3. The effects of mitigation work on non-renewable resources -The best example of this situation is the case where it is necessary to regrade an area to mitigate the effects of subsidence. If it is necessary to remove the topsoil *prior* to regrading, it would be better to wait until all probable subsidence had occurred than to risk topsoil contamination through repeated removal and respreading of the topsoil should subsidence continue for several years. However in this case, it may be necessary to perform lesser or temporary mitigative work to minimize the effects of pending water on the soil resources or hazardous conditions for people, wildlife or livestock.

As discussed above, we do not believe it is possible to commit to a specific timetable for performing subsidence mitigation. However, when subsidence mitigation is required by applicable laws and regulations, mitigation will be performed as soon as practical taking into consideration the above items.

UMC 817.126

As described in the subsidence control plan, under UMC 784.20, the two (2) perennial streams in the permit area will be protected by buffer zones (Refer to Plate V-5). There are no impoundments of 20 acre-feet or more in the permit area.

Underground water rights described in Chapter VI, under UMC 784.14, show that the Town of Emery maintains two (2) wells developed in different aquifers within the Ferron Sandstone formation. These wells are used as a backup water source to the town's present water supply system which relies on surface water from Muddy Creek. Emery Town Well No. 1 is developed in the Lower Ferron aquifer, which lies well below current mining activities. Well No. 2 is developed in the Middle and Upper Ferron aquifers which are directly below and above the seam being mined. No adverse impacts to either well are anticipated since the wells are located about 3 to 4 miles from the mine and are up gradient within the regional ground water flow pattern. If mining activities adversely impact the Emery town wells, Consol will commit to insuring an alternative source of water, per R645-301-731-530, for the town if the surface water supply becomes inadequate. The remedies may include but not be limited to 1) re-conditioning or re-drilling the Emery town wells to a greater depth, 2) transferring water covered by an existing water right or water right application from Table VI-I to the town of Emery, or 3) other mutually agreed upon methods of mitigation/replacement. ~~Static water level readings taken from wells maintained as part of the mine's ground water monitoring program also indicate that no disruption of the aquifers in the vicinity of the town's wells has occurred.~~

Underground operations at the Emery Mine are not conducted beneath or in close proximity to any public buildings, including churches, schools, hospitals, court houses, and government offices.

Revised 10/07

PRE-SUBSIDENCE SURVEY
PRIOR TO FULL EXTRACTION AT THE
ZERO NORTH, 4th EAST MAINS, AND 6th WEST PANELS

Prepared for

CONSOLIDATION COAL COMPANY
Emery Mine
Emery County, Utah

October 2007

Prepared by

EARTHFAX ENGINEERING, INC.
Engineers/Scientists
Midvale, Utah
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TABLE OF CONTENTS

SECTION 1

INTRODUCTION

The purpose of this report is to present baseline surface conditions prior to full extraction operations at the Zero North, 4th East Mains, and 6th West Panel in the Consolidation Coal Company (CONSOL) Emery Mine, Emery County, Utah. It is intended to be part of a Subsidence Control Plan as required in Section R645-301-525.100 of the Utah Administrative Code. Recording initial surface conditions will facilitate locating and mitigating any areas determined to be adversely affected by future subsidence. As part of the pre-subsidence survey, the locations and conditions of the following features were recorded:

- Structures (e.g. buildings, corrals, roads)
- Fences
- Utilities (e.g. power, telephone, gas, and water lines, water wells)
- Surface drainages (e.g. natural channels, irrigation ditches)

This report references the original Pre-subsidence Survey performed prior to mining operations in 1980 (Valley Engineering, 1980). The feature numbers given in this document correspond to those described in the 1980 report. These features were surveyed in the field in October 2007, and any differences and/or changes from the conditions noted during the 1980 survey are noted both in the text and figures of this document. This report supercedes the Valley Engineering survey where conflicts exist.

