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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 MEMORANDUM IN SUPPORT OF MOTION FOR SUMMARY JUDGMENT

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INTRODUCTION

This matter arises from the Powder River Basin Resource Council's (Resource Council) appeal of the Department of Environmental Quality decision to issue a coal mine permit to Brook Mining Company, LLC. The Department granted Brook's permit after six years and twelve rounds of technical review. The Department's permitting action was thorough and also informed by the Environmental Quality Council's (Council) decision on a prior version of the permit application.

The Resource Council challenges multiple aspects of Brook's permit. It first targets Brook's subsidence control plan, contending that Brook's plan lacks sufficient geotechnical analysis to assess the risk of subsidence in future highwall mining areas. The Resource Council expressed this same concern during the comment period on Brook's application, and the Department responded. The Department utilized input from two experts – the Resource Council's own expert, Dr. Gennaro Marino, and the Department's contractor, Dan Overton – to shape permit conditions that ensure Brook's mining operations will be "planned and conducted so as to prevent subsidence from causing material damage to structures, the land surface, and groundwater resources." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal,* ch. 7, § 2(b)(iii).

Rather than question the merits of these permit conditions, the Resource Council asserts that Brook's subsidence control plan was so deficient that it could not be corrected through permit conditions. However, the Resource Council only arrives at this conclusion by mischaracterizing the term "deficiency" in Wyo. Stat. Ann. § 35-11-103(e)(xxiv) and ignoring a provision in the Department's Land Quality-Coal Rules (Rules) that explicitly

authorizes a mine operator to refine its subsidence control measures as mining progresses. *See Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 7, § 2(c).

Next, the Resource Council argues that Brook's application is incomplete because it does not include off-site facilities that are incidental to mining, nor the roads that connect the Brook Mine to these facilities. The Resource Council is specifically concerned with iCam and iPark, Ramaco Carbon, LLC's coal-to-products facilities, and State Highway 345. However, the Resource Council overlooks the fact that iCam and iPark are "end users" of coal, which the Department cannot regulate. The Department also has no authority to oversee activity on Highway 345. Brook will not use this highway as a haul road. Nor will Brook's operations impact the highway. For these reasons, Brook appropriately excluded iCam, iPark, and Highway 345 from its permit application.

On two final points, the Resource Council maintains that Brook's application is defective because it does not include accurate estimates of coal production or identify a mine operator. Neither contention has merit. Brook's application includes estimates of annual and total coal production. This is all the Rules require – estimates. *Id.*, ch. 2, § 5(a)(i)(A). Brook's annual reports will capture deviations from these estimates in future years. Next, Brook is the current, and only, operator of the Brook Mine. Brook may hire an independent contractor to run the mine, but it is free to make this choice in the future.

The facts surrounding Brook's permit application are uncontested, and all parties ask the Council to resolve the issues in this appeal through summary judgment. As a matter of law, the Council should affirm the Department's determination that the Brook Mine application is accurate, complete, and complies with all applicable laws.

LEGAL FRAMEWORK

Surface coal mining operations in the United States are governed by the federal Surface Mining Control and Reclamation Act (SMCRA). 30 U.S.C. §§ 1201 through 1328. SMCRA also governs the surface effects of underground coal mining. 30 U.S.C. § 1266. SMCRA creates a system of cooperative federalism "in which responsibility for the regulation of surface coal mining in the United States is shared between the U.S. Secretary of the Interior and State regulatory authorities." *Bragg v. W. Va. Coal Ass'n*, 248 F.3d 275, 288 (4th Cir. 2001).

SMCRA establishes baseline national standards and "encouraged the States, through an offer of exclusive regulatory jurisdiction, to enact their own laws incorporating these minimum standards." *Id.* States enjoy flexibility in shaping their regulatory programs, so long as state provisions are no less stringent than, nor inconsistent with, SMCRA and its implementing regulations. 30 U.S.C. § 1255(b). Wyoming's approved SMCRA program consists of the Land Quality article of the Environmental Quality Act, the Department's Land Quality-Coal Rules, and portions of the Department's Rules of Practice and Procedure. 30 C.F.R. § 950.10; 30 C.F.R. § 950.15 (listing approved program amendments). The Department enforces these laws.

Under the Act, any person seeking to conduct surface coal mining operations must first obtain a permit from the Department. Wyo. Stat. Ann. § 35-11-401(d). The Department cannot issue a coal mine permit unless the applicant affirmatively demonstrates that its application is accurate, complete, and complies with the Act and all applicable state laws. Wyo. Stat. Ann. § 35-11-406(n). A permit applicant must follow the

detailed application requirements in section 406 of the Act and Chapter 2 of the Rules. *Id.* § 35-11-406; *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 2.

