


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

September 21, 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. 141**  
**Adequacy Response**

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 this adequacy response for technical revision 141 (TR-141) to Permit No. C-1981-019.

Tri-State received your adequacy letter dated September 16, 2020, and is providing the following responses to your concerns:

1. *On the proposed Table of Contents, List of Maps, page x, it lists Map 23A Mine Plan – South Taylor. However, per the provided Colowyo Mine “change sheet”, Map 23A is being requested for removal as it has been incorporated into Map 23. Please provide an updated List of Maps, page x.*

**Response:** Page x in Volume 1 has been updated as noted.

2. *On the proposed List of Maps, there appears to be a typo with Map 29 “Spoil Grading tTiming”. Please provide an updated List of Maps.*

**Response:** The typographically error noted on page 2 of the list of maps has been corrected as noted.

3. *The proposed Volume 12, Rule 2, page 66 does not flow properly into the currently approved pages. The final paragraph for proposed page 66 is the first paragraph of the currently approved page 67. Volume 12, Rule 2, page 66 was last approved with Colowyo Mine MR-220. Please provide an updated Volume 12, Rule 2, page 66 that flows properly into the next page or any additional pages associated with Rule 2 as necessary.*



September 21, 2020

Page 2

**Response:** Volume 12, Rule 2 pages have been provided to correct this flow issue as noted by the Division.

4. *It is observed that the currently approved Map 23A is being incorporated in the proposed Map 23 as per the Colowyo Mine "change sheet". However, Map 23 is missing the cross-sections associated with the South Taylor Pit found on the Map 23A. These cross-sections are necessary as they refer the approved Map 20B – Pre-Mining and Post-Mining Cross Sections South Taylor. Please provide an updated Map 23 including the necessary cross-sections and associated references from Map 23A.*

**Response:** The cross section profiles for South Taylor are shown on Maps 18A and 19B. This is consistent with how they have been historically provided for other areas mined at Colowyo. With the consolidation of Maps 23 and 23A, Tri-State agrees the notes on Map 23 need to be updated to clearly indicate where these cross sections are located in the permit. Therefore, the notes on Map 23 have been updated and a revised map has been provided.

Included in this adequacy response is a change of index sheet to ease incorporation of these revised materials 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:  
  
 B70D69F114324DE...

Daniel J. Casiraro  
 Senior Manager  
 Environmental Services

DJC:TT:der

Enclosure

cc: Chris Gilbreath (via email)  
 Tony Tennyson (via email)  
 Angela Aalbers (via email)  
 File: C. F. 1.1.2.130  
 G471-11.3(21)d



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

Mine Company Name: Colowyo Coal Company L.P.

Permit Number: **C-1981-019**

Date: **September 21, 2020**

Revision Description: **TR-141 Incidental Boundary Revision**

Volume Number	Page, Map or other Permit Entry to be REMOVED	Page, Map or other Permit Entry to be ADDED	Description of Change
1	Page x (1 pages)	Page x (1 pages)	List of Maps has been updated.
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	List of Maps Page 2 (1 pages)	List of Maps Page 2 (1 pages)	List of Maps has been updated.
7	List of Maps Page 2 (1 pages)	List of Maps Page 2 (1 pages)	List of Maps has been updated.
8	List of Maps Page 2 (1 pages)	List of Maps Page 2 (1 pages)	List of Maps has been updated.
8	Map 23	Map 23	Map 23 has ben updated.
9	List of Maps Page 2 (1 pages)	List of Maps Page 2 (1 pages)	List of Maps has been updated.
10	List of Maps Page 2 (1 pages)	List of Maps Page 2 (1 pages)	List of Maps has been updated.
12	South Taylor/Lower Wilson Rule 2, Pages 66 through 70 (5 pages)	South Taylor/Lower Wilson Rule 2, Pages 66 through 70 (5 pages)	Rule 2 pages have been provide to correct flow issues.
13			No Change
14	List of Maps Page 2 (1 pages)	List of Maps Page 2 (1 pages)	List of Maps has been updated.
15			No Change
16			No Change
17			No Change
18A			No Change
18B			No Change

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

Mine Company Name: Colowyo Coal Company L.P.

