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**BEFORE THE ENVIRONMENTAL QUALITY COUNCIL
STATE OF WYOMING**

**In re Brook Mining Co., LLC coal mine)
permit – PT0841) Docket No. 20-4802**

**DEPARTMENT OF ENVIRONMENTAL QUALITY'S
RULE 56.1 STATEMENT OF MATERIAL FACTS**

Respondent, Wyoming Department of Environmental Quality, provides the following statement of material facts in support of its *Motion for Summary Judgment*, pursuant to Chapter 2, section 17 of the Council's Rules of Practice and Procedure and Rule 56.1 of the Wyoming Rules of Civil Procedure. There are no genuine disputes regarding the facts presented below.

1. In October 2014, Brook applied to the Department for a permit to conduct surface and underground coal mining at the proposed Brook Mine in Sheridan County, Wyoming. (DEQ Ex. 11 at 1). After six rounds of technical review, the Department instructed Brook to publish notice of its application. (*Id.*) The Resource Council and other parties submitted objections to Brook's permit application, which were eventually considered by the Council in a seven-day contested case hearing. (*Id.*) The Council decided that Brook's initial permit application could not be approved. *In re Brook Mine*

Application, Findings of Fact, Conclusions of Law, and Order, No. 17-4802, slip op. 29 (EQC Sept. 27, 2017). The Council identified multiple deficiencies in Brook’s permit application and ordered Brook to “complete and revise its permit application” and resubmit it to the Department for further review. *Id.* The Department Director, Todd Parfitt, denied Brook’s permit application in accordance with the Council’s order. (DEQ Ex. 11 at 1).

2. In October 2018, Brook submitted its revised permit application to the Department. *Id.* The Department conducted six additional rounds of technical review on Brook’s revised application, including a top-to-bottom peer review by Nancy Williams, the Land Quality Division’s District II Supervisor. (Edwards Aff. ¶ 11). In February 2020, the Department determined that Brook’s revised application was technically complete and suitable for publication. (DEQ Ex. 11 at 1). Brook published notice of its revised application and several parties, including the Resource Council, filed objections with the Department. (*Id.*; Pet., App. A). The Department held an informal conference regarding the objections to Brook’s application on May 13, 2020. (DEQ Ex. 11 at 1-2).

3. After considering the written objections to Brook’s application and the oral comments presented during the informal conference, Director Parfitt issued Brook’s coal mine permit on July 7, 2020. (DEQ Ex. 9 at 5). The Director granted Brook’s permit subject to five standard conditions and twelve conditions unique to Brook’s permit. (*Id.* at 4-5).

4. Brook’s approved permit covers 4,548 acres on private land north of Sheridan, Wyoming. (*Id.* at 2; DEQ Ex. 5 at 205). Within this larger permit area, Brook’s operations will create surface disturbance on no more than 1,135.1 acres. (DEQ Ex. 9 at 2). Brook’s mine plan calls for thirty-nine years of mining, starting with a five-year period

of open pit mining. (DEQ Ex. 5 at 104, 150). Brook's open pit mining will target both the Monarch and Carney coal seams in the Taylor Quarry area shown on Mine Plan Exhibit MP.1.1. (*Id.* at 15, 141). After completing the open pit mining, Brook will begin its highwall mining operations, gradually moving from east to west and targeting the Carney seam. (*Id.* at 141). The Carney seam splits near the center of Brook's permit area. (*Id.* at 538). East of the split, the Carney seam is merged. (*Id.* at 350). West of the split, Brook will target the lower Carney seam due to its greater thickness. (*Id.*; Barron Aff. ¶ 8).

5. In each highwall mining area, Brook must first excavate a trench to reach the underground coal seam. (DEQ Ex. 5 at 13). Brook selected its trench locations to reach the Carney seam where it is closest to the surface. (*Id.*). The floor of each trench will be at least 150 feet wide to create room for mining equipment. (*Id.*). Brook will use a remotely-operated continuous miner to remove coal in tunnels that run perpendicular to the trench and penetrate the coal seam to depths of 1,500 to 2,000 feet. (*Id.* at 14). The height of the tunnels left by the continuous miner will vary, whereas tunnel widths will typically be set at 11.5 feet. (*Id.* at 15). Between tunnels, Brook will leave protective coal pillars in place to protect against roof collapse. (*Id.*).