The Wyoming program implements SMCRA's central purposes, which include ensuring that coal mining operations are "conducted as to protect the environment." 30 U.S.C. § 1202(d). The Act and Rules further this objective through a combination of permit application requirements and ongoing environmental performance standards. For example, an applicant must describe its "plan for insuring that all acid forming, or toxic materials…are promptly treated or disposed of during the mining process… ." Wyo. Stat. Ann. § 35-11-406(b)(ix). The operator then has a corresponding duty, throughout mining operations, to "[c]over, bury, impound, contain or otherwise dispose of the [toxic or hazardous] material." *Id.* § 35-11-415(b)(iv). Similarly, an applicant must explain its proposed methods for "diverting surface water around the affected lands where necessary to effectively control pollution or unnecessary erosion." *Id.* § 35-11-406(b)(xiv). The Act then requires the operator to implement the proposed pollution control measures during mining, reclamation, and for five years after operations have ended. *Id.* § 35-11-415(b)(viii).

This pattern of an application requirement linked with a performance standard repeats itself throughout the Act and Rules. A coal mine permit applicant must demonstrate through plans and proposals how it will protect environmental resources. *Id.* § 35-11-406(b). But the permit application is only a starting point. Following permit approval, the Act and Rules keep mine operators accountable for environmental protection until, and

often after, mining operations are complete. *Id.* § 35-11-415(b); *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 4.

Because the Department oversees coal mines throughout their entire life cycle, the permit application only presents a framework for mining operations, with the operator filling in details over time. This concept holds true for each element the Resource Council challenges in Brook's permit application, including subsidence control, facilities and roads, estimated coal production, and the identification of a mine operator.

I. Specific Application Requirements for Subsidence Control

Applicants proposing underground mining must evaluate the potential for subsidence and must develop plans to mitigate this risk. *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 7. The extent of an applicant's subsidence analysis depends, however, on the type of mining. For example, an applicant proposing auger mining methods must demonstrate that the mining activities are "planned and conducted so as to prevent subsidence from causing material damage to structures, the land surface, and groundwater resources." *Id.*, ch. 7, § 2(b)(iii). The Rules impose no other subsidence-related application requirements for auger mining. *See Id.*, ch. 5, § 6(d) (directing that subsidence control for auger mining "be provided as required by Chapter 7, Section 2").[1] The Department also has discretion to limit or prohibit auger mining in order to minimize

[1] By contrast, applicants proposing traditional underground mining must follow the requirements of Chapter 7, section 1, which include developing a subsidence control plan and providing additional details on hydrologic control and ventilation within underground mine workings. *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 7, § 1.

unwarranted subsidence. *Id.*, ch. 5, § 6(b). The Department may impose such limits or prohibitions at the application stage.

II. Specific Application Requirements for Mine Facilities and Roads

A coal mine permit applicant must provide "[a] description, plans, and drawings for each mine facility to be constructed, used, or maintained **within the proposed permit area**. *Id.*, ch. 2, § 5(a)(v) (emphasis added). Mine facilities include "structures and areas incidental to the operation of the mine, including mine offices, processing facilities, mineral stockpiles, storage facilities, shipping, loadout and repair facilities, and utility corridors." *Id.*, ch. 1, § 2(ch).

The Rules also require permit applications to include certain off-site processing facilities, grouped under the category of "coal preparation plants." *Id.*, ch. 3, § 6. Coal preparation plants are facilities "where coal is subjected to chemical or physical processing or cleaning, concentrating, or other processing or preparation," which may include: "loading facilities; storage and stockpile facilities; sheds, shops, and other buildings; water treatment and water storage facilities; settling basins and impoundments; and coal-processing and other waste disposal areas." *Id.*, ch. 1, § 2(w). Applicants proposing to construct a coal preparation plant must include "an operation and reclamation plan which specifies plans, including descriptions, maps, and cross-sections, of the construction, operation, maintenance, and removal of the preparation plant and support facilities." *Id.*, ch. 3, § 6(b). The Rules do not require any type of permitting for coal preparation plants "which are located at the site of ultimate coal use." *Id.*, ch. 3, § 6(a).

For roads, the Act requires permit applicants to provide maps identifying all existing roads within the permit area and the haul roads that will be constructed during mining operations. Wyo. Stat. Ann. § 35-11-406(a)(ix); *Id.* § 35-11-406(b)(v). An applicant must also provide detailed plans for all roads "to be constructed, used, or maintained **within the proposed permit area**." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 2, § 5(a)(xvi)(A) (emphasis added). These plans are geared toward new construction and must include "specifications for road widths, gradients, surfacing materials, cuts, fill embankments, culverts, bridges, drainage structures and low-water crossings." *Id.* § 5(a)(xvi)(A)(I). Applicants must also describe their "plans to remove and reclaim each road that would not be retained under an approved postmining land use." *Id.* § 5(a)(xvi)(A)(VI). Finally, the permit application must distinguish between primary roads and ancillary roads, the former including those roads: (1) that are used for transporting mineral or spoil; (2) that will see frequent use during any six-month period; and (3) that will be retained for any approved post-mining land use. *Id.*, ch. 4, § 2(j)(i).

