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TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.
HEADQUARTERS: P.O. BOX 33695 DENVER, COLORADO 80233-0695 303-452-6111

July 27, 2020

Mr. Zach Trujillo
Environmental Protection Specialist
Colorado Division of Reclamation, Mining & Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

RE: Colowyo Coal Company L.P.
Permit No. C-1981-019
Technical Revision No. 140
East Taylor Seep French Drain

Dear Mr. Trujillo,

Tri-State Generation and Transmission Association Inc. (Tri-State), is the parent company to Axial Basin Coal Company, which is the general partner to Colowyo Coal Company L.P. (Colowyo). Therefore, Tri-State on behalf of Colowyo is submitting technical revision 140 (TR-140) to Permit No. C-1981-019.

TR-140 proposes installation of a french drain system to collect the water from the East Taylor Seep into a perforated pipe, route it to a parshall flume for flow measurements, and then through a pipe to the East Taylor Pond. It is requested that the Division calculate the change in reclamation liability with this technical revision as the area has been previously bond released.

Also included with the technical revision application is a change of index sheet to ease incorporation of this revision into the permit document. If you should have any additional questions or concerns, please feel free to contact Tony Tennyson at (970) 824-1232 at your convenience.

Sincerely,

DocuSigned by:
Daniel Casiraro
B70D69F114324DE...

Daniel J. Casiraro
Senior Manager
Environmental Services

DJC:TT:der

Enclosure

cc: Jennifer Maiolo (BLM-LSFO)
Chris Gilbreath (via email)
Tony Tennyson (via email)
Angela Aalbers (via email)
File: C. F. 1.1.1.203 - G471-11.3(21)d

CHANGE SHEET FOR PERMIT REVISIONS, TECHNICAL REVISION, AND MINOR REVISIONS

Mine Company Name: **Colowyo Coal Company**
Permit Number: **C-1981-019**
Date: **July 21, 2020**
Revision Description: **TR-140 East Taylor Seep French Drain**

Volume Number	Page, Map or other Permit Entry to be REMOVED		Page, Map or other Permit Entry to be ADDED		Description of Change
1	Table of Contents page iii (1 page)		Table of Contents page iii (1 page)		Table of Contents has been updated.
1	Figures Table of Contents page viii (1 page)		Figures Table of Contents page viii (1 page)		Figures table of contents has been updated.
1	Figures Page 29 (1 page)		Figures Page 29 (1 page)		Figure 4.05.7-1 has been inserted into the permit.
1	Page 4-12 through 4-23 (12 pages)		Page 4-12 through 4-23 (12 pages)		Section 4.05.7 has been updated which caused a pagination shift.
2A					No Change
2B					No Change
2C					No Change
2D					No Change
2E					No Change
3					No Change
4					No Change
5A					No Change
5B					No Change
6					No Change
7					No Change
8					No Change
9					No Change
10					No Change
12					No Change
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14					No Change
15					No Change
16					No Change
17					No Change

CHANGE SHEET FOR PERMIT REVISIONS, TECHNICAL REVISION, AND MINOR REVISIONS

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Volume Number	Page, Map or other Permit Entry to be REMOVED		Page, Map or other Permit Entry to be ADDED		Description of Change
18A					No Change
18B					No Change
18C					No Change
18D					No Change
19					No Change
20					No Change
21					No Change
22					No Change