6. Highwall mining is similar to auger mining, as both use remotely-operated machines to extract coal without creating surface disturbance. (*Id.* at 95). In both types of mining, no mine personnel enter the underground workings. (*Id.*). Because of these similarities, the Department regulates highwall mining as a form of auger mining. (Edwards Aff. ¶ 6).

7. Subsidence was one of three main issues the Council addressed in its prior review of Brook's permit application. *In re Brook Mine Application*, slip op. 28 (noting deficiencies in the application's treatment of subsidence, hydrology, and blasting). The Council found Brook's 2017 mine plan incomplete "due to the lack of proper testing and analysis to determine the risk of subsidence due to mining activities." *Id.* at 16. In addition to general concerns about the extent of Brook's subsidence-related testing and analysis, the Council identified three specific omissions in Brook's subsidence control plan: (1) appropriate coal strength data for sub-bituminous coal; (2) certification by a licensed professional engineer; and (3) a "site-specific assessment of the strength and stability of the roof, floor, and pillar materials at the permit area." *Id.*

8. Brook's current subsidence control plan retains several subsidence-prevention measures from the 2017 version. For example, Brook will reduce subsidence risk by leaving support pillars with a width "equal to or exceeding the maximum extraction thickness anticipated in a highwall mining hole based on the mine's geologic model." (DEQ Ex. 5 at 351). Brook also proposes 11.5 foot tunnel widths as a conservative measure to reduce subsidence. (*Id.* at 354). Brook selected this width to avoid the mistakes of historic Mine No. 44, where twenty-foot underground roof spans resulted in significant surface subsidence. (*Id.* at 352-54). Brook also explains how the directional precision of its equipment will prevent the intersection of highwall mining tunnels. (*Id.* at 351). Such intersections could "lead to excessive unsupported roof spans and ... subsequent roof collapse or pillar failure." (*Id.*). Finally, Brook will use airborne lidar surveys to monitor

surface elevation before and after highwall mining. (*Id.*). Brook will compare any observed subsidence with the location data for its highwall mining tunnels. (*Id.*).

9. While Brook retained valuable aspects of its original subsidence control plan, it also made important changes in response to the Council's order. For example, Brook's revised subsidence control plan is supported by geotechnical analysis and design recommendations from Agapito Associates, Inc. (DEQ Ex. 5 at 368). Agapito used site-specific analysis to assess the strength and stability of the roof, floor, and pillar materials in the TR-1 area. (*Id.* at 385-89). This analysis included uniaxial compression tests, axial and diametral point load tests, and slake durability tests on a core sample taken from TR-1. (*Id.* at 379). Timothy Ross, a licensed professional engineer, stamped and certified Agapito's work. (*Id.* at 367). Agapito analyzed subsidence potential with an understanding that coal in the Carney seam is sub-bituminous and weaker than other western coals. (*Id.* at 372, 410).

10. Agapito also provided design recommendations to reduce the likelihood of both trough and sinkhole subsidence. (*Id.* at 410-13). Trough subsidence occurs when large spans of the roof material collapse into a mine void, creating a cave-in that progresses upward to the surface. (*Id.* at 410). Brook's highwall mining plan minimizes the likelihood of trough subsidence by leaving pillars with a minimum 1:1 width to height ratio and a minimum 1.6 stability factor. (*Id.*). Sinkhole subsidence occurs where a smaller chimney cave-in progresses upward to the surface. (*Id.*). The risk of sinkhole subsidence is already low at the Brook Mine, due to the depth of the coal seams. (*Id.* at 410-13). However, Brook

will further reduce this risk by limiting tunnel width to 11.5 feet, preventing tunnel intersections, and extracting only thirty-nine percent of accessible coal. (*Id.* at 412-13).

11. Brook’s updated subsidence control plan includes much greater detail and is supported by site-specific geotechnical analysis. Still, several parties expressed concerns about subsidence during the public comment period and informal conference. (*See* Pet., App. A at 7; Overton Aff. ¶¶ 13-14). For example, Dr. Gennaro Marino noted that Agapito only sampled a single boring in which the roof and floor materials displayed “anomalous rock conditions compared to other borings drilled in the application area.” (Pet., App. A at 14). According to Dr. Marino, it would be inappropriate to apply the “[observed] rock conditions and associated test data to all of the application area or, for that matter, all of TR-1.” (*Id.*). Dr. Marino also found Agapito’s analysis insufficient to evaluate the long-term strength of the roof and floor layers in Brook’s highwall mining areas. (*Id.*).