III. Specific Application Requirements for Coal Production

The Act and Rules impose only one application requirement pertaining to coal production. An applicant's mine plan must include the "**anticipated** annual and total production by tonnage… ." *Id.*, ch. 2, § 5(a)(i)(A) (emphasis added).

IV. Specific Application Requirements for Naming an Operator

The Rules require a permit applicant to provide the "names, addresses and telephone numbers of any operators, **if different from the applicant**." *Id.*, ch. 2, § 2(a)(i)(B) (emphasis added). An operator is defined in the Act as "any person, as defined in this act,

engaged in mining, either as a principal who is or becomes the owner of minerals as a result of mining, or who acts as an agent or independent contractor on behalf of such principal in the conduct of mining operations." Wyo. Stat. Ann. § 35-11-103(e)(ix). An operator must have a license before engaging in mining operations. *Id.* § 35-11-410(b). Licenses to mine are available upon application to the Land Quality Division Administrator at any time. *Id.*

FACTUAL BACKGROUND

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]

[2] On appeal, the First Judicial District Court reversed the Council's and Department's decisions. *In re Brook Mining*, No. 188-771 (Wyo. Dist. Ct. Oct. 25, 2019). Two of the Respondents requested further review in the Wyoming Supreme Court. After briefing and oral argument, the Supreme Court dismissed the appeal as moot. *Powder River Basin Res. Council v. Wyo. Dep't of Envtl. Quality*, 2020 WY 127, ¶ 18, --- P.3d --- (Wyo. Sept. 28,

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).

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).

I. Proposed Mining Operations

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.*

2020) (finding no live controversy in light of Brook's newly-issued permit). The appellate review of the Council's prior decision has no impact on the current proceedings.

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 358). 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).

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.*).

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).

II. Subsidence Control

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.*

Brook's current subsidence control plan retains several subsidence-prevention measures from the 2017 version.[3] 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

[3] Brook's initial subsidence control plan is available on the Council's website. *Brook Mine Permit Application, Vol. XI* (DEQ Ex. 12 at 319-33), https://eqc.wyo.gov/Public/ViewPublicDocument.aspx?DocumentId=13978.

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

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).

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).

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.*).

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:c

> 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).

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).

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).

III. Mine Facilities and Roads

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).

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).

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).

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).

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.*).

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.*).

IV. Coal Production Estimates

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.*).

V. The Brook Mine Operator

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).[4]

STANDARD OF REVIEW

The Council may resolve contested cases through summary disposition under Rule 56 of the Wyoming Rules of Civil Procedure. *Rules Wyo. Dep't of Envtl. Quality, Practice and Procedure*, ch. 2, § 17. Under Rule 56, a court or agency "shall grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter for law." Wyo. R. Civ. P. 56(a). "A material fact is one which, if proved, would have the effect of establishing or refuting an essential element of the cause of action or defense asserted by the parties." *Thornock v. PacifiCorp*, 2016 WY 93, ¶ 10, 379 P.3d 175, 179 (Wyo. 2016) (citation omitted). The materiality of facts must be determined in reference to "the pertinent legal standard[s] for the asserted claim and for the corresponding defense to that claim." *Roussalis v. Wyo. Med. Ctr., Inc.*, 4 P.3d 209, 228 (Wyo. 2000) (internal quotation marks and citation omitted). In deciding whether genuine issues of material fact are present, the Council must review the record "from the vantage point most favorable to the party opposing the motion" and "give that

[4] The full sentence reads: "RAMACO will either directly hire personnel for the movement of overburden, or will hire an independent contractor who will operate under a license to mine." Here, and throughout its permit application, Brook refers to its parent company, Ramaco, as the mine operator. These references to Ramaco have no practical significance, because only Brook is authorized to operate the mine under the current permit and license.

party the benefit of all favorable inferences that may fairly be drawn from the record." *Thornock*, ¶ 10, 379 P.3d at 179 (citation omitted). "If the evidence leads to conflicting interpretations or if reasonable minds might differ, summary judgment is improper." *Abraham v. Great W. Energy, LLC*, 2004 WY 145, ¶ 12, 101 P.3d 446, 452 (Wyo. 2004).

"The party requesting summary judgment bears the initial burden of establishing a prima facie case that no genuine issue of material fact exists and that summary judgment should be granted as a matter of law." *Little Medicine Creek Ranch, Inc. v. D'Elia*, 2019 WY 103, ¶ 14, 450 P.3d 222, 227-28 (Wyo. 2019) (citation omitted). Once the moving party makes this showing, "the burden shifts to the party opposing the motion to present evidence showing that there are genuine issues of material fact." *Id.* "The party opposing the motion must present specific facts; relying on conclusory statements or mere opinion will not satisfy that burden, nor will relying solely upon allegations and pleadings." *Id.*

ARGUMENT

I. Brook's current subsidence control plan meets all applicable requirements.

The Resource Council argues that Brook's permit application is patently deficient because it does not contain sufficient geotechnical analysis addressing the potential for subsidence within TR-1 and other highwall mining areas. (Pet. ¶¶ 12-13). The Resource Council contends that, after receiving input from Dr. Genaro Marino and Dan Overton, "the [Department] staff recognized they could not approve the permit application as [submitted]." (*Id.* ¶ 20). The Department does not dispute this point. Brook's subsidence control plan, as submitted, does not contain enough testing and analysis to capture the

potential for subsidence across Brook's entire permit area. Conditions 9 and 10 remedy this concern.