CHAPTER 2
SURVEY AREA OBSERVATIONS

2.1 GENERAL AREA DESCRIPTION

This pre-subsidence survey covers approximately 142 acres, consisting of mostly undeveloped rangeland. Approximately 9.1 acres of the surveyed area are irrigated crop land. There are no structures located above the Zero North, 4th East Mains, or the 6th West Panel, but a small shed and corral is located nearby. Both of these structures are in dilapidated condition. There are several fences in the area in various states of repair. Most of the fences consist of barbed wire strung between posts made from natural rough cut tree limbs. Some fences use finished lumber fence posts or metal tee-stakes. A paved road which serves as the access road for the 4th East Portal traverses roughly west to east across the southeastern corner of the 4th East Mains. Unimproved roads stem from the paved road to the irrigated croplands in the survey area. There are one perennial drainage and several ephemeral drainages in the survey area. The perennial drainage is named Christiansen Wash. An overhead electrical power line traverses through the western portions of both the 4th East Mains and 6th West Panel. All of the features (structures, fences, roads, drainages, utilities, etc.) located during the pre-subsidence survey are shown on Figure 1. CONSOL has signed a County Road Repair Agreement with Emery County to mitigate any subsidence damage to roads within the full extraction area. Similarly, CONSOL has entered into a Power Line Repair Agreement with Pacificorp to mitigate subsidence damage to power lines within the full extraction area.

2.2 INDIVIDUAL FEATURE DESCRIPTIONS

Each numbered feature on Figure 1 is described below. The numbers for each feature are identical to those used in the 1980 Pre-Subsidence Survey. Refer to Section 6 for photographs.

Feature 85. Dirt Road and Fences. This feature is essentially unchanged from how it is described in the Valley Engineering (1980) report, which states the following: "The road is a two-track, single lane, dirt road. The road surface consists of the natural sand and clay that is in the area, and has been compacted by vehicles that travel the road. The fences in the area are barbed wire with either natural rough cut wood posts or steel posts." The fences are in fair to good condition.

Feature 86. Barbed Wire Fence. This feature has been updated from the Valley Engineering (1980) report. The fence, which is constructed with rough cut timber posts, is in dilapidated condition. Several of the posts are missing, and many of the barbed wire strands are loose and partially buried under the ground surface.

Feature 87. Small Creek and Fence. The description of this feature has been updated from the Valley Engineering (1980) report. The fence is constructed of rough cut timber posts and barbed wire and is in good condition. The "small creek" was incorrectly identified in the 1980 survey. The survey area is relatively flat, dry, and contains no established stream channels. The 1980 survey shows several irrigation ditches overlying the Zero North Panel which drain toward this "stream channel," which was actually an irrigation outflow ditch. During the 2007 survey, it was evident that many of the irrigation ditches had been allowed to fill in, including the "stream channel" identified in the 1980 survey.

Feature 88. Small Fenced Area. The description of this feature has been updated from the Valley Engineering (1980) report. It has fallen into disrepair since it was surveyed in 1980. The fenced area measures approximately 25 feet by 25 feet. Many of the fence posts are no longer straight, and the barbed wire sags. The area in the vicinity of the fence is overgrown with vegetation.

Feature 89. Quarter Section Marker. This feature remains the same as described in the Valley Engineering (1980) report, which states the following: "This quarter section corner marker is in Range 6 East Township 22 South. It divides sections 22 and 27. The marker is a metal cap on a short steel pipe."

Feature 90. Ponds. The description of this feature has been updated from the Valley Engineering (1980) report. The ponds were empty during the October 2007 survey, but four earth berms were present that appeared capable of impounding water. The berms are approximately 3 feet tall. Three of the berms are clustered together in a north to south alignment, and one berm is located a few hundred feet to the northeast. A dry irrigation ditch located west of the three clustered ponds appears to serve as a water source. A dilapidated wooden corral and small shed is located just north of the three clustered ponds.

Feature 91. Sixteenth Section Corner Marker. This feature remains the same as described in the Valley Engineering (1980) report, which states the following: "The marker is located in Range 6 East Township 22 South and divides the south boundary of the southwest quarter of Section 22 between sections 22 and 27. The marker is a short steel pipe, about a foot in height, with a metal cap at the top."

