as defined by R645-100-200. *See* R645-301-724.100. The saturated zone in the Mesa Verde group is not an aquifer as defined by the coal regulations because it is not developed for a specific use, nor does it supply any water sources or serve as a beneficial use for an appropriated source. Nonetheless, and although not required by the regulations, UEI has gathered quantity information for the saturated zone through data from Piezometers IPA#1, IPA#2 and IPA#3. The data does not need to be collected two years prior to mining to identify comparative lands. These data show the water level revealing the hydrostatic head in the coal zone. Specifically, the data show:

a. Seasonal variations in head for Piezometers IPA#1, IPA#2 and IPA#3, shown in table form as well as graphically in Appendix 7-1, attached as Exhibit 10. The pieziometric surface was calculated from the only 3 data points within the Lila Canyon Mining area.

b. The piezometric surface as shown on Plate 7-1 is inferred using all the available information. The known elevation points from the Horse Canyon mine are shown on Plate 7-1, attached as Exhibit 9.

c. The effect of faults on ground water is highly variable- in some cases, the fault will act as a conduit – in others- it may act as a barrier to water movement. Faults have been addressed in the Probable Hydrologic Consequences ("PHC"), Determination, on page 5 of Appendix 7-3, attached as Exhibit 12, and page 40 of Chapter 6, attached as Exhibit 13.

d. Groundwater discharge rates will vary according to operational requirements. See discharge rate of the adjacent Horse Canyon Mine at .02 cfs on Page 11 Chapter 7, PAP, attached as Exhibit 14.

5. Ground water quality in the deep saturated zone.

As explained above, the regulations require monitoring of water quality and quantity for groundwater resources such as aquifers as defined by R645-100-200. *See* R645-301-724.100. The saturated zone in the Mesa Verde group is not an aquifer as defined by the coal regulations

at R645-100-200, because it is not developed for a specific beneficial use, nor does it supply any water sources. It has no observable discharge points within the Lila Canyon Mine Extension area or down dip from that area.

Nonetheless, UEI has submitted water quality information for the saturated zone collected from eight "in mine" water monitoring locations shown on Plate 7-1 and found in Appendix VI-1 of the Horse Canyon Plan and Appendix 7-1 and 7-2 of the Lila Canyon Extension, attached as Exhibits 15, 16, and 17. While not required under the regulations, the "in mine" water samples were tested and provide information on the quality of the water in the saturated zone prior to UEI's commencement of mining.

As for SUWA's complaint that no water quality tests have been taken from IPA-1, -2 and –3, SUWA has failed to understand that these locations are piezometers drilled to measure the water level in the coal zone. These piezometers are not water quality monitors and there is no requirement that they be used as such.

6. <u>There is ample ground water quality and quantity for the perched aquifers</u>.

As explained above, the regulations require monitoring of quantity and quality of ground water resources. The waters in the upper Wasatch Group are ground water resources which UEI has and continues to monitor.

SUWA has apparently ignored the fact that UEI continues to monitor the ground water quality and quantity of the perched aquifers with six currently operating ground water monitoring locations. Five of the six locations are in areas outside of the permit area but have been located in adjacent areas to meet DOGM's monitoring requirements. *See* R645-301-724.100. Moreover, contrary to SUWA's assertion, the water quality of the perched aquifers has been tested at least ten times for each location. *See* Exhibit 18. These tests provide the required premining baseline information on the ground water resources within the permit and adjacent areas.

B. **Coal Mine Waste**

7. <u>The PAP explains the use of rock slope material</u>.

The rock slope material is clearly defined as underground development waste in PAP, Appendix 5-7, attached as Exhibit 19. Underground development waste is defined at R645-100-200 as "waste rock mixtures of coal, shale, claystone, siltstone, sandstone, limestone, or related materials that are excavated, moved, and disposed of from underground workings. . ." As clearly explained in the PAP, the rock slope material will be used as fill material. *See* PAP, Chapter 5, pages 18-19, attached as Exhibit 20.

8. Location/extent of coal mine waste is detailed in the PAP.

The location and extent of the underground development waste is shown in PAP, Appendix 5-7, Table 1 (Exhibit 19), and on Figures 1 and 2, attached as Exhibit 21.

9. Treatment of coal mine waste.

The treatment of all the underground coal mine waste is explained in detail in PAP, Appendix 5-7, attached as Exhibit 19.

10. Testing of coal mine waste.

The testing of the rock slope material (refuse) is discussed in detail in PAP, Appendix 5-7, attached as Exhibit 19.

C. Mine Water Discharge

11. UEI has committed to study channel morphology prior to mine water discharge.

UEI does not believe that sufficient volumes of water will be encountered by underground mining activities to necessitate pumping and surface discharge. Nonetheless, UEI has committed to study and analyze channel morphology parameters and erosion impacts prior to discharging any mine water. *See* PAP, Chapter 7, pg. 25, attached as Exhibit 24. In addition, UEI has obtained a UPDES permit Nos. UTG0410024 and UTG 0400000, effective October 1, 1999, attached as Exhibit 25, which require compliance with Utah Department of Environmental Quality regulations concerning discharges.

12. UEI's project will not impermissibly increase salinity.

As explained above, UEI does not believe that sufficient volumes of water will be encountered in underground mining activities to necessitate pumping and surface discharge. Nonetheless, UEI has committed to study and analyze channel morphology parameters and erosion impacts prior to discharging any mine water. *See* PAP, Chapter 7, pg. 25, referenced above. SUWA's comments regarding salinity are speculative unless sufficient water is encountered in the mine to necessitate discharge. However, the Probable Hydrologic Consequences ("PHC"), determination set forth at Appendix 7-3, attached as Exhibit 27, identifies and evaluates the possible impact of increased sediment loading. Moreover, UEI's commitment to test, analyze and sample discharges as well as evaluate impacts, including the impacts from erosion, is all that is required by the regulations, especially since mine water will not be encountered for a number of years. Therefore, PAP adequately addresses the hydrologic resource information requirements of R645-301-724.200.

13. UEI has obtained a UPDES permit.

UEI does not believe that sufficient volumes of water will be encountered underground to necessitate surface discharge. Even if sufficient volumes of water were encountered underground, a UPDES permit would ***not*** be required until mine development and discharge. However, as set forth above, UEI applied for and received UPDES permits from the Department of Environmental Quality, Division of Water Quality. These permits can be found in PAP, Appendix 7-5, and are attached as Exhibit 25.

D. Water Monitoring Plan

14. UEI's ground water monitoring plan is sound and uses accurate baseline data.

The operational plan for Lila Canyon Mine includes a groundwater monitoring plan consistent with R645-301-731.200 and .211 and based on the PHC determination. SUWA has inappropriately concluded that because only one of the six ground water monitors is located inside the permit area, the monitoring plan is somehow flawed. Rather, this fact demonstrates that the permit area is very arid and that there is a paucity of springs and seeps within the permit area, which diminishes the hydrologic impact of mining operations.

As explained above, the six ground water monitoring stations provide the necessary information for monitoring the perched aquifers located within the Wasatch Group. UEI is monitoring the groundwater resources at the six locations shown on Plate 7-4. Exhibit 18 shows that UEI has several years worth of data for these six groundwater monitoring locations. These data provide the critical baseline information required by R645-301-724.100 and the PHC determination.

15. There is ample baseline data for the surface water monitoring plan.

UEI is in compliance with R645-301-724.200 in that it has collected adequate baseline data for Lila Canyon and Little Park washes. This data demonstrates there has been little or no flow in these washes for years. It should be noted that "No Flow" is considered data.

In its request for a hearing, SUWA suggests that snows in recent years have created flows in the washes. Generally, the upper sections of Little Park and Lila Canyon flow briefly during the snow melt runoff and during summer thunderstorms. In dry years, no runoff is produced during snow melt. The data collected by UEI demonstrate that this showing is consistent with "no flow" readings. *See* Exhibit 18 for the three monitoring locations L-1-S through L-3-S. This Exhibit demonstrates that there is adequate baseline data to comply with the operational monitoring requirements of R645-301-731.221. SUWA's argument implying that Little Park and Lila Canyon washes flow regularly is unsubstantiated and inconsistent with UEI's "no flow" data. UEI's baseline information is correct and complete and satisfies the regulatory

requirements of R645-301-724.200 and will satisfy the operational requirements of R645-301-731.221 once the mine begins to operate.

16. The rules do not require water quality monitoring of the deep saturated zone.

As explained above, the regulations do not require monitoring of the deep saturated zone because it is not an aquifer as defined by R645-100-200. *See* R645-301-724.100. The saturated zone in the Mesa Verde group is not an aquifer as defined by the coal regulations because it is not developed for a specific beneficial use, nor does it supply any water sources. The regulation cited by SUWA, R645-301-731.211 confirms that the purpose of a groundwater monitoring plan is to protect groundwater for which there is a use. Specifically, that section states that, "The plan will provide for the monitoring of parameters that relate to the ***suitability of the ground water for current and approved post-mining land uses*** and the protection of the hydrologic balance . . ." R645-301-731.211(emphasis added). The PHC determination confirms that the water in the deep saturated zone is isolated without any known discharge points near the Lila Canyon mine or the down dip from that area. It is isolated by the impermeable North Horn Formation-Flagstaff Limestone and the equally impermeable Mancos Shale. Therefore, due to the isolation of this zone, there are no uses identified for this water for post-mining land use or otherwise under the PHC determination.

Nonetheless, as explained above, water quality information on the deep saturated zone is available from "in mine" samples taken from the Horse Canyon Mine. This information provides historic baseline information on the quality of this water. Moreover, should development of the Lila Canyon Mine require the discharge of water from the deep saturated zone, site L-5-G has been designated to monitor the water quality of any such discharge. *See* PAP, Chapter 7, pg. 36, attached as Exhibit 26.

E. PHC Determination

17. UEI has submitted all required baseline data for the PHC.

UEI's PHC determination complies with R645-301-728.200 and is based on adequate baseline hydrologic and geologic data as set forth at PAP, Appendix 7-1 and Appendix 7-3, attached as Exhibits 17 and 26. It should be noted that acid or toxic forming material was not specifically addressed in the PHC. This will be corrected by adding a paragraph at PAP, Chapter 7, confirming that there is no evidence of acid or toxic forming material.

18. Cumulative Impact Area.

SUWA's comments regarding the Cumulative Hydrologic Impact Assessment ("CHIA"), are premature. Pursuant to R645-301-729.100, DOGM will prepare the CHIA. UEI has supplied DOGM with more than sufficient data to assist the State in defining the cumulative

impact area and assessing the surface and groundwater systems. DOGM's CHIA will be based on information specific to Lila Canyon. SUWA has inappropriately cited a USGS report and cross-section for the Trail Mountain Area which is located outside of the Book Cliffs and does not relate to Lila Canyon. Notably, Trail Mountain is located in the Wasatch Plateau, where the Star Point Sandstone is regarded as a "regional aquifer." The Star Point Sandstone does not exist on the east side of the valley, in the Lila Canyon Area of the Bookcliffs. Therefore, the USGS Report provided by SUWA should be disregarded. Furthermore, Range Creek is not impacted by the Lila Canyon Mine as it is located to the east of the mine, is separated hydrologically by geologic features including the Patmos Ridge, and most importantly because the Blackhawk formation does not intercept Range Creek. *See Geologic overlay,* Exhibit 28. Adequate geologic and hydrologic data are provided by the PAP to allow DOGM to define the cumulative impact area within the CHIA and SUWA's comment should be dismissed.

II. ENGINEERING PLAN

19. The construction, operation and reclamation of the mine is described more than adequately in the PAP.

Contrary to SUWA's claims, the operation of the mine will not impact any wilderness uses. As is described more fully in paragraph 38, there is no wilderness use within or near the permit area. The wilderness study area overlapping a small portion of the permit area will not be impacted by surface facilities. Moreover, the Lila Canyon Mine is located within federal coal leases with valid existing rights, which pre-date the Wilderness Act of 1964, 16 U.S.C. § 1131, and the Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1701, et seq. The Bureau of Land Management ("BLM") owns and manages these lands and operation of the Lila Canyon mine is consistent with BLM's land management plans and regulations. In October, 2000, BLM issued a Finding of No Significant Impact ("FONSI"), and Decision Record approving a right of way to UEI to construct, operate and maintain mine-related facilities on these lands. BLM specifically concluded that surface facilities will not impair wilderness characteristics of the WSA and no mitigation was proposed for wilderness inventory areas. October 27, 2000, FONSI for the UtahAmerican Lila Canyon Mine Project and Access Roads, page 8, attached as Exhibit 29. SUWA has cited no applicable federal law, regulation or land use plan which requires the mitigation measures it identifies such as camouflage and restrictions on night time operations. Therefore, DOGM should dismiss this comment.

20. Subsidence will be minimal and will not impact land uses.

Subsidence is addressed in the PAP at Volume 2, in the Environmental Assessment ("EA"), prepared by BLM, and in the FONSI/Decision Record for Lila Canyon. *See* Exhibits 29 and 30 above. The BLM reasonably concluded in its FONSI/Decision Record that wilderness values would not be degraded by mining activities taking place beneath the surface. *See* Exhibit 29 at p. 8. BLM analyzed the compatibility of underground mining with surface resources and

concluded that underground coal extraction beneath portions of what is the Desolation Canyon Inventory Unit 8 and Turtle Canyon Inventory Unit 4, as well as a small part of the Turtle Canyon WSA, will not degrade or diminish surface lands. *Id.* Specifically, BLM concluded that "[n]aturalness, opportunities for solitude and primitive/ unconfined recreation and cumulative values would not be diminished nor degraded by the proposed underground mining due to the substantial cover anticipated (at least 1,500 feet)." Exhibit 30, #UT-070-99-22 at 56. Moreover, the reclamation plan set forth in the PAP confirms that UEI will restore the area to its pre-mining use as required by law. SUWA has not set forth any facts or substantive arguments to counter the completeness of UEI's PAP.

Furthermore, the Turtle Canyon wilderness inventory unit is to be managed in accordance with "the existing land management plan" as set forth in an opinion dated April 15, 1999 from former Department of Interior Solicitor John Leshy. *See* PAP, Appendix 4-2, Exhibit 22. The Price River MFP does not characterize these lands as wilderness. BLM has specifically found:

> The proposed action is in conformance with the existing BLM land use plan for the area. It is also consistent with the Department of the Interior and BLM Interior Management Guidance for wilderness inventory units. UtahAmerican holds valid existing rights that must be recognized.

BLM FONSI/Decision Record at p. 8, Exhibit 29.

Finally, SUWA incorrectly asserts that no mechanized equipment can be used in wilderness inventory units or in WSA's. In this regard, SUWA fails to recognize UEI's valid existing rights under its federal coal leases.

21. <u>The Reclamation Cost Estimate Information is Not Outdated</u>.

UEI has provided adequate information at Chapters 3 and 5 and at Appendix 8-1 of the PAP to allow DOGM to make an accurate cost estimate consistent with R645-301-800. UEI has appropriately relied on the Caterpillar Performance Handbook in preparing its estimate. This reference is a <u>performance</u> handbook and a particular model of equipment will essentially perform the same regardless of what year it was used. For instance, if a D9E can push 50 cubic yards of material in 1990 it will push 50 cubic yards of material in 2002 and even in 2020. If Caterpillar or any other manufacture produces a similar model with different performance parameters they will designate it as a different model. In addition, the Means 2000 Construction Cost Data book was completely appropriate to use for the initial estimates for bonding purposes.

Finally, SUWA's comments regarding the reclamation bond estimate are premature. The final bond amount will be determined just prior to issuing the permit. *See* R645-301-134; R645-301-830. At that time all bonding costs and production estimates will be checked and updated as

necessary. A bond for the appropriate amount will then be posted prior to the permit being issued. R645-301-820.100.

22. Reclamation costs will be set by DOGM prior to the posting of the bond.

As pointed out by SUWA, there is an insignificant error in the calculations of the cost of earthwork. The amount of the error is more than covered in the reclamation escalation costs and other contingencies. *See* R645-301-830.300 (adding an inflation factor based on a cost index.) However, these reclamation cost estimates are only used as preliminary estimates. The final bond amount reflecting reclamation costs will be determined by DOGM just prior to the permit issuance. Bonding is clearly a technical issue and not an administrative completeness issue. R645-301-134; R645-301-820.100.

III. SOILS

23. Sufficient topsoil will be used for reclamation.

Consistent with R645-301-200, UEI has provided adequate information regarding soil resources at PAP, Chapter 2. In accordance with R645-301-232.300, since the horizon is less than 6 inches deep, the topsoil recovered onsite will include both A and B horizon soils. Depths of salvage range from 6 to 18 inches over the site. The detailed "salvageable soils map" found in Appendix 2-3, attached as Exhibit 31, shows the amount and location of salvageable soil. Plate 2-3 shows the location and amounts of soil that will be salvaged and replaced. The plan does not propose any barrow material as a topsoil substitute; therefore, contrary to SUWA's comment, the reclamation bond should not be adjusted.

24. Subsoil.

As set forth at PAP, Chapter 2, a subsoil stock pile is not needed since an adequate amount of growth media is present for reclamation purposes. *See* Available Soil Resources table, Section 232.100, attached as Exhibit 32.

IV. BIOLOGY

Contrary to SUWA's allegations, the PAP contains adequate vegetative and wildlife information consistent with R645-301-310 and 311 which provides: "Each permit application will include descriptions of the: [v]egetative, fish and wildlife resources of the permit area and adjacent areas as described under R645-301-320," emphasis added. SUWA appears to have confused the extent of an area which must be studied for UEI's underground mine with the more expansive surface mine requirements.

For vegetative areas, the regulations require UEI to analyze the vegetation within "areas affected by surface operations incident to an underground mine for Underground Coal Mining

and Reclamation Activities." R645-301-321.100 (emphasis added.) (Compare "reference areas" for surface coal mining and reclamation activities.) UEI has complied with this standard by analyzing and preparing maps which document the types of vegetation existing within "areas affected by surface operations" which in this case includes the proposed surface facility area—an area of 39.86 acres in size. SUWA's claim that remote areas such as the Range Creek and the Price River drainages must be inventoried is without merit in that those areas will not be affected by surface operations incident to the Lila Canyon extension.

As for wildlife and fish habitat, UEI must submit resource information for the permit and adjacent areas as "determined by DOGM in consultation with state and federal agencies with responsibilities for fish and wildlife." *See* R645-322.100. In consultation with appropriate governmental agencies, UEI has complied with the wildlife and fish requirements by conducting Threatened and Endangered Species Inventories (Appendix 3-4) as well as Raptor Inventories (Appendix 3-5) , attached as Exhibits 33 and 34.

A. Adequate vegetative information

25. Current data.

The PAP contains vegetative information which meets the requirements of R645-301-311 and R645-301-321.100. However, UEI has committed to conduct another vegetative survey this spring to address the Book Cliffs blazing star. SUWA's assertion that the vegetative survey include areas outside of those "areas affected by surface operations incident to an underground mine" are without regulatory support and must be dismissed.

The Lila Canyon Mine Project is an extension to the Horse Canyon Permit ACT/007/013. Vegetation data previously collected and approved for the project area constitute a portion of land which will be mined (Appendix 3-2 attached as Exhibit 35). Climax vegetation communities indigenous to the area are essentially unchanged over several generations. The vegetation communities that were surveyed in 1970 are the same as were present in 2001. *Id.*

Site-specific surveys of the areas of potential disturbance that would result from mine facilities and associated activities were conducted in 1998, 1999, 2000, and 2001, with follow-up threatened, endangered, and sensitive species surveys conducted in the spring of 2002. *Id.* The BLM, the Office of Surface Mining ("OSM"), the U.S. Fish and Wildlife Service ("USFWS"), and the Utah Division of Wildlife Resources ("UDWR"), concurred with the findings and conclusions from these surveys. *See* Environmental Assessment for Development of Lila Canyon Project (EA UT-070-99-022); Table 3.2 (plant species); Chapter 3.8 (wildlife); and Lila Canyon Biological Assessment, (Aug. 2000), attached as Exhibit 36. These agencies have all agreed that the areas to be surveyed were those areas that would be directly affected through surface disturbance associated with mine construction activities and associated direct disturbance such as upgrading the existing county roads to facilitate coal transport. *See* EA, Chapter 6, Consultation and Coordination, attached as Exhibit 30. Contrary to the unsubstantiated claims of

SUWA, the Range Creek drainages, the Price River drainage and most of the seeps and springs are outside the permit area and the affected areas. Therefore, appropriately, no surveys of these areas were conducted. Notably, potential negative impacts to surface springs, seeps and Range Creek were discussed by UEI's consultant, EIS, and government agencies but were deemed "Not Credible" and dismissed through Section 7 consultation with USFWS. *See* EA, Biological Assessment, Exhibit G. The conclusion of the findings were that of a "no effect" to Range Creek, Price River, Green River, and Colorado River, including its tributaries. *See* USFWS letters to DOGM dated April 28, 2000, attached as Exhibit 39.

26. Subsidence has been carefully considered, analyzed and addressed.

Subsidence is thoroughly addressed both in Volume 2 of the PAP and the EA prepared by the BLM. *See* Chapter 4.3, Geology Impacts, EA # UT-070-99-22, Exhibit 30. Notably, BLM required no mitigation to address subsidence, recognizing UEI's commitment to monitoring subsidence and commitment to repair subsidence damage and concluded that subsidence "would not result in any cumulative impacts to any resource." *Id.* at page 59. SUWA claims that seeps and springs will be affected by subsidence are without basis. SUWA has not pointed to any seeps and springs within the permit area which have not been inventoried. The permit area is essentially dry, with few seeps and springs and UEI's inventories are complete.

SUWA has not demonstrated that a qualified individual has identified a wetland and/or riparian area within the permit area as defined by United States Army Corps of Engineers or the State of Utah. The surface of the permit area and the affected area have two basic vegetation communities, pinyon-juniper and grass shrub. There are no hydric soils, and no area which could conceivably maintain saturated soils for prolonged periods. Furthermore, no obligate or facultative species (other than tamrisk) have been identified within the area of purposed disturbance. Therefore, using the established Corps of Engineers protocol for delineation of wetlands, UEI's consultant, a certified wetlands delineator, determined that no wetlands are present in the permit area and none would be affected by mining action.

Relative to SUWA's statement of "numerous springs and seeps which would be impacted through subsidence," there are no springs and seeps located within the permit area and adjacent area which have not been inventoried. *See* Response No. 2, above. No impacts to the springs or seeps have been identified as a result of subsidence. SUWA has provided no data to support its assertions; therefore, DOGM should summarily dismiss SUWA's claims.

27. Reclamation.

UEI has committed to comply with the Utah Coal Program in performing its reclamation duties, including revegetation of disturbed areas in accordance with R645-301-353. UEI has further committed to weed control practices set forth at R645-301-320.

B. Adequate Wildlife Information

28. The biology materials contain site-specific resource information.

The PAP contains all required site-specific resource information with the exception of the survey for the Books Cliffs blazing star (not a threatened or endangered species but a species which BLM has requested UEI study) which will be completed in June 2002. The regulations require "Site-specific resource information necessary to address the respective species or habitats . . . includ[ing] [l]isted or proposed endangered or threatened species of plants or animals." *See* R645-301-322.200, -.210. UEI has complied with these regulatory requirements. For example, in PAP, Appendix 3-4 of the PAP there is an extensive Threatened and Endangered Species Inventory and Plate 3-1 sets forth wildlife habitat within the permit area, attached as Exhibits 33 and 37. Moreover, once UEI has performed the Books Cliffs blazing star inventory this spring, all requirements for collecting site-specific resource information imposed by BLM and DOGM will have been satisfied. A protection and enhancement plan has been provided in accordance with R645-301-322.100 and 333. UEI has agreed to participate in habitat enhancement project on some 10 acres to convert pinion and juniper to shrubs, forbs and grasses. *See* PAP, Chapter 333.

29. There will be no impacts on Southwestern Willow Flycatchers.

Table 3-1 of the PAP lists threatened and endangered species that could be affected by the mine, but, appropriately, does not list the Southwestern Willow Flycatcher. *See* attached Exhibit 38. No Southwestern Willow Flycatchers have been identified within the permit area and UEI has not been asked by any agency to evaluate its habitat. The Lila Canyon Mine permit area is extremely dry without perennial streams, riparian areas or willows or similar type riparian vegetation. According to information provided by the United States Geological Survey ("USGS), and the United States Fish and Wildlife Service (USFWS"),

> (t)he Southwestern Willow Flycatcher breeds in dense riparian habitats along rivers, streams, or other wetlands. Almost all Southwestern Willow Flycatcher breeding habitats are within close proximity (less than 20 yards) of water or very saturated soil. This water may be in the form of large rivers, smaller streams, springs, or marshes. At some sites, surface water is present early in the nesting season, but gradually dries up as the season progresses. Ultimately, the breeding site must have a water table high enough to support riparian vegetation.

See http://wapiti.wr.usgs.gov/swwf/wiflhab.html. The terrain in and around the permit area is far from "dense riparian" capable of supporting flycatcher populations. Rather, the lands surrounding the mine are arid, alkali lands and as a result, no flycatcher survey has been required. SUWA has failed to demonstrate any impacts to Range Creek, either direct or indirect,

by their project. In addition, DOGM and USFWS have concurred in a "not likely to adversely affect" determination for the Southwestern Willow Flycatcher. Letter dated April 28, 2000, attached as Exhibit 39. Accordingly, SUWA's contentions must be dismissed.

30. Sensitive, threatened and endangered species surveys are accurate.

As set forth in response to comment 28, the PAP contains all site-specific resource data required, including surveys of listed or proposed endangered species of plants and animals. *See* PAP, Chapter 3, Appendix 3-4, Page 3-1; R645-301-322.200-.210. SUWA has failed to demonstrate that the Threatened and Endangered Species ("TES"), surveys are in need of updating.

EIS, the consultant who compiled the data for the Biological Assessment is a third party consultant approved by the federal land management agency to perform the interagency consultation by BLM with USFWS. *See* Exhibit 23. Only USFWS and the land management agency have jurisdiction regarding impact findings as to TES species. *See* Biological Assessment, attached as Exhibit G to EA, Exhibit 36 herein.

31. Special status fish species.

UEI has met the requirements of R645-301-322 regarding fish and wildlife resource information for the permit area and adjacent area. There are no fish in the exceedingly dry and desolate permit area and no agency has alleged that fish will be impacted by UEI's project. Moreover, the Biological Assessment prepared in connection with this project analyzed possible impacts upon threatened and endangered species, including endangered fish, and concluded there were "no direct impact on any of the [endangered and threatened] species" studied. *See* § VI, Biological Assessment, attached as Exhibit G to EA, attached hereto as Exhibit 36.

Disregarding the clear findings of the Biological Assessment, SUWA, without submitting a scrap of evidence, alleges that the mine project will impact fish species. UEI has complied with the regulations and analyzed those species identified by DOGM and wildlife agencies. SUWA's baseless arguments do not provide evidence that these species will be directly impacted by the project.

32. Special status amphibians and reptiles have not been identified as needing study.

UEI has met the requirements of R645-301-322 by providing relevant fish and wildlife resource information for the permit area and adjacent area. Furthermore, amphibians and reptiles have been specifically addressed in the EA for the Lila Canyon Mine. *See* §§ 3.8.1 and 3.8.2, EA, attached as Exhibit 30. As discussed at Item 26 above, SUWA's concern is based on a false assumption and lacks all credibility. UEI and its contractor, EIS, have had numerous discussions with the UDWR, USFWS, and the BLM biologists regarding impacts to species, including

amphibians and reptiles. No amphibian or reptile species have been identified as being at risk from the project or needing further study.

33. The PAP and biology analyses have considered high value wildlife habitats.

UEI has met the requirements of R645-301-322 regarding relevant fish and wildlife resource information. SUWA's contention that "other high value wildlife habitat are given little scrutiny," is totally incorrect. The Lila Canyon Mine disturbance constitutes less then 60 acres; at a conservative estimate this is less than 1/10,000 of adjacent similar wildlife habitat. After the numerous man hours in helicopter surveys and agency involvement spent in determining potential impacts on both wildlife and its habitat, the area was well scrutinized and UDWR, USFW, BLM, and DOGM concluded that perceived impacts were all but non existent. *See* EA, Chapter 3 and Biological Assessment, attached as Exhibit G to EA, Exhibit 36 herein.

34. Mitigation is analyzed and addressed.

The wildlife biologists for BLM and UDWR have concluded that the availability of a dependable water source has been a contributing factor in dispersal of the transplanted Rocky Mountain Bighorn sheep population which is becoming established within this area of the Book Cliffs. The existing water sources are solely dependent on precipitation for recharge. For the past several years, with less than average precipitation, the seeps either fail to flow or are of such short duration that they serve little use to large herbivores for the entire periods of summer dispersal.

The one guzzler located at the head of Johnson Canyon has proven very successful and is considered to be a contributing factor in dispersal of sheep in the area. UEI has committed within the BLM EA to implement two additional guzzlers not necessarily as mitigation but as an enhancement feature. *See* EA, attached as Exhibit 30; FONSI/ROD, attached as Exhibit 29. It was also assumed that the professional wildlife biologist working with the BLM and UDWR would locate these guzzlers in the most advantageous areas to facilitate wildlife management goals.

Currently there are a number of man made water retention basins (4) on the flats below the mine site. These basins were constructed to facilitate domestic stock use; though, in arid regions any water is sought out by wildlife as well. Unfortunately, in the past several years the area has experienced lower than normal precipitation. The result has been these basins are frequently dry prior to mid summer when water demand is most critical. In the event that the Lila Canyon Mine were to produce sufficient water to maintain the retention basins through the summer and fall it is only logical that both domestic stock as well as wildlife would benefit. Currently water is not the critical issue in determining winter use by wildlife. The area in question has historically had very low productivity. Forage is largely non-existent by the end of

the grazing season. Wildlife, may utilize water if it were available in the area, but due to the lack of available forage, prolonged use would be extremely unlikely.

Relative to the "prescribed manners of oil removal from stored water", over the past 50 years there have been numerous methods developed to remove oil. Depending on whether oil is present, such devices as skimmers, blotters, booms, sand filler's etc., could be utilized effectively. Actual methods utilized would be site specific and implemented in compliance with the existing UPDES permit for the facility.

35. Impacts of the Emery County road expansion on wildlife.

SUWA has not identified any wildlife species which will be negatively impacted by Emery County's road located outside the permit area. BLM, state and federal wildlife agencies have evaluated impacts on wildlife arising out of UEI's use of the Emery County road at Chapters 3.8 and 4.9 of the Lila Canyon Project EA (UT-070-99-22) (Sept. 2000) and in the Biological Assessment, attached as Exhibit G to the EA, attached hereto as Exhibit 36. BLM decided that the impacts would be insignificant and issued a Finding of No Significant Impact and Decision Record approving the right of way grant to Emery County, Utah. October 27, 2000 FONSI and Decision Record for the Lila Canyon Mine Project, attached as Exhibit 29. SUWA has failed to demonstrate how wildlife will be negatively impacted. Therefore, this comment should be dismissed.

36. Vehicles and haul truck time restrictions. *See* response to #35 above.

As set forth above, BLM studied the wildlife impacts of vehicles using the Emery County Road and did not impose restrictions on timing or use of vehicles. October 27, 2000 FONSI and Decision Record; Lila Canyon Project EA, Chapter 3.5.2, Vehicular Traffic; Chapter 4.6.3, vehicular traffic impacts, Chapter 4.6.4, vehicular traffic mitigation, attached as Exhibits 29 and 30.

37. There is more than adequate wildlife monitoring proposed in the PAP.

Contrary to the comments of SUWA, wildlife species of Federal, and State concern were analyzed and the collective opinion of state and federal wildlife biologists (USFWS, UDWR, and BLM) was that only raptors warranted any type of prolonged monitoring. Therefore, the monitoring plan set forth at PAP, III-18 and 19 meets the requirements of DOGM.

V. LAND USE`

A. Wilderness

38. No requirement to restore to quality capable of supporting wilderness designation.

The PAP accurately describes the pre-mining land uses and sets forth a complete reclamation plan. The Utah Coal Program Rules require each permit application to include "a description of existing land uses and land-use classifications" (R645-301-411.130) and a plan to ensure that the postmining land use will be restored to "[t]he uses they were capable of supporting before any mining; or [h]igher or better uses." *See* R645-301-413.100, -.120. The PAP meets this legal requirements.

The PAP discloses that the pre-mining land uses in the permit area, as determined by the Bureau of Land Management's ("BLM") Price River Management Framework Plan (the "MFP"), are grazing, wildlife habitat, coal mining, and limited recreation. *See* Appendix 4-2. SUWA's argument that wilderness should be included as a pre-mining land use is without legal support. There are ***no wilderness lands*** within the permit area and the MFP does not require that any lands within the permit area be managed as wilderness. Indeed, only Congress can designate wilderness. Although there are two BLM wilderness inventory units and one wilderness study are adjacent to or within the permit area, Congress has declined to enact legislation to designate these lands as wilderness.

The presence of the Desolation Canyon and Turtle Canyon wilderness inventory units and the Turtle Canyon wilderness study area within the permit area does not change the "use" for those lands and does not impose any additional reclamation responsibilities upon UEI. Plate 4-4 of the PAP displays the relationship of the surface facilities to the Desolation Canyon Inventory Unit #8, attached as Exhibit 40. UEI's surface facilities are ***not within any*** designated wilderness areas or any WSA. A portion of the mine's surface facilities and proposed guzzlers would be located on 8 acres within the western boundary of the 48,900-acre Desolation Canyon Wilderness Inventory Unit 8. The project thus represents a direct disturbance of approximately 0.016% of the total unit.[1]

The fact that the Lila Canyon Mine impacts any of the Desolation Canyon Inventory Unit is irrelevant, however, because a wilderness inventory unit is not a wilderness area nor is it a

[1] BLM, the manager of the lands within the permit area, acknowledges that wilderness values would be impaired within the 25.12 acres in and around the mine surface facilities, but reasonably concluded that this level of impairment was a relatively insignificant portion of the Inventory Unit. When the Desolation Canyon Inventory Unit is considered in combination with the adjacent 7,300-acre Turtle Canyon Wilderness Inventory Unit 4 ("**Turtle Canyon Inventory Unit**") and 291,000-acre Turtle Canyon WSA, the area where wilderness characteristics are preserved swells to 347,200 acres, and the 25.12-acre disturbance area shrinks to 0.007% of the whole.

WSA but rather is land that must be managed in conformity with the current land use management plan. BLM has specifically found that the Lila Canyon Mine Project "is in conformance with the existing BLM land use plan for the area. It is also consistent with the Department of Interior and BLM Interim Management Guidance for wilderness inventory units." FONSI/Decision Record at p. 8, Exhibit 29.

In fact, as the IBLA reminded SUWA in a recent decision, the BLM is required, under BLM's land use plan, to manage lands within an Inventory Unit for multiple use, including mineral extraction. *See Southern Utah Wilderness Alliance*, 151 IBLA 338, 342 (2000) (holding "as we have stated on a number of occasions, final administrative decisions relating to the designation of lands as WSA's in Utah were completed in the 1980's. . . . The lands in question were not included in a WSA. Therefore, BLM may administer them for other purposes, including the approval of [extractive uses]") (citations omitted).

Moreover, John Leshy, former Department of Interior Solicitor issued official departmental policy to the Utah State BLM Director regarding the BLM's management of Utah's re-inventory or WSA lands. Solicitor Leshy made clear that lands included in the 1999 Wilderness Inventory must be managed in accordance with "existing land management plans" and "[m]anagement prescriptions may be changed only through amendment of the land management plans." *See* Leshy Opinion, April 15, 1999, within Appendix 4-2, attached as Exhibit 22. SUWA's allegation that Inventory Unit lands must be managed differently from the Price River MFP is not correct. The proper management standard under the MFP is "multiple use" and SUWA has failed to establish that any other standard applies.

In sum, the PAP correctly lists current land uses, not speculative or possible future land uses. UEI cannot be placed under an obligation to treat land as wilderness when Congress itself has not designated ***any*** land within the permit area as wilderness. SUWA's arguments regarding wilderness management and designation should be made to the Congress and not in the context of an informal hearing reviewing the completeness of the PAP.

39. <u>The reclamation will be more than adequate</u>.

UEI has committed in the PAP to perform reclamation to restore the land to its premining land uses. The legal requirement is for an applicant to "demonstrate that the land will be returned to its premining land-use capability." R645-301-414. The land manager of the federal lands involved, BLM, has identified the uses of "wildlife habitat, grazing and incidental recreation" as being the uses to which the land must be restored after operations. *See* PAP, Appendix 4-2. If SUWA is displeased that wilderness is not one of these post mining uses, it should take the matter up with Congress. BLM has identified the post mining land uses and UEI's reclamation plan thoroughly details how UEI will restore the project area to a condition that will support the uses identified.

40. Cultural.

UEI's PAP sets forth the required cultural and historic resources information in Appendix 4-1, attached as Exhibit 41. It should be noted that in answer to SUWA's query, the SHPO issues its concurrence letter to DOGM not UEI. As for the effects of subsidence on cultural resources, the Lila Canyon Environmental Assessment states: "Given the amount of acreage sampled and the type and density of sites recorded and expected as an extrapolation of this sample to the entire area, it seems reasonable that if slumping or crackage does occur, the probability of these occurrences falling within site boundaries should be considered as low. Subsequently, even if limited disturbance does occur, the sites are of nature (e.g., no structures or cultural depth) that their integrity should not be irreparably damaged." EA, attached as Exhibit 30. SUWA has once again ignored analysis contained in the environmental assessment for this project. SUWA has not identified any issue related to the cultural resource information submitted and therefore its claims should be dismissed.

41. Air Quality.

The approved air quality permit DAQE-702-99 dated August 27, 1999, can be found in Appendix 4-3, attached as Exhibit 42.

VI. SIGNIFICANT REVISION

42. The Division is properly processing the PAP as a new permit pursuant to R645-300-100.

UEI has submitted a new permit for extension of the Horse Canyon Mine, Part B, Lila Canyon, consistent with DOGM's policy directive dated January 8, 2002, attached as Exhibit 43.

SUWA's contention that the public notice is somehow defective is incorrect. The public notice must comply with the requirements of R645-300-121.100. UEI's public notice meets each of the regulatory requirements in that it describes the "the precise location and boundaries of the proposed permit area" and refers to the well-known landmark of the Horse Canyon mine to give local residents an idea of the location of the permit area. Indeed the public notice description was sufficient to give SUWA notice of the proposed mine—a fact confirmed by its request for an informal conference.

VII. ROAD

43. The Emery County road is a public road and cannot be made part of the permit area.

The Utah Board of Oil, Gas & Mining has previously upheld DOGM's determination that the Lila Canyon Road is a county road which should not be included in the permit. *SUWA v.*

DOGM, Docket No. 2001-027, Findings of Fact, Conclusions of Law and Order, dated December 14, 2001; upholding July 18, 2001 Analysis and Finding on the Lila Canyon Road ("**Findings**"), attached as Exhibit 16. SUWA's claim that the Lila Canyon Road, a public road, must be included within the permit area is contrary to Congress' intent in enacting SMCRA. As the *Harman* court observed,

> [o]bviously, Congress [in enacting SMCRA] did not anticipate that operators would have to permit interstate highways or four-lane state routes, nor that they would have to permit every road used to haul coal, whether four lane or two lane, state or county, paved or unpaved, or even public or private.

(*Harman Mining Corp. v. Office of Surface Mining Reclamation & Enforcement*, 659 F. Supp. 806, 811 (W.D. Va. 1987).) Despite the absurdity of proposition of permitting a public road, SUWA argues that the Lila Canyon Road should be included within the permit area. Such a decision would subject the Lila Canyon Road to state and federal reclamation requirements and would be clearly contrary to purpose of SMCRA.

To avoid the absurd result of having a public road reclaimed under SMCRA and the Utah Coal Act, the OSM entered into a resolution with DOGM which sets forth criteria for determining whether a road should be included within a permitted area. The four criteria are:

1. The road was properly acquired by the governmental entity and not deeded to avoid regulation;

2. The road is maintained with public funds or in exchange for taxes or fees;

3. The road was constructed in a manner similar to other public roads of the same classification; and

4. Impacts from mining on the road are not significant under Utah's definitions for "affected area" and "surface coal mining operations." *See* Findings, pg. 2, Exhibit 16.

In response to the first criterion, SUWA has failed in to demonstrate that Emery County improperly acquired the Lila Canyon Road. Rather, ample evidence demonstrates that the Lila Canyon Road is owned by Emery County and that the BLM has issued the necessary authorizations to make improvements to the Lila Canyon Road. *See* Finding # 1, Findings, Exhibit 16; Lila Canyon Road FONSI/Decision Record, Exhibit 29.

As for the second and third criteria, Emery County will maintain the road with public funds or in exchange for taxes or fees and Emery County will improve the road according to

engineering requirements applicable to other Class "B" roads in Emery County. *See* Findings #2 and #3, Exhibit 16. SUWA has not produced any evidence demonstrating that Emery County is not the party maintaining its road.

As for the final criterion, the uses associated with the road are varied and not limited exclusively to coal mining. There is substantial evidence demonstrating that the road is used by hunters, recreationalists, scientists and other members of the public. *See* Findings #4, Exhibit 16. The road meets each of the criteria for excluding the road from the permit area.

In sum, the Lila Canyon Road is a public road that is maintained by the Emery County with public funds and is used by members of the public. To include this type of road within UEI's permitted area is contrary to the DOGM/OSM Resolution and the intent of SMCRA. Accordingly, SUWA's claim that the road need be permitted must fail.

VIII. LEGAL

44. The land is clearly suitable for mining.

UEI has valid federal coal leases and the land is suitable for mining, consistent with the Price River MFP. The BLM has specifically determined that the Lila Canyon Mine Project "is in conformance with the objectives and recommendations of the Price River Area Management Framework Plan approved 1983 as amended." FONSI/Record of Decision at 9, attached as Exhibit 29. Coal mining is integral to providing our nation with energy security. Emery and Carbon counties are two of Utah's most coal rich areas. Mining has occurred in these regions for over 100 years. The federal government has encouraged coal mining in the region of the Lila Canyon Mine for decades. Indeed, the federal government has decided that the Lila Canyon area is suitable for mining because it has issued the leases to mine coal and has given mine plan approvals. SUWA continues to ignore the fact that UEI holds federal coal leases with valid existing rights. SUWA's argument that the land is unsuitable for mining is not supported by the Price River MFP and must be dismissed.

45. Schedule.

SUWA's statement that the schedule is "impossible" is speculative and not worthy of response.

46. Reclamation Bond.

UEI has committed to provide a sufficient bond and maintain adequate insurance to govern the legal requirements associated with operating and reclaiming the Lila Canyon mine. As indicated above to response No. 22, bonding is a technical issue and not an administrative completeness issue.

47. There is no disputed right-of-way.

BLM has issued a right of way grant for the county road and no stay of this grant has been issued by the IBLA. *See* October 27, 2000, FONSI/Record of Decision, attached as Exhibit 29. The issue being considered by Interior Board of Land Appeals ("IBLA") is considering the sufficiency of the BLM's NEPA analysis regarding the rights of way for the county road, a powerline easement and surface facilities at the Lila Canyon Mine. While SUWA has sought on more than one occasion to obtain a stay of BLM's decision, the IBLA has consistently refused to grant SUWA a stay.

We appreciate this opportunity to respond to SUWA's comments and look forward to further addressing these concerns during the informal conference.

Sincerely,

R. Jay Marshall

R. Jay Marshall

RJM:jmc:209444.6
Enclosures

From appendix 6-2

UtahAmerican Energy, Inc.

April 22, 2002

Pam Grubaugh-Littig
Permit Coordinator
DOGM
1594 West North Temple, Suite 1210
Salt Lake, Utah 84114-5801

Subject: ACT/007/013 Acid Toxic Testing Wavier

Dear Ms Grubaugh Littig:

Pursuant to the provisions of R645-301-626, UtahAmerican Energy, Inc. respectfully requests that the requirements of R645-301.300 be waved based on other information available to the Division of equal value or effect.

UtahAmerican Energy, Inc. believes that a wavier is reasonable because of the following reasons:

1) With over 100 years of mining in the Sunnyside Mining Operation there have been no proven problems with acid-or toxic-forming materials. The Blackhawk Formation does not have any history of producing acid or toxic drainage. The BLM found that "Experience from over 80 years of operation at the Sunnyside Mine indicates that none of the horizons contains sufficient acid-forming alkaline or toxic materials as to be considered a problem in production or waste disposal". (Bureau of Land Management, Environmental Analysis Record, dated 6/9/76. Related to Kaiser Steel's Federal Lease No. U-32083.)

2) The existence of acid and toxic analysis from two drill holes only two miles south of UEI's lease area. The data was collected from drill holes S-24 and S-25 which are located in the same strata as Lila Canyon. Detailed acid and toxic tests were run for the strata immediately above and below the coal seam as well as for the project slope material. The data from S-24 and S-25 was more extensive than what would be required at Lila Canyon. The data from S-24 and S-25 includes data for the strata from the Mancos Shale through the coal seam up to the surface of Little Park. The Lila Canyon slopes will start at the top of the Mancos and only be driven to the coal seam and not to the surface of Little Park.

3) UEI has committed to treating all material removed from the coal seam or from the rock slopes as if it did contain acid and toxic forming materials. UEI has committed to placing all underground development waste in the refuse pile and be covered with a minimum of 4' of non-acid and non-toxic forming material.

4) To ensure that surface and ground waters will not be polluted by acid or toxic materials UEI has committed to test the slope rock material as necessary to determine acid- and -toxic forming potential.

If you have any questions please call me.

Sincerely,

R. Jay Marshall

R. Jay Marshall

P.O. Box 986 Price, Utah 84501 Telephone (435) 637 5032 x 724 Fax (435) 613 0805 email: jmarshall@coalsource.com

Results of acid and toxic testing completed on drill holes S-24 and S-25 can be found in Appendix 6-2. Testing was completed for the strata immediately above and below the coal seam as well as for the rock slope material. These tests were run on drill holes and at the original projected slope location. The present proposed slope location is approximately three miles to north but located in the same strata. Except that the present projected slopes will start at the top of the Mancos shale and will be driven up to the coal seam but not beyond as was originally proposed by Kaiser.

Kaiser Steel's Sunnyside Mine mined coal in the same horizons as those in the LMPA. With over 100 years of mining experience at the Sunnyside Mine operation, there has been no proven problems with acid-forming alkaline or toxic materials in production or waste disposal. The above statement is made based on history, data substantiating this assertion is beyond the scope of this MRP and is not included.

6.6 GEOLOGIC EFFECTS OF MINING

6.6.1 MINING HAZARDS

Mining hazards other than those normally associated with underground coal mining are not anticipated. Conditions are not expected to be significantly different than those associated with the Geneva, Columbia, and Sunnyside mines.

App 6-2

Prepared for
Kaiser Steel Corporation
300 Lakeside Drive
P.O. Box 58
Oakland, California 94604

ANALYSES OF VARIOUS ROCK TYPES
Sunnyside, Utah

March 10, 1983

Prepared By
ACZ INC.
Engineering & Environmental Division
737 Lincoln Avenue
P.O. Box 774018
Steamboat Springs, Colorado 80477

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SUMMARY

The various strata from two (2) Kaiser Steel Corporation drill holes near Sunnyside, Utah were selected to be analyzed for parameters set forth by State of Utah - Division of Oil, Gas, and Mining. These two drill holes are as follows:

- Drill Hole KSC-S-24
- Drill Hole KSC-S-25

Eleven (11) different zones were identified by Kaiser Steel Corporation to correspond to roof and floor areas or merely rock material to be removed during construction of rock entries.

The analyses of the eleven (11) zones show that with the exception of two (2) zones, no acid-forming, toxic-forming, or alkaline-forming rock exists. The two (2) exceptions are:

- Zone 10
- Zone 11

In Zone 10, relatively high amounts of boron were present. If this material were placed on the surface, the high amounts of boron could be detrimental to plant growth. In Zone 11, high amounts of boron and high values for sodium absorption ratio were found. As in Zone 10, the high values of boron and S.A.R. indicate a salt problem. If this material containing high boron and high S.A.R. were placed on the surface, it would be detrimental to revegetation efforts.

Although not considered to be a problem at this time, somewhat high levels of iron and nickel were found throughout the samples. No suspect levels for plant toxicity with respect to iron and nickel were identified; therefore, it is assumed that these values would not be detrimental to plant re-establishment. With regard to water quality, the iron and nickel will probably prove to be water-soluble. Kaiser Steel Corporation might encounter high values of iron and nickel in any

USE OF E.P. TOXICITY TEST FOR ROCK SAMPLES IN UTAH

The E.P. Toxicity test is generally recommended by the Environmental Protection Agency as an extraction procedure for samples from land-fill areas, smelter and mill tailings, toxic wastes, and other similar areas.

E.P. Toxicity extraction tests are generally run where acid or acid-forming conditions might prevail or be prevalent. These conditions are generally not found in the area around Sunnyside, Utah. Therefore, the use of the E.P. toxicity test will probably show higher concentrations of metals than would be expected under normal alkaline conditions.

ACZ INC. would recommend that on any future testing, the E.P. toxicity test not be used for samples, but rather the following standard extraction procedures for the various heavy metals should be used:

- As - DTPA or AB-DTPA Extraction
- Cd - DTPA or AB-DTPA Extraction
- Cu - DTPA or AB-DTPA Extraction
- Fe - DTPA or AB-DTPA Extraction
- Pb - DTPA or AB-DTPA Extraction
- Mn - DTPA or AB-DTPA Extraction
- Ni - DTPA or AB-DTPA Extraction
- Zn - DTPA or AB-DTPA Extraction
- B - Hot Water Extraction
- Se - Hot Water Extraction
- Mo - Acid Ammonia Oxalate Extraction
- Hg - Acid Extraction

forth in Table 4, Zone 2 - Analytical Summary. Suspect levels along with general comments and recommendations are also included in Table 4.

Zone 3

There are no problems with regard to plant toxicity or water quality based on the analyses run for the samples in Zone 3. The mean value for the various parameters along with the maximum and minimum values is set forth in Table 5, Zone 3 - Analytical Summary. Suspect levels along with general comments and recommendations are also included in Table 5.

Zone 4

There are no problems with regard to plant toxicity or water quality based on the analyses run for the samples in Zone 4 with the possible exception of boron. The mean value for the various parameters along with the maximum and minimum values is set forth in Table 6, Zone 4 - Analytical Summary. Suspect levels along with general comments and recommendations are also included in Table 6.

The mean value for boron in Zone 4 was 5.6 ppm with a maximum value of 14.8 ppm being recorded. This maximum value caused the average to slightly exceed the suspect level of 5 ppm set by the Wyoming Department of Environmental Quality, Land Quality Division. Mixing of rock material through normal operations should cause the overall level of boron to be acceptable.

Zone 5

There are no problems with regard to plant toxicity or water quality based on the analyses run for the samples in Zone 5 with the possible exception of boron. The mean value for the various parameters along with the maximum and minimum values is set forth in Table 7, Zone 5 - Analytical Summary. Suspect levels along with general comments and recommendations are also included in Table 7.

Table 11, Zone 9 - Analytical Summary. Suspect levels along with general comments and recommendations are also included in Table 11.

The mean value for Acid-Base Potential in Zone 9 was -0.5. Rock with this value for Acid-Base Potential could be considered as potential for creating water problems and also be detrimental to revegetation. However, because Acid-Base Potential values in other zones are well within acceptable levels, the dilution of rock material through normal operations will cause the overall level of values for Acid-Base Potential to also be acceptable.

Zone 10

There are no problems with regard to plant toxicity or water quality based on the analyses run for the samples in Zone 10, with the exception of boron. The mean value for the various parameters along with the maximum and minimum values is set forth in Table 12, Zone 10 - Analytical Summary. Suspect levels along with general comments and recommendations are also included in Table 12.

The mean value for boron in Zone 10 was 9.1 ppm with a maximum value of 17.8 ppm. According to the Wyoming Department of Environmental Quality, Land Quality Division Guidelines rock material with boron levels greater than 5 ppm can be considered toxic to revegetation efforts. Zone 10 rock material will come from development of a rock entry. Recommendations on handling high boron material are set forth later in this report under the heading - "RECOMMENDATIONS".

Zone 11

There are no problems with regard to plant toxicity or water quality based on the analyses run for the samples in Zone 11, with the exception of boron and S.A.R. The mean value for the various parameters along with the maximum and minimum values is set forth in Table 13, Zone 11 - Analytical Summary. Suspect levels along with general comments and recommendations are also included in Table 13.

RECOMMENDATIONS

The following are general recommendations with regard to the results set forth in this report:

1. If rock material from Zone 10 or Zone 11 is to be deposited on the surface, it should be buried with a minimum of four (4) feet of inert material in order that revegetation can be accomplished. If a disposal area is available on the Mancos Shale, then Kaiser Steel Corporation might consider placing high boron material on a barren Mancos Shale area. If this type of placement is possible, Kaiser Steel should ask the State of Utah - Division of Oil, Gas, and Mining, to allow placement on barren ground without covering by any inert material. If the salt levels are not critically high, revegetation can possibly be accomplished with the use of salt-tolerant or Atriplex species such as four-winged saltbrush and shadscale saltbrush.

2. To confirm and check the analyses completed on rock material from the two (2) drill holes, Kaiser Steel Corporation might suggest to the State of Utah - Division of Oil, Gas, and Mining that some periodic check samples be taken. These periodic samplings would be completed to predict if high boron or S.A.R. material is to be placed on the surface. Hopefully, no covering of inert material would be necessary if additional test samples indicate an overall dilution of boron and S.A.R. levels in all rock removed under normal operations.

3. Future testing of rock material from the roof and floor and rock entries at the Kaiser Steel Corporation project can possibly be limited to the following parameters:

Boron	S.A.R.
Calcium	Iron
Sodium	Nickel
Magnesium	Electrical Conductivity

BIBLIOGRAPHY

Gough, L. P. and H. T. Skocklette, 1976, Toxicity of Selected Elements to Plants, Animals, and Man; U.S. Geological Survey, Open File Report No. 76-746, 46 pp.

Mountana Department of State Lands; Reclamation Division Soils and Overburden Guidelines.

Wyoming Department of Environment Quality, Land Quality Division, Guidelines 1-3.

Table 1 - Part 2

LIST OF PARAMETERS AND PROCEDURES

Parameter	Procedure
B	EP Toxicity Test, Azo-H Colorimetric, CFR 40, Part 216
F	EP Toxicity Test, Complexone Colorimetric, CFR 40, Part 261
Organic Sulfur	Forms of Sulfur in Coal, ASTM D 2492-68
Pyritic Sulfur	Forms of Sulfur in Coal, ASTM D 2492-68
Sulfate Sulru	Forms of Sulfur in Coal, ASTM D 2492-68
Total Sulfur	Total Sulfur by Eschka Method, ASTM D 3177-75
Neut. Pot.	Alkaline-Earth Carbonates by Gravimetric Loss of Co_2, USDA Handbook No. 60
Acid Pot.	Calculation from Total-Sulfate Sulfur
Base Pot.	Calculation from Neutralization Potential
Acid-Base Potential	Calculation from Acid and Base Potential

Table 3

ZONE 1 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
pH	7.5	7.9	7.3	5.0-9.0 (Wyoming DEQ)	None	None
E.C.	3.7	6.5	1.9	Values <8.0 (Wyoming DEQ)	None	None
Sat %	27	31	23	25-80 (Wyoming DEQ)	None	None
Ca	18.7	29.0	7.6	(See notes on S.A.R.)		
Mg	17.6	28.2	8.9	(See notes on S.A.R.)		
Na	3.7	4.9	2.4	(See notes on S.A.R.)		
S.A.R.	0.9	1.3	0.7	Values <10.0 (Wyoming DEQ)	None	None
Sand %	50	68	14	Values <85% (Wyoming DEQ)	None	None
Silt %	32	51	23	No suspect levels found	None	None--Sand & Clay % are OK
Clay %	19	35	8	Values <50% (Wyoming DEQ)	None	None
As (ppm)	<0.04	---	---	Values <40 ppm (Gough & Skocklette)	None	None
Cd (ppm)	0.25	0.38	0.10	Values <1.0 ppm (Montana DSL)	None	None

Table 3 (Continued)

ZONE 1 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
B (ppm)	6.7	14.8	1.4	Values <8.0 ppm (Montana DSL) Values <5.0 ppm (Wyoming DEQ)	None	None
F (ppm)	4.4	7.2	2.8	No suspect levels found	None	None--low values
Organic Sulfur	0.13	0.24	0.05	No suspect levels found	None	None--low values with neutral pH
Pyritic Sulfur	0.12	0.35	<0.01	No suspect levels found	None	None--low values with neutral pH
Sulfate Sulfur	0.16	0.59	<0.01	No suspect levels found	None	None--low values with neutral pH
Total Sulfur	0.40	0.83	0.05	No suspect levels found	None	None--low values with neutral pH
Neut. Pot.	16.1	32.3	8.6	(See notes on acid-base potential)		
Acid Pot.	8	16	2	(See notes on acid-base potential)		
Base Pot.	161	323	86	(See notes on acid-base potential)		
Acid-Base Potential	153	321	70	Values <-5 (Wyoming DEQ)	None	None

Table 4 (Continued)

ZONE 2 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
Cu (ppm)	<0.4	---	---	Values <40 ppm (Montana DSL)	None	None
Fe (ppm)	64	100	28	No suspect level found	None Expected	Fe is regulated in water discharge by NPDES permit
Pb (ppm)	1.3	2.2	0.4	Values <20 ppm (Montana DSL)	None	None
Mn (ppm)	10.7	17.0	4.4	Values <60 ppm (Montana DSL)	None	None
Hg (ppm)	<0.02	---	---	Values <0.5 ppm (Montana DSL)	None	None
Mo (ppm)	<4	---	---	Values <1.0 ppm (Montana DSL)	None Expected	Detection limits with flame too high--need to use HGA Furnace
Ni (ppm)	0.5	0.6	0.4	Values <1.0 ppm (Montana DSL)	None Expected	Ni may leach out with groundwater but no drinking water prob.
Se (ppm)	<0.04	---	---	Values <2.0 ppm (Wyoming DEQ)	None	None
Zn (ppm)	1.39	1.72	1.06	No suspect level found	None Expected	None--low values

Table 5

ZONE 3 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
pH	7.5	7.7	7.2	5.0-9.0 (Wyoming DEQ)	None	None
E.C.	3.4	4.6	2.3	Values <8.0 (Wyoming DEQ)	None	None
Sat %	24	25	22	25-80 (Wyoming DEQ)		No real problems expected
Ca	21.3	26.2	12.7	(See notes on S.A.R.)		
Mg	29.0	42.3	17.4	(See notes on S.A.R.)		
Na	2.0	2.3	1.7	(See notes on S.A.R.)		
S.A.R.	0.4	0.4	0.4	Values <10.0 (Wyoming DEQ)	None	None
Sand %	84	86	80	Values <85% (Wyoming DEQ)	None	None
Silt %	10	14	8	No suspect levels found	None	None--Sand & Clay % are OK
Clay %	6	7	5	Values < 50% (Wyoming DEQ)	None	None
As (ppm)	<0.04	---	---	Values <40 ppm (Gough & Skocklette)	None	None
Cd (ppm)	<0.10	---	---	Values <1.0 ppm (Montana DSL)	None	None

Table 5 (Continued)

ZONE 3 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
B (ppm)	5.9	7.0	3.7	Values <8.0 ppm (Montana DSL) Values <5.0 ppm (Wyoming DEQ)	None	None
F (ppm)	1.5	1.8	1.2	No suspect levels found	None	None--low values
Organic Sulfur	0.06	0.07	0.05	No suspect levels found	None	None--low values with neutral pH
Pyritic Sulfur	0.07	0.12	0.05	No suspect levels found	None	None--low values with neutral pH
Sulfate Sulfur	<0.01	---	---	No suspect levels found	None	None--low values with neutral pH
Total Sulfur	0.14	0.19	0.10	No suspect levels found	None	None--low values with neutral pH
Neut. Pot.	4.0	5.3	2.3	(See notes on acid-base potential)		
Acid Pot.	4	6	3	(See notes on acid-base potential)		
Base Pot.	40	53	23	(See notes on acid-base potential)		
Acid-Base Potential	36	50	17	Values <-5 (Wyoming DEQ)	None	None

Table 6 (Continued)

ZONE 4 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
Cu (ppm)	0.50	1.0	<0.40	Values <40 ppm (Montana DSL)	None	None
Fe (ppm)	104.5	414	1.60	No suspect level found	None Expected	Fe is regulated in water discharge by NPDES permit
Pb (ppm)	2.62	6.4	0.4	Values <20 ppm (Montana DSL)	None	None
Mn (ppm)	56.6	194	4.4	Values <60 ppm (Montana DSL)	Possible Plant Toxicity	Mixing of all rock material from other zones should dilute high value of 194
Hg (ppm)	<0.02	---	---	Values <0.5 ppm (Montana DSL)	None	None
Mo (ppm)	<4	---	---	Values <1.0 ppm (Montana DSL)	None Expected	Detection limits with flame too high--need to use HGA Furnace
Ni (ppm)	1.6	3.6	0.4	Values <1.0 ppm (Montana DSL)	None Expected	Ni may leach out with groundwater but no drinking water prob.
Se (ppm)	<0.04	---	---	Values <2.0 ppm (Wyoming DEQ)	None	None
Zn (ppm)	2.39	4.53	1.06	No suspect level found	None Expected	None--low values

Table 7

ZONE 5 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
pH	7.5	7.9	7.2	5.0-9.0 (Wyoming DEQ)	None	None
E.C.	3.3	6.5	1.9	Values <8.0 (Wyoming DEQ)	None	None
Sat %	26	31	22	25-80 (Wyoming DEQ)	None	None
Ca	19.5	29.0	7.6	(See notes on S.A.R.)		
Mg	20.5	42.3	8.9	(See notes on S.A.R.)		
Na	2.8	4.9	1.7	(See notes on S.A.R.)		
S.A.R.	0.7	1.3	0.4	Values <10.0 (Wyoming DEQ)	None	None
Sand %	67	86	14	Values <85% (Wyoming DEQ)	None	None
Silt %	20	51	8	No suspect levels found	None	None--Sand & Clay % are OK
Clay %	13	35	5	Values <50% (Wyoming DEQ)	None	None
As (ppm)	<0.04	---	---	Values <40 ppm (Gough & Skocklette)	None	None
Cd (ppm)	0.17	0.38	<0.10	Values <1.0 ppm (Montana DSL)	None	None

Table 7 (Continued)

ZONE 5 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
B (ppm)	5.7	14.8	1.4	Values <8.0 ppm (Montana DSL) Values <5.0 ppm (Wyoming DEQ)	None or Minor	Mixing of rock should dilute high value of 14.8
F (ppm)	2.6	7.2	<0.4	No suspect levels found	None	None--low values
Organic Sulfur	0.10	0.24	0.05	No suspect levels found	None	None--low values with neutral pH
Pyritic Sulfur	0.09	0.35	<0.01	No suspect levels found	None	None--low values with neutral pH
Sulfate Sulfur	0.07	0.59	<0.01	No suspect levels found	None	None--low values with neutral pH
Total Sulfur	0.25	0.83	0.05	No suspect levels found	None	None--low values with neutral pH
Neut. Pot.	9.2	32.3	2.3	(See notes on acid-base potential)		
Acid Pot.	6	16	2	(See notes on acid-base potential)		
Base Pot.	92	323	23	(See notes on acid-base potential)		
Acid-Base Potential	86	321	17	Values <-5 (Wyoming DEQ)	None	None

Table 8 (Continued)

ZONE 6 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
Cu (ppm)	0.53	0.80	<0.40	Values <40 ppm (Montana DSL)	None	None
Fe (ppm)	40.7	52.6	30.2	No suspect level found	None Expected	Fe is regulated in water discharge by NPDES permit
Pb (ppm)	1.5	2.0	0.6	Values <20 ppm (Montana DSL)	None	None
Mn (ppm)	29.1	73.8	6.2	Values <60 ppm (Montana DSL)	Possible Plant Toxicity	Mixing of all rock material from other zones should dilute high values
Hg (ppm)	<0.02	---	---	Values <0.5 ppm (Montana DSL)	None	None
Mo (ppm)	<4	---	---	Values <1.0 ppm (Montana DSL)	None Expected	Detection limits with flame too high--need to use HGA Furnace
Ni (ppm)	1.7	2.4	<0.40	Values <1.0 ppm (Montana DSL)	None Expected	Ni may leach out with groundwater but no drinking water prob.
Se (ppm)	0.04	0.04	<0.04	Values <2.0 ppm (Wyoming DEQ)	None	None
Zn (ppm)	2.47	4.34	1.02	No suspect level found	None Expected	None--low values