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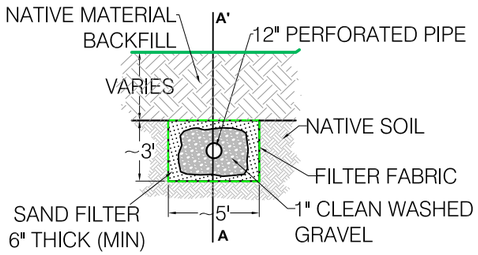
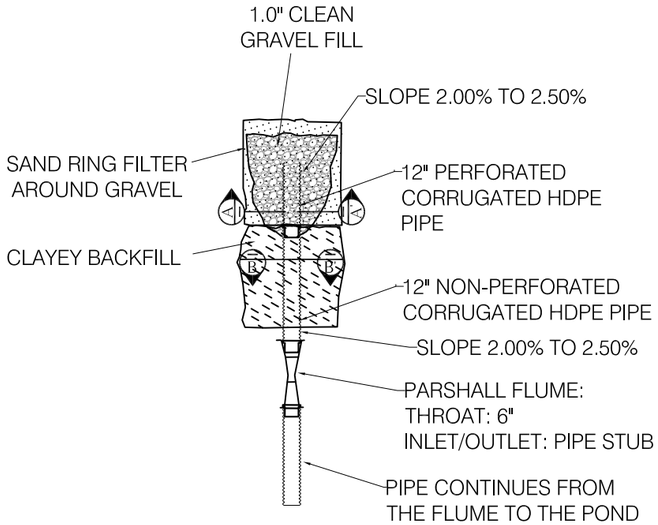
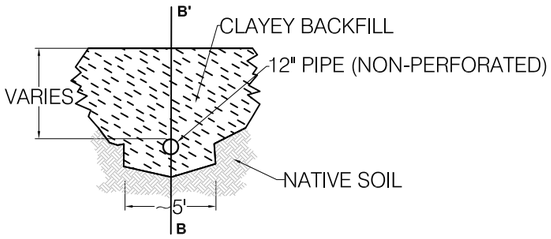
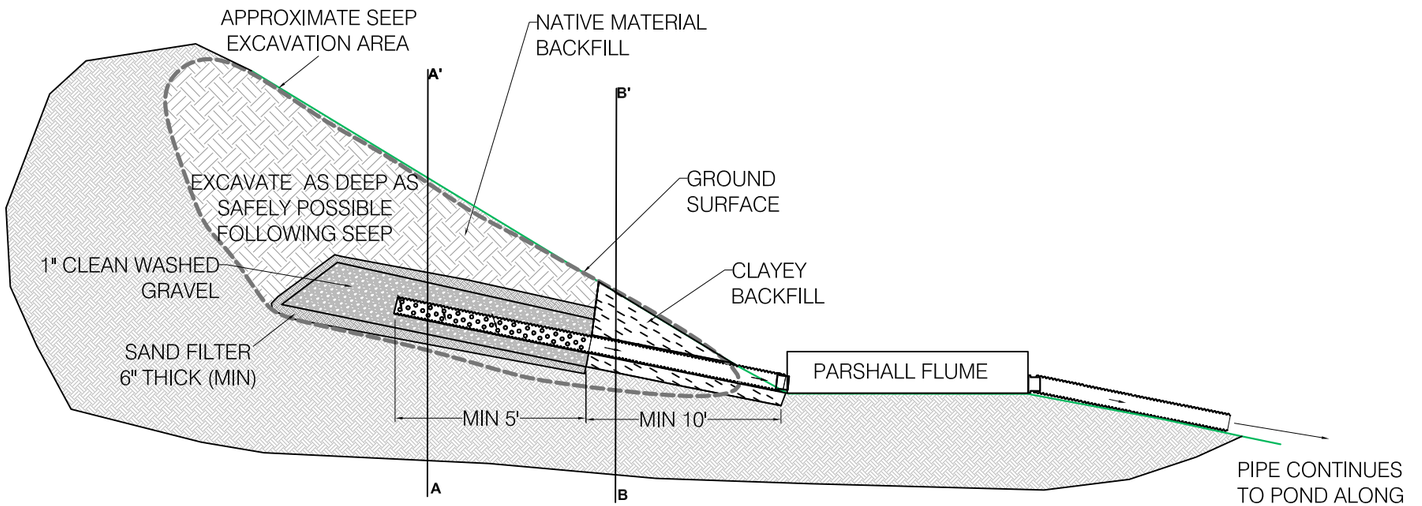
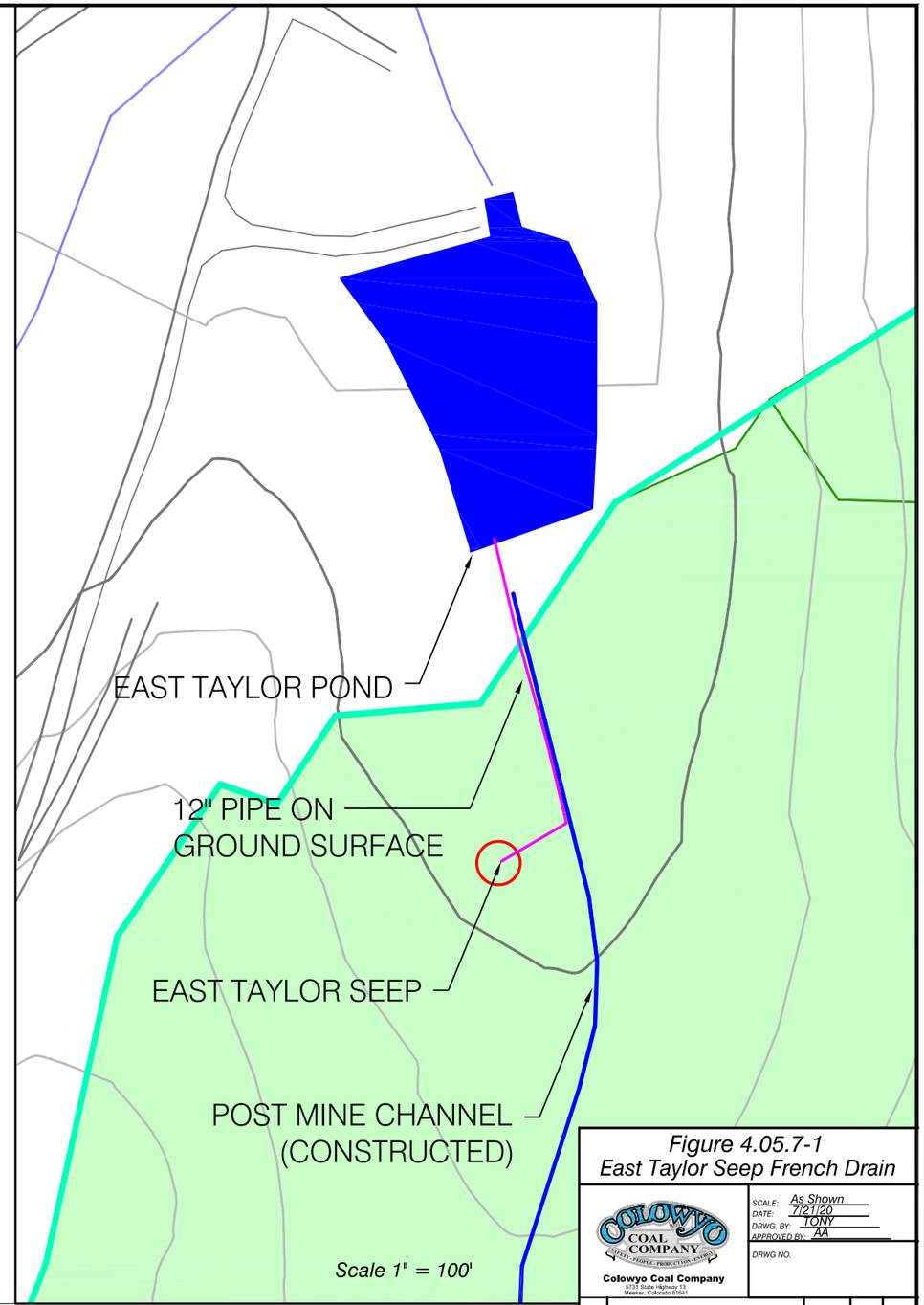