Feature 92. Fence and Dirt Road. The description of this feature has been updated from the Valley Engineering (1980) report. This feature is in fair to poor condition. The road is rutted and overgrown with vegetation, especially where irrigation runoff discharges from the center of the field located to the north. The fence, which is constructed from rough cut timber and barbed wire, is also overgrown by grasses. Many of the fence posts are no longer plumb, and many of the barbed wire strands sag.

Feature 93. Irrigation Ditches and Farmland. The description of this feature has been updated from the Valley Engineering (1980) report. The portion of this feature that overlies the

6th West Panel (it does not exist above the 4th East Mains) contains two irrigated fields with a total of 9.1 acres of cultivated land. The northwestern field drains to the south/southeast and receives irrigation water from a ditch running along its eastern edge. The southeastern field drains to the south and receives irrigation water from a ditch that enters the field from the north.

Feature 96. Cattle Guard. The description of this feature has been updated from the Valley Engineering (1980) report. The cattle guard was not present during the October 2007 survey.

Feature 97. Dirt Road, Utility Power Line, and Fence. The description of this feature has been updated from the Valley Engineering (1980) report. The dirt road is approximately 24 feet wide with a surface constructed from imported, compacted gravel. The road is in very good condition. The utility power line hangs from 30 to 40 foot tall wooden poles, and is in very good condition. The poles appear relatively plumb. The barbed wire fence is located on the west side of the road and has posts constructed from rough cut timbers and metal tee-stakes. The fence is in good to excellent condition.

Feature 98. Small Creek. The description of this feature has been updated from the Valley Engineering (1980) report. The creek is called Christiansen Wash. During the October 2007 survey, flow in the creekbed was approximately 3 feet wide. The creek flows to the southwest and discharges into Quitchupah Creek. The creek flows under the paved access road for the 4th East Portal via a 60-inch diameter coated corrugated steel pipe that is in very good condition.

Feature 103. Farm Land, Corrals, Ponds, and Fences. The description of this feature has been updated from the Valley Engineering (1980) report. Most of this feature lies just outside the boundaries of the 4th East Mains and 6th West Panel. However, a fenced and gated hay storage area is located just to the northwest of the 6th West Panel. The fence and gate are in good

condition. An unimproved dirt road (good condition) leads from the gravel road up to the hay storage area.

Feature 122. Irrigation Ditch. This feature was mapped but not enumerated in the Valley Engineering (1980) report. It consists of an irrigation ditch that conveys water from north to south along the west side of the road described in Feature 97, and then along the northwest edge of an irrigated field adjacent to the road. The ditch is approximately six inches deep and is in fair to good condition.

Feature 123. Remnant Irrigation Ditch Segment. This feature was mapped but not enumerated in the Valley Engineering (1980) report. It consists of a segment of an irrigation ditch that has been allowed to fall into disrepair. The ditch contains a section of irrigation piping, and both the ditch and the piping have mostly filled in with sediment. Both the inflow and outflow to and from this ditch segment are completely filled in.

SECTION 3
CONCLUSIONS

This report summarizes pre-subsidence surface conditions for the Zero North, 4th East Mains, and 6th West Panel at the Consolidation Coal Emery Mine, Emery County, Utah. Surface features were inspected and surveyed in October 2007 prior to full extraction. Although the damage due to subsidence is generally expected to be limited, the greatest potential for adverse effects would likely be disturbances to surface drainages, roads, and utilities. By detailing pre-subsidence conditions in this report, it will be easier to both identify and mitigate negative impacts caused by future subsidence.