Table 9

ZONE 7 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
pH	7.15	7.2	7.1	5.0-9.0 (Wyoming DEQ)	None	None
E.C.	3.7	4.4	3.0	Values <8.0 (Wyoming DEQ)	None	None
Sat %	27	27	27	25-80 (Wyoming DEQ)	None	None
Ca	20.7	27.8	13.5	(See notes on S.A.R.)		
Mg	37.8	48.1	27.4	(See notes on S.A.R.)		
Na	2.5	2.8	2.1	(See notes on S.A.R.)		
S.A.R.	0.5	0.6	0.3	Values <10.0 (Wyoming DEQ)	None	None
Sand %	64	70	57	Values <85% (Wyoming DEQ)	None	None
Silt %	22	25	18	No suspect levels found	None	None--Sand & Clay % are OK
Clay %	15	18	12	Values <50% (Wyoming DEQ)	None	None
As (ppm)	<0.04	---	---	Values <40 ppm (Gough & Skocklette)	None	None
Cd (ppm)	0.15	0.18	0.12	Values <1.0 ppm (Montana DSL)	None	None

Table 10

ZONE 8 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
pH	7.0	7.3	6.7	5.0-9.0 (Wyoming DEQ)	None	None
E.C.	4.1	5.8	3.0	Values <8.0 (Wyoming DEQ)	None	None
Sat %	28	31	26	25-80 (Wyoming DEQ)	None	None
Ca	23.5	27.8	13.5	(See notes on S.A.R.)		
Mg	41.3	71.4	23.2	(See notes on S.A.R.)		
Na	3.3	6.2	2.0	(See notes on S.A.R.)		
S.A.R.	0.6	1.1	0.3	Values <10.0 (Wyoming DEQ)	None	None
Sand %	61	79	42	Values <85% (Wyoming DEQ)	None	None
Silt %	24	39	14	No suspect levels found	None	None--Sand & Clay % are OK
Clay %	15	19	7	Values <50% (Wyoming DEQ)	None	None
As (ppm)	<0.04	---	---	Values <40 (Gough & Skocklette)	None	None
Cd (ppm)	0.12	0.18	<0.10	Values <1.0 ppm (Montana DSL)	None	None

Table 10 (Continued)

ZONE 8 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
Cu (ppm)	0.72	1.00	<0.40	Values <40 ppm (Montana DSL)	None	None
Fe (ppm)	50.2	66.4	30.2	No suspect level found	None Expected	Fe is regulated in water discharge by by NPDES permit
Pb (ppm)	1.4	2.0	0.6	Values <20 ppm (Montana DSL)	None	None
Mn (ppm)	12.3	73.8	6.2	Values <60 ppm (Montana DSL)	Possible Plant Toxicity	Mixing of all rock material from other zones should dilute high value of 73.8
Hg (ppm)	<0.02	---	---	Values <0.5 ppm (Montana DSL)	None	None
Mo (ppm)	<4	---	---	Values <1.0 ppm (Montana DSL)	None Expected	Detection limits with flame too high--need to use HGA Furnace
Ni (ppm)	2.2	3.6	<0.4	Values <1.0 ppm (Montana DSL)	None Expected	Ni may leach out with groundwater but no drinking water prob.
Se (ppm)	<0.04	---	---	Values <2.0 ppm (Wyoming DEQ)	None	None
Zn (ppm)	3.41	6.06	1.02	No suspect level found	None Expected	None--low values

Table 11

ZONE 9 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
pH	7.5	7.7	7.3	5.0-9.0 (Wyoming DEQ)	None	None
E.C.	1.4	1.4	1.4	Values <8.0 (Wyoming DEQ)	None	None
Sat %	26	26	26	25-80 (Wyoming DEQ)	None	None
Ca	5.25	6.3	4.2	(See notes on S.A.R.)		
Mg	8.0	9.1	6.9	(See notes on S.A.R.)		
Na	2.8	3.8	1.7	(See notes on S.A.R.)		
S.A.R.	1.1	1.6	0.6	Values <10.0 (Wyoming DEQ)	None	None
Sand %	76	89	63	Values <85% (Wyoming DEQ)	None	None
Silt %	12	18	6	No suspect levels found	None	None--Sand & Clay % are OK
Clay %	12	19	5	Values <50% (Wyoming DEQ)	None	None
As (ppm)	<0.04	---	---	Values <40 ppm (Gough & Skocklette)	None	None
Cd (ppm)	<0.10	---	---	Values <1.0 ppm (Montana DSL)	None	None

Table 11 (Continued)
ZONE 9 - ANALYTICAL SUMMARY
KAISER STEEL CORPORATION
Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
B (ppm)	2.8	3.8	1.8	Values <8.0 ppm (Montana DSL) Values <5.0 ppm (Wyoming DEQ)	None	None
F (ppm)	1.3	2.2	<0.4	No suspect levels found	None	None--low values
Organic Sulfur	0.06	0.07	0.04	No suspect levels found	None	None--low values with neutral pH
Pyritic Sulfur	0.02	0.03	<0.01	No suspect levels found	None	None--low values with neutral pH
Sulfate Sulfur	<0.01	---	---	No suspect levels found	None	None--low values with neutral pH
Total Sulfur	0.07	0.07	0.07	No suspect levels found	None	None--low values with neutral pH
Neut. Pot.	0.15	0.2	0.1	(See notes on acid-base potential)		
Acid Pot.	2	2	2	(See notes on acid-base potential)		
Base Pot.	1.5	2	1	(See notes on acid-base potential)		
Acid-Base Potential	-0.5	0	-1.0	Values <-5 (Wyoming DEQ)	Minor	Mix this material with rock zones to dilute Low values

Table 12 (Continued)

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
Cd (ppm)	0.16	0.20	<0.10	Values <1.0 ppm (Montana DSL)	None	None
Cu (ppm)	0.8	1.0	0.4	Values <40 ppm (Montana DSL)	None	None
Fe (ppm)	220	476	21.4	No suspect level found	None Expected	Fe is regulated in water discharge by NPDES permit
Pb (ppm)	1.6	2.2	0.4	Values <20 ppm (Montana DSL)	None	None
Mn (ppm)	21.5	39.2	2.6	Values <60 ppm (Montana DSL)	None	None
Hg (ppm)	<0.02	---	---	Values <0.5 ppm (Montana DSL)	None	None
Mo (ppm)	<4	---	---	Values <1.0 ppm (Montana DSL)	None Expected	Detection limits with flame too high-need to use HGA Furnace
Ni (ppm)	1.47	2.2	1.0	Values <1.0 ppm (Montana DSL)	None Expected	Ni may leach out with groundwater but no drinking water prob.
Se (ppm)	<0.04	---	---	Values <2.0 ppm (Wyoming DEQ)	None	None
Zn (ppm)	2.53	3.78	1.24	No suspect level found	None Expected	None--low values

Table 13

ZONE 11 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
pH	8.2	8.7	7.7	5.0-9.0 (Wyoming DEQ)	None	None
E.C.	4.9	6.6	3.2	Values <8.0 (Wyoming DEQ)	None	None
Sat %	28	31	25	25-80 (Wyoming DEQ)	None	None
Ca	6.2	23.1	0.3	(See notes on S.A.R.)		
Mg	5.7	21.6	0.3	(See notes on S.A.R.)		
Na	50.7	68.7	35.1	(See notes on S.A.R.)		
S.A.R.	46.1	76.5	10.4	Values <10.0 (Wyoming DEQ)	Plant Toxicity	Bury high S.A.R. material with 4 ft. of inert material; plant Atriplex species
Sand %	52	62	40	Values <85% (Wyoming DEQ)	None	None
Silt %	29	32	25	No suspect levels found	None	None--Sand & Clay % are OK
Clay %	19	28	13	Values <50% (Wyoming DEQ)	None	None
As (ppm)	<0.04	---	---	Values <40 ppm (Gough & Skocklette)	None	None

Table 13 (Continued)

ZONE 11 - ANALYTICAL SUMMARY

KAISER STEEL CORPORATION

Sunnyside, Utah

Parameter	Arithmetic Mean	Maximum Value	Minimum Value	Accepted Suitability	Problems Expected	Recommendations
B (ppm)	15.0	21.4	10.2	Values <8.0 ppm (Montana DSL) Values <5.0 ppm (Wyoming DEQ)	Possible Plant Toxicity	Bury high boron with 4 ft. of inert material; plant Atriplex species
F (ppm)	4.3	7.6	1.0	No suspect levels found	None	None--low values
Organic Sulfur	0.20	0.66	0.01	No suspect levels found	None	None--low values with neutral pH
Pyritic Sulfur	0.31	0.67	0.05	No suspect levels found	None	None--low values with neutral pH
Sulfate Sulfur	<0.01	---	---	No suspect levels found	None	None--low values with neutral pH
Total Sulfur	0.47	1.13	0.10	No suspect levels found	None	None--low values with neutral pH
Neut. Pot.	24.8	30.4	17.7	(See notes on acid-base potential)		
Acid Pot.	14	35	3	(See notes on acid-base potential)		
Base Pot.	248	304	177	(See notes on acid-base potential)		
Acid-Base Potential	233	278	171	Values <-5 (Wyoming DEQ)	None	None

Date: 2/23/83

BOOKCLIFFS COMMERICAL LABORATORIES

OVERBURDEN ANALYSIS REPORT

Client: Kaiser Steel Corporation
Address: Sunnyside Mine
Sunnyside, Utah 84539
Attn: Mr. Robert Turner
Hole: KSC-S-24

Sample Date: Unknown
Date Received: 2/14/83
Project: South Lease Coal Property

P.O. Number: 28076166

Sample I.D.	Lab No.	As[3] ppm	Cd[3] ppm	Cu[3] ppm	Fe[3] ppm	Pb[3] ppm	Mn[3] ppm	Hg[3] ppm	Mo[3] ppm	Ni[3] ppm	Se[1] ppm	Zn[1] ppm
Sample 1 547.7-548.8	83-0328-0B	< 0.04	0.36	1.9	226	4.6	106	< 0.02	< 4	4.3	< 0.04	3.02
Sample 2 524.8-525.3	83-0329-0B	< 0.04	0.22	0.6	234	3.2	24.4	< 0.02	< 4	2.6	< 0.04	2.60
Sample 3 507.1-508.0	83-0330-0B	< 0.04	0.36	0.8	258	3.8	42.0	< 0.02	< 4	3.0	< 0.04	2.78
Sample 4 479.9-481.2	83-0331-0B	< 0.04	0.38	1.2	521	4.4	46.2	< 0.02	< 4	3.2	< 0.04	6.00
Sample 5 458.3-459.4	83-0332-0B	< 0.04	0.32	1.0	583	3.6	55.8	< 0.02	< 4	1.8	< 0.04	3.20
Sample 6 166.5-168.2	83-0333-0B	< 0.04	< 0.10	< 0.4	34.4	0.6	0.8	< 0.02	< 4	< 0.4	< 0.04	1.04
Sample 7A 148.1-149.1	83-0334-0B	< 0.04	0.12	< 0.4	52.6	2.0	73.8	< 0.02	< 4	2.4	< 0.04	2.06
Sample 7 144.4-145.1	83-0335-0B	< 0.04	0.10	0.8	39.4	0.6	7.4	< 0.02	< 4	2.4	0.04	4.34
Sample 8 136.8-137.8	83-0336-0B	< 0.04	< 0.10	< 0.4	30.2	2.0	6.2	< 0.02	< 4	< 0.4	< 0.04	1.02
Sample 8A 125.6-126.6	83-0337-0B	< 0.04	< 0.10	< 0.4	28.0	0.4	4.4	< 0.02	< 4	0.4	< 0.04	1.06
Sample 9 103.1-105.0	83-0338-0B	< 0.04	0.10	< 0.4	100	2.2	17.0	< 0.02	< 4	0.6	< 0.04	1.72
Sample 10 85.0-87.0	83-0339-0B	< 0.04	0.27	1.0	414	3.5	75.5	< 0.02	< 4	2.8	< 0.04	4.53
Sample 11 54.9-56.4	83-0340-0B	< 0.04	0.10	0.4	65.2	1.2	26.0	< 0.02	< 4	0.4	< 0.04	3.24
Sample 12 28.0-30.0	83-0341-0B	< 0.04	0.26	< 0.4	1.60	2.0	22.8	< 0.02	< 4	1.8	< 0.04	1.50
Sample 13 22.0-24.0	83-0342-0B	< 0.04	0.38	0.4	18.4	6.4	194	< 0.02	< 4	3.6	< 0.04	2.26

[3]EP Toxicity Extraction. Results expressed in ppm of solid material.

Ralph V. Poulsen
Ralph V. Poulsen, Director

BOOKCLIFFS
COMMERCIAL LABORATORIES

Date: 2/23/83

BOOKCLIFFS COMMERICAL LABORATORIES

OVERBURDEN ANALYSIS REPORT

Client: Kaiser Steel Corporation
Address: Sunnyside Mine
Sunnyside, Utah 84539
Attn: Mr. Robert Turner
Hole: KSC-S-25

Sample Date: Unknown
Date Received: 2/14/83
Project: South Lease Coal Property
P.O. Number: 28076166

Sample I.D.	Lab No.	*pH	*E. C.[1]	*Sat. %	*Soluble Cations (meq/l) Ca	Mg	Na	S.A.R.	Sand %	Silt %	Clay %
Sample 1A 567.2-568.3	83-0343-0B	7.6	3.7	28	16.1	19.9	14.5	3.4	46	39	15
Sample 1 532.0-523.2	83-0344-0B	7.8	2.6	27	10.8	15.8	9.0	2.5	70	23	7
Sample 2 494.5-495.6	83-0345-0B	7.1	2.7	26	15.6	19.1	3.6	0.9	76	16	8
Sample 3 467.0-469.0	83-0346-0B	7.3	1.4	26	6.3	9.1	1.7	0.6	89	6	5
Sample 4 456.5-458.0	83-0347-0B	7.2	3.0	27	13.5	27.4	2.8	0.6	57	25	18
Sample 5 449.7-451.6	83-0348-0B	7.1	4.4	27	27.8	48.1	2.1	0.3	70	18	12
Sample 6 440.7-442.7	83-0349-0B	7.5	3.4	24	25.1	27.4	2.1	0.4	86	9	5
Sample 7 427.7-428.8	83-0350-0B	7.7	2.3	25	12.7	17.4	1.7	0.4	80	14	6
Sample 8 392.8-399.8	83-0351-0B	7.2	4.6	22	26.2	42.3	2.3	0.4	85	8	7

*From Saturated Paste Procedure
[1]mmhos/cm @ 25°C

Ralph V. Poulsen
Ralph V. Poulsen, Director

BOOKCLIFFS
COMMERCIAL LABORATORIES

Date:

BOOKCLIFFS COMMERICAL LABORATORIES

OVERBURDEN ANALYSIS REPORT

Client: Kaiser Steel Corporation
Address: Sunnyside Mine
Sunnyside, Utah 84539
Attn: Mr. Robert Turner
Hole: KSC-S-25

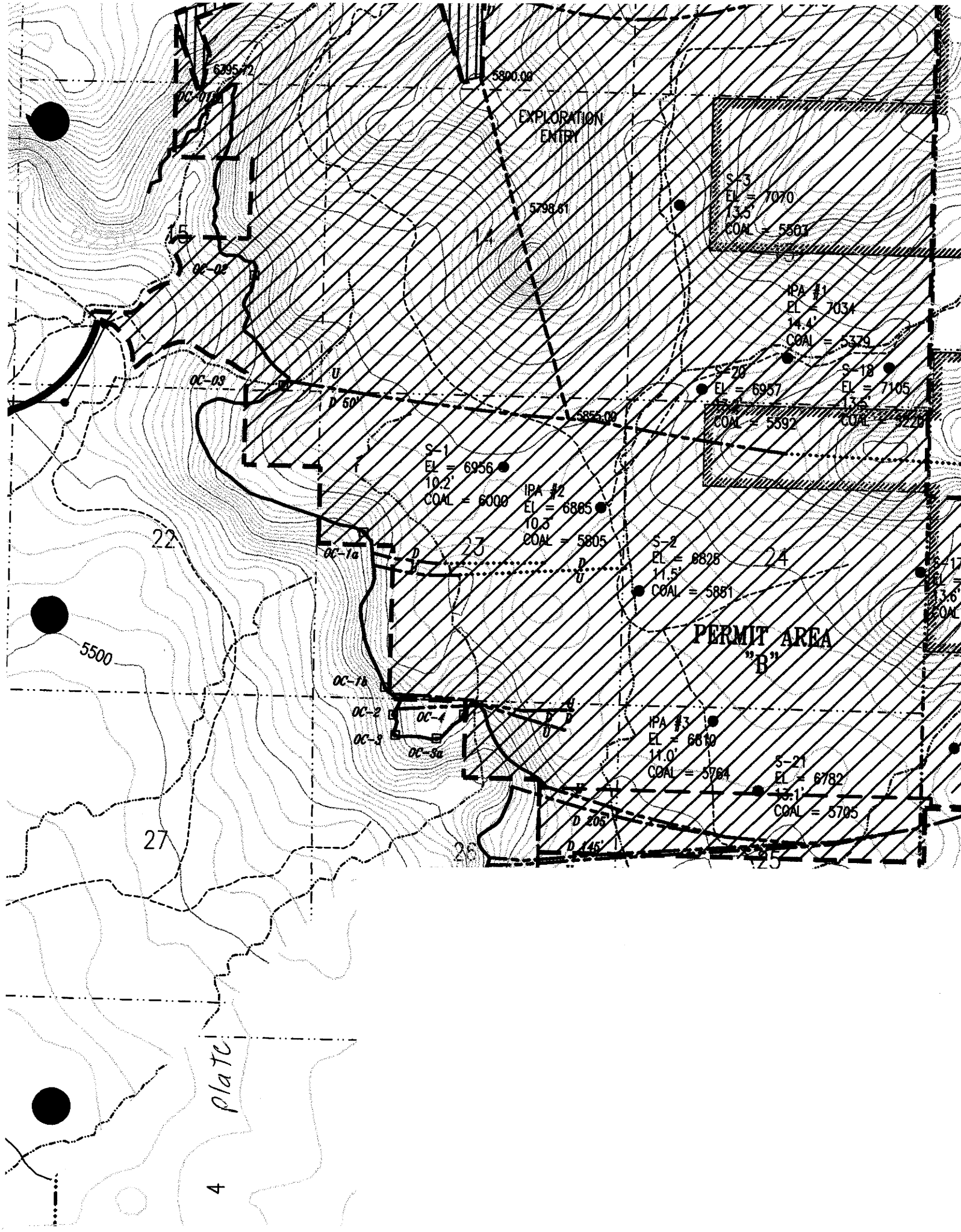
Sample Date: Unknown
Date Received: 2/14/83
Project: South Lease Coal Property
P.O. Number: 28076166

Sample I.D.	Lab No.	Sulfur Organic	Sulfur Pyritic	Sulfur Sulfate	Sulfur Total	Neut.Pot. % (as $CaCO_3$)	Acid[2] Potential	Base[2] Potential	Acid-Base[2] Potential	B[3] ppm	F[3] ppm
Sample 1A 567.2-568.3	83-0343-0B	0.05	0.30	<0.01	0.35	13.9	10	139	129	17.8	3.8
Sample 1 532.0-523.2	83-0344-0B	0.04	0.07	<0.01	0.11	8.9	3	89	86	8.0	9.8
Sample 2 494.5-495.6	83-0345-0B	0.14	0.06	<0.01	0.20	0.6	6	6	0	1.4	3.0
Sample 3 467.0-469.0	83-0346-0B	0.04	0.03	<0.01	0.07	0.2	2	2	0	1.8	2.2
Sample 4 456.5-458.0	83-0347-0B	0.23	0.27	<0.01	0.51	23.7	16	237	221	5.4	3.8
Sample 5 449.7-451.6	83-0348-0B	0.23	0.37	<0.01	0.64	11.9	20	119	99	3.6	2.6
Sample 6 440.7-442.7	83-0349-0B	0.07	0.05	<0.01	0.12	4.5	4	45	41	7.0	1.6
Sample 7 427.7-428.8	83-0350-0B	0.05	0.05	<0.01	0.10	5.3	3	53	50	7.0	1.8
Sample 8 392.8-399.8	83-0351-0B	0.07	0.12	<0.01	0.19	2.3	6	23	17	3.7	1.2

[2]Tons $CaCO_3$/1,000 Tons Material

Ralph V. Poulsen, Director

BOOKCLIFFS
COMMERCIAL LABORATORIES



6395.72
5800.00
EXPLORATION ENTRY
5798.61
S-3
EL = 7070
13.5'
COAL = 5503
15
14
OC-02
IPA #1
EL = 7034
14.4'
COAL = 5379
S-20
EL = 6957
COAL = 5592
S-18
EL = 7105
13.5'
COAL = 5220
OC-03
U
D 50'
5855.00
S-1
EL = 6956
10.2'
COAL = 6000
IPA #2
EL = 6865
10.3'
COAL = 5805
22
23
24
OC-1a
D
U
S-2
EL = 6825
11.5'
COAL = 5851
PERMIT AREA
"B"
5500
OC-1b
OC-2
OC-4
OC-3
OC-3a
IPA #3
EL = 6810
11.0'
COAL = 5764
S-21
EL = 6782
13.1'
COAL = 5705
D 205'
D 145'
27
26
25
plate
4

As can be seen by Table 1 the area identified for refuse disposal is large enough to dispose of approximately 44,437 yd^3 of material. The rock slope material is expected to take up approximately 25,000 leaving approximately 19,500 yd^3 capacity for future underground mine waste and coal processing waste production.

The disposal site will be comprised of two separate sections. The first section (Structural Fill) will be comprised of rock from the rock slopes and will not contain any coal. The Structural Fill site will not require an MSHA number. The second section (Refuse Site) will be for the disposal of coal mine waste.

The following sections will describe the ground preparation, refuse placement, and reclamation procedures for the refuse area. All the refuse will be placed in an incised area.

Ground Preparation

Vegetation and topsoil will be removed from the proposed refuse site and stored in the topsoil pile as shown on Plate 5-2 and Figure 1, Appendix 5-7. Subsoil will then be removed from the area as shown on Figure1. The subsoil will be pushed to the side using the blade of a caterpillar. The hole that is made by pushing the subsoil to the side will be filled by refuse material, either from the rock slope development and or coal processing waste or underground development waste as per Figure 1.

Placement of Refuse

Refuse will be dumped into the hole created from the removal of the subsoil. The refuse will be placed in the hole as per Figure 1. Once the hole is filled to the level shown in Figure 1 the subsoil will then be placed over the top of the refuse and another hole will be constructed by removing subsoil adjacent to the previous hole. The topsoil removal and storage, subsoil removal, hole being filled with refuse, and subsoil replacement, procedure will be repeated as additional refuse disposal area is needed.

Refuse Testing

Material from the rock slope portals will be tested five times during their development. The first test will be during the initial startup of the rock slopes. The second, third and fourth tests will be when the development reaches 1/4, ½, and 3/4 of the construction phase. The last test will be taken near the completion of the project.

Material placed in the refuse pile from normal mining operations will be tested approximately every 6,000 tons. Testing parameters for the rock slope material and normal mining refuse will be as per Table 2.

Spreading and Compaction

Compaction will take place using a wheeled loader during the filling operation. Upon final reclamation the topsoil will be redistributed over the refuse storage area and reclaimed as per chapter 3. The total cover over the refuse area when considering the subsoil and topsoil will be a minimum of 4'.

Pile Configuration and Drainage

The hole for the refuse will be filled with refuse. The subsoil will be redistributed and graded to allow drainage and prevent impoundment of water on the pile. Runoff from the refuse pile will drain to the sediment pond as shown on Plate 7-5. A berm will be placed along the perimeter of the pile to direct runoff into the Sediment Pond.

A projected plan and section view of the refuse disposal area is shown on Figure 1 of this Appendix.

Site Inspection

The refuse disposal area will be inspected under the supervision of a qualified registered professional engineer during construction; this will continue until the area has been graded, covered, and reseeded. Inspections will include observations of any potential safety hazards, to assure that organic material and topsoil is removed before deposition and that construction and maintenance are being performed in accordance with the design plan.

If such inspection discloses a potential hazard, the inspector will immediately notify the regulatory authority of the hazard and the emergency procedures to be implemented.

Copies of the inspection reports will be maintained and available for review.

Reclamation

Upon completion of operation, the topsoil will be redistributed over the previously placed subsoil. Finally, the refuse area will be covered with topsoil and seeded according to the approved plan. Runoff from the reclaimed refuse pile area will continue to flow to the sediment pond until Phase II Bond Release requirements for the reclaimed site are met.

Factor of Safety

Using Geosystems Software SB-Slope Version 3.0 stability analysis for the refuse

From Appendix 5-7

As can be seen by Table 1 the area identified for refuse disposal is large enough to dispose of approximately 44,437 yd^3 of material. The rock slope material is expected to take up approximately 25,000 leaving approximately 19,500 yd^3 capacity for future underground mine waste and coal processing waste production.

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Refuse Testing

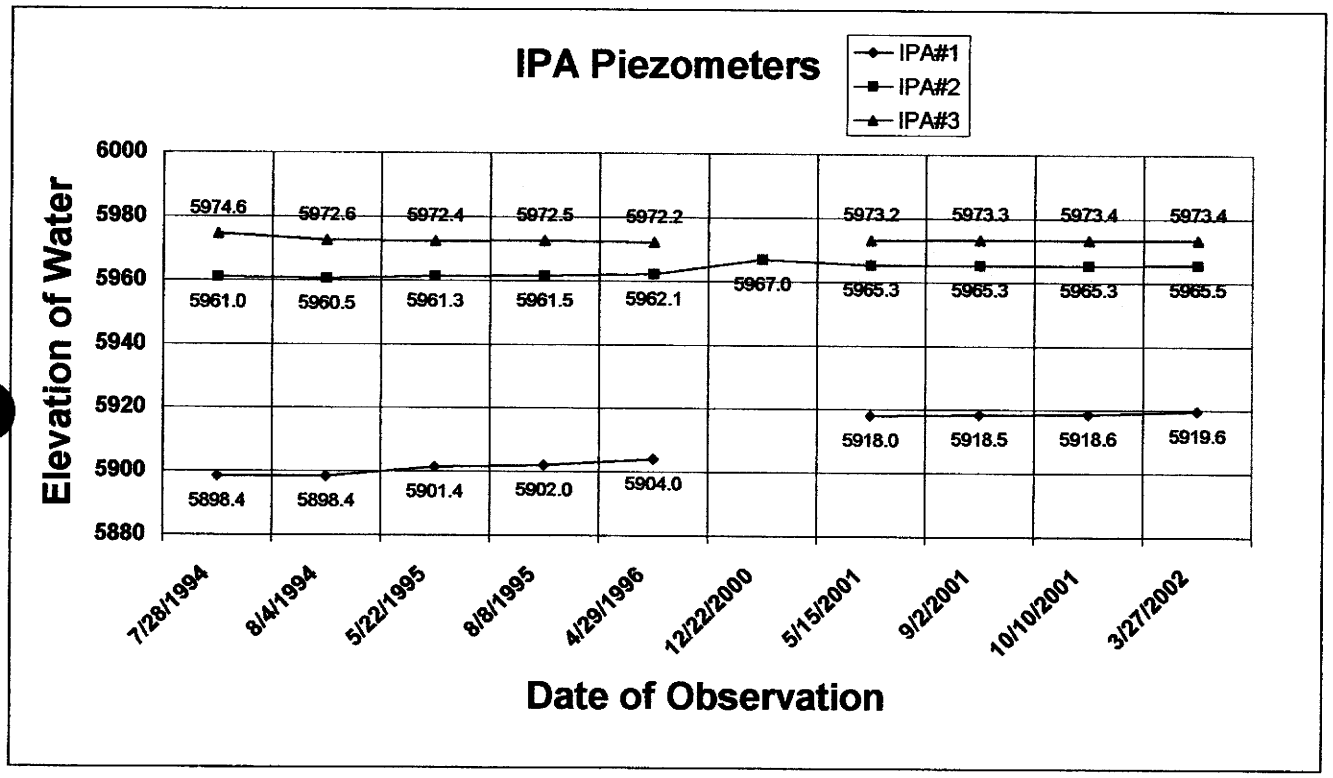
Material from the rock slope portals will be tested five times during their development. The first test will be during the initial startup of the rock slopes. The second, third and fourth tests will be when the development reaches 1/4, ½, and 3/4 of the construction phase. The last test will be taken near the completion of the project.

Material placed in the refuse pile from normal mining operations will be tested approximately every 6,000 tons. Testing parameters for the rock slope material and normal mining refuse will be as per Table 2.

App 7-1

IPA Piezometers
Water Depths

		IPA#1			IPA#2			IPA#3		
		Depth to Water	Top of Casing	[redacted]	Depth to Water	Top of Casing	[redacted]	Depth to Water	Top of Casing	[redacted]
Summer	7/28/1994	1134.1	7032.5	[redacted]	905.5	6866.5	[redacted]	837.9	6812.5	[redacted]
Summer	8/4/1994	1134.1	7032.5	[redacted]	906.0	6866.5	[redacted]	839.9	6812.5	[redacted]
Spring	5/22/1995	1131.1	7032.5	[redacted]	905.2	6866.5	[redacted]	840.1	6812.5	[redacted]
Summer	8/8/1995	1130.6	7032.5	[redacted]	905.0	6866.5	[redacted]	840.0	6812.5	[redacted]
Spring	4/29/1996	1128.5	7032.5	[redacted]	904.4	6866.5	[redacted]	840.3	6812.5	[redacted]
Winter	12/22/2000			[redacted]	899.5	6866.5	[redacted]			[redacted]
Spring	5/15/2001	1114.5	7032.5	[redacted]	901.2	6866.5	[redacted]	839.3	6812.5	[redacted]
Fall	9/2/2001	1114.1	7032.5	[redacted]	901.2	6866.5	[redacted]	839.2	6812.5	[redacted]
Fall	10/10/2001	1113.9	7032.5	[redacted]	901.2	6866.5	[redacted]	839.2	6812.5	[redacted]
Spring	3/27/2002	1112.9	7032.5	[redacted]	901.0	6866.5	[redacted]	839.1	6812.5	[redacted]



why slope in sp's?
erosion of casing → shift
interrup → displacement of water

Sch April 02

Lila Mine Site Water Monitoring
2001

no contacts

Month	Date Inspected	L-1-S LF Lila	L-2-S RF Lila	L-3-S RF Lila	L-4-S Lila Pond	L-5-G Mine	Initial of Inspector	Entered
January	1/10/01	NA	NA	NA	NA	NA	D.V.	2/19/02 RJM
February	2/07/01	NA	NA	NA	NA	NA	J.T.P.	2/19/02 RJM
March	3/23/01	NF	NF	NF	NF	NF	J.T.P.	
April	4/21/01	NF	NF	NF	NF	NF	J.T.P.	2/18/02 RJM
May	5/04/01	NF	NF	NF	NF	NF	J.T.P	2/18/02 RJM
June	6/19/01	NF	NF	NF	NF	NF	RJM	2/18/02 RJM
July	7/12/01	NF	NF	NF	NF	NF	RJM	2/18/02 RJM
August	8/07/01	NF	NF	NF	NF	NF	RJM	2/18/02 RJM
September	9/04/01	NF	NF	NF	NF	NF	RJM	2/18/02 RJM
October	10/9/01	NF	NF	NF	NF	NF	RJM	2/18/02 RJM
November	11/23/01	NF	NF	NF	NF	NF	RJM	2/18/02 RJM
December	12/12/01	NA	NA	NA	NA	NA	RJM	2/18/02 RJM

NF = No Flow NA = Not Accessibly

Lila Mine Site Water Monitoring
2002

Month	Date Inspected	L-1-S LF Lila	L-2-S RF Lila	L-3-S RF Lila	L-4-S Lila Pond	L-5-G Mine	Initial of Inspector	Entered
January	29/01/02	NA	NA	NA	NA	NA	RJM	2/13/02 RJM
February	2/21/02	NF	NF	NF	NA	NA	RJM KH	2/22/02 RJM
March	3/13/02	NF	NF	NF	NA	NA	RJM MH	
April								
May								
June								
July								
August								
September								
October								
November								
December								

NF = No Flow NA = Not Accessibly

Little Park Area
Ephemeral - Intermittent Washes
Water Monitoring

Since 1988 UEI and their consultants have traveled on Little Park gathering water samples, locating drill holes, gathering baseline data for the Lila Canyon Mine and at no time has their been a single observation of water flow in Little Park Wash, William Draw Wash, or in the unnamed wash below L-12-G. When traveling the Little Park Road all three washes are crossed and if their had been any flow, ephemeral or otherwise, it would have been noted. Below are some of the dates that no flow was observed. NOTE: there are many other times when "no flow" observations were made but not recorded.

Date	Little Park Wash	Wash Below L-12-G	Williams Draw Wash	Initial of Observer
12/22/00	No Flow	No Flow	No Flow	MAC
5/15/01	No Flow	No Flow	No Flow	JTP
7/03/01	No Flow	No Flow	No Flow	RJM
9/02/01	No Flow	No Flow	No Flow	RJM
10/10/01	No Flow	No Flow	No Flow	RJM
3/27/02	No Flow	No Flow	No Flow	RJM
4/05/02	No Flow	No Flow	No Flow	RJM

4) The coal mined at Horse Canyon (as well as that at Lila Canyon) is underlain by a marine sheet sandstone (Sunnyside, see Geology, Chapter VI). Balsley (1981) did extensive petrographic work on porosity and permeability in the formation. If the water level in the mine were to ever approach the level of the portal, the Sunnyside marine sandstone would likely discharge water, preventing any head development behind the portal closures.

5) Much of the Horse Canyon Mine floor has been fractured by the effects of pillar removal, especially near the outcrop. Fracturing develops secondary porosity and enhances the permeability of the underlying Sunnyside marine sandstone. This would function as a means to dissipate any head which might otherwise develop on the portals. The proposed longwall mining in the Lila Canyon Mine is also expected to produce floor fracturing.

6) There is a difference in elevation of about 500 feet between the lowest portal and the approximate water level in the Horse Canyon mine (1986). If the water level in the mine continues to rise, the head differential between the discharging aquifer and the mine will decrease. The decrease in head will have the direct effect of decreasing the inflow rate into the mine. The volume of water required to "fill the mine" would also have to fill the aquifer porosity above the mine, which has been dewatered throughout the history of the mine.

Based on these factors it is unlikely that the groundwater level in the regional aquifer will ever rise to the level of the portal, at any portal location for the Horse Canyon or Lila Canyon Mines. Hence, there should be no natural discharge of groundwater through any of the sealed portals. Stand pipes will be incorporated into the grading plans for the portals so that water levels can be checked annually.

Springs and Seeps

Water

Subsurface water inflow associated with fault or fracture systems are possible, however, this potential is not expected to be significant in the LMPA. Minor water inflows from the exploration entries is anticipated.

Gas

Gas in the Geneva mine was not a problem although an increase was detected as mining reached deeper levels over 2,000 feet. In view of the relatively low cover over the LMPA coal, and proximity up dip to the outcrop, methane is not anticipated to be a problem.

Seismic Disturbances

Coal mine bump phenomenon has long been observed in the Columbia, Geneva, and Sunnyside mines. In the LMPA where faults are closely spaced, highly stressed rock and coal are likely to occur.

6.6.2 SURFACE HAZARDS

Surface subsidence can be expected in the LMPA. The impact will vary with depth of overburden and mining methods, i.e. full extraction versus leaving of supports which will affect coal recovery.

6.6.3 IMPACTS OF MINING

Horn Formation. The fact that no springs occur in the Castlegate Sandstone or stratigraphically below indicates these lower formations may be recharged by streams which flow over them. This also indicates the groundwater flow direction is similar to the structural dip direction in the regional aquifer.

Field conductivity of the springs (Table 7-1) indicates that generally the springs which are stratigraphically highest in the section have the lowest conductivity, indicating they discharge from local flow systems.

Mining in the Horse Canyon area began in the late 1930's. Detailed hydrologic information was first gathered in the late 1970's. It is impossible to precisely describe the area's pre-mining hydrology. The conditions represented by these data help to define the hydrology about the time SMCRA was passed.

It should be noted that the determination of no known depletion of flow or quality in the PHC (Appendix 7-3) is based on available data, which is primarily post-mining.

An additional spring and seep survey was conducted on the area, including the proposed Lila Canyon Mine area, by Earthfax Engineering in 1993 through 1995. Details of this survey are included in Appendix 7-1 of this permit. This is the most consistent and most recent data; therefore, this data has been used for baseline monitoring in Appendix 7-1.

Groundwater Encountered in the Horse Canyon Mine

According to mining records of U.S. Steel (previous owner), groundwater was monitored within the Horse Canyon mine in several locations. Generally, the underground flows which issue from rock slopes and gob areas were small. Only when the mine intercepted the Sunnyside Fault was significant water encountered. The mine pumped water from the workings prior to suspending operations. The water was pumped for use in the water supply system for the mine and to keep some of the workings near the Sunnyside Fault from flooding.

The rate of inflow into the mine is not precisely known. In U.S. Steel's Permit Application Package (PAP) (1983) they estimated the average discharge from the mine to be 0.2 cfs. Lines and Plantz (1981, p. 32) also estimated the discharge from the mine to be 0.2 cfs and mentioned that the discharge was intermittent. It is not known however if this represents a constant average flow or the average flow rate during discharge periods.

Appendix VI-1

Water Quality Data

003518

U.S. Steel Data

SURFACE WATER QUALITY DATA
GENEVA COAL MINE

Sampling Date:	2/81	3/81	4/81	5/81
RF-1				
Flow (gpm)	NA	NA	NA	10
Acidity as CaCO3 mg/l	<0.1	14.0	<0.01	4.00
Alkalinity as CaCO3 mg/l	520.00	444.00	386.00	400.00
Dissolved Iron mg/l	0.218	0.210	0.820	0.070
Iron as Fe (Total) mg/l	1.100	0.250	3,080	0.180
Manganese as Mn (Tot) mg/l	0.060	0.010	0.290	0.020
Suspended Solids mg/l	59.0	9.0	303	104
Total Dissolved Solids mg/l	1,000	1,800	950	900
pH Units	8.00	8.00	8.10	8.20

Sampling Date:	6/81	7/81	8/81	9/81
RF-1				
Flow (gpm)	NA	5	7	15
Acidity as CaCO3 mg/l	<0.01	4.00	<0.01	<0.01
Alkalinity as CaCO3 mg/l	404.00	438.00	390.00	396.00
Dissolved Iron mg/l	0.030	0.010	<0.001	0.024
Iron as Fe (Total) mg/l	0.050	0.020	0.070	0.065
Manganese as Mn (Tot) mg/l	0.010	0.010	<0.001	0.013
Suspended Solids mg/l	15.0	8.0	2.0	7.0
Total Dissolved Solids mg/l	950	1,000	900	950
pH Units	8.20	7.70	8.60	8.30

Sampling Date:	10/81	11/81	12/81	3/82
RF-1				
Flow (gpm)	25	15	15	18
Acidity as CaCO3 mg/l	10.00	<0.01	<0.01	10.00
Alkalinity as CaCO3 mg/l	46.00	485.00	380.00	497.00
Dissolved Iron mg/l	0.030	0.033	0.026	1.900
Iron as Fe (Total) mg/l	0.140	0.065	0.095	9.400
Manganese as Mn (Tot) mg/l	0.020	0.020	0.013	0.018
Suspended Solids mg/l	6.2	5.0	2.0	130
Total Dissolved Solids mg/l	987	950	900	874
pH Units	8.00	8.20	8.10	7.60

Sampling Date:	4/82	5/82	6/82	7/82
RF-1				
Flow (gpm)	20	20	25	10
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	345.00	485.00	413.50	327.20
Dissolved Iron mg/l	NA	NA	0.030	0.030
Iron as Fe (Total) mg/l	0.200	1.100	0.100	0.040
Manganese as Mn (Tot) mg/l	0.020	0.035	0.008	0.005
Suspended Solids mg/l	15.0	59.0	13.0	<1.0
Total Dissolved Solids mg/l	988	862	925	915
pH Units	8.10	8.20	8.40	8.50

SURFACE WATER QUALITY DATA
GENEVA COAL MINE

Sampling Date:	8/82	9/82	10/82	4/83
[illegible]1				
[illegible]ow (gpm)	25	20	20	NA
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	NA
Alkalinity as CaCO3 mg/l	505.00	364.40	537.00	NA
Dissolved Iron mg/l	0.020	0.036	0.021	NA
Iron as Fe (Total) mg/l	0.025	0.052	0.030	26.500
Manganese as Mn (Tot) mg/l	0.008	0.008	0.010	0.360
Suspended Solids mg/l	4.0	9.0	8.0	1,648
Total Dissolved Solids mg/l	874	890	920	940
pH Units	8.30	8.40	8.50	8.10

Sampling Date:

Flow (gpm)
Acidity as CaCO3 mg/l
Alkalinity as CaCO3 mg/l
Dissolved Iron mg/l
Iron as Fe (Total) mg/l
Manganese as Mn (Tot) mg/l
Suspended Solids mg/l
Total Dissolved Solids mg/l
pH Units

[illegible]mpling Date:

Flow (gpm)
Acidity as CaCO3 mg/l
Alkalinity as CaCO3 mg/l
Dissolved Iron mg/l
Iron as Fe (Total) mg/l
Manganese as Mn (Tot) mg/l
Suspended Solids mg/l
Total Dissolved Solids mg/l
pH Units

Sampling Date:

Flow (gpm)
Acidity as CaCO3 mg/l
Alkalinity as CaCO3 mg/l
Dissolved Iron mg/l
Iron as Fe (Total) mg/l
Manganese as Mn (Tot) mg/l
Suspended Solids mg/l
Total Dissolved Solids mg/l
pH Units

SURFACE WATER QUALITY DATA
GENEVA COAL MINE

Sampling Date:	2/81	3/81	4/81	5/81
B-1				
Flow (gpm)	NA	NA	NA	375
Acidity as CaCO3 mg/l	<0.1	<0.1	<0.01	6.00
Alkalinity as CaCO3 mg/l	424.00	372.00	346.00	330.00
Dissolved Iron mg/l	0.270	0.210	0.190	0.520
Iron as Fe (Total) mg/l	0.310	0.250	0.560	0.950
Manganese as Mn (Tot) mg/l	0.020	0.010	0.030	0.050
Suspended Solids mg/l	18.0	9.0	87.0	50.0
Total Dissolved Solids mg/l	1,900	1,800	2,050	1,700
pH Units	8.40	8.0	8.30	8.10

Sampling Date:	7/81	9/81	10/81	3/82
B-1				
Flow (gpm)	375	310	650	300
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	4.50
Alkalinity as CaCO3 mg/l	356.00	298.00	1,095.00	293.60
Dissolved Iron mg/l	0.020	0.075	0.080	0.640
Iron as Fe (Total) mg/l	0.440	0.280	0.255	1.110
Manganese as Mn (Tot) mg/l	0.030	0.014	0.017	0.022
Suspended Solids mg/l	136	10.0	8.1	18.0
Total Dissolved Solids mg/l	1,850	2,000	1,850	362
pH Units	8.20	8.30	8.30	8.20

Sampling Date:	4/82	5/82	6/82	8/82
B-1				
Flow (gpm)	425	400	500	520
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	291.60	350.30	366.90	297.50
Dissolved Iron mg/l	NA	NA	0.760	0.810
Iron as Fe (Total) mg/l	1.600	0.060	1.720	1.920
Manganese as Mn (Tot) mg/l	0.060	0.015	0.070	0.090
Suspended Solids mg/l	105	3.0	98.0	114
Total Dissolved Solids mg/l	2,708	2,178	2,175	2,372
pH Units	7.80	8.10	7.90	8.10

Sampling Date:	9/82	10/82	4/83
B-1			
Flow (gpm)	400	350	NA
Acidity as CaCO3 mg/l	<0.01	<0.01	NA
Alkalinity as CaCO3 mg/l	304.00	399.20	NA
Dissolved Iron mg/l	0.820	0.920	NA
Iron as Fe (Total) mg/l	1.890	2.140	14.800
Manganese as Mn (Tot) mg/l	0.095	0.095	0.515
Suspended Solids mg/l	21.0	8.0	640
Total Dissolved Solids mg/l	2,120	1,900	1,688
pH Units	8.20	8.30	7.80

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	3-81	4-81	5-81	6-81
HC1				
Flow (gpm)	NA	NA	25	NA
Acidity as CaCO3 mg/l	< 0.1	< 0.01	10.00	< 0.01
Alkalinity as CaCO3 mg/l	370.00	416.00	360.00	408.00
Dissolved Iron mg/l	0.030	0.010	0.140	0.010
Iron as Fe (Total) mg/l	0.060	0.230	0.270	0.120
Manganese as Mn (Tot) mg/l	0.030	0.020	0.040	0.050
Suspended Solids mg/l	1.0	23.0	12.0	44.0
Total Dissolved Solids mg/l	1,400	1,450	1,300	1,450
pH Units	7.70	8.10	8.00	8.10

Sampling Date:	7-81	8-81	10-81	11-81
HC1				
Flow (gpm)	40	3	35	25
Acidity as CaCO3 mg/l	< 0.01	< 0.01	< 0.01	< 0.01
Alkalinity as CaCO3 mg/l	420.00	416.00	985.00	452.00
Dissolved Iron mg/l	0.070	0.090	0.130	0.019
Iron as Fe (Total) mg/l	0.080	0.140	0.265	0.155
Manganese as Mn (Tot) mg/l	0.050	0.120	0.130	0.030
Suspended Solids mg/l	11.0	5.0	6.6	16.0
Total Dissolved Solids mg/l	1,400	1,400	1,500	1,500
pH Units	8.20	8.30	8.20	8.10

Sampling Date:	12-81	4-82	5-82	6-82
HC1				
Flow (gpm)	17	12	60	65
Acidity as CaCO3 mg/l	< 0.01	< 0.01	4.00	2.00
Alkalinity as CaCO3 mg/l	360.00	252.00	517.50	412.00
Dissolved Iron mg/l	0.013	NA	NA	0.040
Iron as Fe (Total) mg/l	0.150	0.030	2.250	0.070
Manganese as Mn (Tot) mg/l	0.025	0.010	0.100	0.010
Suspended Solids mg/l	11.0	4.0	106	9.0
Total Dissolved Solids mg/l	1,325	1,566	1,372	1,375
pH Units	8.10	7.80	7.90	8.00

Sampling Date:	7-82	8-82	10-82	4-83
HC1				
Flow (gpm)	45	40	10	NA
Acidity as CaCO3 mg/l	< 0.01	< 0.01	6.00	NA
Alkalinity as CaCO3 mg/l	339.50	523.00	211.00	NA
Dissolved Iron mg/l	0.040	0.040	0.038	NA
Iron as Fe (Total) mg/l	0.040	0.044	0.040	49.300
Manganese as Mn (Tot) mg/l	0.010	0.055	0.042	1.450
Suspended Solids mg/l	2.0	2.0	14.0	2,152
Total Dissolved Solids mg/l	1,425	1,502	1,500	1,188
pH Units	8.00	8.10	7.80	8.10

SURFACE WATER QUALITY

MINE DISCHARGES

	001 4-6-81	002 4-6-81
Aluminum, Al mg/l	0.016	0.025
Ammonia, NH3 mg/l	0.10	0.45
Antimony, Sb mg/l	<0.001	<.001
Arsenic, As mg/l	0.002	0.005
Barium, Ba mg/l	0.035	0.045
Bicarbonate, HNO3 mg/l		
Boron, B mg/l	0.020	0.033
Cadmium, Cd mg/l	<0.001	<0.001
Beryllium, Be mg/l	<0.01	<0.01
Bromide, Br mg/l	<0.001	<0.001
Cobalt, Co, mg/l	<0.001	<0.004
Chromium, Cr mg/l	<0.001	<0.001
Conductivity, umhos/cm		
Copper, Cu mg/l	0.003	0.006
Flouride, F mg/l	0.35	0.41
Hardness, CaCO3 mg/l		
Iron, Fe (total) mg/l	0.120	0.170
Lead, Pb mg/l	0.003	<0.001
Magnesium, Mg mg/l	112.80	96.00
Manganese, Mn mg/l	0.012	0.016
Mercury, Hg mg/l	<0.0002	<0.0002
Molybdenum, Mo mg/l	0.003	0.009
Nickel, Ni mg/l	0.094	0.095
Nitrate, NO3-N mg/l	0.66	0.62
Nitrite, NO2-N mg/l	<0.01	0.08
Phosphate, PO4 mg/l	0.070	0.060
Potassium, K mg/l		
Selenium, Se mg/l	<0.001	<0.001
Sodium, Na mg/l		
Sulfate, SO4 mg/l	990	960
Sulfide, S mg/l	0.67	0.92
Suspended Solids mg/l	20.0	28.0
Total Combustable Solids mg/l		
Total Dissolved Solids mg/l		
Zinc, Zn mg/l	0.006	0.019
pH Units		

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	3/11/81	3/27/81	4/6/81	4/22/81
001				
Average Flow (Mgpd)	NA	NA	1.60	1.60
Acidity as CaCO3 mg/l	<0.1	<0.1	NA	<0.1
Alkalinity as CaCO3 mg/l	376.00	378.00	NA	386.00
Dissolved Iron mg/l	0.220	0.040	NA	0.020
Iron as Fe (Total) mg/l	0.240	0.140	0.120	0.080
Manganese as Mn (Tot) mg/l	0.010	0.010	0.012	0.020
Oil and Grease mg/l	1.60	NA	0.80	NA
Suspended Solids mg/l	8.0	8.0	20.0	25.0
Total Dissolved Solids mg/l	1,770	1,750	NA	2,100
pH Units	7.70	7.80	7.30	8.10

Sampling Date:	5/13/81	6/11/81	6/24/81	7/8/81
001				
Average Flow (Mgpd)	1.60	1.60	0.197	0.197
Acidity as CaCO3 mg/l		<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l		370.00	366.00	366.00
Dissolved Iron mg/l		0.010	0.180	0.050
Iron as Fe (Total) mg/l		0.080	0.210	0.080
Manganese as Mn (Tot) mg/l		0.010	0.010	<0.001
Oil and Grease mg/l		1.00	NA	<0.01
Suspended Solids mg/l		1.0	29.0	9.0
Total Dissolved Solids mg/l		1,700	1,900	1,850
pH Units		8.10	8.10	8.20

Sampling Date:	7/22/81	8/12/81	8/26/81	9/9/81
001				
Average Flow (Mgpd)	0.197	0.197	0.197	0.197
Acidity as CaCO3 mg/l	<0.01	<0.01	3.46	3.60
Alkalinity as CaCO3 mg/l	372.00	370.00	388.00	340.00
Dissolved Iron mg/l	0.185	0.038	0.150	0.024
Iron as Fe (Total) mg/l	0.240	0.050	0.260	0.110
Manganese as Mn (Tot) mg/l	0.012	0.010	0.018	0.015
Oil and Grease mg/l	NA	1.60	NA	1.40
Suspended Solids mg/l	5.0	4.0	12.5	10.0
Total Dissolved Solids mg/l	1,822	1,800	1,850	1,975
pH Units	8.20	8.30	7.90	7.60

Sampling Date:	9/9/81	10/14/81	10/28/81	11/10/81
001				
Average Flow (Mgpd)	0.197	0.271	0.271	0.271
Acidity as CaCO3 mg/l	<0.01	2.40	6.00	<0.01
Alkalinity as CaCO3 mg/l	368.00	363.00	362.00	439.00
Dissolved Iron mg/l	0.040	0.040	0.085	NA
Iron as Fe (Total) mg/l	0.068	0.115	0.112	0.112
Manganese as Mn (Tot) mg/l	0.015	0.015	0.018	0.050
Oil and Grease mg/l	NA	2.50	NA	0.20
Suspended Solids mg/l	13.0	4.0	11.0	15.0
Total Dissolved Solids mg/l	1,985	2,000	1,900	1,800
pH Units	8.10	7.95	7.90	8.10

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	11/15/81	12/9/81	12/23/81	1/13/82
001				
Average Flow (Mgpd)	0.271	0.271	0.271	0.127
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Oil and Grease mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:	1/27/82	2/9/82	2/22/82	3/9/82
001				
Average Flow (Mgpd)	0.127	0.319	0.319	0.325
Acidity as CaCO3 mg/l		<0.01	NA	6.00
Alkalinity as CaCO3 mg/l		238.00	NA	472.00
Dissolved Iron mg/l		0.110	NA	0.380
Iron as Fe (Total) mg/l		0.125	0.240	0.420
Manganese as Mn (Tot) mg/l		0.044	NA	0.062
Oil and Grease mg/l		<1.0	NA	1.60
Suspended Solids mg/l		5.0	26.0	2.0
Total Dissolved Solids mg/l		2,000	2,150	2,456
pH Units		7.70	7.70	7.80

Sampling Date:	3/23/82	4/13/82	4/27/82	5/13/82
001				
Average Flow (Mgpd)	0.325	0.119	0.119	0.162
Acidity as CaCO3 mg/l	NA	<0.01	NA	10.0
Alkalinity as CaCO3 mg/l	NA	323.50	NA	381.20
Dissolved Iron mg/l	NA	0.180	NA	0.250
Iron as Fe (Total) mg/l	0.260	0.195	0.286	0.250
Manganese as Mn (Tot) mg/l	NA	0.020	NA	0.040
Oil and Grease mg/l	NA	1.4	NA	<0.1
Suspended Solids mg/l	1.0	13.0	4.0	5.0
Total Dissolved Solids mg/l	2,308	2,654	2,632	2,566
pH Units	7.80	7.90	7.90	7.80

Sampling Date:	5/24/82	6/8/82	6/23/82	7/13/82
001				
Average Flow (Mgpd)	0.162	0.184	0.184	0.183
Acidity as CaCO3 mg/l	NA	<0.01	NA	1.00
Alkalinity as CaCO3 mg/l	NA	401.10	NA	313.40
Dissolved Iron mg/l	NA	0.200	NA	0.250
Iron as Fe (Total) mg/l	0.150	0.210	0.230	0.250
Manganese as Mn (Tot) mg/l	NA	0.015	NA	0.035
Oil and Grease mg/l	NA	0.2	NA	1.2
Suspended Solids mg/l	2.0	9.0	6.0	5.0
Total Dissolved Solids mg/l	2,268	1,875	2,150	2,035
pH Units	8.00	7.90	7.80	7.80

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	7/28/82	8/11/82	8/26/82	9/15/8
001				
Average Flow (Mgpd)	0.263	0.208	0.208	0.2
Acidity as CaCO3 mg/l	NA	1.00	NA	9.
Alkalinity as CaCO3 mg/l	NA	398.70	NA	348.
Dissolved Iron mg/l	NA	0.050	NA	0.2
Iron as Fe (Total) mg/l	0.290	0.116	0.180	0.3
Manganese as Mn (Tot) mg/l	NA	0.055	NA	0.0
Oil and Grease mg/l	NA	<0.1	NA	0.
Suspended Solids mg/l	1.0	7.0	38.0	1.
Total Dissolved Solids mg/l	1,970	1,890	1,820	2,6
pH Units	8.00	8.00	7.90	7.

Sampling Date:	9/28/82	10/12/82	10/26/82	11/10/
001				
Average Flow (Mgpd)	0.263	0.208	0.208	0.2
Acidity as CaCO3 mg/l	NA	1.00	NA	9.
Alkalinity as CaCO3 mg/l	NA	398.70	NA	348.
Dissolved Iron mg/l	NA	0.050	NA	0.2
Iron as Fe (Total) mg/l	0.290	0.116	0.180	0.3
Manganese as Mn (Tot) mg/l	NA	0.055	NA	0.0
Oil and Grease mg/l	NA	<0.1	NA	0
Suspended Solids mg/l	1.0	7.0	38.0	1
Total Dissolved Solids mg/l	1,970	1,890	1,8250	2,6
pH Units	8.00	8.00	7.90	7.

Sampling Date:	11/24/82	12/8/82	12/22/82	1/12/
001				
Average Flow (Mgpd)	0.234	0.263	0.263	0.2
Acidity as CaCO3 mg/l	NA	<0.01	NA	<0.
Alkalinity as CaCO3 mg/l	NA	319.80	NA	439.
Dissolved Iron mg/l	NA	0.420	NA	0.3
Iron as Fe (Total) mg/l	0.370	0.430	0.210	0.3
Manganese as Mn (Tot) mg/l	NA	0.025	NA	0.0
Oil and Grease mg/l	NA	0.6	NA	1
Suspended Solids mg/l	6.0	17.0	5.0	4
Total Dissolved Solids mg/l	1,920	1,815	1,840	1,8
pH Units	8.00	8.10	7.90	8.

Sampling Date:	1/26/83	2/9/83	2/22/83	3/9/
001				
Average Flow (Mgpd)	0.272	NA	NA	NA
Acidity as CaCO3 mg/l	NA	6.00	NA	7
Alkalinity as CaCO3 mg/l	NA	328.20	NA	344.
Dissolved Iron mg/l	NA	0.380	NA	0.3
Iron as Fe (Total) mg/l	0.550	0.430	0.190	0.3
Manganese as Mn (Tot) mg/l	NA	0.020	NA	0.0
Oil and Grease mg/l	NA	0.6	NA	<0
Suspended Solids mg/l	17.0	26.0	<0.1	5
Total Dissolved Solids mg/l	1,850	1,800	1,775	1,8
pH Units	7.80	7.80	7.80	7.