Permit Number: **C-1981-019**

Date: **September 21, 2020**

Revision Description: **TR-141 Incidental Boundary  
Revision**

Volume Number	Page, Map or other Permit Entry to be REMOVED	Page, Map or other Permit Entry to be ADDED	Description of Change
18C			No Change
18D			No Change
19			No Change
20			No Change
21	List of Maps Page 2 (1 pages)	List of Maps Page 2 (1 pages)	List of Maps has been updated.
22	List of Maps Page 2 (1 pages)	List of Maps Page 2 (1 pages)	List of Maps has been updated.

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### 2.05.2 Operation Plan - Estimated Area for Life of Operation

Information regarding the permit term is delineated in Section 2.01.5. Information for the operation plan is delineated in Section 2.05.3. Likewise, for purposes of this application, the permit area identifies the area for the life of the mine.

Colowyo will employ detailed and current engineering designs for all surface mining activities in order to maximize coal recovery. The open pit mining technique minimizes or eliminates coal rib losses and coal fenders. The mining operations described in Section 2.05.3 are designed for maximum coal recovery.

### 2.05.3 (1) Operation Plan –Production Methods

Colowyo has selected its mining procedures on the basis of information from numerous exploration drill holes which penetrated the overburden, the interburden, and the coal seams. Each phase of mining has been carefully scheduled so that all equipment can be operated in situations suitable to their design capabilities. The overall operation plan is designed to flow logically from topsoil removal through reclamation. The plan is designed to maximize coal recovery and minimize environmental disturbances. Colowyo's operation plan is described in detail within Volume 1, Section 2.05.3.

Topsoil removal schedules and stockpile locations are delineated on the Topsoil Handling Map, (Map 28). The amounts of topsoil to be replaced is found in Volume 1 on Table 2.05-1. Topsoil will be removed from an area primarily during the summer and fall months to allow for one year of mining advance. A buffer zone, with topsoil removed, will be left between the undisturbed area and the crest of the pit.

Once the overburden is sufficiently fragmented to allow for efficient removal and loading, overburden removal will commence. The location of the area to be mined is shown on the Mine Plan Map (Map 23).

Colowyo will utilize two distinct methods of overburden removal in the mining operation of South Taylor: (1) truck/shovel techniques and (2) dragline technique. By combining the use of both shovel and trucks, and draglines, Colowyo can both efficiently and economically handle the logistics involved in a multiseam, open pit coal mine.

The truck/shovel operation will be used to open up the initial boxcut, and then will be generally utilized in removing overburden over the upper coal seams. In some areas of the pit the truck/ shovel will be utilized by taking all seams from the "X3" to the "G8" (X3, X4, B0, B1, B2, B3, C5, D1, D2, E2, F1, F6, F7, FA, FB, G7 and G8). In the dragline portions of the pit the dragline will generally uncover the "F6" through the "G8" (F6, F7, FA, FB, G7 and G8). From time to time, based on production requirements, truck/shovel or loader/truck methods may be utilized to assist the dragline operation in the lower seams.

The overburden material is removed in a series of lifts or benches; the height of these benches will be influenced by the distance between the coal seams to be mined (see Map 24B, Mining Range Diagrams), and the equipment mining those benches.

Overburden removal by the, truck/shovel method progresses on approximately 170-240 foot wide benches and has a maximum highwall height of about 60 feet. Electric shovels or front-end loaders load this overburden into 50, 170, 190 or 240-ton trucks. The trucks then haul the overburden around the active coal pit and dump this material into the mined-out or stock pile areas. The truck/shovel operation will always precede the dragline operation in the multiple seam pits.

