

March 5, 2020

Permit Supervisor, Utah Regulatory Program
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, UT 84114-5801

Re: Water Monitoring Revisions, Canyon Fuel Company, LLC, Sufco Mine, C/041/002

Dear Sirs:

Enclosed with this letter is revisions to Chapter 7, associated with general text changes and revisions to the water monitoring plan commitments. Several changes to the monitoring plan reflect timelines written into the text, but not reflected in the tables.

Please contact Vicky Miller at (435)286-4481 if there are questions or additional information is needed.

Sincerely,

Vicky S Miller
for

John D. Byars
General Manager
Sufco Coal Mine

Encl.

Cc: DOGM Correspondence File

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MAR 11 2020

DIV OF OIL, GAS & MINING

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change New Permit Renewal Exploration Bond Release Transfer

Permittee: Canyon Fuel Company, LLC

Mine: Sufco Mine

Permit Number: C/041/002

Title: Water Monitoring Revisions

Description, Include reason for application and timing required to implement:

Instructions: If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

- Yes No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ increase decrease.
- Yes No 2. Is the application submitted as a result of a Division Order? DO# _____
- Yes No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- Yes No 4. Does the application include operations in hydrologic basins other than as currently approved?
- Yes No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
- Yes No 6. Does the application require or include public notice publication?
- Yes No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
- Yes No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
- Yes No 9. Is the application submitted as a result of a Violation? NOV # _____
- Yes No 10. Is the application submitted as a result of other laws or regulations or policies?
 Explain: _____
- Yes No 11. Does the application affect the surface landowner or change the post mining land use?
- Yes No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
- Yes No 13. Does the application require or include collection and reporting of any baseline information?
- Yes No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
- Yes No 15. Does the application require or include soil removal, storage or placement?
- Yes No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
- Yes No 17. Does the application require or include construction, modification, or removal of surface facilities?
- Yes No 18. Does the application require or include water monitoring, sediment or drainage control measures?
- Yes No 19. Does the application require or include certified designs, maps or calculation?
- Yes No 20. Does the application require or include subsidence control or monitoring?
- Yes No 21. Have reclamation costs for bonding been provided?
- Yes No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
- Yes No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

Please attach one (1) review copy of the application.

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Jacob Smith
Print Name

[Signature], Engineering Manager, 3/5/
Sign Name, Position, Date

Subscribed and sworn to before me this 5th day of March, 2020

Jill White
Notary Public

My commission Expires: 3/28, 2020
Attest: State of Utah } ss:
County of Sevier



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DIV OF OIL, GAS & MINING

CHAPTER 7

HYDROLOGY

7.2.4.3 Geologic Information

Geologic information related to the permit and adjacent areas is presented in Chapter 6 of this M&RP.

7.2.4.4 Climatological Information

Climatological data have been collected from a station location at the mine surface facilities since July 1986. Historical monthly summaries of these data are presented in Appendix 7-5. These and other regional data are summarized in this section. Updated climatological data have been submitted to the Division in annual reports through 2019.

Precipitation. Based on regional data, normal annual precipitation at the mine is about 18 inches per year (Utah Division of Water Resources, 1977). Approximately 42 percent of this precipitation falls in the period of May through September, with the remainder falling in the October through April period, primarily as snow (Utah Division of Water Resources, 1977).

During the historical period of record at the mine site, precipitation has been below the regional normal cited above, averaging 12.51 inches per year (see Appendix 7-5). Average monthly precipitation at the mine has ranged from 0.59 inch in June to 1.65 inches in August, with the August peak being the result of summer thunderstorm activity. Snow cover is typically on the ground from September through May.

Wind. The station closest to the mine that reports wind data is located at Gunnison, Utah (approximately 28 miles northwest of the mine). Due to the mountainous conditions in the area, the wind data collected at this station are not considered representative of the mine site. Periodic observations by mine personnel suggest that the prevailing wind at the mine is up the local canyons (i.e. south to north at the mine surface facilities).