A. With Conditions 9 and 10 in place, Brook Mine's highwall mining will be planned and conducted in a manner that prevents material damage from subsidence.

Brook's highwall mining operations must be "planned and conducted so as to prevent subsidence from causing material damage to structures, the land surface, and groundwater resources." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 7, § 2(b)(iii). The Department imposed Conditions 9 and 10 to ensure that Brook's subsidence control plan meets this standard. While the Department found these conditions necessary, they build upon conservative measures that Brook already proposed for subsidence control.

As a starting point, Brook's subsidence control plan addresses each of the concerns expressed in the Council's 2017 order. Brook not only corrected the minor problems, such as evaluating the strength of sub-bituminous coal and making sure the plan was stamped and certified by a licensed professional engineer, but also conducted site-specific analysis of the strength and stability of the roof, pillar, and floor materials within the TR-1 area. (DEQ Ex. 5 at 367, 372, 379).

Brook exceeded applicable requirements[5] by creating a subsidence control plan containing each component required for other types of underground mining, namely:

(A) A description of the mining methods;

[5] Brook's highwall mining is regulated as a type of auger mining, which is subject to a smaller set of subsidence control requirements. *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 5, § 6(d) (directing that subsidence control for auger mining "be provided as required by Chapter 7, Section 2"). For example, Chapter 7, section 2 does not require a "subsidence control plan."

(B) Extent and effect of any planned and controlled subsidence;

(C) Except for areas where planned subsidence is projected to be used, measures to be taken in the mine to prevent or minimize subsidence, including backfilling of voids and leaving areas in which no coal is removed; and

(D) Measures to be taken to prevent, lessen, or mitigate material damage or loss of value to property, including reinforcement, relocation, restoration, or replacement of structures and features; monitoring; and purchase of property or insurance. The manner of determining the degree of material damage or loss of value of property shall be described.

Id.

Brook's subsidence control plan includes design specifications for highwall mining, indicates that no planned subsidence will occur, identifies the areas where coal will remain in place to prevent subsidence, and notes the absence of any structures above underground mine workings. (DEQ Ex. 5 at 91, 355, 410-13). The subsidence control plan also includes specific measures to minimize the risk of trough and sinkhole subsidence, such as keeping highwall openings no wider than 11.5 feet, preventing tunnel intersections, designing pillars at a 1:1 width to height ratio and a minimum 1.6 stability factor, and planning a thirty-nine percent coal extraction ratio. (DEQ Ex. 5 at 410-13; Overton Aff. ¶ 21).

While the subsidence control elements in Brook's application had some clear strengths, the public comment process shed light on some important weaknesses. Dr. Gennaro Marino and Dan Overton each informed the Department that Agapito's testing and analysis on a single core hole does not adequately characterize the subsurface conditions in the TR-1 area, let alone future highwall mine panels. (Overton Aff, Ex. 3 at 2-4). Dr. Marino and Mr. Overton also agreed that Atterberg Limit testing and

consolidated-drained triaxial testing should be done on future core samples to "evaluate the long-term strength of the roof and floor materials." (*Id.* at 4). The Department created Conditions 9 and 10 in response to this input. (Parfitt Aff. ¶ 14).

Conditions 9 and 10 prevent Brook from proceeding into any highwall mining panel, including TR-1, until it fully evaluates the roof, coal, and floor materials in that panel. (DEQ Ex. 9 at 4-5). Condition 9 requires Brook to collect a minimum of three core samples in each proposed panel, using a geostatistical algorithm to show that the sample locations sufficiently characterize the entire panel. (*Id.*). For each core sample, Brook must repeat the full battery of tests it completed on core 2017-4, with additional Atterberg Limit and consolidated-drained triaxial testing. (*Id*. at 5). Condition 10 requires Brook to revise its mine plan and subsidence control plan to include all data and analysis from this geotechnical testing. (*Id*.). Brook cannot commence mining in any highwall mining panel until the Department reviews Brook's plan revisions and provides written approval. (*Id.*).

Mr. Overton helped the Department draft Conditions 9 and 10, with the aim of establishing "a mechanism by which sufficient geotechnical data must be collected and analyzed with respect to mine subsidence." (Overton Aff. ¶ 22). This mechanism is designed to last for the entire life of the Brook Mine. As Mr. Overton explains, "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.*) (emphasis added).[6] Brook's subsidence control plan, as supplemented by Conditions 9 and 10, clearly satisfies the subsidence control requirements in Chapter 7, section 2 of the Rules.