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	3/23/83	4/14/83	4/28/83	5/17/83
001				
Average Flow (Mgpd)	NA	0.075	0.075	0.048
Acidity as $CaCO_3$ mg/l	NA	<0.01	NA	<0.01
Alkalinity as $CaCO_3$ mg/l	NA	324.00	NA	338.00
Dissolved Iron mg/l	NA	0.310	NA	0.190
Iron as Fe (Total) mg/l	0.200	0.370	0.290	0.190
Manganese as Mn (Tot) mg/l	NA	0.025	NA	0.018
Oil and Grease mg/l	NA	<0.2	NA	<0.1
Suspended Solids mg/l	13.0	3.0	15.0	11.0
Total Dissolved Solids mg/l	1,810	2,160	2,172	2,124
pH Units	7.30	7.10	7.80	8.20

Sampling Date:	5/26/83	6/8/83	6/29/83
001			
Average Flow (Mgpd)	0.048		
Acidity as $CaCO_3$ mg/l	NA	<0.01	NA
Alkalinity as $CaCO_3$ mg/l	NA	320.00	NA
Dissolved Iron mg/l	NA	0.030	NA
Iron as Fe (Total) mg/l	0.240	0.170	0.100
Manganese as Mn (Tot) mg/l	NA	0.027	NA
Oil and Grease mg/l	NA	<0.2	NA
Suspended Solids mg/l	30.0	29.0	11.0
Total Dissolved Solids mg/l	2,016	1,988	1,710
pH Units	8.00	7.90	7.80

Sampling Date:			
Flow (gpm)			
Acidity as $CaCO_3$ mg/l			
Alkalinity as $CaCO_3$ mg/l			
Dissolved Iron mg/l			
Iron as Fe (Total) mg/l			
Manganese as Mn (Tot) mg/l			
Suspended Solids mg/l			
Total Dissolved Solids mg/l			
pH Units			

Sampling Date:			
Flow (gpm)			
Acidity as $CaCO_3$ mg/l			
Alkalinity as $CaCO_3$ mg/l			
Dissolved Iron mg/l			
Iron as Fe (Total) mg/l			
Manganese as Mn (Tot) mg/l			
Suspended Solids mg/l			
Total Dissolved Solids mg/l			
pH Units			

SURFACE WATER QUALITY - GENEVA COAL MINE

Sampling Date:	2/12/81	2/27/81	3/11/81	3/27/81
002				
Average Flow (Mgpd)	NA	NA	NA	NA
Acidity as CaCO3 mg/l	<0.1	12.0	8.0	10.0
Alkalinity as CaCO3 mg/l	462.00	430.00	432.00	390.00
Dissolved Iron mg/l	NA	0.270	0.620	0.310
Iron as Fe (Total) mg/l	0.660	0.270	0.650	0.340
Manganese as Mn (Tot) mg/l	NA	0.025	0.030	0.020
Oil and Grease mg/l	5.60	NA	1.20	NA
Suspended Solids mg/l	3.0	6.0	7.0	6.0
Total Dissolved Solids mg/l	1,750	1,950	1,750	1,700
pH Units	8.40	7.50	7.60	7.30

Sampling Date:	4/6/81	4/22/81	5/13/81	6/11/81
002				
Average Flow (Mgpd)	0.319	0.319	0.319	0.319
Acidity as CaCO3 mg/l	NA	10.00	35.00	
Alkalinity as CaCO3 mg/l	NA	368.00	470.00	
Dissolved Iron mg/l	NA	0.020	0.050	
Iron as Fe (Total) mg/l	0.170	0.310	0.160	
Manganese as Mn (Tot) mg/l	0.016	0.250	0.020	
Oil and Grease mg/l	0.80	NA	2.10	
Suspended Solids mg/l	28.0	18.0	9.0	
Total Dissolved Solids mg/l	NA	1,900	1,800	
pH Units	7.40	7.60	7.80	

Sampling Date:	6/24/81	7/8/81	7/22/81	8/12/81
002				
Average Flow (Mgpd)	0.319	0.225	0.225	0.225
Acidity as CaCO3 mg/l	6.80	8.00	5.70	20.00
Alkalinity as CaCO3 mg/l	404.00	404.00	364.00	382.00
Dissolved Iron mg/l	0.330	0.110	0.350	0.090
Iron as Fe (Total) mg/l	0.350	0.140	0.398	0.150
Manganese as Mn (Tot) mg/l	0.080	<0.001	0.085	0.010
Oil and Grease mg/l	NA	<0.01	NA	0.80
Suspended Solids mg/l	19.0	9.0	4.0	5.0
Total Dissolved Solids mg/l	1,800	1,800	1,810	1,700
pH Units	7.80	7.80	7.70	7.90

Sampling Date:	8/26/81	9/9/81	9/23/81	10/14/81
002				
Average Flow (Mgpd)	0.225	0.225	0.225	0.213
Acidity as CaCO3 mg/l				10.00
Alkalinity as CaCO3 mg/l				451.00
Dissolved Iron mg/l				0.095
Iron as Fe (Total) mg/l				0.150
Manganese as Mn (Tot) mg/l				0.010
Oil and Grease mg/l				0.20
Suspended Solids mg/l				2.0
Total Dissolved Solids mg/l				1,800
pH Units				7.80

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SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	10/28/81	11/10/81	11/25/81	12/9/81
002				
Average Flow (Mgpd)	0.213	0.213	0.213	0.213
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Oil and Grease mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:	12/13/81	1/13/82	1/27/82	2/9/82
002				
Average Flow (Mgpd)	0.213	0.000	0.000	0.000
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Oil and Grease mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:	2/22/82	3/9/82	3/23/82	4/13/82
002				
Average Flow (Mgpd)	0.000	0.122	0.122	0.197
Acidity as CaCO3 mg/l			NA	<0.01
Alkalinity as CaCO3 mg/l			NA	335.80
Dissolved Iron mg/l			NA	0.570
Iron as Fe (Total) mg/l			0.630	0.588
Manganese as Mn (Tot) mg/l			NA	0.050
Oil and Grease mg/l			NA	1.6
Suspended Solids mg/l			1.0	12.0
Total Dissolved Solids mg/l			2,516	2,404
pH Units			7.40	7.60

Sampling Date:	4/27/82	5/17/82	5/24/82	6/8/82
002				
Average Flow (Mgpd)	0.197	0.185	0.185	0.819
Acidity as CaCO3 mg/l	NA	12.00	NA	24.00
Alkalinity as CaCO3 mg/l	NA	442.10	NA	410.20
Dissolved Iron mg/l	NA	0.300	NA	0.350
Iron as Fe (Total) mg/l	0.665	0.300	0.250	0.350
Manganese as Mn (Tot) mg/l	NA	0.035	NA	0.045
Oil and Grease mg/l	NA	<0.1	NA	0.6
Suspended Solids mg/l	6.0	6.0	3.0	9.0
Total Dissolved Solids mg/l	2,772	2,150	2,192	2,275
pH Units	7.60	7.70	7.70	7.50

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	6/23/82	7/13/82	7/29/82	8/11/82
002				
Average Flow (Mgpd)	0.819	0.360	0.360	0.253
Acidity as $CaCO_3$ mg/l	NA		NA	10.00
Alkalinity as $CaCO_3$ mg/l	NA		NA	311.80
Dissolved Iron mg/l	NA		NA	0.320
Iron as Fe (Total) mg/l	0.160		1.100	0.350
Manganese as Mn (Tot) mg/l	NA		NA	0.030
Oil and Grease mg/l	NA		NA	0.2
Suspended Solids mg/l	5.0		14.0	5.0
Total Dissolved Solids mg/l	2,200		2,344	2,450
pH Units	7.40		7.60	7.80

Sampling Date:	8/27/82	9/15/82	9/28/82	10/12/82
002				
Average Flow (Mgpd)	0.253	0.185	0.185	0.164
Acidity as $CaCO_3$ mg/l	NA	5.00	NA	8.00
Alkalinity as $CaCO_3$ mg/l	NA	346.10	NA	485.10
Dissolved Iron mg/l	NA	0.290	NA	0.065
Iron as Fe (Total) mg/l	1.320	0.330	0.230	0.380
Manganese as Mn (Tot) mg/l	NA	0.036	NA	0.041
Oil and Grease mg/l	NA	<0.1	NA	<0.1
Suspended Solids mg/l	18.0	25.0	1.0	6.0
Total Dissolved Solids mg/l	1,900	2,190	1,820	1,800
pH Units	7.80	7.80	7.80	7.60

Sampling Date:	10/26/82	11/10/82	11/24/82	12/8/82
002				
Average Flow (Mgpd)	0.164	0.180	1.180	0.153
Acidity as $CaCO_3$ mg/l	NA	<0.01	NA	3.00
Alkalinity as $CaCO_3$ mg/l	NA	339.60	NA	320.20
Dissolved Iron mg/l	NA	0.065	NA	0.520
Iron as Fe (Total) mg/l	0.240	0.120	0.570	0.535
Manganese as Mn (Tot) mg/l	NA	0.020	NA	0.025
Oil and Grease mg/l	NA	0.8	NA	1.0
Suspended Solids mg/l	5.0	2.0	3.0	11.0
Total Dissolved Solids mg/l	1,910	1,900	2,500	2,505
pH Units	7.70	8.10	7.40	7.50

Sampling Date:	12/22/82	1/13/83	1/27/83	2/9/83
002				
Average Flow (Mgpd)	0.153	0.993	0.993	0.150
Acidity as $CaCO_3$ mg/l	NA	9.00	NA	11.00
Alkalinity as $CaCO_3$ mg/l	NA	422.50	NA	329.00
Dissolved Iron mg/l	NA	0.500	NA	NA
Iron as Fe (Total) mg/l	0.380	0.530	0.300	0.310
Manganese as Mn (Tot) mg/l	NA	0.025	NA	0.015
Oil and Grease mg/l	NA	<0.1	NA	<0.1
Suspended Solids mg/l	8.0	9.0	27.0	27.0
Total Dissolved Solids mg/l	2,510	1,785	2,500	1,775
pH Units	7.70	7.50	7.60	7.60

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	2/22/83	3/9/83	3/23/83	4/13/83
002				
Average Flow (Mgpd)	0.150	0.132	0.132	0.304
Acidity as CaCO3 mg/l	NA	7.00	NA	<0.01
Alkalinity as CaCO3 mg/l	NA	351.30	NA	394.00
Dissolved Iron mg/l	NA	0.270	NA	0.380
Iron as Fe (Total) mg/l	0.250	0.270	0.285	0.380
Manganese as Mn (Tot) mg/l	NA	0.015	NA	0.015
Oil and Grease mg/l	NA	<0.2	NA	<0.2
Suspended Solids mg/l	1.0	3.0	13.0	<0.1
Total Dissolved Solids mg/l	1,845	1,725	1,750	1,710
pH Units	7.60	7.40	7.20	7.80

Sampling Date:	4/27/83	5/10/83	5/25/83	6/8/83
002				
Average Flow (Mgpd)	0.304	0.253	0.253	
Acidity as CaCO3 mg/l	NA	<0.01	NA	<0.01
Alkalinity as CaCO3 mg/l	NA	428.00	NA	374.00
Dissolved Iron mg/l	NA	0.300	NA	0.030
Iron as Fe (Total) mg/l	0.410	0.445	0.370	0.220
Manganese as Mn (Tot) mg/l	NA	0.017	NA	0.015
Oil and Grease mg/l	NA	<0.2	NA	1.2
Suspended Solids mg/l	14.0	11.0	27.0	12.0
Total Dissolved Solids mg/l	1,988	1,822	1,978	1,902
pH Units	7.60	7.80	7.80	7.70

Sampling Date:	6/29/83
002	
Average Flow (Mgpd)	
Acidity as CaCO3 mg/l	NA
Alkalinity as CaCO3 mg/l	NA
Dissolved Iron mg/l	NA
Iron as Fe (Total) mg/l	0.180
Manganese as Mn (Tot) mg/l	NA
Oil and Grease mg/l	NA
Suspended Solids mg/l	13.0
Total Dissolved Solids mg/l	1,724
pH Units	7.60

Sampling Date:	
Flow (gpm)	
Acidity as CaCO3 mg/l	
Alkalinity as CaCO3 mg/l	
Dissolved Iron mg/l	
Iron as Fe (Total) mg/l	
Manganese as Mn (Tot) mg/l	
Oil and Grease mg/l	
Suspended Solids mg/l	
Total Dissolved Solids mg/l	
pH Units	

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	2/1281	3/11/82	4/6/81	5/13/81
003				
BOD 5 day mg/l	4.8	0.19	0.04	NA
Free Chlorine (Avail) as C12	0.20	0.19	0.04	NA
MPN Fecal Coliform MPN/100 ml	<2.0	790	<2.0	<2.0
MPN Total Coliform MPN/100 ml	8.0	1,300	NA	460
Oil and Grease mg/l	2.01	3.80	<0.01	1.20
Suspended Solids mg/l	26.0	4.0	30.0	16.0
Total Chlorine mg/l	NA	NA	NA	<0.01
pH Units	7.80	7.50	7.50	7.50

Sampling Date:	6/11/81	7/8/81	8/12/81	9/9/81
003				
BOD 5 day mg/l	16.8	12.0	4.5	11.0
Free Chlorine (Avail) as C12	NA	NA	NA	NA
MPN Fecal Coliform MPN/100 ml	<2.0	23.0	23.0	<2.0
MPN Total Coliform MPN/100 ml	130	700	3,300	110
Oil and Grease mg/l	<0.01	1.20	5.40	<0.01
Suspended Solids mg/l	32.0	30.0	2.0	9.0
Total Chlorine mg/l	0.04	0.01	0.08	0.06
pH Units	7.20	7.30	7.50	7.70

Sampling Date:	10/15/81	11/10/81	11/12/81	12/9/81
003				
BOD 5 day mg/l	2.6	4.4	NA	2.0
MPN Fecal Coliform MPN/100 ml	<2.0	NA	<2.0	<2.0
MPN Total Coliform MPN/100 ml	8.0	NA	<2.0	<2.0
Oil and Grease mg/l	2.70	0.80	NA	4.00
Suspended Solids mg/l	4.0	2.0	NA	4.2
Total Chlorine mg/l	1.58	3.17	NA	2.14
pH Units	7.68	7.50	NA	7.70

Sampling Date:	1/13/82	2/9/82	3/9/82	4/14/82
003				
BOD 5 day mg/l	6.6	6.5	7.0	1.8
MPN Fecal Coliform MPN/100 ml	3,300	2.0	5.0p	<2.0
MPN Total Coliform MPN/100 ml	13,000	79.0	130	1,700
Oil and Grease mg/l	2.20	<1.0	1.20	1.6
Suspended Solids mg/l	12.0	15.0	3.2	4.0
Total Chlorine mg/l	3.11	2.46	3.78	0.06
pH Units	7.40	7.40	7.70	7.70

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/17/82	6/8/82	7/13/82	8/11/82
003				
BOD 5 Day mg/l	3.7	3.5	12.6	9.5
MPN Fecal Coliform MPN/100 ml	<2.0	<2.0	5.0	<2.0
MPN Total Coliform MPN/100 ml	79.0	1,300	13,000	4,900
Oil and Grease mg/l	4.0	1.8	13.0	0.6
Suspended Solids mg/l	16.0	22.0	18.0	8.5
Total Chlorine mg/l	<0.01	<0.01	<0.01	<0.01
pH Units	7.90	7.80	7.50	7.90

Sampling Date:	9/15/82	10/12/82	11/19/82	12/8/82
003				
BOD 5 Day mg/l	7.0	5.0	2.0	2.1
MPN Fecal Coliform MPN/100 ml	<2.0	<2.0	<2.0	<2.0
MPN Total Coliform MPN/100 ml	<2.0	21.0	<2.0	11.0
Oil and Grease mg/l	0.4	0.8	0.6	0.6
Suspended Solids mg/l	16.0	18.0	8.0	15.0
Total Chlorine mg/l	<0.01	5.48	0.63	0.83
pH Units	7.30	7.60	NA	7.60

Sampling Date:	1/12/83	2/9/83	3/9/83	4/13/83
003				
BOD 5 day mg/l	4.4	5.2	5.0	2.8
MPN Fecal Coliform MPN/100 ml	<2	<2	<2	<2
MPN Total Coliform MPN/100 ml	<2.0	79.0	<2.0	33.0
Oil and Grease mg/l	<0.2	0.2	<0.2	<0.2
Suspended Solids mg/l	24.0	13.0	12.0	4.0
Total Chlorine mg/l	0.84	0.07	4.22	0.34
pH Units	7.80	7.50	7.50	7.60

Sampling Date:	5/10/83	6/8/83
003		
BOD 5 day mg/l	3.2	3.90
MPN Fecal Coliform MPN/100 ml	<2	2
MPN Total Coliform MPN/100 ml	<2.0	22.0
Oil and Grease mg/l	<0.2	0.6
Suspended Solids mg/l	12.0	14.0
Total Chlorine mg/l	0.09	<0.02
pH Units	7.90	7.80

SURFACE WATER QUALITY DAT/
GENEVA COAL MINE

Sampling Date:	2/81	3/81	4/81	5/81
B-1				
Flow (gpm)	NA	NA	NA	375
Acidity as CaCO3 mg/l	<0.1	<0.1	<0.01	6.00
Alkalinity as CaCO3 mg/l	424.00	372.00	346.00	330.00
Dissolved Iron mg/l	0.270	0.210	0.190	0.520
Iron as Fe (Total) mg/l	0.310	0.250	0.560	0.950
Manganese as Mn (Tot) mg/l	0.020	0.010	0.030	0.050
Suspended Solids mg/l	18.0	9.0	87.0	50.0
Total Dissolved Solids mg/l	1,900	1,800	2,050	1,700
pH Units	8.40	8.0	8.30	8.10

Sampling Date:	7/81	9/81	10/81	3/82
B-1				
Flow (gpm)	375	310	650	300
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	4.50
Alkalinity as CaCO3 mg/l	356.00	298.00	1,095.00	293.60
Dissolved Iron mg/l	0.020	0.075	0.080	0.640
Iron as Fe (Total) mg/l	0.440	0.280	0.255	1.110
Manganese as Mn (Tot) mg/l	0.030	0.014	0.017	0.022
Suspended Solids mg/l	136	10.0	8.1	18.0
Total Dissolved Solids mg/l	1,850	2,000	1,850	362
pH Units	8.20	8.30	8.30	8.20

ampling Date:	4/82	5/82	6/82	8/82
B-1				
Flow (gpm)	425	400	500	520
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	291.60	350.30	366.90	297.50
Dissolved Iron mg/l	NA	NA	0.760	0.810
Iron as Fe (Total) mg/l	1.600	0.060	1.720	1.920
Manganese as Mn (Tot) mg/l	0.060	0.015	0.070	0.090
Suspended Solids mg/l	105	3.0	98.0	114
Total Dissolved Solids mg/l	2,708	2,178	2,175	2,372
pH Units	7.80	8.10	7.90	8.10

Sampling Date:	9/82	10/82	4/83
B-1			
Flow (gpm)	400	350	NA
Acidity as CaCO3 mg/l	<0.01	<0.01	NA
Alkalinity as CaCO3 mg/l	304.00	399.20	NA
Dissolved Iron mg/l	0.820	0.920	NA
Iron as Fe (Total) mg/l	1.890	2.140	14.800
Manganese as Mn (Tot) mg/l	0.095	0.095	0.515
uspended Solids mg/l	21.0	8.0	640
otal Dissolved Solids mg/l	2,120	1,900	1,688
pH Units	8.20	8.30	7.80

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	2-81	3-81	4-81	5-81
RS2				
Flow (gpm)	NA	NA	NA	20
Acidity as CaCO3 mg/l	< 0.1	< 0.1	2.50	4.00
Alkalinity as CaCO3 mg/l	500.00	434.00	418.00	450.00
Dissolved Iron mg/l	0.032	0.060	NA	0.390
Iron as Fe (Total) mg/l	0.040	0.190	0.160	0.440
Manganese as Mn (Tot) mg/l	< 0.001	0.050	0.010	0.050
Suspended Solids mg/l	NA	NA	NA	9.0
Total Dissolved Solids mg/l	900	900	1,000	900
pH Units	8.10	7.80	8.00	8.20

Sampling Date:	6-81	7-81	8-81	9-81
RS2				
Flow (gpm)	NA	34	24	25
Acidity as CaCO3 mg/l	< 0.01	4.00	4.00	< 0.01
Alkalinity as CaCO3 mg/l	424.00	424.00	416.00	430.00
Dissolved Iron mg/l	0.010	<0.001	<0.001	0.018
Iron as Fe (Total) mg/l	0.400	0.010	0.070	0.420
Manganese as Mn (Tot) mg/l	0.010	0.010	0.010	0.009
Suspended Solids mg/l	113	14.0	5.0	8.0
Total Dissolved Solids mg/l	900	950	900	950
pH Units	8.10	7.80	8.10	8.10

Sampling Date:	10-81	11-81	12-81	4-82
RS2				
Flow (gpm)	30	30	24	20
Acidity as CaCO3 mg/l	< 0.01	< 0.01	< 0.01	< 0.01
Alkalinity as CaCO3 mg/l	79.00	486.00	388.00	494.00
Dissolved Iron mg/l	0.020	NA	0.015	NA
Iron as Fe (Total) mg/l	0.450	0.465	0.460	<0.001
Manganese as Mn (Tot) mg/l	0.015	0.025	0.017	0.010
Suspended Solids mg/l	6.1	NA	2.0	7.0
Total Dissolved Solids mg/l	950	900	900	1,050
pH Units	8.30	8.10	8.30	7.80

Sampling Date:	5-82	6-82	7-82	8-82
RS2				
Flow (gpm)	30	30	25	30
Acidity as CaCO3 mg/l	6.00	18.00	5.00	<0.01
Alkalinity as CaCO3 mg/l	520.20	411.00	500.00	536.00
Dissolved Iron mg/l	NA	0.010	0.030	0.060
Iron as Fe (Total) mg/l	0.060	0.010	0.030	0.150
Manganese as Mn (Tot) mg/l	0.005	0.002	0.005	0.015
Suspended Solids mg/l	7.0	11.0	<1.0	5.0
Total Dissolved Solids mg/l	886	900	950	862
pH Units	7.80	7.60	7.60	8.20

NA = NOT AVAILABLE

Sampling Date:	9-82	10-82	4-83
RS2			
Flow (gpm)	25	30	20
Acidity as CaCO3 mg/l	< 0.01	5.00	NA
Alkalinity as CaCO3 mg/l	318.30	552	NA
Dissolved Iron mg/l	0.045	0.040	NA
Iron as Fe (Total) mg/l	0.056	0.049	0.180
Manganese as Mn (Tot) mg/l	0.010	0.012	0.003
Suspended Solids mg/l	11.0	8.0	61.0
Total Dissolved Solids mg/l	946	910	966
pH Units	8.10	7.80	7.90

Sampling Date:	1-81	2-81	3-81	4-81
2WB				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	<0.1	<0.1	2.0	3.60
Alkalinity as CaCO3 mg/l	184.00	168.00	162.00	150.00
Dissolved Iron mg/l	0.420	0.050	0.040	0.030
Iron as Fe (Total) mg/l	0.640	0.060	0.060	0.070
Manganese as Mn (Tot) mg/l	0.030	0.020	0.020	0.020
Suspended Solids mg/l	59.0	10.0	8.0	8.0
Total Dissolved Solids mg/l	2,200	2,200	2,100	2,200
pH Units	7.40	8.00	7.70	8.10

Sampling Date:	5-81	6-81	7-81	8-81
2WB				
Flow (gpm)	3	3	5	7
Acidity as CaCO3 mg/l	5.70	<0.01	10.80	<0.01
Alkalinity as CaCO3 mg/l	124.00	140.00	350.00	210.00
Dissolved Iron mg/l	0.140	0.033	0.150	0.146
Iron as Fe (Total) mg/l	0.360	0.075	0.380	0.410
Manganese as Mn (Tot) mg/l	0.030	0.025	0.027	0.020
Suspended Solids mg/l	19.0	13.0	15.0	1.0
Total Dissolved Solids mg/l	2,300	2,400	2,050	2,200
pH Units	8.00	8.10	7.60	7.90

Sampling Date:	9-81	10-81	11-81	12-81
2WB				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	2.00	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	265.00	198.10	203.30	228.20
Dissolved Iron mg/l	0.136	0.150	0.150	0.150
Iron as Fe (Total) mg/l	0.390	0.380	0.380	0.400
Manganese as Mn (Tot) mg/l	0.022	0.025	0.025	0.027
Suspended Solids mg/l	24.0	17.0	13.0	7.0
Total Dissolved Solids mg/l	2,200	2,175	2,200	2,175
pH Units	8.10	7.90	8.10	8.20

NA = NOT AVAILABLE

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1-82	2-92	3-82	4-82
WB				
Flow (gpm)	3	3	5	3
Acidity as CaCO3 mg/l	12.00	12.00	< 0.01	2.00
Alkalinity as CaCO3 mg/l	204.40	249.20	205.20	232.70
Dissolved Iron mg/l	0.350	0.020	NA	NA
Iron as Fe (Total) mg/l	0.365	0.050	0.100	0.100
Manganese as Mn (Tot) mg/l	0.030	0.020	0.020	0.020
Suspended Solids mg/l	23.0	40.0	10.0	7.0
Total Dissolved Solids mg/l	2,375	2,200	3,516	2,232
pH Units	7.50	8.00	7.70	7.80

Sampling Date:	5-82	6-82	7-82	8-82
2WB				
Flow (gpm)	3	3	3	4
Acidity as CaCO3 mg/l	<0.01	1.50	4.00	7.00
Alkalinity as CaCO3 mg/l	209.60	219.20	211.70	195.50
Dissolved Iron mg/l	0.030	0.113	0.090	0.090
Iron as Fe (Total) mg/l	0.200	0.180	0.090	0.095
Manganese as Mn (Tot) mg/l	0.003	0.015	0.015	0.012
Suspended Solids mg/l	1.0	17.0	3.0	1.0
Total Dissolved Solids mg/l	3,928	2,400	3,490	2,325
pH Units	8.10	7.70	7.80	8.00

Sampling Date:	9-82	10-82
2WB		
Flow (gpm)	7	3
Acidity as CaCO3 mg/l	<0.01	<0.01
Alkalinity as CaCO3 mg/l	193.70	183.40
Dissolved Iron mg/l	0.090	0.130
Iron as Fe (Total) mg/l	0.100	0.140
Manganese as Mn (Tot) mg/l	0.020	0.015
Suspended Solids mg/l	4.0	8.0
Total Dissolved Solids mg/l	2,410	2,300
pH Units	8.20	8.00

Sampling Date:		
Flow (gpm)		
Acidity as CaCO3 mg/l		
Alkalinity as CaCO3 mg/l		
Dissolved Iron mg/l		
Iron as Fe (Total) mg/l		
Manganese as Mn (Tot) mg/l		
Suspended Solids mg/l		
Total Dissolved Solids mg/l		
pH Units		

NA = NOT AVAILABLE

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1/81	2/81	3/81	4/81
1E2				
Flow (gpm)	1	1	1	1
Acidity as CaCO3 mg/l	<0.1	<0.1	4.0	10.80
Alkalinity as CaCO3 mg/l	330.00	294.00	296.00	290.00
Dissolved Iron mg/l	0.030	0.010	0.020	0.030
Iron as Fe (Total) mg/l	0.050	0.020	0.040	0.080
Manganese as Mn (Tot) mg/l	0.010	0.010	0.010	0.020
Suspended Solids mg/l	13.0	11.0	9.0	6.0
Total Dissolved Solids mg/l	1,900	1,810	1,800	1,875
pH Units	7.60	8.10	7.70	8.10

Sampling Date:	5/81	8/81	7/81	8/81
1E2				
Flow (gpm)	1	1	1	1
Acidity as CaCO3 mg/l	7.60	<0.01	1.80	<0.01
Alkalinity as CaCO3 mg/l	270.00	322.00	310.00	298.00
Dissolved Iron mg/l	0.010	0.035	0.009	0.010
Iron as Fe (Total) mg/l	0.150	0.095	0.136	0.150
Manganese as Mn (Tot) mg/l	0.010	0.021	0.011	0.019
Suspended Solids mg/l	5.0	10.0	1.0	4.0
Total Dissolved Solids mg/l	1,800	2,000	1,950	2,000
pH Units	8.00	8.00	8.20	7.90

Sampling Date:	9/81	10/81	11/81	12/81
1E2; 1E-B				
Flow (gpm)	1	1	1	1
Acidity as CaCO3 mg/l	2.00	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	439.00	312.00	287.10	317.80
Dissolved Iron mg/l	0.020	0.022	0.014	0.011
Iron as Fe (Total) mg/l	0.156	0.160	0.185	0.155
Manganese as Mn (Tot) mg/l	0.020	0.015	0.014	0.009
Suspended Solids mg/l	14.0	10.0	13.0	1.0
Total Dissolved Solids mg/l	1,900	1,900	1,950	1,875
pH Units	8.50	8.00	8.10	8.20

Sampling Date:	1/82	2/82	3/82	4/82
1E2; 1E-B				
Flow (gpm)	1	1	1	1
Acidity as CaCO3 mg/l	<0.01	2.00	<0.01	<0.01
Alkalinity as CaCO3 mg/l	297.70	311.10	317.90	325.00
Dissolved Iron mg/l	0.030	0.020	NA	NA
Iron as Fe (Total) mg/l	0.060	0.190	0.020	0.040
Manganese as Mn (Tot) mg/l	0.010	0.010	0.010	0.010
Suspended Solids mg/l	20.0	11.0	11.0	6.0
Total Dissolved Solids mg/l	1,975	1,950	2,714	1,430
pH Units	7.80	8.00	7.90	8.00

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
1EB				
Flow (gpm)	1	1	1	Sump
Acidity as CaCO3 mg/l	<0.01	1.00	<0.01	14.00
Alkalinity as CaCO3 mg/l	315.00	335.50	317.30	356.70
Dissolved Iron mg/l	0.002	0.011	0.020	0.019
Iron as Fe (Total) mg/l	<0.001	0.020	0.020	0.022
Manganese as Mn (Tot) mg/l	<0.001	0.005	0.008	0.006
Suspended Solids mg/l	1.0	5.0	4.0	12.0
Total Dissolved Solids mg/l	2,622	2,000	2,626	2,825
pH Units	8.00	7.90	8.00	7.50

Sampling Date:	9/82	10/82
1EB		
Flow (gpm)	Sump	Sump
Acidity as CaCO3 mg/l	10.00	5.00
Alkalinity as CaCO3 mg/l	405.20	218.00
Dissolved Iron mg/l	1.240	10.550
Iron as Fe (Total) mg/l	1.400	13.200
Manganese as Mn (Tot) mg/l	0.105	0.115
Suspended Solids mg/l	5.0	17.0
Total Dissolved Solids mg/l	2,715	2,720
pH Units	7.60	7.80

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

GROUND WATER QUALITY DATA -- GENEVA COAL MINE

Sampling Date:	1/81	2/81	3/81	4/81
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	14.0	30.0	16.0	18.00
Alkalinity as CaCO3 mg/l	482.00	416.00	422.00	408.00
Dissolved Iron mg/l	1.810	0.550	1.650	1.350
Iron as Fe (Total) mg/l	1.830	1.770	1.820	1.470
Manganese as Mn (Tot) mg/l	0.060	0.070	0.060	0.050
Suspended Solids mg/l	6.0	7.0	10.0	8.0
Total Dissolved Solids mg/l	1,850	1,830	1,750	1,750
pH Units	7.20	7.40	7.10	7.70

Sampling Date:	5/81	6/81	7/81	8/81
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	24.70	5.10	14.40	5.19
Alkalinity as CaCO3 mg/l	398.00	428.00	420.00	398.00
Dissolved Iron mg/l	1.250	0.996	1.310	1.440
Iron as Fe (Total) mg/l	1.470	1.510	1.542	1.825
Manganese as Mn (Tot) mg/l	0.050	0.048	0.066	0.060
Suspended Solids mg/l	5.0	20.0	8.0	4.0
Total Dissolved Solids mg/l	1,700	1,800	1,750	1,800
pH Units	7.40	7.50	7.60	7.40

Sampling Date:	9/81	10/81	11/81	12/81
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	12.0	12.0	12.0	16.00
Alkalinity as CaCO3 mg/l	252.00	448.00	499.00	343.00
Dissolved Iron mg/l	0.810	1.100	0.965	1.130
Iron as Fe (Total) mg/l	1.520	1.588	1.550	1.520
Manganese as Mn (Tot) mg/l	0.065	0.055	0.076	0.046
Suspended Solids mg/l	17.0	10.0	9.0	57.0
Total Dissolved Solids mg/l	1,750	1,750	1,750	1,700
pH Units	7.90	7.80	7.50	7.60

Sampling Date:	1/82	2/82	3/82	4/82
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	18.00	18.00	<0.01	24.00
Alkalinity as CaCO3 mg/l	317.80	550.00	479.00	332.70
Dissolved Iron mg/l	3.380	0.020	NA	NA
Iron as Fe (Total) mg/l	3.380	0.300	2.250	2.500
Manganese as Mn (Tot) mg/l	0.080	0.040	0.060	0.060
Suspended Solids mg/l	8.0	12.0	14.0	5.0
Total Dissolved Solids mg/l	1,825	1,850	2,162	1,690
pH Units	7.50	7.50	7.50	7.50

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as $CaCO_3$ mg/l	24.00	10.00	7.00	16.00
Alkalinity as $CaCO_3$ mg/l	369.20	382.30	442.00	435.00
Dissolved Iron mg/l	2.100	1.450	1.900	1.800
Iron as Fe (Total) mg/l	2.100	2.100	1.930	1.870
Manganese as Mn (Tot) mg/l	0.050	0.050	0.045	0.050
Suspended Solids mg/l	6.0	3.0	2.0	15.0
Total Dissolved Solids mg/l	2,022	1,850	2,086	1,775
pH Units	7.60	7.40	7.60	7.50

Sampling Date:	9/82	10/82
2E-B		
Flow (gpm)	Sump	Sump
Acidity as $CaCO_3$ mg/l	11.00	11.00
Alkalinity as $CaCO_3$ mg/l	589.20	44.00
Dissolved Iron mg/l	1.220	1.540
Iron as Fe (Total) mg/l	1.230	1.680
Manganese as Mn (Tot) mg/l	0.045	0.045
Suspended Solids mg/l	5.0	10.0
Total Dissolved Solids mg/l	1,800	1,710
pH Units	7.80	7.70

Sampling Date:
Flow (gpm)
Acidity as $CaCO_3$ mg/l
Alkalinity as $CaCO_3$ mg/l
Dissolved Iron mg/l
Iron as Fe (Total) mg/l
Manganese as Mn (Tot) mg/l
Suspended Solids mg/l
Total Dissolved Solids mg/l
pH Units

Sampling Date:
Flow (gpm)
Acidity as $CaCO_3$ mg/l
Alkalinity as $CaCO_3$ mg/l
Dissolved Iron mg/l
Iron as Fe (Total) mg/l
Manganese as Mn (Tot) mg/l
Suspended Solids mg/l
Total Dissolved Solids mg/l
pH Units

.ing Date:	1/81	2/81	3/81	4/81
S				
m)	38.0	4.0	48.0	37.80
i s CaCO3 mg/l	622.00	544.00	580.00	584.00
linity as CaCO3 mg/l	0.060	0.030	0.040	0.040
solved Iron mg/l	0.120	0.090	0.080	0.090
as Fe (Total) mg/l	0.010	0.010	0.020	0.010
ganese as Mn (Tot) mg/l	5.0	10.0	15.0	10.0
pended Solids mg/l	2,200	2,100	2,100	2,150
al Dissolved Solids mg/l	7.00	7.60	7.00	7.40
Units				

npling Date:	5/81	6/81	7/81	8/81
N-K			3	3
ow (gpm)	57.00	40.80	43.20	50.17
idity as CaCO3 mg/l	582.00	620.00	650.00	618.00
kalinity as CaCO3 mg/l	0.090	0.050	0.110	0.130
ssolved Iron mg/l	0.140	0.110	0.160	0.188
on as Fe (Total) mg/l	0.030	0.009	0.031	0.027
anganese as Mn (Tot) mg/l	16.0	6.0	8.0	7.0
uspended Solids mg/l	2,100	2,300	2,400	2,450
otal Dissolved Solids mg/l	7.30	7.20	7.40	7.20
H Units				

mpling Date:	9/81	10/81	11/81	12/81
	3	3	3	3
Flow (gpm)	32.00	48.00	28.00	38.00
Acidity as CaCO3 mg/l	526.00	620.00	752.00	140.00
Alkalinity as CaCO3 mg/l	0.133	0.095	0.095	0.110
Dissolved Iron mg/l	0.200	0.150	0.166	0.165
Iron as Fe (Total) mg/l	0.020	0.027	0.014	0.031
Manganese as Mn (Tot) mg/l	12.0	11.00	9.0	8.0
Suspended Solids mg/l	2,350	2,275	2,300	2,250
Total Dissolved Solids mg/l	7.50	7.30	7.30	7.30
pH Units				

Sampling Date:	1/82	2/82	3/82	4/82
2LN-K	3	3	3	3
Flow (gpm)	38.00	46.00	14.00	58.00
Acidity as CaCO3 mg/l	319.40	330.90	830.00	341.20
Alkalinity as CaCO3 mg/l	1.290	0.300	NA	NA
Dissolved Iron mg/l	1.320	0.355	0.300	0.140
Iron as Fe (Total) mg/l	0.040	0.020	0.030	0.025
Manganese as Mn (Tot) mg/l	11.0	8.0	22.0	3.0
Suspended Solids mg/l	2,350	2,400	3,640	2,428
Total Dissolved Solids mg/l	7.20	7.20	7.20	7.20
pH Units				

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
2LN-K				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	66.00	30.00	36.00	76.00
Alkalinity as CaCO3 mg/l	1,210.00	552.00	408.00	799.00
Dissolved Iron mg/l	0.020	0.040	0.090	0.110
Iron as Fe (Total) mg/l	0.050	0.100	0.090	0.120
Manganese as Mn (Tot) mg/l	0.010	0.015	0.015	0.016
Suspended Solids mg/l	1.0	11.0	30.0	16.0
Total Dissolved Solids mg/l	3,586	2,600	3,542	2,225
pH Units	7.00	7.10	7.20	7.10

Sampling Date:	9/82	10/82
2LN-K		
Flow (gpm)	1	1
Acidity as CaCO3 mg/l	27.00	35.00
Alkalinity as CaCO3 mg/l	789.20	844.00
Dissolved Iron mg/l	0.080	0.133
Iron as Fe (Total) mg/l	0.110	0.140
Manganese as Mn (Tot) mg/l	0.015	0.015
Suspended Solids mg/l	1.0	29.0
Total Dissolved Solids mg/l	2,710	2,620
pH Units	7.10	7.30

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1/81	2/81	3/81	4/81
Main Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as $CaCO_3$ mg/l	8.0	10.0	18.0	16.20
Alkalinity as $CaCO_3$ mg/l	442.00	404.00	398.00	376.00
Dissolved Iron mg/l	1.930	2.150	2.120	1.850
Iron as Fe (Total) mg/l	1.930	2.150	2.130	1.960
Manganese as Mn (Tot) mg/l	0.110	0.100	0.100	0.090
Suspended Solids mg/l	14.0	9.0	16.0	10.0
Total Dissolved Solids mg/l	2,200	2,050	2,000	2,000
pH Units	7.20	7.60	7.20	7.60

Sampling Date:	5/81	6/81	7/81	8/81
Main Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as $CaCO_3$ mg/l	3.80	8.50	7.20	6.92
Alkalinity as $CaCO_3$ mg/l	270.00	406.00	390.00	360.00
Dissolved Iron mg/l	1.100	1.600	1.170	1.350
Iron as Fe (Total) mg/l	1.580	2.200	1.650	1.770
Manganese as Mn (Tot) mg/l	0.020	0.085	0.025	0.035
Suspended Solids mg/l	44.0	4.0	10.0	6.0
Total Dissolved Solids mg/l	1,700	2,150	2,100	2,200
pH Units	8.10	7.60	7.80	7.60

Sampling Date:	9/81	10/81	11/81	12/81
Main Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as $CaCO_3$ mg/l	10.00	18.00	14.00	12.00
Alkalinity as $CaCO_3$ mg/l	214.00	407.00	287.00	377.00
Dissolved Iron mg/l	0.470	1.060	1.160	1.130
Iron as Fe (Total) mg/l	1.410	1.850	1.650	1.665
Manganese as Mn (Tot) mg/l	0.039	0.031	0.025	0.019
Suspended Solids mg/l	35.0	12.0	14.0	15.0
Total Dissolved Solids mg/l	2,150	2,125	2,100	2,050
pH Units	8.00	7.50	8.05	7.70

Sampling Date:	1/82	2/82	3/82	4/82
Main Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as $CaCO_3$ mg/l	20.00	20.00	2.00	18.00
Alkalinity as $CaCO_3$ mg/l	332.30	320.70	500.00	318.10
Dissolved Iron mg/l	0.020	1.900	NA	NA
Iron as Fe (Total) mg/l	2.380	1.950	1.750	1.690
Manganese as Mn (Tot) mg/l	0.100	0.100	0.100	0.090
Suspended Solids mg/l	10.0	18.0	12.0	8.0
Total Dissolved Solids mg/l	2,175	2,200	2,770	2,640
pH Units	7.40	7.50	7.50	7.50

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
Main Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	20.00	10.00	<0.01	15.00
Alkalinity as CaCO3 mg/l	351.30	3,567.00	230.10	241.20
Dissolved Iron mg/l	2.000	0.985	0.310	0.260
Iron as Fe (Total) mg/l	2.200	2.250	0.340	0.450
Manganese as Mn (Tot) mg/l	0.070	0.095	0.030	0.035
Suspended Solids mg/l	18.0	34.0	6.0	7.0
Total Dissolved Solids mg/l	2,584	2,225	2,016	2,020
pH Units	7.50	7.40	8.10	7.60

Sampling Date:	9/82	10/82
Main Slope		
Flow (gpm)	Sump	Sump
Acidity as CaCO3 mg/l	<0.01	9.00
Alkalinity as CaCO3 mg/l	185.10	287.30
Dissolved Iron mg/l	1.650	1.550
Iron as Fe (Total) mg/l	1.800	1.870
Manganese as Mn (Tot) mg/l	0.045	0.095
Suspended Solids mg/l	5.0	20.0
Total Dissolved Solids mg/l	1,795	2,090
pH Units	8.20	7.60

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1/81	2/81	3/81	4/81
12 N-M				
Flow (gpm)				
Acidity as CaCO3 mg/l	<0.1	<0.1	4.0	7.20
Alkalinity as CaCO3 mg/l	384.00	348.00	336.00	328.00
Dissolved Iron mg/l	0.020	0.020	0.010	0.030
Iron as Fe (Total) mg/l	0.030	0.020	0.020	0.060
Manganese as Mn (Tot) mg/l	0.010	0.010	0.010	0.020
Suspended Solids mg/l	5.0	4.0	5.0	7.0
Total Dissolved Solids mg/l	1,650	1,600	1,575	1,875
pH Units	7.50	8.20	7.80	8.00

Sampling Date:	5/81	6/81	7/81	8/81
12 N-M				
Flow (gpm)			20	20
Acidity as CaCO3 mg/l	5.70	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	318.00	342.00	350.00	326.00
Dissolved Iron mg/l	0.030	0.035	0.027	0.038
Iron as Fe (Total) mg/l	0.080	0.077	0.095	0.099
Manganese as Mn (Tot) mg/l	0.010	0.019	0.011	0.015
Suspended Solids mg/l	8.0	9.0	4.0	3.0
Total Dissolved Solids mg/l	1,700	1,800	1,750	1,750
pH Units	8.10	8.10	8.40	7.90

Sampling Date:	9/81	10/81	11/81	12/81
12N-M				
Flow (gpm)	20	20	20	24
Acidity as CaCO3 mg/l	6.00	12.00	8.00	16.00
Alkalinity as CaCO3 mg/l	212.60	218.80	217.20	241.90
Dissolved Iron mg/l	0.040	0.045	0.040	0.035
Iron as Fe (Total) mg/l	0.080	0.089	0.075	0.088
Manganese as Mn (Tot) mg/l	0.012	0.011	0.014	0.012
Suspended Solids mg/l	41.0	25.0	22.0	16.0
Total Dissolved Solids mg/l	2,450	2,350	2,350	2,200
pH Units	7.90	7.60	7.80	8.00

Sampling Date:	1/82	2/82	3/82	4/82
12N-M				
Flow (gpm)	24	20	20	20
Acidity as CaCO3 mg/l	12.00	8.00	<0.01	12.00
Alkalinity as CaCO3 mg/l	269.80	290.70	295.20	250.40
Dissolved Iron mg/l	0.550	0.430	NA	NA
Iron as Fe (Total) mg/l	0.680	0.450	0.610	0.790
Manganese as Mn (Tot) mg/l	0.110	0.090	0.160	0.120
Suspended Solids mg/l	12.0	20.0	21.0	18.0
Total Dissolved Solids mg/l	2,125	2,000	3,096	2,186
pH Units	7.70	8.00	7.70	7.80

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
12N-M				
Flow (gpm)	20	20	20	20
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	3.00
Alkalinity as CaCO3 mg/l	204.40	294.90	292.20	288.10
Dissolved Iron mg/l	0.350	0.155	0.280	0.250
Iron as Fe (Total) mg/l	0.350	0.350	0.280	0.260
Manganese as Mn (Tot) mg/l	0.060	0.050	0.060	0.061
Suspended Solids mg/l	1.0	11.0	6.0	6.0
Total Dissolved Solids mg/l	2,398	2,050	2,756	2,050
pH Units	8.00	7.90	8.00	8.10

Sampling Date:	9/82	10/82
12N-M		
Flow (gpm)	20	20
Acidity as CaCO3 mg/l	<0.01	<0.01
Alkalinity as CaCO3 mg/l	300.30	290.00
Dissolved Iron mg/l	0.180	0.185
Iron as Fe (Total) mg/l	0.200	0.220
Manganese as Mn (Tot) mg/l	0.045	0.045
uspended Solids mg/l	43.0	24.0
otal Dissolved Solids mg/l	2,090	2,005
H Units	8.20	8.00

Sampling Date:		
Flow (gpm)		
Acidity as CaCO3 mg/l		
Alkalinity as CaCO3 mg/l		
Dissolved Iron mg/l		
Iron as Fe (Total) mg/l		
Manganese as Mn (Tot) mg/l		
Suspended Solids mg/l		
Total Dissolved Solids mg/l		
pH Units		

Sampling Date:		
Flow (gpm)		
Acidity as CaCO3 mg/l		
Alkalinity as CaCO3 mg/l		
Dissolved Iron mg/l		
Iron as Fe (Total) mg/l		
Manganese as Mn (Tot) mg/l		
uspended Solids mg/l		
Total Dissolved Solids mg/l		
Units		

GROUND WATER QUALITY MONITORING
GENEVA COAL MINE

CA-1

Sample Date:	9/13/78	9/26/79	8/8/80	9/24/80
Aluminum, Al mg/l	0.47	<0.001	<0.010	NA
Ammonia, NH3 mg/l	NA	NA	0.15	NA
Arsenic, As mg/l	<0.001	<0.001	<0.001	NA
Antimony as Sb mg/l	<0.001	<0.001	0.100	NA
Barium, Ba mg/l	0.010	0.020	0.010	NA
Beryllium as Be mg/l	0.018	0.001	<0.001	NA
Bicarbonate, HNO3 mg/l	NA	NA	329.40	NA
Boron, B mg/l	0.230	0.140	0.060	NA
Cadmium, Cd mg/l	<0.001	<0.001	<0.001	NA
Calcium,Ca mg/l	92.8	280.00	116.80	NA
Carbonate, CO3 mg/l	<0.01	<0.01	<0.01	NA
Chloride, Cl mg/l	26.0	18.0	22.0	NA
Chromium, Cr mg/l	<0.001	<0.001	<0.001	NA
Cobalt as Co mg/l	0.025	0.045	0.026	NA
Copper, Cu mg/l	0.007	0.003	0.010	NA
Flouride, F mg/l	0.29	0.25	0.25	NA
Flow gpm	NA	3	4	4
Germanium as Ge mg/l	<0.001	<0.001	<0.001	NA
Hardness, CaCO3 mg/l	NA	NA	696	NA
Iron, Fe (total) mg/l	0.114	20.000	21.800	16.200
Lead, Pb mg/l	0.004	<0.001	<0.001	NA
Magnesium, Mg mg/l	54.72	2.40	96.96	NA
Manganese, Mn mg/l	0.077	0.088	0.050	0.100
Mercury, Hg mg/l	<0.0005	<0.0002	<0.0002	NA
Molybdenum, Mo mg/l	0.09	<0.001	<0.001	NA
Nickel, Ni mg/l	<0.001	0.046	0.023	NA
Nitrate, NO3-N mg/l	0.11	<0.01	0.04	NA
Nitrite, NO2-N mg/l	<0.01	<0.01	0.01	NA
Phosphate, PO4 mg/l	0.014	0.040	0.002	NA
Potassium, K mg/l	NA	NA	4.70	NA
Selenium, Se mg/l	<0.001	0.002	<0.001	NA
Silver as As mg/l	<0.001	<0.001	<0.001	NA
Sodium, Na mg/l	159.4	137.00	135.00	NA
Sulfate, SO4 mg/l	690.0	680	658	NA
Sulfide, S mg/l	NA	NA	<0.01	NA
Suspended Solids mg/l	6.0	1.0	58.0	36.0
Total Dissolved Solids mg/l	1,250	1,200	1,199	1,200
Total Kjeldahl Nitrogen mg/l	<0.01	0.20	0.30	NA
Vanadium as V mg/l	0.17	<0.001	<0.001	NA
Zinc, Zn mg/l	0.015	0.194	0.010	NA
pH Units	NA	NA	NA	7.10

NA - Not Available

GROUND WATER QUALITY MONITORING
GENEVA COAL MINE

RS-1

Sample Date:	9/18/78	9/26/68	8/8/80	9/24/8
Aluminum, Al mg/l	0.06			
Ammonia, NH3 mg/l	NA			
Arsenic, As mg/l	<0.001			
Antimony as Sb mg/l	<0.001			
Barium, Ba mg/l	0.030			
Beryllium as Be mg/l	0.014			
Bicarbonate, HNO3 mg/l	NA			
Boron, B mg/l	0.080			
Cadmium, Cd mg/l	<0.001			
Calcium,Ca mg/l	49.6			
Carbonate, CO3 mg/l	<0.01			
Chloride, Cl mg/l	18.0			
Chromium, Cr mg/l	<0.001			
Cobalt as Co mg/l	0.011			
Copper, Cu mg/l	0.002			
Flouride, F mg/l	0.21			
Flow gpm	NA	No Flow	No Flow	No Flow
Germanium as Ge mg/l	<0.001			
Hardness, CaCO3 mg/l	NA			
Iron, Fe (total) mg/l	0.105			
Lead, Pb mg/l	<0.001			
Magnesium, Mg mg/l	66.24			
Manganese, Mn mg/l	0.013			
Mercury, Hg mg/l	<0.0002			
Molybdenum, Mo mg/l	0.015			
Nickel, Ni mg/l	<0.001			
Nitrate, NO3-N mg/l	0.34			
Nitrite, NO2-N mg/l	<0.01			
Phosphate, PO4 mg/l	0.012			
Potassium, K mg/l	NA			
Selenium, Se mg/l	<0.001			
Silver as As mg/l	<0.001			
Sodium, Na mg/l	133.9			
Sulfate, SO4 mg/l	296.0			
Sulfide, S mg/l	NA			
Suspended Solids mg/l	8.0			
Total Dissolved Solids mg/l	976			
Total Kjeldahl Nitrogen mg/l	<0.01			
Vanadium as V mg/l	0.019			
Zinc, Zn mg/l	0.019			
pH Units	NA			

NA - Not Available

GROUND WATER QUALITY MONITORING
GENEVA COAL MINE

RS-2

Sample Date:	9/13/78	9/16/79	8/8/80	9/24/80
Aluminum, Al mg/l	0.31	0.010	0.310	NA
Ammonia, NH3 mg/l	NA	NA	<0.01	NA
Arsenic, As mg/l	<0.001	<0.001	<0.001	NA
Antimony as Sb mg/l	<0.001	<0.001	0.060	NA
Barium, Ba mg/l	0.210	0.050	0.030	NA
Beryllium as Be mg/l	0.020	<0.001	<0.001	NA
Bicarbonate, HNO3 mg/l	NA	NA	534.36	NA
Boron, B mg/l	0.315	0.190	0.090	NA
Cadmium, Cd mg/l	<0.001	<0.001	<0.001	NA
Calcium,Ca mg/l	49.6	168.00	52.00	NA
Carbonate, CO3 mg/l	<0.01	<0.01	1.20	NA
Chloride, Cl mg/l	22.0	22.0	30.0	NA
Chromium, Cr mg/l	<0.001	<0.001	<0.001	NA
Cobalt as Co mg/l	0.005	0.004	<0.001	NA
Copper, Cu mg/l	0.004	0.006	0.020	NA
Flouride, F mg/l	0.24	0.19	0.18	NA
Flow gpm	NA	9	30	30
Germanium as Ge mg/l	<0.001	<0.002	<0.001	NA
Hardness, CaCO3 mg/l	NA	NA	460	NA
Iron, Fe (total) mg/l	0.018	<0.001	0.310	0.080
Lead, Pb mg/l	0.003	<0.001	<0.001	NA
Magnesium, Mg mg/l	72.0	16.80	79.20	NA
Manganese, Mn mg/l	0.016	0.012	0.010	0.010
Mercury, Hg mg/l	<0.0002	<0.0002	<0.0002	NA
Molybdenum, Mo mg/l	0.16	<0.001	<0.001	NA
Nickel, Ni mg/l	<0.001	0.001	<0.001	NA
Nitrate, NO3-N mg/l	0.04	0.45	<0.01	NA
Nitrite, NO2-N mg/l	<0.01	<0.01	<0.01	NA
Phosphate, PO4 mg/l	0.055	0.060	0.010	NA
Potassium, K mg/l	NA	NA	1.57	NA
Selenium, Se mg/l	<0.001	0.004	<0.001	NA
Silver as As mg/l	<0.001	0.001	<0.001	NA
Sodium, Na mg/l	140.9	170.00	171.00	NA
Sulfate, SO4 mg/l	300.0	350	320	NA
Sulfide, S mg/l	NA	NA	<0.01	NA
Suspended Solids mg/l	9.0	1.0	10.0	14.0
Total Dissolved Solids mg/l	920	900	925	1,000
Total Kjeldahl Nitrogen mg/l	<0.01	0.10	0.22	NA
Vanadium as V mg/l	0.25	<0.001	<0.001	NA
Zinc, Zn mg/l	0.018	0.017	0.020	NA
pH Units	NA	NA	NA	7.70

NA - Not Available

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1/81	2/81	3/81	4/81
1E2				
Flow (gpm)	1	1	1	1
Acidity as CaCO3 mg/l	<0.1	<0.1	4.0	10.80
Alkalinity as CaCO3 mg/l	330.00	294.00	296.00	290.00
Dissolved Iron mg/l	0.030	0.010	0.020	0.030
Iron as Fe (Total) mg/l	0.050	0.020	0.040	0.080
Manganese as Mn (Tot) mg/l	0.010	0.010	0.010	0.020
Suspended Solids mg/l	13.0	11.0	9.0	6.0
Total Dissolved Solids mg/l	1,900	1,810	1,800	1,875
pH Units	7.60	8.10	7.70	8.10

Sampling Date:	5/81	8/81	7/81	8/81
1E2				
Flow (gpm)	1	1	1	1
Acidity as CaCO3 mg/l	7.60	<0.01	1.80	<0.01
Alkalinity as CaCO3 mg/l	270.00	322.00	310.00	298.00
Dissolved Iron mg/l	0.010	0.035	0.009	0.010
Iron as Fe (Total) mg/l	0.150	0.095	0.136	0.150
Manganese as Mn (Tot) mg/l	0.010	0.021	0.011	0.019
Suspended Solids mg/l	5.0	10.0	1.0	4.0
Total Dissolved Solids mg/l	1,800	2,000	1,950	2,000
pH Units	8.00	8.00	8.20	7.90

Sampling Date:	9/81	10/81	11/81	12/81
1E-B				
Flow (gpm)	1	1	1	1
Acidity as CaCO3 mg/l	2.00	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	439.00	312.00	287.10	317.80
Dissolved Iron mg/l	0.020	0.022	0.014	0.011
Iron as Fe (Total) mg/l	0.156	0.160	0.185	0.155
Manganese as Mn (Tot) mg/l	0.020	0.015	0.014	0.009
Suspended Solids mg/l	14.0	10.0	13.0	1.0
Total Dissolved Solids mg/l	1,900	1,900	1,950	1,875
pH Units	8.50	8.00	8.10	8.20

Sampling Date:	1/82	2/82	3/82	4/82
1E-B				
Flow (gpm)	1	1	1	1
Acidity as CaCO3 mg/l	<0.01	2.00	<0.01	<0.01
Alkalinity as CaCO3 mg/l	297.70	311.10	317.90	325.00
Dissolved Iron mg/l	0.030	0.020	NA	NA
Iron as Fe (Total) mg/l	0.060	0.190	0.020	0.040
Manganese as Mn (Tot) mg/l	0.010	0.010	0.010	0.010
Suspended Solids mg/l	20.0	11.0	11.0	6.0
Total Dissolved Solids mg/l	1,975	1,950	2,714	1,430
pH Units	7.80	8.00	7.90	8.00

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
1EB				
Flow (gpm)	1	1	1	Sump
Acidity as CaCO3 mg/l	<0.01	1.00	<0.01	14.00
Alkalinity as CaCO3 mg/l	315.00	335.50	317.30	356.70
Dissolved Iron mg/l	0.002	0.011	0.020	0.019
Iron as Fe (Total) mg/l	<0.001	0.020	0.020	0.022
Manganese as Mn (Tot) mg/l	<0.001	0.005	0.008	0.006
Suspended Solids mg/l	1.0	5.0	4.0	12.0
Total Dissolved Solids mg/l	2,622	2,000	2,626	2,825
pH Units	8.00	7.90	8.00	7.50

Sampling Date:	9/82	10/82
1EB		
Flow (gpm)	Sump	Sump
Acidity as CaCO3 mg/l	10.00	5.00
Alkalinity as CaCO3 mg/l	405.20	218.00
Dissolved Iron mg/l	1.240	10.550
Iron as Fe (Total) mg/l	1.400	13.200
Manganese as Mn (Tot) mg/l	0.105	0.115
Suspended Solids mg/l	5.0	17.0
Total Dissolved Solids mg/l	2,715	2,720
pH Units	7.60	7.80

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1/81	2/81	3/81	4/81
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	14.0	30.0	16.0	18.00
Alkalinity as CaCO3 mg/l	482.00	416.00	422.00	408.00
Dissolved Iron mg/l	1.810	0.550	1.650	1.350
Iron as Fe (Total) mg/l	1.830	1.770	1.820	1.470
Manganese as Mn (Tot) mg/l	0.060	0.070	0.060	0.050
Suspended Solids mg/l	6.0	7.0	10.0	8.0
Total Dissolved Solids mg/l	1,850	1,830	1,750	1,750
pH Units	7.20	7.40	7.10	7.70

Sampling Date:	5/81	6/81	7/81	8/81
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	24.70	5.10	14.40	5.19
Alkalinity as CaCO3 mg/l	398.00	428.00	420.00	398.00
Dissolved Iron mg/l	1.250	0.996	1.310	1.440
Iron as Fe (Total) mg/l	1.470	1.510	1.542	1.825
Manganese as Mn (Tot) mg/l	0.050	0.048	0.066	0.060
Suspended Solids mg/l	5.0	20.0	8.0	4.0
Total Dissolved Solids mg/l	1,700	1,800	1,750	1,800
pH Units	7.40	7.50	7.60	7.40

Sampling Date:	9/81	10/81	11/81	12/81
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	12.0	12.0	12.0	16.00
Alkalinity as CaCO3 mg/l	252.00	448.00	499.00	343.00
Dissolved Iron mg/l	0.810	1.100	0.965	1.130
Iron as Fe (Total) mg/l	1.520	1.588	1.550	1.520
Manganese as Mn (Tot) mg/l	0.065	0.055	0.076	0.046
Suspended Solids mg/l	17.0	10.0	9.0	57.0
	1,750	1,750	1,750	1,700
Total Dissolved Solids mg/l	7.90	7.80	7.50	7.60
pH Units				

Sampling Date:	1/82	2/82	3/82	4/82
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	18.00	18.00	<0.01	24.00
Alkalinity as CaCO3 mg/l	317.80	550.00	479.00	332.70
Dissolved Iron mg/l	3.380	0.020	NA	NA
Iron as Fe (Total) mg/l	3.380	0.300	2.250	2.500
Manganese as Mn (Tot) mg/l	0.080	0.040	0.060	0.060
Suspended Solids mg/l	8.0	12.0	14.0	5.0
Total Dissolved Solids mg/l	1,825	1,850	2,162	1,690
pH Units	7.50	7.50	7.50	7.50

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
2E-B				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	24.00	10.00	7.00	16.00
Alkalinity as CaCO3 mg/l	369.20	382.30	442.00	435.00
Dissolved Iron mg/l	2.100	1.450	1.900	1.800
Iron as Fe (Total) mg/l	2.100	2.100	1.930	1.870
Manganese as Mn (Tot) mg/l	0.050	0.050	0.045	0.050
Suspended Solids mg/l	6.0	3.0	2.0	15.0
Total Dissolved Solids mg/l	2,022	1,850	2,086	1,775
pH Units	7.60	7.40	7.60	7.50

Sampling Date:	9/82	10/82
2E-B		
Flow (gpm)	Sump	Sump
Acidity as CaCO3 mg/l	11.00	11.00
Alkalinity as CaCO3 mg/l	589.20	44.00
Dissolved Iron mg/l	1.220	1.540
Iron as Fe (Total) mg/l	1.230	1.680
Manganese as Mn (Tot) mg/l	0.045	0.045
Suspended Solids mg/l	5.0	10.0
Total Dissolved Solids mg/l	1,800	1,710
pH Units	7.80	7.70

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	2-81	3-81	4-81	5-81
RS2				
Flow (gpm)	NA	NA	NA	20
Acidity as CaCO3 mg/l	< 0.1	< 0.1	2.50	4.00
Alkalinity as CaCO3 mg/l	500.00	434.00	418.00	450.00
Dissolved Iron mg/l	0.032	0.060	NA	0.390
Iron as Fe (Total) mg/l	0.040	0.190	0.160	0.440
Manganese as Mn (Tot) mg/l	< 0.001	0.050	0.010	0.050
Suspended Solids mg/l	NA	NA	NA	9.0
Total Dissolved Solids mg/l	900	900	1,000	900
pH Units	8.10	7.80	8.00	8.20

Sampling Date:	6-81	7-81	8-81	9-81
RS2				
Flow (gpm)	NA	34	24	25
Acidity as CaCO3 mg/l	< 0.01	4.00	4.00	< 0.01
Alkalinity as CaCO3 mg/l	424.00	424.00	416.00	430.00
Dissolved Iron mg/l	0.010	<0.001	<0.001	0.018
Iron as Fe (Total) mg/l	0.400	0.010	0.070	0.420
Manganese as Mn (Tot) mg/l	0.010	0.010	0.010	0.009
Suspended Solids mg/l	113	14.0	5.0	8.0
Total Dissolved Solids mg/l	900	950	900	950
pH Units	8.10	7.80	8.10	8.10

Sampling Date:	10-81	11-81	12-81	4-82
RS2				
Flow (gpm)	30	30	24	20
Acidity as CaCO3 mg/l	< 0.01	< 0.01	< 0.01	< 0.01
Alkalinity as CaCO3 mg/l	79.00	486.00	388.00	494.00
Dissolved Iron mg/l	0.020	NA	0.015	NA
Iron as Fe (Total) mg/l	0.450	0.465	0.460	<0.001
Manganese as Mn (Tot) mg/l	0.015	0.025	0.017	0.010
Suspended Solids mg/l	6.1	NA	2.0	7.0
Total Dissolved Solids mg/l	950	900	900	1,050
pH Units	8.30	8.10	8.30	7.80

Sampling Date:	5-82	6-82	7-82	8-82
RS2				
Flow (gpm)	30	30	25	30
Acidity as CaCO3 mg/l	6.00	18.00	5.00	<0.01
Alkalinity as CaCO3 mg/l	520.20	411.00	500.00	536.00
Dissolved Iron mg/l	NA	0.010	0.030	0.060
Iron as Fe (Total) mg/l	0.060	0.010	0.030	0.150
Manganese as Mn (Tot) mg/l	0.005	0.002	0.005	0.015
Suspended Solids mg/l	7.0	11.0	<1.0	5.0
Total Dissolved Solids mg/l	886	900	950	862
pH Units	7.80	7.60	7.60	8.20

NA = NOT AVAILABLE

Sampling Date:	9-82	10-82	4-83
RS2			
Flow (gpm)	25	30	20
Acidity as CaCO3 mg/l	< 0.01	5.00	NA
Alkalinity as CaCO3 mg/l	318.30	552	NA
Dissolved Iron mg/l	0.045	0.040	NA
Iron as Fe (Total) mg/l	0.056	0.049	0.180
Manganese as Mn (Tot) mg/l	0.010	0.012	0.003
Suspended Solids mg/l	11.0	8.0	61.0
Total Dissolved Solids mg/l	946	910	966
pH Units	8.10	7.80	7.90

Sampling Date:	1-81	2-81	3-81	4-81
2WB				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	<0.1	<0.1	2.0	3.60
Alkalinity as CaCO3 mg/l	184.00	168.00	162.00	150.00
Dissolved Iron mg/l	0.420	0.050	0.040	0.030
Iron as Fe (Total) mg/l	0.640	0.060	0.060	0.070
Manganese as Mn (Tot) mg/l	0.030	0.020	0.020	0.020
Suspended Solids mg/l	59.0	10.0	8.0	8.0
Total Dissolved Solids mg/l	2,200	2,200	2,100	2,200
pH Units	7.40	8.00	7.70	8.10

Sampling Date:	5-81	6-81	7-81	8-81
2WB				
Flow (gpm)	3	3	5	7
Acidity as CaCO3 mg/l	5.70	<0.01	10.80	<0.01
Alkalinity as CaCO3 mg/l	124.00	140.00	350.00	210.00
Dissolved Iron mg/l	0.140	0.033	0.150	0.146
Iron as Fe (Total) mg/l	0.360	0.075	0.380	0.410
Manganese as Mn (Tot) mg/l	0.030	0.025	0.027	0.020
Suspended Solids mg/l	19.0	13.0	15.0	1.0
Total Dissolved Solids mg/l	2,300	2,400	2,050	2,200
pH Units	8.00	8.10	7.60	7.90

Sampling Date:	9-81	10-81	11-81	12-81
2WB				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	2.00	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	265.00	198.10	203.30	228.20
Dissolved Iron mg/l	0.136	0.150	0.150	0.150
Iron as Fe (Total) mg/l	0.390	0.380	0.380	0.400
Manganese as Mn (Tot) mg/l	0.022	0.025	0.025	0.027
Suspended Solids mg/l	24.0	17.0	13.0	7.0
Total Dissolved Solids mg/l	2,200	2,175	2,200	2,175
pH Units	8.10	7.90	8.10	8.20

NA = NOT AVAILABLE

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1-82	2-92	3-82	4-82
WB				
Flow (gpm)	3	3	5	3
Acidity as CaCO3 mg/l	12.00	12.00	< 0.01	2.00
Alkalinity as CaCO3 mg/l	204.40	249.20	205.20	232.70
Dissolved Iron mg/l	0.350	0.020	NA	NA
Iron as Fe (Total) mg/l	0.365	0.050	0.100	0.100
Manganese as Mn (Tot) mg/l	0.030	0.020	0.020	0.020
Suspended Solids mg/l	23.0	40.0	10.0	7.0
Total Dissolved Solids mg/l	2,375	2,200	3,516	2,232
pH Units	7.50	8.00	7.70	7.80

Sampling Date:	5-82	6-82	7-82	8-82
2WB				
Flow (gpm)	3	3	3	4
Acidity as CaCO3 mg/l	<0.01	1.50	4.00	7.00
Alkalinity as CaCO3 mg/l	209.60	219.20	211.70	195.50
Dissolved Iron mg/l	0.030	0.113	0.090	0.090
Iron as Fe (Total) mg/l	0.200	0.180	0.090	0.095
Manganese as Mn (Tot) mg/l	0.003	0.015	0.015	0.012
Suspended Solids mg/l	1.0	17.0	3.0	1.0
Total Dissolved Solids mg/l	3,928	2,400	3,490	2,325
pH Units	8.10	7.70	7.80	8.00

Sampling Date:	9-82	10-82
2WB		
Flow (gpm)	7	3
Acidity as CaCO3 mg/l	<0.01	<0.01
Alkalinity as CaCO3 mg/l	193.70	183.40
Dissolved Iron mg/l	0.090	0.130
Iron as Fe (Total) mg/l	0.100	0.140
Manganese as Mn (Tot) mg/l	0.020	0.015
Suspended Solids mg/l	4.0	8.0
Total Dissolved Solids mg/l	2,410	2,300
pH Units	8.20	8.00

Sampling Date:		
Flow (gpm)		
Acidity as CaCO3 mg/l		
Alkalinity as CaCO3 mg/l		
Dissolved Iron mg/l		
Iron as Fe (Total) mg/l		
Manganese as Mn (Tot) mg/l		
Suspended Solids mg/l		
Total Dissolved Solids mg/l		
pH Units		

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1/81	2/81	3/81	4/81
2LN-K				
Flow (gpm)				
Acidity as CaCO3 mg/l	38.0	4.0	48.0	37.80
Alkalinity as CaCO3 mg/l	622.00	544.00	580.00	584.00
Dissolved Iron mg/l	0.060	0.030	0.040	0.040
Iron as Fe (Total) mg/l	0.120	0.090	0.080	0.090
Manganese as Mn (Tot) mg/l	0.010	0.010	0.020	0.010
Suspended Solids mg/l	5.0	10.0	15.0	10.0
Total Dissolved Solids mg/l	2,200	2,100	2,100	2,150
pH Units	7.00	7.60	7.00	7.40

Sampling Date:	5/81	6/81	7/81	8/81
2LN-K				
Flow (gpm)			3	3
Acidity as CaCO3 mg/l	57.00	40.80	43.20	50.17
Alkalinity as CaCO3 mg/l	582.00	620.00	650.00	618.00
Dissolved Iron mg/l	0.090	0.050	0.110	0.130
Iron as Fe (Total) mg/l	0.140	0.110	0.160	0.188
Manganese as Mn (Tot) mg/l	0.030	0.009	0.031	0.027
Suspended Solids mg/l	16.0	6.0	8.0	7.0
Total Dissolved Solids mg/l	2,100	2,300	2,400	2,450
pH Units	7.30	7.20	7.40	7.20

Sampling Date:	9/81	10/81	11/81	12/81
2LN-k				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	32.00	48.00	28.00	38.00
Alkalinity as CaCO3 mg/l	526.00	620.00	752.00	140.00
Dissolved Iron mg/l	0.133	0.095	0.095	0.110
Iron as Fe (Total) mg/l	0.200	0.150	0.166	0.165
Manganese as Mn (Tot) mg/l	0.020	0.027	0.014	0.031
Suspended Solids mg/l	12.0	11.00	9.0	8.0
Total Dissolved Solids mg/l	2,350	2,275	2,300	2,250
pH Units	7.50	7.30	7.30	7.30