12. The Department reviewed the subsidence-related public comments in consultation with Dan Overton, a geotechnical engineering expert. (Parfitt Aff. ¶¶ 8, 13; Overton Aff. ¶ 29). After the informal conference and prior to the issuance of Brook’s permit, Mr. Overton prepared a report evaluating Brook’s subsidence control plan in light of the public comments. (Overton Aff., Ex. 4). Like Dr. Marino, Mr. Overton expressed concerns regarding the extent of core hole sampling in the TR-1 area:

In our opinion, the single core hole (2017-4) does not adequately characterize the stratigraphy or the geotechnical properties of the rock in the immediate area of the proposed TR-1 highwall mining area. From our review of the maps and geologic cross sections in Appendix D5 ..., we note that most of the existing core holes are located well to the west of the TR-1 area... it appears that the closest core holes to 2017-4 are 578409 and 578415 which are located well outside the proposed TR-1 mining area at a distance of

approximately 3,100 and 3,300 feet from core hole 2017-4, respectively ... In our opinion, this distance between core holes is excessive and does not allow an adequate characterization of the TR-J area. We recommend that additional core holes be drilled within the TR-I boundary, especially since this area will be the first area to be highwall mined.

(*Id.* at 2-3). Mr. Overton also concurred in Dr. Marino's recommendation that Brook use "Atterberg Limit testing to evaluate the plasticity of the roof and floor units, as well as consolidated-drained triaxial testing to better evaluate the long-term strength of the roof and floor." (*Id.* at 4).

13. After considering public comment, Dr. Marino's expert report, and input from Mr. Overton, the Department created two permit conditions to strengthen Brook's subsidence control plan. (Parfitt Aff. ¶¶ 14-21). Conditions 9 and 10 provide:

Form 1, Condition 9: Before commencing mining in the TR-1 area or any subsequent highwall mining panel, Brook Mine shall provide WDEQ/LQD with the results from physical property testing of cores from a minimum of at least three geotechnical core holes for each panel to be mined. For the TR-1 area, this will require drilling and sampling at least two more core holes in addition to the previously tested hole 2017-4 core. The location and number of the core holes to be drilled should be based on a geostatistical algorithm, such as Kriging (Gaussian process regression), to demonstrate the adequacy of the core holes for purposes of characterizing each highwall mining panel. Samples collected from each core hole should include the roof, coal, and floor of the proposed highwall mining panel. For all future core holes, Atterberg limits and consolidated-drained triaxial testing should be performed in addition to the testing procedures performed on core hole 2017-4. The results of the core laboratory testing shall be reviewed and analyzed by a Wyoming registered Professional Geologist or Engineer. The Mine Plan and Subsidence Control Plan shall be revised, if necessary, based upon the additional data and analyses.

Form 1, Condition 10: Brook Mine shall submit all data and analysis from the geotechnical testing required in Condition No. 9 to WDEQ/LQD in the form of non-significant revisions to the Mine Plan and Subsidence Control Plan. Brook Mine shall not commence mining in any new highwall mining

panel until WDEQ/LQD has provided written approval of the corresponding non-significant revision.

(DEQ Ex. 9 at 4-5).

14. Mr. Overton helped the Department develop the substantive requirements described in Condition 9. (Overton Aff. ¶ 16). He believes that Brook's permitted subsidence control plan, "which includes adherence to Conditions 9 and 10, is designed so as to prevent subsidence from causing material damage to the land surface." (*Id.* ¶ 21). According to Mr. Overton, "by supporting future highwall mine design with geotechnical testing and analysis from a minimum of three core samples per highwall mining panel, Brook will have taken reasonable steps to ensure its highwall mining will be conducted in a manner that prevents subsidence from causing material damage to the land surface in all of the highwall mining areas identified in Brook's mine plan." (*Id.* ¶ 22).