Scale 1" = 40'



Scale 1" = 100'

Figure 4.05.7-1
East Taylor Seep French Drain

Colowyo Coal Company
5731 State Highway 13
Meeker, Colorado 81641

SCALE: As Shown
DATE: 7/21/20
DRWG. BY: TONY
APPROVED BY: AA
DRWG NO.

No.	REVISION	DATE	BY	CHK

LEGEND

- *POST MINE CHANNEL*
- *DISTURBANCE BOUNDARY*
- *SURFACE PIPING*
- *EXISTING ROADS*
- *SEDIMENT POND*
- *RECLAIMED AREAS*

N W E S

100' 0 100' 200'

CONTOUR INTERVAL 25 FT.
TOPO JUNE 2020

impounded will be riprapped or otherwise stabilized, where necessary. Areas in which revegetation is not successful or, where rills and gullies develop, will be repaired and revegetated.

Sedimentation ponds that are subsequently approved as part of the post-mining land use will remain in place after the termination of mining activities.

Colowyo will inspect the condition of each pond and submit a quarterly report. None of Colowyo's ponds meet the size criteria of 30 CFR 77.216(a)(1989).

A small area exemption for sediment control will be utilized for sediment control for the remaining reclamation area in the Gulch A watershed that has not achieved Phase II or Phase III bond release. This small area exemption allows for a grass filter to be utilized for sediment control for the small area exemption.Please see Volume 2C, Item 18 for the small area exemption demonstration (grass filter) for the Gulch A watershed.

4.05.7 Discharge Structures

The sedimentation ponds at Colowyo are designed to treat the 10-year, 24-hour storm event in accordance with Rule 4.05.6(3)(a). As such, the general operation of the ponds will be a passive discharge system where water is allowed to discharge automatically as necessary. Colowyo will sample discharges as appropriate to remain in compliance with applicable CDPS Permit requirements. Pond dewatering through a manual headgate may be performed as necessary to lower the water level depending on operational requirements. Manual dewatering of ponds will meet applicable CDPS Permit standards. Discharge from sedimentation ponds will be controlled by energy dissipaters and flow check devices where necessary. All embankment ponds utilize separate principal and emergency spillways with the emergency spillway located at a minimum of 1 foot above the elevation of the maximum water surface during the discharge of the 10-year, 24-hour storm event through the principal spillway. The principal spillways are designed for the 10-year, 24-hour storm event and the emergency spillways are designed to pass the 25-year, 24-hour storm event in accordance with Rule 4.05.9(2)(c)(i). The design requirements for existing ponds can be found on each of the pond as-built drawings or in Exhibit 7, Item 15 of the existing permit document. All embankment sedimentation ponds will provide a non-clogging dewatering device or conduit spillway to remove water storage from inflow. Design requirements for all sediment ponds associate with the Collom Pit be found in Exhibit 7, Item 23. For compliance purposes, in systems that incorporate ponds in a series, CDPS effluent quality parameters will only apply to the last pond in the series that directly discharges into the receiving stream or drainage. Out of pit designed ponds internal to the last pond in the series will be inspected and maintained in the same manner as the "compliance" pond to ensure proper sediment control and design performance.

The sumps along Haul Road A are required to have flow measurement devices at the outflow of each sump. Each sump therefore will have a flume installed at the outflow to measure any flow discharged from each sump.

It was deemed necessary to install a french drain structure to monitor the flows from the East Taylor Seep. The East Taylor Seep is just above (south) of the East Taylor Pond. A clean washed gravel filter was installed to route water to an underground-perforated pipe. The perforated pipe

then routes from the seep water to the surface to a parshall flume for flow measurements. At the outlet of the parshall flume, the water is then routed through another twelve-inch solid pipe, which is on the ground surface directly adjacent (west) to the Taylor Trib Ditch. The pipe ends at the inlet of the East Taylor Pond were the seep water is discharged into the East Taylor Pond. The location and a design for this french drain system is presented on Figure 4.05.7-1.

4.05.8 Acid-forming and Toxic-forming Spoil

Acid forming materials do not exist within the overburden to be removed by the mining operations. A discussion on the overburden at the Colowyo operation has been conducted as set forth in Section 2.04.6. A discussion of the overburden monitoring plan is set forth in Section 2.05.