Sampling Date:	1/82	2/82	3/82	4/82
2LN-K				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	38.00	46.00	14.00	58.00
Alkalinity as CaCO3 mg/l	319.40	330.90	830.00	341.20
Dissolved Iron mg/l	1.290	0.300	NA	NA
Iron as Fe (Total) mg/l	1.320	0.355	0.300	0.140
Manganese as Mn (Tot) mg/l	0.040	0.020	0.030	0.025
Suspended Solids mg/l	11.0	8.0	22.0	3.0
Total Dissolved Solids mg/l	2,350	2,400	3,640	2,428
pH Units	7.20	7.20	7.20	7.20

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
LN-K				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	66.00	30.00	36.00	76.00
Alkalinity as CaCO3 mg/l	1,210.00	552.00	408,00	799.00
Dissolved Iron mg/l	0.020	0.040	0.090	0.110
Iron as Fe (Total) mg/l	0.050	0.100	0.090	0.120
Manganese as Mn (Tot) mg/l	0.010	0.015	0.015	0.016
Suspended Solids mg/l	1.0	11.0	30.0	16.0
Total Dissolved Solids mg/l	3,586	2,600	3,542	2,225
pH Units	7.00	7.10	7.20	7.10

Sampling Date:	9/82	10/82
2LN-K		
Flow (gpm)	1	1
Acidity as CaCO3 mg/l	27.00	35.00
Alkalinity as CaCO3 mg/l	789.20	844.00
Dissolved Iron mg/l	0.080	0.133
Iron as Fe (Total) mg/l	0.110	0.140
Manganese as Mn (Tot) mg/l	0.015	0.015
Suspended Solids mg/l	1.0	29.0
Total Dissolved Solids mg/l	2,710	2,620
pH Units	7.10	7.30

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	8/82	6/82	7/82	8/82
1Dip				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	<0.01	4.00	4.00	8.00
Alkalinity as CaCO3 mg/l	313.70	331.90	351.30	288.00
Dissolved Iron mg/l	0.200	0.150	0.090	0.098
Iron as Fe (Total) mg/l	0.200	0.260	0.100	0.110
Manganese as Mn (Tot) mg/l	0.010	0.015	0.008	0.010
Suspended Solids mg/l	4.0	19.0	<1.0	5.0
Total Dissolved Solids mg/l	1,648	1,575	1,826	1,450
pH Units	8.00	7.70	7.80	7.90

Sampling Date:	9/82
2Dip	
Flow (gpm)	Sump
Acidity as CaCO3 mg/l	<0.01
Alkalinity as CaCO3 mg/l	410.10
Dissolved Iron mg/l	0.050
Iron as Fe (Total) mg/l	0.050
Manganese as Mn (Tot) mg/l	0.010
Suspended Solids mg/l	1.0
Total Dissolved Solids mg/l	1,510
pH Units	8.20

Sampling Date:	
Flow (gpm)	
Acidity as CaCO3 mg/l	
Alkalinity as CaCO3 mg/l	
Dissolved Iron mg/l	
Iron as Fe (Total) mg/l	
Manganese as Mn (Tot) mg/l	
Suspended Solids mg/l	
Total Dissolved Solids mg/l	
pH Units	

Sampling Date:	
Flow (gpm)	
Acidity as CaCO3 mg/l	
Alkalinity as CaCO3 mg/l	
Dissolved Iron mg/l	
Iron as Fe (Total) mg/l	
Manganese as Mn (Tot) mg/l	
Suspended Solids mg/l	
Total Dissolved Solids mg/l	
pH Units	

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1/81	2/81	3/81	4/81
Main Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	8.0	10.0	18.0	16.20
Alkalinity as CaCO3 mg/l	442.00	404.00	398.00	376.00
Dissolved Iron mg/l	1.930	2.150	2.120	1.850
Iron as Fe (Total) mg/l	1.930	2.150	2.130	1.960
Manganese as Mn (Tot) mg/l	0.110	0.100	0.100	0.090
Suspended Solids mg/l	14.0	9.0	16.0	10.0
Total Dissolved Solids mg/l	2,200	2,050	2,000	2,000
pH Units	7.20	7.60	7.20	7.60

Sampling Date:	5/81	6/81	7/81	8/81
Main Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	3.80	8.50	7.20	6.92
Alkalinity as CaCO3 mg/l	270.00	406.00	390.00	360.00
Dissolved Iron mg/l	1.100	1.600	1.170	1.350
Iron as Fe (Total) mg/l	1.580	2.200	1.650	1.770
Manganese as Mn (Tot) mg/l	0.020	0.085	0.025	0.035
Suspended Solids mg/l	44.0	4.0	10.0	6.0
Total Dissolved Solids mg/l	1,700	2,150	2,100	2,200
pH Units	8.10	7.60	7.80	7.60

Sampling Date:	9/81	10/81	11/81	12/81
Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	10.00	18.00	14.00	12.00
Alkalinity as CaCO3 mg/l	214.00	407.00	287.00	377.00
Dissolved Iron mg/l	0.470	1.060	1.160	1.130
Iron as Fe (Total) mg/l	1.410	1.850	1.650	1.665
Manganese as Mn (Tot) mg/l	0.039	0.031	0.025	0.019
Suspended Solids mg/l	35.0	12.0	14.0	15.0
Total Dissolved Solids mg/l	2,150	2,125	2,100	2,050
pH Units	8.00	7.50	8.05	7.70

Sampling Date:	1/82	2/82	3/82	4/82
MAIN Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as CaCO3 mg/l	20.00	20.00	2.00	18.00
Alkalinity as CaCO3 mg/l	332.30	320.70	500.00	318.10
Dissolved Iron mg/l	0.020	1.900	NA	NA
Iron as Fe (Total) mg/l	2.380	1.950	1.750	1.690
Manganese as Mn (Tot) mg/l	0.100	0.100	0.100	0.090
Suspended Solids mg/l	10.0	18.0	12.0	8.0
Total Dissolved Solids mg/l	2,175	2,200	2,770	2,640
pH Units	7.40	7.50	7.50	7.50

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
Main Slope				
Flow (gpm)	Sump	Sump	Sump	Sump
Acidity as $CaCO_3$ mg/l	20.00	10.00	<0.01	15.00
Alkalinity as $CaCO_3$ mg/l	351.30	3,567.00	230.10	241.20
Dissolved Iron mg/l	2.000	0.985	0.310	0.260
Iron as Fe (Total) mg/l	2.200	2.250	0.340	0.450
Manganese as Mn (Tot) mg/l	0.070	0.095	0.030	0.035
Suspended Solids mg/l	18.0	34.0	6.0	7.0
Total Dissolved Solids mg/l	2,584	2,225	2,016	2,020
pH Units	7.50	7.40	8.10	7.60

Sampling Date:	9/82	10/82
Main Slope		
Flow (gpm)	Sump	Sump
Acidity as $CaCO_3$ mg/l	<0.01	9.00
Alkalinity as $CaCO_3$ mg/l	185.10	287.30
Dissolved Iron mg/l	1.650	1.550
Iron as Fe (Total) mg/l	1.800	1.870
Manganese as Mn (Tot) mg/l	0.045	0.095
Suspended Solids mg/l	5.0	20.0
Total Dissolved Solids mg/l	1,795	2,090
pH Units	8.20	7.60

Sampling Date:				
Flow (gpm)				
Acidity as $CaCO_3$ mg/l				
Alkalinity as $CaCO_3$ mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:				
Flow (gpm)				
Acidity as $CaCO_3$ mg/l				
Alkalinity as $CaCO_3$ mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	1/81	2/81	3/81	4/81
12 N-M				
Flow (gpm)				
Acidity as CaCO3 mg/l	<0.1	<0.1	4.0	7.20
Alkalinity as CaCO3 mg/l	384.00	348.00	336.00	328.00
Dissolved Iron mg/l	0.020	0.020	0.010	0.030
Iron as Fe (Total) mg/l	0.030	0.020	0.020	0.060
Manganese as Mn (Tot) mg/l	0.010	0.010	0.010	0.020
Suspended Solids mg/l	5.0	4.0	5.0	7.0
Total Dissolved Solids mg/l	1,650	1,600	1,575	1,875
pH Units	7.50	8.20	7.80	8.00

Sampling Date:	5/81	6/81	7/81	8/81
12 N-M				
Flow (gpm)			20	20
Acidity as CaCO3 mg/l	5.70	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	318.00	342.00	350.00	326.00
Dissolved Iron mg/l	0.030	0.035	0.027	0.038
Iron as Fe (Total) mg/l	0.080	0.077	0.095	0.099
Manganese as Mn (Tot) mg/l	0.010	0.019	0.011	0.015
Suspended Solids mg/l	8.0	9.0	4.0	3.0
Total Dissolved Solids mg/l	1,700	1,800	1,750	1,750
H Units	8.10	8.10	8.40	7.90

Sampling Date:	9/81	10/81	11/81	12/81
12N-M				
Flow (gpm)	20	20	20	24
Acidity as CaCO3 mg/l	6.00	12.00	8.00	16.00
Alkalinity as CaCO3 mg/l	212.60	218.80	217.20	241.90
Dissolved Iron mg/l	0.040	0.045	0.040	0.035
Iron as Fe (Total) mg/l	0.080	0.089	0.075	0.088
Manganese as Mn (Tot) mg/l	0.012	0.011	0.014	0.012
Suspended Solids mg/l	41.0	25.0	22.0	16.0
Total Dissolved Solids mg/l	2,450	2,350	2,350	2,200
pH Units	7.90	7.60	7.80	8.00

Sampling Date:	1/82	2/82	3/82	4/82
12N-M				
Flow (gpm)	24	20	20	20
Acidity as CaCO3 mg/l	12.00	8.00	<0.01	12.00
Alkalinity as CaCO3 mg/l	269.80	290.70	295.20	250.40
Dissolved Iron mg/l	0.550	0.430	NA	NA
Iron as Fe (Total) mg/l	0.680	0.450	0.610	0.790
Manganese as Mn (Tot) mg/l	0.110	0.090	0.160	0.120
Suspended Solids mg/l	12.0	20.0	21.0	18.0
Total Dissolved Solids mg/l	2,125	2,000	3,096	2,186
pH Units	7.70	8.00	7.70	7.80

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/82	6/82	7/82	8/82
12N-M				
Flow (gpm)	20	20	20	20
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	3.00
Alkalinity as CaCO3 mg/l	204.40	294.90	292.20	288.10
Dissolved Iron mg/l	0.350	0.155	0.280	0.250
Iron as Fe (Total) mg/l	0.350	0.350	0.280	0.260
Manganese as Mn (Tot) mg/l	0.060	0.050	0.060	0.061
Suspended Solids mg/l	1.0	11.0	6.0	6.0
Total Dissolved Solids mg/l	2,398	2,050	2,756	2,050
pH Units	8.00	7.90	8.00	8.10

Sampling Date:	9/82	10/82
12N-M		
Flow (gpm)	20	20
Acidity as CaCO3 mg/l	<0.01	<0.01
Alkalinity as CaCO3 mg/l	300.30	290.00
Dissolved Iron mg/l	0.180	0.185
Iron as Fe (Total) mg/l	0.200	0.220
Manganese as Mn (Tot) mg/l	0.045	0.045
Suspended Solids mg/l	43.0	24.0
Total Dissolved Solids mg/l	2,090	2,005
pH Units	8.20	8.00

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

JBR Data

CHEMTECH
28 EAST 1500 NORTH
OREM, UTAH 84057
(801) 226-8822

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U009230

DATE SAMPLED: 11-6-85

TIME SAMPLED: 1500

SAMPLED BY: Martz

LOCATION: RB-21 H-1

COMMENTS: metals - dissolved

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	365
Ammonia as NH_3-N, mg/l	0.15
Arsenic as As, mg/l	0.012
Barium as Ba, mg/l	0.060
Bicarbonate as HCO_3, mg/l	445
Boron as B, mg/l	0.59
Cadmium as Cd, mg/l	<.005
Calcium as Ca, mg/l	27.5
Carbonate as CO_3, mg/l	0
Sulfide as S, mg/l	<.05
Molybdenum as Mo, mg/l	<.005

PARAMETER	LEVEL
Chloride as Cl, mg/l	12.6
Chromium as Cr (Hex.), mg/l	<.005
Chromium as Cr (Total), mg/l	<.005
Conductivity, umhos/cm	866
Copper as Cu, mg/l	0.020
Fluoride as F, mg/l	0.17
Hardness as $CaCO_3$, mg/l	399
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.248
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.022
Magnesium as Mg, mg/l	48.2
Manganese as Mn, mg/l	0.020
Mercury as Hg, mg/l	0.0003
Nickel as Ni, mg/l	0.006
Nitrate as NO_3-N, mg/l	0.27
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	0.042
Potassium as K, mg/l	1.92
Selenium as Se, mg/l	<.002
Silica as SiO_2 (Dissolved), mg/l	10.44
Silver as Ag, mg/l	<.005
Sodium as Na, mg/l	89.8
Sulfate as SO_4, mg/l	115
Total Dissolved Solids, mg/l	581
Turbidity, NTU	--
Zinc as Zn, mg/l	0.10
pH Units	7.69

CHEMTECH

CHEMTECH
28 EAST 1500 NORTH
OREM, UTAH 84057
(801) 226-8822

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U009231

DATE SAMPLED: 11-8-85

TIME SAMPLED: 1130

SAMPLED BY: Martz

LOCATION: RB-26 H·6

COMMENTS: metals - dissolved

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	375
Ammonia as NH_3-N, mg/l	0.15
Arsenic as As, mg/l	0.010
Barium as Ba, mg/l	0.050
Bicarbonate as HCO_3, mg/l	457
Boron as B, mg/l	1.07
Cadmium as Cd, mg/l	<.005
Calcium as Ca, mg/l	32.5
Carbonate as CO_3, mg/l	0
Sulfide as S, mg/l	<.05
Molybdenum as Mo, mg/l	0.016

PARAMETER	LEVEL
Chloride as Cl, mg/l	27.1
Chromium as Cr (Hex.), mg/l	<.005
Chromium as Cr (Total), mg/l	<.005
Conductivity, umhos/cm	1300
Copper as Cu, mg/l	0.010
Fluoride as F, mg/l	0.38
Hardness as $CaCO_3$, mg/l	401
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.023
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.024
Magnesium as Mg, mg/l	68.8
Manganese as Mn, mg/l	<.005
Mercury as Hg, mg/l	0.0005
Nickel as Ni, mg/l	<.005
Nitrate as NO_3-N, mg/l	0.48
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	0.016
Potassium as K, mg/l	1.84
Selenium as Se, mg/l	0.004
Silica as SiO_2 (Dissolved), mg/l	10.71
Silver as Ag, mg/l	<.005
Sodium as Na, mg/l	161
Sulfate as SO_4, mg/l	251
Total Dissolved Solids, mg/l	892
Turbidity, NTU	--
Zinc as Zn, mg/l	0.06
pH Units	7.87

CHEMTECH

CHEMTECH
28 EAST 1500 NORTH
OREM, UTAH 84057
(801) 226-8822

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U009220

DATE SAMPLED: 11-8-85

TIME SAMPLED: 1015

SAMPLED BY: Martz

OCATION: EWL-25 H-18

COMMENTS: metals - dissolved

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	377
Ammonia as NH_3-N, mg/l	0.12
Arsenic as As, mg/l	0.012
Barium as Ba, mg/l	0.120
Bicarbonate as HCO_3, mg/l	460
Boron as B, mg/l	0.37
Cadmium as Cd, mg/l	<.005
Calcium as Ca, mg/l	29.6
Carbonate as CO_3, mg/l	0
Sulfide as S, mg/l	<.05
Molybdenum as Mo, mg/l	<.005

PARAMETER	LEVEL
Chloride as Cl, mg/l	25.2
Chromium as Cr (Hex.), mg/l	<.005
Chromium as Cr (Total), mg/l	<.005
Conductivity, umhos/cm	1010
Copper as Cu, mg/l	0.030
Fluoride as F, mg/l	0.24
Hardness as $CaCO_3$, mg/l	343
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.040
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.024
Magnesium as Mg, mg/l	52.8
Manganese as Mn, mg/l	<.005
Mercury as Hg, mg/l	0.0010
Nickel as Ni, mg/l	<.005
Nitrate as NO_3-N, mg/l	0.11
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	0.025
Potassium as K, mg/l	1.64
Selenium as Se, mg/l	<.002
Silica as SiO_2 (Dissolved), mg/l	10.76
Silver as Ag, mg/l	<.005
Sodium as Na, mg/l	123
Sulfate as SO_4, mg/l	107
Total Dissolved Solids, mg/l	641
Turbidity, NTU	--
Zinc as Zn, mg/l	0.10
pH Units	7.58

CHEMTECH

003569

CHEMTECH
28 EAST 1500 NORTH
OREM, UTAH 84057
(801) 226-8822

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U009221

DATE SAMPLED: 11-8-85

TIME SAMPLED: 0945

SAMPLED BY: Martz

LOCATION: EWL-26 H-21

COMMENTS: metals - dissolved

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	152
Ammonia as NH_3-N, mg/l	0.15
Arsenic as As, mg/l	0.011
Barium as Ba, mg/l	0.220
Bicarbonate as HCO_3, mg/l	186
Boron as B, mg/l	0.22
Cadmium as Cd, mg/l	<.005
Calcium as Ca, mg/l	13.4
Carbonate as CO_3, mg/l	0
Sulfide as S, mg/l	<.05
Molybdenum as Mo, mg/l	<.005

PARAMETER	LEVEL
Chloride as Cl, mg/l	21.0
Chromium as Cr (Hex.), mg/l	<.005
Chromium as Cr (Total), mg/l	<.005
Conductivity, umhos/cm	525
Copper as Cu, mg/l	0.013
Fluoride as F, mg/l	0.10
Hardness as $CaCO_3$, mg/l	152
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.105
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.011
Magnesium as Mg, mg/l	20.4
Manganese as Mn, mg/l	0.008
Mercury as Hg, mg/l	0.0008
Nickel as Ni, mg/l	<.005
Nitrate as NO_3-N, mg/l	0.29
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	0.025
Potassium as K, mg/l	0.67
Selenium as Se, mg/l	0.004
Silica as SiO_2 (Dissolved), mg/l	10.90
Silver as Ag, mg/l	<.005
Sodium as Na, mg/l	72.1
Sulfate as SO_4, mg/l	77.2
Total Dissolved Solids, mg/l	347
Turbidity, NTU	--
Zinc as Zn, mg/l	0.09
pH Units	7.86

CHEMTECH

1989 Water Monitoring Data

Water Quality and Flow Summaries - Mine In-flow
Horse Canyon Mine
(0 = number of samples)

Parameter	Units	Sample Site 2E-0 Mean	Max.	Min.	0	Sample Site 2LN-K Mean	Max.	Min.	0	Sample Site Main Slope Mean	Max.	Min.	0	Sample Site 2 Dip Mean	Max.	Min.	0	Sample Site 12 N-N Mean	Max.	Min.	0	Parameter
1 Flow	(gpm)				0	2.75	3.00	1.00	16				0				0	20.50	26.00	20.00	16	1
2 pH	standard	7.53	7.90	7.10	22	7.23	7.60	7.00	22	7.65	8.20	7.20	22	7.92	8.20	7.70	5	7.94	8.40	7.50	22	2
3 Acidity as CaCO3	mg/l	14.47	30.00	0.00	22	40.50	76.00	4.00	22	11.21	20.00	0.00	22	3.20	8.00	0.00	5	4.27	16.00	0.00	22	3
4 Alkalinity as CaCO3	mg/l	402.51	589.20	44.00	22	602.00	1210.00	140.00	22	484.73	3567.00	185.10	22	339.00	410.10	288.00	5	290.04	384.00	204.40	22	4
5 Iron Dissolved	mg/l	1.309	3.300	0.020	20	0.152	1.290	0.020	20	1.288	2.150	0.020	20	0.110	0.200	0.050	5	0.130	0.550	0.010	20	5
6 Iron Total	mg/l	1.762	3.300	0.300	22	0.199	1.320	0.050	22	1.756	2.300	0.340	22	0.144	0.260	0.050	5	0.227	0.790	0.020	22	6
7 Manganese as Mn (Tot)	mg/l	0.056	0.080	0.040	22	0.020	0.040	0.009	22	0.065	0.110	0.019	22	0.011	0.015	0.008	5	0.043	0.160	0.010	22	7
8 Suspended Solids	mg/l	11.0	57.0	2.0	22	11.3	30.0	1.0	22	14.9	44.0	4.0	22	5.0	19.0	0.0	5	14.1	43.0	1.0	22	8
9 TDS	mg/l	1816	2162	1690	22	2503	3440	2100	22	2152	2770	1700	22	1602	1826	1450	5	2002	3096	1575	22	9

Water Quality and Flow Summaries - Mine Discharges
Horse Canyon Mine
(0 = number of samples)

Prepared 3-2-90

Parameter	Units	Sample Site 001 Mean	Max.	Min.	0	Sample Site 002 Mean	Max.	Min.	0
1 Flow	(Mgpd)	0.26	1.60	0.00	32	0.19	0.99	0.00	35
2 pH	standard	7.89	8.20	7.45	22	7.67	7.95	7.30	24
3 Acidity as CaCO3	mg/l	2.24	10.00	0.00	24	6.78	35.00	0.00	22
4 Alkalinity as CaCO3	mg/l	362.90	472.00	238.00	25	391.17	485.10	311.00	22
5 Aluminum	mg/l	0.016	0.016	0.016	1	0.025	0.025	0.025	1
6 Antimony, Sb	mg/l					0.000	0.000	0.000	1
7 Arsenic	mg/l	0.002	0.002	0.002	1	0.005	0.005	0.005	1
8 Barium	mg/l	0.035	0.035	0.035	1	0.045	0.045	0.045	1
9 Beryllium, Be	mg/l					0.000	0.000	0.000	1
10 Boron	mg/l	0.020	0.020	0.020	1	0.033	0.033	0.033	1
11 Bromide, Br	mg/l					0.000	0.000	0.000	1
12 Cadmium	mg/l	0.000	0.000	0.000	1	0.000	0.000	0.000	1
13 Chromium	mg/l	0.000	0.000	0.000	1	0.000	0.000	0.000	1
14 Cobalt, Co	mg/l					0.000	0.000	0.000	1
15 Copper	mg/l	0.003	0.003	0.003	1	0.006	0.006	0.006	1
16 Fluoride	mg/l	0.35	0.35	0.35	1	0.41	0.41	0.41	1
17 Iron Dissolved	mg/l	0.100	0.420	0.020	24	0.262	0.570	0.020	21
18 Iron Total	mg/l	0.218	0.425	0.089	25	0.390	1.100	0.150	24
19 Lead	mg/l	0.003	0.003	0.003	1	0.000	0.000	0.000	1
20 Magnesium	mg/l	112.00	112.00	112.00	1	96.00	96.00	96.00	1
21 Manganese	mg/l	0.01	0.01	0.01	1	0.02	0.02	0.02	1
22 Manganese as Mn (Tot)	mg/l	0.02	0.06	0.00	25	0.03	0.13	0.01	22
23 Mercury	mg/l	0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000	1
24 Molybdenum	mg/l	0.003	0.003	0.003	1	0.009	0.009	0.009	1
25 Nickel	mg/l	0.094	0.094	0.094	1	0.095	0.095	0.095	1
26 Ammonia	mg/l	0.10	0.10	0.10	1	0.45	0.45	0.45	1
27 Nitrate	mg/l	0.66	0.66	0.66	1	0.62	0.62	0.62	1
28 Nitrite	mg/l	0.00	0.00	0.00	1	0.00	0.00	0.00	1
29 Oil and Grease	mg/l	0.67	2.50	0.00	22	0.77	5.60	0.00	21
30 Phosphate	mg/l	0.070	0.070	0.070	1	0.060	0.060	0.060	1
31 Selenium	mg/l	0.000	0.000	0.000	1	0.000	0.000	0.000	1
32 Sulfate	mg/l	990.0	990.0	990.0	1	960.0	960.0	960.0	1
33 Sulfide	mg/l	0.67	0.67	0.67	1	0.92	0.92	0.92	1
34 Suspended Solids	mg/l	20.00	20.00	20.00	1	9.86	20.00	1.00	24
35 TDS	mg/l	2000	2643	1760	21	2010	2500	1700	24

NOTE: 0 = below detection limit
See individual analyses for detection limits

0035572

Water Quality and Flow Summaries - Surface and Groundwater
Horse Canyon Mine
(# = number of samples)

Parameter	Units	Sample Site RS-2				Sample Site D-1				Sample Site RF-1				Sample Site MC-1				Sample Site 2MD				Sample Site 1E2				
		Mean	Max.	Min.	#	Mean	Max.	Min.	#	Mean	Max.	Min.	#	Mean	Max.	Min.	#	Mean	Max.	Min.	#	Mean	Max.	Min.	#	
1 Flow	(gpm)	23.92	34.00	9.00	25	256	650	0	18	11.36	25.00	0.00	22	20.95	65.00	0.00	19	3.59	7.00	3.00	22	1.00	1.00	1.00	19	1
2 pH	standard	7.95	8.36	7.37	27	8.13	8.40	7.80	15	8.20	8.60	7.60	22	8.05	8.40	7.70	22	7.90	8.20	7.40	22	7.95	8.50	7.50	22	2
3 Temp	o C	9.00	10.00	8.00	7					11.00	11.00	11.00	2	13.83	20.00	10.00	6									3
4 Conductivity	umhos/cm	2414.29	2700.00	2200.00	7					2500.00	2700.00	2300.00	2	3766.67	3900.00	3600.00	6									4
5 Dissolved Oxygen	ppm	6.47	8.10	4.20	7					4.40	4.90	3.90	2	5.77	7.40	4.30	6									5
6 Acidity as CaCO3	mg/l	2.69	10.00	0.00	10	0.75	6.00	0.00	14	2.21	14.00	0.00	19	1.47	10.00	0.00	15	2.05	12.00	0.00	22	2.65	14.00	0.00	22	6
7 Alkalinity as CaCO3	mg/l	432.25	552.00	79.00	18	394.50	1095.00	291.60	14	408.50	537.00	46.00	19	629.47	905.00	211.00	15	203.96	350.00	124.00	22	316.60	439.00	210.00	22	7
8 Aluminum	mg/l	0.063	0.310	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									8
9 Antimony as Sb	mg/l	0.020	0.060	0.000	3																					9
10 Arsenic	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									10
11 Barium	mg/l	0.029	0.210	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.00	6									11
12 Beryllium as Be	mg/l	0.007	0.020	0.000	3																					12
13 Bicarbonate	mg/l	510.30	581.00	330.00	8					424.50	513.00	336.00	2	486.83	537.00	420.00	6									13
14 Boron	mg/l	0.190	0.315	0.090	10					0.100	0.100	0.100	2	0.240	0.400	0.16	6									14
15 Cadmium	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.00	6									15
16 Calcium	mg/l	63.14	160.00	30.20	10					40.00	52.00	44.00	2	63.33	83.90	41.10	6									16
17 Carbonate	mg/l	8.27	70.00	0.00	10					44.00	72.00	16.00	2	6.00	19.00	0.00	6									17
18 Chloride	mg/l	22.0	30.0	19.7	10					24.2	26.3	22.0	2	32.3	43.0	13.0	6									18
19 Chromium	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.00	0.00	0.00	6									19
20 Cobalt as Co	mg/l	0.003	0.005	0.000	3																					20
21 Copper	mg/l	0.003	0.020	0.000	10					0.000	0.000	0.000	2	0.00	0.00	0.00	6									21
22 Fluoride	mg/l	0.37	0.52	0.18	10					0.63	0.70	0.40	2	0.61	1.01	0.14	6									22
23 Germanium as Ge	mg/l	0.000	0.000	0.000	3																					23
24 Hardness	mg/l	602	660	310	8					610	633	307	2	717	872	271	6									24
25 Iron Dissolved	mg/l	0.052	0.390	0.000	14	0.043	0.920	0.020	12	0.204	1.900	0.000	17	0.052	0.140	0.010	13	0.125	0.420	0.020	20	0.606	10.350	0.002	20	25
26 Iron Total	mg/l	0.293	4.210	0.000	29	1.806	14.000	0.060	15	141.004	3000.000	0.020	22	2.447	49.300	0.020	22	0.220	0.640	0.050	22	0.743	13.200	0.000	22	26
27 Lead	mg/l	0.000	0.003	0.000	8					0.000	0.000	0.000	2	0.000	0.000	0.000	6									27
28 Magnesium	mg/l	61.10	102.00	0.00	10					70.45	70.00	70.10	2	78.50	133.00	33.00	6									28
29 Manganese	mg/l	0.000	0.000	0.000	7					0.000	0.000	0.000	2	0.000	0.000	0.000	6									29
30 Manganese as Mn (Tot)	mg/l	0.014	0.050	0.000	23	0.076	0.515	0.010	13	0.047	0.360	0.000	20	0.136	1.050	0.010	16	0.021	0.030	0.003	22	0.020	0.115	0.000	22	30
31 Mercury	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									31
32 Molybdenum	mg/l	0.016	0.160	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									32
33 Nickel	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									33
34 Ammonia	mg/l	0.27	0.60	0.00	8					0.32	0.44	0.20	2	0.08	0.20	0.00	6									34
35 Nitrate	mg/l	0.70	3.46	0.00	10					0.06	0.12	0.00	2	0.27	1.24	0.00	6									35
36 Nitrite	mg/l	0.00	0.02	0.00	10					0.01	0.02	0.00	2	0.01	0.03	0.00	6									36
37 Phosphate	mg/l	0.013	0.060	0.000	10					0.000	0.000	0.000	2	0.002	0.010	0.000	6									37
38 Potassium	mg/l	4.25	12.40	0.00	8					2.30	2.00	1.00	2	6.35	8.10	2.60	6									38
39 Selenium	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									39
40 Silver as Ag	mg/l	0.000	0.000	0.000	3																					40
41 Sodium	mg/l	185.59	600.00	140.00	10					179.50	180.00	179.00	2	204.50	224.00	184.00	6									41
42 Sulfate	mg/l	306	675	79	10					298	300	288	2	485	817	232	6									42
43 Sulfide	mg/l	0.00	0.00	0.00	8					0.00	0.00	0.00	2	0.00	0.00	0.00	6									43
44 Suspended Solids	mg/l	16.0	113.0	0.0	18	80.3	640.0	3.0	15	120.3	1640.0	0.0	20	151.2	2152.0	1.0	16	14.0	59.0	1.0	22	8.6	20.0	1.0	22	44
45 TDS	mg/l	930	1300	774	29	1910	2700	362	15	964	1800	847	22	1306	1760	800	22	2435	3920	2030	22	2106	2025	1430	22	45
46 Total Kjeldahl Nitrog	mg/l	0.11	0.22	0.00	3																					46
47 Vanadium as V	mg/l	0.00	0.25	0.00	3																					47
48 Zinc	mg/l	0.019	0.120	0.000	10					0.000	0.000	0.000	2	0.004	0.012	0.000	6									48

NOTE: 0 = below detection limit - see individual analysis for detection limit

Prepared 2-2-90

003573

KAISER COAL CORPORATION
HORSE CANYON MINE
ACT/007/013

1989 WATER MONITORING DATA

SAMPLE LOCATION: B - 1 (Horse Canyon Wash Below Mine) * INACCESSIBLE

Parameter	Units	Jan 89	Feb 89	Mar 89	Apr 89	May 89	June 89	July 89	Aug 89	Sep 89	Oct 89	Nov 89	Dec 89
Flow	(gpm)	*	*	0	0	0	0	0	0	0			
pH	standard												
Temp	o C												
Conductivity	umhos/cm												
Dissolved Oxygen	ppm												
Aluminum	mg/l												
Arsenic	mg/l												
Barium	mg/l												
Bicarbonate	mg/l												
Boron	mg/l												
Cadmium	mg/l												
Calcium	mg/l												
Carbonate	mg/l												
Chloride	mg/l												
Chromium	mg/l												
Copper	mg/l												
Flouride	mg/l												
Hardness	mg/l												
Iron Total	mg/l												
Lead	mg/l												
Magnesium	mg/l												
Manganese	mg/l												
Mercury	mg/l												
Molybdenum	mg/l												
Nickel	mg/l												
Ammonia	mg/l												
Nitrate	mg/l												
Nitrite	mg/l												
Phosphate	mg/l												
Potassium	mg/l												
Selenium	mg/l												
Sodium	mg/l												
Sulfate	mg/l												
Sulfide	mg/l												
TDS	mg/l												
Zinc	mg/l												

003574

KAISER COAL CORPORATION
HORSE CANYON MINE
ACT/007/013

1989 WATER MONITORING DATA

SAMPLE LOCATION: HC - 1 (Horse Canyon Wash)

* INACCESSIBLE

Parameter	Units	Jan 89	Feb 89	Mar 89	Apr 89	May 89	June 89	July 89	Aug 89	Sep 89	Oct 89	Nov 89	Dec 89
Flow	(gpm)	*	*	3	3	6	9	<1	<1	0			
pH	standard			8.33	8.48	7.88	7.78	8.02	8.1				
Temp	o C			10	13	12	10	18	20				
Conductivity	umhos/cm			3700	3900	3600	3800	3800	3800				
Dissolved Oxygen	ppm			4.3	4.8	5.2	6.3	6.6	7.4				
Aluminum	mg/l			<.1	<.1	<.1	<.1	<.1	<.1				
Arsenic	mg/l			<.01	<.01	<.01	<.01	<.01	<.1				
Barium	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
Bicarbonate	mg/l			424	491	537	499	514	456				
Boron	mg/l			0.22	0.4	0.22	0.157	0.18	0.26				
Cadmium	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
Calcium	mg/l			41.1	83.9	41.1	80.7	74.1	59.2				
Carbonate	mg/l			19	9.5	12.3	0	0	0				
Chloride	mg/l			29.3	33.1	13	43	34.1	41.3				
Chromium	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
Copper	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
Flouride	mg/l			0.32	0.66	0.14	0.86	0.68	1.01				
Hardness	mg/l			766	697	271	872	834	863				
Iron Total	mg/l			0.182	0.17	0.02	0.055	0.07	0.102				
Lead	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
Magnesium	mg/l			102	112	38.4	33	53.1	133				
Manganese	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
Mercury	mg/l			<.0002	<.0002	<.0002	<.0002	<.0002	<.0002				
Molybdenum	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
Nickel	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
Ammonia	mg/l			0.18	<.1	0.28	<.2	<.2	<.2				
Nitrate	mg/l			0.257	<.1	1.24	<.01	<.02	0.14				
Nitrite	mg/l			0.028	<.01	<.005	<.01	0.0065	<.005				
Phosphate	mg/l			<.01	<.01	<.01	<.01	<.01	0.01				
Potassium	mg/l			8.1	6.1	5.5	8	2.6	7.8				
Selenium	mg/l			<.002	<.002	<.002	<.002	<.002	<.002				
Sodium	mg/l			202	224	197	202	184	218				
Sulfate	mg/l			560	724	232	281	294	817				
Sulfide	mg/l			<.1	<.1	<.1	<.1	<.1	<.1				
TDS	mg/l			1400	1420	824	800	1635	1760				
Zinc	mg/l			<.01	<.01	0.012	0.012	<.01	<.01				

003575

KAISER COAL CORPORATION
HORSE CANYON MINE
ACT/007/013

1989 WATER MONITORING DATA

SAMPLE LOCATION: RF - 1 (Right Fork, Horse Canyon Wash)

* INACCESSIBLE

Parameter	Units	Jan 89	Feb 89	Mar 89	Apr 89	May 89	June 89	July 89	Aug 89	Sep 89	Oct 89	Nov 89	Dec 89
Flow	(gpm)	*	*	<1	<1	0	0	0	0	0			
pH	standard			8.45	8.51								
Temp	o C			11	11								
Conductivity	umhos/cm			2300	2700								
Dissolved Oxygen	ppm			3.9	4.9								
Aluminum	mg/l			<.1	<.1								
Arsenic	mg/l			<.01	<.01								
Barium	mg/l			<.01	<.01								
Bicarbonate	mg/l			336	513								
Boron	mg/l			0.18	0.18								
Cadmium	mg/l			<.01	<.01								
Calcium	mg/l			52.8	44.8								
Carbonate	mg/l			72	16								
Chloride	mg/l			22	26.3								
Chromium	mg/l			< 01	< 01								
Copper	mg/l			<.01	<.01								
Flouride	mg/l			0.78	0.48								
Hardness	mg/l			433	387								
Iron Total	mg/l			0.144	0.065								
Lead	mg/l			<.01	<.01								
Magnesium	mg/l			70.8	70.1								
Manganese	mg/l			<.01	<.01								
Mercury	mg/l			<.0002	<.0002								
Molybdenum	mg/l			<.01	<.01								
Nickel	mg/l			<.01	<.01								
Ammonia	mg/l			0.2	0.44								
Nitrate	mg/l			<.01	0.12								
Nitrite	mg/l			0.021	<.01								
Phosphate	mg/l			<.01	<.01								
Potassium	mg/l			1.8	2.8								
Selenium	mg/l			<.002	<.002								
Sodium	mg/l			180	179								
Sulfate	mg/l			308	288								
Sulfide	mg/l			<.1	<.1								
TDS	mg/l			847	876								
Zinc	mg/l			<.01	<.1								

Table 7.--Summary of chemical constituents and bacteria in water at gaging station 09314374 in Horse Canyon, August 1978 through September 1979

	Parameters and constituents	No. of analyses	Mean	Minimum-maximum
	Discharge (cubic feet per second)	12	-	<0.01-1.20
	Water temperature (degrees Celsius)	12	18.0	6.0-27.0
	Specific conductance (micromhos per centimeter)	12	2,800	1,390-7,000
	pH (units)	12	-	8.5-8.7
Milligrams per liter	Dissolved solids, sum of constituents	12	1,960	953-4,220
	Oxygen, dissolved (O_2)	12	7.8	6.1-10.6
	Carbon dioxide, dissolved (CO_2)	12	2.1	1.2-4.7
	Alkalinity ($CaCO_3$)	12	350	290-380
	Bicarbonate (HCO_3)	12	398	338-444
	Carbonate (CO_3)	12	16	8-26
	Oil and grease	3	-	0
	Nitrogen, dissolved (N)	2	-	0.83-0.89
	Nitrogen, organic dissolved (N)	4	.31	0.20-0.46
	Nitrogen, ammonia dissolved (N)	4	.19	0-0.42
	Nitrogen, nitrite dissolved (N)	4	.03	0.02-0.06
	Nitrogen, nitrate dissolved (N)	4	.54	0.19-1.20
	Nitrogen, ammonia + organic suspended total (N)	4	.16	0.08-0.25
	Nitrogen, nitrite + nitrate dissolved (N)	4	.57	0.21-1.20
	Nitrogen, ammonia + organic total (N)	4	.66	0.50-0.85
	Phosphorus, total (P)	4	.02	0-0.04
	Phosphorus, ortho dissolved (P)	4	.005	0-0.02
	Carbon, organic dissolved (C)	4	4.0	1.8-8.8
	Hardness, (as $CaCO_3$)	12	790	420-1,600
	Hardness, (as noncarbonate $CaCO_3$)	12	440	99-1,400
	Calcium, dissolved (Ca)	12	98	61-210
	Magnesium, dissolved (Mg)	12	130	65-260
	Sodium, dissolved (Na)	12	360	130-1,000
	Sodium-adsorption-ratio	12	5.7	1.4-12.0
	Potassium, dissolved (K)	12	11	5.7-26
	Chloride, dissolved (Cl)	12	160	18-1,500
	Sulfate, dissolved (SO_4)	12	960	440-1,300
	Fluoride, dissolved (F)	4	.3	0.2-0.4
	Silica, dissolved (SiO_2)	12	11	10-15
Micrograms per liter	Arsenic, dissolved (As)	4	-	1
	Boron, dissolved (B)	4	260	0-360
	Chromium, dissolved (Cr)	4	5	0-10
	Iron, dissolved (Fe)	4	20	10-30
	Lead, dissolved (Pb)	4	15	0-47
	Manganese, dissolved (Mn)	4	15	10-20
	Strontium, dissolved (Sr)	4	1,400	1,100-2,000
	Zinc, dissolved (Zn)	4	20	10-30
	Lithium, dissolved (Li)	4	200	50-630
	Selenium, dissolved (Se)	4	1.2	0-3
	Phenols	4	1.2	1-2
	Bacteria (colonies per 100 milliliters)			
	Coliform, fecal	2	-	3-5
	Streptococci, fecal	1	-	84

003577

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
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July 18, 2001

TO: Internal File

FROM: Mary Ann Wright, Associate Director, Mining

RE: Analysis and Finding on the Lila Canyon Road, UtahAmerican Energy, Inc., Horse Canyon Mine, C/007/013

Following is a finding and analysis of the road leading to the Lila Canyon Mine Facility which is proposed to be constructed in conjunction with the Horse Canyon Mine. This analysis and findings takes into account the regulations and policy under the Utah Coal Regulatory Program (UCRP) in regards to the "Permitting of Roads". This document will accompany and become part of the permit findings for the Lila Canyon Revision to the Horse Canyon Mine permit issued by the UCRP.

SUMMARY

Presently, there are two access routes to the proposed Lila Canyon Mine area. One route starts near the Horse Canyon Mine and extends south following the Book Cliffs escarpment. The second route heads east from U. S. Highway 191/6, passes the proposed Lila Canyon site, and eventually connects to the first route. Both of these routes, constructed in the early 1940's, have generally been called the Lila Canyon Road and have had little if any maintenance over the years. The southwestern portion of the Lila Canyon Road (from US 191/6 to the proposed mine site), is presently claimed as part of the Emery County road system (Lila Canyon Road #126) and is planned to be upgraded to provide better access to the mine as well as other multiple use activities. Emery County plans to realign and improve the Lila Canyon Road #126, from its current condition to an engineered and upgraded condition. Emery County will be responsible for the alignment, construction and maintenance of the road which will total approximately 4.8 miles in length. There are no plans to alter the road that leads from the Horse Canyon Mine to the Lila Canyon Mine although the County may choose to conduct maintenance on the road consistent with its RS2477 designation. After the Lila Canyon Mine opens, the Lila Canyon Road #126 will remain a public road, allowing access by multiple purpose users up to, and ending at, the proposed disturbed area boundary (mine surface facilities area). The Lila Canyon Road #126 up to the mine disturbed area boundary is found under this analysis to be

exempt from regulation according to the State of Utah Coal Mining Rules, R645, et seq. and the Utah Division of Oil, Gas and Mining (UDOGM) July 3, 1995, policy on roads.

POLICY

This analysis implements the July 3, 1995, permitting policy on roads (see Reference #1 of the attached Reference List). In deciding to exempt the Lila Canyon road from regulation, UDOGM herein makes written findings as to whether:

1. The road was properly acquired by the governmental entity and not deeded to avoid regulation;
2. The road is maintained with public funds or in exchange for taxes or fees,
3. The road was constructed in a manner similar to other public roads of the same classification; and
4. Impacts from mining on the road are not significant under Utah's definitions for "affected area" and "surface coal mining operations".

ANALYSIS AND FINDINGS

The following analysis and information is made from existing documents (see attached Reference List) and designated in the text as follows:

1. July 3, 1995, Letter from James Carter to Rick Seibel Re: Permitting of Roads.
2. UtahAmerican Energy, Inc.'s Permit Application Package (PAP),
3. Decision Record, Environmental Assessment UT-070-99-22, Bureau of Land Management.
4. Agreement between Emery County and UtahAmerican Energy Inc., October 19, 1999.
5. February 27, 2001 letter from Emery County to Lowell P. Braxton in regards to Lila Canyon Road.
6. Utah R-645 et seq. Coal Mining Rules, and
7. December 15, 1997 Interior Board of Land Appeals decision (IBLA 94-366).

Analysis #1:

- UtahAmerican Energy Inc.'s (UEI) Lila Canyon Permit Application Package (PAP) was found "Administratively Complete" on February 26, 1999, and is currently still under technical review. The PAP contains a copy of an agreement entered into between UEI and Emery County which recognizes that UEI requires extensive use of the Lila Canyon Road (#126) and that the county will improve the road to meet UEI's needs. The county will perform the upgrade and charge the operator a toll for use of the road.(2)

- The approximate description of the county road to be upgraded is as follows: The road will start from U. S. Highway 6 located in the west half of Section 6, T. 17 S., R. 14 E. and proceed northeasterly to the NE 1/4 NE 1/4 of Section 32, T. 16 S., R. 14 E. The road will then proceed to the NW 1/4 of Section 28 and then to the NE 1/4 NE 1/4 of Section 21. The road finally abuts the Lila Canyon Mine surface facilities in the SW 1/4 of Section 15. The total length of this road would be approximately 4.8 miles.(5)

- Emery County has asserted its claim on the Lila Canyon Road as a county road and has designated it Lila Canyon Road No.126. The assertions were indexed and submitted to the Bureau of Land Management (BLM) on January 8, 1993. (4)

- The surface land ownership for the Lila Canyon Road #126 is the BLM and Utah School and Institutional Trust Lands Administration (SITLA). Emery county will control all necessary rights of way for this road. (5)

Finding #1:

The Lila Canyon road has historically existed since the 1940's or earlier. Emery County asserts that it had jurisdiction over the road prior to the implementation of the Surface Mining Control and Reclamation Act of 1977 (SMCRA), and has maintained this jurisdiction to the present. The Lila Canyon road right-of-way crosses a mix of federal and SITLA lands. The mixed land ownership that is crossed by the Lila Canyon Road #126 precludes the possibility of UtahAmerican Energy, Inc., a predecessor, or successor from deeding the right-of-way to Emery County to avoid regulation under the UCRP. Thus, the road was properly acquired by the governmental entity and was not deeded to avoid regulation.

Analysis # 2:

- Emery County is and will be responsible for the alignment, construction (upgrading) and maintenance of the Lila Canyon Road #126. (4) and (5)

- Emery County is responsible for all environmental issues relating to the alignment, and construction (upgrading) of the Lila Canyon road. (4) and (5)

- The maintenance for the Lila Canyon road will be performed by Emery County. Emery County will be responsible for funds to improve and maintain the Lila Canyon Road No.126. It is recognized that UEI and Emery County have an escrow agreement whereby contributions for the construction of the road may be made by UEI, however, it is also acknowledged that said contribution does not in any manner constitute participation by UEI in the design, construction, maintenance or operation of the road. The road will remain a county network road entirely under the authority of Emery County. The maintenance schedule will be the same as other similar Class "B" roads in Emery County. Examples of such roads: Cottonwood Canyon road No. 506 (Trail Mountain Mine), Deer Creek Road No. 304 (Deer Creek Mine), Bear Creek Road No. 305 (Bear Canyon Mine), C Canyon Road in Carbon County (West Ridge Mine). (4) & (5)

Finding # 2:

Emery County has established its jurisdiction over the alignment, maintenance, construction and environmental aspects of this road. The road is to be maintained with public funds or in exchange for taxes or fees.

Analysis # 3:

- Emery County supports the responsible development of its natural resources which is consistent with it's Comprehensive Master Plan. Emery County proposes to upgrade the Lila Canyon Road #126 to meet existing county, state and federal specifications. The road will be improved according to the plans and specifications as approved by Johansen & Tuttle Engineering, Inc., as Emery County's engineers of record. Emery County will oversee the upgrade of the Lila Canyon road. (4) & (5)

- The Lila Canyon Road #126 will be built and maintained the same as other similar Class "B" roads in Emery County, such as the Cottonwood Canyon Road No.506, the Deer Creek Road No. 304, and the Bear Creek Road No. 305.

Finding #3:

Emery County will use established professional association and state guidelines to align and surface the road as it does for other Class 'B" roads. Thus, the road was and will be constructed similar to other public roads of the same classification.

Analysis # 4:

- The Lila Canyon Road #126 is and will be a public and multiple purpose road. It is currently used by stockmen, sightseers, hunters, and mineral developers. (3) & (5)

- The Lila Canyon Road #126 is and will be a part of the Emery County road system and public use will not be denied to any portion of the road. (4) and (5)

- In order for a road to be permitted under the UCRP, the road must meet the test of being a "coal mining and reclamation operation", and fall within the UCRP's definition of "roads." Activities occurring on the Lila Canyon Road are similar to activities occurring on public roads of the same classification throughout the State. No coal mining operations are occurring that would require special jurisdiction or regulation of the road under the UCRP. (4), (5) and (6)

- A recent Interior Board of Land Appeals (IBLA) decision states the following, *"We find nothing in section 701(28)(B) of SMCRA, or its legislative history, which expressly provides that transportation facilities, especially ones that carry processed coal to a remote point of sale/use, should generally be considered "surface coal mining operation," subject to regulation under SMCRA... Congress made no specific provision for regulating the transportation of processed coal, even though that activity is itself a "major industrial sector," which encompasses railroads, barges, trucks, and pipelines "that collectively stretch over thousands of miles throughout the nation."... The fact that it did not, strongly indicates that Congress did not intend to regulate the transportation of processed coal under SMCRA, presumably leaving it to regulation pursuant to other Federal and state laws." (7)*

Finding #4:

The uses of the Lila Canyon Road are considerably greater than the narrow, regulated activities of providing access to coal mining and reclamation operations. In addition, the environmental impacts to the Lila Canyon Road caused by coal truck traffic will not differ from the environmental impacts of other trucks of similar weight operating on this road. The trucks being used for transporting coal are licensed commercial haulers which are legal to operate on public roads of the same classification throughout the state.

The mine is not conducting any coal mining and reclamation operation on the public portion of the Lila Canyon Road that would require any special regulation under SMCRA or the UCRP. Impacts from mining on the road are not significant under Utah's definitions for "affected area" and "surface coal mining operations".

CONCLUSION

The Lila Canyon County Road #126 leading from State Highway 6 up to the Lila Canyon disturbed area boundary does not need to be included in the permitted area for the Horse Canyon Mine, and is thus exempted from the jurisdiction of the Utah Coal Regulatory Program.

UEI has no plans for upgrading, hauling coal or storing equipment on the exiting Lila Canyon Road segment that stretches from the Horse Canyon Mine to Lila Canyon. As such, there is no requirement to permit this road under the Utah Coal Regulatory Program. Should UEI decide to conduct coal mining and reclamation operations that involve the alternative road from Horse Canyon to the Lila Canyon facilities, analysis and findings will need to be made in regards to its permitted status under the Utah Coal Regulatory Program.

sm
cc: Clyde Borrell, Utah American Energy, Inc.
Rex Funk, Emery County
James Fulton, OSM
O:\007013.HOR\DRAFT\roadfind3.wpd

REFERENCE LIST

1. July 3, 1995 letter from James W. Carter, Director of Utah Division of Oil, Gas, & Mining to Rick Seibel, Regional Director and to Jim Fulton Denver Field Office Division Chief, U.S. Dept. Of Interior, Office of Surface Mining. RE: Utah Section 733 Letter, Permitting of Roads.

2. Utah American Energy, Inc.'s Permit Application Package (PAP),

3. Decision Record, Environmental Assessment UT-070-99-22, Bureau of Land Management.

4. Agreement between Emery County and UtahAmerican Energy Inc., October 19, 1999.

5. February 27, 2001 letter from Emery County to Lowell P. Braxton in regards to Lila Canyon Road.

6. December 15, 1997 Interior Board of Land Appeals decision (IBLA 94-366) finding that a railroad and pipeline used to transport coal from surface mines are not regulated by the federal Surface Mining Control and Reclamation Act.

7. Utah R645 et. seq. Coal Mining Rules, especially definition of the terms "Affected Area", "Coal Mining and Reclamation Operations", and "Road".

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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July 3, 1995

Rick Seibel, Regional Director
Jim Fulton, Denver Field Office Division Chief
U. S. Department of the Interior
Office of Surface Mining, Western Support Center
1999 Broadway, Suite 3320
Denver, Colorado 80202-5733

Re: Utah Section 733 Letter; Permitting of Roads

Gentlemen:

In light of the discussions and correspondence between the Division of Oil, Gas and Mining and the Office of Surface Mining ("OSM") since the informal conference in this matter, I am writing to clarify Utah's policy with regard to the permitting of public roads which may be used for, or related in some way to, coal mining and reclamation activities. Aside from the present disagreement regarding permitting road policy, the Utah Act and implementing regulations are approved by OSM and have been determined to be no less stringent than those of SMCRA. 30 U.S.C. § 1255.

Utah acknowledges that, under its approved definition of "affected area," there exists no blanket exemption from regulation for public roads. Utah recognizes, therefore, that some public roads may be subject to the permitting requirements of the Utah Act. Utah believes, however, that it is best suited to interpret its program, and to decide whether a particular road falls within the definition of "affected area." Since there is little substantive guidance in this area, the State will interpret its program by reference to such authorities as the court's decision **In Re Permanent (Flannery)** as well as conflicting IBLA decisions, such as **Harman Mining** and **W. E. Carter**.

Coal mining permits are required for all roads (public or private) that are constructed, reconstructed or used exclusively for coal mining and reclamation activities. Utah fully recognizes that the quantity of public use of a road is not the exclusive consideration to determine whether it is exempt from regulation. As a result, upon a finding by the State that a road is a bona-fide public road as defined by the approved regulations, Utah will rely on the definition of "surface coal mining operations" under U.C.A. § 40-10-3(18), 30 U.S.C. § 1291(28) and "affected area," U.A.C. Rule R645-100-

200 and 30 C.F.R. §701.5, to determine whether an exemption from regulation is in order. If the operator can demonstrate to the satisfaction of the Utah regulatory authority that a particular road is not included in the definition of "surface coal mining operations," as explained in the pertinent preambles to the publication of the implementing federal rules and as interpreted by the courts, then Utah will not regulate the road.

Thus, a public road which was not constructed, reconstructed or used exclusively for coal mining and reclamation activities; i.e., a multiple use, open access public road, may not be required to be permitted if a) it was properly acquired by the governmental entity (not deeded to avoid regulation), b) it is maintained with public funds or in exchange for taxes or fees, c) it was constructed in a manner similar to other public roads of the same classification, and d) impacts from mining are not significant under the definition of "affected area" and "surface coal mining operations."

Utah recognizes that arrangements sometimes exist between coal companies and the entities which govern public roads used by such companies, whereby maintenance of the road is done in part by the coal companies. Utah believes that such arrangements are not the most important focus of inquiry; rather, coal mining usage and the associated impacts of such usage are the critical area of focus. A public road maintained by a coal operator or permittee should be examined as to:

1. whether the maintenance is occasioned primarily by the environmental impacts of coal mining operations on the road;

2. whether the maintenance is routine and similar to that which would be performed by the county or land management authority absent the agreement of the permittee or operator to do it; and

3. whether the maintenance agreement with the public entity is an arms-length arrangement, such that the essence of the requirement that maintenance be carried out with public funds is met.

For example, if a public land management agency stipulates that, as a condition of a special use permit, the permittee is responsible for maintenance of certain existing roads used by the operator, the fact that such roads are not maintained with public funds for the duration of the operation would not automatically subject those roads to regulation if the effect of mining use on them is relatively slight. Similarly, if state or local governments or public land management agencies require mine operators to construct road improvements or contribute road maintenance funds or services as a

prerequisite for granting the permits and approvals necessary for the mining operation, the stipulation does not, by itself, render all such existing roads subject to regulation under SMCRA.

Utah believes that it, as the regulatory authority, is in the best position to make such determinations, and will decide, based upon these factors, whether such roads are public and whether the coal mining usage and impacts fall within the Utah program definitions of "surface coal mining operations" and "affected area."

We believe that this clarification addresses all of OSM's concerns while allowing the state of Utah to exercise its discretion in interpreting and administering its approved regulatory program. I trust this clarification will provide the basis for OSM to determine that Utah's implementation of its regulatory program is no less effective than the federal program, and that OSM may find the inquiry of the Section 733 letter satisfactorily answered.

We look forward to resolution of this issue and a continuing productive partnership with OSM in implementing Utah's coal regulatory program

Very truly yours,

James W. Carter
Director

jbe
cc: R. Uram, Director
Office of Surface Mining
H:733RESOL.LTR

2890/UTU-76614
2890/UTU-77122
2820/UTU-76617
(UT-070)

FINDING OF NO SIGNIFICANT IMPACT FOR THE UTAHAMERICAN LILA CANYON MINE PROJECT AND ACCESS ROAD

ENVIRONMENTAL ASSESSMENT UT-070-99-22

The analysis determined that impacts would occur to the following resources, but that mitigation through design (mitigation built into the proposal) would resolve most concerns:

- Soils
- Hydrology
- Grazing
- Visuals
- Vegetation/habitat
- Wilderness values
- Wildlife

Where impacts could not be totally mitigated the impacts were not major in scope or would be of short duration.

The coal leases that are included in the proposed action have been examined in the following environmental impact statements (EIS) :

- Development of Coal Resources in Central Utah, Final Environmental Impact Statement, Part 2 Site Specific Analysis, US Geological Survey, 1979.
- Uinta-Southwestern Utah Coal Leasing, Final Environmental Impact Statement, BLM, 1981.
- Unita-Southwestern Utah Coal Region Round Two, Final Environmental Impact Statement, BLM, 1983.

These leases were included in the foreseeable future development scenarios, hence included in the cumulative impacts analysis of proposed mining (all existing leases and future tracts proposed for leasing).

Based on the analysis of potential environmental impacts contained in the attached environmental assessment, I have determined the impacts are not expected to be significant and an environmental impact statement is not required.

Tom Rasmussen., Acting Field Manager Date

2890/UTU-76614
2890/UTU-77122
2820/UTU-76617
(UT-070)

DECISION RECORD

ENVIRONMENTAL ASSESSMENT UT-070-99-22

DEVELOPMENT OF THE LILA CANYON PROJECT
EMERY COUNTY, UTAH

DECISION

It is the decision of the Price Field Manager of the Bureau of Land Management to select Alternative B outlined in the referenced environmental assessment with modification. This record of decision documents the specific components of my decision and the rationale for my decision.

Elements of the Decision

My decision consists of a number of separate actions designed to meet the purpose and need for this project. Specifically, these actions include:

- Grant right-of-way to UtahAmerican Energy to construct, operate and maintain mine- related surface facilities on the public lands described in the EA administered by the Bureau of Land Management. The right-of-way would encompass approximately 40.0 acres, more or less. The grant would be issued under authority of section 501 (a) of the Federal Land Policy and Management Act of 1976 (90 stat 2776, 43 U.S.C. 1761) The grant would be issued for a term of thirty (30) years, with the right of renewal. The grant would be subject to provisions outlined in the proposed action and specific administrative requirements as outlined in the Code of Federal Regulations(CFR), Chapter 43, part 2800. Since the facilities would be located within the boundaries of a permitted mine, all actions occurring within the permit area would also be under jurisdiction of the Utah Division of Oil, Gas and Mining. *Approval of the right-of-way would be contingent upon mine plan approval.*

- Grant right-of-way to construct, operate and maintain a 46 kV powerline as described in the proposed action. The grant would be issued under authority of section 501 (a) of the Federal Land Policy and Management Act of 1976 (90 stat 2776, 43 U.S.C. 1761.) The grant would be issued for a term of thirty (30) years with the right of renewal. The grant would be subject to provisions outlined in the proposed action and specific administrative requirements as outlined in the Code of Federal Regulations (CFR), Chapter 43, part 2800. *Approval of the right-of-way would be contingent upon mine plan approval.*

- Grant right-of-way to Emery County, Utah to construct, operate and maintain a coal haul access road across public lands as described in the EA. The right-of-way would encompass approximately 30 acres, more or less. The grant would be issued under authority of section 501 (a) of the Federal Land Policy and Management Act of 1976 (90 stat 2776, 43 U.S.C. 1761.) The grant would be issued for a term of thirty (30) years with the right of renewal. The grant would be subject to provisions outlined in the proposed action and specific administrative requirements as outlined in the Code of Federal Regulations (CFR), Chapter 43, part 2800. *Approval of the right-of-way would be contingent upon mine plan approval*

MITIGATION

As noted in the EA, the stabilization, maintenance and operation plan described in Chapter 2.0 was designed to minimize most impacts to resources within the project area. In addition, best management practices for low impact construction and maintenance measures were incorporated into the proposed action.

However, three issues brought up in scoping that were analyzed in detail resulted in a change to the proposed action by the agency or the recommendation for mitigation. These three issues were grazing, wildlife and cultural resources. Detailed discussions of how these issues were treated are discussed below.

Grazing

Analysis determined that potential impacts would occur through vehicular collisions with livestock during the life of the operation. To reduce this potential impact, the construction of a livestock fence on both sides of the haul road was incorporated into the *Stabilization, Operation and Maintenance Plan.* In addition, as a result of splitting the grazing allotment through construction of the proposed fence and the road, potential impacts would occur to the grazing utilization of the allotment. Installation and maintenance of livestock water tanks is also incorporated into the referenced plan to lessen these impacts.

These mitigations were placed in the applicant's proposed action as suggestions to minimize the potential for impact to the respective resources. The applicant has not proposed these, but BLM is requiring them as additional mitigation.

Cultural Resources
It was determined that there could be indirect impacts to a site determined to have cultural and historical significance. As such, it was recommended that UEI submit a data recovery plan for the site. This plan will delineate the objectives of recovery, timeframe for analysis and reporting procedures for any resources identified.

In order to approve the plan, BLM would have to enter into a programmatic agreement with the Utah State Historic Preservation Office and other consulting parties. This agreement would then be signed and approved prior to issuing a notice to proceed.

Wildlife
UEI would be required to provide two guzzlers to benefit bighorn sheep populations and habitat because of the potential loss of seeps. These mitigations were placed in the applicant's proposed action as suggestions to minimize the potential for impact to the respective resources. The applicant has not proposed these, but BLM is requiring them as additional mitigation.

PUBLIC INVOLVEMENT

On March 3, 1999, the scoping process was initiated through notification on BLM's electronic notification bulletin board. A thirty (30) day public comment period was held commencing on March 3, 1999 and ending on April 4,1999. In addition, newspaper articles or notices appeared in four separate issues of the local newspapers in Carbon and Emery Counties, Utah announcing the scoping meetings and soliciting comments. Scoping meetings were held on March 2,1999, at the Carbon County Courthouse, as well as on March 4,1999, at the Emery County Courthouse. Scoping identified the following issues that were carried forward in the document:

- Surface subsidence
- Soils, slope stability and rehabilitation stability
- Ground water and surface water
- Livestock grazing
- Vehicular traffic
- Visual resources
- Vegetation potential for loss in species diversity, cover, productivity
- Wilderness values
- Displacement and direct disturbance of wildlife
- Cultural resources

Data was collected, reviewed for adequacy, and assessed for impacts during a 24-month period following the conclusion of public scoping. The EA was submitted for final public review and comment in July 2000.

Comments received prior to the conclusion of the public comment period on August 7, 2000, included those from the U.S. Fish and Wildlife Service and Emery County Road Department. Specific concerns raised by these entities in regards to threatened and endangered species, hydrology, and assorted information consistency errors were addressed and incorporated into an EA revision. The issue of R.S. 2477 assertion raised by the Emery County Road Department was determined to be beyond the scope of this proposed action and EA, and therefore was not incorporated into the EA revision.

Two hundred and thirty five (235) comments were received in response to a request for public comment on the EA issued on August 10, 2000, by the Southern Utah Wilderness Alliance (SUWA). Although the official comment period ended on August 7, 2000, and the vast majority of the comments were received past the closing date, they were reviewed for content and possible incorporation into the EA revision. Two hundred and twenty-one (221) comments were received that reiterated the general SUWA call for opposition to the proposed action and request for preparation of an EIS. Though substantial in number, the common qualitative nature of the comments provided did not necessitate a modification of the EA. Fourteen (14) comments were received that voiced support of the proposed action. Basis of support for the project came more from a negative response to the SUWA alert, rather than review of the proposed action. Again these comments were assertive in nature and therefore did not provide a basis to modify the EA.

SUWA did provide an official written response to the EA on August 16, 2000, voicing opposition to the proposed action and adequacy of the EA process conducted. Specific points presented included the failure of the document to identify significant impacts to the wilderness, wildlife, visual, recreation, and overall landscape of the project area and adjacent lands, as well as the need for an EIS. Though reviewed in great detail, the concerns voiced by SUWA either lacked indepth quantitative analysis; were absent of quantitative support; or were unfounded. Therefore, these concerns did not require a modification to the EA.

RATIONALE AND MANAGEMENT CONSIDERATIONS

The rationale to approve the proposed action was primarily based on the analysis of the environmental impacts presented in the attached environmental assessment. Both the proponent and BLM have incorporated a variety of measures into the proposed action to mitigate potential impacts from the project.

As stated under the objectives for the regulations (43 CFR 2800) governing the issuance of rights-of-way, it is the objective of the Secretary of Interior to grant rights-of-way and temporary use permits covered by the regulations to any qualified individual, business entity, or governmental entity and regulate, control and direct the use of said right-of-way on public lands.

In doing so, the Secretary shall protect the natural resources associated with the public lands, adjacent private or other lands administered by a government agency and prevent unnecessary and undue environmental damage to the lands and resources. In approving this action, the objectives of the Secretary have been met.