A dragline will be used for overburden removal over the lower coal seams and the generalized multi-seam dragline sequence at the Colowyo operation is as follows:

## RULE 2 PERMITS

The dragline will begin the sequence by removing the overburden over the "F6" through the "FA" seams in a single sidecast mode, spoiling the overburden into the previously mined-out pit. The "FB" through the "G8" is removed from the spoil side of the pit. The spoil from the benching operation will be placed to allow the draglines sufficient room and adequate reach to remove overburden while operating on the spoil side. The draglines construct temporary ramps in order to walk to the spoil side.

The "F6" overburden is first drilled and blasted, removed by the draglines, "F6" coal is removed behind the advance of the draglines, then the drilling is initiated on the overburden of the "F7" seam. This sequence is typical through the "G8" seam. With the dragline only mining through the F6 and below spoil, it will ensure that any suspect level spoil, based upon the suitability criteria, will stay in the bottom of the pit and will be buried by a minimum of 50 foot of suitable Truck Shovel material.

Upon complete removal of the overburden over the "G8" seam, the draglines walk around the end of the pit to the next cut to begin removal of the overburden over "F6" coal seam.

No Special Handling Procedures will be required for the overburden in the South Taylor pit. The current overburden sampling program that will be used for the East Pit, West Pit, Section 16 Pit and the South Taylor Pit is described within Volume 1, Section 2.05. It was discussed between the Division of Reclamation, Mining and Safety (DRMS) and Colowyo that suspect levels of the Sodium Adsorption Ratio (SAR), Selenium (Se), Boron (B), Saturation % (Sat), and Molybdenum (Mo) need to be addressed in more detail to determine that Special Handling Procedures, that are outside the normal pit operational procedures, will not be needed in the South Taylor pit area. For this purpose, Colowyo will only use the material that is removed and stockpiled by the Truck/Shovel operation to cap the regraded areas. It was also noted through review of Exhibit 6, Item 6, that in the region of the initial boxcut area, no unsuitable material was found in the seam sequence from the F6 coal seam to the G8 coal seam that will be removed by the Truck/Shovel operation. The entire seam sequence from the top overburden through to the bottom G8 seam, which resides in the area of the initial boxcut, will be placed in the valley fill locations; this will allow Colowyo enough spoil room to reach the desired mining depth.

In the following analysis, Colowyo has demonstrated that no Truck/Shovel spoil material will exceed the suitability range for overburden criteria as described in Volume 1, section 2.05. This demonstration will be completed by showing the total percentage of unsuitable material in comparison to the total amount of suitable material in the truck/shovel sequence as it relates to the drill hole data shown in Exhibit 6, Item 6. It was discussed with DRMS, that as long as the total percentage does not exceed 15% of the total truck shovel sequence for each drill hole, spoil suitability will not be an issue based upon the overburden seams.

### Drill Hole 83-D3-06

Unsuitability range in feet of Truck Shovel Sequence:

SAR > 15 = N/A

Se > 0.3 = **6.7 feet**

B > 5.0 = N/A

Sat <25 or >80 = **28.5 feet**

Mo > 1.0 = **7.8 feet**

Total Depth from surface to Bottom of Truck Shovel Sequence (F6) = **184.7 feet**

Total Percentage of each criteria for Truck Shovel Sequence:

SAR = N/A

Se = **6.7 feet/184.7 feet = 3%**

B = N/A

## RULE 2 PERMITS

$$\text{Sat} = 28.5 \text{ feet}/184.7 \text{ feet} = 15\%$$

$$\text{Mo} = 7.8 \text{ feet}/184.7 \text{ feet} = 4\%$$

**Suitability analysis for Drill Hole 83-D3-06 shows all criteria within the suitable range.**

### **Drill Hole 83-D3-07**

Unsuitability range in feet of Truck Shovel Sequence:

$$\text{SAR} > 15 = 7.6 \text{ feet}$$

$$\text{Se} > 0.3 = 5.0 \text{ feet}$$

$$\text{B} > 5.0 = \text{N/A}$$

$$\text{Sat} < 25 \text{ or } > 80 = 8.4 \text{ feet}$$

$$\text{Mo} > 1.0 = 15.8 \text{ feet}$$

Total Depth from surface to Bottom of Truck Shovel Sequence (F6) = **295.1 feet**