4.05.9 Permanent and Temporary Impoundments

Colowyo constructs small impoundments on reclaimed areas in accordance with Rule 4.05.9. These small impoundments are essential and basic to the management of the rangeland post-mining land use of livestock grazing and wildlife habitat. The design of post-mining impoundments provides for structures having a vertical height less than five feet from the bottom of the channel to the bottom of the spillway and impound less than two acre-feet of water. As such they are exempt from Division of Water Resources, Office of State Engineer requirements. Water harvesting ditches may also be used to enhance the function of the impoundments, which is consistent with practices employed on adjacent rangelands.

The impoundments collect surface runoff from precipitation events and snowmelt from reclaimed areas. The impoundments do not result in the diminution of the quality or quantity of water for downstream water users. Colowyo is the holder of water rights immediately downstream. During periods of low precipitation, the impoundments may be dry, which is consistent with regional practices on similar rangelands. Since the source of water is surface runoff from revegetated areas the quality of the water will meet the requirements of the intended use.

The post-mining impoundments have slopes of 3h:1v or less to provide easy access to both livestock and wildlife. These impoundments and any associated ditches, while intended to be permanent, will be classified as temporary until the requirements of Rule 4.05.9 are met. Prior to construction, all designs are submitted to the Division. A copy of the as-built design information will be submitted after construction for inclusion into the permit document. In addition, sedimentation ponds that are subsequently approved as part of the post-mining land use, as shown on Map 12, will remain as permanent impoundments after the requirements of Rule 4.05.9 have been met. Please refer to Section 4.05.6 for additional information regarding compliance with Rule 4.05.9(7)(a thru e).

All embankments, impoundments, and associated structures will be revegetated if construction materials are conducive to plant growth. If not, rock or gravel will be used on the embankments. The quarterly routine inspections of these structures will be conducted as required by Rule 4.05.9(17) if and until a waiver is granted to allow for annual inspections of these structures in the future. As per Rule 4.05.9(14) requirements, inspections performed during and after construction of these structures will be performed by a qualified registered professional engineer or other

qualified professional specialist under the direction of a professional engineer. The inspections will be made regularly during construction, at completion of construction, and at least annually (quarterly until such a time as annual inspections are requested from granted by DRMS) until removal of the structure or release of the performance bond. The qualified registered professional engineer shall provide the Division with a certified report that the impoundment has been constructed and/or maintained as designed, and in accordance with the approved plan and the applicable regulations. As per Rule 4.05.9(15), certified inspection reports shall include discussion of:

1) Any appearance of erosion, instability, structural weakness or other hazardous conditions;
2) Existing and required monitoring procedures and instrumentation;
3) The depth and elevation of any impounded waters at the time of the certified report;
4) Existing storage capacity of the impoundment; and
5) Any other aspects of the structure affecting stability, or requiring maintenance.

Colowyo will maintain a copy of each certified report at the mine site.

Colowyo successfully demonstrated that failure of small impoundments would not create a threat to public health and safety or threaten significant environmental harm. A written safety demonstration completed by a professional engineer is located in Exhibit 7, Item 11, Volume 2B, in accordance with rule 4.05.9(18)(b). None of the small post-mining impoundments act as primary sediment control structure for a particular area; they are all constructed in reclaimed areas of the mine to enhance the approved postmining land use; they are all under two-acre feet.

All impoundments will be maintained according to the specifications set forth in this part. Maintenance for impoundments may include (if necessary) mowing and cutting of excess vegetative growth for the purpose of facilitating inspections and repairs including keeping ditches, culverts, spillways, and other outflow structures free of debris. All combustible material, other than mulch or other material needed for erosion control and surface stability (vegetative growth) will be removed.

Plans for any modification of any sedimentation impoundments or dams will be submitted to the Division, and no modification will begin until approval of the plans have been granted unless such modification is necessary on an emergency basis for public health, safety or the environment would be endangered.

Colowyo will inspect the condition of each pond quarterly (until a waiver for annual inspection is granted) with the reports submitted quarterly as well. None of Colowyo's post-mining impoundments will meet the size criteria of 30 CFR 77.216(a)(1989).

4.05.10 Underground Mine Entry and Access Discharges

Colowyo currently conducts surface coal mining exclusively.

4.05.11 Ground Water Protection

There are no aquifers or continuous sources of ground water within the stratigraphic section from which the Colowyo Mine mines coal using surface mining techniques. This is also noted in Section 2.04.7. In addition, there are no continuous aquifers of regional extent within the entire Williams Fork Formation in the location of the Colowyo Mine. Occasionally, a minimal amount of water is found under perched conditions in noncontiguous lenticular sandstones and in fractured coal under the sandstones. No toxic concentrations of acid forming materials have been found in the overburden, reclaimed slopes or surface and ground water system associated with the Colowyo Mine. No adverse effects on groundwater quality are expected to occur due to mine excavations or backfilling.

4.05.12 Protection of Groundwater Recharge Capacity

The reclamation plan as described in 2.05.4 will return the disturbed lands to approximately the pre-mining condition; therefore, ground water recharge capacity is expected to approximate the premining condition. Also, because of the minimal existence of ground water in the mining area, the mining operation and subsequent reclamation should have no adverse effect on the existing ground water recharge capacities.