Temperature. The normal annual temperature at the Salina, Utah station (located 24 miles west of the mine) is 49.5° F (National Weather Service, 1989). Seasonally, this temperature varies from a normal monthly low of 27.6° F in January to a normal monthly high of 73.7° F in July. During the period of record, temperatures at the mine have ranged from a low of -19° F in February 1989 to a high of 92° F in July 1989.

	09-16-98	1.0 (estimated)	Erik Petersen
	12-07-01	0.5 (estimated)	Chris Hansen
	10-26-02	No Flow - Standing Water	Erik Petersen
	10-30-02	No Flow - Standing Water	Erik Petersen
	11-06-02	No Flow - Standing Water	Erik Petersen
	11-15-02	No Flow - Standing Water	Erik Petersen
Link Portal - East	12-07-01	0.5 (estimated)	Chris Hansen
	10-26-02	No Flow - Standing Water	Erik Petersen
	10-30-02	No Flow - Standing Water	Erik Petersen
	11-06-02	No Flow - Standing Water	Erik Petersen
	11-15-02	No Flow - Standing Water	Erik Petersen

Vegetation in the Link Canyon channel below the mine will be photographically monitored on a quarterly basis, except in the winter months, to determine what, if any, impacts the reduction of discharge from the western portal has on the vegetative community. The vegetation monitoring was started in the summer of 2005 and will continue through the reclamation of the portals. The general health of the willows, Woods Rose, clematis, and wire grasses present in the vegetative community will be observed and the observations reported in the mine's annual report (2000 through 2013(discontinued)). . If significant changes occur in the vegetation monitored, these changes will be reported to the Division and the Forest Service. A plan may be developed and instigated at that time to mitigate any damages to the vegetation as a result of mining activities. Refer to Section 3.2.2.2 for additional vegetation information.

Flows from the Link Canyon portals have been measured periodically since 1977 with discharges ranging from 5 gpm (estimated by Hydrometrics, 1977) to no discharge (Petersen 2002). Samples of the water discharged from the west portal have been obtained and analyzed by Thiros and Cordy (1991), Mayo and Associates during the Pines Tract EIS process (1998), and recently by Petersen (2002, Appendix 7-4).

Surface Water Protection. To protect the hydrologic balance, coal mining and reclamation operations will be conducted to handle earth materials and runoff in a manner that minimizes acidic or toxic drainage, prevents, to the extent possible, additional contributions of suspended solids to streamflow outside the permit area, and otherwise prevents water pollution. Additionally, SUFCO will maintain adequate runoff- and sediment-control facilities to protect local surface waters. SUFCO commits to mitigating any material damage resulting from subsiding perennial streams in the leased area as indicated in Chapter 5 of this M&RP. The plan for protection of the perennial streams meets the BLM requirements for protection of their water rights (BLM, 1992).

Sedimentation Pond Sludge Plan. Sludge contained in the sediment ponds will be cleaned from the ponds and temporarily stockpiled upstream of the pond to allow water to drain from the sludge back into the pond. The sludge will be sampled for acid and toxic forming substances prior to be transported to the waste rock disposal site. Sedimentation pond sludge will be incorporated into the fill as described in Section 536 of Waste Rock Volume.

7.3.1.2 Water Monitoring

Groundwater Monitoring. Groundwater monitoring is proposed to be conducted in the SUFCO permit and adjacent areas according to the water monitoring plans presented in Tables 7-2 through 7-5A and for the rock waste disposal site in Section 731 in Waste Rock Volume of this M&RP. These tables are based on the studies done by Mayo and Associates (Appendices 7-17 and 7-18) and supersede previous plans.

The location of the monitoring points are presented on Plate 7-3 and 7-10. The location of the monitoring wells for the rock waste disposal site are presented on Map 5A, Waste Rock Volume of this M&RP. The monitoring plans were developed based on information presented in the PHC determinations, the baseline hydrologic data, and the geology chapter of this M&RP.

The monitoring programs provide data that are reviewed and compared to the baseline data. Any significant changes are evaluated to determine their impact on the hydrologic balance. These comparisons have taken the form of reports prepared by Hydrometrics early in the permit term (1978-1987). Results of these evaluations are submitted periodically to the UDOGM. The annual Water Quality Report information submitted to the Division through the Divisions database contains the monitoring data.