SECTION 4

REFERENCES

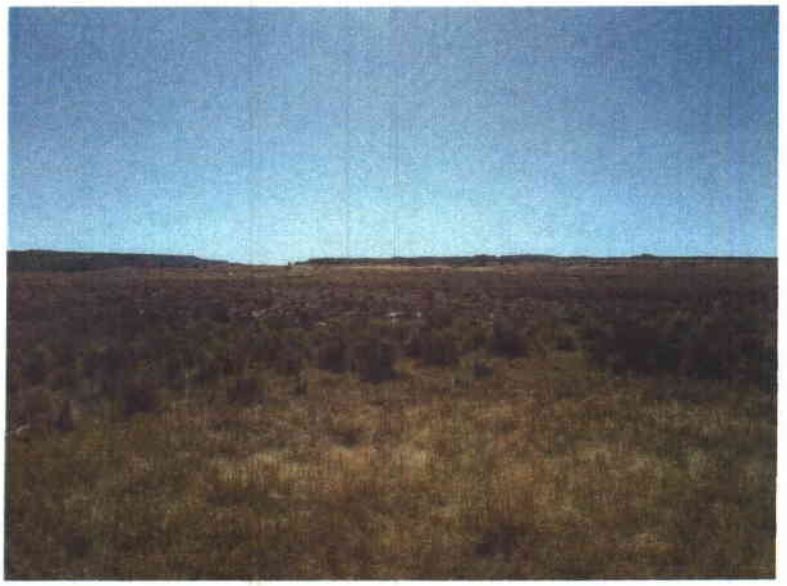
Consolidation Coal Company, 1990. Emery Mine Permit Act 015/015 Renewal. Chapter VI Volume 1 Section VI.A.3. Submitted to Division of Oil, Gas, and Mining September 9, 1990.

Valley Engineering, Inc., 1980. Consolidation Coal Company, Emery Mine, Presubsidence Survey, Structure and Renewable Resources Descriptions. Division of Oil, Gas, and Mining, Emery Permit 015/015. Chapter V, Vol. 2 of 3.

FIGURE 1

SITE PHOTOGRAPHS

Corners of Sections 22, 23, 26, and 27. Looking west at the ground surface above the Zero North Panel. USGS bench marker is visible where fences intersect. Note that the fence is constructed of unfinished timbers and is in fair condition.



View looking south near the center of the Zero North Panel. The ground surface is relatively flat, and is not currently used for crop production.

Feature 85. Dirt Road and Fences. Looking east. Fence is constructed from rough cut timbers and is in good condition. The road is an unsurfaced two track road and is in good condition.

Feature 86. Barbed Wire Fence. Looking west at the fence that extends to the north from the point labeled Feature 86 on Appendix V-5 Figure 1. The fence is missing several of its rough cut timber posts, and is in poor condition.

Feature 86. Barbed Wire Fence. Looking south along the fence that extends to the north from the point labeled Feature 86 on Appendix V-5 Figure 1.

Features 86, 87. Barbed Wire Fence, Small Creek and Fence. Looking southwest. Fence is constructed from rough cut timbers and is in good condition. The small creek identified in the 1980 survey was not present in 2007.

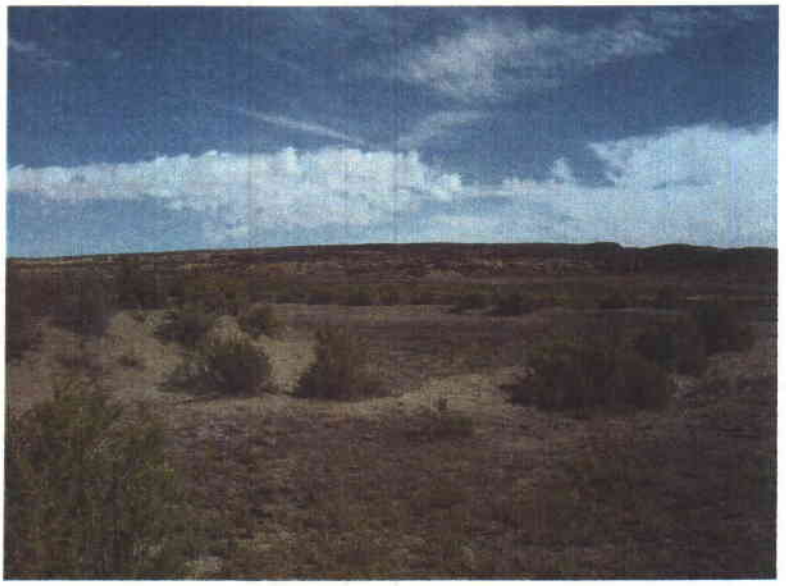
Paved Access Road to 4th East Portal. Looking southeast along road. The 4th East Portal is visible in the distance.

