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

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May 21, 1998

Dan Guy
Blackhawk Engineering
214 East 1st North
Price, Utah 84501

Re: Water Monitoring Wells, Savage Coal Industries, Savage Coal Terminal, ACT/007/022-98B Folder #2, Carbon County, Utah

Dear Mr. Guy:

The referenced amendment has been reviewed by Jim Smith, (Senior Reclamation Specialist for the Division). The following technical analysis is provided for your review and response. As you will note on page two paragraph two there is a recommendation and two minor deficiencies at the top of page six. Please address these items by June 4, 1998.

TECHNICAL ANALYSIS

ENVIRONMENTAL RESOURCE INFORMATION

HYDROLOGIC RESOURCE INFORMATION

Analysis:

Initial surface disturbance of the terminal area was in 1975 by Utah Power and Light. The land was sold to Swisher Coal Company in 1977, and construction of the loadout, coal preparation plant, railroad loop and related facilities was done mainly between October 1977 and June 1979. Most of the site is identified as "pre-law" on Plate 3-1 in the MRP, disturbance having occurred prior to May 3, 1978.

At least 2 french drains were constructed; one extending across the entire length of the northern border and approximately one-half of the east border of the property, and the other in the southeast corner along the south side of the railroad loop (Plate 7-2 of the MRP). Ground water flowed from the french drain adjacent to the railroad loop for a while and then ceased. The french drain along the north and west sides of the property has been described as flowing continually. CV-4W and CV-5W, wells near the drain, initially had water but have been dry for at least five years.

Three monitoring wells were in operation on the property in 1980 when 10 additional wells were installed on and adjacent to the site, so with the french-drain sump there was a total of 14 ground-water monitoring stations. Monitoring of CV-2W, CV-7W, CV-8W, CV-9W, and CV-13W was eliminated in 1987 because the wells were dry, the casing was blocked, or the wells were in the way of expansion of

the coal and refuse piles. These 5 wells were simply capped and were not filled, with the intention of keeping them for possible future use (Table 7-1a of the MRP and letter to UDOGM dated March 16, 1987).

There has been no coal washing at this site since 1984. Only minor amounts of coal and waste from sedimentation pond clean-out have been added to the refuse pile since 1984. Savage Industries purchased the property in 1993 and has operated it as a coal handling facility. Savage Industries has indicated there are no current or future plans to resume washing coal (Appendix 7-1), but coal washing is still a permitted operation under the current MRP and the washing facilities have not been removed from the site.

Monitoring wells CV-0W, CV-4W, CV-5W, CV-10W, and CV-12W have been dry for at least five years. Under the current MRP, monitoring of all wells is to cease when reclamation regrading begins even though the french drains will not be severed and plugged nor the sump filled until completion of site reclamation. Because areas monitored by these wells will remain dry up to and probably through reclamation, continuation of operational monitoring appears to be of no value.

Well CV-11W has been damaged to the point it is useless as a monitoring well. Water quality data indicate that ground water in this area is affected by agricultural operations rather than by operations at the Savage Coal Terminal.

Monitoring well CV-3W is located on property owned and controlled by Jensen Trucking. It is located approximately 200 feet downgradient of a small irrigation canal and water in this well may be mostly seepage from that canal. Three water samples from well CV-3W have been analyzed for oil and grease: one from 1993 was clean but two from 1980 contained 495 and 239 mg/L. (Bill Malencik indicated that around the time of construction of the berm between the Jensen Trucking property and the Savage Coal Terminal water from Savage's pond 5 was found to contain tetrachloroethylene, a common industrial solvent known by many other names including perchloroethylene, PERC, and PCE. The source could have been runoff from the Jensen property but could also have been the refuse pile. DOGM has no analysis reports on water from pond No. 5 to confirm or refute this.)

Water levels in well CV-6W correlate with the water surface elevation in Sediment Pond No. 5 and with the marshy ground-water discharge area located nearby, west of the main rail line. Savage Industries pumps the water from pond No. 5 to pond No. 6 and the sump in order to keep ground water levels low under the adjacent alfalfa field. The water level in CV-6W is affected by this pumping, so water levels from this well provide little useful information. Water quality is better than at other sites, but TDS content varies and is too high for agricultural use at times. Water pumped from this area is mixed with other waters in the french-drain sump and analyzed.