B. The Department appropriately used permit conditions to resolve omissions in Brook's subsidence analysis.

The Resource Council does not critique Conditions 9 and 10, but instead maintains that the omissions in Brook's subsidence control plan were so significant that they could not be corrected through permit conditions. (Pet. ¶¶ 26-27). To reach this conclusion, the Resource Council relies upon the Act's definition of a "deficiency," which includes errors and omissions "serious enough to preclude correction or compliance by stipulation in the approved permit to be issued by the director." Wyo. Stat. Ann. § 35-11-103(e)(xxiv).

The Resource Council's reliance on the term "deficiency" is misleading. The Department acknowledges that Brook's subsidence control plan lacked sufficient data and analysis to show that subsidence risk would be controlled in future highwall mining panels. However, Conditions 9 and 10 force Brook to collect, test, and analyze a sufficient number of core samples to fully evaluate subsidence potential in each panel. By adhering to these conditions, Brook will plan and conduct its highwall mining "so as to prevent subsidence from causing material damage." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 7, § 2(b)(iii). If the Council agrees, then the Director has in fact corrected any omissions in Brook's subsidence control plan through "stipulation in the approved permit." *Id.* In

[6] Mr. Overton's opinion focuses on damage to the land surface, because no party contends that subsidence at the Brook Mine will damage structures or groundwater resources.

other words, if Conditions 9 and 10 create an adequate subsidence control mechanism, then there can be no remaining "deficiency" in Brook's subsidence control plan.

Director Parfitt acknowledges that public comments highlighted omissions in Brook's treatment of subsidence. (Parfitt Aff. ¶ 14). The Director responded to public input by bolstering Brook's plan to evaluate the risk of subsidence in future mining panels. (*Id.*). The Director's use of permit conditions is not a clever workaround, but rather a success story illustrating that public participation can inform agency action.

With Conditions 9 and 10, the Department not only demonstrated an effective response to public input, but also followed procedures outlined in the Rules. Chapter 7, section 2 requires auger mining operators to submit plans of underground workings that include "maps and descriptions of significant features of the underground mine, extraction ratios, measures taken to prevent or minimize subsidence and related damage, areas of full extraction and other information, **as required by the Administrator**." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 7, § 2(c) (emphasis added). Importantly, the Rules do not require the entire set of information at the application stage. Instead, the operator must provide these subsidence-related details "**pursuant to a schedule approved by the Administrator**." *Id.* (emphasis added). Conditions 9 and 10 set forth the criteria Brook must follow to demonstrate subsidence control and the schedule for Brook's submissions.

Extending Brook's Condition 10 submissions over time is not only allowed under the Rules, but also makes practical sense. There is no way an applicant could feasibly assess subsidence potential across an entire 4,548 acre permit area while also providing the level of detail necessary to understand the subsurface conditions in any particular location.

Agapito's 107-page report focused exclusively on the TR-1 highwall mining area, with analysis of a single core sample. (DEQ Ex. 5 at 364-470; Overton Aff. ¶ 11). Condition 9 triples the amount of testing Brook must conduct to assess the strength of roof, floor, and coal layers in each highwall mine panel. (DEQ Ex. 9 at 4-5). Brook's highwall mining is planned to involve eleven trenches, with at least sixteen separate highwall mining panels. (DEQ Ex. 5 at 150). To capture roof, floor, and coal strength in all sixteen panels, Brook would need to test and analyze at least forty-seven new core samples (forty-eight minus the core sample previously analyzed by Agapito). Brook could not reasonably be expected to prepare this much information in an initial permit application, nor could the Department be expected to review it.

Even if permit-area-wide testing and analysis were feasible, the results would have less value now than they will in future years. Brook's future core sample analysis will build upon the first-hand knowledge Brook gains through its highwall mining operations in all prior panels. For example, Brook will be able to directly observe roof, pillar, and floor strength as it develops individual highwall mining tunnels. Brook will also be able to detect actual subsidence developing on the land surface through airborne lidar surveys. These observations will help Brook plan its future highwall mining and will facilitate the Department's review of Brook's Condition 10 submissions. (Edwards Aff. ¶ 27).

C. The Department did not restrict public participation by classifying Brook's Condition 10 submissions as non-significant revisions.

Finally, the Resource Council asserts that the Department erred by pre-determining that Brook's future submissions under Condition 10 would constitute "non-significant"

permit revisions under Chapter 13 of the Rules. (Pet. ¶ 34). Only "significant" revisions require public notice and an opportunity for a public hearing. *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 13, § 2. In Condition 10, the Department appropriately designated Brook's future permit revisions as non-significant. This initial designation, however, does not limit the Administrator's authority to evaluate Brook's future submissions and determine, at a later time, that they are in fact significant permit revisions.