4th East Mains South of Paved Access Road. Looking South. Note Christiansen Wash on far right of photo. The land surface is undeveloped.

Feature 88. Small Fenced Area. Looking east.

Feature 89. Quarter Section Corner Marker.

Feature 90. Ponds. Looking southeast at southern pond.



Feature 90. Ponds. Looking southeast at central pond.

Feature 90. Ponds. Looking southeast at northern pond.

Feature 90. Ponds. Looking southeast at northeastern pond.

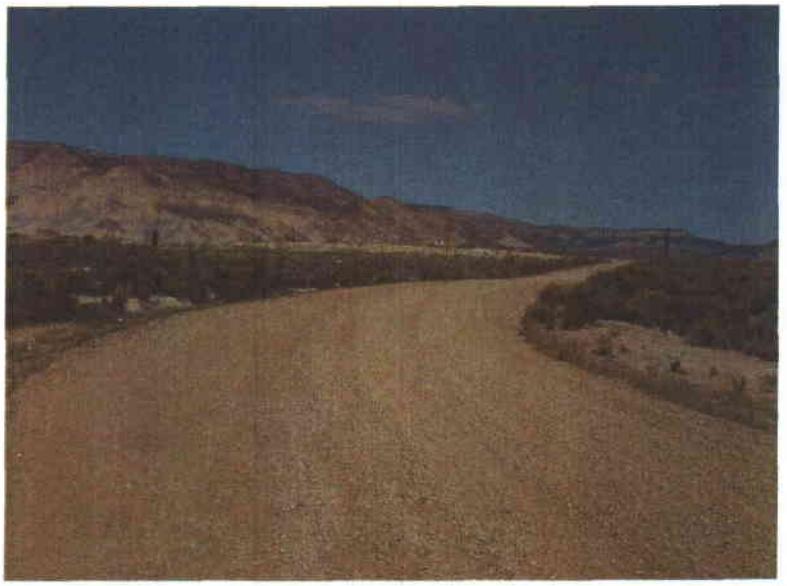
Feature 90. Ponds. Looking north at a nearby dilapidated corral and small Shed.

Feature 90. Ponds. Looking west at a nearby small Shed.

Feature 92. Fence and Dirt Road. Looking east. Note that road and fence are overgrown and in fair to poor condition.

Feature 93. Irrigation Ditches and Farmland. Looking south at the northern field.

Feature 93. Irrigation Ditches and Farmland. Looking south at the southern field.



Feature 97. Dirt Road, Utility Power Line, and Fence. Looking north from a point just north of where the dirt road crosses Christiansen Wash.

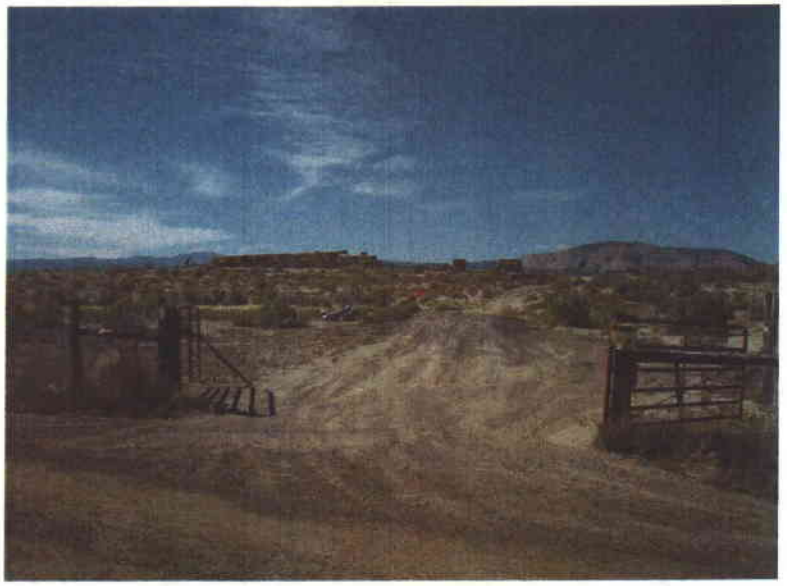
Feature 97. Dirt Road, Utility Power Line, and Fence. Looking north. Note that Feature 103 is visible in the distance.