In reaching a decision to grant the subject rights-of-way other factors were considered and discussed below:

Through this decision BLM is only approving the use of public lands for proposed mine surface facilities as related to the mining of coal. Approval of the mine plan and the subsequent mining of coal is under jurisdiction of the Office of Surface Mining Reclamation and Enforcement (OSM). The OSM is a cooperating agency in this environmental assessment. As such, under CEQ regulations can base its recommendation for mine plan approval on this document. The actual approval of the mine plan is made by the Assistant Secretary of the Interior. BLM will make approval of the rights-of-way contingent upon UEI having received approval of their mining plan.

Section 523 (a) of the Surface Mining Control and Reclamation Act (SMCRA) (91 Stat, 445) requires the Secretary of the Interior to establish and implement a Federal regulatory program that applies to all surface coal mining operations that take place on Federal lands. The administration of OSM coal mining requirements of the Federal lands program is delegated to Utah's Division of Oil, Gas and Mining (UDOGM).

The Horse Canyon Permit Application Package (ACT/007/013) was approved and a permit issued for reclamation effective on May 6, 1991. The Lila Canyon Permit Application Package (a significant revision of the Horse Canyon Permit Application Package) is being reviewed by the UDOGM (OSM primacy state under SMCRA). The Permit Application Package review includes a determination of completeness, public comments and technical adequacy determination. This review includes concurring agencies of BLM (surface management agency), the State Historic Preservation Officer (SHPO) (cultural and historical) and commenting agencies, the Utah Division of Wildlife Resources (UDWR) and the Untied States Fish and Wildlife Service (USFWS), Utah Division of Water Resources (UDWR- State Engineer (Water Rights), Division of Environmental Quality (UDEQ) (air quality, water pollution control) and Utah Department of Transportation (UDOT).

The BLM conducts a resource recovery and protection plan review (R2P2/MER), approves the R2P2 and recommends to DOGM approval of this part of the Permit Application Package. This plan spells out in detail how the lessee will mine the coal for maximum economic recovery. BLM approved the Lila Canyon Mine R2P2 on March 2, 2000.

Under 30 CFR 745.13, the Secretary reserved the authority to approve mining plans or modifications thereto, of Federal coal leases and compliance with NEPA. The UDOGM assists OSM in preparing a decision document that is sent to the Assistant Secretary Lands and Minerals for approval of the Federal Mining and Reclamation Plan (M&RP). The Federal M&RP approval will include any special conditions attached by agencies. UtahAmerican has the following valid Federal coal leases: SL-066145 (Issued 6/19/46), SL-066490 (Issued 12/31/47), and SL-069291 (Issued 4/1/50). UtahAmerican also has the following State of Utah coal leases: U-0126947 (issued 12/1/47), U-014217 (issued 2/1/55), and U-014218 (issued 2/1/55). These leases would be mined upon approval of the mine plan. Conveyance of these leases gives the lessee certain rights and obligations to extract the mineral resources in an environmentally sound manner.

Upon approval of the mine plan, a portion of the Turtle Canyon WSA would be undermined. Minimal impacts in the form of minor subsidence is expected. The incorporation of the original IMP (interim management policy) stipulations for actions resulting from mining of the pre-FLPMA coal leases under the Turtle Canyon WSA would be incorporated for all areas deemed to be affected by subsurface actions. No surface facilities authorized by BLM would be located within the WSA and no actions approved by BLM would impact the WSA.

Surface facilities within the proposed mine site and proposed guzzlers would directly disturb eight acres of the natural wilderness value and future designation of the immediate area as wilderness within the Desolation Canyon Inventory Unit 8. (1999 Utah Wilderness Inventory) Due to topography, the direct area of impact would be restricted to 25.12 acres below the canyon face. In addition, 901 acres within the Desolation Canyon and Turtle Canyon inventory units would be undermined by coal extraction. It should be noted that Desolation Canyon Inventory Unit 8 or the Turtle Canyon Inventory Unit 4 are not designated wilderness study areas, but were found to have wilderness characteristics in the 1999 Utah Wilderness Inventory .

The proposed action meets Wilderness Interim Management Policy objectives. No action is proposed that would impair the wilderness character of the established WSA.

The proposed action is in conformance with the existing BLM land use plan for the area. It also is consistent with the Department of the Interior and BLM Interim Management Guidance for wilderness inventory units. UtahAmerican holds valid existing rights that must be recognized.

CONFORMANCE WITH THE LAND USE PLAN AND CONSISTENCY WITH OTHER LAWS

Land Use Plan
The proposed action is in conformance with the objectives and recommendations of the Price River Resource Area Management Framework Plan approved in 1983, as amended.

Consistency with Existing Laws
This decision is consistent with Federal, state, and local laws imposed for the protection of the environment. Specifically:

National Environmental Policy Act
Federal Land Policy and Management Act
Endangered Species Act
Surface Mining Control and Reclamation Act
Clean Water Act
National Historic and Preservation Act
Migratory Bird Treaty Act
Bald Eagle Protection Act

IMPLEMENTATION AND APPEAL RIGHTS

Implementation may begin upon approval of the mine plan for the project. The rights granted through the right-of-way become effective immediately following approval of the right-of-way.

Within 30 days of receipt of this decision, you have the right of appeal to the Board of Land Appeals, Office of the Secretary, in accordance with the regulations at 43 CFR 4.4. If an appeal is taken, you must follow the procedures outlined in the enclosed Form 1842-1, Information on Taking Appeals to the Board of Land Appeals. The appellant has the burden of showing that the decision appealed from is in error.

Tom Rasmussen, Acting Field Manager

Date

Enclosure:
Form 1842-1

Appendix 1-4 in MRP 4

AGREEMENT

This agreement made and entered into this 19 day of October 1999, by and between Emery County, a body corporate and politic (County), and UtahAmerican Energy, Inc. (UEI).

WHEREAS, there is an existing road in Emery County known as Lila Canyon Road (#126) and

WHEREAS, UEI requires extensive use of said road, and

WHEREAS, due to said extensive use, said road must be improved for the health, safety and welfare of the citizens of County as well as others who may have occasion to use said road,

NOW THEREFORE, be it agreed as follows:

1. The parties hereto agree and acknowledge that presently the southwest portion of the road known as Lila Canyon Road is a County road. Said County road runs from State Route 6 in a Northeasterly direction for approximately 2.63 miles to a presently existing corral. Thereafter the road is an unimproved RS 2477 roadway under assertion by Emery County with the Bureau of Land Management (BLM) and identified as assertion #144 lower Lila point, #155 Lila Canyon and #326 Lila Canyon Lila Pt. The Assertions were indexed and submitted to BLM Jan. 8, 1993.

2. That Emery County will improve the Lila Canyon Road according to the plans and specifications as approved by Johansen & Tuttle Engineering, Inc., as Emery County's engineers of record.

3. The parties shall enter into an Escrow Agreement. Johansen & Tuttle Engineering, Inc. estimates for such improvements are shown in attachment A. Estimates for each phase shall be carefully reviewed and brought up to date before funds are put in escrow prior to initiation of the individual phases. UEI and Emery County shall jointly agree in writing before beginning any specific phase. No phase shall commence before the required funds for that specific phase is in escrow. Each phase once initiated shall be completed.

4. Insofar as the road will be used by the public for access to private and public lands and by UEI for access and construction of the Lila Canyon mine, and insofar as improvement of the Roadway would not otherwise be a budgeted item for Emery County given other priorities for highway maintenance or reconstruction, it has been agreed between Emery County and UEI that the total cost of the reconstruction of the county road shall be the responsibility of UEI. Upon satisfactory completion by both parties of each phase, any remaining unspent funds in escrow shall remain sole property of UEI.

5. UEI will assist the County in obtaining additional road ROW's as required. The newly applied for BLM, ROW #UTU- 76617, now in the EA process will, be issued and assigned to Emery County.

6. Emery County shall make available at no cost, any native rock or dirt materials available on County or otherwise permitted local properties which might be suitable for road construction.

7. UEI shall acquire an Encroachment Permit from Emery County and comply with the conditions as set forth in the permit. It is agreed that when UEI is operating any coal mining or reclamation activity within 100' of a County road that UEI shall protect the public from normal hazards associated with said activity by installing a 6' chain link fence between the public and mine activity or facility situated within the 100' distance from the road unless as otherwise agreed to by Emery County through its Road Encroachment Ordinance 8-7-85A or as amended.

8. It is further agreed by Emery County that in consideration of UEI's contributions, Emery County agrees and acknowledges that said contribution does not in any manner constitute participation by UEI in the design, construction, maintenance or operation of the road except as otherwise agreed by both parties. The road will remain a County network road entirely under authority of Emery County. Furthermore, Emery County agrees to indemnify and hold UEI, its owners, directors, officers, employees, and agents (indemnitees) harmless of any liability, cost or expense, including defense costs, from any claim, demand or action which may be brought alleging negligence or responsibility on the part of indemnitees in the design or construction of the roadway, including any claim or demand which may be made by UEI employees. This obligation to indemnify and hold harmless commences immediately and includes the period of time during which construction is taking place.

Emery County agrees that it will fully cooperate with UEI should any explanation of this expenditure by UEI be required by any of the commissions which regulate UEI operations and/or any government agency which may inquire or investigate into the expenditure of UEI.

EMERY COUNTY

Commission Chairman

Attest:

Emery County Clerk

Subscribed and sworn to before me this 19th day of October, 1999.

CAROL D. COX
NOTARY PUBLIC - STATE of UTAH
180 WEST 200 NORTH
ORANGEVILLE UT 84537
COMM. EXP 11-7-2001

Carol D. Cox
Notary Public

UtahAmerican Energy, Inc.

President
Hershiel H. Hayden, President

Subscribed and sworn to before me this 26th day of October, 1999.

OFFICIAL SEAL
JANET A. KING
NOTARY PUBLIC STATE OF ILLINOIS
My Commission Expires 05-01-2001

Janet A. King
Notary Public

ATTACHMENT "A"

Phase	Description	Estimated Cost
Phase I	Engineering and Design of the Lila Canyon road complete, ready for bid.	$150,000
Phase II	Construction of gravel roadways. Includes acceleration & deceleration lanes on State Hwy 6.	To be determined by Phase I studies.
Phase III	Paving of the western segment of the Lila Canyon road.	To be determined by Phase I studies.

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mine file

cc [illegible] 3/6/01
Pam 3/15/01

EMERY COUNTY
A Great Place to Live and Work

Road Department

RECEIVED
MAR 05 2001
DIVISION OF
OIL, GAS AND MINING

Incoming
C/007/013
Copy Daron

February 27, 2001

Lowell P. Braxton
Division of Oil, Gas, and Mining
1594 West North Temple, STE 1210
P. O. 145801
Salt Lake City, Utah 84114-5801

Dear Mr. Braxton:

The following information should answer certain questions posed to Melvin Coonrod, Resident Agent UEI, by Daron Haddock on November 29, 2000 regarding the proposed Lila Canyon Road (#126) improvements.

Emery County recognizes that there are significant natural resources located on its State School Trust and Federal Public Lands. Emery County supports the responsible development of its natural resources which is consistent with Emery County's Comprehensive Master Plan and the multiple use ideals held by its people. Our natural resources include, but are not limited to, mineral deposits including coal, oil and natural gas, timber, water, grazing, recreation, wildlife, cultural and scenic which are all of significant social and economic benefit to Emery County, the State of Utah and the United States in terms of employment, tax revenue, mineral royalties and recreational opportunities.

I will respond to the questions in the order set forth in Mr. Haddock's letter (November 29, 2000).

A. **A legal description of the road right of way.**
The approximate description of the proposed county road is as follows: The road will start from U.S. Highway 6 located in the west half of Section 6, T. 17 S., R. 14 E. and proceed northeasterly to the NE ¼ NE ¼ of Section 32, T. 16 S., R. 14 E. The road will then proceed to the NW ¼ of Section 28 and then to the NE ¼ NE ¼ of Section 21. The road finally enters the Lila Canyon Mine surface facilities in the SW ¼ of Section 15. The total length of this road would be approximately 4.8 miles.

B. **Name or numerical designation for the road.**
Lila Canyon Road No.126

C. **Land ownership for the road right of way.**
Lila Canyon Road No.126 is currently situated on Federal and State Properties. Emery County will control all necessary right of ways for this road.

D. **Name of the entity responsible for the alignment, construction, maintenance and liability for the road.**
Emery County will be responsible for the alignment, construction, maintenance and liability for the road.

000798

P.O. Box 889 • 300 North 1st West • Castle Dale, Utah 84513 • Telephone (801) 381-5450 • FAX (801) 381-5239

E. **Name of the entity responsible for environmental permitting of the road.**
Emery County will be ultimately responsible for obtaining environmental permitting for the road.

F. **Construction standard for the road and the entity responsible for attaining this standard.**
Emery County will design the Lila Canyon Road No.126 according to existing county, state and federal specifications.

G. **Maintenance schedule for the road.**
The maintenance schedule for the road will be the same as other similar Class "B" roads in Emery County.

H. **Source of funds for construction and/or maintenance of the road.**
Emery County will be responsible for funds to improve and maintain the Lila Canyon Road No.126.

I. **Examples of similar roads in Carbon and Emery Counties.**
Cottonwood Canyon road No.506 (Trail Mountain), Deer Creek Road No.304, Bear Creek Road No.305 (Co-Op), C Canyon Road Carbon County.

J. **Will Utah American Energy, Inc. have the ability to deny use of the road?**
No! The Lila Canyon Road No.126 will continue as a multiple use public road under the authority of Emery County providing access to stockmen, recreationalists, minerals exploration and development, hunters and the general public.

I hope that this information is sufficient for your purposes.

Sincerely,

Rex Funk,
Road Supervisor

RF/ls

attachment

cc Commissioners
Val Payne, Public Lands Director
Craig Johansen, Johansen & Tuttle Engineering
Melvin Coonrod, EIS

(2-sided)

Copy Mary Ann; Aaron Joe, Pam
File OSM Dreaming

United States Department of the Interior

OFFICE OF HEARINGS AND APPEALS
Interior Board of Land Appeals
4015 Wilson Boulevard
Arlington, Virginia 22203

IN REPLY REFER TO:

RECEIVED
JAN 26 1998
DIV. OF OIL, GAS & MINING

CITIZENS COAL COUNCIL, ET AL.

IBLA 94-366 Decided December 15, 1997

Appeal from Decisions of the Acting Director, Office of Surface Mining Reclamation and Enforcement, finding that a railroad and a pipeline, used to transport coal from surface mines, are not regulated by the Federal surface coal mining act. 94-16-Johnson/Bird.

Affirmed.

1. Surface Mining Control and Reclamation Act of 1977: Applicability: Generally

The OSM properly concluded that a railroad and a pipeline, used solely to transport coal from surface mines to remote electrical generating stations, are not "surface coal mining operations," within the meaning of section 701(28)(B) of the Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. § 1291(28)(B) (1994), and are therefore not subject to the requirements of that Act.

APPEARANCES: Walton D. Morris, Jr., Esq., Charlottesville, Virginia, for Appellants; James R. Bird, Esq., and Benjamin J. Vernia, Esq., Washington, DC, for the Peabody Western Coal Company; Jack D. Palma, II, P.C., Esq., Cheyenne, Wyoming, and Donald B. Atkins, Esq., Tulsa, Oklahoma, for Black Mesa Pipeline, Inc.; John B. Weldon, Jr., Esq., and Stephen E. Crofton, Esq., Phoenix, Arizona, for the Salt River Project Agricultural Improvement and Power District; Jon K. Johnson, Esq., Office of the Regional Solicitor, U.S. Department of the Interior, Lakewood, Colorado, for the Office of Surface Mining Reclamation and Enforcement.

OPINION BY ADMINISTRATIVE JUDGE KELLY

The Citizens Coal Council, the Water Information Network, and the Dineh-Hopi Alliance (collectively, Appellants) have appealed from two identical Decisions of the Acting Director, Office of Surface Mining Reclamation and Enforcement (OSM), dated February 25, 1994. Responding to Appellants' citizens complaints, OSM found that two transportation facilities associated with the Black Mesa/Kayenta Mines are not "surface coal mining operations" governed by the Surface Mining Control and Reclamation

Act of 1977 (SMCRA), as amended, 30 U.S.C. §§ 1201-1328 (1994), and are therefore not subject to the permitting and other requirements of SMCRA.

The two mines are owned and operated by the Peabody Western Coal Company (PWCC), and are located in northeastern Arizona within the Navajo/Hopi Indian Reservations. The transportation facilities are a railroad, known as the Black Mesa and Lake Powell (BM&LP) Railroad, which is owned (along with others) and operated by the Salt River Project Agricultural Improvement and Power District (SRP), and a coal slurry pipeline, which is owned and operated by Black Mesa Pipeline, Inc. (BMP). The PWCC, BMP, and SRP have all filed answers to Appellants' Statement of Reasons for Appeal (SOR) and all are joined as proper parties to this appeal.

The pipeline at issue is 273 miles long and is buried for most of its length. It carries coal from the Black Mesa Mine to the Mohave Generating Station, in Laughlin, Nevada. Coal extracted at the mine is crushed by PWCC and placed on a conveyor system, which is owned by PWCC, BMP, and the Mohave Generating Station, and operated by PWCC. That system carries the coal to a preparation plant, which is owned and operated by BMP, where it is further crushed and water is added to create a coal slurry. The conveyor system and preparation plant are all within the area proposed by PWCC for permitting under SMCRA as part of the Black Mesa Mine. The proposed mine permit would cover the conveyor system. The BMP has applied for a separate permit for the plant. Following preparation, the coal slurry leaves the plant by way of BMP's pipeline, traversing a portion of the proposed mine permit area and continuing on to the electrical generating station in Laughlin, Nevada, where it is used for fuel.

The railroad at issue is 83 miles long, and carries coal from the Kayenta Mine to the Navajo Generating Station, in Page, Arizona. Coal extracted at the mine is crushed by PWCC and placed on a conveyor system, which is owned and operated by PWCC. That system carries the coal to silos and a loadout facility, which are also owned by PWCC. The conveyor system, silos, and loadout facility are all within the permit area for the Kayenta Mine and covered by the mine permit. At the loadout facility, the coal is loaded into cars and transported by SRP's railroad to the electrical generating station in Page, Arizona, where it is used for fuel.

Title to the coal passes from PWCC to the electrical generating station either at the station (Black Mesa Mine) or at the loadout facility (Kayenta Mine). Further, the railroad and the pipeline are operated for the sole purpose of transporting all of the coal produced by PWCC at each mine to the respective electrical generating station. Throughout the 17-year operation of the mines from the enactment of SMCRA in 1977 to the 1994 Decisions at issue here, neither transportation facility has ever been permitted or otherwise authorized to operate under that Act.

In her Decisions, the Acting Director concluded that the railroad and pipeline are not "surface coal mining operations" regulated by SMCRA. She

concluded that the applicable statutory standard is whether they can be considered facilities "resulting from or incident to" PWCC's surface coal mining activities at the Black Mesa/Kayenta Mines, under section 701(28)(B) of SMCRA, 30 U.S.C. § 1291(28)(B) (1994), as that standard is explicated in the preamble to 1988 final rulemaking, 53 Fed. Reg. 47377 (Nov. 22, 1988). (Decision at 1-2, 3.) Applying this standard, the Acting Director held that neither the railroad nor the pipeline can be considered to result from or be incident to PWCC's mining activities since a substantial portion of each facility is located well beyond the minesite, the primary function of the facility is to supply coal to a power plant, and, because the facility is not owned or operated by PWCC, it is more economically dependent on the generating station than on the mine. (Decision at 3; see id. at 4, 5.) The Acting Director also noted that weighing against SMCRA regulation is the fact that neither the statute nor the regulations explicitly cover either facility and that regulating them at this point would "reverse long-standing decisions by [OSM] which have been relied upon" by the operator of the facility. Id. at 3, 5.

In their SOR, Appellants contend that the railroad and pipeline should be considered "surface coal mining operations," within the meaning of section 701(28)(B) of SMCRA, 30 U.S.C. § 1291(28)(B) (1994), because they are "facilities 'resulting from or incident to' surface coal mines that [PWCC] operates on Navajo lands." (SOR at 2 (quoting from 30 U.S.C. § 1291(28)(B) (1994)).) They argue that this is so because each facility is "functionally integrated with the mine it serves because it provides the sole means of transporting coal from the mine site directly to the mine's only customer" and serves no other mine, and each is "economically dependent upon the mine they serve because the mine is their sole source of cargo, and thus presumably their sole source of revenue." (SOR at 29, 30.) Appellants distinguish this situation from that of a common carrier, noting that each transportation facility and its respective mine and power plant are a "closed, unified industrial operation." Id. at 14, 16. They argue that to find that the facilities at issue here do not result from or are not incident to the mines, would exclude all such facilities from SMCRA jurisdiction. Since the railroad and pipeline are section 701(28)(B) facilities, Appellants assert that OSM must require PWCC to either amend its existing or proposed mine permits to encompass them or obtain separate permits for them. Failing such amendment or permit, OSM must preclude any further operation of these facilities.

I presume this argument

[1] Section 701(28)(A) of SMCRA provides that "surface mining operations" are "activities conducted on the surface of lands in connection with a surface coal mine," including "excavation * * *, and * * * chemical or physical processing, and the cleaning, concentrating, or other processing or preparation, [and] loading of coal for interstate commerce at or near the mine site." 30 U.S.C. § 1291(28)(A) (1994). Subsection B further provides that such operations include the "areas upon which such activities occur or where such activities disturb the natural land surface." It also states that

> [s]uch areas shall also include any adjacent land the use of which is incidental to any such activities, all lands affected by the construction of new roads or the improvement or use of existing roads to gain access to the site of such activities and for haulage, and excavations, workings, impoundments, dams, ventilation shafts, entryways, refuse banks, dumps, stockpiles, overburden piles, spoil banks, culm banks, tailings, holes or depressions, repair areas, storage areas, processing areas, shipping areas and other areas upon which are sited structures, facilities, or other property or materials on the surface, resulting from or incident to such activities[.]

30 U.S.C. § 1291(28)(B) (1994) (emphasis added). In enacting SMCRA, Congress stated that "surface coal mining operations" thus include "all roads, facilities[,] structures, property, and materials on the surface resulting from or incident to [surface coal mining] activities, such as refuse banks, dumps, culm banks, impoundments and processing wastes." S. Rep. No. 128, 95th Cong., 1st Sess. 98 (1977) (emphasis added).

We find nothing in section 701(28)(B) of SMCRA, or its legislative history, which expressly provides that transportation facilities, especially ones that carry processed coal to a remote point of sale/use, should generally be considered "surface coal mining operations," subject to regulation under SMCRA. Rather, the statute indicates that the point at which the coal is loaded for shipment, following all processing/preparation necessary for marketing and associated transportation, constitutes the last stage of mining and related operations subject to SMCRA, either under section 701(28)(A) or (B). See Ann Lorentz Coal Co. v. OSM, 79 IBLA 34, 43, 91 Interior Dec. 108, 113 (1984). Congress made no specific provision for regulating the transportation of processed coal, even though that activity is itself a "major industrial sector," which encompasses railroads, barges, trucks, and pipelines "that collectively stretch over thousands of miles throughout the nation." (PWCC Answer at 2, 9.) The fact that it did not, strongly indicates that Congress did not intend to regulate the transportation of processed coal under SMCRA, presumably leaving it to regulation pursuant to other Federal and state laws.

highlighted entire

We turn to SMCRA's implementing regulations. When the Department first promulgated regulations in 1979 designed to permanently govern surface coal mining activities, it established general standards for constructing and maintaining transportation facilities other than roads, which were said to include "[r]ailroad loops, spurs, sidings, surface conveyor systems, chutes, aerial tramways, or other transportation facilities." 30 C.F.R. § 816.180 (1979). The Department explained in the preamble to the final rulemaking that the regulation was intended to cover transportation facilities "incident to coal mining operations," which are required for the "[m]ovement of coal, equipment and personnel within the mine plan area." 44 Fed. Reg. 15260, 15261 (Mar. 13, 1979) (emphasis added).

In 1983, the Department defined what constitutes facilities resulting from or incident to surface coal mining activities, termed "support facilities," requiring that they be operated "in accordance with a permit issued for the mine or coal preparation [plant] to which [they are] incident or from which [their] operation results." 30 C.F.R. §§ 701.5 and 816.181 (1983). It said that such facilities "may" include "railroads, surface conveyor systems, chutes, aerial tramways, or other transportation facilities." Id. However, the Department also stated, at the end of the regulation, that "'[r]esulting from or incident to' a[] [surface coal mining] activity connotes an element of proximity to that activity." Id. Further, in the preamble to the final rulemaking, the Department indicated that whether the enumerated transportation facilities could be considered support facilities hinged on whether they did, in fact, result from or were incident to such activities. See 48 Fed. Reg. 20396 (May 5, 1983) ("[T]o be regulated under Section 701(28)(B) a facility must result from or be incident to an activity regulated under Section 701(28)(A)"); National Wildlife Federation (NWF) v. Hodel, 839 F.2d 694, 746 n.80 (D.C. Cir. 1988).

Moreover, the Department particularly stated that it would interpret the regulation "to include all facilities located up to the point of load-out of coal for interstate transport." 48 Fed. Reg. 20397 (May 5, 1983) (emphasis added). Thus, where coal was transported by rail, the regulation "would extend to the loadout facility located at or near the mine site from which run of mine coal is conveyed or trucked to the rail line and loaded," and this same principle would also apply in the case of other modes of transportation, such as trucks, barges, and pipelines. Id. This regulation would have clearly excluded that portion of the railroad and pipeline at issue here, which are located beyond the loadout point.

In 1988, the Department dropped that regulatory definition, leaving the requirement in 30 C.F.R. § 816.181 that "support facilities" be operated under the permit for the individual mine or coal preparation plant to which they were incident or from which their operation resulted. It rejected any categorical exclusion or inclusion in favor of a case-by-case determination of what facilities can properly be regulated under SMCRA, and declined to define what facilities result from or are incident to mining activities. See 53 Fed. Reg. 47380, 47382 (Nov. 22, 1988).

However, in the preamble which accompanied its 1988 rulemaking, the Department provided that OSM would address three factors when deciding whether a facility is properly considered to result from or be incident to surface coal mining activities: (1) whether the facility is geographically proximate to the producing mine; (2) whether the facility is functionally tied to the particular mine in question; and (3) whether the facility is economically dependent upon that particular mine. 53 Fed. Reg. 47379, 47381 (Nov. 22, 1988). The Department noted that the factors of geographic proximity and function had been endorsed by the circuit court in NWF, when it reviewed the propriety of the prior "support facilities" definition in 30 C.F.R. § 701.5 (1983). See 839 F.2d at 765-66.

Interpretation

Appellants assert that this case should be decided by applying the above three factors. (SOR at 8.) The other parties to the case likewise utilize those criteria. See Decision at 1, 3; OSM Answer at 9-10; PWCC Answer at 18; SRP Answer at 14; BHP Answer at 10.

We conclude that, even applying the criteria outlined in the 1988 preamble but never formally adopted by the Department, the railroad and pipeline at issue here do not constitute facilities "resulting from or incident to" regulated surface coal mining activities, within the meaning of section 701(28)(B) of SMCRA.

We agree with OSM that both the railroad and pipeline are not geographically proximate to the surface coal mining activities at issue here, since most of those transportation facilities are located many miles from the Black Mesa/Kayenta Mines. Indeed, 80 percent of the pipeline and railroad is located more than 54 and 16 miles, respectively, from the 2 mines. These facilities do not become geographically proximate because they originate at and traverse a small portion of the mine area that is currently permitted or proposed for permitting. (SOR at 11, 18.) To so hold would render all transportation facilities proximate unless the coal is first transported outside the mine area by other means and then placed into the facility. We do not think this is what the Department intended. Nor is geographic proximity affected by the particular use made of the facilities or, generally, the functional and economic concerns that animate the other criteria. Id.

Next, we conclude that, in order to be considered to "result[] from or [be] incident to" surface coal mining activities which are themselves subject to SMCRA regulation under section 701(28)(A) of SMCRA, within the meaning of 30 U.S.C. § 1291(28)(B) (1994), facilities must be functionally and economically tied to regulated surface coal mining activities, and thus be justifiably also subject to such regulation. This does not mean that the facilities must be actually "involved in excavation, processing or loading coal," i.e., section 701(28)(A) activity. (SRP Answer at 16.) Rather, there must be a direct and meaningful connection to such activity. See United States v. Devil's Hole, Inc., 747 F.2d 895, 897-98 (3d Cir. 1984) (mining waste piles used to recover anthracite silt - "incidental facility"); Paul F. Kuhn, 120 IBLA 1, 30-32, 98 Interior Dec. 231, 246-47 (1991) (natural gas pipeline section relocated from mine area - "incidental facility"). We think that is the clear intent of Congress in expanding the definition of "surface coal mining operations" to include "incidental facilities" and also of the Department when it adopted the relevant criteria. See NWP, 839 F.2d at 743, 744; 53 Fed. Reg. 47379 (Nov. 22, 1988); 48 Fed. Reg. 20393 (May 5, 1983). Indeed, to hold otherwise would bring facilities within the ambit of SMCRA regulation that are not somehow functionally and/or economically tied to regulated surface coal mining activity. We find nothing to indicate that Congress and the Department intended to do so.

At the present time, the railroad and pipeline are functionally tied to and economically dependent on the surface coal mining activities at issue here in the limited sense that they currently serve only to transport all of the coal from the Black Mesa/Kayenta Mines to the final point of use and derive all of their revenues from that service. However, there is no evidence that the two facilities are otherwise functionally tied, in any way, to the actual operation of or the conducting of any particular surface coal mining activity regulated by SMCRA.

As the circuit court instructed in NWF, 839 F.2d at 745, the phrase "resulting from or incident to" requires some type of proximate causation, "[o]therwise, every support facility that could be considered a 'but for' result of a surface coal mining operation would be subject to SMCRA regulation." We conclude that the railroad and pipeline are not functionally tied to any regulated surface coal mining activity, other than by the mere fact that they transport the final product derived from such activity to market. That fact alone does not render the facilities subject to SMCRA regulation, since it would encompass any and all transportation facilities. There is simply no evidence that Congress and the Department intended to apply the "incidental facilities" definition of "surface coal mining operations" in such a broad fashion.

Therefore, we conclude that the Acting Director, OSM, properly held that the BM&LP Railroad and BMP's coal slurry pipeline are not "surface coal mining operations," within the meaning of section 701(28)(B) of SMCRA, and are not subject to the permitting and other requirements of the Act.

To the extent Appellants have raised other arguments not specifically addressed herein, they have been considered and rejected.

Accordingly, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 C.F.R. § 4.1, the Decisions appealed from are affirmed.

John H. Kelly
Administrative Judge

I concur:

R.W. Mullen
Administrative Judge

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Kathleen Clarke
Executive Director
Lowell P. Braxton
Division Director

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801-538-7223 (TDD)

November 29, 2000

Melvin Coonrod, Resident Agent
UtahAmerican Energy, Inc
Environmental Industrial Service.
31 North Main Street
Helper, Utah 84501

Re: Lila Canyon Road, UtahAmerican Energy, Inc., Horse Canyon Mine, C/007/013-SR98(1), Outgoing File

Dear Mr. Coonrod:

As you know the Division has been reviewing your application to permit mine facilities in the Lila Canyon area. A number of questions have been asked regarding the transportation and access routes to the proposed Lila Canyon facilities. Your application indicates that access will be by an existing County road, although very little information is known about this road or is provided in the application. In order for us to better understand the status of the transportation and access corridors and to determine whether or not the road would require permitting action, we need additional information. The following information is typical of what we have asked other mines to provide and will help us in making the required findings. Please provide the information as completely as possible.

A. A legal description of the road right-of-way.

B. Name or numerical designation for the road.

C. Land ownership for the road/right-of-way.

D. Name of the entity responsible for the alignment, construction, maintenance and liability for the road.

E. Name of the entity responsible for environmental permitting of the road.

F. Construction standard for the road, and the entity responsible for attaining this standard.

G. Maintenance schedule for the road.

H. Source of funds for construction and/or maintenance of the road.

I. Examples of similar roads in Carbon and Emery Counties.

J. Will UtahAmerican Energy, Inc. have the ability to deny use of the road?
If yes, please provide a legal description for the portions of the road that are subject to exclusive use by UtahAmerican Energy, Inc. Also, please provide the basis for the exclusive use.

Thank you for your assistance in this matter.

Sincerely,

Daron R. Haddock
Permit Supervisor

drh/sm
cc: Clyde Borrell, VP, UtahAmerican Energy, Inc.
Price Field Office
O:\007013.HOR\FINAL\roadfindSR98(1).wpd

Appendix 7-2
Lila Canyon Mine

Water Monitoring Data
(Horse Canyon Area)

INTERMOUNTAIN POWER AGENCY

ANNUAL HYDROLOGIC MONITORING REPORT

HORSE CANYON MINE
CARBON COUNTY, UTAH
ACT/007/013

INTRODUCTION

This 1997 Annual Hydrologic Monitoring Report for the Intermountain Power Agency (IPA) Horse Canyon Mine, Carbon County, Utah, Permit No. ACT/007/013 is submitted to the Division for their records and as a reference document. This report has been divided into six sections including this introduction. Each of the sections, except the introduction, presents a brief discussion concerning the monitoring results from each sample site and the two UPDES discharge locations. Included with this report are appendices containing the laboratory and field data sheets (Appendix A) and bar graphs illustrating measured flow, conductivity, pH, and concentrations of TDS, total iron, and hardness (Appendix B).

It is important to note that each surface and groundwater site was monitored on a quarterly basis, while the UPDES discharge points are monitored on a monthly basis.

Monitoring Site B-1

This site is located in Horse Canyon Creek downstream of the mine area. This site was visited quarterly. Surface water flow was not observed at this location in 1997.

Monitoring Site HC-1

This site is located upstream of the mine site area on Horse Canyon Creek. Flows varied between a high of 30 gpm in March and a low of 12 gpm in September. Iron (total) was not detected in any water sample. TDS concentration ranged from a low of 870 mg/l to a high of 1470 mg/l (Appendix B).

The pH of the water samples from HC-1 was measured in the field and had a range from nearly neutral at 7.32 in September to slightly alkaline at 7.64 in June. Conductivity was also measured in the field and had a range of a high of 1000 umhos/cm in September to a low of 275 umhos/cm in April.

Monitoring Site RF-1

This site is located upstream of the point where the Little Horse Canyon Road crosses the Right Fork of Horse Canyon. Flows varied between a high of 20 gpm in March and a low of 5 gpm in June. Iron (total) was noted in the April water sample at 10.4 mg/l. This concentration is likely the result of iron carried in the sediment load from spring snowmelt. TDS concentration ranged from a low of 650 mg/l to a high of 880 mg/l (Appendix B).

The pH of the water samples from RF-1 was measured in the field and had a range from nearly neutral at 7.27 to slightly alkaline at 8.15. Conductivity was also measured in the field and had a range of a high of 1100 umhos/cm to a low of 720 umhos/cm.

Monitoring Site RS-2

This monitoring site is Redden Spring. The spring discharges from a sandstone ledge in the bottom of the Right Hand Fork of Horse Canyon. Measured spring flows varied between a high of 12 gpm and a low of 10 gpm. Iron (total) was not detected in the water samples. Typical TDS concentrations for RS-2 samples ranged from 820 mg/l to 1570 mg/l. Hardness concentrations were typically between a low of 361 mg/l and 747 mg/l.

The pH of the water samples from RS-2 was measured in the field and had a range from nearly neutral at 6.3 to slightly alkaline at 7.56. Conductivity was also measured in the field and had a range of a high of 850 umhos/cm to a low of 450 umhos/cm.

UPDES Discharge Points 001A and 002A

Discharge point 001A is located at the outlet structure of Sediment Pond 1 and discharge point 002A is located at the outlet structure of Sedimentation Pond 2. No water was discharged at either point in 1997.

APPENDIX A

LABORATORY AND FIELD DATA SHEETS

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # ~~RS-1~~ RS-2 Redden Spring

Sample Date 6-26-97

Sample Time 1010

Type: Spring X Stream _____ UPDES _____

Sample Collection Point _____

Appearance of Water: Clear X Slightly Cloudy____ Cloudy___ Opaque___

Flow/Depth (gpm) 12 GPM

Water Temperature (C) 10°C

pH 6.30

Specific Conductivity 850

Dissolved Oxygen 5

Comments: AREA AROUND SPRING DISCHARGE HEAVILY DISTURBED BY CATTLE - HAVE NEVER PREVIOUSLY OBSERVED DAMAGE TO THIS EXTE

Sampled by: Leo R. Clark

Laboratory CTEE, HUNTINGTON Date Shipped 6-26-97

Sample ID# _____ Date Results Received _____

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # HC-2

Sample Date N/A 6-26-97 - No Flow

Sample Time 0855

Type: Spring _____ Stream No Flow UPDES _____

Sample Collection Point _____

Appearance of Water: Clear ____ Slightly Cloudy_____ Cloudy___ Opaque____

Flow/Depth (gpm) _____

Water Temperature (C) _____

pH _____

Specific Conductivity _____

Dissolved Oxygen _____

Comments: _____

Sampled by: Leo P. Clark

Laboratory ~~GT&L~~ N/A Date Shipped_____

Sample ID# _____ Date Results Received _____

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # HC-1

Sample Date 6-26-97

Sample Time 0910

Type: Spring _____ Stream X UPDES _____

Sample Collection Point APPROX. CARBON - EMERY CO. LINE - END OF ROAD

Appearance of Water: Clear X Slightly Cloudy____ Cloudy___ Opaque___

Flow/Depth (gpm) 20 GPM

Water Temperature (C) 17°C

pH 7.60

Specific Conductivity 850

Dissolved Oxygen 5

Comments: STREAM BED RECENTLY HEAVILY DISTURBED BY CATTLE MOVEMENT TO RANGE CREEK

Sampled by: Leo R. Clark

Laboratory CT&E, HUNTINGTON Date Shipped 6-26-97

Sample ID# _____ Date Results Received _____

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # RF-1

Sample Date 6-26-97

Sample Time 1045

Type: Spring _____ Stream X UPDES _____

Sample Collection Point APPROX 150' DOWNSTREAM FROM ROAD CROSSING

Appearance of Water: Clear X Slightly Cloudy____ Cloudy___ Opaque___

Flow/Depth (gpm) 5 GPM

Water Temperature (C) 22°c

pH 8.15

Specific Conductivity 1100

Dissolved Oxygen 5

Comments: STREAM FLOWING CLEAR, BUT AREA HEAVILY DISTURBED WITH CATTLE. ALGAE PRESENT

Sampled by: Leo R. Clark

Laboratory CT & E, HUNTINGTON Date Shipped 6-26-97

Sample ID# _____ Date Results Received _____

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TEL: (801) 653-2311
FAX: (801) 653-2436

August 6, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by
LADWP

ID: HC-1

Kind of sample reported to us: Water

Rec'd 1215 hr.
Sampled 0910 hr.

Sample taken at

Sample taken by: Leo Clark

Date sampled: June 26, 1997

Date received: June 26, 1997

FIELD MEASUREMENTS

pH	7.60
DO	5
Flow	20 gpm
Conductivity	850
Turbidity	Clear
Temperature	17.0°C

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17413

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	521	5	mg/l	as HCO_3	SM2320-B	07-08-1997 0800	SC
Alkalinity, Carbonate	<5	5	mg/l	as CO_3	SM2320-B	07-08-1997 0800	SC
Alkalinity, Total	430	5	mg/l	as $CaCO_3$	EPA 310.1	07-08-1997 0800	SC
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	08-05-1997 1315	MK
Anions	24.3	----	meq/l		---------	08-05-1997 1530	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	07-18-1997 0800	MK
Barium, Dissolved	<1	1	mg/l		EPA 208.1	08-05-1997 1400	MK
Boron, Dissolved	0.3	0.1	mg/l		EPA 212.3	07-16-1997 0700	MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	08-05-1997 0845	MK
Calcium, Dissolved	77	1	mg/l		EPA 215.1	08-05-1997 1200	MK
Cations	23.0	----	meq/l		---------	08-05-1997 1530	RJ
Chloride	24	1	mg/l		SM4500-Cl-B	07-23-1997 0830	SC
Chromium, Dissolved	<0.1	0.1	mg/l		EPA 218.1	08-05-1997 1330	MK
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	08-05-1997 0800	MK
Fluoride	0.28	0.01	mg/l		SM4500-F-C	07-24-1997 0800	RJ
Hardness, Total	678	----	mg/l	as $CaCO_3$	SM2340-B	08-05-1997 1530	RJ
Iron, Total	<0.1	0.1	mg/l		EPA 236.1	08-05-1997 1000	MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	08-05-1997 1000	MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	08-05-1997 0915	MK
Magnesium, Dissolved	118	2	mg/l		EPA 242.1	08-05-1997 1230	MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	08-05-1997 1030	MK
Mercury, Dissolved	<0.2	0.2	ug/l		EPA 245.1	07-21-1997 0700	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	08-05-1997 1430	MK
Nickel, Dissolved	<0.1	0.1	mg/l		EPA 249.1	08-05-1997 0830	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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FAX: (801) 653-2436

August 6, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by
LADWP

ID: HC-1

Kind of sample reported to us: Water

Rec'd 1215 hr.
Sampled 0910 hr.

Sample taken at

Sample taken by: Leo Clark

Date sampled: June 26, 1997

Date received: June 26, 1997

FIELD MEASUREMENTS

pH	7.60
DO	5
Flow	20 gpm
Conductivity	850
Turbidity	Clear
Temperature	17.0°C

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17413

ameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
rogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0720 RJ
ogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	07-21-1997 0400 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-27-1997 0700 JC
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	06-25-1997 0730 RJ
Potassium, Dissolved	5	1	mg/l	EPA 258.1	08-05-1997 1045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-18-1997 1130 MK
Sodium, Dissolved	215	2	mg/l	EPA 273.1	08-05-1997 1130 MK
Solids, Total Dissolved	1470	10	mg/l	EPA 160.1	07-02-1997 0700 JC
Sulfate	724	125	mg/l	EPA 375.4	07-16-1997 0730 SC
Sulfide	<1.0	0.1	mg/l	EPA 376.1	07-04-1997 1630 RJ
Zinc, Dissolved	0.03	0.01	mg/l	EPA 289.1	08-05-1997 0815 MK
Cation/Anion Balance	-2.7	----	%		08-05-1997 1530 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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August 6, 1997

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7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by
LADWP

ID: RF-1

Kind of sample reported to us: Water

Rec'd 1215 hr.
Sampled 1045 hr.

Sample taken at

Sample taken by: Leo Clark

Date sampled: June 26, 1997

Date received: June 26, 1997

FIELD MEASUREMENTS

pH	8.15
DO	5
Flow	5 gpm
Conductivity	1100
Turbidity	Clear
Temperature	22.0°C

NOTE:DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17414

·ameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
.alinity, Bicarbonate	513	5	mg/l	as HCO_3	SM2320-B	07-08-1997 0800	SC
linity, Carbonate	13	5	mg/l	as CO_3	SM2320-B	07-08-1997 0800	SC
linity, Total	443	5	mg/l	as $CaCO_3$	EPA 310.1	07-08-1997 0800	SC
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	08-05-1997 1315	MK
Anions	16.9	----	meq/l		---------	08-05-1997 1530	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	07-18-1997 0800	MK
Barium, Dissolved	<1	1	mg/l		EPA 208.1	08-05-1997 1400	MK
Boron, Dissolved	0.4	0.1	mg/l		EPA 212.3	07-16-1997 0700	MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	08-05-1997 0845	MK
Calcium, Dissolved	26	1	mg/l		EPA 215.1	08-05-1997 1200	MK
Cations	14.1	----	meq/l		---------	08-05-1997 1530	RJ
Chloride	17	1	mg/l		SM4500-Cl-B	07-23-1997 0830	SC
Chromium, Dissolved	<0.1	0.1	mg/l		EPA 218.1	08-05-1997 1330	MK
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	08-05-1997 0800	MK
Fluoride	0.27	0.01	mg/l		SM4500-F-C	07-24-1997 0800	RJ
Hardness, Total	328	----	mg/l	as $CaCO_3$	SM2340-B	08-05-1997 1530	RJ
Iron, Total	0.1	0.1	mg/l		EPA 236.1	08-05-1997 1000	MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	08-05-1997 1000	MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	08-05-1997 0915	MK
Magnesium, Dissolved	64	2	mg/l		EPA 242.1	08-05-1997 1230	MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	08-05-1997 1030	MK
Mercury, Dissolved	<0.2	0.2	ug/l		EPA 245.1	07-21-1997 0700	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	08-05-1997 1430	MK
Nickel, Dissolved	<0.1	0.1	mg/l		EPA 249.1	08-05-1997 0830	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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August 6, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by
LADWP

ID: RF-1

Kind of sample reported to us: Water

Rec'd 1215 hr.
Sampled 1045 hr.

Sample taken at

Sample taken by: Leo Clark

Date sampled: June 26, 1997

Date received: June 26, 1997

FIELD MEASUREMENTS

pH	8.15
DO	5
Flow	5 gpm
Conductivity	1100
Turbidity	Clear
Temperature	22.0°C

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17414

ameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
ogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0720	RJ
ogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	07-21-1997 0400	AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-27-1997 0700	JC
Phosphorous, Ortho-PO_4	0.04	0.01	mg/l as P	SM4500-P-E	06-25-1997 0730	RJ
Potassium, Dissolved	3	1	mg/l	EPA 258.1	08-05-1997 1045	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-18-1997 1130	MK
Sodium, Dissolved	172	2	mg/l	EPA 273.1	08-05-1997 1130	MK
Solids, Total Dissolved	880	10	mg/l	EPA 160.1	07-02-1997 0700	JC
Sulfate	366	125	mg/l	EPA 375.4	07-16-1997 0730	SC
Sulfide	<1.0	0.1	mg/l	EPA 376.1	07-04-1997 1630	RJ
Zinc, Dissolved	0.02	0.01	mg/l	EPA 289.1	08-05-1997 0815	MK
Cation/Anion Balance	- 9.1	----	%		08-05-1997 1530	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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TEL: (801) 653-2311
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August 6, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by
LADWP

ID: RS-~~1~~2

Kind of sample reported to us: Water

Rec'd 1215 hr.
Sampled 1010 hr.

Sample taken at

Sample taken by: Leo Clark

Date sampled: June 26, 1997

Date received: June 26, 1997

FIELD MEASUREMENTS

pH	6.3
DO	5
Flow	12 gpm
Conductivity	850
Turbidity	Clear
Temperature	10.0°C

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17412

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	549	5	mg/l	as HCO_3	SM2320-B	07-08-1997 0800	SC
Alkalinity, Carbonate	<5	5	mg/l	as CO_3	SM2320-B	07-08-1997 0800	SC
Alkalinity, Total	450	5	mg/l	as $CaCO_3$	EPA 310.1	07-08-1997 0800	SC
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	08-05-1997 1315	MK
Anions	15.8	----	meq/l		---------	08-05-1997 1530	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	07-18-1997 0800	MK
Barium, Dissolved	<1	1	mg/l		EPA 208.1	08-05-1997 1400	MK
Boron, Dissolved	0.2	0.1	mg/l		EPA 212.3	07-16-1997 0700	MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	08-05-1997 0845	MK
Calcium, Dissolved	44	1	mg/l		EPA 215.1	08-05-1997 1200	MK
Cations	13.7	----	meq/l		---------	08-05-1997 1530	RJ
Chloride	17	1	mg/l		SM4500-Cl-B	07-23-1997 0830	SC
Chromium, Dissolved	<0.1	0.1	mg/l		EPA 218.1	08-05-1997 1330	MK
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	08-05-1997 0800	MK
Fluoride	0.37	0.01	mg/l		SM4500-F-C	07-24-1997 0800	RJ
Hardness, Total	361	----	mg/l	as $CaCO_3$	SM2340-B	08-05-1997 1530	RJ
Iron, Total	<0.1	0.1	mg/l		EPA 236.1	08-05-1997 1000	MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	08-05-1997 1000	MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	08-05-1997 0915	MK
Magnesium, Dissolved	61	2	mg/l		EPA 242.1	08-05-1997 1230	MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	08-05-1997 1030	MK
Mercury, Dissolved	<0.2	0.2	ug/l		EPA 245.1	07-21-1997 0700	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	08-05-1997 1430	MK
Nickel, Dissolved	<0.1	0.1	mg/l		EPA 249.1	08-05-1997 0830	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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August 6, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by
LADWP

ID: RS-~~1~~ 2

Kind of sample reported to us: Water

Rec'd 1215 hr.
Sampled 1010 hr.

Sample taken at

Sample taken by: Leo Clark

Date sampled: June 26, 1997

Date received: June 26, 1997

FIELD MEASUREMENTS

pH	6.3
DO	5
Flow	12 gpm
Conductivity	850
Turbidity	Clear
Temperature	10.0°C

NOTE: DISSOLVED METALS FILTERED AT LAB!

Analysis report no. 59-17412

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	07-22-1997 0720 RJ
Nitrogen, Nitrate-Nitrite	0.3	0.1	mg/l as N	EPA 353.3	07-21-1997 0400 AR
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	06-27-1997 0700 JC
Phosphorous, Ortho-PO_4	0.04	0.01	mg/l as P	SM4500-P-E	06-27-1997 0730 RJ
Potassium, Dissolved	1	1	mg/l	EPA 258.1	08-05-1997 1045 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	07-18-1997 1130 MK
Sodium, Dissolved	149	2	mg/l	EPA 273.1	08-05-1997 1130 MK
Solids, Total Dissolved	870	10	mg/l	EPA 160.1	07-02-1997 0700 JC
Sulfate	303	250	mg/l	EPA 375.4	07-16-1997 0730 SC
Sulfide	<1.0	0.1	mg/l	EPA 376.1	07-04-1997 1630 RJ
Zinc, Dissolved	0.02	0.01	mg/l	EPA 289.1	08-05-1997 0815 MK
Cation/Anion Balance	-7.0	----	%		08-05-1997 1530 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # HC-1

Sample Date 3-27-97

Sample Time 1600

Type: Spring _____ Stream X UPDES _____

Sample Collection Point APPROX. CARBON, EMERY CO. LINE - END OF ROAD

Appearance of Water: Clear ✓ Slightly Cloudy_____ Cloudy___ Opaque____

Flow/Depth (gpm) 30 GPM

Water Temperature (C) 11°C

pH 7.59

Specific Conductivity 275

Dissolved Oxygen 5

Comments: SPRING RUN-OFF UNDERWAY

Sampled by: L. P. CLARK

Laboratory CTEE - HUNTINGTON Date Shipped 3-28-97

Sample ID# HC-1 Date Results Received _____

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # RS-~~1~~ 2 AS

Sample Date 3-27-97

Sample Time 1640

Type: Spring X Stream _____ UPDES _____

Sample Collection Point PIPE DISCHARGE FROM SPRING

Appearance of Water: Clear X Slightly Cloudy____ Cloudy___ Opaque____

Flow/Depth (gpm) 10 GPM

Water Temperature (C) 10°C

pH 7.70

Specific Conductivity 450

Dissolved Oxygen 5

Comments: _____

Sampled by: L. P. CLARK

Laboratory CT&E HUNTINGTON Date Shipped 3-28-97

Sample ID# RS-1 Date Results Received _____

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # HC-2

Sample Date N/A 3-27-97 - NO FLOW

Sample Time CHECKED 1650 & 0830 ON 3-28-97

Type: Spring _____ Stream X UPDES _____

Sample Collection Point _____

Appearance of Water: Clear ____ Slightly Cloudy ____ Cloudy ____ Opaque ____

Flow/Depth (gpm) _____

Water Temperature (C) _____

pH _____

Specific Conductivity _____

Dissolved Oxygen _____

Comments: _____

Sampled by: L. P. CLARK

Laboratory — Date Shipped —

Sample ID# _____ Date Results Received _____

COMMERCIAL TESTING & ENGINEERING CO.

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
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April 30, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Kind of sample reported to us: Water

Sample taken at:

Sample taken by: Leo Clark

Date sampled: March 27, 1997

Date received: March 28, 1997

Sample identification by LADWP

ID: RS-~~1~~2
Rec'd 1500 hr.
Sampled 1640 hr.

FIELD MEASUREMENTS

pH	7.70
DO	5
Flow	10 GPM
Conductivity	450
Turbidity	Clear
Temperature	10.0°C

NOTE: Dissolved metals filtered at lab!
NOTE: Nitrate & Ortho Phos. received to late to analyze before time expired!

Analysis report no. 59-17080

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	542	5	mg/l	as HCO_3	SM2320-B	04-01-1997 1100 SW
Alkalinity, Carbonate	<5	5	mg/l	as CO_3	SM2320-B	04-01-1997 1100 SW
Alkalinity, Total	444	5	mg/l	as $CaCO_3$	EPA 310.1	04-01-1997 1100 SW
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	04-04-1997 1245 MK
Anions	14.7	----	meq/l		---------	04-08-1997 0815 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	04-15-1997 0830 MK
Barium, Dissolved	<1	1	mg/l		EPA 208.1	04-04-1997 1330 MK
Boron, Dissolved	0.3	0.1	mg/l		EPA 212.3	04-14-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	04-04-1997 0815 MK
Calcium, Dissolved	44	1	mg/l		EPA 215.1	04-04-1997 1130 MK
Cations	14.4	----	meq/l		---------	04-08-1997 0815 RJ
Chloride	17	1	mg/l		SM4500-Cl-B	04-01-1997 0800 SW
Chromium, Dissolved	<0.1	0.1	mg/l		EPA 218.1	04-04-1997 1300 MK
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	04-04-1997 0730 MK
Fluoride	0.52	0.01	mg/l		SM4500-F-C	04-24-1997 1130 RJ
Hardness, Total	382	----	mg/l	as $CaCO_3$	SM2340-B	04-08-1997 0815 RJ
Iron, Total	<0.1	0.5	mg/l		EPA 236.1	04-04-1997 0930 MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	04-04-1997 0930 MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	04-04-1997 0845 MK
Magnesium, Dissolved	66	1	mg/l		EPA 242.1	04-04-1997 1145 MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	04-04-1997 1000 MK
Mercury, Dissolved	<0.2	0.2	ug/l		EPA 245.1	04-01-1997 0700 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	04-04-1997 1345 MK
Nickel, Dissolved	<0.1	0.1	mg/l		EPA 249.1	04-04-1997 0800 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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April 30, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Kind of sample reported to us: Water

Sample taken at

Sample taken by: Leo Clark

Date sampled: March 27, 1997

Date received: March 28, 1997

Sample identification by LADWP

ID: RS-~~1~~2
Rec'd 1500 hr.
Sampled 1640 hr.

FIELD MEASUREMENTS

pH	7.70
DO	5
Flow	10 GPM
Conductivity	450
Turbidity	Clear
Temperature	10.0°C

NOTE: Dissolved metals filtered at lab!
NOTE: Nitrate & Ortho Phos. received to late to analyze before time expired!

Analysis report no. 59-17080

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	04-07-1997 0800	SW
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l as N	EPA 353.3	04-21-1997 0500	JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	03-31-1997 0830	JC
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	03-31-1997 0830	JC
Potassium, Dissolved	1	1	mg/l	EPA 258.1	04-04-1997 1030	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	04-15-1997 1100	MK
Sodium, Dissolved	156	2	mg/l	EPA 273.1	04-04-1997 1045	MK
Solids, Total Dissolved	820	10	mg/l	EPA 160.1	04-03-1997 0700	JC
Sulfate	257	50	mg/l	EPA 375.4	04-02-1997 0700	SW
Sulfide	<1.0	1.0	mg/l	EPA 376.1	04-02-1997 1015	RJ
Zinc, Dissolved	0.04	0.01	mg/l	EPA 289.1	04-04-1997 0745	MK
Cation/Anion Balance	-0.9	----	%		04-08-1997 0815	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory RJ

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April 30, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Kind of sample reported to us: Water

Sample taken at:

Sample taken by: Leo Clark

Date sampled: March 27, 1997

Date received: March 28, 1997

Sample identification by LADWP

ID: HC-1
Rec'd 1500 hr.
Sampled 1600 hr.

FIELD MEASUREMENTS

pH	7.59
DO	5
Flow	30 GPM
Conductivity	275
Turbidity	Murky
Temperature	11.0°C

NOTE: Dissolved metals filtered at lab!
NOTE: Nitrate & Ortho Phos. received to late before time expired!

Analysis report no. 59-17081

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	448	5	mg/l	as HCO_3	SM2320-B	04-01-1997 1100 SW
Alkalinity, Carbonate	<5	5	mg/l	as CO_3	SM2320-B	04-01-1997 1100 SW
Alkalinity, Total	367	5	mg/l	as $CaCO_3$	EPA 310.1	04-01-1997 1100 SW
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	04-04-1997 1245 MK
Anions	20.4	----	meq/l		---------	04-08-1997 0815 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	04-15-1997 0830 MK
Barium, Dissolved	<1	1	mg/l		EPA 208.1	04-04-1997 1330 MK
Boron, Dissolved	0.3	0.1	mg/l		EPA 212.3	04-14-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	04-04-1997 0815 MK
Calcium, Dissolved	80	1	mg/l		EPA 215.1	04-04-1997 1130 MK
Cations	20.6	----	meq/l		---------	04-08-1997 0815 RJ
Chloride	22	1	mg/l		SM4500-Cl-B	04-01-1997 0800 SW
Chromium, Dissolved	<0.1	0.1	mg/l		EPA 218.1	04-04-1997 1300 MK
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	04-04-1997 0730 MK
Fluoride	0.54	0.01	mg/l		SM4500-F-C	04-24-1997 1130 RJ
Hardness, Total	624	----	mg/l	as $CaCO_3$	SM2340-B	04-08-1997 0815 RJ
Iron, Total	0.7	0.5	mg/l		EPA 236.1	04-04-1997 0930 MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	04-04-1997 0930 MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	04-04-1997 0845 MK
Magnesium, Dissolved	103	5	mg/l		EPA 242.1	04-04-1997 1145 MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	04-04-1997 1000 MK
Mercury, Dissolved	<0.2	0.2	ug/l		EPA 245.1	04-01-1997 0700 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	04-04-1997 1345 MK
Nickel, Dissolved	<0.1	0.1	mg/l		EPA 249.1	04-04-1997 0800 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory

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April 30, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Kind of sample reported to us: Water

Sample taken at:

Sample taken by: Leo Clark

Date sampled: March 27, 1997

Date received: March 28, 1997

Sample identification by LADWP

ID: HC-1
Rec'd 1500 hr.
Sampled 1600 hr.

FIELD MEASUREMENTS

pH	7.59
DO	5
Flow	30 GPM
Conductivity	275
Turbidity	Murky
Temperature	11.0°C

NOTE: Dissolved metals filtered at lab!
NOTE: Nitrate & Ortho Phos. received to late before time expired!

Analysis report no. 59-17081

'ameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
ogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	04-07-1997 0800	SW
ogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	04-21-1997 0500	JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	03-31-1997 0830	JC
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	03-31-1997 0830	JC
Potassium, Dissolved	5	1	mg/l	EPA 258.1	04-04-1997 1030	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	04-15-1997 1100	MK
Sodium, Dissolved	184	5	mg/l	EPA 273.1	04-04-1997 1045	MK
Solids, Total Dissolved	1310	10	mg/l	EPA 160.1	04-03-1997 0700	JC
Sulfate	596	250	mg/l	EPA 375.4	04-02-1997 0700	SW
Sulfide	<1.0	1.0	mg/l	EPA 376.1	04-02-1997 1015	RJ
Zinc, Dissolved	0.03	0.01	mg/l	EPA 289.1	04-04-1997 0745	MK
Cation/Anion Balance	0.6	----	%		04-08-1997 0815	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory RJ

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April 30, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Kind of sample reported to us: Water

Sample taken at

Sample taken by: Leo Clark

Date sampled: March 27, 1997

Date received: March 28, 1997

Sample identification by LADWP

ID: RF-1
Rec'd 1500 hr.
Sampled 1515 hr.

FIELD MEASUREMENTS

pH	7.27
DO	6
Flow	20 GPM
Conductivity	720
Turbidity	H1
Temperature	12.0°C

NOTE:Dissolved metals filtered at lab!
NOTE:Nitrate & Ortho Phos. received to late to analyze before time expired!

Analysis report no. 59-17079

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst
Alkalinity, Bicarbonate	407	5	mg/l	as HCO_3	SM2320-B	04-04-1997 1000 SW
Alkalinity, Carbonate	<5	5	mg/l	as CO_3	SM2320-B	04-04-1997 1000 SW
Alkalinity, Total	344	5	mg/l	as $CaCO_3$	EPA 310.1	04-04-1997 1000 SW
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	04-04-1997 1245 MK
Anions	11.2	----	meq/l		---------	04-08-1997 1120 RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	04-15-1997 0830 MK
Barium, Dissolved	<1	1	mg/l		EPA 208.1	04-04-1997 1330 MK
Boron, Dissolved	0.2	0.1	mg/l		EPA 212.3	04-14-1997 0700 MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	04-04-1997 0815 MK
Calcium, Dissolved	35	1	mg/l		EPA 215.1	04-04-1997 1130 MK
Cations	10.1	----	meq/l		---------	04-08-1997 1120 RJ
Chloride	14	1	mg/l		SM4500-Cl-B	04-01-1997 0800 SW
Chromium, Dissolved	<0.1	0.1	mg/l		EPA 218.1	04-04-1997 1300 MK
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	04-04-1997 0730 MK
Fluoride	0.49	0.01	mg/l		SM4500-F-C	04-24-1997 1130 RJ
Hardness, Total	264	----	mg/l	as $CaCO_3$	SM2340-B	04-08-1997 1120 RJ
Iron, Total	10.4	0.5	mg/l		EPA 236.1	04-04-1997 0930 MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	04-04-1997 0930 MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	04-04-1997 0845 MK
Magnesium, Dissolved	43	1	mg/l		EPA 242.1	04-04-1997 1145 MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	04-04-1997 1000 MK
Mercury, Dissolved	<0.2	0.2	ug/l		EPA 245.1	04-01-1997 0700 MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	04-04-1997 1345 MK
Nickel, Dissolved	<0.1	0.1	mg/l		EPA 249.1	04-04-1997 0800 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory

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April 30, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Kind of sample reported to us: Water

Sample taken at

Sample taken by: Leo Clark

Date sampled: March 27, 1997

Date received: March 28, 1997

Sample identification by LADWP

ID: RF-1
Rec'd 1500 hr.
Sampled 1515 hr.

FIELD MEASUREMENTS

pH	7.27
DO	6
Flow	20 GPM
Conductivity	720
Turbidity	H1
Temperature	12.0°C

NOTE: Dissolved metals filtered at lab!
NOTE: Nitrate & Ortho Phos. received to late to analyze before time expired!