Total hardness, total alkalinity, dissolved iron, and dissolved manganese were not included in the groundwater operational monitoring plan proposed by Mayo and Associates (Appendices 7-17 and 7-18). The reasons for excluding these parameters are discussed below:

- Mayo does not believe that total hardness is a necessary parameter in the operational monitoring plan. Total hardness describes the soap-consuming capacity of water, but has very limited value in geochemical studies. This parameter is generally calculated from the milliequivalent concentrations of Ca^{2+} and Mg^{2+} . Because Ca^{2+} and Mg^{2+} are included in the operational monitoring plan, the parameter could be calculated if it were ever necessary to evaluate total hardness.
- Mayo does not believe that total alkalinity should be included in the operational monitoring plan. In the waters of Wasatch Plateau, total alkalinity is almost exclusively the product of bicarbonate and carbonate alkalinity. Both bicarbonate and carbonate alkalinity are included in the operational monitoring plans. Contributions to alkalinity from hydroxide, silicate, borate, and organic ligands are trivial.
- Mayo did not include dissolved iron and dissolved manganese in the operational monitoring plan because iron and manganese do not readily exist in dissolved form in basic ($pH > 7$) waters but exist instead as hydroxide complexes. All waters in the leased area are basic. Measurements of total iron and manganese quantify both the dissolved and complex forms of these elements.

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of groundwater in the permit and adjacent areas have been installed, maintained, and operated in accordance with accepted procedures. This equipment will be removed or properly abandoned by SUFCO when no longer needed.

TABLE 7-2

Water Monitoring Program

<u>Monitoring Wells</u>	<u>Protocol</u>	<u>Comments</u>
US-80-2	A	Screened in Castlegate Sandstone
US-80-4	B	Screened in Castlegate Sandstone
89-20-2W	A	Screened in Castlegate Sandstone
US-79-13	B	Screened in Blackhawk Formation
US-81-3	A	Screened in Blackhawk Formation
US-81-4	A	Screened in Blackhawk Formation
01-8-1	A	Screened in Blackhawk Formation
MW-15-5-2	A	Screened in Castlegate Sandstone
MW 4-09***	A	Screened in Castlegate Sandstone
In-mine Well (Proposed)	A	Screened in Starpoint Sandstone

TABLE 7-2 (Continued) Water Monitoring Program

Streams

SUFCO 006	C,2	Upper South Fork Quitchupah Creek
SUFCO 006D	F,1	Upper South Fork Quitchupah Creek
SUFCO 007 (North Fork Lower)	C,2	Upper North Fork Quitchupah Creek
SUFCO 041	C,2	Lower Quitchupah Creek
SUFCO 042	C,2	Lower North Fork Quitchupah Creek
SUFCO 046	C,2 8	Upper Quitchupah Creek
SUFCO 047A	C,2	Lower East Spring Canyon Creek
SUFCO 090	C,1	Upper Box Canyon Creek
Pines 106	C,2	Upper East Fork Box Canyon
Pines 302	C,1	Muddy Creek-Last Water Creek Confluence
Pines 403	C,2	Lower Box Canyon Creek
Pines 405	C,2 8+	Muddy Creek - Box Creek Confluence
Pines 406	C,1	Lower Muddy Creek
Pines 406b*	C,1	Lower Muddy Creek
Pines 407	C,1	Box Canyon Creek
Pines 408	C,1	East Fork Box Canyon Creek
USFS-109	C,1	Upper Main Fork of Box Canyon Creek
Link 001	C,2 10	Link Canyon Drainage
Link 002	C,2 10	Link Canyon Drainage
FP-1	G,6	East Fork of Main Fork of Box Canyon
FP-2	G,6	East Fork of East Fork of Box Canyon
M-STR1	C,1	Cowboy Creek
M-STR4	C,1	Cowboy Creek
M-STR6	C,8	Top Greens Canyon
Muddy ABF	C,2 1+	Lower Muddy Creek
U-Mud	C,8	Confluence North & South Fork Muddy
Cowboy Top	C,2 1	Top of Cowboy Creek
Cowboy Middle	C,2 1	Mid segment of Cowboy Creek
Cowboy Bottom	C,2 1	Bottom of Cowboy Creek
SP60 Creek	C,2 8	Creek adjacent to Monitoring point SP60
CPC Upper	C,2 8	Top of Tributary to North Fork Quitchupah
CPC Middle	C,2 8	Mid segment of Tributary to North Fork Quitcupah
CPC Lower	C,2 8	Just above North Fork confluence
North Fork Upper	C,2 8	Top of North Fork Quitchupah at lease edge