Feature 97. Dirt Road, Utility Power Line, and Fence. Looking west at fence and power line.

Feature 97. Dirt Road, Utility Power Line, and Fence. Looking south from road junction in Panel 6W. The 4th East Portal is visible in the distance.

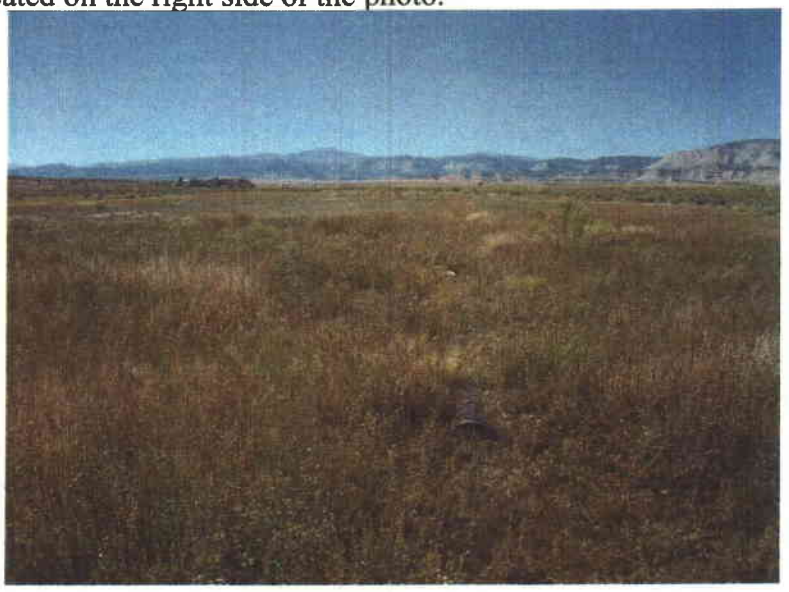
Feature 98. Small Creek. Looking south from where the creek intersects the graded gravel road. Note the embankment for the paved access road for the 4th East Portal along the horizon. This small creek is called Christiansen Wash. During the October 2007 survey, the stream was flowing about 3 feet across.

Feature 98. Small Creek. Looking south at the 60-inch diameter coated corrugated metal pipe that conveys Christiansen Wash under the paved access road for the 4th East Portal.



Feature 103. Farm Land, Corrals, Ponds, and Fences. Looking west at a hay storage area.

Feature 122. Irrigation Ditch. Looking southwest where the ditch curves from running along the gravel road toward the irrigated field located west of the road. Vegetation is growing in the ditch, which is located on the right side of the photo.



Feature 123. Remnant Irrigation Ditch Segment. Looking southwest from the northeast portion of Zero North Panel. Note the partially buried piping in the foreground. It is in dilapidated condition.

inflow and potentiometric surface changes were predicted from the period of June 2007 through December 2016 (the projected life of mine at the time of modeling).

Three scenarios were run with MODFLOW to approximate a range of future conditions. To simulate worst-case inflow, it was assumed that groundwater levels in the upper Ferron Sandstone do not change in the future (i.e., that the vertical head over the mine remains unchanged beyond 2007). The conservative nature of this set of assumptions is evidenced by the fact that water levels in the upper Ferron Sandstone *have* declined in the vicinity of the mine as mining has progressed, thereby decreasing the head above the mine and the transmissivity of the aquifer.