The Department must classify proposed permit revisions as significant when they present "significant deviations from that which was contemplated in the approved mining and reclamation plan." *Id.*, ch. 13, § 2(b). Unless the Administrator determines otherwise, the following permit revisions are presumed to be significant:

> (i) A change in the approved future land use or uses which affects more than 20 percent of the land within the permit area;
>
> (ii) A change in the approved method for insuring that all acid-forming or toxic materials, radioactive materials, or materials constituting a fire, health or safety hazard uncovered during or created by the mining process are promptly treated or disposed of during the mining or reclamation process in a manner designed to prevent pollution of surface or subsurface water or threats to human or animal health and safety;
>
> (iii) The construction or relocation of mills and tailings disposal facilities;
>
> (iv) A change in the approved method of mining which results in surface disturbance (e.g. underground, surface or in situ mining);
>
> (v) A change which would adversely affect the quality, quantity, or distribution of water in surface or groundwater systems;
>
> (vi) For surface coal mining operations, continuing operation after cancellation or material reduction of the liability insurance policy, the performance bond or other equivalent guarantee upon which the original permit was approved; or

> (vii) Any changes which propose significant alterations in the approved mining or reclamation operation, as determined by the Administrator.

Id.

The Department correctly presumes that Brook's Condition 10 submissions will not fit within the above categories. The first six are inapplicable. Regarding the seventh, Brook's submissions should not significantly alter its approved mining and reclamations plans. Under Condition 10, one of two outcomes will result for each highwall mine panel: (1) Brook's geotechnical analysis will show a controlled risk of subsidence, in which case the Department allows Brook to move forward with its approved mine plan; or (2) Brook's geotechnical analysis will show an elevated subsidence risk, in which case the Department may prevent Brook from mining a particular panel. Neither outcome would significantly alter Brook's approved mining and reclamation plans.

The Department also has a practical basis for classifying Brook's Condition 10 submissions as non-significant revisions. The Rules allow the Administrator to establish the format for receiving non-significant revisions, so long as they contain: "[a] brief description of the change and why the change is being sought; [a]n outline or index indicating what pages, maps, tables, or other parts of the approved permit are affected by the revision; and [a]dditional information necessary to support or justify the change." *Id.*, ch. 13, § 1(b). The Department used "non-significant revision" in Condition 10 to guide Brook on the appropriate format for updating its mine plan and subsidence control plan. (Edwards Aff. ¶ 25).

Importantly, the Department's decision to classify Brook's Condition 10 permit revisions as non-significant does not restrict the Administrator's freedom to treat these revisions as significant in the future. Within 90 days of receiving Brook's revisions, the Administrator must "notify the operator of whether … notice and opportunity for public hearing is required." *Id.*, ch. 13, § 2(a). The Administrator is responsible for making this determination, regardless of the instructions within Condition 10.

Brook's subsidence control plan, supplemented by Conditions 9 and 10, demonstrates that Brook will prevent material damage from subsidence, in accordance with Chapter 7, section 2 of the Rules. The Department's use of a permit condition complies with the Rules and does not restrict public participation. Because there are no factual disputes pertaining to subsidence, the Council should grant summary judgment on all subsidence-related issues in favor of the Department.

II. Brook's application covers all required mine facilities and roads.

The Resource Council asserts that Brook's permit application is incomplete because it excludes certain mine facilities and roads. (Pet. ¶ 40). Brook's application, however, includes all mine facilities and roads that must be identified under the Act and Rules. For the reasons described below, each of the Resource Council's arguments lack merit.

A. Brook properly excluded the iCam and iPark from its application because they are end users of coal.

The Resource Council first contends that Ramaco's iCam and iPark facilities must be included within Brook's permit application because they result from or are incident to Brook's coal mining activities. (Pet. ¶ 37). If this were true, then iCam and iPark would be

considered a part of Brook's surface coal mining operations. (*Id.* ¶ 35). The Act defines "surface coal mining operations" as:

> (A) Activities conducted on the surface of lands in connection with a surface coal mine or with the surface impacts incident to an underground coal mine as provided in Section 516 of P.L. 95-87. These activities include excavation for the purpose of obtaining coal including common methods as contour, strip, auger, mountaintop removal, box cut, open pit and area mining, the use of explosives and blasting, and in situ distillation or retorting, leaching or other chemical or physical processing, and the cleaning, concentrating or other processing or preparation, and the loading of coal; and
>
> (B) The areas upon which these activities occur or where these activities disturb the land surface. These areas shall also include any adjacent land the use of which is incidental to any of these activities, all lands affected by the construction of new roads or the improvement or use of existing roads to gain access to the site of these activities and for haulage, and excavations, workings, impoundments, dams, ventilation shafts, entry ways, refuse banks, dumps, stockpiles, overburden piles, spoil banks, culm banks, tailings, holes or depressions, repair areas, **storage areas, processing areas, shipping areas and other areas upon which are sited structures, facilities or other property or materials on the surface, resulting from or incident to these activities.**

Wyo. Stat. Ann. § 35-11-103(e)(xx) (emphasis added).