TABLE 7-2 (Continued) Water Monitoring Program

<u>Streams</u>	<u>Protocol</u>	<u>Comments</u>
North Fork Middle	C,2 8	Mid segment of North Fork Quitchupah just above CPC confluence
ULGH	C,2 8	Upper Left Fork Greens Hollow Creek
URGH	C,2 8	Upper Right Fork Greens Hollow Creek
GH at Road	C,2 1	Greens Hollow Creek at road crossing
Muddy Creek below Horse	C,2 1+	Muddy Crk below confluence with Horse Crk
Muddy Creek above Horse	C,2 8+	Muddy Crk above confluence with Horse Crk
Horse Creek	C,2 1+	Horse Creek at confluence with Muddy Creek
S. Fork Quitchupah Creek Upper	C, 2	Upper S. Fork Quitchupah Creek
S. Fork Quitchupah Creek Lower	C, 2	Lower S. Fork Quitchupah Creek
Skutumpah Creek Upper	C, 2	Upper Reaches of Skutumpah Creek
<u>Springs</u>		
SUFCO 001	D,3	Blackhawk Formation
SUFCO 047	D,4	Star Point Sandstone
SUFCO 057A	D,3	North Horn Formation
SUFCO 089	E,3	Castlegate Sandstone
GW-8	D,5	Price River Formation
GW-9	D,5	Price River Formation
GW-13	D,3	North Horn Formation
GW-20	D,5/3	Castlegate Sandstone
GW-21	D,3	Castlegate Sandstone
Pines 100	D,4	Castlegate Sandstone
Pines 105	D,3	Castlegate Sandstone
Pines 206	D,5/3	Blackhawk Formation
Pines 209	D,5/3	Blackhawk Formation
Pines 212	D,5/3	Blackhawk Formation
Pines 214	D,5/3	Blackhawk Formation
Pines 218	D,3	Castlegate Sandstone
Pines 303	D,3	Blackhawk Formation
Pines 310	D,7/3	Castlegate Sandstone
Pines 311	D,7/3	Castlegate Sandstone
Link Portal-West	D,4 10	Link Canyon Portal
Link Portal-East	D,4 10	Link Canyon Portal

TABLE 7-2 (Continued) Water Monitoring Program

<u>Springs</u>	<u>Protocol</u>	<u>Comments</u>
M-SP01	D,3	Price River Formation
M-SP02	D,3	Price River Formation
M-SP04	D,9	North Horn Formation
M-SP05	D,9 3	North Horn Formation
M-SP06	D,9	North Horn Formation
M-SP08	D,3	North Horn Formation
M-SP09	D,9 3	North Horn Formation
M-SP11	D,9	North Horn Formation
M-SP12	D,9	North Horn Formation
M-SP15	D,9 3	North Horn Formation
M-SP18	D,3	Price River Formation
M-SP19	D,9 3	North Horn Formation
M-SP20	D,9	North Horn Formation
M-SP39	D,3	Price River Formation
M-SP40	D,9 3	North Horn Formation
M-SP41	D,9	North Horn Formation
M-SP44	D,9	North Horn Formation
M-SP45	D,9	North Horn Formation
M-SP53	D,3	North Horn Formation
M-SP60	D,9	North Horn Formation
M-SP87	D,9	Price River Formation
M-SP100	D,9	North Horn Formation
M-SP103	D,9	North Horn Formation
M-SP104	D,9 3	North Horn Formation
M-SP105	D,9 3	North Horn Formation
M-SP106	D,9 3	North Horn Formation
Mud Spring	D,5	Price River Formation
Broad Hollow	D,5	Blackhawk Formation
USP-2	D,9	Price River Formation
94-591***	D,3	Castlegate Sandstone
Wedge Spring	H,3	Castlegate Sandstone
Amanda Spring	H,3	Castlegate Sandstone
94-113 Seep	H,3	Price River Formation
Divide Spring	D,4 9	North Horn Formation
A Spring	D,4 9	Price River Formation
B Spring	D,4 9	Price River Formation