As a worst case drawdown evaluation, it was assumed that groundwater levels in the upper Ferron Sandstone are allowed to decline as mining progresses. Since water-level declines will likely continue as mining progresses, this scenario is considered more realistic than the worst case inflow scenario discussed above.

As an independent check to the modeled inflows, a relatively simple calculation of predicted inflow based on unit-area inflows measured in the 1st and 2nd South pillared area was used and applied to the remaining areas to be mined. However, since the 1st and 2nd South areas of the mine are near the outcrop, this unit-area approximation may not be representative of the deeper portions of the mine.

The results of the MODFLOW evaluation are summarized in Table VI-15. Predicted mine-water inflow rates under the worst-case drawdown scenario agree reasonably well with the mass balance estimates presented in Table VI-14. These inflow estimates are also considered most realistic since drawdown is expected to continue to occur in the future, based on past observations.

Figure VI-18 shows the predicted potentiometric surface under the worst-case drawdown scenario for the upper Ferron Sandstone at the end of the year 2016 (when all planned mining has been completed). As indicated, it is anticipated that the trough of depression created by mine dewatering will expand to the northeast as the mine expands in that direction. It is not predicted, however, that the maximum drawdown in the area will increase above that currently being experienced, since the elevation of the mine floor will rise as mining proceeds updip.

A comparison of Plates VI-1 (1979 data) and VI-7 (2006 data) indicate that the potentiometric surface of the upper Ferron Sandstone has been affected by mining. As would be expected, declines in this surface have been most pronounced within the permit area, with decreasing effects away from the mine workings. On the other hand, a comparison of Plates VI-2 (1985 data) and VI-8 (2006 data) indicates that the effects of mining on the potentiometric surface of the lower Ferron Sandstone have been comparatively small. Thus, although the modeling effort concentrated on the upper Ferron Sandstone, it is anticipated that these conditions will continue into the future (the effects on the potentiometric surfaces will decrease in the following order: upper Ferron>middle Ferron>lower Ferron).

Data presented in Appendix VI-15 indicate that the potentiometric surface of the upper Ferron Sandstone will gradually return to pre-mining conditions once pumping ceases. Whereas maximum drawdowns of 350 to 400 feet have occurred in the center of the permit area during the mining period (compare Plates VI-1 and VI-7), it is predicted that water-level recoveries will result in a maximum residual drawdown of 50 to 60 feet approximately 10 years

after cessation of pumping from the mine (compare Plate VI-1 with Figure 5 in Appendix VI-15). Maximum residual drawdowns will be approximately half those levels within 20 years following cessation of pumping operations (compare Plate VI-1 with Figure 6 in Appendix VI-15). Groundwater flow directions will gradually return to approximate pre-mining conditions following the cessation of pumping.

As noted in Table VI-1, the town of Emery has water rights at two wells, each located about 14,500 feet north of the mine permit boundary. The model output was evaluated to determine the potential effects of mining on the potentiometric surface at the location of these wells. These wells are completed in the middle and lower Ferron Sandstone and supply water on a backup basis to the town's distribution system. As noted in Figure 2 of Appendix VI-15, the northern boundary of the MODFLOW model was approximately 8,800 feet south of the Emery wells. At this northern model boundary, the model results indicate that groundwater levels in the Upper Ferron sandstone will drop 1.6 feet from 2007 to 2016, the period when active mining is planned to cease. From 2016 to 2026, groundwater levels at the northern model boundary are predicted to increase to approximately 5.4 feet above 2007 levels. Twenty years after mining is expected to cease (2036), the model predicts that the head at the northern model boundary will be approximately 12.7 feet above 2007 levels. The predicted heads in 2026 and 2036 are calculated to be higher than 2007 levels primarily because of the high transmissivity and lateral recharge in the vicinity of the Joe's Valley-Paradise fault zone.