15. Brook's mine plan describes the facilities that will support future mining operations, including personnel and equipment facilities, a change house, an equipment service shop, a truck tire shop, a lab/sample building, a substation for power, a fuel station, a crusher facility, a coal storage pad, a scale to measure tonnage, and facilities for explosives storage. (DEQ Ex. 5 at 19-21). Brook will also use a combination of portable in-pit and out-of-pit crushers. (*Id.* at 20). All of these proposed facilities will be located within Brook's approved permit boundary. (*See* DEQ Ex. 5 at 143). Brook's coal storage pad, identified on Mine Plan Exhibit MP.2-1, will be the point of sale for all coal mined within the permit area. (*Id.*; Barron Aff. ¶ 24). Coal from the Brook Mine "will be transferred, at the pad, by a retail sale, sold freight on board ("FOB") at the mine and will

be transported off the mine site by the independent third-party purchaser.” (Barron Aff. ¶ 25).

16. Brook’s parent company, Ramaco Carbon, is developing a research center and business park outside of the Brook Mine permit boundary that will market products made from coal-derived carbon. (Barron Aff. ¶¶ 11-16). These facilities will be known as iCam and iPark, respectively. (*Id.* ¶¶ 11-12). Both facilities will conduct some amount of coal processing, but no raw or processed coal will leave iCam and iPark for other destinations. (*Id.* at 13, 16). The only materials leaving iCam and iPark will be products made from coal-derived carbon, such as carbon fiber, graphene, and graphite. (*Id.* at 16).

17. Neither iCam nor iPark will be directly involved with the Brook Mine operations. (*Id.* ¶ 15). Despite sharing a parent company with Brook, iCam and iPark are separate legal entities. (*Id.* at 18). While Brook intends to supply coal to iCam and iPark, these facilities may purchase coal from other parties. (*Id.* ¶¶ 16, 19-20). If iCam and iPark do source their coal from the Brook Mine, they will purchase and take possession of the coal at the Brook Mine storage pad. (*Id.* ¶¶ 22-25).

18. Brook’s application identifies all of the roads within the permit area, including the public roads that provide access to the mine and the haul roads that Brook will use to bring coal from the open pit and highwall mining areas to the coal storage pad. (DEQ Ex. 5 at 23-25, 145). Brook’s mine plan includes detailed designs for the haul roads that Brook will construct during the first five years of operations. (*Id.* at 25, 146-49). Several public roads, including State Highway 345, provide access to Brook’s permit area.

(*Id.* at 23). Of these, only Ash Creek Road “will facilitate transportation within the Permit Area.” (*Id.* at 92).


19. Brook does not identify any impact to public roads from its mining operations, but does note: “Later in the mine life, county roads will be adjacent to the mining activities. Measures will be taken at that time to ensure the public safety and allow the public to pass through the mine area on the county roads.” (*Id.*). Brook also acknowledges the possibility that mining activities may require relocating a county road. (*Id.*). In the event this becomes necessary, Brook explains that “plans will be submitted to and approved by Sheridan County and the affected landowners” and that the new section of the road will be fully constructed before any existing road is disturbed. (*Id.*).

20. Brook does not consider Highway 345 to be a haul road for its coal mining operations. (*See Id.* at 145). This highway runs parallel to the southern edge of Brook’s permit area and connects the Brook Mine to Ramaco’s iCam and iPark facilities (*Id.* at 143; Pet. ¶¶ 42-43). Independent third parties may purchase coal at Brook’s storage pad and transport it, via Highway 345, to iCam and iPark. (Barron Aff. ¶¶ 22-26). Brook, however, will not haul any coal on this public highway. (*Id.*).

21. Brook’s estimated annual coal production is shown on Table MP.1-2. (DEQ Ex. 5 at 105). During the initial five years of open pit mining, Brook’s coal production will gradually increase from 100,000 tons to 250,000 per year. (*Id.*). Brook expects to produce greater amounts of coal through its highwall mining operations, eventually reaching an average of 500,000 tons in future years. (*Id.*). Brook estimates its coal production over thirty-nine years will total 17,325,000 tons. (*Id.*).

22. Brook is the current operator of the Brook Mine, with a permit and license issued by the Department. (DEQ Ex. 9 and 10). Brook did not name another operator in its application, but contemplates hiring a contractor to run the mine in the future. For the initial sequence of open pit mining, Brook explains that it “will either directly hire personnel for the movement of overburden, or will hire an independent contractor who will operate under a license to mine.” (DEQ Ex. 5 at 15).

Dated this 28th day of October, 2020.



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CERTIFICATE OF SERVICE

I hereby certify that I served a true and correct copy of the foregoing *Rule 56.1 Statement of Material Facts* upon the persons listed below, this 28th day of October, 2020, addressed as follows:

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