Water in the french-drain sump CV-1W does not characterize ground-water conditions at the Savage Coal Terminal. Water in this sump is a mixture of surface runoff from the terminal property and ground water intercepted as it moves towards the terminal from irrigation canals, irrigated fields, and manufacturing and coal-shipping operations on adjacent lands. TDS concentrations in the sump water have repeatedly fluctuated up and down through a wide range of values.

Probable hydrologic consequences determination.

The current MRP contains no section identified as a PHC determination but Section 7.1.4 discusses observed and probable effects of operations on ground water and Section 7.2.4 discusses observed and probable effects of operations on surface water. The proposed revision of the MRP contains no changes to these determinations of the probable hydrologic consequences from coal mining operations at this site. Review by UDOGM has determined that this proposed permit revision does not require a new or updated PHC.

Ground-water monitoring plan.

Before construction of the french drain, depth to ground water in the permit area was as much as 20 feet in places. On the other hand, even with the french drain in operation, the water table currently intersects the surface in a marshy area east of the railroad embankment that runs along the east edge of the Savage Coal Terminal property (Plate 7-1). A system of irrigation canals west and south of the permit area appear to be the main source for ground water recharge. Flood irrigation and grazing in the fields east and downgradient of the Savage Coal Terminal affect the quality and quantity of ground water in that area.

Water-table elevations were monitored as early as 1977 at several locations. Results of water quality analyses are summarized for December 1979 through December 1982 in Tables 7-4 through 7-14a in the current MRP and for May 1993 through December 1997 in Table A7-1 in Appendix 7-1. Wells CV-7W, CV-9W, and CV-13W were dry from August 1980 until monitoring ceased in 1987. Except for August 1980, CV-2W was dry from December 1979 up to the time monitoring ceased in 1987. CV-8W had measurable water levels over this same period, but was closed to allow expansion of the refuse pile. CV-10W has had alternate wet and dry periods but has been dry since at least May 1993. CV-0W, CV-4W, CV-5W, and CV-12W had measurable water levels in the early 1980's but have been dry since at least May 1993.

The ground water is not suitable for irrigation, stockwatering, and most other uses because of the high TDS content. The approved post-mining land use of small mammal and songbird habitat will not depend on ground water quality or quantity. Water quality in the wells varies, with higher concentrations during winter and spring in some wells but no discernable pattern in others. Only a small percentage of samples have a TDS concentration below 1200 mg/L, the Utah water quality standard for agricultural use. Sodium sulfate is the dominant solute in the water and deposits of mineral salts are found at low spots where the water table is, or has been, close to the surface.

Water from the french drain is collected and used for dust control within the Savage Coal Terminal. In the past the french drain was also an alternate, secondary source for water used in the coal washing process.

Available information indicates that the shallow water-bearing stratum in the permit and adjacent areas does not serve as an aquifer that significantly ensures the hydrologic balance within the cumulative impact area.

Findings:

Hydrologic resource information is adequate to meet the requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Analysis:

Monitoring Sampling Location Maps

A revised Plate 7-1 and a new Plate A7-1 are included with the proposed amendment. Elevations and locations of the wells that are currently monitored are shown on the Plate 7-1, and Plate A7-1 shows CV-1W (the french-drain monitoring well) as the only ground-water monitoring location under the proposed amendment. Both Plates 7-1 and A7-1 show the three surface-water monitoring locations that are currently monitored and that will continue to be monitored under the proposed revision of the MRP. Plate 7-2 in the current MRP shows locations of older wells that are no longer monitored. This map has not been revised and will remain in the MRP. Plates 7-1 and A7-1 are not certified.

Subsurface Water Resource Maps

Plate 7-2 in the current MRP shows the direction of ground-water flow and the general configuration of the water-table surface. This map is based on ground-water levels measured on August 20, 1980. Several of the contour lines on Plate 7-2 are mislabeled and the water-surface elevation shown for well CV-10W is incorrect. CV-3W was not dry on August 8, 1980 as indicated on Plate 7-2, and either the elevation of CV-3W is incorrect on Plate 7-2 and in Tables 7-1 and 7-1a or the location of this well is incorrect on Plates 7-1 , A7-1, and 7-2. Plate 7-2 is certified. Plate 7-2 is not part of the proposed revision and these errors do not hinder enforcement of the Coal Mining Rules, so no requirement to correct this map is being made at this time.

Plate 7-1 in the current MRP shows the underground drain constructed in the southeast corner of the Savage Coal Terminal property, south of the railroad loop. The revised Plate 7-1 does not show this drain.