Although the MODFLOW evaluation concentrated on the upper Ferron Sandstone, it is reasonable to conclude that impacts to the middle and lower Ferron Sandstone will be less than those in the upper Ferron Sandstone. Given the distance of the Emery town wells from the modeled area and their completion zones, the effects of mining on water levels at the Emery town wells are predicted to be much less than those predicted to occur in the upper Ferron Sandstone at the model boundary (i.e., these impacts will be minimal at the town wells, if at all).

Two springs have historically issued from the Ferron Sandstone adjacent to the permit area (SP-15 from the upper Ferron Sandstone and SP-16 from the lower Ferron Sandstone). Both of these springs are located near the formation outcrop, making model predictions less precise. However, the model results indicate that the potentiometric surface will decline approximately 24.1 feet at the location of SP-15 from 2007 to 2016 (the period of active mining and dewatering) and subsequently recover to approximately 4.1 feet below 2007 levels by 2036. Data contained in Appendix VI-1 indicate that no flow has occurred at SP-15 since June 2000. The model data imply that this condition will continue for some time in the future.

Quantitative predictions of potentiometric surface impacts at SP-16 are not possible since modeling concentrated on the upper Ferron Sandstone and since SP-16 is located near the formation outcrop just east of the model boundary. This spring is not currently used for beneficial purposes. Given the generally lesser mining-related impacts on the lower as compared to the upper Ferron Sandstone and the fact that this spring is located updip of the upper Ferron Sandstone outcrop, impacts to the potentiometric surface at this location should be less than those predicted for SP-15.

Several seepage points representing irrigation return flow are noted on Plate VI-5 (specifically SP-1 through SP-14). Recharge to these seeps is primarily a function of surface irrigation practices. Since this recharge is not connected to the regional groundwater system contained in the Ferron Sandstone, no impacts to these seeps are anticipated as a result of mine-dewatering activities.

The Emery Mine hydrologic monitoring program has been designed to assess the impacts of mining on groundwater resources in the area. Data collected from this program will provide a much more accurate picture of mining impacts than the current model will provide.

Impacts to Surface Water Availability. Water removed from the mine will be discharged to Quitchupah Creek in the future as it has in the past, increasing the flow of this receiving stream. As noted previously, only limited continuous streamflow data are available for Quitchupah Creek, with the U.S. Geological Survey maintaining a gaging station near the mine office from July 1978 through September 1981. The average annual flow of Quitchupah Creek at this location for the three complete water years of record was 8.43 cfs, ranging from 6.73 to 10.8 cfs (see Appendix VI-11). Mine-water discharge rates are predicted in Tables VI-14 and VI-15 to range from 1.35 cfs to 3.20 cfs through the end of mining. These values represent a 16 to 38% increase in the above-noted average annual flow of Quitchupah Creek.

As noted above, no water has been observed to discharge from the Emery Mine sedimentation ponds. Hence, a small quantity of runoff is precluded from reaching Quitchupah Creek and Christiansen Wash that would discharge to this stream if the mine surface facilities were not present. Given the small amount of precipitation in the area and the relatively small area of the surface facilities, this reduction in the streamflow of Quitchupah Creek and

E.1,690,000
E.1,695,000
E.1,700,000
E.1,705,000
E.1,710,000
E.1,715,000
E.1,720,000
E.1,725,000

EMERY TOWN
WELLS

N.6,775,000
N.6,770,000
N.6,765,000
N.6,760,000
N.6,755,000
N.6,750,000

5300
5400
5500
5600
5700
5800
5900
6000

2010
2011
2012
2013
2014
2015
2016
2009
2008
2007

SP-15
SP-16

LEGEND

2010	FORCASTED PANELS
	PREVIOUSLY MINED
5400	BOTTOM OF COAL CONTOUR
	MODFLOW MODEL LIMITS
	PERMIT AREA BOUNDARY
SP-15	SPRING

0' 3000'

CONSOLIDATION COAL COMPANY
P.O. BOX 566
SESSER, IL 62884-0566

FIGURE 2.
MODFLOW MODEL, PLAN VIEW

G:\UC982\Hydrology rewrite\MODFLOW DWGs\FIG2-MODEL.dwg, 10/26/2007 1:20:11 PM