<u>Springs</u>	<u>Protocol</u>	<u>Comments</u>
Skutumpah Spring	D,4 9	Price River Formation
Spring 99	D,4 9	North Horn Formation
94-110 Spring	D,4 9	North Horn Formation
Hansen Seep	D,4 9	Price River Formation
94-1397	D,4 9	Price River Formation

***Added to the monitoring plan in 2019 and monitoring will cease following the 4th Quarter of 2024 after mining of the Pines East panels.

* Monitoring point 406B is located at an old USGS monitoring location (circa 1999) located in the NW1/4NE1/4, Sec. 21, T21S. R6E.

Should a spring listed in Table 7-2 change locations, the Division will be notified in the note section during the entry of the quarterly data into the Division's database.

TABLE 7-3
Field and Laboratory Measurement Protocol

Water level and flow measurements

- A Monitoring well: quarterly water level measurement (3 quarters per year)
- B Monitoring well: annual water level measurement (3rd quarter)
- C Stream: quarterly discharge measurements (3 quarters per year)
- D Spring: quarterly discharge measurements (3 quarters per year)
- E Spring Pool: quarterly water level measurement (3 quarters per year)
- F Stream: Bi-weekly measurements while mining is occurring under the stream in 2013, thereafter quarterly for two years (SUFCO 006 A - D).
- G Stream: Identify perennial portion of stream on or near October 1 of each year.
- H Spring: Quarterly measurements while mining is occurring under the 2R2S panel stream in 2013, thereafter quarterly for two years (Wedge Spring, Amanda Spring, 94-113 See, 006A, Roberts Spring, RS-A, RS-B).

Water quality (3 quarters per year)

- 1 Stream: quarterly surface water quality field measurements
- 2 Stream: quarterly surface water quality operational laboratory measurements
- 3 Spring: quarterly groundwater quality field measurements
- 4 Spring: quarterly groundwater quality operational laboratory measurements
- 5 Spring: groundwater quality operational laboratory measurements quarterly for two (2) years, then reverting to quarterly water quality field measurements

- 6 Stream: flow measurements only, no water quality samples required.
- 7 Spring: initially ground water field measurements June 2006 through December 2006 as accessible then quarterly groundwater field measurements thereafter.
- 8 Stream: quarterly surface water quality field measurements and analysis for total dissolved solids, total suspended solids, total iron, total manganese.
- 9 Spring: quarterly ground water quality field measurements and analysis for total dissolved solids, total iron, total manganese.
- 10 Monitoring in 2nd Quarter only for ground water quality field measurements and analysis for total dissolved solids, total iron, total manganese.
- + Turbidity will be measured.

TABLE 7-4
Groundwater Operational Water Quality Parameters

<u>FIELD MEASUREMENTS</u>	<u>REPORTED AS</u>
Water Level or Flow	
pH	pH units
Specific Conductivity	µs/cm @ 25°C
Temperature	°C
 <u>LABORATORY MEASUREMENTS</u>	
Total dissolved solids	mg/l
Carbonate	mg/l
Bicarbonate	mg/l
Calcium (dissolved)	mg/l
Chloride	mg/l
Iron (total)	mg/l
Iron (dissolved)	mg/l
Magnesium (dissolved)	mg/l
Manganese (total)	mg/l
Manganese (dissolved)	mg/l
Potassium (dissolved)	mg/l
Sodium (dissolved)	mg/l
Sulfate	mg/l
Cations	meq/l
Anions	meq/l