Total Percentage of each criteria for Truck Shovel Sequence:

$$\text{SAR} = 7.6 \text{ feet}/295.1 = 3\%$$

$$\text{Se} = 5.0 \text{ feet}/295.1 \text{ feet} = 2\%$$

$$\text{B} = \text{N/A}$$

$$\text{Sat} = 8.4 \text{ feet}/295.1 \text{ feet} = 3\%$$

$$\text{Mo} = 15.8 \text{ feet}/295.1 \text{ feet} = 5\%$$

**Suitability analysis for Drill Hole 83-D3-07 shows all criteria within the suitable range.**

### **Drill Hole 83-D3-10**

Unsuitability range in feet of Truck Shovel Sequence:

$$\text{SAR} > 15 = 2.7 \text{ feet}$$

$$\text{Se} > 0.3 = \text{N/A}$$

$$\text{B} > 5.0 = \text{N/A}$$

$$\text{Sat} < 25 \text{ or } > 80 = 40.4 \text{ feet}$$

$$\text{Mo} > 1.0 = 12.9 \text{ feet}$$

Total Depth from surface to Bottom of Truck Shovel Sequence (F6) = **291.2 feet**

Total Percentage of each criteria for Truck Shovel Sequence:

$$\text{SAR} = 2.7 \text{ feet}/291.2 \text{ feet} = 1\%$$

$$\text{Se} = \text{N/A}$$

$$\text{B} = \text{N/A}$$

$$\text{Sat} = 40.4 \text{ feet}/291.2 \text{ feet} = 14\%$$

$$\text{Mo} = 12.9 \text{ feet}/291.2 \text{ feet} = 4\%$$

**Suitability analysis for Drill Hole 83-D3-10 shows all criteria within the suitable range.**

### **Drill Hole 83-D3-12**

Unsuitability range in feet of Truck Shovel Sequence:

$$\text{SAR} > 15 = 47.9 \text{ feet}$$

$$\text{Se} > 0.3 = 0.3 \text{ feet}$$

$$\text{B} > 5.0 = \text{N/A}$$

$$\text{Sat} < 25 \text{ or } > 80 = \text{N/A}$$

$$\text{Mo} > 1.0 = 22.7 \text{ feet}$$

Total Depth from surface to Bottom of Truck Shovel Sequence (F6) = **326.8 feet**

Total Percentage of each criteria for Truck Shovel Sequence:

SAR = 47.9 feet/326.8 feet = 15%  
Se = 0.3 feet/326.8 feet = 0%  
B = N/A  
Sat = N/A  
Mo = 22.7 feet/326.8 feet = 7%

**Suitability analysis for Drill Hole 83-D3-12 shows all criteria within the suitable range.**

### **Drill Hole 83-D3-14**

Unsuitability range in feet of Truck Shovel Sequence:

SAR > 15 = N/A  
Se > 0.3 = N/A  
B > 5.0 = 22.5 feet  
Sat <25 or >80 = N/A  
Mo > 1.0 = 6.0 feet

Total Depth from surface to Bottom of Truck Shovel Sequence (F6) = 212.0 feet

Total Percentage of each criteria for Truck Shovel Sequence:

SAR = N/A  
Se = N/A  
B = 22.5 feet/212.0 feet = 11%  
Sat = N/A  
Mo = 6.0 feet/212.0 feet = 3%

**Suitability analysis for Drill Hole 83-D3-14 shows all criteria within the suitable range.**

After removal of the overburden, the coal seams are exposed. As the coal seams are exposed, they are cleaned using auxiliary equipment, then either drilled and shot with explosives or ripped to prepare the coal for loading and removal.