Analysis report no. 59-17079

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
Nitrogen, Ammonia	0.2	0.5	mg/l as N	EPA 350.3	04-07-1997 0800	SW
Nitrogen, Nitrate-Nitrite	0.1	0.1	mg/l as N	EPA 353.3	04-21-1997 0500	JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	03-31-1997 0830	JC
Phosphorous, Ortho-PO_4	0.03	0.01	mg/l as P	SM4500-P-E	03-31-1997 0830	JC
Potassium, Dissolved	2	1	mg/l	EPA 258.1	04-04-1997 1030	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	04-15-1997 1100	MK
Sodium, Dissolved	109	1	mg/l	EPA 273.1	04-04-1997 1045	MK
Solids, Total Dissolved	650	10	mg/l	EPA 160.1	04-03-1997 0700	JC
Sulfate	198	50	mg/l	EPA 375.4	04-02-1997 0700	SW
Sulfide	<1.0	1.0	mg/l	EPA 376.1	04-04-1997 1015	RJ
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	04-04-1997 0745	MK
Cation/Anion Balance	-5.3	----	%		04-08-1997 1120	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Huntington Laboratory

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # HC-1

Sample Date 9-28-97

Sample Time 1325

Type: Spring _____ Stream X UPDES _____

Sample Collection Point APPROX. CARBON-EMERY CO. LINE - END OF ROAD

Appearance of Water: Clear X Slightly Cloudy____ Cloudy___ Opaque____

Flow/Depth (gpm) 12 GPM

Water Temperature (C) 19°C

pH 7.32

Specific Conductivity 1000

Dissolved Oxygen 4

Comments: _____

Sampled by: L. P. CLARK

Laboratory CT&E, HUNTINGTON, UT Date Shipped 9-29-97

Sample ID# HC-1 Date Results Received REPORT DATED 11-4-97

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # RF 1

Sample Date 9-28-97

Sample Time 1410

Type: Spring _____ Stream X UPDES _____

Sample Collection Point APPROX 150' DOWNSTREAM FROM ROAD CROSSING

Appearance of Water: Clear ____ Slightly Cloudy ____ Cloudy X Opaque ____

Flow/Depth (gpm) 6 GPM

Water Temperature (C) 21°C

pH 7.6

Specific Conductivity 1060

Dissolved Oxygen 4

Comments: STREAM FLOW HAS BEEN PRESENT AT EVERY INSPECTION THROUGHOUT SPRING, SUMMER, FALL

Sampled by: L.P. CLARK

Laboratory CTEE, HUNTINGTON Date Shipped 9-29-97

Sample ID# RF-1 Date Results Received REPORT DATED 11-13-97

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # RS-~~1~~2 TAS REDDEN SPRING

Sample Date 9-28-97

Sample Time 1450

Type: Spring X Stream _____ UPDES _____

Sample Collection Point PIPE DISCHARGE FROM SPRING

Appearance of Water: Clear X Slightly Cloudy____ Cloudy___ Opaque___

Flow/Depth (gpm) 12 GPM

Water Temperature (C) 9°C

pH 7.56

Specific Conductivity 750

Dissolved Oxygen 5

Comments: NO EVIDENCE OF CATTLE IN CANYON FOR SOME TIME -

Sampled by: L. P. CLARK

Laboratory CT&E, HUNTINGTON, UT Date Shipped_____

Sample ID# RS-1 Date Results Received LAB REPORT DATED 11-4-97

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # HC-2

Sample Date N/A - No FLOW - 9-28-97

Sample Time — 1530

Type: Spring _____ Stream _____ UPDES _____

Sample Collection Point _____

Appearance of Water: Clear ____ Slightly Cloudy ____ Cloudy ____ Opaque ____

Flow/Depth (gpm) _____

Water Temperature (C) _____

pH _____

Specific Conductivity _____

Dissolved Oxygen _____

Comments: CHECKED FOR FLOW - NONE PRESENT

Sampled by: L. P. CLARK -

Laboratory _____ Date Shipped _____

Sample ID# _____ Date Results Received _____

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FAX: (801) 653-2436

November 4, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by
LADWP

ID:HC-1

Kind of sample reported to us: Water

Sample taken at

Sample taken by: Leo Clark

Date sampled: September 28, 1997

Date received: September 29, 1997

Rec'd 0820 hr.
Sampled 1325 hr.

FIELD MEASUREMENTS

pH	7.32
DO	4
Flow	12 GPM
Conductivity	1000
Turbidity	CLEAR
Temperature	19°C

Note:Dissolved metals filtered at lab!

Analysis report no. 59-17823

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	530	5	mg/l	as HCO_3	SM2320-B	09-30-1997 1200	SC
Alkalinity, Carbonate	10	5	mg/l	as CO_3	SM2320-B	09-30-1997 1200	SC
Alkalinity, Total	451	5	mg/l	as $CaCO_3$	EPA 310.1	09-30-1997 1200	SC
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	10-07-1997 0145	MK
Anions	15.7	----	meq/l		---------	10-08-1997 0900	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	10-02-1997 0230	MK
Barium, Dissolved	<1	1	mg/l		EPA 208.1	10-07-1997 0230	MK
Boron, Dissolved	0.2	0.1	mg/l		EPA 212.3	10-07-1997 1930	MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	10-06-1997 0715	MK
Calcium, Dissolved	35	1	mg/l		EPA 215.1	10-07-1997 0030	MK
Cations	14.1	----	meq/l		---------	10-08-1997 0900	RJ
Chloride	18	1	mg/l		SM4500-Cl-B	10-02-1997 1400	SC
Chromium, Dissolved	<0.1	0.1	mg/l		EPA 218.1	10-07-1997 0200	MK
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	10-06-1997 0600	MK
Fluoride	0.10	0.01	mg/l		SM4500-F-C	10-22-1997 0800	SC
Hardness, Total	343	----	mg/l	as $CaCO_3$	SM2340-B	10-08-1997 0900	RJ
Iron, Total	2.1	0.1	mg/l		EPA 236.1	10-06-1997 2245	MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	10-06-1997 2245	MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	10-06-1997 0730	MK
Magnesium, Dissolved	62	1	mg/l		EPA 242.1	10-07-1997 0100	MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	10-06-1997 2315	MK
Mercury, Dissolved	<0.2	0.2	ug/l		EPA 245.1	09-29-1997 2230	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	10-07-1997 0245	MK
Nickel, Dissolved	<0.1	0.1	mg/l		EPA 249.1	10-06-1997 0645	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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November 4, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by LADWP

ID:HC-1

Kind of sample reported to us: Water

Sample taken at

Sample taken by: Leo Clark

Date sampled: September 28, 1997

Date received: September 29, 1997

Rec'd 0820 hr.
Sampled 1325 hr.

FIELD MEASUREMENTS

pH	7.32
DO	4
Flow	12 GPM
Conductivity	1000
Turbidity	CLEAR
Temperature	19°C

Note:Dissolved metals filtered at lab!

Analysis report no. 59-17823

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst	
rogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-20-1997 0930	RJ
rogen, Nitrate-Nitrite	0.1	0.1	mg/l as N	EPA 353.3	10-09-1997 0700	JC
ogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-30-1997 0830	JC
& Grease	<2	2	mg/l	SM5520-B	10-23-1997 0700	JC
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-30-1997 0730	JC
Potassium, Dissolved	2	1	mg/l	EPA 258.1	10-06-1997 2330	MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	10-03-1997 0145	MK
Sodium, Dissolved	165	2	mg/l	EPA 273.1	10-07-1997 0000	MK
olids, Total Dissolved	870	10	mg/l	EPA 160.1	09-29-1997 0700	JC
Sulfate	298	125	mg/l	EPA 375.4	10-07-1997 1210	SC
Sulfide	5.4	0.1	mg/l	EPA 376.1	10-03-1997 1115	RJ
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	10-06-1997 0630	MK
ation/Anion Balance	-5.7	----	%		10-08-1997 0900	RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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November 13, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Kind of sample reported to us: Water

Sample taken at:

Sample taken by: Leo Clark

Date sampled: September 28, 1997

Date received: September 29, 1997

Sample identification by LADWP

ID:RF-1
Rec'd 0820 hr.
Sampled 1410 hr.

FIELD MEASUREMENTS

pH	7.6
DO	4
Flow	6 GPM
Conductivity	1060
Turbidity	MURKY
Temperature	21°C

NOTE: Dissolved metals filtered at lab
NOTE: Sulfate expired when analyzed due to rerun for charge balance

Analysis report no. 59-17824

Parameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
Alkalinity, Bicarbonate	563	5	mg/l	as HCO_3	SM2320-B	09-30-1997 1200	SC
Alkalinity, Carbonate	<5	5	mg/l	as CO_3	SM2320-B	09-30-1997 1200	SC
Alkalinity, Total	461	5	mg/l	as $CaCO_3$	EPA 310.1	09-30-1997 1200	SC
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	10-07-1997 0145	MK
Anions	14.3	----	meq/l		---------	11-12-1997 1400	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	10-02-1997 0230	MK
Barium, Dissolved	<1	1	mg/l		EPA 208.1	10-07-1997 0230	MK
Boron, Dissolved	0.1	0.1	mg/l		EPA 212.3	10-07-1997 1930	MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	10-06-1997 0715	MK
Calcium, Dissolved	45	1	mg/l		EPA 215.1	10-07-1997 0030	MK
Cations	14.1	----	meq/l		---------	11-12-1997 1400	RJ
Chloride	17	1	mg/l		SM4500-Cl-B	10-02-1997 1400	SC
Chromium, Dissolved	<0.1	0.1	mg/l		EPA 218.1	10-07-1997 0200	MK
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	10-06-1997 0600	MK
Fluoride	<0.10	0.01	mg/l		SM4500-F-C	10-22-1997 0800	SC
Hardness, Total	364	----	mg/l	as $CaCO_3$	SM2340-B	11-12-1997 1400	RJ
Iron, Total	<0.1	0.1	mg/l		EPA 236.1	10-06-1997 2245	MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	10-06-1997 2245	MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	10-06-1997 0730	MK
Magnesium, Dissolved	61	1	mg/l		EPA 242.1	10-07-1997 0100	MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	10-06-1997 2315	MK
Mercury, Dissolved	<0.2	0.2	ug/l		EPA 245.1	09-29-1997 2230	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	10-07-1997 0245	MK
Nickel, Dissolved	<0.1	0.1	mg/l		EPA 249.1	10-06-1997 0645	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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November 13, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Kind of sample reported to us: Water

Sample taken at:

Sample taken by: Leo Clark

Date sampled: September 28, 1997

Date received: September 29, 1997

Sample identification by LADWP

ID:RF-1
Rec'd 0820 hr.
Sampled 1410 hr.

FIELD MEASUREMENTS

pH	7.6
DO	4
Flow	6 GPM
Conductivity	1060
Turbidity	MURKY
Temperature	21°C

NOTE: Dissolved metals filtered at lab
NOTE: Sulfate expired when analyzed due to rerun for charge balance

Analysis report no. 59-17824

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-20-1997 0930 RJ
Nitrogen, Nitrate-Nitrite	0.2	0.1	mg/l as N	EPA 353.3	10-09-1997 0700 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-30-1997 0830 JC
Oil & Grease	<2	2	mg/l	SM5520-B	10-23-1997 0700 JC
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-30-1997 0730 JC
Potassium, Dissolved	<1	1	mg/l	EPA 258.1	10-06-1997 2330 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	10-03-1997 0145 MK
Sodium, Dissolved	157	1	mg/l	EPA 273.1	10-07-1997 0000 MK
Solids, Total Dissolved	830	10	mg/l	EPA 160.1	09-29-1997 0700 JC
Sulfate	222	1	mg/l	EPA 375.4	11-12-1997 0900 SC
Sulfide	<1.0	0.1	mg/l	EPA 376.1	10-03-1997 1115 RJ
Zinc, Dissolved	0.03	0.01	mg/l	EPA 289.1	10-06-1997 0630 MK
Cation/Anion Balance	-0.8	----	%		11-12-1997 1400 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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October 30, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by
LADWP

ID:RS-2

Kind of sample reported to us: Water

Sample taken at

Sample taken by: Leo Clark

Date sampled: September 28, 1997

Date received: September 29, 1997

Rec'd 0820 hr.
Sampled 1450 hr.

FIELD MEASUREMENTS

pH	7.56
DO	5
Flow	12 GPM
Conductivity	750
Turbidity	CLEAR
Temperature	9°C

Dissolved metals filtered at lab!

Analysis report no. 59-17825

ameter	Result	MRL	Units		Method	Analyzed Date/Time/Analyst	
alinity, Bicarbonate	518	5	mg/l	as HCO_3	SM2320-B	09-30-1997 1200	SC
linity, Carbonate	<5	5	mg/l	as CO_3	SM2320-B	09-30-1997 1200	SC
linity, Total	425	5	mg/l	as $CaCO_3$	EPA 310.1	09-30-1997 1200	SC
Aluminum, Dissolved	<1	1	mg/l		EPA 202.1	10-07-1997 0145	MK
Anions	27.2	----	meq/l		---------	10-08-1997 0900	RJ
Arsenic, Dissolved	<0.01	0.01	mg/l		EPA 206.2	10-02-1997 0230	MK
Barium, Dissolved	<1	1	mg/l		EPA 208.1	10-07-1997 0230	MK
Boron, Dissolved	0.3	0.1	mg/l		EPA 212.3	10-07-1997 1930	MK
Cadmium, Dissolved	<0.01	0.01	mg/l		EPA 213.1	10-06-1997 0715	MK
Calcium, Dissolved	103	1	mg/l		EPA 215.1	10-07-1997 0030	MK
Cations	24.6	----	meq/l		---------	10-08-1997 0900	RJ
Chloride	29	1	mg/l		SM4500-Cl-B	10-02-1997 1400	SC
Chromium, Dissolved	<0.1	0.1	mg/l		EPA 218.1	10-07-1997 0200	MK
Copper, Dissolved	<0.1	0.1	mg/l		EPA 220.1	10-06-1997 0600	MK
Fluoride	<0.10	0.01	mg/l		SM4500-F-C	10-22-1997 0800	SC
Hardness, Total	747	----	mg/l	as $CaCO_3$	SM2340-B	10-08-1997 0900	RJ
Iron, Total	<0.1	0.1	mg/l		EPA 236.1	10-06-1997 2245	MK
Iron, Dissolved	<0.1	0.1	mg/l		EPA 236.1	10-06-1997 2245	MK
Lead, Dissolved	<0.1	0.1	mg/l		EPA 239.1	10-06-1997 0730	MK
Magnesium, Dissolved	119	2	mg/l		EPA 242.1	10-07-1997 0100	MK
Manganese, Dissolved	<0.1	0.1	mg/l		EPA 243.1	10-06-1997 2315	MK
Mercury, Dissolved	<0.2	0.2	ug/l		EPA 245.1	09-29-1997 2230	MK
Molybdenum, Dissolved	<0.1	0.1	mg/l		EPA 246.1	10-07-1997 0245	MK
Nickel, Dissolved	<0.1	0.1	mg/l		EPA 249.1	10-06-1997 0645	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

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October 30, 1997

LADWP-EARTHFAX ENGINEERING
7324 SO. UNION PARK AVENUE
SUITE 100
MIDVALE, UTAH 84047
CHRIS HANSEN

Sample identification by
LADWP

ID:RS-2

Kind of sample reported to us: Water

Sample taken at

Sample taken by: Leo Clark

Date sampled: September 28, 1997

Date received: September 29, 1997

Rec'd 0820 hr.
Sampled 1450 hr.

FIELD MEASUREMENTS

pH	7.56
DO	5
Flow	12 GPM
Conductivity	750
Turbidity	CLEAR
Temperature	9°C

Dissolved metals filtered at lab!

Analysis report no. 59-17825

Parameter	Result	MRL	Units	Method	Analyzed Date/Time/Analyst
Nitrogen, Ammonia	<0.5	0.5	mg/l as N	EPA 350.3	10-20-1997 0930 RJ
Nitrogen, Nitrate-Nitrite	<0.1	0.1	mg/l as N	EPA 353.3	10-09-1997 0700 JC
Nitrogen, Nitrite	<0.01	0.01	mg/l as N	EPA 354.1	09-30-1997 0830 JC
Phosphorous, Ortho-PO_4	0.02	0.01	mg/l as P	SM4500-P-E	09-30-1997 0730 JC
Potassium, Dissolved	7	1	mg/l	EPA 258.1	10-06-1997 2330 MK
Selenium, Dissolved	<0.01	0.01	mg/l	EPA 270.2	10-03-1997 0145 MK
Sodium, Dissolved	217	2	mg/l	EPA 273.1	10-07-1997 0000 MK
Solids, Total Dissolved	1570	10	mg/l	EPA 160.1	09-29-1997 0700 JC
Sulfate	859	250	mg/l	EPA 375.4	10-07-1997 1210 SC
Sulfide	<1.0	0.1	mg/l	EPA 376.1	10-03-1997 1115 RJ
Zinc, Dissolved	0.01	0.01	mg/l	EPA 289.1	10-06-1997 0630 MK
Cation/Anion Balance	5.1	----	%		10-08-1997 0900 RJ

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Huntington Laboratory

MEMBER ACIL

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # HC-1

Sample Date N/A - 4TH Q, DECEMBER, 1997, NOT ACCESSABLE, SNOW & ICE

Sample Time " " " " " " " "

Type: Spring _____ Stream X UPDES _____

Sample Collection Point NOT ACCESSABLE - APPROX. CARBON-EMERY COUNTY LINE - END OF ROAD

Appearance of Water: Clear ____ Slightly Cloudy ____ Cloudy ____ Opaque ____

Flow/Depth (gpm) _____

Water Temperature (C) _____

pH _____

Specific Conductivity _____

Dissolved Oxygen _____

Comments: NOT SAMPLED DUE TO SNOW & ICE

Sampled by: REPORTED BY: L. PAUL CLARK

Laboratory _____ Date Shipped N/A

Sample ID# N/A Date Results Received N/A

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # RF - 1

Sample Date N/A - 4TH Q, DECEMBER, 1997, NOT ACCESSABLE, SNOW & ICE

Sample Time " " " " " " " " "

Type: Spring _____ Stream X UPDES _____

Sample Collection Point NOT ACCESSABLE - APPROX 150' DOWNSTREAM FROM ROAD CROSSING

Appearance of Water: Clear ____ Slightly Cloudy ____ Cloudy ____ Opaque ____

Flow/Depth (gpm) _____

Water Temperature (C) _____

pH _____

Specific Conductivity _____

Dissolved Oxygen _____

Comments: NOT SAMPLED DUE TO SNOW & ICE

Sampled by: REPORTED BY. L. PAUL CLARK

Laboratory _____ Date Shipped N/A

Sample ID# N/A Date Results Received N/A

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # RS-X2 REDDEN SPRING TS

Sample Date N/A - 4TH Q, DECEMBER 1997, NOT ACCESSABLE, SNOW & ICE.

Sample Time " " " " " " " "

Type: Spring _____ Stream _____ UPDES _____

Sample Collection Point _____

Appearance of Water: Clear ____ Slightly Cloudy_____ Cloudy___ Opaque____

Flow/Depth (gpm) _____

Water Temperature (C) _____

pH _____

Specific Conductivity _____

Dissolved Oxygen _____

Comments: _____

_____

Sampled by: _____

Laboratory _____ Date Shipped_____

Sample ID# _____ Date Results Received _____

INTERMOUNTAIN POWER AGENCY
HORSE CANYON MINE

WATER MONITORING FORM

PERMIT # ACT/007/013

Station # HC-2

Sample Date N/A - NO FLOW DURING 4TH Q, 1997

Sample Time N/A

Type: Spring _____ Stream X UPDES _____

Sample Collection Point _____

Appearance of Water: Clear ____ Slightly Cloudy ____ Cloudy ____ Opaque ____

Flow/Depth (gpm) _____

Water Temperature (C) _____

pH _____

Specific Conductivity _____

Dissolved Oxygen _____

Comments: NO FLOW IN HORSE CANYON WASH AT THIS POINT DURING 4TH Q. '98

Sampled by: L. PAUL CLARK

Laboratory N/A Date Shipped N/A

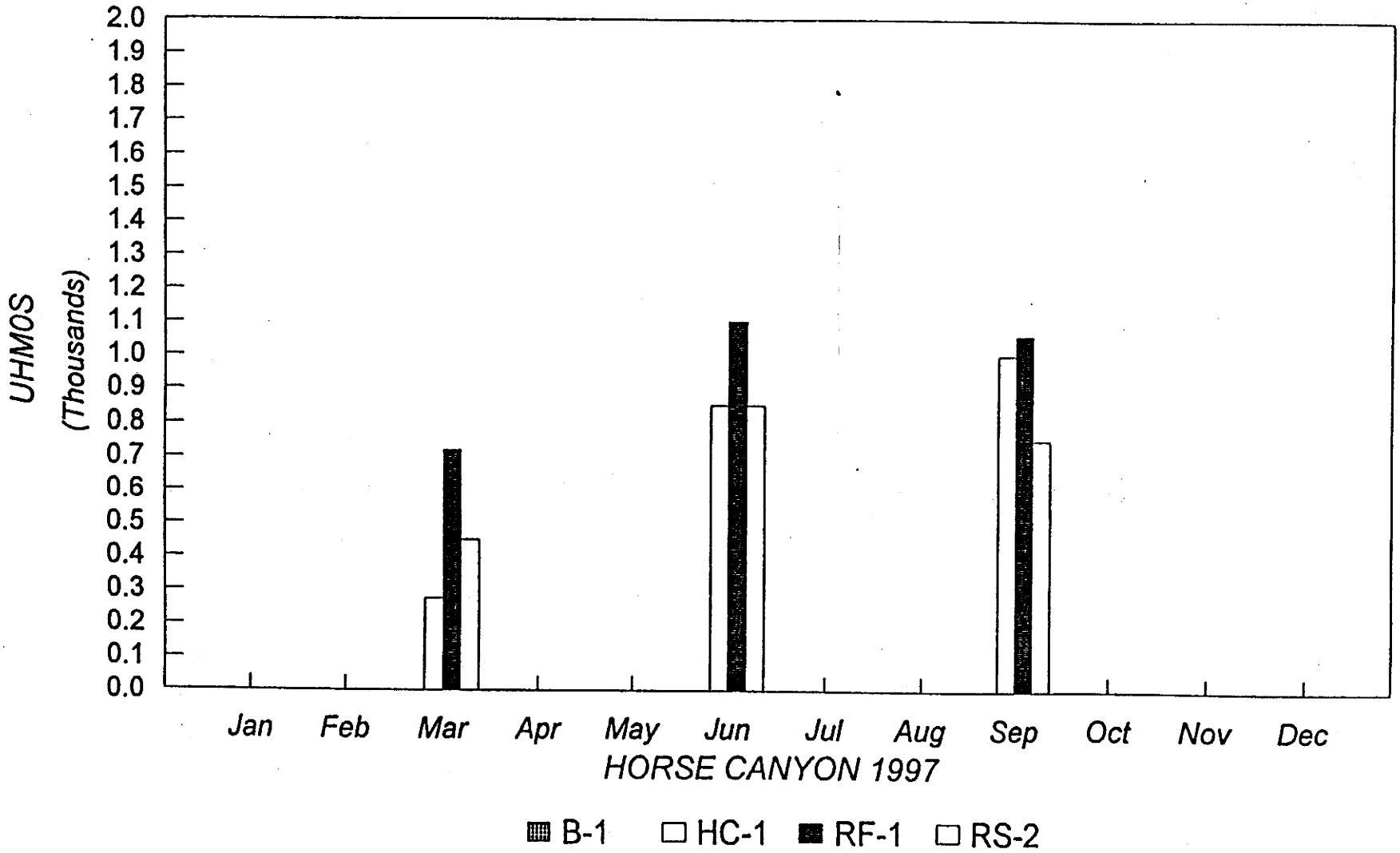
Sample ID# N/A Date Results Received N/A

APPENDIX B

BAR GRAPHS AND SPREADSHEETS

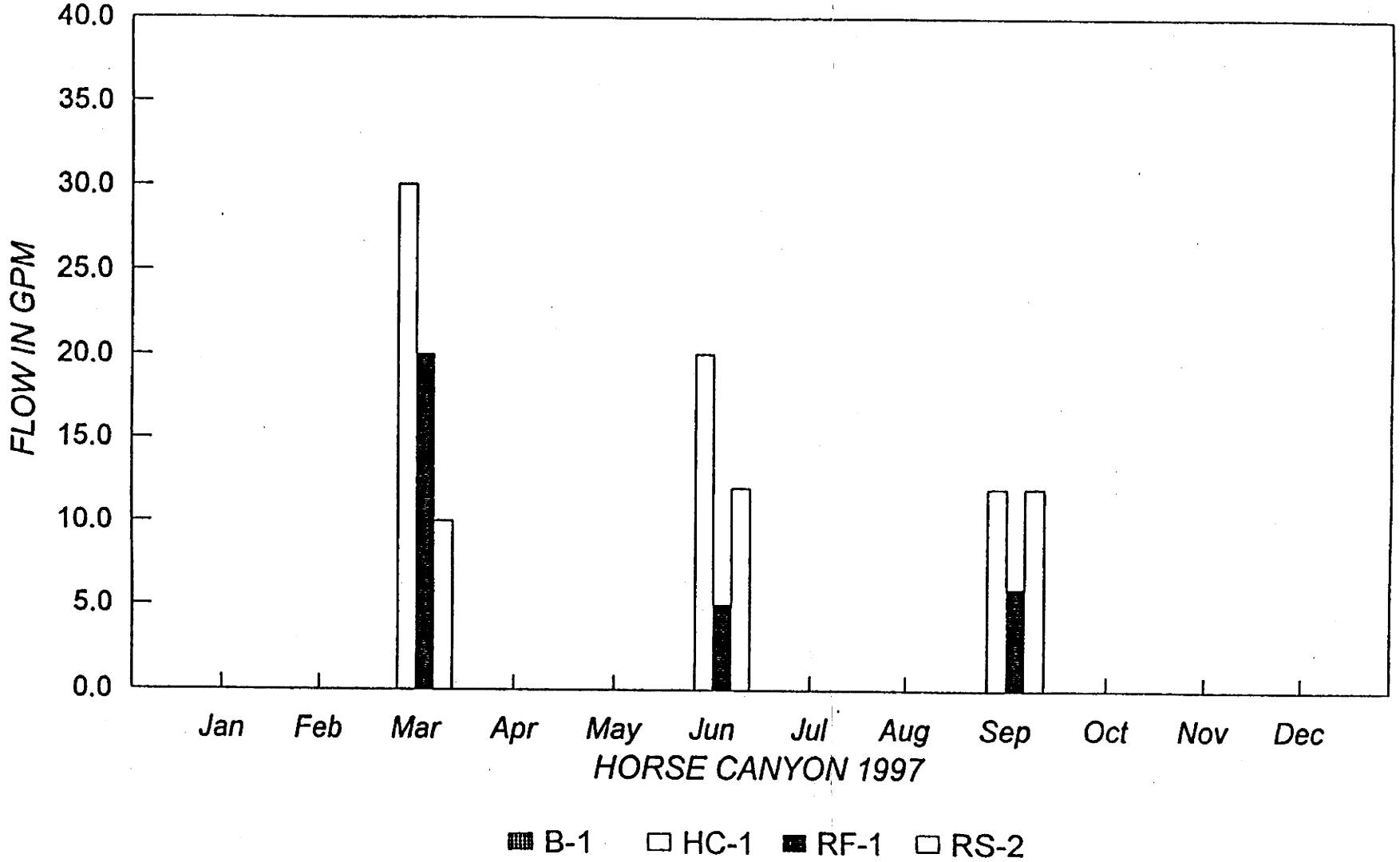
IPA

CONDUCTIVITY



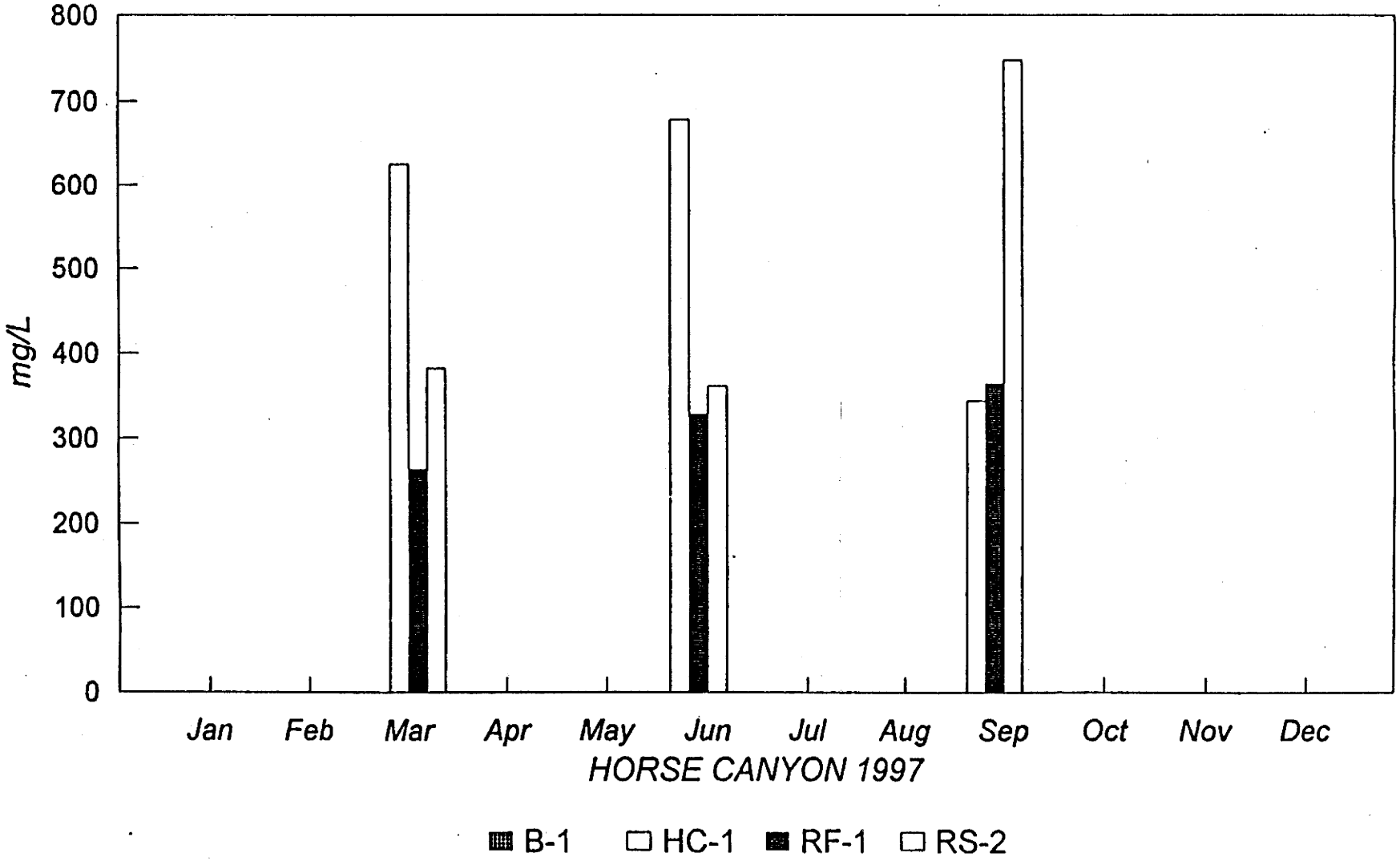
IPA

FLOW


40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
FLOW IN GPM
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
HORSE CANYON 1997
B-1
HC-1
RF-1
RS-2

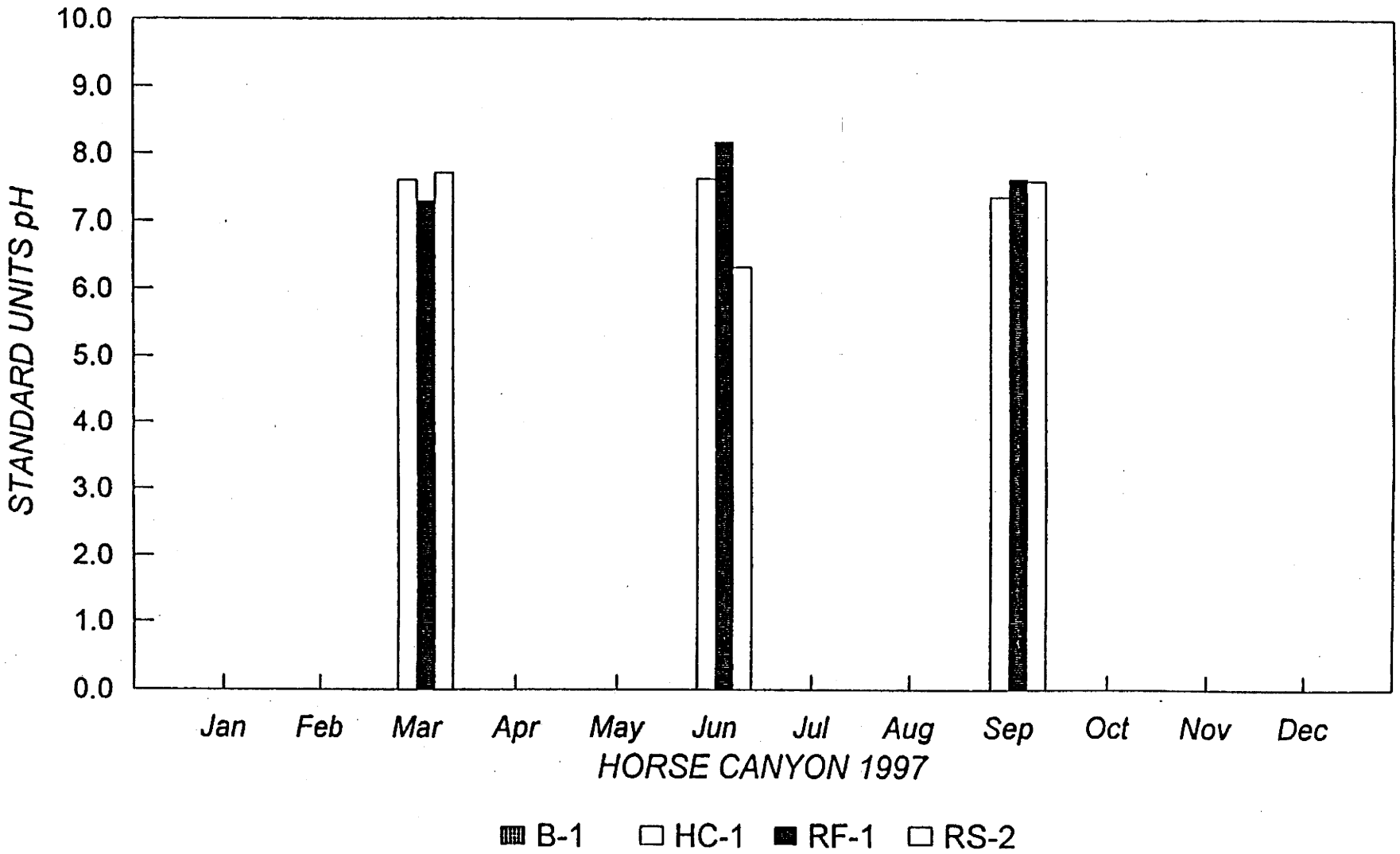
IPA

HARDNESS



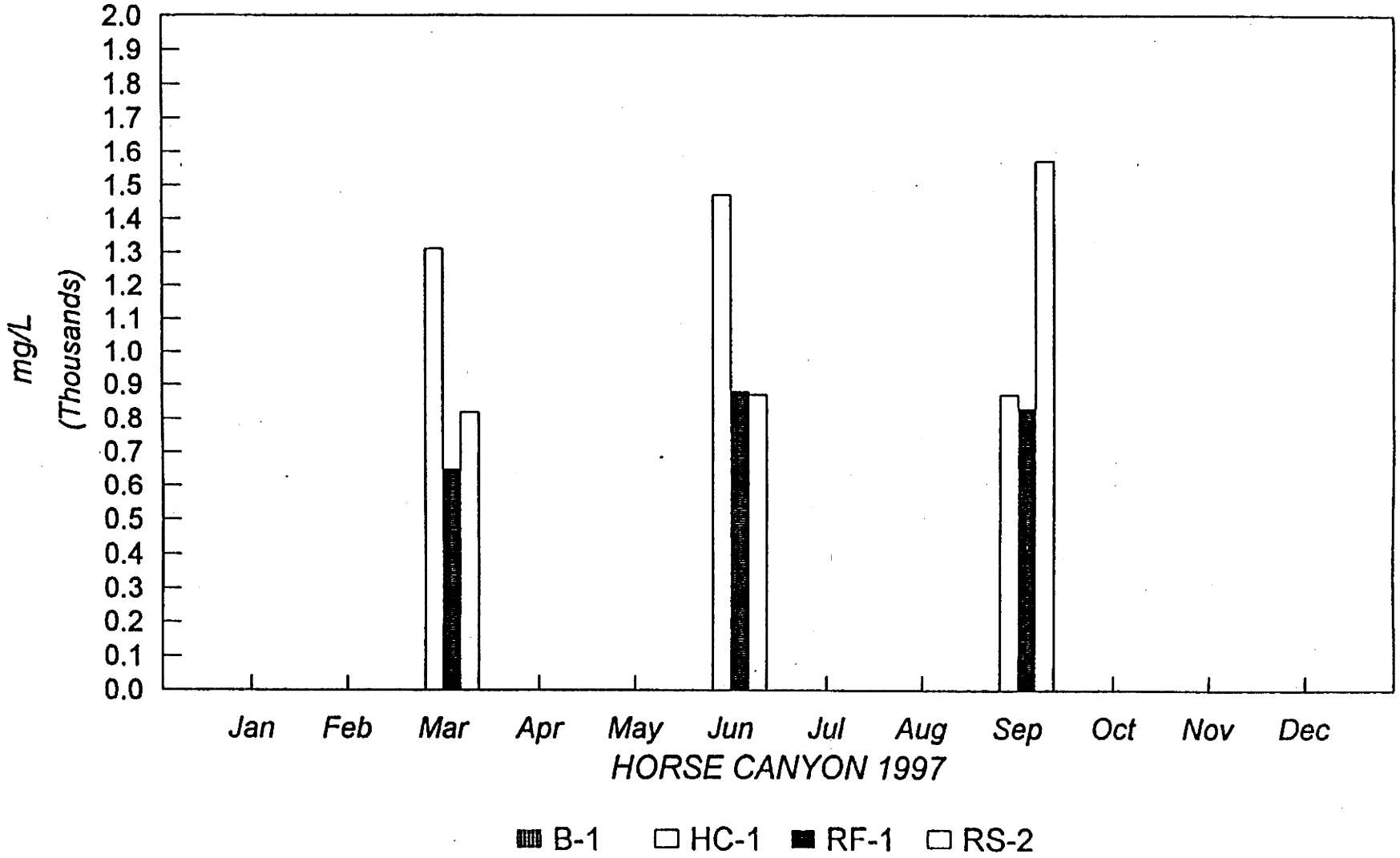
IPA

pH


10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
STANDARD UNITS pH
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
HORSE CANYON 1997
B-1
HC-1
RF-1
RS-2

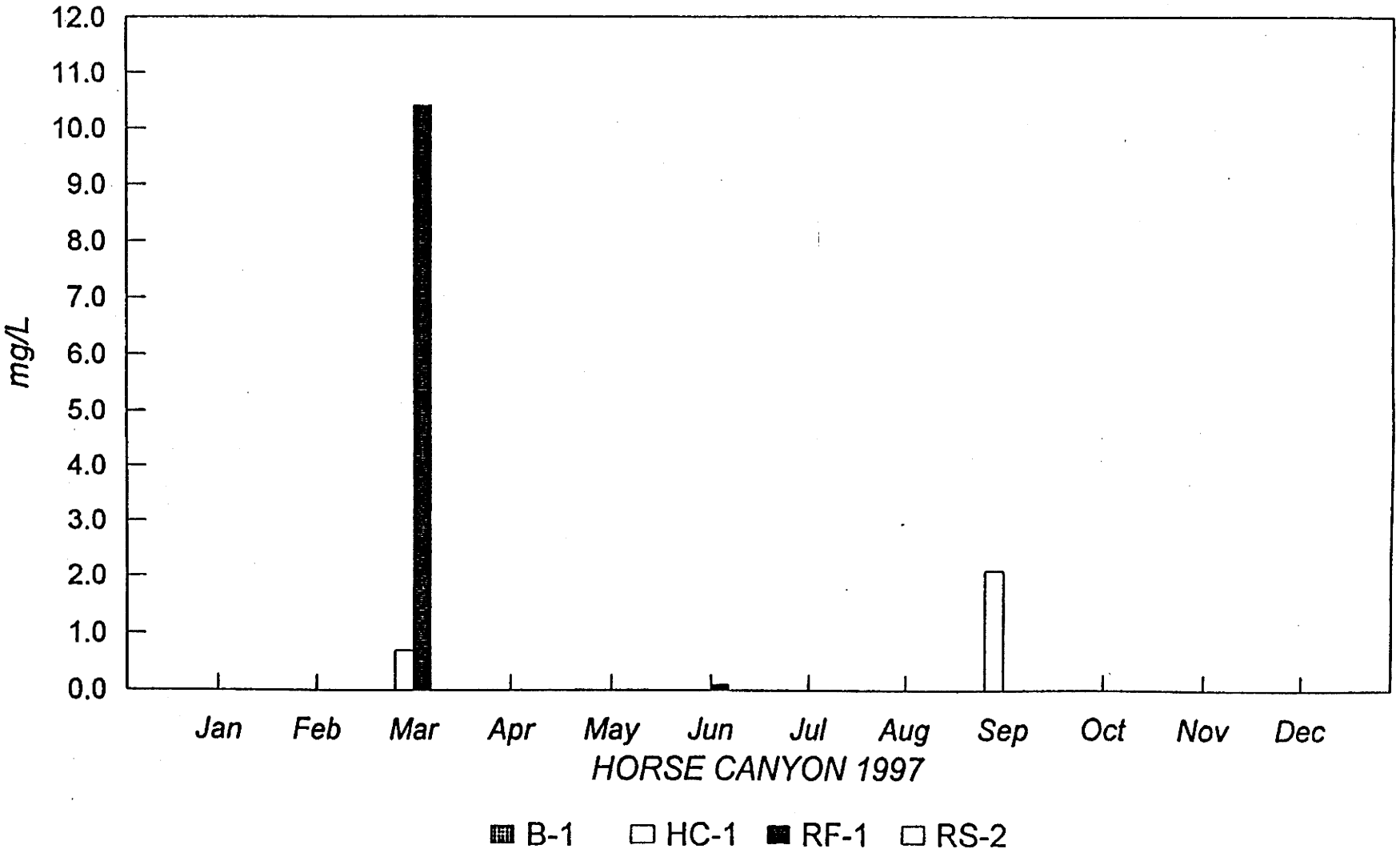
IPA

TDS


2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
mg/L
(Thousands)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
HORSE CANYON 1997
B-1
HC-1
RF-1
RS-2

IPA

TOTAL IRON



IPA
HORSE CANYON MINE
ACT/007/013

1997 WATER MONITORING DATA

SAMPLE LOCATION: B - 1 (Horse Canyon Wash Below Mine)

* - Inaccessible

Parameter	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flow	(gpm)			0			0			0			
pH	standard												
Temp	o C												
Conductivity	umhos/cm												
Dissolved Oxygen	ppm												
Aluminum	mg/l												
Arsenic	mg/l												
Barium	mg/l												
Bicarbonate	mg/l												
Boron	mg/l												
Cadmium	mg/l												
Calcium	mg/l												
Carbonate	mg/l												
Chloride	mg/l												
Chromium	mg/l												
Copper	mg/l												
Fluoride	mg/l												
Hardness	mg/l												
Iron Total	mg/l												
Lead	mg/l												
Magnesium	mg/l												
Manganese	mg/l												
Mercury	mg/l												
Molybdenum	mg/l												
Nickel	mg/l												
Ammonia	mg/l												
Nitrate	mg/l												
Nitrite	mg/l												
Phosphate	mg/l												
Potassium	mg/l												
Selenium	mg/l												
Sodium	mg/l												
Sulfate	mg/l												
Sulfide	mg/l												
TDS	mg/l												
Zinc	mg/l												

IPA
HORSE CANYON MINE
ACT/007/013

1997 WATER MONITORING DATA

SAMPLE LOCATION: HC - 1 (Horse Canyon Wash)

* - Inaccessible

Parameter	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flow	(gpm)			30			20			12			
pH	standard			7.59			7.6			7.32			
Temp	o C			11			17			19			
Conductivity	umhos/cm			275			850			1000			
Dissolved Oxygen	ppm			5			5			4			
Aluminum	mg/l			<1			<1			<1			
Arsenic	mg/l			<0.01			<0.01			<0.01			
Barium	mg/l			<1			<1			<1			
Bicarbonate	mg/l			448			521			530			
Boron	mg/l			0.3			0.3			0.2			
Cadmium	mg/l			<0.001			<0.01			<0.01			
Calcium	mg/l			80			77			35			
Carbonate	mg/l			<5			<5			10			
Chloride	mg/l			22			24			18			
Chromium	mg/l			<0.01			<0.1			<0.1			
Copper	mg/l			<0.1			<0.1			<0.1			
Fluoride	mg/l			0.54			0.28			0.1			
Hardness	mg/l			624			678			343			
Iron Total	mg/l			0.7			<0.1			2.1			
Lead	mg/l			<0.1			<0.1			<0.1			
Magnesium	mg/l			103			118			62			
Manganese	mg/l			<0.1			<0.1			<0.1			
Mercury	mg/l			<0.2			<0.2			<0.2			
Molybdenum	mg/l			<0.1			<0.1			<0.1			
Nickel	mg/l			<0.1			<0.1			<0.1			
Ammonia	mg/l			<0.5			<0.5			<0.5			
Nitrate	mg/l			<0.1			<0.1			0.1			
Nitrite	mg/l			<0.01			<0.01			<0.01			
Phosphate	mg/l			<0.02			0.03			0.02			
Potassium	mg/l			5			5			2			
Selenium	mg/l			<0.01			<0.01			<0.01			
Sodium	mg/l			184			215			165			
Sulfate	mg/l			596			724			298			
Sulfide	mg/l			<0.1			<0.1			5.4			
TDS	mg/l			1310			1470			870			
Zinc	mg/l			<0.03			0.03			0.01			

IPA
HORSE CANYON MINE
ACT/007/013

1997 WATER MONITORING DATA

SAMPLE LOCATION: RF - 1 (Right Fork, Horse Canyon Wash)

* - Inaccessible

Parameter	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flow	(gpm)			20			5			6			
pH	standard			7.27			8.15			7.6			
Temp	o C			12			22			21			
Conductivity	umhos/cm			720			1100			1060			
Dissolved Oxygen	ppm			6			5			4			
Aluminum	mg/l			<1			<1			<1			
Arsenic	mg/l			<0.01			<0.01			<0.01			
Barium	mg/l			<1			<1			<1			
Bicarbonate	mg/l			407			513			563			
Boron	mg/l			0.2			0.4			0.1			
Cadmium	mg/l			<0.01			<0.01			<0.01			
Calcium	mg/l			35			26			45			
Carbonate	mg/l			<5			13			<5			
Chloride	mg/l			14			17			17			
Chromium	mg/l			<0.1			<0.1			<0.1			
Copper	mg/l			<0.1			<0.1			<0.1			
Fluoride	mg/l			0.49			0.27			<0.1			
Hardness	mg/l			264			328			364			
Iron Total	mg/l			10.4			0.1			<0.1			
Lead	mg/l			<0.1			<0.1			<0.1			
Magnesium	mg/l			43			64			61			
Manganese	mg/l			<0.1			<0.1			<0.1			
Mercury	mg/l			<0.2			<0.2			<0.2			
Molybdenum	mg/l			<0.1			<0.1			<0.1			
Nickel	mg/l			<0.1			<0.1			<0.1			
Ammonia	mg/l			0.2			<0.5			<0.5			
Nitrate	mg/l			0.1			<0.1			0.2			
Nitrite	mg/l			<0.01			<0.01			<0.01			
Phosphate	mg/l			0.03			0.04			0.02			
Potassium	mg/l			2			3			<1			
Selenium	mg/l			<0.01			<0.01			<0.01			
Sodium	mg/l			109			172			157			
Sulfate	mg/l			198			366			22			
Sulfide	mg/l			<0.1			<0.1			<1			
TDS	mg/l			650			880			830			
Zinc	mg/l			<0.01			0.02			0.03			

IPA
HORSE CANYON MINE
ACT/007/013

1997 WATER MONITORING DATA

SAMPLE LOCATION: RS - 2 (Redden Spring)

* - Inaccessible

Parameter	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flow	(gpm)	*	*	10			12			12			
pH	standard			7.7			6.3			7.56			
Temp	o C			10			10			9			
Conductivity	umhos/cm			450			850			750			
Dissolved Oxygen	ppm			5			5			5			
Aluminum	mg/l			<1			<1			<1			
Arsenic	mg/l			<0.01			<0.01			<0.01			
Barium	mg/l			<0.1			<0.1			<1			
Bicarbonate	mg/l			542			549			518			
Boron	mg/l			0.3			0.2			0.3			
Cadmium	mg/l			<0.01			<0.01			<0.01			
Calcium	mg/l			44			44			103			
Carbonate	mg/l			<5			<5			<5			
Chloride	mg/l			17			17			29			
Chromium	mg/l			<0.1			<0.1			<0.1			
Copper	mg/l			<0.1			<0.1			<0.1			
Fluoride	mg/l			0.52			0.37			<0.1			
Hardness	mg/l			382			361			747			
Iron Total	mg/l			<0.1			<0.1			<0.1			
Lead	mg/l			<0.1			<0.1			<0.1			
Magnesium	mg/l			66			61			119			
Manganese	mg/l			<0.1			<0.1			<0.1			
Mercury	mg/l			<0.2			<0.2			<0.2			
Molybdenum	mg/l			<0.1			<0.1			<0.1			
Nickel	mg/l			<0.1			<0.1			<0.1			
Ammonia	mg/l			<0.5			<0.5			<0.5			
Nitrate	mg/l			0.2			0.3			<0.1			
Nitrite	mg/l			<0.01			<0.01			<0.01			
Phosphate	mg/l			0.02			0.04			0.02			
Potassium	mg/l			1			1			7			
Selenium	mg/l			<0.01			<0.01			<0.01			
Sodium	mg/l			156			149			217			
Sulfate	mg/l			257			303			849			
Sulfide	mg/l			<1.0			<1.0			<1			
TDS	mg/l			820			870			1570			
Zinc	mg/l			0.04			0.02			0.01			

Note:

(1) The following data was taken from the "Mining and Reclamation Plan, Horse Canyon Mine, Volume III, Appendix VI-I".

(2) The Annual Hydrologic Monitoring Reports have been submitted to the Division by I.P.A. since 1989; however, because of the volume of these reports, only the 1997 Annual Report is included with this Appendix for reference.

U.S. Steel Data

SURFACE WATER QUALITY DATA
GENEVA COAL MINE

Sampling Date:	2/81	3/81	4/81	5/81
B-1				
Flow (gpm)	NA	NA	NA	375
Acidity as CaCO3 mg/l	<0.1	<0.1	<0.01	6.00
Alkalinity as CaCO3 mg/l	424.00	372.00	346.00	330.00
Dissolved Iron mg/l	0.270	0.210	0.190	0.520
Iron as Fe (Total) mg/l	0.310	0.250	0.560	0.950
Manganese as Mn (Tot) mg/l	0.020	0.010	0.030	0.050
Suspended Solids mg/l	18.0	9.0	87.0	50.0
Total Dissolved Solids mg/l	1,900	1,800	2,050	1,700
pH Units	8.40	8.0	8.30	8.10

Sampling Date:	7/81	9/81	10/81	3/82
B-1				
Flow (gpm)	375	310	650	300
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	4.50
Alkalinity as CaCO3 mg/l	356.00	298.00	1,095.00	293.60
Dissolved Iron mg/l	0.020	0.075	0.080	0.640
Iron as Fe (Total) mg/l	0.440	0.280	0.255	1.110
Manganese as Mn (Tot) mg/l	0.030	0.014	0.017	0.022
Suspended Solids mg/l	136	10.0	8.1	18.0
Total Dissolved Solids mg/l	1,850	2,000	1,850	362
pH Units	8.20	8.30	8.30	8.20

Sampling Date:	4/82	5/82	6/82	8/82
B-1				
Flow (gpm)	425	400	500	520
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	291.60	350.30	366.90	297.50
Dissolved Iron mg/l	NA	NA	0.760	0.810
Iron as Fe (Total) mg/l	1.600	0.060	1.720	1.920
Manganese as Mn (Tot) mg/l	0.060	0.015	0.070	0.090
Suspended Solids mg/l	105	3.0	98.0	114
Total Dissolved Solids mg/l	2,708	2,178	2,175	2,372
pH Units	7.80	8.10	7.90	8.10

Sampling Date:	9/82	10/82	4/83
B-1			
Flow (gpm)	400	350	NA
Acidity as CaCO3 mg/l	<0.01	<0.01	NA
Alkalinity as CaCO3 mg/l	304.00	399.20	NA
Dissolved Iron mg/l	0.820	0.920	NA
Iron as Fe (Total) mg/l	1.890	2.140	14.800
Manganese as Mn (Tot) mg/l	0.095	0.095	0.515
Suspended Solids mg/l	21.0	8.0	640
Total Dissolved Solids mg/l	2,120	1,900	1,688
pH Units	8.20	8.30	7.80

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	3-81	4-81	5-81	6-81
HC1				
Flow (gpm)	NA	NA	25	NA
Acidity as CaCO3 mg/l	< 0.1	< 0.01	10.00	< 0.01
Alkalinity as CaCO3 mg/l	370.00	416.00	360.00	408.00
Dissolved Iron mg/l	0.030	0.010	0.140	0.010
Iron as Fe (Total) mg/l	0.060	0.230	0.270	0.120
Manganese as Mn (Tot) mg/l	0.030	0.020	0.040	0.050
Suspended Solids mg/l	1.0	23.0	12.0	44.0
Total Dissolved Solids mg/l	1,400	1,450	1,300	1,450
pH Units	7.70	8.10	8.00	8.10

Sampling Date:	7-81	8-81	10-81	11-81
HC1				
Flow (gpm)	40	3	35	25
Acidity as CaCO3 mg/l	< 0.01	< 0.01	< 0.01	< 0.01
Alkalinity as CaCO3 mg/l	420.00	416.00	985.00	452.00
Dissolved Iron mg/l	0.070	0.090	0.130	0.019
Iron as Fe (Total) mg/l	0.080	0.140	0.265	0.155
Manganese as Mn (Tot) mg/l	0.050	0.120	0.130	0.030
Suspended Solids mg/l	11.0	5.0	6.6	16.0
Total Dissolved Solids mg/l	1,400	1,400	1,500	1,500
pH Units	8.20	8.30	8.20	8.10

Sampling Date:	12-81	4-82	5-82	6-82
HC1				
Flow (gpm)	17	12	60	65
Acidity as CaCO3 mg/l	< 0.01	<0.01	4.00	2.00
Alkalinity as CaCO3 mg/l	360.00	252.00	517.50	412.00
Dissolved Iron mg/l	0.013	NA	NA	0.040
Iron as Fe (Total) mg/l	0.150	0.030	2.250	0.070
Manganese as Mn (Tot) mg/l	0.025	0.010	0.100	0.010
Suspended Solids mg/l	11.0	4.0	106	9.0
Total Dissolved Solids mg/l	1,325	1,566	1,372	1,375
pH Units	8.10	7.80	7.90	8.00

Sampling Date:	7-82	8-82	10-82	4-83
HC1				
Flow (gpm)	45	40	10	NA
Acidity as CaCO3 mg/l	< 0.01	< 0.01	6.00	NA
Alkalinity as CaCO3 mg/l	339.50	523.00	211.00	NA
Dissolved Iron mg/l	0.040	0.040	0.038	NA
Iron as Fe (Total) mg/l	0.040	0.044	0.040	49.300
Manganese as Mn (Tot) mg/l	0.010	0.055	0.042	1.450
Suspended Solids mg/l	2.0	2.0	14.0	2,152
Total Dissolved Solids mg/l	1,425	1,502	1,500	1,188
pH Units	8.00	8.10	7.80	8.10

SURFACE WATER QUALITY DATA
GENEVA COAL MINE

Sampling Date:	2/81	3/81	4/81	5/81
[illegible]1				
Flow (gpm)	NA	NA	NA	10
Acidity as CaCO3 mg/l	<0.1	14.0	<0.01	4.00
Alkalinity as CaCO3 mg/l	520.00	444.00	386.00	400.00
Dissolved Iron mg/l	0.218	0.210	0.820	0.070
Iron as Fe (Total) mg/l	1.100	0.250	3,080	0.180
Manganese as Mn (Tot) mg/l	0.060	0.010	0.290	0.020
Suspended Solids mg/l	59.0	9.0	303	104
Total Dissolved Solids mg/l	1,000	1,800	950	900
pH Units	8.00	8.00	8.10	8.20

Sampling Date:	6/81	7/81	8/81	9/81
RF-1				
Flow (gpm)	NA	5	7	15
Acidity as CaCO3 mg/l	<0.01	4.00	<0.01	<0.01
Alkalinity as CaCO3 mg/l	404.00	438.00	390.00	396.00
Dissolved Iron mg/l	0.030	0.010	<0.001	0.024
Iron as Fe (Total) mg/l	0.050	0.020	0.070	0.065
Manganese as Mn (Tot) mg/l	0.010	0.010	<0.001	0.013
Suspended Solids mg/l	15.0	8.0	2.0	7.0
Total Dissolved Solids mg/l	950	1,000	900	950
pH Units	8.20	7.70	8.60	8.30

Sampling Date:	10/81	11/81	12/81	3/82
RF-1				
Flow (gpm)	25	15	15	18
Acidity as CaCO3 mg/l	10.00	<0.01	<0.01	10.00
Alkalinity as CaCO3 mg/l	46.00	485.00	380.00	497.00
Dissolved Iron mg/l	0.030	0.033	0.026	1.900
Iron as Fe (Total) mg/l	0.140	0.065	0.095	9.400
Manganese as Mn (Tot) mg/l	0.020	0.020	0.013	0.018
Suspended Solids mg/l	6.2	5.0	2.0	130
Total Dissolved Solids mg/l	987	950	900	874
pH Units	8.00	8.20	8.10	7.60

Sampling Date:	4/82	5/82	6/82	7/82
RF-1				
Flow (gpm)	20	20	25	10
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	345.00	485.00	413.50	327.20
Dissolved Iron mg/l	NA	NA	0.030	0.030
Iron as Fe (Total) mg/l	0.200	1.100	0.100	0.040
Manganese as Mn (Tot) mg/l	0.020	0.035	0.008	0.005
Suspended Solids mg/l	15.0	59.0	13.0	<1.0
Total Dissolved Solids mg/l	988	862	925	915
pH Units	8.10	8.20	8.40	8.50

SURFACE WATER QUALITY DATA
GENEVA COAL MINE

Sampling Date:	8/82	9/82	10/82	4/83
[illegible]1				
[illegible]ow (gpm)	25	20	20	NA
Acidity as CaCO3 mg/l	<0.01	<0.01	<0.01	NA
Alkalinity as CaCO3 mg/l	505.00	364.40	537.00	NA
Dissolved Iron mg/l	0.020	0.036	0.021	NA
Iron as Fe (Total) mg/l	0.025	0.052	0.030	26.500
Manganese as Mn (Tot) mg/l	0.008	0.008	0.010	0.360
Suspended Solids mg/l	4.0	9.0	8.0	1,648
Total Dissolved Solids mg/l	874	890	920	940
pH Units	8.30	8.40	8.50	8.10

Sampling Date:

Flow (gpm)
Acidity as CaCO3 mg/l
Alkalinity as CaCO3 mg/l
Dissolved Iron mg/l
Iron as Fe (Total) mg/l
Manganese as Mn (Tot) mg/l
Suspended Solids mg/l
Total Dissolved Solids mg/l
pH Units

[illegible]mpling Date:

Flow (gpm)
Acidity as CaCO3 mg/l
Alkalinity as CaCO3 mg/l
Dissolved Iron mg/l
Iron as Fe (Total) mg/l
Manganese as Mn (Tot) mg/l
Suspended Solids mg/l
Total Dissolved Solids mg/l
pH Units

Sampling Date:

Flow (gpm)
Acidity as CaCO3 mg/l
Alkalinity as CaCO3 mg/l
Dissolved Iron mg/l
Iron as Fe (Total) mg/l
Manganese as Mn (Tot) mg/l
Suspended Solids mg/l
Total Dissolved Solids mg/l
pH Units

SURFACE WATER QUALITY

MINE DISCHARGES

	001 4-6-81	002 4-6-81
Aluminum, Al mg/l	0.016	0.025
Ammonia, NH3 mg/l	0.10	0.45
Antimony, Sb mg/l	<0.001	<.001
Arsenic, As mg/l	0.002	0.005
Barium, Ba mg/l	0.035	0.045
Bicarbonate, HNO3 mg/l		
Boron, B mg/l	0.020	0.033
Cadmium, Cd mg/l	<0.001	<0.001
Beryllium, Be mg/l	<0.01	<0.01
Bromide, Br mg/l	<0.001	<0.001
Cobalt, Co, mg/l	<0.001	<0.004
Chromium, Cr mg/l	<0.001	<0.001
Conductivity, umhos/cm		
Copper, Cu mg/l	0.003	0.006
Flouride, F mg/l	0.35	0.41
Hardness, CaCO3 mg/l		
Iron, Fe (total) mg/l	0.120	0.170
Lead, Pb mg/l	0.003	<0.001
Magnesium, Mg mg/l	112.80	96.00
Manganese, Mn mg/l	0.012	0.016
Mercury, Hg mg/l	<0.0002	<0.0002
Molybdenum, Mo mg/l	0.003	0.009
Nickel, Ni mg/l	0.094	0.095
Nitrate, NO3-N mg/l	0.66	0.62
Nitrite, NO2-N mg/l	<0.01	0.08
Phosphate, PO4 mg/l	0.070	0.060
Potassium, K mg/l		
Selenium, Se mg/l	<0.001	<0.001
Sodium, Na mg/l		
Sulfate, SO4 mg/l	990	960
Sulfide, S mg/l	0.67	0.92
Suspended Solids mg/l	20.0	28.0
Total Combustable Solids mg/l		
Total Dissolved Solids mg/l		
Zinc, Zn mg/l	0.006	0.019
pH Units		

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	3/11/81	3/27/81	4/6/81	4/22/81
001				
Average Flow (Mgpd)	NA	NA	1.60	1.60
Acidity as CaCO3 mg/l	<0.1	<0.1	NA	<0.1
Alkalinity as CaCO3 mg/l	376.00	378.00	NA	386.00
Dissolved Iron mg/l	0.220	0.040	NA	0.020
Iron as Fe (Total) mg/l	0.240	0.140	0.120	0.080
Manganese as Mn (Tot) mg/l	0.010	0.010	0.012	0.020
Oil and Grease mg/l	1.60	NA	0.80	NA
Suspended Solids mg/l	8.0	8.0	20.0	25.0
Total Dissolved Solids mg/l	1,770	1,750	NA	2,100
pH Units	7.70	7.80	7.30	8.10

Sampling Date:	5/13/81	6/11/81	6/24/81	7/8/81
001				
Average Flow (Mgpd)	1.60	1.60	0.197	0.197
Acidity as CaCO3 mg/l		<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l		370.00	366.00	366.00
Dissolved Iron mg/l		0.010	0.180	0.050
Iron as Fe (Total) mg/l		0.080	0.210	0.080
Manganese as Mn (Tot) mg/l		0.010	0.010	<0.001
Oil and Grease mg/l		1.00	NA	<0.01
Suspended Solids mg/l		1.0	29.0	9.0
Total Dissolved Solids mg/l		1,700	1,900	1,850
pH Units		8.10	8.10	8.20

Sampling Date:	7/22/81	8/12/81	8/26/81	9/9/81
001				
Average Flow (Mgpd)	0.197	0.197	0.197	0.197
Acidity as CaCO3 mg/l	<0.01	<0.01	3.46	3.60
Alkalinity as CaCO3 mg/l	372.00	370.00	388.00	340.00
Dissolved Iron mg/l	0.185	0.038	0.150	0.024
Iron as Fe (Total) mg/l	0.240	0.050	0.260	0.110
Manganese as Mn (Tot) mg/l	0.012	0.010	0.018	0.015
Oil and Grease mg/l	NA	1.60	NA	1.40
Suspended Solids mg/l	5.0	4.0	12.5	10.0
Total Dissolved Solids mg/l	1,822	1,800	1,850	1,975
pH Units	8.20	8.30	7.90	7.60

Sampling Date:	9/9/81	10/14/81	10/28/81	11/10/81
001				
Average Flow (Mgpd)	0.197	0.271	0.271	0.271
Acidity as CaCO3 mg/l	<0.01	2.40	6.00	<0.01
Alkalinity as CaCO3 mg/l	368.00	363.00	362.00	439.00
Dissolved Iron mg/l	0.040	0.040	0.085	NA
Iron as Fe (Total) mg/l	0.068	0.115	0.112	0.112
Manganese as Mn (Tot) mg/l	0.015	0.015	0.018	0.050
Oil and Grease mg/l	NA	2.50	NA	0.20
Suspended Solids mg/l	13.0	4.0	11.0	15.0
Total Dissolved Solids mg/l	1,985	2,000	1,900	1,800
pH Units	8.10	7.95	7.90	8.10

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	11/15/81	12/9/81	12/23/81	1/13/82
001				
Average Flow (Mgpd)	0.271	0.271	0.271	0.127
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Oil and Grease mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:	1/27/82	2/9/82	2/22/82	3/9/82
001				
Average Flow (Mgpd)	0.127	0.319	0.319	0.325
Acidity as CaCO3 mg/l		<0.01	NA	6.00
Alkalinity as CaCO3 mg/l		238.00	NA	472.00
Dissolved Iron mg/l		0.110	NA	0.380
Iron as Fe (Total) mg/l		0.125	0.240	0.420
Manganese as Mn (Tot) mg/l		0.044	NA	0.062
Oil and Grease mg/l		<1.0	NA	1.60
Suspended Solids mg/l		5.0	26.0	2.0
Total Dissolved Solids mg/l		2,000	2,150	2,456
pH Units		7.70	7.70	7.80

Sampling Date:	3/23/82	4/13/82	4/27/82	5/13/82
001				
Average Flow (Mgpd)	0.325	0.119	0.119	0.162
Acidity as CaCO3 mg/l	NA	<0.01	NA	10.0
Alkalinity as CaCO3 mg/l	NA	323.50	NA	381.20
Dissolved Iron mg/l	NA	0.180	NA	0.250
Iron as Fe (Total) mg/l	0.260	0.195	0.286	0.250
Manganese as Mn (Tot) mg/l	NA	0.020	NA	0.040
Oil and Grease mg/l	NA	1.4	NA	<0.1
Suspended Solids mg/l	1.0	13.0	4.0	5.0
Total Dissolved Solids mg/l	2,308	2,654	2,632	2,566
pH Units	7.80	7.90	7.90	7.80

Sampling Date:	5/24/82	6/8/82	6/23/82	7/13/82
001				
Average Flow (Mgpd)	0.162	0.184	0.184	0.183
Acidity as CaCO3 mg/l	NA	<0.01	NA	1.00
Alkalinity as CaCO3 mg/l	NA	401.10	NA	313.40
Dissolved Iron mg/l	NA	0.200	NA	0.250
Iron as Fe (Total) mg/l	0.150	0.210	0.230	0.250
Manganese as Mn (Tot) mg/l	NA	0.015	NA	0.035
Oil and Grease mg/l	NA	0.2	NA	1.2
Suspended Solids mg/l	2.0	9.0	6.0	5.0
Total Dissolved Solids mg/l	2,268	1,875	2,150	2,035
pH Units	8.00	7.90	7.80	7.80

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	7/28/82	8/11/82	8/26/82	9/15/8
001				
Average Flow (Mgpd)	0.263	0.208	0.208	0.2
Acidity as CaCO3 mg/l	NA	1.00	NA	9.
Alkalinity as CaCO3 mg/l	NA	398.70	NA	348.
Dissolved Iron mg/l	NA	0.050	NA	0.2
Iron as Fe (Total) mg/l	0.290	0.116	0.180	0.3
Manganese as Mn (Tot) mg/l	NA	0.055	NA	0.0
Oil and Grease mg/l	NA	<0.1	NA	0
Suspended Solids mg/l	1.0	7.0	38.0	1
Total Dissolved Solids mg/l	1,970	1,890	1,820	2,6
pH Units	8.00	8.00	7.90	7.