The Resource Council is correct that all surface coal mining operations require a permit from the Department. Wyo. Stat. Ann. § 35-11-401(d). However, while the Act's definition of surface coal mining operations is broad, it does not encompass facilities like the iCam and iPark.

The Department has authority to regulate some off-site processing facilities under the Act. *See Nat'l Wildlife Found. v. Hodel*, 839 F.2d 694, 745 (D.C. Cir. 1988) (finding, under SMCRA's surface coal mining operations definition, that "the Secretary may reasonably construe the meaning of 'processing areas … resulting from or incident to such

activities' to include processing facilities that are not at or near the mine site."). However, because of the "resulting from or incident to" language, there must be a significant connection between the mine operations and the off-site processing facilities. *Id.* This decision of whether facilities are sufficiently connected to a mine is rooted in policy considerations and must be delegated in the first instance to the regulatory authority. *Id.* (finding jurisdiction over off-site facilities to be "an obvious example of the … delegation of policy choices to an agency").

The Department and Council have chosen to exercise jurisdiction over some off-site facilities by creating a special application requirement for coal preparation plants. *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 3, § 6. However, under the coal preparation plant rule, the Department does not regulate or require any permitting for plants "located at the site of ultimate coal use." *Id.*, ch, 3 § 6(a). The Department and Council have clearly established that the processing activities conducted by an end user of coal neither "result from" nor are "incident to" a particular coal mine.

This decision not to regulate end users of coal matches the Office of Surface Mining and Reclamation Enforcement's (OSMRE) early regulations for coal preparation plants. OSMRE also exempted facilities "located at the site of ultimate coal use," recognizing that its jurisdiction did not "extend[] to facilities which are operated solely in connection with the end user of the coal product." Surface Coal Mining and Reclamation Operations; Permanent Regulatory Program; Support Facilities and Coal Preparation Plants, 48 Fed. Reg. 20392, 20393, 20401 (May 5, 1983). Despite later changes to the language of this

exemption,[7] OSMRE maintains its position that "regulation of facilities operated by or for the end user of coal at the point of such use is not required under SMCRA." Permanent Regulatory Program; Coal Preparation Plants Not Located Within the Permit Area of a Mine, 53 Fed. Reg. 47384, 47385 (Nov. 22, 1988).

The Department's only option for regulating the iCam and iPark facilities – if they could be regulated at all – is to treat them as coal preparation plants. Both iCam and iPark will engage in chemical and physical processing of coal, which technically might fall within the "coal preparation plant" definition. (Barron Aff. ¶ 13); *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 1, § 2(w) (broadly capturing facilities that perform any type of "chemical or physical processing or cleaning, concentrating, or other processing or preparation."). However, the iCam and iPark are also the sites of "ultimate coal use" and therefore exempt from permit requirements. The purpose of both iCam and iPark is to create products from coal-derived carbon. (Barron Aff. ¶ 16). No raw or processed coal will leave these facilities for other destinations. (*Id.*). Instead, the only materials leaving the iCam and iPark will be manufactured products like carbon fiber, graphene, and graphite. (*Id.*). Because iCam and iPark are end users of coal, Brook appropriately excluded them from its permit application.

[7] Instead of exempting end users, OSMRE's regulations now require permitting for only coal preparation plants that operate "in connection with" a coal mine. 30 C.F.R. § 785.21 ("This section applies to any person who operates or intends to operate a coal preparation plant in connection with a coal mine but outside the permit area for a specific mine."). In making this change, OSMRE clarified that the new 'in connection with' language "necessarily excludes facilities at the site of ultimate use." Permanent Regulatory Program; Coal Preparation Plants Not Located Within the Permit Area of a Mine, 53 Fed. Reg. 47384, 47385 (Nov. 22, 1988).

B. Brook properly excluded State Highway 345 from its application.

State Highway 345 connects the main entrance to the Brook Mine with the iCam and iPark facilities. For this reason, the Resource Council contends that Highway 345 is a "primary haul road for the mine" and "must be included within the boundary of the coal mine permit." (Pet. ¶ 42). Brook, however, proposes no coal hauling beyond the present boundary of its mine permit. Moreover, Brook's operations will not impact Highway 345. Because it is not a haul road and will not be affected by mining operations, Brook appropriately excluded Highway 345 from its coal mine permit application.

1. Highway 345 is not a haul road.

The Resource Council contends that State Highway 345 is a haul road because trucks will bring coal from the Brook Mine to the iCam facility. (Pet. ¶ 42). The Resource Council points to the Department's definition of roads, which includes those "used by coal hauling vehicles to and from transfer, processing, or storage areas." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 1, § 2(ds). For several reasons, this definition does not apply to Highway 345.