When explosives are needed, the drilling is performed by an auger drill. The drill hole pattern is generally spaced approximately 12 feet by 12 feet, but is dependent upon the actual coal seam thickness. Drill holes are loaded with either ANFO or a waterproof explosive, if the holes are wet.

Once the coal has been prepared for loading by blasting or ripping, a rubber-tired front-end loader loads the coal into haulage trucks. Following loading, these haulage trucks transport the coal along in pit haulage routes to the primary crusher located just outside of the mining area as shown on the Existing Structures - South Map (Map 22).

In order to visualize the overall mine plan, a range diagram was drawn. This diagram is found as Mining Range Diagram (Map 24B) and depicts operations by draglines in combination with shovels and trucks.

Coal from the mining area is transported to a coal crushing facility as shown on the Existing Structures - South Map (Map 22). Details of the coal crushing and load-out facilities are included in Volume 1, Section 2.05.3 under the heading of Mine Facilities.

After coal recovery by conventional truck/shovel and dragline methods has reached the maximum economical recovery limit, Colowyo has the potential of using a highwall miner when the conditions allow. The highwall miner can recover additional reserves left in the pit face that were deemed non-recoverable by conventional surface mining methods. This new highwall miner technology can recover coal up to 1600 feet in advance of the final pit walls with an approximate coal recovery ratio of 40% to

60%. Once the coal has been recovered and stockpiled in the pit, then the coal will be transported to the primary crusher and train loadout by coal haul trucks. Refer to Map 23 for the location of potential highwall mining areas.

As soon as possible after the coal is removed from the mining area and sufficient room is available for back-filling, reclamation begins. In general, rough backfilling is completed by the over-burden trucks and bulldozers. As stated earlier, overburden material removed ahead of the operation is transported by truck around the active coal mining areas and deposited into the mined-out and stockpile areas. A dragline may also be utilized on the backfill material to assist in final spoil placement and in achievement of the planned final topography. Final grading for topsoil placement will be done in a manner that reduces erosion and provides a surface for topsoil that minimizes slippage. Prior to completion of topsoil replacement on 3:1 (horizontal to vertical) slopes, a dozer will construct a drainage control bench or furrow, where necessary, to slow water flow on the longer slopes and minimize erosion. The design Calculations for the benches and furrows are found in Exhibit 7, Hydrology Information. At the completion of the final grading, topsoil will be redistributed over the regraded spoil and revegetated in accordance with Volume 1, Section 2.05.4.

Other surface treatments are also described in Volume 1, section 2.05.4. A list of the equipment used by Colowyo in order to perform the day-to-day operation of coal mining is shown in Volume 1, Table 2.05-3.

### **2.05.3 (2) Operation Description**

A detailed narrative description of the land to be affected within the South Taylor area is provided above under the heading Production Methods and Equipment. The mining plan for South Taylor is graphically portrayed on the Mine Plan Map (Map 23). The various acreages to be affected by the planned mine operation are shown in Volume 1, Section 2.03 on Table 1, Affected Areas for Mining and Reclamation. The details of these operations for South Taylor are shown on the Mining Range Diagram (Map 24B).

The lines on Map 23 refer to coal seam mining, the lines on Map 28, Topsoil Handling, refer to the anticipated overall disturbance that not only includes coal mining, but also associated perimeter disturbances as well.

### **2.05.3 (3) Mine Facilities**

The existing buildings, structures, utility corridors and other facilities are shown on the Existing Structures - North Map (Map 21), Existing Structures - South Area (Map 22) and Existing Structures – South Taylor Area (Map 22A). Colowyo only anticipates the need for a minimal amount of major structures within the South Taylor area, which will include the installation of utility lines, water lines and in-pit haulage routes. No out of pit haul roads are anticipated. All other support facilities are located on maps 21 and 22, which will continue to be used for the life of mine.

Please refer to Volume 1, Section 2.05 for a complete description of Operational procedures within the permit boundary including the South Taylor area.

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