Surface Water Resource Maps

Plates 7-1, A7-1 , and 7-2 show locations of surface waters that receive discharges from affected areas in the Savage Coal Terminal property and locations of surface water bodies such as streams, lakes, ponds, wetlands, springs, drains, and irrigation ditches within the proposed permit and adjacent areas.

Surface drainage from the Jensen Trucking property has been diverted and no longer flows to the Savage Coal Terminal sedimentation ponds. Plates 7-1 and A7-1 show drainage from this area flows onto the Savage Coal Terminal property, along the south side of the railroad loop to the BTCA area in the southeast corner of the permitted area, then through a culvert under the main railroad line and off the Savage Industries property.

Findings:

Maps, plans, and cross sections of surface and subsurface water resources and monitoring and sampling locations are adequate to meet the requirements of this section except:

R645-301-731.700 - The revised Plate 7-1 does not show the underground drain constructed in the southeast corner of the Savage Coal Terminal property, south of the railroad loop.

R645-301-731.730 - Plates 7-1 and A7-1 are not certified.

OPERATION PLAN

HYDROLOGIC INFORMATION

Analysis:

Ground-water monitoring.

The purposes set forth in the monitoring plan, Section 7.1.6 of the MRP are to identify trends in water quality characteristics and to relate any trends to operational activities, off-site activities, or natural variation.

Following the ground-water monitoring plan in the MRP, ground water is currently monitored in eight wells and the french drain. Savage Industries has requested that monitoring be eliminated at the 8 wells, with monitoring to be continued at the french-drain sump, CV-1W.

Before installation of the french drain, ground water was at or near the surface and the Savage Coal Terminal and surrounding lands were an area of ground-water discharge rather than recharge. There are still low places where water is at or near the surface, as indicated by soft, boggy ground and salt crusts on the surface (Plate 7-1). However, the refuse storage piles have been constructed on higher ground where high or surfacing ground water has not been observed, either presently or prior to construction of the piles.

The french drains have lowered the water table at the site to the extent that CV-4W, CV-5W, CV-10W, and CV-12W, which had water in them in 1982, are now dry. Deepening these wells would be of no benefit because they already penetrate a few feet into the Bluegate Shale and are intended to monitor the water table above this impermeable stratum. Under the current MRP ground-water monitoring at the wells will stop when regrading for reclamation begins; under the proposed revision the monitoring will end immediately. The water table may recover when, at completion of site reclamation, the french drains are severed and plugged and pumping from the sump is terminated, but operations on the adjacent RailCo and COVOL properties may continue to affect the ground water.

The material on the refuse disposal piles has been determined to be non-toxic and non-acid forming (p. 7-55a). Coal washing is no longer done at the site and there are no current or future plans to

wash coal. The only new material placed on the refuse disposal piles is from cleaning of the sedimentation pond and ditches.

Wells CV-10W and CV-11W are outside the permit area, in an alfalfa field not owned or controlled by Savage Industries (Plate 4-1). CV-10W and CV-11W have been recently damaged by plowing and are no longer accessible. Savage Industries wants to remove these two wells from the monitoring plan rather than try to repair or replace them. Their main concern is that any wells in this area will always be subject to damage from ongoing farming and grazing operations. Water quality data that have been collected indicate that the wells probably have been monitoring impacts from farming and that there have been no impacts from operation of the Savage Coal Terminal. Continued monitoring of ground water at these locations does not appear to be necessary, especially as long as there is no coal processing on the Savage Coal Terminal property.

Appendix 7-1 states that well CV-12W is on land owned by RailCo (Co-Op) and that the use of the land has changed since CV-12W was installed. This well has been dry for at least five years, but any monitoring results that might be obtained would most likely indicate impacts from the RailCo operation rather than the Savage Coal Terminal. Plate 4-1 does not show RailCo as the landowner. A railroad cut on the RailCo property is mentioned on page 3 of Appendix 7-1, but Plates A7-1 and 7-1 indicate this is an alfalfa field and show no railroad cut. Ownership and use of this land need to be clarified on the maps. Continued monitoring of well CV-12W will probably be of little or no value and Savage Industries should be allowed to drop it from the ground-water monitoring plan.

Well CV-6W is located along the western edge of the permit area, adjacent to the main rail line and near Sediment Pond No. 5. Water levels in CV-6W correlate with the water surface elevation in Sediment Pond No. 5 and with the wetness of the marshy area in the alfalfa field west of the railroad embankment. Savage Industries pumps the water from pond No. 5 to pond No. 6, and from there to the french-drain sump where samples are taken for water-quality analysis. Pumping from pond No. 5 is done, in part, to keep ground-water levels low under the adjacent alfalfa field: this is an informal agreement between Savage Industries and the owner of the field. The water level in CV-6W is affected by this pumping, so water levels from this well provide little useful information.