the requirements of R645-301-731.222.1, 40 CFR 122 and 123, R645-301-751, and the applicable UPDES permits. These tables are based on studies done by Mayo (Appendices 7-17 and 7-18) and supersede previous plans. For clarification of the apparent discrepancies over the classification of stream-monitoring site 047A in the M&RP and the Mayo report (Appendix 7-17) which identified site 047A as a spring-monitoring site. SUFCA has always called the station a surface water monitoring site because samples are taken in a drainage. However, Mayo called this site a spring in their report and recommended monitoring plan. When Mayo first collected samples from the site, they were surprised to learn that water from this site had essentially no tritium. Modern surface waters contain abundant tritium. They visited this site again in June 1996 and located several springs in the drainage several hundred feet above where samples are collected and classified the site as a spring-monitoring site. Nevertheless, Mayo now agrees with SUFCA that this site should be considered a surface water site for monitoring purposes because, at times, this drainage has flow which is contributed by snow melt, precipitation, or sediment pond discharge.

Monitoring sites are sampled three times per year. Surface water monitoring data are submitted to UDOGM through the Division's database by the end of the quarter following sampling. ~~Monitoring data are submitted in an annual summary by March 31 of the subsequent year.~~ UPDES reporting requirements will be met for the three UPDES discharge sites at the mine (see Appendix 7-7).

To better understand the effects that mining will have, if any, on the stream flows within Box Canyon, surface water monitoring sites Pines-407 and Pines-408 will be monitored for stream flows in gallons per minute once every week during the months of June, July, August, September, and October in 1999. Starting in the year 2000, sites 407 and 408 will be monitored once a month in July, August, September, and October for a five year period. If analysis of the data shows no significant changes during this time period, monitoring at these points will be eliminated from the water monitoring program on Table 7-2. Flow measurements at these two sites will be obtained on the same day. Also, the operator will endeavor to obtain the required samples at least five days after the last precipitation event in the drainage area.

To better understand the effects that mining will have, if any, on the stream flows within the South Fork of Quitchupah, surface water monitoring sites SUFCA 006A and SUFCA 006B will be monitored quarterly starting in 2010 for stream flows in gallons per minute and once every two weeks when accessible while mining is occurring within the 15 degree angle-of-draw of the stream channel. Two additional surface water monitoring sites will be monitored quarterly, SUFCA 006C starting in 2011 and SUFCA 006D starting in 2012. Once mining has been completed within the angle-of draw, the sites will be monitored on a quarterly basis for two years after mining has progressed past the 15 degree angle-of-draw. If analysis of the data shows no significant changes during this time period, monitoring at these points will be eliminated from the water monitoring program on Table 7-2. Flow measurements at these four sites will be obtained on the same day.

Areas identified on Plate 7-3 as FP-1 and FP-2 will be monitored on or near October 1 of each year to determine the extent of perennial stream flow, if any, present in the East Fork of the Main Fork of Box Canyon Creek and the East Fork of the East Fork of Box Canyon Creek, respectively. Stream flows will be obtained a short distance below the point where the streams become perennial and the location will be mapped.

Monitoring points Pines 106 and USFS 109 are located at or near the points which the streams become perennial in the East Fork of Box Canyon Creek and the Main Fork of Box Canyon Creek, respectively. The drainages in the area of these two points will be monitored on or near October 1 of each year to verify and map the location where the streams become perennial. Flows will be obtained at Pines 106 and USFS 109 on or near October 1.

Data gathered from monitoring points Pines 407, Pines 408, FP-1, FP-2, Pines 106, and USFS 109 will be compared with precipitation data collected from the mine site weather station, and any other appropriate nearby station, to aid in determining if there have been any mining-related effects on the perennial flows. The flow data, perennial stream flow maps, and the results of the weather data/flow data comparison will be submitted in the annual report through ~~2019-fourth quarter water monitoring report each year.~~

Some of the site locations have been identified using a survey grade GPS. However, the locations of sites deeper in the Canyon could not be located with a GPS due to the restrictive nature of the narrow canyon when trying to locate satellites with which to triangulate a location.