Sampling Date:	9/28/82	10/12/82	10/26/82	11/10/
001				
Average Flow (Mgpd)	0.263	0.208	0.208	0.2
Acidity as CaCO3 mg/l	NA	1.00	NA	9.
Alkalinity as CaCO3 mg/l	NA	398.70	NA	348.
Dissolved Iron mg/l	NA	0.050	NA	0.2
Iron as Fe (Total) mg/l	0.290	0.116	0.180	0.3
Manganese as Mn (Tot) mg/l	NA	0.055	NA	0.0
Oil and Grease mg/l	NA	<0.1	NA	0
Suspended Solids mg/l	1.0	7.0	38.0	1
Total Dissolved Solids mg/l	1,970	1,890	1,8250	2,6
pH Units	8.00	8.00	7.90	7.

Sampling Date:	11/24/82	12/8/82	12/22/82	1/12.
001				
Average Flow (Mgpd)	0.234	0.263	0.263	0.
Acidity as CaCO3 mg/l	NA	<0.01	NA	<0
Alkalinity as CaCO3 mg/l	NA	319.80	NA	439
Dissolved Iron mg/l	NA	0.420	NA	0.
Iron as Fe (Total) mg/l	0.370	0.430	0.210	0.
Manganese as Mn (Tot) mg/l	NA	0.025	NA	0.
Oil and Grease mg/l	NA	0.6	NA	
Suspended Solids mg/l	6.0	17.0	5.0	
Total Dissolved Solids mg/l	1,920	1,815	1,840	1,
pH Units	8.00	8.10	7.90	8

Sampling Date:	1/26/83	2/9/83	2/22/83	3/9
001				
Average Flow (Mgpd)	0.272	NA	NA	N
Acidity as CaCO3 mg/l	NA	6.00	NA	
Alkalinity as CaCO3 mg/l	NA	328.20	NA	344
Dissolved Iron mg/l	NA	0.380	NA	0.
Iron as Fe (Total) mg/l	0.550	0.430	0.190	0.
Manganese as Mn (Tot) mg/l	NA	0.020	NA	0.
Oil and Grease mg/l	NA	0.6	NA	
Suspended Solids mg/l	17.0	26.0	<0.1	
Total Dissolved Solids mg/l	1,850	1,800	1,775	1,
pH Units	7.80	7.80	7.80	7

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	3/23/83	4/14/83	4/28/83	5/17/83
001				
Average Flow (Mgpd)	NA	0.075	0.075	0.048
Acidity as CaCO3 mg/l	NA	<0.01	NA	<0.01
Alkalinity as CaCO3 mg/l	NA	324.00	NA	338.00
Dissolved Iron mg/l	NA	0.310	NA	0.190
Iron as Fe (Total) mg/l	0.200	0.370	0.290	0.190
Manganese as Mn (Tot) mg/l	NA	0.025	NA	0.018
Oil and Grease mg/l	NA	<0.2	NA	<0.1
Suspended Solids mg/l	13.0	3.0	15.0	11.0
Total Dissolved Solids mg/l	1,810	2,160	2,172	2,124
pH Units	7.30	7.10	7.80	8.20

Sampling Date:	5/26/83	6/8/83	6/29/83
001			
Average Flow (Mgpd)	0.048		
Acidity as CaCO3 mg/l	NA	<0.01	NA
Alkalinity as CaCO3 mg/l	NA	320.00	NA
Dissolved Iron mg/l	NA	0.030	NA
Iron as Fe (Total) mg/l	0.240	0.170	0.100
Manganese as Mn (Tot) mg/l	NA	0.027	NA
Oil and Grease mg/l	NA	<0.2	NA
Suspended Solids mg/l	30.0	29.0	11.0
Total Dissolved Solids mg/l	2,016	1,988	1,710
pH Units	8.00	7.90	7.80

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:				
Flow (gpm)				
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

SURFACE WATER QUALITY - GENEVA COAL MINE

Sampling Date:	2/12/81	2/27/81	3/11/81	3/27/81
002				
Average Flow (Mgpd)	NA	NA	NA	NA
Acidity as CaCO3 mg/l	<0.1	12.0	8.0	10.0
Alkalinity as CaCO3 mg/l	462.00	430.00	432.00	390.00
Dissolved Iron mg/l	NA	0.270	0.620	0.310
Iron as Fe (Total) mg/l	0.660	0.270	0.650	0.340
Manganese as Mn (Tot) mg/l	NA	0.025	0.030	0.020
Oil and Grease mg/l	5.60	NA	1.20	NA
Suspended Solids mg/l	3.0	6.0	7.0	6.0
Total Dissolved Solids mg/l	1,750	1,950	1,750	1,700
pH Units	8.40	7.50	7.60	7.30

Sampling Date:	4/6/81	4/22/81	5/13/81	6/11/81
002				
Average Flow (Mgpd)	0.319	0.319	0.319	0.319
Acidity as CaCO3 mg/l	NA	10.00	35.00	
Alkalinity as CaCO3 mg/l	NA	368.00	470.00	
Dissolved Iron mg/l	NA	0.020	0.050	
Iron as Fe (Total) mg/l	0.170	0.310	0.160	
Manganese as Mn (Tot) mg/l	0.016	0.250	0.020	
Oil and Grease mg/l	0.80	NA	2.10	
Suspended Solids mg/l	28.0	18.0	9.0	
Total Dissolved Solids mg/l	NA	1,900	1,800	
pH Units	7.40	7.60	7.80	

Sampling Date:	6/24/81	7/8/81	7/22/81	8/12/81
002				
Average Flow (Mgpd)	0.319	0.225	0.225	0.225
Acidity as CaCO3 mg/l	6.80	8.00	5.70	20.00
Alkalinity as CaCO3 mg/l	404.00	404.00	364.00	382.00
Dissolved Iron mg/l	0.330	0.110	0.350	0.090
Iron as Fe (Total) mg/l	0.350	0.140	0.398	0.150
Manganese as Mn (Tot) mg/l	0.080	<0.001	0.085	0.010
Oil and Grease mg/l	NA	<0.01	NA	0.80
Suspended Solids mg/l	19.0	9.0	4.0	5.0
Total Dissolved Solids mg/l	1,800	1,800	1,810	1,700
pH Units	7.80	7.80	7.70	7.90

Sampling Date:	8/26/81	9/9/81	9/23/81	10/14/81
002				
Average Flow (Mgpd)	0.225	0.225	0.225	0.213
Acidity as CaCO3 mg/l				10.00
Alkalinity as CaCO3 mg/l				451.00
Dissolved Iron mg/l				0.095
Iron as Fe (Total) mg/l				0.150
Manganese as Mn (Tot) mg/l				0.010
Oil and Grease mg/l				0.20
Suspended Solids mg/l				2.0
Total Dissolved Solids mg/l				1,800
pH Units				7.80

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SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	10/28/81	11/10/81	11/25/81	12/9/81
002				
Average Flow (Mgpd)	0.213	0.213	0.213	0.213
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Oil and Grease mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:	12/13/81	1/13/82	1/27/82	2/9/82
002				
Average Flow (Mgpd)	0.213	0.000	0.000	0.000
Acidity as CaCO3 mg/l				
Alkalinity as CaCO3 mg/l				
Dissolved Iron mg/l				
Iron as Fe (Total) mg/l				
Manganese as Mn (Tot) mg/l				
Oil and Grease mg/l				
Suspended Solids mg/l				
Total Dissolved Solids mg/l				
pH Units				

Sampling Date:	2/22/82	3/9/82	3/23/82	4/13/82
002				
Average Flow (Mgpd)	0.000	0.122	0.122	0.197
Acidity as CaCO3 mg/l			NA	<0.01
Alkalinity as CaCO3 mg/l			NA	335.80
Dissolved Iron mg/l			NA	0.570
Iron as Fe (Total) mg/l			0.630	0.588
Manganese as Mn (Tot) mg/l			NA	0.050
Oil and Grease mg/l			NA	1.6
Suspended Solids mg/l			1.0	12.0
Total Dissolved Solids mg/l			2,516	2,404
pH Units			7.40	7.60

Sampling Date:	4/27/82	5/17/82	5/24/82	6/8/82
002				
Average Flow (Mgpd)	0.197	0.185	0.185	0.819
Acidity as CaCO3 mg/l	NA	12.00	NA	24.00
Alkalinity as CaCO3 mg/l	NA	442.10	NA	410.20
Dissolved Iron mg/l	NA	0.300	NA	0.350
Iron as Fe (Total) mg/l	0.665	0.300	0.250	0.350
Manganese as Mn (Tot) mg/l	NA	0.035	NA	0.045
Oil and Grease mg/l	NA	<0.1	NA	0.6
Suspended Solids mg/l	6.0	6.0	3.0	9.0
Total Dissolved Solids mg/l	2,772	2,150	2,192	2,275
pH Units	7.60	7.70	7.70	7.50

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	6/23/82	7/13/82	7/29/82	8/11/82
002				
Average Flow (Mgpd)	0.819	0.360	0.360	0.253
Acidity as CaCO3 mg/l	NA		NA	10.00
Alkalinity as CaCO3 mg/l	NA		NA	311.80
Dissolved Iron mg/l	NA		NA	0.320
Iron as Fe (Total) mg/l	0.160		1.100	0.350
Manganese as Mn (Tot) mg/l	NA		NA	0.030
Oil and Grease mg/l	NA		NA	0.2
Suspended Solids mg/l	5.0		14.0	5.0
Total Dissolved Solids mg/l	2,200		2,344	2,450
pH Units	7.40		7.60	7.80

Sampling Date:	8/27/82	9/15/82	9/28/82	10/12/82
002				
Average Flow (Mgpd)	0.253	0.185	0.185	0.164
Acidity as CaCO3 mg/l	NA	5.00	NA	8.00
Alkalinity as CaCO3 mg/l	NA	346.10	NA	485.10
Dissolved Iron mg/l	NA	0.290	NA	0.065
Iron as Fe (Total) mg/l	1.320	0.330	0.230	0.380
Manganese as Mn (Tot) mg/l	NA	0.036	NA	0.041
Oil and Grease mg/l	NA	<0.1	NA	<0.1
Suspended Solids mg/l	18.0	25.0	1.0	6.0
Total Dissolved Solids mg/l	1,900	2,190	1,820	1,800
pH Units	7.80	7.80	7.80	7.60

Sampling Date:	10/26/82	11/10/82	11/24/82	12/8/82
002				
Average Flow (Mgpd)	0.164	0.180	1.180	0.153
Acidity as CaCO3 mg/l	NA	<0.01	NA	3.00
Alkalinity as CaCO3 mg/l	NA	339.60	NA	320.20
Dissolved Iron mg/l	NA	0.065	NA	0.520
Iron as Fe (Total) mg/l	0.240	0.120	0.570	0.535
Manganese as Mn (Tot) mg/l	NA	0.020	NA	0.025
Oil and Grease mg/l	NA	0.8	NA	1.0
Suspended Solids mg/l	5.0	2.0	3.0	11.0
Total Dissolved Solids mg/l	1,910	1,900	2,500	2,505
pH Units	7.70	8.10	7.40	7.50

Sampling Date:	12/22/82	1/13/83	1/27/83	2/9/83
002				
Average Flow (Mgpd)	0.153	0.993	0.993	0.150
Acidity as CaCO3 mg/l	NA	9.00	NA	11.00
Alkalinity as CaCO3 mg/l	NA	422.50	NA	329.00
Dissolved Iron mg/l	NA	0.500	NA	NA
Iron as Fe (Total) mg/l	0.380	0.530	0.300	0.310
Manganese as Mn (Tot) mg/l	NA	0.025	NA	0.015
Oil and Grease mg/l	NA	<0.1	NA	<0.1
Suspended Solids mg/l	8.0	9.0	27.0	27.0
Total Dissolved Solids mg/l	2,510	1,785	2,500	1,775
pH Units	7.70	7.50	7.60	7.60

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	2/22/83	3/9/83	3/23/83	4/13/83
002				
Average Flow (Mgpd)	0.150	0.132	0.132	0.304
Acidity as CaCO3 mg/l	NA	7.00	NA	<0.01
Alkalinity as CaCO3 mg/l	NA	351.30	NA	394.00
Dissolved Iron mg/l	NA	0.270	NA	0.380
Iron as Fe (Total) mg/l	0.250	0.270	0.285	0.380
Manganese as Mn (Tot) mg/l	NA	0.015	NA	0.015
Oil and Grease mg/l	NA	<0.2	NA	<0.2
Suspended Solids mg/l	1.0	3.0	13.0	<0.1
Total Dissolved Solids mg/l	1,845	1,725	1,750	1,710
pH Units	7.60	7.40	7.20	7.80

Sampling Date:	4/27/83	5/10/83	5/25/83	6/8/83
002				
Average Flow (Mgpd)	0.304	0.253	0.253	
Acidity as CaCO3 mg/l	NA	<0.01	NA	<0.01
Alkalinity as CaCO3 mg/l	NA	428.00	NA	374.00
Dissolved Iron mg/l	NA	0.300	NA	0.030
Iron as Fe (Total) mg/l	0.410	0.445	0.370	0.220
Manganese as Mn (Tot) mg/l	NA	0.017	NA	0.015
Oil and Grease mg/l	NA	<0.2	NA	1.2
Suspended Solids mg/l	14.0	11.0	27.0	12.0
Total Dissolved Solids mg/l	1,988	1,822	1,978	1,902
pH Units	7.60	7.80	7.80	7.70

Sampling Date:	6/29/83
002	
Average Flow (Mgpd)	
Acidity as CaCO3 mg/l	NA
Alkalinity as CaCO3 mg/l	NA
Dissolved Iron mg/l	NA
Iron as Fe (Total) mg/l	0.180
Manganese as Mn (Tot) mg/l	NA
Oil and Grease mg/l	NA
Suspended Solids mg/l	13.0
Total Dissolved Solids mg/l	1,724
pH Units	7.60

Sampling Date:	
Flow (gpm)	
Acidity as CaCO3 mg/l	
Alkalinity as CaCO3 mg/l	
Dissolved Iron mg/l	
Iron as Fe (Total) mg/l	
Manganese as Mn (Tot) mg/l	
Oil and Grease mg/l	
Suspended Solids mg/l	
Total Dissolved Solids mg/l	
pH Units	

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	2/1281	3/11/82	4/6/81	5/13/81
003				
BOD 5 day mg/l	4.8	0.19	0.04	NA
Free Chlorine (Avail) as C12	0.20	0.19	0.04	NA
MPN Fecal Coliform MPN/100 ml	<2.0	790	<2.0	<2.0
MPN Total Coliform MPN/100 ml	8.0	1,300	NA	460
Oil and Grease mg/l	2.01	3.80	<0.01	1.20
Suspended Solids mg/l	26.0	4.0	30.0	16.0
Total Chlorine mg/l	NA	NA	NA	<0.01
pH Units	7.80	7.50	7.50	7.50

Sampling Date:	6/11/81	7/8/81	8/12/81	9/9/81
003				
BOD 5 day mg/l	16.8	12.0	4.5	11.0
Free Chlorine (Avail) as C12	NA	NA	NA	NA
MPN Fecal Coliform MPN/100 ml	<2.0	23.0	23.0	<2.0
MPN Total Coliform MPN/100 ml	130	700	3,300	110
Oil and Grease mg/l	<0.01	1.20	5.40	<0.01
Suspended Solids mg/l	32.0	30.0	2.0	9.0
Total Chlorine mg/l	0.04	0.01	0.08	0.06
pH Units	7.20	7.30	7.50	7.70

Sampling Date:	10/15/81	11/10/81	11/12/81	12/9/81
003				
BOD 5 day mg/l	2.6	4.4	NA	2.0
MPN Fecal Coliform MPN/100 ml	<2.0	NA	<2.0	<2.0
MPN Total Coliform MPN/100 ml	8.0	NA	<2.0	<2.0
Oil and Grease mg/l	2.70	0.80	NA	4.00
Suspended Solids mg/l	4.0	2.0	NA	4.2
Total Chlorine mg/l	1.58	3.17	NA	2.14
pH Units	7.68	7.50	NA	7.70

Sampling Date:	1/13/82	2/9/82	3/9/82	4/14/82
003				
BOD 5 day mg/l	6.6	6.5	7.0	1.8
MPN Fecal Coliform MPN/100 ml	3,300	2.0	5.0p	<2.0
MPN Total Coliform MPN/100 ml	13,000	79.0	130	1,700
Oil and Grease mg/l	2.20	<1.0	1.20	1.6
Suspended Solids mg/l	12.0	15.0	3.2	4.0
Total Chlorine mg/l	3.11	2.46	3.78	0.06
pH Units	7.40	7.40	7.70	7.70

SURFACE WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	5/17/82	6/8/82	7/13/82	8/11/82
003				
BOD 5 Day mg/l	3.7	3.5	12.6	9.5
MPN Fecal Coliform MPN/100 ml	<2.0	<2.0	5.0	<2.0
MPN Total Coliform MPN/100 ml	79.0	1,300	13,000	4,900
Oil and Grease mg/l	4.0	1.8	13.0	0.6
Suspended Solids mg/l	16.0	22.0	18.0	8.5
Total Chlorine mg/l	<0.01	<0.01	<0.01	<0.01
pH Units	7.90	7.80	7.50	7.90

Sampling Date:	9/15/82	10/12/82	11/19/82	12/8/82
003				
BOD 5 Day mg/l	7.0	5.0	2.0	2.1
MPN Fecal Coliform MPN/100 ml	<2.0	<2.0	<2.0	<2.0
MPN Total Coliform MPN/100 ml	<2.0	21.0	<2.0	11.0
Oil and Grease mg/l	0.4	0.8	0.6	0.6
Suspended Solids mg/l	16.0	18.0	8.0	15.0
Total Chlorine mg/l	<0.01	5.48	0.63	0.83
pH Units	7.30	7.60	NA	7.60

Sampling Date:	1/12/83	2/9/83	3/9/83	4/13/83
003				
BOD 5 day mg/l	4.4	5.2	5.0	2.8
MPN Fecal Coliform MPN/100 ml	<2	<2	<2	<2
MPN Total Coliform MPN/100 ml	<2.0	79.0	<2.0	33.0
Oil and Grease mg/l	<0.2	0.2	<0.2	<0.2
Suspended Solids mg/l	24.0	13.0	12.0	4.0
Total Chlorine mg/l	0.84	0.07	4.22	0.34
pH Units	7.80	7.50	7.50	7.60

Sampling Date:	5/10/83	6/8/83
003		
BOD 5 day mg/l	3.2	3.90
MPN Fecal Coliform MPN/100 ml	<2	2
MPN Total Coliform MPN/100 ml	<2.0	22.0
Oil and Grease mg/l	<0.2	0.6
Suspended Solids mg/l	12.0	14.0
Total Chlorine mg/l	0.09	<0.02
pH Units	7.90	7.80

GROUND WATER QUALITY DATA - GENEVA COAL MINE

Sampling Date:	2-81	3-81	4-81	5-81
RS2				
Flow (gpm)	NA	NA	NA	20
Acidity as CaCO3 mg/l	< 0.1	< 0.1	2.50	4.00
Alkalinity as CaCO3 mg/l	500.00	434.00	418.00	450.00
Dissolved Iron mg/l	0.032	0.060	NA	0.390
Iron as Fe (Total) mg/l	0.040	0.190	0.160	0.440
Manganese as Mn (Tot) mg/l	< 0.001	0.050	0.010	0.050
Suspended Solids mg/l	NA	NA	NA	9.0
Total Dissolved Solids mg/l	900	900	1,000	900
pH Units	8.10	7.80	8.00	8.20

Sampling Date:	6-81	7-81	8-81	9-81
RS2				
Flow (gpm)	NA	34	24	25
Acidity as CaCO3 mg/l	< 0.01	4.00	4.00	< 0.01
Alkalinity as CaCO3 mg/l	424.00	424.00	416.00	430.00
Dissolved Iron mg/l	0.010	<0.001	<0.001	0.018
Iron as Fe (Total) mg/l	0.400	0.010	0.070	0.420
Manganese as Mn (Tot) mg/l	0.010	0.010	0.010	0.009
Suspended Solids mg/l	113	14.0	5.0	8.0
Total Dissolved Solids mg/l	900	950	900	950
pH Units	8.10	7.80	8.10	8.10

Sampling Date:	10-81	11-81	12-81	4-82
RS2				
Flow (gpm)	30	30	24	20
Acidity as CaCO3 mg/l	< 0.01	< 0.01	< 0.01	< 0.01
Alkalinity as CaCO3 mg/l	79.00	486.00	388.00	494.00
Dissolved Iron mg/l	0.020	NA	0.015	NA
Iron as Fe (Total) mg/l	0.450	0.465	0.460	<0.001
Manganese as Mn (Tot) mg/l	0.015	0.025	0.017	0.010
Suspended Solids mg/l	6.1	NA	2.0	7.0
Total Dissolved Solids mg/l	950	900	900	1,050
pH Units	8.30	8.10	8.30	7.80

Sampling Date:	5-82	6-82	7-82	8-82
RS2				
Flow (gpm)	30	30	25	30
Acidity as CaCO3 mg/l	6.00	18.00	5.00	<0.01
Alkalinity as CaCO3 mg/l	520.20	411.00	500.00	536.00
Dissolved Iron mg/l	NA	0.010	0.030	0.060
Iron as Fe (Total) mg/l	0.060	0.010	0.030	0.150
Manganese as Mn (Tot) mg/l	0.005	0.002	0.005	0.015
Suspended Solids mg/l	7.0	11.0	<1.0	5.0
Total Dissolved Solids mg/l	886	900	950	862
pH Units	7.80	7.60	7.60	8.20

NA = NOT AVAILABLE

Sampling Date:	9-82	10-82	4-83
RS2			
Flow (gpm)	25	30	20
Acidity as CaCO3 mg/l	< 0.01	5.00	NA
Alkalinity as CaCO3 mg/l	318.30	552	NA
Dissolved Iron mg/l	0.045	0.040	NA
Iron as Fe (Total) mg/l	0.056	0.049	0.180
Manganese as Mn (Tot) mg/l	0.010	0.012	0.003
Suspended Solids mg/l	11.0	8.0	61.0
Total Dissolved Solids mg/l	946	910	966
pH Units	8.10	7.80	7.90

Sampling Date:	1-81	2-81	3-81	4-81
2WB				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	<0.1	<0.1	2.0	3.60
Alkalinity as CaCO3 mg/l	184.00	168.00	162.00	150.00
Dissolved Iron mg/l	0.420	0.050	0.040	0.030
Iron as Fe (Total) mg/l	0.640	0.060	0.060	0.070
Manganese as Mn (Tot) mg/l	0.030	0.020	0.020	0.020
Suspended Solids mg/l	59.0	10.0	8.0	8.0
Total Dissolved Solids mg/l	2,200	2,200	2,100	2,200
pH Units	7.40	8.00	7.70	8.10

Sampling Date:	5-81	6-81	7-81	8-81
2WB				
Flow (gpm)	3	3	5	7
Acidity as CaCO3 mg/l	5.70	<0.01	10.80	<0.01
Alkalinity as CaCO3 mg/l	124.00	140.00	350.00	210.00
Dissolved Iron mg/l	0.140	0.033	0.150	0.146
Iron as Fe (Total) mg/l	0.360	0.075	0.380	0.410
Manganese as Mn (Tot) mg/l	0.030	0.025	0.027	0.020
Suspended Solids mg/l	19.0	13.0	15.0	1.0
Total Dissolved Solids mg/l	2,300	2,400	2,050	2,200
pH Units	8.00	8.10	7.60	7.90

Sampling Date:	9-81	10-81	11-81	12-81
2WB				
Flow (gpm)	3	3	3	3
Acidity as CaCO3 mg/l	2.00	<0.01	<0.01	<0.01
Alkalinity as CaCO3 mg/l	265.00	198.10	203.30	228.20
Dissolved Iron mg/l	0.136	0.150	0.150	0.150
Iron as Fe (Total) mg/l	0.390	0.380	0.380	0.400
Manganese as Mn (Tot) mg/l	0.022	0.025	0.025	0.027
Suspended Solids mg/l	24.0	17.0	13.0	7.0
Total Dissolved Solids mg/l	2,200	2,175	2,200	2,175
pH Units	8.10	7.90	8.10	8.20

NA = NOT AVAILABLE

GROUND WATER QUALITY MONITORING
GENEVA COAL MINE

RS-2

Sample Date:	9/13/78	9/16/79	8/8/80	9/24/80
Aluminum, Al mg/l	0.31	0.010	0.310	NA
Ammonia, NH3 mg/l	NA	NA	<0.01	NA
Arsenic, As mg/l	<0.001	<0.001	<0.001	NA
Antimony as Sb mg/l	<0.001	<0.001	0.060	NA
Barium, Ba mg/l	0.210	0.050	0.030	NA
Beryllium as Be mg/l	0.020	<0.001	<0.001	NA
Bicarbonate, HNO3 mg/l	NA	NA	534.36	NA
Boron, B mg/l	0.315	0.190	0.090	NA
Cadmium, Cd mg/l	<0.001	<0.001	<0.001	NA
Calcium,Ca mg/l	49.6	168.00	52.00	NA
Carbonate, CO3 mg/l	<0.01	<0.01	1.20	NA
Chloride, Cl mg/l	22.0	22.0	30.0	NA
Chromium, Cr mg/l	<0.001	<0.001	<0.001	NA
Cobalt as Co mg/l	0.005	0.004	<0.001	NA
Copper, Cu mg/l	0.004	0.006	0.020	NA
Flouride, F mg/l	0.24	0.19	0.18	NA
Flow gpm	NA	9	30	30
Germanium as Ge mg/l	<0.001	<0.002	<0.001	NA
Hardness, CaCO3 mg/l	NA	NA	460	NA
Iron, Fe (total) mg/l	0.018	<0.001	0.310	0.080
Lead, Pb mg/l	0.003	<0.001	<0.001	NA
Magnesium, Mg mg/l	72.0	16.80	79.20	NA
Manganese, Mn mg/l	0.016	0.012	0.010	0.010
Mercury, Hg mg/l	<0.0002	<0.0002	<0.0002	NA
Molybdenum, Mo mg/l	0.16	<0.001	<0.001	NA
Nickel, Ni mg/l	<0.001	0.001	<0.001	NA
Nitrate, NO3-N mg/l	0.04	0.45	<0.01	NA
Nitrite, NO2-N mg/l	<0.01	<0.01	<0.01	NA
Phosphate, PO4 mg/l	0.055	0.060	0.010	NA
Potassium, K mg/l	NA	NA	1.57	NA
Selenium, Se mg/l	<0.001	0.004	<0.001	NA
Silver as As mg/l	<0.001	0.001	<0.001	NA
Sodium, Na mg/l	140.9	170.00	171.00	NA
Sulfate, SO4 mg/l	300.0	350	320	NA
Sulfide, S mg/l	NA	NA	<0.01	NA
Suspended Solids mg/l	9.0	1.0	10.0	14.0
Total Dissolved Solids mg/l	920	900	925	1,000
Total Kjeldahl Nitrogen mg/l	<0.01	0.10	0.22	NA
Vanadium as V mg/l	0.25	<0.001	<0.001	NA
Zinc, Zn mg/l	0.018	0.017	0.020	NA
pH Units	NA	NA	NA	7.70

NA - Not Available

JBR Data

CHEMTECH
28 EAST 1500 NORTH
OREM, UTAH 84057
(801) 226-8822

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U009230

DATE SAMPLED: 11-6-85

TIME SAMPLED: 1500

SAMPLED BY: Martz

LOCATION: RB-21 H-1

COMMENTS: metals - dissolved

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	365
Ammonia as NH_3-N, mg/l	0.15
Arsenic as As, mg/l	0.012
Barium as Ba, mg/l	0.060
Bicarbonate as HCO_3, mg/l	445
Boron as B, mg/l	0.59
Cadmium as Cd, mg/l	<.005
Calcium as Ca, mg/l	27.5
Carbonate as CO_3, mg/l	0
Sulfide as S, mg/l	<.05
Molybdenum as Mo, mg/l	<.005

PARAMETER	LEVEL
Chloride as Cl, mg/l	12.6
Chromium as Cr (Hex.), mg/l	<.005
Chromium as Cr (Total), mg/l	<.005
Conductivity, umhos/cm	866
Copper as Cu, mg/l	0.020
Fluoride as F, mg/l	0.17
Hardness as $CaCO_3$, mg/l	399
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.248
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.022
Magnesium as Mg, mg/l	48.2
Manganese as Mn, mg/l	0.020
Mercury as Hg, mg/l	0.0003
Nickel as Ni, mg/l	0.006
Nitrate as NO_3-N, mg/l	0.27
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	0.042
Potassium as K, mg/l	1.92
Selenium as Se, mg/l	<.002
Silica as SiO_2 (Dissolved), mg/l	10.44
Silver as Ag, mg/l	<.005
Sodium as Na, mg/l	89.8
Sulfate as SO_4, mg/l	115
Total Dissolved Solids, mg/l	581
Turbidity, NTU	--
Zinc as Zn, mg/l	0.10
pH Units	7.69

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28 EAST 1500 NORTH
OREM, UTAH 84057
(801) 226-8822

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U009231

DATE SAMPLED: 11-8-85

TIME SAMPLED: 1130

SAMPLED BY: Martz

LOCATION: RB-26 H-6

COMMENTS: metals - dissolved

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	375
Ammonia as NH_3-N, mg/l	0.15
Arsenic as As, mg/l	0.010
Barium as Ba, mg/l	0.050
Bicarbonate as HCO_3, mg/l	457
Boron as B, mg/l	1.07
Cadmium as Cd, mg/l	<.005
Calcium as Ca, mg/l	32.5
Carbonate as CO_3, mg/l	0
Sulfide as S, mg/l	<.05
Molybdenum as Mo, mg/l	0.016

PARAMETER	LEVEL
Chloride as Cl, mg/l	27.1
Chromium as Cr (Hex.), mg/l	<.005
Chromium as Cr (Total), mg/l	<.005
Conductivity, umhos/cm	1300
Copper as Cu, mg/l	0.010
Fluoride as F, mg/l	0.38
Hardness as $CaCO_3$, mg/l	401
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.023
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.024
Magnesium as Mg, mg/l	68.8
Manganese as Mn, mg/l	<.005
Mercury as Hg, mg/l	0.0005
Nickel as Ni, mg/l	<.005
Nitrate as NO_3-N, mg/l	0.48
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	0.016
Potassium as K, mg/l	1.84
Selenium as Se, mg/l	0.004
Silica as SiO_2 (Dissolved), mg/l	10.71
Silver as Ag, mg/l	<.005
Sodium as Na, mg/l	161
Sulfate as SO_4, mg/l	251
Total Dissolved Solids, mg/l	892
Turbidity, NTU	--
Zinc as Zn, mg/l	0.06
pH Units	7.87

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OREM, UTAH 84057
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CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U009220

DATE SAMPLED: 11-8-85

TIME SAMPLED: 1015

SAMPLED BY: Martz

OCATION: EWL-25 H-18

COMMENTS: metals - dissolved

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	377
Ammonia as NH_3-N, mg/l	0.12
Arsenic as As, mg/l	0.012
Barium as Ba, mg/l	0.120
Bicarbonate as HCO_3, mg/l	460
Boron as B, mg/l	0.37
Cadmium as Cd, mg/l	<.005
Calcium as Ca, mg/l	29.6
Carbonate as CO_3, mg/l	0
Sulfide as S, mg/l	<.05
Molybdenum as Mo, mg/l	<.005

PARAMETER	LEVEL
Chloride as Cl, mg/l	25.2
Chromium as Cr (Hex.), mg/l	<.005
Chromium as Cr (Total), mg/l	<.005
Conductivity, umhos/cm	1010
Copper as Cu, mg/l	0.030
Fluoride as F, mg/l	0.24
Hardness as $CaCO_3$, mg/l	343
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.040
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.024
Magnesium as Mg, mg/l	52.8
Manganese as Mn, mg/l	<.005
Mercury as Hg, mg/l	0.001
Nickel as Ni, mg/l	<.005
Nitrate as NO_3-N, mg/l	0.11
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	0.025
Potassium as K, mg/l	1.64
Selenium as Se, mg/l	<.002
Silica as SiO_2 (Dissolved), mg/l	10.76
Silver as Ag, mg/l	<.005
Sodium as Na, mg/l	123
Sulfate as SO_4, mg/l	107
Total Dissolved Solids, mg/l	641
Turbidity, NTU	--
Zinc as Zn, mg/l	0.10
pH Units	7.58

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28 EAST 1500 NORTH
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CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants
2556 East Oak Creek Circle
Sandy, UT 84092

LAB NO.: U009221

DATE SAMPLED: 11-8-85

TIME SAMPLED: 0945

SAMPLED BY: Martz

LOCATION: EWL-26 H-21

COMMENTS: metals - dissolved

PARAMETER	LEVEL
Alkalinity as $CaCO_3$, mg/l	152
Ammonia as NH_3-N, mg/l	0.15
Arsenic as As, mg/l	0.011
Barium as Ba, mg/l	0.220
Bicarbonate as HCO_3, mg/l	186
Boron as B, mg/l	0.22
Cadmium as Cd, mg/l	<.005
Calcium as Ca, mg/l	13.4
Carbonate as CO_3, mg/l	0
Sulfide as S, mg/l	<.05
Molybdenum as Mo, mg/l	<.005

PARAMETER	LEVEL
Chloride as Cl, mg/l	21.0
Chromium as Cr (Hex.), mg/l	<.005
Chromium as Cr (Total), mg/l	<.005
Conductivity, umhos/cm	525
Copper as Cu, mg/l	0.013
Fluoride as F, mg/l	0.10
Hardness as $CaCO_3$, mg/l	152
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.105
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.011
Magnesium as Mg, mg/l	20.4
Manganese as Mn, mg/l	0.008
Mercury as Hg, mg/l	0.0008
Nickel as Ni, mg/l	<.005
Nitrate as NO_3-N, mg/l	0.29
Nitrite as NO_2-N, mg/l	<.005
Phosphate as PO_4-P, mg/l	0.025
Potassium as K, mg/l	0.67
Selenium as Se, mg/l	0.004
Silica as SiO_2 (Dissolved), mg/l	10.90
Silver as Ag, mg/l	<.005
Sodium as Na, mg/l	72.1
Sulfate as SO_4, mg/l	77.2
Total Dissolved Solids, mg/l	347
Turbidity, NTU	--
Zinc as Zn, mg/l	0.09
pH Units	7.86

CHEMTECH

1989 Water Monitoring Data

Water Quality and Flow Dynamics - Surface and Groundwater
Horse Canyon Mine
(N = number of samples)

Parameter	Units	Sample Site RS-2				Sample Site D-1				Sample Site RF-1				Sample Site HC-1				Sample Site 2HB				Sample Site 9E2				
		Mean	Max.	Min.	N	Mean	Max.	Min.	N	Mean	Max.	Min.	N	Mean	Max.	Min.	N	Mean	Max.	Min.	N	Mean	Max.	Min.	N	
1 Flow	(gpm)	23.92	34.00	9.00	25	256	650	0	18	11.36	25.00	0.00	22	20.95	65.00	0.00	19	3.59	7.00	3.00	22	1.00	1.00	1.00	19	1
2 pH	standard	7.95	8.36	7.37	27	8.03	8.00	7.00	15	8.20	8.60	7.60	22	8.05	8.40	7.70	22	7.90	8.20	7.40	22	7.95	8.50	7.50	22	2
3 Temp	o C	9.00	10.00	8.00	7					11.00	11.00	11.00	2	13.83	20.00	10.00	6									3
4 Conductivity	umhos/cm	2410.29	2700.00	2200.00	7					2500.00	2700.00	2300.00	2	3766.67	3900.00	3600.00	6									4
5 Dissolved Oxygen	ppm	6.47	8.10	4.20	7					4.40	4.90	3.90	2	5.77	7.40	4.30	6									5
6 Acidity as CaCO3	mg/l	2.69	10.00	0.00	16	0.75	6.00	0.00	14	2.21	14.00	0.00	19	1.47	10.00	0.00	15	2.05	12.00	0.00	22	2.65	14.00	0.00	22	6
7 Alkalinity as CaCO3	mg/l	432.23	552.00	79.00	18	394.20	1095.00	291.60	14	400.50	537.00	46.00	19	629.47	905.00	211.00	15	203.96	350.00	124.00	22	316.60	439.00	210.00	22	7
8 Aluminum	mg/l	0.063	0.310	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									8
9 Antimony as Sb	mg/l	0.020	0.060	0.000	3																					9
10 Arsenic	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									10
11 Barium	mg/l	0.029	0.210	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.00	6									11
12 Beryllium as Be	mg/l	0.007	0.020	0.000	3																					12
13 Bicarbonate	mg/l	510.30	581.00	330.00	8					424.50	513.00	336.00	2	684.83	537.00	426.00	6									13
14 Boron	mg/l	0.190	0.315	0.090	10					0.100	0.100	0.100	2	0.200	0.400	0.16	6									14
15 Cadmium	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.00	6									15
16 Calcium	mg/l	63.10	160.00	30.20	10					48.00	52.00	44.00	2	63.33	83.90	41.10	6									16
17 Carbonate	mg/l	8.27	70.00	0.00	10					44.00	72.00	16.00	2	6.00	19.00	0.00	6									17
18 Chloride	mg/l	22.8	30.0	19.7	10					24.2	26.3	22.0	2	32.3	43.0	13.0	6									18
19 Chromium	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.00	0.00	0.00	6									19
20 Cobalt as Co	mg/l	0.003	0.005	0.000	3																					20
21 Copper	mg/l	0.003	0.020	0.000	10					0.000	0.000	0.000	2	0.00	0.00	0.00	6									21
22 Fluoride	mg/l	0.37	0.52	0.18	10					0.63	0.70	0.40	2	0.61	1.01	0.19	6									22
23 Germanium as Ge	mg/l	0.000	0.000	0.000	3																					23
24 Hardness	mg/l	402	460	310	8					410	433	387	2	717	872	271	6									24
25 Iron Dissolved	mg/l	0.052	0.390	0.000	14	0.443	0.920	0.020	12	0.206	1.900	0.000	17	0.052	0.160	0.010	13	0.125	0.420	0.020	20	0.606	10.350	0.002	20	25
26 Iron Total	mg/l	0.293	0.210	0.000	29	1.086	10.000	0.060	15	101.004	3000.000	0.020	22	2.447	49.300	0.020	22	0.220	0.600	0.050	22	0.743	13.200	0.000	22	26
27 Lead	mg/l	0.000	0.003	0.000	8					0.000	0.000	0.000	2	0.000	0.000	0.000	6									27
28 Magnesium	mg/l	61.10	102.00	0.00	10					70.45	70.00	70.10	2	70.50	133.00	33.00	6									28
29 Manganese	mg/l	0.000	0.000	0.000	7					0.000	0.000	0.000	2	0.000	0.000	0.000	6									29
30 Manganese as Mn (Tot)	mg/l	0.014	0.050	0.000	23	0.076	0.313	0.010	13	0.047	0.360	0.000	20	0.136	1.450	0.010	16	0.021	0.030	0.003	22	0.020	0.115	0.000	22	30
31 Mercury	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									31
32 Molybdenum	mg/l	0.016	0.160	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									32
33 Nickel	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									33
34 Ammonia	mg/l	0.27	0.80	0.00	8					0.32	0.44	0.20	2	0.00	0.20	0.00	6									34
35 Nitrate	mg/l	0.70	3.46	0.00	10					0.06	0.12	0.00	2	0.27	1.24	0.00	6									35
36 Nitrite	mg/l	0.00	0.07	0.00	10					0.01	0.02	0.00	2	0.01	0.03	0.00	6									36
37 Phosphate	mg/l	0.013	0.060	0.000	10					0.000	0.000	0.000	2	0.002	0.010	0.000	6									37
38 Potassium	mg/l	4.25	12.40	0.00	8					2.30	2.00	1.00	2	6.33	8.10	2.60	6									38
39 Selenium	mg/l	0.000	0.000	0.000	10					0.000	0.000	0.000	2	0.000	0.000	0.000	6									39
40 Silver as Ag	mg/l	0.000	0.000	0.000	3																					40
41 Sodium	mg/l	105.59	400.00	140.00	10					179.50	180.00	179.00	2	204.50	224.00	184.00	6									41
42 Sulfate	mg/l	306	675	79	10					298	300	298	2	485	817	232	6									42
43 Sulfide	mg/l	0.00	0.00	0.00	8					0.00	0.00	0.00	2	0.00	0.00	0.00	6									43
44 Suspended Solids	mg/l	16.0	113.0	0.0	18	88.3	640.0	3.0	15	120.3	1640.0	0.0	20	151.2	2132.0	1.0	16	10.0	59.0	1.0	22	0.6	20.0	1.0	22	44
45 TDS	mg/l	930	1380	774	29	1910	2700	362	15	964	1800	847	22	1386	1760	800	22	2435	3920	2050	22	2106	2875	1630	22	45
46 Total Kjeldahl Nitrog	mg/l	0.11	0.22	0.00	3																					46
47 Vanadium as V	mg/l	0.00	0.25	0.00	3																					47
48 Zinc	mg/l	0.019	0.120	0.000	10					0.000	0.000	0.000	2	0.004	0.012	0.000	6									48

NOTE: 0 = below detection limit - see individual analysis for detection limit

Prepared 2-2-90

KAISER COAL CORPORATION
HORSE CANYON MINE
ACT/007/013

1989 WATER MONITORING DATA

SAMPLE LOCATION: B - 1 (Horse Canyon Wash Below Mine) * INACCESSIBLE

Parameter	Units	Jan 89	Feb 89	Mar 89	Apr 89	May 89	June 89	July 89	Aug 89	Sep 89	Oct 89	Nov 89	Dec 89
Flow	(gpm)	*	*	0	0	0	0	0	0	0			
pH	standard												
Temp	o C												
Conductivity	umhos/cm												
Dissolved Oxygen	ppm												
Aluminum	mg/l												
Arsenic	mg/l												
Barium	mg/l												
Bicarbonate	mg/l												
Boron	mg/l												
Cadmium	mg/l												
Calcium	mg/l												
Carbonate	mg/l												
Chloride	mg/l												
Chromium	mg/l												
Copper	mg/l												
Flouride	mg/l												
Hardness	mg/l												
Iron Total	mg/l												
Lead	mg/l												
Magnesium	mg/l												
Manganese	mg/l												
Mercury	mg/l												
Molybdenum	mg/l												
Nickel	mg/l												
Ammonia	mg/l												
Nitrate	mg/l												
Nitrite	mg/l												
Phosphate	mg/l												
Potassium	mg/l												
Selenium	mg/l												
Sodium	mg/l												
Sulfate	mg/l												
Sulfide	mg/l												
TDS	mg/l												
Zinc	mg/l												

KAISER COAL CORPORATION
HORSE CANYON MINE
ACT/007/013

1989 WATER MONITORING DATA

AMPLE LOCATION: HC - 1 (Horse Canyon Wash) * INACCESSIBLE

arameter	Units	Jan 89	Feb 89	Mar 89	Apr 89	May 89	June 89	July 89	Aug 89	Sep 89	Oct 89	Nov 89	Dec 89
low	(gpm)	*	*	3	3	6	9	<1	<1	0			
H	standard			8.33	8.48	7.88	7.78	8.02	8.1				
emp	o C			10	13	12	10	18	20				
onductivity	umhos/cm			3700	3900	3600	3800	3800	3800				
issolved Oxygen	ppm			4.3	4.8	5.2	6.3	6.6	7.4				
luminum	mg/l			<.1	<.1	<.1	<.1	<.1	<.1				
rsenic	mg/l			<.01	<.01	<.01	<.01	<.01	<.1				
arium	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
icarbonate	mg/l			424	491	537	499	514	456				
oron	mg/l			0.22	0.4	0.22	0.157	0.18	0.26				
admium	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
alcium	mg/l			41.1	83.9	41.1	80.7	74.1	59.2				
arbonate	mg/l			19	9.5	12.3	0	0	0				
hloride	mg/l			29.3	33.1	13	43	34.1	41.3				
hromium	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
opper	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
luoride	mg/l			0.32	0.66	0.14	0.86	0.68	1.01				
ardness	mg/l			766	697	271	872	834	863				
ron total	mg/l			0.182	0.17	0.02	0.055	0.07	0.102				
ead	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
agnesium	mg/l			102	112	38.4	33	53.1	133				
anganese	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
ercury	mg/l			<.0002	<.0002	<.0002	<.0002	<.0002	<.0002				
olybdenum	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
ickel	mg/l			<.01	<.01	<.01	<.01	<.01	<.01				
mmonia	mg/l			0.18	<.1	0.28	<.2	<.2	<.2				
itrate	mg/l			0.257	<.1	1.24	<.01	<.02	0.13				
itrite	mg/l			0.028	<.01	<.005	<.01	0.0065	<.005				
hosphate	mg/l			<.01	<.01	<.01	<.01	<.01	0.01				
otassium	mg/l			8.1	6.1	5.5	8	2.6	7.8				
elenium	mg/l			<.002	<.002	<.002	<.002	<.002	<.002				
odium	mg/l			202	224	197	202	184	218				
ulfate	mg/l			560	724	232	281	294	817				
ulfide	mg/l			<.1	<.1	<.1	<.1	<.1	<.1				
DS	mg/l			1400	1420	824	800	1635	1760				
inc	mg/l			<.01	<.01	0.012	0.012	<.01	<.01				

KAISER COAL CORPORATION
HORSE CANYON MINE
ACT/007/013

1989 WATER MONITORING DATA

PLE LOCATION: RF - 1 (Right Fork, Horse Canyon Wash) * INACCESSIBLE

ameter	Units	Jan 89	Feb 89	Mar 89	Apr 89	May 89	June 89	July 89	Aug 89	Sep 89	Oct 89	Nov 89	Dec 89
w	(gpm)	*	*	<1	<1	0	0	0	0	0			
	standard			8.45	8.51								
p	o C			11	11								
ductivity	umhos/cm			2300	2700								
solved Oxygen	ppm			3.9	4.9								
minum	mg/l			<.1	<.1								
enic	mg/l			<.01	<.01								
lum	mg/l			<.01	<.01								
arbonate	mg/l			336	513								
on	mg/l			0.18	0.18								
mium	mg/l			<.01	<.01								
cium	mg/l			52.8	44.8								
bonate	mg/l			72	16								
oride	mg/l			22	26.3								
omium	mg/l			<.01	<.01								
per	mg/l			<.01	<.01								
uride	mg/l			0.78	0.48								
dness	mg/l			433	387								
n Total	mg/l			0.144	0.065								
d	mg/l			<.01	<.01								
nesium	mg/l			70.8	70.1								
ganese	mg/l			<.01	<.01								
cury	mg/l			<.0002	<.0002								
ybdenum	mg/l			<.01	<.01								
kel	mg/l			<.01	<.01								
onia	mg/l			0.2	0.44								
rate	mg/l			<.01	0.12								
rite	mg/l			0.021	<.01								
sphate	mg/l			<.01	<.01								
assium	mg/l			1.8	2.8								
enium	mg/l			<.002	<.002								
lium	mg/l			180	179								
fate	mg/l			308	288								
fide	mg/l			<.1	<.1								
	mg/l			847	876								
c	mg/l			<.01	<.1								

Table 7.–Summary of chemical constituents and bacteria in water at gaging station 09314374 in Horse Canyon, August 1978 through September 1979

	Parameters and constituents	No. of analyses	Mean	Minimum-maximum
	Discharge (cubic feet per second)	12	-	<0.01-1.20
	Water temperature (degrees Celsius)	12	18.0	6.0-27.0
	Specific conductance (micromhos per centimeter)	12	2,800	1,390-7,000
	pH (units)	12	-	8.5-8.7
Milligrams per liter	Dissolved solids, sum of constituents	12	1,960	953-4,220
	Oxygen, dissolved (O_2)	12	7.8	6.1-10.6
	Carbon dioxide, dissolved (CO_2)	12	2.1	1.2-4.7
	Alkalinity ($CaCO_3$)	12	350	290-380
	Bicarbonate (HCO_3)	12	398	338-444
	Carbonate (CO_3)	12	16	8-26
	Oil and grease	3	-	0
	Nitrogen, dissolved (N)	2	-	0.83-0.89
	Nitrogen, organic dissolved (N)	4	.31	0.20-0.46
	Nitrogen, ammonia dissolved (N)	4	.19	0-0.42
	Nitrogen, nitrite dissolved (N)	4	.03	0.02-0.06
	Nitrogen, nitrate dissolved (N)	4	.54	0.19-1.20
	Nitrogen, ammonia + organic suspended total (N)	4	.16	0.08-0.25
	Nitrogen, nitrite + nitrate dissolved (N)	4	.57	0.21-1.20
	Nitrogen, ammonia + organic total (N)	4	.66	0.50-0.85
	Phosphorus, total (P)	4	.02	0-0.04
	Phosphorus, ortho dissolved (P)	4	.005	0-0.02
	Carbon, organic dissolved (C)	4	4.0	1.8-8.8
	Hardness, (as $CaCO_3$)	12	790	420-1,600
	Hardness, (as noncarbonate $CaCO_3$)	12	440	99-1,400
	Calcium, dissolved (Ca)	12	98	61-210
	Magnesium, dissolved (Mg)	12	130	65-260
	Sodium, dissolved (Na)	12	360	130-1,000
	Sodium-adsorption-ratio	12	5.7	1.4-12.0
	Potassium, dissolved (K)	12	11	5.7-26
	Chloride, dissolved (Cl)	12	160	18-1,500
	Sulfate, dissolved (SO_4)	12	960	440-1,300
	Fluoride, dissolved (F)	4	.3	0.2-0.4
	Silica, dissolved (SiO_2)	12	11	10-15
Micrograms per liter	Arsenic, dissolved (As)	4	-	1
	Boron, dissolved (B)	4	260	0-360
	Chromium, dissolved (Cr)	4	5	0-10
	Iron, dissolved (Fe)	4	20	10-30
	Lead, dissolved (Pb)	4	15	0-47
	Manganese, dissolved (Mn)	4	15	10-20
	Strontium, dissolved (Sr)	4	1,400	1,100-2,000
	Zinc, dissolved (Zn)	4	20	10-30
	Lithium, dissolved (Li)	4	200	50-630
	Selenium, dissolved (Se)	4	1.2	0-3
	Phenols	4	1.2	1-2
	Bacteria (colonies per 100 milliliters)			
	Coliform, fecal	2	-	3-5
	Streptococci, fecal	1	-	84

Utah American Energy

	IPA #1	IPA#2	IPA#3	L-1-S	L-2-S	L-3-S	L-4-S	L-5-G	L-6-G	L-7-G	L-8-G	L-9-G	L-10-G	L-11-G	L-12-G
	Piezometers			Lila Int.	R ForkLila	R Fork Lila	Sed Pond	Mine Water	H-18	Cott Wood	S-10	16-z	(S-14)	new 18-A	new 12 D
	Water Elevation Only				Above	Below	Not Constructed								
1993															
2										May	May	May	May		May
3															
4									Oct	Oct	Oct	Oct	Oct	Oct	Oct
1994															
2									May	May	May				May
3	July Aug	July Aug	July Aug						Aug	Aug	Aug	Aug	Aug		Aug
4									Oct	Oct	Oct	Oct	Oct		Oct
1995															
2	May	May	May						May	May	May	May	May		May
3	Aug	Aug	Aug						Aug	Aug	Aug	Aug	Aug		Aug
4									Oct	Oct	Oct	Oct	Oct		Oct
1996															
2	Apr	Apr	Apr												
3															
4															
2000															
2															
3				Jul Aug Se	Jul Aug Se	Jul Aug Se									
4		Dec		Oct No De	Oct No De	Oct No De									
2001				Jan Feb M	Jan Feb M	Jan Feb M									
2	May	May	May	Apr May J	Apr May J	Apr May J			June		June				
3	Sep	Sep	Sep	Jul Aug Se	Jul Aug Se	Jul Aug Se			July	July	July	July	July		
4	Oct	Oct	Oct	Oct Nov D	Oct Nov D	Oct Nov D			Oct	Oct	Oct	Oct	Oct	Oct	Oct
2002	Mar	Mar	Mar	Jan Feb M	Jan Feb M	Jan Feb M			Mar	Mar	Mar	Mar	Mar	Mar	Mar
2				Apr	Apr	Apr									
3															
4															

Utah American Energy

	IPA #1	IPA#2	IPA#3	L-1-S	L-2-S	L-3-S	L-4-S	L-5-G	L-6-G	L-7-G	L-8-G	L-9-G	L-10-G	L-11-G	L-12-G
	Piezometers			Lila Int.	R ForkLila	R Fork Lila	Sed Pond	Mine Water	H-18	Cott Wood	S-10	16-z	(S-14)	new 18-A	new 12 D
	Water Elevation Only				Above	Below	Not Constructed								
1993															
2										May	May	May	May		May
3															
4									Oct	Oct	Oct	Oct	Oct	Oct	Oct
1994															
2									May	May	May				May
3	July Aug	July Aug	July Aug						Aug	Aug	Aug	Aug	Aug		Aug
4									Oct	Oct	Oct	Oct	Oct		Oct
1995															
2	May	May	May						May	May	May	May	May		May
3	Aug	Aug	Aug						Aug	Aug	Aug	Aug	Aug		Aug
4									Oct	Oct	Oct	Oct	Oct		Oct
1996															
2	Apr	Apr	Apr												
3															
4															
2000															
2															
3				Jul Aug Se	Jul Aug Se	Jul Aug Se									
4		Dec		Oct No De	Oct No De	Oct No De									
2001				Jan Feb M	Jan Feb M	Jan Feb M									
2	May	May	May	Apr May J	Apr May J	Apr May J			June		June				
3	Sep	Sep	Sep	Jul Aug Se	Jul Aug Se	Jul Aug Se			July	July	July	July	July		
4	Oct	Oct	Oct	Oct Nov D	Oct Nov D	Oct Nov D			Oct	Oct	Oct	Oct	Oct	Oct	Oct
2002	Mar	Mar	Mar	Jan Feb M	Jan Feb M	Jan Feb M			Mar	Mar	Mar	Mar	Mar	Mar	Mar
2				Apr	Apr	Apr									
3															
4															

Appendix 5-7
Refuse Pile

General

The proposed Lila Canyon Mine includes a site and plan for permanent disposal of coal refuse, as shown on Plate 5-2. Although washing of coal is not proposed, it is likely that some coal processing waste will be generated by the operation of the screening plant and from the mine itself. Additional rock slope material (refuse) will be generated by the construction of the rock slopes.

The rock slope work will generate approximately 16,650 bank cubic yards of underground development waste. Using a 1.5 bulking or swell factor, the total amount of loose yard of rock slope material to be disposed of in the refuse area is estimated to be 25,000 yd^3. See Figure 1, Appendix 5-7 for cross sections of the refuse area and Table 1 for potential refuse storage volumes.

The amount of coal processing waste will be generated by the operation of the screening plant and from the mine itself. The amount of coal processing waste or refuse expected to be generated by this operation is difficult to predict but expected to be very insignificant.

Table 1
Lila Canyon Mine
Rock Slope - Refuse Storage Area

X-Section	Topsoil Ft2	Cover Material Ft2	SlopeRock or Refuse Ft2	Topsoil VolumeYd3 to Pile	Cover Material Volume Yd3	SlopeRock or Refuse Yd3	Total Top Soil to Pile Yd3	Total Cover Material	Total Refuse
4+00	0	0	0						
5+00	180	300	776	333.33	555.556	1437.04	333.3	555.6	1437
6+00	315	475	1482	916.67	1435.19	4181.48	1250	1991	5619
7+00	312	545	1405	1161.1	1888.89	5346.3	2411	3880	10965
8+00	487	700	2512	1479.6	2305.56	7253.7	3891	6185	18219
9+00	469	787	3057	1770.4	2753.7	10313	5661	8939	28531
10+00	439	787	2766	1681.48	2914.81	10783.3	7343	11854	39315
11+00	0	0	0	812.963	1457.41	5122.22	8156	13311	44437

As can be seen by Table 1 the area identified for refuse disposal is large enough to dispose of approximately 44,437 yd^3 of material. The rock slope material is expected to take up approximately 25,000 leaving approximately 19,500 yd^3 capacity for future underground mine waste and coal processing waste production.

The disposal site will be comprised of two separate sections. The first section (Structural Fill) will be comprised of rock from the rock slopes and will not contain any coal. The Structural Fill site will not require an MSHA number. The second section (Refuse Site) will be for the disposal of coal mine waste.

The following sections will describe the ground preparation, refuse placement, and reclamation procedures for the refuse area. All the refuse will be placed in an incised area.

Ground Preparation

Vegetation and topsoil will be removed from the proposed refuse site and stored in the topsoil pile as shown on Plate 5-2 and Figure 1, Appendix 5-7. Subsoil will then be removed from the area as shown on Figure1. The subsoil will be pushed to the side using the blade of a caterpillar. The hole that is made by pushing the subsoil to the side will be filled by refuse material, either from the rock slope development and or coal processing waste or underground development waste as per Figure 1.

Placement of Refuse

Refuse will be dumped into the hole created from the removal of the subsoil. The refuse will be placed in the hole as per Figure 1. Once the hole is filled to the level shown in Figure 1 the subsoil will then be placed over the top of the refuse and another hole will be constructed by removing subsoil adjacent to the previous hole. The topsoil removal and storage, subsoil removal, hole being filled with refuse, and subsoil replacement, procedure will be repeated as additional refuse disposal area is needed.

Refuse Testing

Material from the rock slope portals will be tested three times during their development. The first test will be during the initial startup of the rock slopes. The second test will be when the development reaches the mid construction phase. The last test will be taken near the completion of the project.

Material placed in the refuse pile from normal mining operations will be tested approximately every 10,000 tons. Testing parameters for the rock slope material and normal mining refuse will be as per Table 2.

Refuse Pile

The refuse pile has been designed to provide a location for the storage of underground development waste that is brought to the surface and for any excess slope rock which will be generated and not used as fill. The capacity of the pile is designed for 150,000 tons which is in excess of projected needs. The refuse pile design is shown in Appendix 5-7 and shown on Plate 5-2.

Sediment Pond

The sediment pond has been design to provide for adequate sediment protection for the project area. All water running off the disturbed area will be routed into the sediment pond for treatment. The sediment pond has been designed according to the appropriate R645 regulations and the designs can be found in Appendix 7-4 and Plate 7-6. Because the sediment pond does not fit into the requirement of 30 CFR 77.216(a) an MSHA number for the proposed pond is not required. The sediment pond is located on the south-west end of the property and shown on Plate 5-2.

Slope Access Road

The slope access road splits off the facility access road near the north-east corner of the equipment and supply storage area, and follows an alignment that takes into consideration grade and direct access. The slope access road will be used to provide access to the roc slopes which in-turn proved access to the underground workings. The slope access road will be used as access for all men, material and equipment need in the mine. Since the slope access road provides for frequent access for men, equipment and materials for a period of six months or longer the slope access road is classified as a primary road. The slope access road will be designed, constructed, and maintained according to appropriate R645 regulations. The slope access road is shown on Plate 5-2.

Rock Slopes

Access to the underground workings of the Lila Canyon Mine will be provide by two rock slopes driven from the top of the Mancos shale up-dip to the intersection of the coal seam. One portal will proved for access for men, equipment and material to the mine. The second access slope will contain the run of mine belt line from the underground workings of the mine to the run of mine stock pile. There is a possibility that only one larger slope will be driven and then divided. to provide for two separate entries. The two 1,227 foot long slopes will slope up at approximately 12%, from a

starting elevation of approximately 6150'. The intersection of the coal seam and the rock slope will take place at approximately 6,300 feet elevation. The length of the slopes were minimized by taking advantage of the coal seam dip which is approximately 12% to the east. The rock material removed from the slopes will be used as fill material for the surface facilities. The rock slope material will contain mostly shale, sandstone and mudstone. Traces of coal may be found but the amount will be insignificant. There are no known coal seams or significant rider seams found below the Sunnyside Seam in the Lila Canyon Portal Area. The rock slope locations are shown on Plate 5-2.

Ventilation Fan

The ventilation fan will be accessed and installed from underground. The ventilation portal will be driven from underground and broken from inside out. The location of the portal and fan is shown on Plate 5-2. Fan power will be run underground. Fan access for maintenance and monitoring will be from the underground works. The need for surface fan access is not anticipated at this time, access will be from underground.

ROM Underground Belt

The Run of Mine underground belt will provide for a means for coal to be conveyed from the working faces to the run of mine coal storage pile on the surface. The run of mine underground belts will travel approximately 650 feet per minute and will be 60" wide or narrower. The belts will provide capacity to convey to the surface, all coal mined in the underground workings.

ROM Storage Pile

The run of mine storage pile receives coal directly from the underground works and provides storage for the coal until it is crushed and loaded into trucks for transportation to a unit train loadout. The coal from the underground run of mine belt will be dropped into a stacking tube located in the center of the run of mine storage pile. This tube will help reduce any fugitive dust. The stacking tube will be approximately 80' high and will allow for approximately 27,000 tons of open storage in the run of mine storage pile. The run of mine storage pile is shown on Plate 5-2.

Crusher

Coal will be reclaimed from the run of mine storage pile by use of a 42" covered surface conveyor running at a speed of approximately 600 FPM. The coal will be delivered to an enclosed crusher. The enclosed crusher will crush coal from the 8" minus down to a 2" minus size, at the rate of approximately 450 tons per hour. The crushed coal will leave the crusher and be stored temporarily in a 500 ton

Appendix 5-7
Refuse Pile

General

The proposed Lila Canyon Mine includes a site and plan for permanent disposal of coal refuse, as shown on Plate 5-2. Although washing of coal is not proposed, it is likely that some coal processing waste will be generated by the operation of the screening plant and from the mine itself. Additional rock slope material (refuse) will be generated by the construction of the rock slopes.

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Price Field Office
125 South 600 West
Price, Utah 84501

2800
(UT-070)

Mr. Jay Marshall
UtahAmerican Energy Inc.
P. O. Box 986
Price, Utah 84501

JAN 15 1999

Dear Mr. Marshall:

We received your letter requesting information on the post mine land use for the public land within the Lila Canyon Mine permit area. The post mine land use for this area is wildlife habitat, grazing and incidental recreation. If you have any questions please feel free to call me at 435) 636-3600.