The history of the ground water monitoring plan is further documented in 4.05.13. The mine has not established Point of Compliance locations for ground water monitoring because of a lack of ground water. The following discussion is provided to document this:

> The aspect of monitoring ground water is dependent on whether or not there is a continuous, non-perched ground water layer/zone to monitor. Since active mining at Colowyo Mine began 30 years ago, the mining zone in both the East and West Pits have not encountered any significant ground water, except for perched ground water. Therefore, the following is presented to clarify the ground water conditions at the Colowyo Mine.
>
> <u>Geology/Topography</u>
>
> The Colowyo Mine is located in the Williams Fork Formation of the Cretaceous Mesaverde Group. The Williams Fork Formation is comprised of discordant beds/units of sandstone, siltstone and mudstone and coal seams, with an approximate thickness of 1,200 to 1,300 feet in the mine area. Deposited in a deltaic environment, the beds vary in thickness and lateral extent throughout the Colowyo Mine. The numerous coal seams also vary in thickness and lateral extent. The sandstones tend to be very fine grained to fine grained and poorly sorted, with various amounts of silt and clay. For the siltstones and mudstones, theses units contain various amounts of finer and coarser materials. The total mined sequence in both pits is up to 450 feet thick and is comprised principally of mudstones, siltstones and coals, with sandstone layers being least prevalent.
>
> The Williams Fork Formation conformably overlies the Iles Formation. At the top of the Iles Formation is the Trout Creek Sandstone (TCSS). The TCSS is a massive, white to light gray, very fine to fine grained, moderately well sorted sandstone with a thickness of

between 50 and 70 feet and is approximately 1,200 to 1,300 feet below the Colowyo Mine. This is the only mapped continuous unit in the area of the Colowyo Mine and has been noted as being an excellent marker bed for correlation work of the coal seams. Beneath the TCSS, the Iles Formation is comprised of sandstones, siltstones and marine shales.

Two major features, the Collom Syncline and the Danforth Hills Anticline/Wilson Dome, control the geologic structure in the area of Colowyo Mine. The axis of the Collom Syncline, located approximately 0.5 miles north of the north edge of the reclaimed East Pit, trends west-northwest (approximately N60°W) with a slight dip in the axis to the west-northwest. The Collom Syncline is sub-parallel to the Axial Anticline on the north and the Danforth Hills Anticline on the south. The Collom Syncline is asymmetrical, with the north flank of the syncline steeply dipping (20°-40°) to the south-southwest. The south flank dips to the north-northeast at around 10°±5°. The Colowyo Mine is located on the south flank of the Collom Syncline. Therefore, based on the geologic structure of the area, the coal seams and non-coal beds of the Colowyo Mine dip to the north-northeast at approximately 10°. The southern portion of the Colowyo Mine is located on a structural high, an unnamed anticline, which is an offshoot of the Danforth Hills anticline.

Topographically, the mine is located on a topographic high, bordered on the east and west by deeply incised valleys. These valleys are Good Spring Creek and Wilson Creek, on the east and west respectively. The valleys slope from south to north, similar to the topographic slope at Colowyo Mine. The topography in the area of the Colowyo Mine ranges from 8000 feet on the south to 7150 feet on the north. The valleys have elevation ranges from approximately 7100 feet on the south to 6550 feet on the north. On the south, south of the Section 16 mine area, the topography drops off into the West Fork Good Spring Creek, a small tributary to Good Spring Creek.

Hydrology

Based on the above, the Colowyo Mine is located on both a topographic and structural high. Thus, these highs cause the mined units of the Colowyo Mine to be above any significant recharge source, e.g., surface water. This is because the bottoms of the pits are at an elevation higher than the elevation of the surface water in the creeks. Only when the units are at an elevation lower than the valleys does any significant recharge occur. Thus, the only source of recharge for the mined units in the pit areas of the Colowyo Mine is precipitation.

Precipitation is less than 22 inches (on average) per year. Evaporation rates approach 30 inches per year, with recharge rates in the Goodspring Creek and Taylor Creek basins being less than 0.35 inches per year. In addition, any surface water/precipitation on this topographic high has to percolate through the clayey soils, prevalent in the area of the Colowyo Mine, into the underlying bedrock. Any water that recharges the bedrock units tends to accumulate along unit contacts since these tend to be areas of least flow resistance. This is exhibited in the highwall of both pits of the Colowyo Mine, where any discharge is easily seen as issuing primarily from these contacts and has been the case since 1981.

Any ground water that has been discharged from the mine highwall has been found to evaporate from the pit floor or be consumed by pit highwall. Past hydrological studies also reveal the mined units tend to have low permeabilities (even the sandstones) and do not allow for large water movement, even if the ground water is present. This is also the case where the ground water is under confined or unconfined conditions (i.e. below the elevation of the valley bottoms).

If any ground water does percolate vertically through the discordant geologic units, it encounters a tonstein bed near the base of the Williams Fork Formation. This bed is approximately 150 feet above the top of the Trout Creek Sandstone and is approximately 400 feet below the bottom of the active pits. The tonstein bed has an approximate thickness of 2.5 feet. Permeability tests of this material show it has permeabilities greater than 1x10-10 centimeters per second. Thus, this bed is an effective aquiclude and prevents downward movement of any ground water to the underlying Trout Creek Sandstone.

Water Quality

The quality of the water in the area of the Colowyo Mine has been rated as poor by the USGS and designated for limited agricultural use. Since USGS testing in 1978, no water quality analysis performed at monitoring points at the Colowyo Mine have shown any significant difference in water quality compared with what the initial USGS work. The water is slightly saline, alkaline and definitely classified as 'hard' water. This can be seen in the water quality measurements for total dissolved solids (TDS) and electrical conductivity (eC). Both TDS and eC exceed the EPA secondary drinking water standards.