The vegetation and soil monitoring program is discussed in greater detail in Section 3.2.2.2 of this M&RP. The surface and/or ground water flows and channel width at these stations will be monitored on a weekly basis while mining is occurring within the 15 degree angle-of-draw of the stream channel. Once mining has been completed within the angle-of draw, the sites will be monitored once every two weeks for a period of eight weeks after mining has progressed past the 15 degree angle-of-draw. Table 7-5A presents the monitoring site numbers, monitoring parameters, and the frequency of monitoring. The fourth quarter 2003 water monitoring will be conducted prior to mining within the area of concern in the East Fork of Box Canyon. If new springs are created as a result of subsiding the East Fork, the spring flows will be monitored two times per week until the 15 degree angle-of-draw area above the longwall face has advanced beyond the new spring. Thereafter, the spring flows will be monitored once every week for a period of eight weeks followed by monitoring the springs once every two weeks for eight weeks. A report on the impacts, if any, to the stream or ground water flows, vegetation, soils, general geomorphology, location of the longwall, etc., will be provided via e-mail to the Division on a weekly basis (discontinued 2006).

One goal of monitoring the stream sites in the East Fork of Box Canyon Creek will be to determine the portion of the stream that is perennial and where the stream is gaining or losing flow prior to, during, and after subsidence. In addition to the monitoring stations, the Thalweg of the stream channel between the lower-most monitoring station and Upper Joe's Mill pond will be surveyed. Also, two pools near monitoring sites EFB-9 and EFB-11, will be monitored before during and after subsidence. The criteria for monitoring the two pools will be width and depth of the pool and the height of the fall structure.

Monitoring for subsidence cracks within the stream channel of the East Fork of Box Canyon Creek will also be part of this intensive monitoring and mitigation plan. The details of the mitigation plan are discussed in greater detail in Section 5.2.5.1 of this M&RP. However, in an effort to compile as much of the monitoring requirements for the East Fork of Box Canyon in a single location within

Quitcupah 2R2S Block "A" and 3R2S Block "B". Refer to Chapter 3, Section 3.3.3.3 for additional information.

A bi-weekly (once every two weeks) report on the impacts to stream flow and required mitigation, if any, will be submitted via e-mail to the Division and the Forest detailing the results of the inspections while mining is occurring under the stream channel. The reports will include, but not necessarily be limited to: a map illustrating the current location of the longwall face; descriptions and dates of field activities; noted changes in stream and local geomorphology; location, width, frequency of cracks; and a description of repairs, if any, conducted. If the prescribed inspections cannot be conducted, the reason for the missed inspection and a record of the attempt to conduct the inspection will be submitted to Division and the Forest in the report. Division and the Forest will be notified immediately after mining-induced cracks, if any, are found in the South Fork stream channel and the steps taken or planned to be taken as mitigation. Thereafter, Division and the Forest will be advised of continuing mitigation efforts, if needed, in the report (discontinued 2017).

Prior to implementation of any mining-induced subsidence mitigation efforts in the stream channel as described in Chapter 5, a Stream Alteration Permit will be obtained from the Utah Division of Water Rights. Sufco will have the alteration permit(s) prior to undermining the South Fork of Quitcupah stream channel since the mitigation efforts will occur as soon as possible after a need for mitigation is determined.

Greens Hollow. Refer to Appendix 7-28 for the Greens Hollow PHC which describes the potential impacts on the hydrologic balance. The PHC also contains a drawing showing the location and a description of monitoring data for the monitoring locations within the Greens Hollow Lease. Plate 7-3 shows historic in addition to current water monitoring locations. Plate 7-10 shows current monitoring locations only.

A Greens Hollow Lease progress map (**Confidential**) will be created highlighting mined out areas segmented with monthly completion dates and labeled showing the current location of the longwall. During mining within the Lease the map will be submitted to the Division within 30 days following the end of the previous quarter with the sediment pond and waste rock quarterly inspection forms.