Well CV-6W is downgradient of the refuse and coal-storage piles. TDS concentrations vary and generally exceed TDS standards for agricultural use, but except for several very high TDS measurements, especially during the period from 1983 to 1989, water quality has been better in CV-6W than at other monitoring sites. On page 4 of Appendix 7-1 it is stated that water quality has improved in CV-6W with time, but data from Table 7-9a in the MRP and Table A7-1 in Appendix 7-1 indicate that TDS has increased somewhat since monitoring began in 1981, although there has been a slight decrease since 1991.

Savage Industries asserts that water-quality monitoring from well CV-6W is not necessary because the same water can be monitored at Sediment Pond No. 5 or the french-drain sump. No water-quality data for pond No. 5 have been submitted to DOGM. Although water in Sediment Pond No. 5 or the sump may have similarities to that in CV-6W, it also contains sediments and solutes carried in by surface runoff and is in a geochemical environment very different from the ground water. TDS measured at the sump is typically 2 to 3 times higher than TDS measured at CV-6W. However, continuing analysis of ground water from CV-6W will likely produce no further information to identify trends in

water quality characteristics or to relate any such trends to operational activities, off-site activities, or natural variation, which are the purposes set forth in the monitoring plan, Section 7.1.6 of the MRP.

On pages 3 and 4 of Appendix 7-1 the RailCo railroad cut is mentioned, along with the french drain, as impacting ground water flow or recharge to wells CV-4W and CV-5W. As already discussed there is no railroad cut shown on the maps. CV-4W and CV-5W are immediately adjacent to the french drain and have been dry for at least five years. Continued monitoring of CV-4W and CV-5W appears to be of no value as long as the french drain and the RailCo railroad cut are draining the ground water from the area.

CV-3W is also outside the permit area, on land owned and controlled by Jensen Trucking (Kevin and Lois Jensen, Plate 4-1). This well is upgradient of all Savage Coal Terminal operations. Although TDS content is too high for agricultural use, this water probably originates as seepage from the nearby irrigation ditch. Because the well is on property Savage Industries does not own or control and to which there is not ready access, Savage Industries should be allowed to drop CV-3W from the ground-water monitoring plan. However, it would be in Savage Industries' best interest to have a monitoring well located where it could sample ground water flowing to the Savage Coal Terminal from the Jensen property.

The french-drain sump, CV-1W, is to be monitored up to the initiation of reclamation regrading. Under the current proposal CV-1W would be the only ground-water monitoring station to remain in use. This sump not only holds ground water drained from the north and west perimeters of the property, but also receives water pumped from Sediment Ponds No. 5 and No. 6. It provides a general or broad indication of ground-water quality.

CV-0W is within 200 feet of and downgradient of the french drain. It has been dry since December 1979. It is in an undisturbed corner of the permit area. Further monitoring of this well appears to be of no value.

The operator has demonstrated, using baseline and operational ground-water monitoring data, that the operation has minimized disturbance to the prevailing hydrologic balance in the permit and adjacent areas and prevented material damage to the hydrologic balance outside the permit area. Mostly because of the high TDS content, the shallow ground water is not suitable for grazing and agriculture; data collected on and adjacent to the Savage Coal Terminal indicate that the quality of the shallow ground water may even be made worse by grazing and irrigation.

Casing and sealing of wells.

Wells CV-10W and CV-11W have been damaged by plowing in the alfalfa field where they are located. The casing has been broken off below the surface and the wells are probably at least partially filled with soil. No further work is planned to close these two wells.

For the other wells that are abandoned:

- PVC casing will be cut approximately 4 to 6 inches below the surface;
- The casing will be filled with gravel to within approximately 3 feet of the surface;
- The remainder of the casing will be filled with concrete; and

- The surface will be covered over with native soil.

Findings:

Hydrologic operation information is adequate to meet the requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Analysis:

Surface and subsurface manmade features maps.

RailCo's coal shipping operation and COVOL's briquet manufacturing plant are immediately adjacent to the Savage Coal Terminal, to the north and west, respectively. A deep cut for RailCo's railroad loop lies within 100 feet of the Savage terminal's north boundary line. There is also a wood processing plant adjacent to the southeast corner, along the main rail line. Although they could be having significant impacts on ground and surface water, none of these adjacent operations are shown on the maps in the MRP.