Sincerely,

Mark A. Mackiewicz
Realty Specialist

ENVIRONMENTAL INDUSTRIAL SERVICES
435-472-3814 • 800-641-2927 • FAX 435-472-8780 • EIS@CASTLENET.COM • 31 NORTH MAIN STREET HELPER, UTAH 84526

January 29, 1998

Bryant Anderson
Zoning Officer
Emery County Office of Planning and Zoning
Castledale, Utah 84513

Dear Mr. Anderson:

Our company is currently involved in preparing data for Chapter Four of a Mine and Reclamation Plan. The proposed mine permit area lies within Emery County and is depicted in red on the enclosed map. This map is a copy of the U.S. Bureau of Land Management, Huntington Map at a scale of 1:100,000. The general region can be described as the following sections:

Township 16S Range 14E
Sections 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, 36

Township 17S Range 14E
Sections 1, 12

Township 16S Range 15E
Sections 19, 29, 30, 31

Township 17S Range 15E
Sections 5, 6, 7, 8

The proposed portals will be located within the Southeast quarter of Section 15, Township 16S, Range 14E. The transportation and utility corridor is sketched in red on the enclosed map and will depart from Highway 191, Route 6, of the northeast corner of Township 17S, Range 13E, Section 1. We are interested in determining how this land is classified or zoned by Emery County. Please notify us of any additional information regarding this site and Emery County zoning laws.

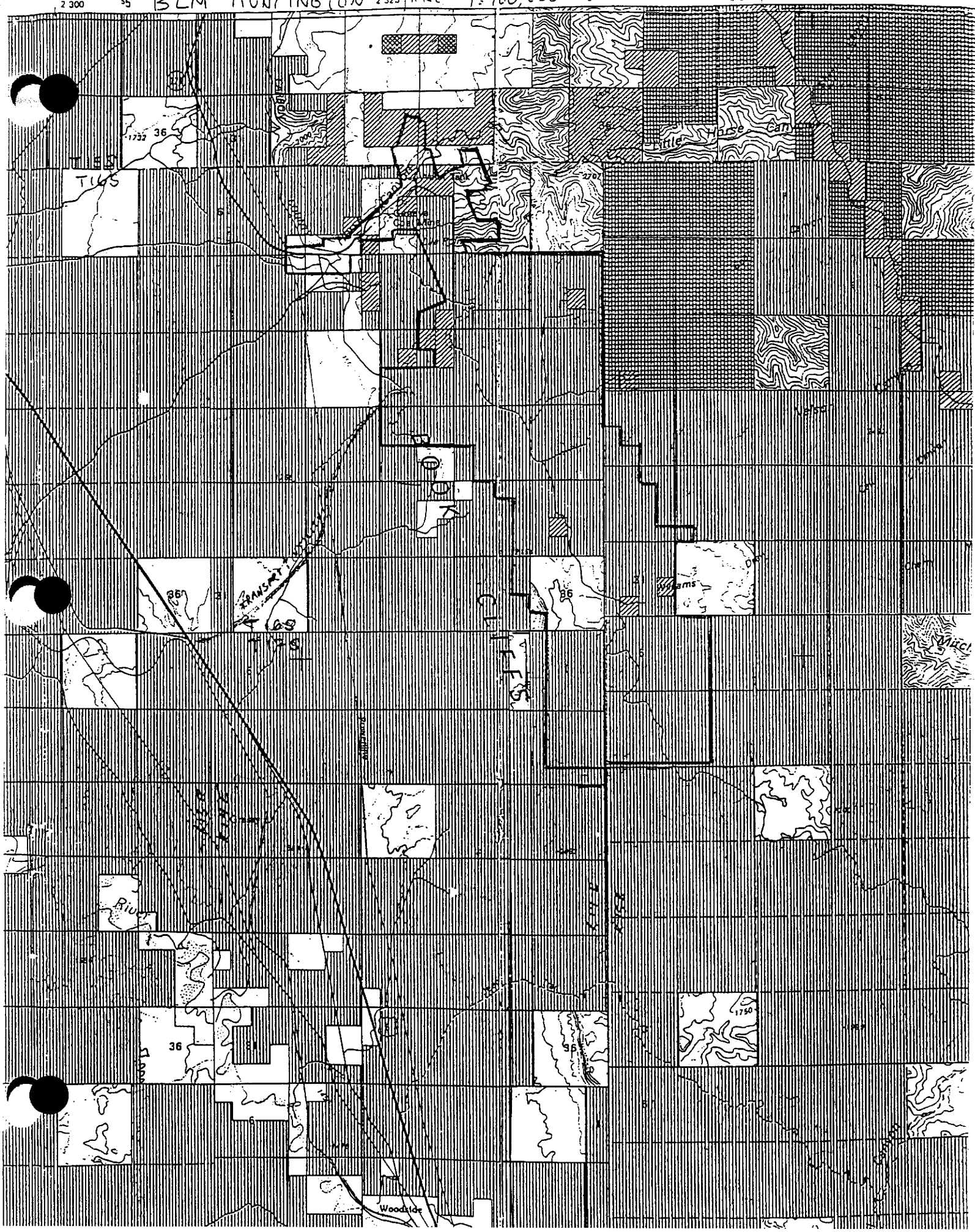
Please feel free to call me at (435) 472-3814 with questions or concerns. Thank-you for your time and effort.

Sincerely,
Allyson Traficonte
Allyson Traficonte
Engineer

c:\lila\zoning.wpd

SCALE

BLM HUNTINGTON 1:100,000



EMERY COUNTY
A Great Place to Live and Work

EMERY COUNTY PLANNING AND ZONING
Bryant Anderson, Administrator

June 4, 1999

Jay Marshall
Utah American Energy Inc
P.O. Box 986
Price Utah 84501

Dear Mr. Marshall:

This letter is to confirm that the Emery County Board of Commissioners approved a Large Scale Industrial Site Plan for the Lila Canyon Mine Operation on March 16, 1999. Enclosed is a copy of the Commission Meeting Minutes showing the approval.

If you need any further information, please call our office.

Sincerely,

Bryant Anderson

Bryant Anderson,
Zoning Administrator

Enclosure

Emery County Courthouse (Upstairs) 95 East Main Street - PO Box 417 Castle Dale, Utah 84513
Telephone: (801) 381-5374 FAX: (801) 381-5183

forward on this project and seek funding from the State to help with the costs. The Recreation Subcommittee is doing a good job in helping the project move forward. Margaret Swasey should be commended for her efforts in this area.

(6)
PUBLIC HEARING - TO RECEIVE PUBLIC COMMENT REGARDING PROPOSED LARGE SCALE SITE PLAN WHICH INCLUDES A COAL MINE IN LILA CANYON.

Mack Huntington, Planning Commission Chairman, informed the Commission that Utah American Energy Inc. has meet with the Planning Commission staff and the Planning Commission Board and both have endorsed their large scale site plan. Jay Marshall representing Utah American Energy Inc. presented a map showing where the proposed mine would be located. Construction is scheduled to begin in the summer of 1999. The site plan encompasses forty acres of land owned by the Bureau of Land Management. Access to the mine would be by Emery County roads. Rosann Fillmore asked how many jobs would be created. Mr. Marshall stated that at full capacity the mine would employ 135 people. Tony Conder asked about the company, where the headquarters were located and if they would be a union or nonunion mine. Mr. Marshall stated that the company is owned by Robert Murray. Mr. Murray is the largest independent coal producer in the United States. The company is incorporated in the State of Utah. The mine would prefer to be union free.

(7)
CONSIDERATION AND APPROVAL OF UTAH AMERICAN ENERGY INC.'S PROPOSED LARGE SITE PLAN.

Commissioner Ira Hatch made a motion to approve the large scale site plan of Utah American Energy Inc. The motion was seconded by Commissioner Randy Johnson and approved by all members present.

(8)
PLANNING/ZONING REQUESTS THE SETTING OF A PUBLIC HEARING TO RECEIVE PUBLIC COMMENT ON SITE PLAN APPROVAL FOR A GOLD MINING OPERATION.

Planning Commission Chairman Mack Huntington informed the Commission that the Planning Commission Board has finished the preliminary work on a site plan for GoldTerra, Inc. The site plan is for a gold mining operation at the Blue Castle mine site. Mr. Huntington requested that the Commission set a date for a public hearing to receive public comment on the proposed site. Commissioner Ira Hatch made a motion to set a public hearing for April 6, 1999 at 5:30 p.m. to receive public comment on the above proposal. The motion was seconded by Commissioner Randy Johnson and approved by all members present.

EMERY COUNTY
A Great Place to Live and Work

Road Department

February 23, 2000

Jay Marshall
UtahAmerican Energy, Inc.
P. O. Box 986
Price, Utah 84501

Dear Mr. Marshall:

In regards to your recent inquiry, yes Emery County understands that there is a distinct probability that UEI will be performing mining and reclamation activities within a 100' distance from a County Road. This was specifically discussed during the Planning and Zoning Commission phases of your County Permit and is discovered in item seven (7) of the Agreement made between UtahAmerican Energy, Inc. (UEI) and Emery County Dated October 19, 1999.

We have no problem with this issue provided that a 6' chain link fence is installed around UEI's activities at a distance of 100' from the public road as protection from any normal hazards generally associated with your industry. If I can be of further assistance don't hesitate to call.

Sincerely,

Rex Funk,
Road Supervisor

RF\ls

Castle Dale, Utah 84513 • Telephone (801) 381-5450 • FAX (801) 381-5239

SOUTHEASTERN UTAH ASSOCIATION OF LOCAL GOVERNMENTS

Milovich
Chairman

William D. Howell
Executive Director

375 South Carbon Ave.
P.O. Drawer 1106
Price, Utah 84501
(435) 637-5444
FAX (435) 637-5448

April 29, 1999

Dick Manus
P.O. Box 7004
Price, UT 84501

Dear Mr. Manus:

The purpose of this letter is to request your response to a couple questions pertinent to the wilderness re-inventory. Because of the "fast track" nature of the public participation component of the re-inventory, I ask that you or your staff provide a response as quickly as possible.

Question 1: I understand that as of February 14, 1999, BLM has managed re-inventory tracts found by the field teams to possess wilderness characteristics as wilderness study areas pending a final agency decision. Is this true?

Question 2: I understand that as of February 14, 1999, BLM has reviewed, or is reviewing, all management decisions that have been made, or which are pending, to determine whether those decisions or pending decisions will result in impairment to tracts found to have wilderness qualities as a result of the wilderness re-inventory. Is this true?

Question 3: If either question #1 or #2 is true, or true in part, would you peruse your files and make available to me, all internal memoranda and, or instructional directives, issued from what ever source, that either discuss or direct such management or review?

I am aware of the demands being placed on your staff above and beyond normal duties and recognize that additional requests from the public only add to the stress that you are currently under. I apologize if the above request adds to that situation. However, the importance of the decisions are about to be made and the pace that has been set by the department have created the urgency with which I present this request.

I sincerely appreciate your prompt response to this request.

Sincerely,

Bill Howell

William D. Howell
Executive Director

WDH:lb

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Price Field Office
125 South 600 West
Price, Utah 84501

8500/1600
(UT-070)

MAY 11 1999

William D. Howell, Executive Director
Southeastern Utah Association of Local Governments
PO Drawer 1106
Price, Utah 84501

Dear Mr. Howell:

Here are the answers to the three questions raised in your letter of April 29, 1999:

Question 1: Your understanding is incorrect. BLM will not manage any of the inventory areas as wilderness study areas (WSAs) until the current statewide planning project is completed, and at that time WSA management will only apply to those areas formally established as WSAs in approved amendments to land use plans.

Question 2: Your statement is partially correct. BLM decided about 10 days ago to make a statewide list of all applications for activities within inventory areas found to have wilderness characteristics. Such activities include permits, rights-of-ways, etc., which have been approved since February 14, 1999, are pending, or may be forthcoming (according to advance information BLM may have received from prospective applicants). Such a list will enable BLM to consider actions within the inventory areas on a consistent basis statewide. On April 26, 1999, BLM field office managers were requested by telephone to compile information for this list and send it to the BLM State Office within the next few days.

Question 3: Management to be applied on inventory lands during the planning process of one of the Question-Answer items on the BLM Internet site. A copy from that site is enclosed The only other written material regarding this subject is the memorandum of April 15, also enclosed.

Sincerely,

Richard L. Manus
Field Manager

2 Enclosures
1. Q&A Reprint from Internet
2. Leshy Memo of April 15

RECEIVED
MAY 12 1999
SOUTHEASTERN UTAH ASSOCIATION OF LOCAL GOVERNMENTS

Post-it® Fax Note 7671	Date 4/19	# of pages ▶
To Tom Rasmussen	From Roger Zortman	
Co./Dept. Price	Co.	
Phone #	Phone #	
Fax # 435-636-3657	Fax #	

...rtment of the Interior

...HE SOLICITOR
...ington, D.C. 20240

1849-1999

IN REPLY REFER TO:

Memorandum

APR 15 1999

To: Utah State Director, Bureau of Land Management

From: John Leshy, Solicitor

Subject: Land Use Planning and the Utah Wilderness Inventory--1999

On February 4, 1999, the BLM completed a comprehensive field examination and document review under the authority of section 201 of the Federal Land Policy and Management Act (FLPMA) regarding wilderness characteristics of certain lands in Utah (the 1999 Wilderness Inventory). On March 18, 1999, BLM began a statewide planning effort to determine whether additional Wilderness Study Areas (WSAs) should be established under section 202 of FLPMA on the public lands identified as having wilderness characteristics in the 1999 Wilderness Inventory. These events have given rise to questions regarding management standards and processes applicable to these lands, including compliance with FLPMA and the National Environmental Policy Act (NEPA).

While the planning process is being completed on lands found to have wilderness characteristics in the 1999 Wilderness Inventory, the management prescriptions of existing land management plans do not change. For example, if current land management plans have designated lands open for mineral leasing, they remain open for leasing. Management prescriptions may be changed only through amendment of the land management plans, following the procedures of section 202 of FLPMA and implementing regulations at 43 CFR Subpart 1610.

As you may recall, the Secretary of the Interior had asked the Director of the BLM on November 1, 1993 to give "careful attention" to development proposals that could limit Congress' ability to designate certain BLM areas in Utah (H.R. 1500 lands) as wilderness. State Director Matt Millenbach elaborated on this policy in his letter to Representative Hansen on March 29, 1995 by outlining the standard NEPA review and public involvement process to be followed on these lands. Attached are copies of this guidance. This same policy should continue, but the area covered should be modified to conform with public lands identified as having wilderness characteristics in the 1999 Wilderness Inventory.

Specifically, in completing its Environmental Assessment (EA) or Environmental Impact Statement (EIS) on any proposed actions within inventory areas, the BLM should address whether the approval of the proposed action would harm existing wilderness characteristics so as to negate the eligibility of the lands for wilderness designation in the future. Proposed actions may be modified by appropriate protective stipulations, relocations, or redesigns to reduce the

effect on wilderness characteristics. If the BLM determines that the proposed action would harm wilderness characteristics so as to negate the eligibility of the lands for wilderness designation, the BLM must consider among its alternatives in its EA or EIS the no action alternative, which would preserve the land's eligibility for wilderness designation.

It is permissible to conduct the required NEPA analysis through the NEPA compliance that will accompany the plan amendment process being conducted to consider the results of the 1999 Wilderness Inventory, rather than through an action-specific NEPA process.

cc: Director, Bureau of Land Management
Associate Solicitor for Land and Water
Counselor to the Secretary Molly McUnic

App 1-5

Melvin A. Coonrod
Owner, EIS

Mel Coonrod has a Bachelors of Science Degree in Vertebrate Zoology and Chemistry, a Masters Degree in Silviculture, and Post-Graduate work in ecology. Mel has a wide range of experience in the environmental arena. Beginning as an instructor in two major universities, then into the private sector where he built the largest reforestation TSI contracting firm in the Intermountain West, planting in excess of one million trees per year. In the mid-1970's, he was hired by Getty Oil Company as an environmental coordinator; and completed the second Approved Mine Reclamation Plan in Utah. When Texaco purchased Getty Oil in 1981, Mel founded EIS Environmental Industrial Service. Under his direction, the firm has implemented numerous NEPA documents, PAP's, LBA's. reclamation and engineering plans throughout the west. The first two coal mines to receive Phase III Bond Release were projects in which EIS played a major role in both planning and implementation. Mel is licensed in engineering; landscape architecture; general contracting; and is certified for Threatened, Endangered, and Sensitive Species surveys; wetland delineation; raptor inventories; asbestos inspection; and numerous MSHA ratings. He is also a licensed pilot and a fully certified diver in open water, with scuba ratings in various areas.

In addition to his vast experience in a variety of fields, he has published a number of articles and has worked extensively with several government agencies in developing training films and literature used to instruct both industry and agency personnel in areas of reclamation and wildlife enhancement. Mel's philosophy relative to development is to create a win-win scenario, wherein the resource can be utilized in a cost-effective manner, while at the same time the environment can be enhanced to such a degree through cost-effective mitigation that there is no net loss for the life of the project. (Full resume attached).

David K. Steed
Project Manager/Ecologist

Mr. Steed (B.S. Ecology, 1993 Idaho State University) is an experienced Environmental Consultant and Project Manager with highly developed administrative and decision-making skills. Since joining EIS in 1993, he has overseen the coordination and management of regulatory documentation and baseline analysis required for state and federal mandates. Mr. Steed develops and acts as primary author of most of the NEPA and EPA related regulatory documentation produced, and is proficient with all CERCLA, RCRA, and TSCA related documentation. He is able to interface with agency personnel on all levels and in the absence of the supervisor, is responsible for the functions of the firm. Other specific duties include the supervision of water, soil and vegetation monitoring; wetland delineations, threatened, endangered and sensitive species inventories, stream classification, aquatic restoration, compliance coordination, reclamation supervision, GIS mapping, marketing solicitation; and contract management.

In 1998, Mr. Steed conducted an independent review for the Utah Regulatory Office of the U.S. Army Corp of Engineers of developed wetland mitigation projects throughout the state of Utah. Through his role as Lead Project Ecologist, his study was utilized to determine the rate of functional success, as well as to develop a set of guidelines for insuring the success of future projects. Associated duties while assisting the COE included independent review of federal wetland guidelines, wetland delineations, project management assistance, new-site review and interagency coordination on policy action and design.

Other studies that Mr. Steed has been associated with include: a nutrient cycling stream study in

Yellowstone National Park for the National Park Service to examine the impacts to burned watersheds from the 1988 fire; a two-year Department of Energy telemetry study at the Idaho Nuclear Engineering Laboratory upon the potential for radioisotope transport by small mammals; a comparative U.S. Forest Service stream study in Southeastern Idaho to determine the level of stream degradation from year-long grazing; and numerous toxicity studies to determine the impact of heavy metals, pesticides, and nutrient enrichment upon salmonid communities. (Full resume attached).

David D. Varner
Biologist

David graduated in May of 1999 from Southern Utah University with a Bachelors of Interdisciplinary Science with an emphasis in Plant Science. He worked as an Assistant Laboratory Supervisor for Anadalex Resources for three years. In that capacity, David was responsible for maintaining quality of coal test results, and environmental compliance of the Wildcat Loadout surface facility. He is also licensed by the State of Utah as a private pesticide applicator. He has also conducted Environment Reviews for Federal Housing Authority and Housing and Urban Development grants.

Since joining EIS in May of 2000 David has conducted Threatened, Endangered, and Sensitive species surveys, raptor inventories, and has written corresponding reports for these studies. He has also participated and supervised in reclamation and mine surface compliance work.

As a lifetime resident of Eastern Utah, David is very familiar with the environmental issues that effect rural communities. Being a third generation agriculturist, Dave understands that conservation of our natural resources is vital to our future generations.

Carl East
Biologist

Carl graduated in December of 1995 from Adams State College with a Bachelors of Science in Biology with a field emphasis. He worked as a fishery technician for Utah State University, where he assisted in the surgery placing ultrasonic radio tags inside cutthroat trout. In 1996, Carl worked for the U.S. Forest Service in the state of Colorado, there he maintained and constructed motorized trails. Carl was responsible for the clearing of the timber, cleaning and building water diversion structures and informing users about the Colorado Off Highway Coalition Program.

Carl joined the EIS team in 1998, he has been involved with inventories such as Threatened, Endangered and Sensitive Species surveys, Vegetation Surveys, Wildlife Delineation of Habitat Constituents. He has worked extensively with aquatics and aquatic environments and is currently over the fisheries program for the Nest Purse Indian Nation.

Melvin A. Coonrod
Owner/Principal Consultant
Environmental Industrial Services

EXPERIENCE

Owner/Principal Consultant - Environmental Industrial Services (EIS), Helper, Utah

1990 to Present: Environmental Industrial Services (EIS) operates two distinct divisions and maintains a fully staffed office of college trained consultants that are involved in all phases of biological and physical monitoring of potential disturbance. Duties include vegetation baseline studies, wildlife, soils, and threatened and endangered species inventories, riparian and wetland classification, environmental assessments, environmental impact statements, mine reclamation plans (MRP), lease buy applications (LBA), etc. In addition, the staff works with and coordinates with a number of local, state and federal agencies to facilitate permits and compliance with federal and state regulations.

Mr. Coonrod also provides reclamation/revegetation and construction project management. This involves the oversight and coordination of a large variety of heavy equipment and a substantial labor force, subcontractors, skilled technicians, etc. to implement the work. Projects include all aspects of construction from total mine construction with associated support facilities to demolition and the total reclamation of abandoned and obsolete mine facilities. This is followed with environmental monitoring to assist and insure bond release.

Co-Owner - B & R Reclamation, Helper, Utah

1983 - 1990: Performed reclamation contracting for the following clients:
Husky Oil Company, M.K. Contracting, Getty Oil Co., Skyline Mine, Plateau Mine, Exxon Oil Co., Price River Coal Co., Soldier Creek Coal, Trail Mountain Coal, Beaver Creek Coal, Co-Op Mining Co., Kaiser Coal Co., Blackhawk Coal Co., Rancho Energies, Amoco Oil Co., Marathon Oil Co., U.S.G.S., and Amax Mining Co.

Co-Op Mining Co. - Salaried Position, Permitting and Compliance.
Beaver Creek Coal - Hydrologic Monitoring, Mines 3,2,4,6,7, and CV Spur.
Summit Coal Co. - Mine and Reclamation Plan Preparation, submittal January 1984.
Exxon Oil Co. - Drill Site Reclamation Plan.
U.S. Fuel - Ocular Monitoring of Revegetation Success.
R & M Consultants - Stability Analysis Compaction Testing Sediment Ponds, Genwal Coal Co.
Longmire Coal Co. - Inspection of Coal Loading, U.S. Government Contracts.
College of Eastern Utah - Instructor, Taught Reclamation Practices, Spring Quarter 1983.
A.E.P. Blackhawk Coal Co. - Environmental Engineer, Maintain Utah Coal Properties.

Environmental Coordinator Permitting and Compliance - Getty Oil Company, Price, Utah

1980 - 1983: All phases of mine plan approval, environmental assessment on proposed unit-train loadout, reclamation plans including methods, species, and procedures though train loadout, reclamation contracts and work on property in 1981 in excess of $400,000.00.

Supervised all monitoring of hydrology subsidence, climate, wildlife and revegetation efforts. Handled compliance efforts relative to all state, federal and local regulations including toxic waste, raptors and subsidence.

Residential, Licensed General B-1 Contractor - State of Utah

1971 - 1981: Working in all phases of construction, averaging +20 homes per year. Involved in subdivision development and light commercial construction. Owned and operated construction and Real Estate offices in Carbon and Emery Counties.

Teacher - Carbon County School District, Price, Utah

1970 - 1973: Teaching Botany, Zoology, and Ecology. Was instrumental in changing curriculum design to offer a wider range of subjects rather than general science. Set up and maintained a fully enclosed herpatarium within the school including both tropical and desert life zones with representative plants and animal life of each.

T.S.I. and Reforestation Contractor

1967 - 1977: Worked for: United States Forest Service, Bureau of Land Management, B.I.A. and Boise Cascade Lumber Co. as a prime contractor in Arizona, New Mexico, Utah, Wyoming, Idaho, Colorado, and Montana. Work involved implementation of site preparation, thinning and planting. Supervised a crew of 40+ men in addition to heavy equipment. Worked as a consultant on private grounds, recommending species and procedures to revegetate denuded areas.

Teacher - Weber State College, Ogden, Utah

1965 - 1967: Teaching assistance in entomology and physiology under Dr. Earl Smart, Taught bacteriology, entomology, and physiology.

EDUCATION

Utah State University - Utah
M.F. Silviculture -1970
Secondary Certification - Ecology/ Botany
Post Graduate work in Ecology

Weber State College - Utah
B.S. Zoology - 1967
Minor - Chemistry

PROFESSIONAL LICENSES & CERTIFICATIONS

General Contractor, Classification - B-100
Engineering - S-310
Landscape Architecture - S-330
Earth Moving - B-100-A
Blaster - Utah, Arizona, New Mexico, Arkansas.
MSHA - Refuse and Sediment Pond Inspection.
Asbestos -Inspection and Compliance, Utah.
Opacity Inspector - DEQ Visual Emission, Utah.
Threatened and Endangered Species Inventories - BLM.
NEPA and Biological Consultant - BLM - Utah, New Mexico, Arizona, Colorado, & Nevada.
USFS Manti-LaSal National Forest Approved TES Consultant.
Utah State Division of Wildlife Resources TES and Raptor Consultant.
USFWS Certified Mexican Spotted Owl Surveyor.
USACOE Certified Section 404 Wetland Delineator.
Utah State DEQ Certified On-Site Wastewater Treatment Design, Soil Evaluation & Percolation Testing.
BIA certified on TE&S Species - Utah, Arizona, New Mexico and Colorado for a number of Indian Nations

AWARDS & CERTIFICATES

National Wildlife Certificate of Appreciation - Reclamation Practices.
Wildlife Society - Conservation Achievement Award.
Utah State University - Outstanding Reclamation Award 1986 & 1987.
Board of Director - Carbon County Country Club.
Board of Director - East Duck Club.
Utah Agro-Forester of the Year - 2001
Chairman Local DU Chapter

PUBLICATIONS

Coal Mining and Wildlife. slide presentation in cooperation with UDWR, presently being utilized by the majority of mine in Utah as a training program.

Enhancement Methods to Increase Vegetation of Critical Valued Winter Mule Deer Range. N.P. Seminar, February 1983.

Riparian Enhancement on Coal Properties with Intermediate Streams. NPI Seminar, January 1989, Salt Lake City.

Burnout Canyon Reclamation Project, methodologies and Success. University of Colorado Reclamation Seminar, July 1994.

David K. Steed
Project Manager
EIS Environmental & Engineering Consulting

SUMMARY OF SUPPORTIVE QUALIFICATIONS AND CAREER OBJECTIVE

An experienced Environmental Consultant and Project Manager with highly developed administrative and decision-making skills. Expertise in regulatory procedures, site design and proposal preparation, environmental monitoring and systems design, as well as a developed background in terrestrial and aquatic ecology.

EMPLOYMENT HISTORY

Ecologist/Environmental Consultant - EIS Environmental & Engineering Consulting, Helper, UT

1993 to Present: Coordination and management of regulatory documentation and baseline analysis required for state and federal mandates. Specific duties include: supervision of water, soil and vegetation monitoring; wetland delineation; stream classification; aquatic restoration; threatened, endangered and sensitive (TES) species monitoring; compliance coordination; reclamation supervision; marketing solicitation; and contract management. Federally certified to conduct threatened, endangered and sensitive species inventories. Coordinate and act as primary author of most of the NEPA and EPA related regulatory documentation produced. Interface with agency personnel on all levels and in the absence of the supervisor, responsible for the functions of the firm. Also proficient with all CERCLA, RCRA, and TSCA related documentation.

Project Ecologist - U.S. Army Corp of Engineers, Utah Regulatory Office, Bountiful, UT

1998: Review and analysis of on-going wetland mitigation projects throughout the state of Utah to determine the rate of success, as well as to determine a set of guidelines for insuring the success of future projects. Specific duties included review of federal wetland guidelines, wetland delineations, project management assistance, new-site review and interagency coordination on policy action and design.

Ecological Technician - CERE Environmental Research Group, Pocatello, ID

1991 to 1993: Primary design and collection of ecological data associated with several on-going studies. Studies included: a nutrient cycling stream study in Yellowstone N.P. to examine the impacts to burned watersheds from the 1988 fire, a two year telemetry study at the Idaho Nuclear Engineering Laboratory upon the potential for radioisotope transport by small mammals, a comparative U.S. Forest Service stream study in Southeastern Idaho to determine the level of stream degradation from year-long grazing, and numerous toxicity studies to determine the impact of heavy metals, pesticides, and nutrient enrichment upon salmonid communities.

Field Technician - Idaho Department of Fish and Game, Pocatello, ID

1988 to 1991: Coordinated numerous wildlife population dynamics studies. Directed field collection in the absence of the supervising biologist.

EDUCATION

Idaho State University: B.S. 1993. Major - Ecology; Minors - Geology, English and Philosophy

Course work emphasized stream ecology, geology, environmental law, and outdoor recreation management. Specific experience with GIS technology, remote sensing and data logging equipment. Extensive use and expertise with Windows, Corel, Wordperfect, Quattro and ArcView.

Utah BLM Approved NEPA and Biological Consultant
Utah BLM Approved TES Consultant
Utah BLM Approved Third Party Monitor and ROW Preparer
Approved BLM NEPA and Biological Consultant in New Mexico, Idaho, Arizona, Colorado and Nevada
USFS Manti-LaSal NF Approved NEPA and Biological Consultant
USFS Manti-LaSal NF Approved TES Consultant
Utah State Division of Wildlife Resources TES and Raptor Consultant
USFWS Certified Mexican Spotted Owl Surveyor
USFWS Certified Southwestern Willow Flycatcher Surveyor
USACOE Certified Section 404 Wetland Delineator
International Erosion Control Association - Member

COMMUNITY AFFILIATIONS

Castle Country Anglers-Trout Unlimited - Member
Castle Country Council for the Arts and Humanities - Board Member
Emery County Tourism Economic Development - Board Member
Utah Division of Community Development/Helper Main Street Program - Board Member
Utah Department of Transportation - U.S. Highway 191/6 Interchange Planning
Helper Arts Festival - Board Member
BSA Troop 282 - Committee Member

PROJECTS AND RELATED EXPERIENCE

1998: Project manager and third party coordinator, Environmental Assessment for Andalex Resources and Carbon County Westridge Project, Carbon County, Utah.

Project manager and third party coordinator, Environmental Assessment for Chandler & Associates Gas Field Development, Emery County, Utah.

Project Manager and agency liaison, Mine and Reclamation Plan for Marblehead Lime Company, Toole County, Utah.

Supervise analysis for threatened, endangered and sensitive plant, animal and insect species in Southeastern Utah for numerous federal projects

1997: Coordinate resource evaluation and project design for Ferron Coalbed Methane projects, Environmental Assessments for proposed Texaco E&P, Inc. Exploration, Emery County, Utah.

Supervise evaluation and alternative design, and address all associated permitting, Environmental Assessment for proposed PacifiCorp Barn Canyon Transmission Line Realignment, Carbon County, Utah.

Supervised resource evaluation, impact analysis, and associated permitting, Environmental Assessment for Dugout Canyon Road, Carbon County, Utah.

1996-93: Conducted raptor inventories, emphasizing sensitive species/nesting habitat within the Wasatch Plateau and Book Cliffs for various developments in Carbon, Emery and Wasatch Counties, Utah.

1996-95: Assist in project design and supervision, Mountain Coal/ARCO 2,7&8 Mine Reclamation, Carbon County, Utah. Coordinate revegetaion requirements and design.

1996-95: Analyzed natural resource impacts involved in a Lease-Buy Application for a 5000 Acre land acquisition by Genwal Resources from Manti-La Sal NF, Emery County, Utah.

1995: Supervised development and alternative evaluation process, for a proposed gas pipeline in Nine Mile Canyon, Carbon-Duschene Counties, Utah. Coordinated the assessment with 7 separate Indian Nations (Shoshone (3), Shoshone-Bannock, Navajo, Hopi, & Ute) with established cultural rights within the area.

Project manager for development and ROW/resource impact evaluation, Environmental Assessment for proposed PacifiCorp Helper-National 138 kV Transmission Line, Carbon County, Utah.

Conducted a series of Phase I Environmental Audits for Utah Railway, Mountain Coal, and several realty offices

Project manager for development and resource impact evaluation of proposed route and alternatives, Environmental Assessment for PacifiCorp, Trail Mountain 69 Kv Transmission Line, Emery County, Utah. Prime author of document.

1994: Conducted a full riparian inventory of soils, vegetation, and habitat available to macrobenthic organisms and associated wildlife along Crandall Creek in Emery County, Utah for Genwal Resources in association with Manti-La Sal NF and UDWR.

Conducted resource development and baseline analysis for Environmental Assessment for Genwal Resources of Proposed Morland Coal Loadout, Emery County, Utah. Co-authored document.

Conducted a Phase I Environmental Site Assessment of the Proposed Moab Tram for Portal

Recreation, Grand County, Utah.

1994-93: Co-supervised reclamation construction and equipment needs, AMAX Coal Sowbelly Mine Reclamation, Carbon County, Utah. Acted as liaison for mine with UDOGM in regards to project compliance.

1993: Analyzed and organized regulatory permitting included in the Banning Loadout Mining & Reclamation Plan for Soldier Creek Coal, Carbon County, Utah.

Other Experience:

Ecological Technician - CERE, Pocatello, Idaho: 1989-93

Conducted telemetry studies on Black-tailed jackrabbit populations and assisted Great Basin desert vegetation composition and nutrient cycling studies at the Idaho Nuclear Engineering Laboratory (INEL).

Developed nitrogen and micronutrient cycling study in Yellowstone National Park. The study concerned the role of detrital and chemical breakdown in terrestrial and aquatic habitats as a result of the 1988 fire.

Comparative stream study showing the effects of stream degradation on the East and West forks of Mink Creek, Idaho. Conducted toxicity testing involving the effects of nutrient enrichment, heavy metals, and pesticides upon fish.

Studied the effects of changing water levels on trout populations along Henry's Fork of the Snake River.

Each of the above potential impacts has been evaluated in the PHC (Appendix 7-3). Based on information provided in this plan to mitigate or otherwise control these impacts, the Probable Hydrologic Consequences determination is that of minimal (or no) negative impacts.

(Also See Appendix 7-3)

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

728.320 Acid/Toxic Forming Materials

(See Appendix 7-3)

728.330. What impact the proposed coal mining and reclamation operation will have on:

728.330 Impacts On:

728.331. Sediment yield from the disturbed area;

728.331 Sediment Yield

(See Appendix 7-3)

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

728.332 Water Quality Parameters

(See Appendix 7-3)

728.333. Flooding or streamflow alteration;

728.333 Flooding and Streamflow Alteration

In the event that sufficient volumes of water are encountered underground that necessitate pumping, the applicant will take the following steps:

(1) Water will be held in sumps as long as possible to promote settling;

(2) Water will be sampled prior to discharge to ensure compliance with UPDES standards;

(3) Receiving channel morphology parameters and erosion

Permit No. UTG040000
Industrial

STATE OF UTAH
DIVISION OF WATER QUALITY
DEPARTMENT OF ENVIRONMENTAL QUALITY
SALT LAKE CITY, UTAH

AUTHORIZATION TO DISCHARGE UNDER THE

UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM
(UPDES)

GENERAL PERMIT FOR COAL MINING

In compliance with provisions of the Utah *Water Quality Act, Title 19, Chapter 5, Utah Code Annotated ("UCA") 1953, as amended* (the *"Act"*),

UTAH AMERICAN ENERGY - LILA CANYON MINE

as identified in the application No. UTG040024 is authorized to discharge from two outfalls to receiving waters named:

Grassy Wash to Marsh Flat to the Price River

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on October 1, 1999.

This general permit and the authorization to discharge shall expire at midnight, April 30, 2003.

Signed this 20th day of September, 1999.

Authorized Permitting Official
Executive Secretary
Utah Water Quality Board

The following is a list of proposed monitoring sites:

Station No.	Location	Type
L-1-S	Lila Canyon	Intermittent Stream
L-2-S	Rt. Fork Lila (above mine)	Ephemeral Stream
L-3-S	Lila Canyon Below Mine	Intermittent Steam
L-4-S	Sediment Pond Discharge	UPDES
L-5-G	Mine Water Discharge	UPDES (Groundwater)
L-6-G	Mont/Leslie Spring	Spring
L-7-G	Cottonwood Spring	Spring
L-8-G	Unnamed Spring	Spring
L-9-G	Pine Spring	Spring
L-10-G	Unnamed Spring	Spring
IPA-1	Little Park Wash	Borehole
IPA-2	Little Park Wash	Borehole
IPA-3	Little Park Wash	Borehole

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", Table 7-4, "Surface Water Monitoring Parameters", and Table 7-5 "Ground 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.

731.221. The permit application will include a surface-water monitoring plan based upon the PHC determination required under R645-301-728 and the analysis of all baseline hydrologic, geologic and other information in the permit application. The plan will provide for the 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 R645-301-731 as well as the effluent limitations found in R645-301-751;

731.221 Surface-Water Monitoring Plan

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 751 (see Table 7-4).

Appendix 7-3

Probable Hydrologic Consequences Determination

Appendix 7-3
Probable Hydrologic Consequences Determination

General

The best available data to assist in making a determination of probable hydrologic consequences of the proposed operation comes from the adjacent Horse Canyon Mine, and Columbia Mines. The Columbia Mine has been closed since the late 1960's, and the Horse Canyon Mine has been closed since the early 1980's. The Horse Canyon Mine has also been reclaimed under SMCRA.

Data gathered from these mines and the surrounding hydrologic regime has been used in this determination, as well as baseline data gathered in the area of the proposed Lila Canyon Mine.

Surface Water

The climate associated with the Book Cliffs near the mine permit area can be classified as semi-arid. Precipitation averages 12 inches a year while mean annual evaporation is approximately 62 inches. Historically, heavy thunderstorms in the summer have produced runoff events in nearby drainages that have been estimated to have return periods of 100 years or greater. Local stream flow deteriorates in quality along the edges of the mountains because of water diversions, waste disposal, consumptive use, and irrigation of poorly drained, saline soils of the Mancos shale.

Baseline Data

The U.S. Geological Survey conducted a water quality study in Horse Canyon from August 1978 until September 1979 during the time that U.S. Steel operated the mine. Samples were taken monthly from the Horse Canyon Creek and analyzed for most major ions and cations and field parameters. Metals, eight nitrogen species and other minor chemical constituents were taken on a quarterly basis or less.

Between January 1981 and April 1983, baseline water quality data was collected for four surface water/spring sites B-1, HC-1, RF-1 and RS-2, and 3 UPDES Discharge Points, 001, 002 and 003, on the Horse Canyon permit area. Between 14 and 19 samples were taken and analyzed during the monitoring period depending on the site. The parameters that were analyzed were derived from Section 783.16 in the regulations. DOGM monitoring guidelines were not in force at that time.

Two other sites, RS-1, and RS-2, were sampled once a year during 1978, 1979, and 1980 and analyzed for most major chemical constituents. In addition, springs H-1, H-6, H-18, and H-21 were sampled once and analyzed for the major constituents in 1985. Third quarter data for 1989 were collected for B-1, HC-1, RF-1, and RS-2 and sampled for most of the parameters in DOGM's guidelines.

Sample sites B-1, HC-1, RF-1 and RS-2, along with the UPDES Discharge Points 001A and 001B, have been monitored since 1989 in accordance with the approved water monitoring plan for the Horse Canyon Mine (Part A). The results of this monitoring have been submitted to the Division each year with the Annual Report.

Pertinent water monitoring data for the Horse Canyon Mine is included in Appendix 7-2 of this application.

Baseline monitoring was also conducted on the proposed Lila Canyon Mine area by Earthfax Engineering in 1993-1995. This data is presented in Appendix 7-1 of this application.

All of the above referenced monitoring sites are shown on Plate 7-1.

Analysis of Data

The analysis of the Horse Canyon Creek data is complicated by the fact that the 1981-1983 and earlier data reflects the mine discharge that contributed to the base flow in the stream. The early data shows flow rates

in the lower reaches of the stream were on the order of magnitude of 10 times greater than those flows in the upper reaches. Since there is presently no mine discharge, Station B-1, located 2 miles below the mine, does not flow except in response to rainfall and snow melt. HC-1, located above the mine discharge point(s) and approximately 2.75 miles above B-1 flows due to snow melt and groundwater, about seven to eight months out of the year. Because Horse Canyon Creek is a losing stream, flow contributions from the upper channel do not reach B-1.

Even though the early data indicate a large difference in flow rates between the upper and lower reaches of Horse Canyon Creek, chemical analysis of comparable constituents show no significant differences between water at HC-1 and samples taken at B-1, which included mine discharge water. There are two exceptions. TSS is noticeably less in the lower stream probably due to prior deposition of suspended load. Average TDS is higher downsteam, since an analysis of mine water discharge data also shows elevated levels of dissolved solids. This occurs because the mine water probably originates from the Blackhawk Formation which is interbedded with some saline shale.

An analysis of base flow data from the right fork of Horse Canyon Creek and the limited data for springs indicate no anomalies that could be considered significant. H-21 has considerably lower alkalinity, bicarbonate, calcium, and sodium resulting in a lower TDS than the other two similar springs sampled. This indicates the spring is associated with a local flow system.

Data analysis of the sampling in the proposed Lila Canyon Mine area indicate flow and spring/seep characteristics similar to those in the Horse Canyon area, without the mine water discharge. Springs and seeps appear to be associated with small, non-interconnecting aquifers and flows vary widely depending on the time of year. Streams in the proposed permit area flow only in response to precipitation runoff or snow melt.

Ground Water

Mine Water

Since the proposed Lila Canyon Mine has not started, there is no specific data available on mine water. It is known however, that the exploration entries driven south form the Horse Canyon Mine into the proposed Lila Canyon mining area do contain water. The Lila Canyon Mine will eventually intercept these entries, and water may then have to be pumped from the mine. It is expected that water quality and downsteam impacts from this pumping would be very similar to those experienced in the adjacent Horse Canyon Mine.

It should be noted that the analyses of available data and lack of documented negative impacts are the primary basis for determining that there have been no "known impacts" to the channel as a result of the mining and pumping in the Horse Canyon Mine. While it is expected that any pumping from the Lila Canyon Mine would have similar results, additional steps will be taken to evaluate the before and after pumping stream morphology below Lila Canyon Mine. This will allow the permittee to make any necessary changes to reduce or eliminate negative impacts. The "before pumping" stream characteristics were not available for Horse Canyon.

Since the regional geology and hydrologic regimes of the Horse Canyon and Lila Canyon Mines are so similar, data has been extrapolated from the Horse Canyon Mine to the proposed Lila Canyon Mine. The proposed Lila Canyon Mine portals are located up-dip from areas in the mine where water is expected; therefore, the only mine water expected to reach the surface is that which is pumped. Mine water is not expected to reach the portal level or flow from the reclaimed portal level or flow from the reclaimed portals of either the reclaimed Horse Canyon Mine or the Lila Canyon Mine based on the following information:

1) Mine water level information gathered in 1986 indicates that there has been little, if any, rise in the water level since mining activities ceased.

2) The Columbia Mine also encountered the Sunnyside Fault zone and has been closed since the late 1960's. If water inflow rates were high, the mine workings would have flooded, developing a head differential between the Columbia Mine and the Horse Canyon Mine (pumped). Sieler and Baskins (1986) showed that the water quality generally drops significantly when exposed to mine workings (gon, etc). The water quality of the mine water samples from the sump locations (2 Dip, Main Slope, 2E-B) as compared to the water quality of springs in the lower stratigraphic section of the permit area show little difference in TDS. This indicates that water in the mine is not the result of inflow along the fault zone from the Columbia Mine. Either the fault zone is a poor conductor of water or the Columbia Mine Workings have not flooded much beyond the water levels in the Horse Canyon Mine while it was pumped.

3) There is evidence (presented in previous section) indicating that the regional groundwater flow direction is away from the portal openings (down structural dip). Three drill holes, IPA-1, 2 and 3 shown on Plate 7-1, indicate the maximum water levels expected. The piezometric surface of known ground ground water is shown on this plate.

4) The coal mined at Horse Canyon (as well as that at Lila Canyon) is underlain by a marine sheet sandstone (Sunnyside, see Geology, Chapter VI). Balsley (1981) did extensive petrographic work on porosity and permeability in the formation. If the water level in the mine were to ever approach the level of the portal, the Sunnyside marine sandstone would likely discharge water, preventing any head development behind the portal closures.

5) Much of the Horse Canyon Mine floor has been fractured by the effects of pillar removal, especially near the outcrop. Fracturing develops secondary porosity and enhances the permeability of the underlying Sunnyside marine sandstone. This would function as a

means to dissipate any head which might otherwise develop on the portals. The proposed longwall mining in the Lila Canyon Mine is also expected to produce floor fracturing.

6) There is a difference in elevation of about 500 feet between the lowest portal and the approximate water level in the Horse Canyon mine (1986). If the water level in the mine continues to rise, the head differential between the discharging aquifer and the mine will decrease. The decrease in head will have the direct effect of decreasing the inflow rate into the mine. The volume of water required to "fill the mine" would also have to fill the aquifer porosity above the mine, which has been dewatered throughout the history of the mine.

Based on these factors it is unlikely that the groundwater level in the zone of saturation will ever rise to the level of the portal, at any portal location for the Horse Canyon or Lila Canyon Mines. Hence, there should be no natural discharge of groundwater through any of the sealed portals. Stand pipes will be incorporated into the grading plans for the portals so that water levels can be checked annually.

Springs and Seeps

The conditions represented by existing spring and seep data reflects the impacts (if any) of 50 years of mining as well as pre-mining conditions. It is unlikely that there will be any additional measurable impacts from the mining and reclamation activities at the mine. Existing springs in the area above the mine should continue to flow, showing fluctuations which are related to variations in recharge.

Subsidence presents a potential to alter the groundwater flow regime in the area. There are two factors which tend to limit the effects of subsidence on the groundwater regime. One, the springs which supply most of the local flow discharge from the North Horn Formation. This formation or

aquifer is perched from the underlying zone of saturation and the formation contains swelling clays which tend to heal small fractures. Second, since the perched aquifer materials are lenticular, there is a greater probability that fractures in one area will not drain all the different perched aquifers because they are not interconnected.

Water flow which previously was pumped from the mine into Horse Canyon Creek has ceased. This water will now remain in the natural flow regime of the zone of saturation.

Within the permit area, the general seasonal streamflow is ephemeral. The streams generally dry up by late spring with only occasional runoff during the summer resulting from rainfall events.

Because of the presence of disturbed areas and the potential for large runoff events, the control of erosion is a prime factor in maintaining the hydrologic balance within the mine permit area. As indicated in the Sediment Control Plan, Appendix 7-4, sediment controls and a sediment pond will be constructed at the new mine site to minimize impacts. 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.

The contamination, diminution, or interruption of any water resources would not likely occur within the mine permit area. Since surface water flows only a limited part of year and will be provided protection by use of sediment controls, the major usable water resources that could potentially be effected in the area would be springs that are currently in use 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. To date no known depletion of flow and quality of surveyed springs in the Horse Canyon permit area exists, and none are expected in the Lila Canyon area, based on available data from the Horse Canyon Mine. Although pre-mining data is not available for Horse Canyon, depletion problems from subsidence are not known to have been filed and are not indicated by sampling results in Appendices 7-1 and 7-2. Therefore, it is unlikely an alternative water supply will be needed, although they have been identified in Section R645-301-727.

Based on the previous comparison of upstream and downstream data gathered on Horse Canyon Creek which incorporates the analysis from past mine discharges to the channel, water quality will not be drastically affected in the intermittent creek even in the unlikely event of natural discharge of mine water into the channel. The expected impacts to the channels of the Lila Canyon area are very likely to be similar to those at Horse Canyon due to the close proximity, and similarities of mining and drainage conditions.

Once again, this determination is based on water quality and quantity data and lack of documentation of negative impacts to the channel below Horse Canyon. Although no "pre-pumping" information is available for Horse Canyon, this information will be gathered at Lila Canyon prior to pumping. Any negative impacts to the stream channel can then be reduced or eliminated based on monitoring data.

As indicated earlier, it is likely that water will be encountered in the mining, and there is a possibility that some water may have to be discharged by pumping. If water does need to be discharged, it will be sampled and discharged in accordance with the approved UPDES Discharge Permit. If the quality parameters of the mine water do not meet UPDES standards, the water will be treated prior to discharge. Treatment may include holding/settling in the mine, pumping to retaining or sediment ponds, chemical treatment or other approved means to prevent non-compliant discharge.

If water has to be pumped from the mine, there is also a potential for alteration of downstream channel morphology. The applicant has committed to evaluating channel parameters and erosion impacts if water should be discharged.

Conclusion

Based on available data and expected mining conditions, the proposed mining and reclamation activity is not expected to proximately result in contamination, diminution or interruption of an underground or surface source of water within the proposed permit or adjacent areas which is used for domestic, agricultural, industrial or other legitimate purpose.

Table 1 Projected Water Usage	
1- Bath House/Office a. 150 @ 35 gpd/ea. = 5250 x 240	1,260,000 gal./yr.
2- Mining a. 2 Sections (1) 1 M Ton @ 4.5 gal./ton	4,500,000 gal./yr.
3- Fan a. Evaporation (1) 900,000 cfm @ 473,040 M cf/yr. (2) 2.5 gal./M c.f.	1,183,000 gal./yr.
Total Usage	6,943,000 gal./yr. (21.31 ac.ft./yr.)

References

Balsley, John K., 1980. Cretaceous wave-dominated delta systems: Book Cliffs, east-central Utah, AAPG Field Guide, 163 p.

Croley, Thomas W. III, 1977. Hydrologic and hydraulic computations on small programmable calculators, Iowa Institute of Hydraulic Research, Univ. of Iowa, Iowa City, Iowa.

Goldman, et.al., 1986. Erosion and Sediment Control Handbook, McGraw-Hill Book Company, N.Y.

Intermittent Power Agency, Horse Canyon Mining and Reclamation Plan, Carbon County, Utah, ACT/007/013.

JBR Consultants Group, 1986. Field notes and maps for the spring and seep survey of the Horse Canyon area, Fall, 1985.

Kaiser Coal Corporation, 1985. Mining and Reclamation Plan for the South Lease. Submitted to DOGM.

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UEI EXHIBIT 28

See mounted Geologic overlay

2890/UTU-76614
2890/UTU-77122
2820/UTU-76617
(UT-070)

FINDING OF NO SIGNIFICANT IMPACT FOR THE UTAHAMERICAN LILA CANYON MINE PROJECT AND ACCESS ROAD

ENVIRONMENTAL ASSESSMENT UT-070-99-22

The analysis determined that impacts would occur to the following resources, but that mitigation through design (mitigation built into the proposal) would resolve most concerns:

- Soils
- Hydrology
- Grazing
- Visuals
- Vegetation/habitat
- Wilderness values
- Wildlife

Where impacts could not be totally mitigated the impacts were not major in scope or would be of short duration.

The coal leases that are included in the proposed action have been examined in the following environmental impact statements (EIS) :

- Development of Coal Resources in Central Utah, Final Environmental Impact Statement, Part 2 Site Specific Analysis, US Geological Survey, 1979.
- Uinta-Southwestern Utah Coal Leasing, Final Environmental Impact Statement, BLM, 1981.
- Unita-Southwestern Utah Coal Region Round Two, Final Environmental Impact Statement, BLM, 1983.

These leases were included in the foreseeable future development scenarios, hence included in the cumulative impacts analysis of proposed mining (all existing leases and future tracts proposed for leasing).

Based on the analysis of potential environmental impacts contained in the attached environmental assessment, I have determined the impacts are not expected to be significant and an environmental impact statement is not required.

Tom Rasmussen., Acting Field Manager Date

2890/UTU-76614
2890/UTU-77122
2820/UTU-76617
(UT-070)

DECISION RECORD

ENVIRONMENTAL ASSESSMENT UT-070-99-22

DEVELOPMENT OF THE LILA CANYON PROJECT
EMERY COUNTY, UTAH

DECISION

It is the decision of the Price Field Manager of the Bureau of Land Management to select Alternative B outlined in the referenced environmental assessment with modification. This record of decision documents the specific components of my decision and the rationale for my decision.

Elements of the Decision

My decision consists of a number of separate actions designed to meet the purpose and need for this project. Specifically, these actions include:

- Grant right-of-way to UtahAmerican Energy to construct, operate and maintain mine- related surface facilities on the public lands described in the EA administered by the Bureau of Land Management. The right-of-way would encompass approximately 40.0 acres, more or less. The grant would be issued under authority of section 501 (a) of the Federal Land Policy and Management Act of 1976 (90 stat 2776, 43 U.S.C. 1761) The grant would be issued for a term of thirty (30) years, with the right of renewal. The grant would be subject to provisions outlined in the proposed action and specific administrative requirements as outlined in the Code of Federal Regulations(CFR), Chapter 43, part 2800. Since the facilities would be located within the boundaries of a permitted mine, all actions occurring within the permit area would also be under jurisdiction of the Utah Division of Oil, Gas and Mining. *Approval of the right-of-way would be contingent upon mine plan approval.*

- Grant right-of-way to construct, operate and maintain a 46 kV powerline as described in the proposed action. The grant would be issued under authority of section 501 (a) of the Federal Land Policy and Management Act of 1976 (90 stat 2776, 43 U.S.C. 1761.) The grant would be issued for a term of thirty (30) years with the right of renewal. The grant would be subject to provisions outlined in the proposed action and specific administrative requirements as outlined in the Code of Federal Regulations (CFR), Chapter 43, part 2800. *Approval of the right-of-way would be contingent upon mine plan approval.*

- Grant right-of-way to Emery County, Utah to construct, operate and maintain a coal haul access road across public lands as described in the EA. The right-of-way would encompass approximately 30 acres, more or less. The grant would be issued under authority of section 501 (a) of the Federal Land Policy and Management Act of 1976 (90 stat 2776, 43 U.S.C. 1761.) The grant would be issued for a term of thirty (30) years with the right of renewal. The grant would be subject to provisions outlined in the proposed action and specific administrative requirements as outlined in the Code of Federal Regulations (CFR), Chapter 43, part 2800. *Approval of the right-of-way would be contingent upon mine plan approval*

MITIGATION

As noted in the EA, the stabilization, maintenance and operation plan described in Chapter 2.0 was designed to minimize most impacts to resources within the project area. In addition, best management practices for low impact construction and maintenance measures were incorporated into the proposed action.

However, three issues brought up in scoping that were analyzed in detail resulted in a change to the proposed action by the agency or the recommendation for mitigation. These three issues were grazing, wildlife and cultural resources. Detailed discussions of how these issues were treated are discussed below.

Grazing

Analysis determined that potential impacts would occur through vehicular collisions with livestock during the life of the operation. To reduce this potential impact, the construction of a livestock fence on both sides of the haul road was incorporated into the *Stabilization, Operation and Maintenance Plan*. In addition, as a result of splitting the grazing allotment through construction of the proposed fence and the road, potential impacts would occur to the grazing utilization of the allotment. Installation and maintenance of livestock water tanks is also incorporated into the referenced plan to lessen these impacts.

These mitigations were placed in the applicant's proposed action as suggestions to minimize the potential for impact to the respective resources. The applicant has not proposed these, but BLM is requiring them as additional mitigation.

Cultural Resources
It was determined that there could be indirect impacts to a site determined to have cultural and historical significance. As such, it was recommended that UEI submit a data recovery plan for the site. This plan will delineate the objectives of recovery, timeframe for analysis and reporting procedures for any resources identified.

In order to approve the plan, BLM would have to enter into a programmatic agreement with the Utah State Historic Preservation Office and other consulting parties. This agreement would then be signed and approved prior to issuing a notice to proceed.

Wildlife
UEI would be required to provide two guzzlers to benefit bighorn sheep populations and habitat because of the potential loss of seeps. These mitigations were placed in the applicant's proposed action as suggestions to minimize the potential for impact to the respective resources. The applicant has not proposed these, but BLM is requiring them as additional mitigation.

PUBLIC INVOLVEMENT

On March 3, 1999, the scoping process was initiated through notification on BLM's electronic notification bulletin board. A thirty (30) day public comment period was held commencing on March 3, 1999 and ending on April 4,1999. In addition, newspaper articles or notices appeared in four separate issues of the local newspapers in Carbon and Emery Counties, Utah announcing the scoping meetings and soliciting comments. Scoping meetings were held on March 2,1999, at the Carbon County Courthouse, as well as on March 4,1999, at the Emery County Courthouse. Scoping identified the following issues that were carried forward in the document:

- Surface subsidence
- Soils, slope stability and rehabilitation stability
- Ground water and surface water
- Livestock grazing
- Vehicular traffic
- Visual resources
- Vegetation potential for loss in species diversity, cover, productivity
- Wilderness values
- Displacement and direct disturbance of wildlife
- Cultural resources

Data was collected, reviewed for adequacy, and assessed for impacts during a 24-month period following the conclusion of public scoping. The EA was submitted for final public review and comment in July 2000.

Comments received prior to the conclusion of the public comment period on August 7, 2000, included those from the U.S. Fish and Wildlife Service and Emery County Road Department. Specific concerns raised by these entities in regards to threatened and endangered species, hydrology, and assorted information consistency errors were addressed and incorporated into an EA revision. The issue of R.S. 2477 assertion raised by the Emery County Road Department was determined to be beyond the scope of this proposed action and EA, and therefore was not incorporated into the EA revision.

Two hundred and thirty five (235) comments were received in response to a request for public comment on the EA issued on August 10, 2000, by the Southern Utah Wilderness Alliance (SUWA). Although the official comment period ended on August 7, 2000, and the vast majority of the comments were received past the closing date, they were reviewed for content and possible incorporation into the EA revision. Two hundred and twenty-one (221) comments were received that reiterated the general SUWA call for opposition to the proposed action and request for preparation of an EIS. Though substantial in number, the common qualitative nature of the comments provided did not necessitate a modification of the EA. Fourteen (14) comments were received that voiced support of the proposed action. Basis of support for the project came more from a negative response to the SUWA alert, rather than review of the proposed action. Again these comments were assertive in nature and therefore did not provide a basis to modify the EA.

SUWA did provide an official written response to the EA on August 16, 2000, voicing opposition to the proposed action and adequacy of the EA process conducted. Specific points presented included the failure of the document to identify significant impacts to the wilderness, wildlife, visual, recreation, and overall landscape of the project area and adjacent lands, as well as the need for an EIS. Though reviewed in great detail, the concerns voiced by SUWA either lacked indepth quantitative analysis; were absent of quantitative support; or were unfounded. Therefore, these concerns did not require a modification to the EA.

RATIONALE AND MANAGEMENT CONSIDERATIONS

The rationale to approve the proposed action was primarily based on the analysis of the environmental impacts presented in the attached environmental assessment. Both the proponent and BLM have incorporated a variety of measures into the proposed action to mitigate potential impacts from the project.

As stated under the objectives for the regulations (43 CFR 2800) governing the issuance of rights-of-way, it is the objective of the Secretary of Interior to grant rights-of-way and temporary use permits covered by the regulations to any qualified individual, business entity, or governmental entity and regulate, control and direct the use of said right-of-way on public lands.

In doing so, the Secretary shall protect the natural resources associated with the public lands, adjacent private or other lands administered by a government agency and prevent unnecessary and undue environmental damage to the lands and resources. In approving this action, the objectives of the Secretary have been met.

In reaching a decision to grant the subject rights-of-way other factors were considered and discussed below:

Through this decision BLM is only approving the use of public lands for proposed mine surface facilities as related to the mining of coal. Approval of the mine plan and the subsequent mining of coal is under jurisdiction of the Office of Surface Mining Reclamation and Enforcement (OSM). The OSM is a cooperating agency in this environmental assessment. As such, under CEQ regulations can base its recommendation for mine plan approval on this document. The actual approval of the mine plan is made by the Assistant Secretary of the Interior. BLM will make approval of the rights-of-way contingent upon UEI having received approval of their mining plan.

Section 523 (a) of the Surface Mining Control and Reclamation Act (SMCRA) (91 Stat, 445) requires the Secretary of the Interior to establish and implement a Federal regulatory program that applies to all surface coal mining operations that take place on Federal lands. The administration of OSM coal mining requirements of the Federal lands program is delegated to Utah's Division of Oil, Gas and Mining (UDOGM).

The Horse Canyon Permit Application Package (ACT/007/013) was approved and a permit issued for reclamation effective on May 6, 1991. The Lila Canyon Permit Application Package (a significant revision of the Horse Canyon Permit Application Package) is being reviewed by the UDOGM (OSM primacy state under SMCRA). The Permit Application Package review includes a determination of completeness, public comments and technical adequacy determination. This review includes concurring agencies of BLM (surface management agency), the State Historic Preservation Officer (SHPO) (cultural and historical) and commenting agencies, the Utah Division of Wildlife Resources (UDWR) and the Untied States Fish and Wildlife Service (USFWS), Utah Division of Water Resources (UDWR- State Engineer (Water Rights), Division of Environmental Quality (UDEQ) (air quality, water pollution control) and Utah Department of Transportation (UDOT).

The BLM conducts a resource recovery and protection plan review (R2P2/MER), approves the R2P2 and recommends to DOGM approval of this part of the Permit Application Package. This plan spells out in detail how the lessee will mine the coal for maximum economic recovery. BLM approved the Lila Canyon Mine R2P2 on March 2, 2000.

Under 30 CFR 745.13, the Secretary reserved the authority to approve mining plans or modifications thereto, of Federal coal leases and compliance with NEPA. The UDOGM assists OSM in preparing a decision document that is sent to the Assistant Secretary Lands and Minerals for approval of the Federal Mining and Reclamation Plan (M&RP). The Federal M&RP approval will include any special conditions attached by agencies. UtahAmerican has the following valid Federal coal leases: SL-066145 (Issued 6/19/46), SL-066490 (Issued 12/31/47), and SL-069291 (Issued 4/1/50). UtahAmerican also has the following State of Utah coal leases: U-0126947 (issued 12/1/47), U-014217 (issued 2/1/55), and U-014218 (issued 2/1/55). These leases would be mined upon approval of the mine plan. Conveyance of these leases gives the lessee certain rights and obligations to extract the mineral resources in an environmentally sound manner.

Upon approval of the mine plan, a portion of the Turtle Canyon WSA would be undermined. Minimal impacts in the form of minor subsidence is expected. The incorporation of the original IMP (interim management policy) stipulations for actions resulting from mining of the pre-FLPMA coal leases under the Turtle Canyon WSA would be incorporated for all areas deemed to be affected by subsurface actions. No surface facilities authorized by BLM would be located within the WSA and no actions approved by BLM would impact the WSA.

Surface facilities within the proposed mine site and proposed guzzlers would directly disturb eight acres of the natural wilderness value and future designation of the immediate area as wilderness within the Desolation Canyon Inventory Unit 8. (1999 Utah Wilderness Inventory) Due to topography, the direct area of impact would be restricted to 25.12 acres below the canyon face. In addition, 901 acres within the Desolation Canyon and Turtle Canyon inventory units would be undermined by coal extraction. It should be noted that Desolation Canyon Inventory Unit 8 or the Turtle Canyon Inventory Unit 4 are not designated wilderness study areas, but were found to have wilderness characteristics in the 1999 Utah Wilderness Inventory .

The proposed action meets Wilderness Interim Management Policy objectives. No action is proposed that would impair the wilderness character of the established WSA.

The proposed action is in conformance with the existing BLM land use plan for the area. It also is consistent with the Department of the Interior and BLM Interim Management Guidance for wilderness inventory units. UtahAmerican holds valid existing rights that must be recognized.

CONFORMANCE WITH THE LAND USE PLAN AND CONSISTENCY WITH OTHER LAWS

Land Use Plan
The proposed action is in conformance with the objectives and recommendations of the Price River Resource Area Management Framework Plan approved in 1983, as amended.

Consistency with Existing Laws
This decision is consistent with Federal, state, and local laws imposed for the protection of the environment. Specifically:

National Environmental Policy Act
Federal Land Policy and Management Act
Endangered Species Act
Surface Mining Control and Reclamation Act
Clean Water Act
National Historic and Preservation Act
Migratory Bird Treaty Act
Bald Eagle Protection Act

IMPLEMENTATION AND APPEAL RIGHTS

Implementation may begin upon approval of the mine plan for the project. The rights granted through the right-of-way become effective immediately following approval of the right-of-way.

Within 30 days of receipt of this decision, you have the right of appeal to the Board of Land Appeals, Office of the Secretary, in accordance with the regulations at 43 CFR 4.4. If an appeal is taken, you must follow the procedures outlined in the enclosed Form 1842-1, Information on Taking Appeals to the Board of Land Appeals. The appellant has the burden of showing that the decision appealed from is in error.

Tom Rasmussen, Acting Field Manager Date

Enclosure:
Form 1842-1