Since the water is alkaline, the pH is above 7, but rarely exceeding 8.4. Concentrations of heavy metals rarely exceed health limits, as stated in the USGS report. This has also been backed up by the shallow ground water monitoring performed since the Colowyo Mine began operation.

Conclusions

The Colowyo Mine has no single or multiple continuous geologic units in the mine that contains ground water under unconfined or confined conditions. The only ground water encountered is the discontinuous perched pockets of ground water. This lack of ground water, except for discontinuous perched ground water pockets, encountered during mining precludes the necessity to monitor ground water on a ridge top.

4.05.13 Surface and Groundwater Monitoring

The current monitoring program can be found in Section 4.05.13 in Volume 15.

4.05.14 Transfer of Wells

Colowyo does not plan to transfer any monitoring wells to water wells.

4.05.15 Water Rights and Replacement

Colowyo, if necessary, will replace the water supply of any owner of interest in real estate who obtains all or part of a supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source where the water supply has been affected by the mining operation.

Colowyo does not anticipate that any water supply or water right of any owner of interest will be affected by the mining operation.

4.05.16 Discharge of Water into an Underground Mine

No surface water will be diverted into any underground mine workings.

4.05.17 Post-mining and Rehabilitation of Sedimentation Ponds, Diversions, Impoundments, and Treatment Facilities

No treatment facilities are planned. Approved permanent sedimentation ponds, stock ponds, and permanent diversions will be left in place. These structures will be maintained in an appropriate condition before the Permit area is abandoned by repairing any necessary portions, cleaning sediment and debris out, establishing appropriate vegetation and providing soil stabilization.

4.05.18 Stream Buffer Zones

In accordance with Rule 4.05.18, no land within 100 feet, or greater if required by the Division, of a perennial stream, an intermittent stream, or an ephemeral stream with a drainage area greater than one square mile, shall be disturbed by surface and underground coal mining operations unless the Division specifically authorizes surface or underground mining operations closer to, or through such a stream. Additionally, the area not to be disturbed shall be designated a stream buffer zone and marked as specified in Section 4.02.5.

The locations of the disturbances that have occurred within 100' of a stream buffer zone are described below and are depicted on Map 10C.

Good Springs Creek

Streeter Pond was constructed within 100 feet of Good Springs Creek. During construction (sometime during the late 1970's) and to date this pond has not created any adverse impacts to Good Springs Creek. This structure is not anticipated to have any long-term impacts to Good Springs Creek.

Other structures have been constructed or previously existed within 100 feet of Goodsprings Creek and they include Colowyo's access road off of Highway 13 where it crossing Goodsprings Creek and Colowyo's guard shack. Colowyo constructed the access road to the mine and the guard shack at the beginning of the Colowyo Mine. To date the access road and guard shack have not created any adverse impacts to Good Springs Creek, and these long term structures are not anticipated to have any long term impacts to Good Springs Creek.

West Fork of Good Springs Creek

The access road to Section 28 Pond off of Highway 13 was not a new disturbance when Colowyo began using it to construct and access the Section 28 Pond. Rather it was premining, pre-existing "ranch" road, that accessed an old ranch home and surrounding valley area. Colowyo made minor upgrades to the road when the Section 28 Pond was constructed. The majority of these upgrades were to allow proper draining through swales across the road. To date the pre-mining ranch road and upgrades have not created any adverse impacts to the West Fork of Good Springs Creek, and it is not anticipated that this road will have any long term impacts either to the West Fork of Good Springs Creek.

Colowyo also has two surface water monitoring and two groundwater monitoring structures (flumes and wells) installed within the stream buffer zone to the West Fork of Goodsprings Creek. This includes LWFGSC, UWFGSC, A-7 and A-8 as presented on Map 10C. All four monitoring structures have not and will not create any adverse impacts to the West Fork of Goodsprings Creek.

Taylor Creek

Colowyo constructed Haul Road A and B within the stream buffer zone which crosses Taylor Creek. During construction (late 1970's to early 1980's) and to date, the haul roads have not created any adverse impacts to Taylor Creek. These long term structures are also not anticipated to have any long term impacts to Taylor Creek.

In 2018, Haul Road A will be widened to facilitate equipment movement from the existing facilities and South Taylor Pit to the Collom area. Haul Road A will have mechanically stabilized earth (MSE) walls constructed in locations very near to Taylor Creek to limit disturbance and protect Taylor Creek within the stream buffer zone area that already contains the footprint of Haul Road A. Best management practices (BMPs) including silt fence, s-fence, wattles, or other items at the discretion of the field engineer will be installed and maintained during the widening of Haul Road A to protect Taylor Creek. Once Haul Road A outslope is stabilized the BMP's will be removed. Utilization of BMP's during construction and until the outslopes of the road are stabilize will minimize any potential impacts to Taylor Creek. It is anticipated that the Haul Road A footprint will not have any short or long-term impacts to Taylor Creek.

During the widening of Haul Road A, two light use roads will be constructed at the toe of the Haul Road A to provide access to the Taylor Pump Holding Pond and a water rights diversion structure on Taylor Creek. Both structures will have proper BMPs installed and maintained until construction and stabilization of the light use roads is complete. It is not expected that the light use road will have any short or long term impacts to Taylor Creek.