Surface and subsurface ownership maps.

It isn't clear if Plate 4-1 has been updated to show current ownership of properties adjacent to the Savage Coal Terminal. It may be that RailCo and COVOL are leasing the land their facilities are on and that the ownership is still as shown on Plate 4-1.

Monitoring and sample location maps.

A revised Plate 7-1 and a new Plate A7-1 are included with the proposed amendment. Elevations and locations of the wells that are currently monitored are shown on the Plate 7-1, and Plate A7-1 shows CV-1W (the french-drain monitoring well) as the only ground-water monitoring location under the proposed amendment. Both Plates 7-1 and A7-1 show the three surface-water monitoring locations that are currently monitored and that will continue to be monitored under the proposed revision of the MRP. (Plate 7-2 in the current MRP shows locations of older wells that are no longer monitored.) Plates 7-1 and A7-1 are not certified.

Subsurface Water Resource Maps

Plate 7-2 in the current MRP shows the direction of ground-water flow and the general configuration of the water-table surface. This map is based on ground-water levels measured on August 20, 1980. Several of the contour lines on Plate 7-2 are mislabeled and the water-surface elevation shown for well CV-10W is incorrect. Plate 7-2 is certified. Plate 7-2 is not part of the proposed revision and these errors do not hinder enforcement of the Coal Mining Rules, so no requirement to correct this map is being made at this time.

Surface Water Resource Maps

Plates 7-1, A7-1 , and 7-2 show locations of surface waters that receive discharges from affected

areas in the Savage Coal Terminal property and locations of surface water bodies such as streams, lakes, ponds, wetlands, springs, drains, and irrigation ditches within the proposed permit and adjacent areas.

Surface drainage from the Jensen Trucking property has been diverted and no longer flows to the Savage Coal Terminal sedimentation ponds. Plates 7-1 and A7-1 show drainage from this area flows onto the Savage Coal Terminal property, along the south side of the railroad loop to the BTCA area in the southeast corner of the permitted area, then through a culvert under the main railroad line and off the Savage Industries property.

Findings:

Maps, plans, and cross sections of surface and subsurface operations and monitoring and sampling locations are adequate to meet the requirements of this section except:

R645-301-731.730 - (Repeat - see Resources Section) Plates 7-1 and A7-1 are not certified.

R645-301-521.121, -521.190 - Maps in the MRP do not show buildings and other facilities that are adjacent to Savage Coal Terminal, such as the COVOL briquet manufacturing plant, the wood products plant, and the RailCo coal loading facility, which includes a deep excavated cut for a railroad loop.

R645-301-112.600 - It is not clear whether or not Plate 4-1 has been updated to show current ownership of properties adjacent to the Savage Coal Terminal.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Analysis:

Ground-water monitoring.

Under the current MRP ground-water monitoring at the wells will stop when regrading for reclamation begins; under the proposed revision this monitoring will end immediately. The water table may recover when, at completion of site reclamation, the french drain is severed and plugged and pumping from the sump is terminated, but operations on the adjacent RailCo and COVOL properties may continue to affect the ground water.

Transfer of wells.

Wells will not be transferred.

Casing and sealing of wells.

The following steps are to be taken to case or seal wells that are no longer used:

- PVC casing will be cut approximately 4 to 6 inches below the surface;
- The casing will be filled with gravel to within approximately 3 feet of the surface;
- The remainder of the casing will be filled with concrete; and
- The surface will be covered over with native soil.

Findings:

Hydrologic reclamation information is adequate to meet the requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Analysis:

Reclamation Monitoring and Sampling Location Maps

According to the current MRP ground-water monitoring is to end when mining operations cease and regrading begins. The only effect of the proposed revision is that the monitoring wells will become inactive immediately rather than at the time of reclamation. Surface-water monitoring will continue at UPDES discharge point CV-15 until removal of the sedimentation pond and at stations CV-14 and CV-15 until bond release. Elevations and locations of those three surface-water monitoring stations are shown on Plates 7-1 and A7-1.

Certification Requirements

Plates 7-1 and A7-1 are not certified.

Findings:

R645-301-731.730 - (Repeat-see Resources Section) Reclamation monitoring and sampling location maps on Plates 7-1 and A7-1 are not certified.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

The application for permit revision has been reviewed by UDOGM and it has been determined that a new or updated CHIA is not required.

If you have any questions please call.

Sincerely,

Joseph C. Helfrich
Permit Supervisor

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cc: James Jensen, Savage Industries
Bill Malencik
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