Two sediment ponds were constructed within the stream buffer zone on Taylor Creek. The West Pit Pond embankment lies within 100' of Taylor Creek, and the West Taylor Pond was constructed at the base of the West Taylor Fill and makes up part of Taylor Creek. During construction and to date these structures have not created any adverse impacts to Taylor Creek, and both structures are also not anticipated to have any long term impacts to Taylor Creek.

Much of the upper reaches of Taylor Creek above the West Taylor Pond will be directly impacted by the South Taylor Pit, and the permeant West Taylor Fill (see Map 23A). The West Taylor Pond will protect the lower reaches of Taylor Creek that will not be disturbed during mining and reclamation. It is expected that during mining the South Taylor Pit will intercept and hold surface water runoff thus providing less discharge through the West Taylor Pond. Once mining is complete the entire South Taylor Pit will be backfilled and the pre-mine profile and function of the upper reaches of Taylor Creek will be restored.

One best management practice structure (sediment sump) lies within the stream buffer zone on Taylor Creek. This structure manages storm water runoff from the haul road and provides a benefit to Taylor Creek by capturing stormwater runoff from the haul road. This structure is not anticipated to have any impacts to Taylor Creek, and provides a benefit in protecting stormwater runoff to Taylor Creek.

The Taylor Pump Holding Pond was constructed within 100' of Taylor Creek. The Taylor Pump Holding Pond is utilized to manage water movement from Wilson Reservoir to the active operation; therefore, an underground water pipeline that transports water to and the from the Taylor Pump Holding Pond was also constructed at various locations within 100' of Taylor Creek as shown on Map 10C. Neither of these structures has impacted Taylor Creek, and neither structure is expected to have any long term impacts to Taylor Creek.

A water diversion structure is constructed in Taylor Creek that allows Colowyo to divert water from Taylor Creek to exercise a water right. This structure would be utilized even if mining was not occurring at Colowyo, as Colowyo is the private surface landowner utilizing a privately held water right structure.

A light use road that was a premine "ranch" road follows along Taylor Creek. This road is utilized to access the West Pit, East Taylor, and West Taylor sediment ponds. The road has been improved upon from its premine condition to allow equipment access for dredging activities and continued environmental monitoring. The lower reach of the road where it begins off of the paved haul road up to the East Taylor Pond, snakes in and out of the 100' stream buffer zone off of Taylor Creek. The upper reach from the East Taylor Pond to the West Taylor Pond is almost exclusively within the 100' stream buffer zone due to steep topography. To date this road has not created any adverse impacts to Taylor Creek, and it is not anticipated to have any long term impacts to Taylor Creek.

The raw water pipeline to the Collom operation will be routed across Taylor Creek through an elevated structure. An elevated structure minimizes impacts within the stream buffer zone versus other routing options such as boring the pipeline under Taylor Creek, which requires large trenches and greater ground disturbances for equipment to bore under both sides of Taylor Creek. With the elevated structure small disturbances will occur within the stream buffer zone of Taylor Creek. Prior to ground disturbing activities proper best management practices (silt fence or other suitable sediment control measures) will be installed. Topsoil will be windowed and concrete footers will be poured which will provide the base for the structural stability needed to support the pipe over Taylor Creek. Once the pipe and structure steel is installed the limited

disturbance areas have the topsoil windrows spread back out and the areas will be seeded. Sediment will be controlled during the construction of these structures and will negate any impacts to Taylor Creek while the ground is disturbed. The sediment control structures will be left in place after reclamation until a suitable vegetative cover has been achieved. The water pipe line and associated infrastructure will not create any long term impacts to Taylor Creek.

For a discussion on stream buffer zones from Wilson Creek, Jubb Creek, and Little Collom Gulch please see Volume 15, Section 4.05.18.

4.06 TOPSOIL

4.06.1 General Requirements

Before the disturbance of any area, topsoil is removed and segregated from other material. Upon removal, this material is either immediately redistributed on regraded areas or stockpiled in locations shown on the Topsoil Handling Maps 28 and 28A.

4.06.2 Removal

All topsoil, as classified in section 2.04.9, is removed from areas to be affected by the surface coal mining operations. The graphical representation of the topsoil removal is shown on the Topsoil Handling Map (Map 28 and 28A). This map has been greatly simplified from that of the original application to reflect actual on-the-ground operations. The techniques for removal of woody plant materials that otherwise would interfere with the usefulness of the topsoil is discussed in Section 2.05.3

Removal techniques for topsoil are described in Section 2.05.3.

A variance from topsoil removal was requested and approved by the Colorado Division of Reclamation, Mining and Safety for the following areas; construction of small structures such as power poles, signs or fence lines, areas of light traffic that do not destroy existing vegetation or cause erosion and areas where removal would result in needless damage to soil characteristics such as sediment control ditches and small water diversions. In most cases, especially on steep slopes, removal of topsoil prior to ditch construction needlessly damages large areas of topsoil, along with the adjacent natural vegetation. Implementation of the technique of cutting the ditches directly into the hillside without topsoil removal will limit needless topsoil disturbance, reduce unnecessary destruction of adjacent vegetation and will facilitate reclamation of the ditches at a future date.

It should also be clarified that consistent with Map 6, Soils – South and Exhibit 9, Volume 19, there will be small areas of rock outcrop, rocky steep slopes, etc. where the topsoil depth is 0 inches. Where this occurs there will not be an attempt to recover topsoil or otherwise disturb the area before disturbance by mining.

Colowyo does not plan to use overburden material for topsoil substitutes or as a supplement to topsoil. Colowyo will remove topsoil before any mining operations commence and always maintain a buffer zone between the area stripped of topsoil and the overburden drilling and blasting

operations.. As depicted on the Topsoil Handling Map (Map 28 & 28C), the topsoil handling program will result in an orderly sequence for the continuous removal, storage or reapplication of topsoil. The redistribution of topsoil will be done at a time when the physical and chemical properties of the topsoil can be protected from alteration while minimizing the potential for erosion.

Topsoil and vegetation matter is typically windrowed, sloped and seeded during initial sediment pond construction and saved for reapplication when the pond is reclaimed at at future date.

The pond embankments are constructed utilizing in-place materials directly below the upper topsoil zone. This colluvial material is "topsoil" in nature and will be utilized at a future date for pond reclamation. Since the nature of the embankment material functions readily as a topsoil material, it is not anticpated that additional topsoil will be required for final reclamation of the site. However, if necessary, Colowyo will apply an appropriate amount of topsoil to pond embankments that do not readily revegetate post construction.

4.06.3 Storage

The estimated quantity of topsoil in stockpile is found in Table 2.05-1, Topsoil Balance As Of October, 2005, and in Section 11 of the Annual Reclamation Report. Topsoil stockpiles exist for support facilities and the mining area. All of the existing or proposed stockpiles result where immediate redistribution will not be practical, either because redistribution areas are not available at the time of topsoil removal, or because more topsoil is being removed than what will be necessary for immediate redistribution. Any additional stockpiles may be placed on flat spoil backfill areas or stable portions of the permit area where stockpiles will be protected from external effects of both wind and water erosion. Stockpiles have also been placed to avoid disturbances other than those incidental to their deposition and removal.

Colowyo utilizes a variety of methods to protect topsoil stockpiles from erosion. Colowyo will utilize one or more of the following techniques to protect topsoil from erosion. Small catchment berms and ditches may be employed to route surface runoff away from stockpile areas. Small sumps or dozer basins may be employed to collect runoff. Adjacent disturbance areas may be ripped or otherwise roughened to reduce runoff. Topsoil stockpiles may be strategically placed and constructed to allow runoff to be routed around stockpile locations rather than pond against a stockpile.

Topsoil marker signs will be placed on each stockpile to prevent inadvertent disturbance, unnecessary compaction or contamination.

At the locations where topsoil piles are located on undisturbed land, in place topsoil and vegetation will not be removed prior to stockpiling topsoil. The topsoil stockpiles will be seeded with the following perennial seed mixture to control erosion.

Western wheatgrass	-	4 Lbs PLS/Acre
Thickspike wheatgrass*	-	4 Lbs PLS/Acre
Yarrow**	-	.15 Lbs PLS/Acre

*option to replace Thickspike wheatgrass with Beardless bluebunch wheatgrass or Sheep fescue
**option to replace Yarrow with Cicer milkvetch

Topsoil stockpiles will be drill seeded to the greatest extent possible. The remaining areas will be broadcast seeded.

In those areas where topsoil is stripped and hauled directly back to contoured backfill, some of the established native species can be expected to occur in the revegetated area.

Stockpiled topsoil will not be moved when required for redistribution on disturbed areas prior to seeding. An exception to this can occur to facilitate mining, construction of sediment control ditches, ponds, etc. Approval from the Division will occur prior to moving stockpiled topsoil for purposes other than seedbed preparation.

All topsoil stockpiles should be protected with a ditch and berm around their perimeter to conserve the resource.

4.06.4 Redistribution

After the final grading is completed, the topsoil will be reapplied as shown on the disturbed land areas shown on the Topsoil Handling Map (Map 28 and 28A). Please see section 2.05.4 for topsoil redistribution depth replacement.

Where necessary, to prevent slippage surfaces and promote root penetration the spoil will be scarified by ripping and/or rough grading. This practice will assure a solid bond between the spoil and reapplied topsoil. To date, there is no evidence of topsoil slippage on reclaimed areas. A few small tension cracks resulting from settling of fill and topsoil have occurred in a few areas within a year or two after reclamation, but soon stabilize and begin to fill in.

Since all available topsoil existing on areas to be disturbed will be removed and reapplied, it will be fully capable of supporting growth necessary for the proposed post-mining land use. Compaction will be alleviated through chisel plowing. The method of topsoil replacement most often used at Colowyo, which makes use of dozers, leaves the surface in a rough condition which minimizes wind and water erosion. The use of a chisel plow following topsoil replacement and the construction of contour furrows at the time of seeding or before will also aid in erosion control.

4.06.5 Reconditioning

Topsoil quality at Colowyo is excellent in terms of providing a suitable plant growth medium capable of supporting the approved post-mining land use and the revegetation requirements of Section 4.15. Soil testing has not indicated any deficiencies. Refer to Volume 3, Exhibit 10, Establishment of Native Shrubs on Disturbed Lands in the Mountain Shrub Vegetation Type. This study was conducted on the Colowyo Mine July 1975 through December 1979. Colowyo has the option to apply 50-70 pounds of phosphorus per acre to all safely accessible reclaimed mine areas prior to chiseling and seeding.