First, the Resource Council's argument depends on classifying iCam and iPark as "transfer, processing, or storage areas" that must be included in Brook's permit area. As described above, iCam and iPark are end users of coal, which the Department does not regulate as surface coal mining operations. Because iCam and iPark are not included in Brook's permit area, Highway 345 cannot be considered a haul road.

Further, Brook does not actually plan to haul coal on Highway 345. (Barron Aff. ¶ 25) ("Any mine haulage that takes place within the mine will terminate at the pad.").

Brook's coal storage pad is the point of sale for all coal leaving the permit area. (*Id.* ¶ 24). While independent parties may transport coal from the Brook Mine to the iCam and iPark, this use of Highway 345 does not make it a haul road for the Brook Mine.

Finally, no portion of Highway 345 lies within Brook's permit area. Brook's exclusion of Highway 345 fits with the requirement that permit applicants identify all roads "to be constructed, used, or maintained **within the proposed permit area**." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 2, § 5(a)(xvi)(A) (emphasis added). The Department does not regulate roads outside of the permit area. The Council has previously recognized that "complaints of truck traffic or other county road issues outside of the mine site are not within the regulatory authority of the Land Quality Division," and instead, "are a matter for [county] officials." *In re Wilson Bros. Constr.*, Findings of Fact, Conclusions of Law, and Order, No. 18-4804, slip op. 12 (EQC April 11, 2019).[8] Brook's application,

[8] Although *In re Wilson Brothers* involved a non-coal mine, the Council's holding applies equally in the coal context. OSRME, for example, acknowledges that its regulatory authority stops at the point where roads leave a mine site. Describing the extent of "support facilities" covered under SMCRA, OSMRE noted:

> [OSMRE] would interpret the [support facilities] regulation to include all facilities located up to the point of loadout of coal for interstate transport. For coal transported by rail line, this would extend to the loadout facility located at or near the mine site from which run of mine coal is conveyed or trucked to the rail line and loaded. **For operations that use road transportation, this would include all facilities located up to public roads beyond the boundary of the affected area**.

48 Fed. Reg. at 20397 (emphasis added).

which excludes roads beyond the permit boundary, is consistent with the Rules and the Council's *Wilson Brothers* decision.

2. Highway 345 will not be affected by Brook's mining operations.

Even if Highway 345 were somehow considered a haul road, it does not belong in Brook's permit application. When it comes to roads, Brook's surface coal mining operations include only the "lands **affected** by the construction of new roads or the improvement or use of existing roads to gain access to the site of these activities and for haulage." Wyo. Stat. Ann. § 35-11-103(e)(xx)(B) (emphasis added). Similarly, under the Rules, a road is a "surface corridor of **affected land** associated with travel by land vehicles used in surface coal mining and reclamation operations." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 1, § 2(ds) (emphasis added). The Act defines "affected land" as the "area of land from which overburden is removed, or upon which overburden, development waste rock or refuse is deposited, or both, including access roads, haul roads, mineral stockpiles, mill tailings …, mill facilities …, impoundment basins …, and all other lands whose natural state has been or will be disturbed as a result of the operations." Wyo. Stat. Ann. 35-11-103(e)(xvi).

This concept of identifying and regulating "affected lands" is rooted in Congress's recognition that surface mining operations "result in disturbances of surface areas that burden and adversely affect commerce and the public welfare by destroying or diminishing the utility of land for commercial, industrial, residential, recreational, agricultural, and forestry purposes." 30 U.S.C. § 1201(c). One of SMCRA's central purposes is to ensure that "procedures are undertaken to reclaim surface areas" affected by mining. 30 U.S.C.

§ 1202(e). To implement this SMCRA objective, the Department requires operators to report the extent of surface disturbances, reclaim all disturbed lands to an approved future use, and provide financial assurances guaranteeing that reclamation will be accomplished. Wyo. Stat. Ann. § 35-11-406(b); *Id.* § 35-11-415(b)(v) through (vii); *Id.* § 35-11-417(c).

Highway 345 will not be affected by the Brook Mine. It is an existing state highway. Neither Brook nor any other party will regrade, resurface, relocate, change, improve, or otherwise disturb the land surface around this highway. With no surface disturbance, Brook could not be reasonably expected to conduct future reclamation work on Highway 345. Because Brook will not affect Highway 345, it does not belong in Brook's permit.

The Resource Council provides two examples where roads connected with surface coal mining operations did require a permit. (Pet. ¶¶ 38-39). Both are easily distinguished from Highway 345.

In the first example, the Alaska Supreme Court required permitting for an eleven mile haul road and adjacent conveyor that led to a shipping port. *Trs. for Alaska v. Gorsuch*, 835 P.2d 1239 (Alaska 1992). The court found that the road, conveyor, and facilities at the port resulted from or were incidental to the mining operation. *Id.* at 1245. In support of its holding, the court noted that the road and facilities "will be built to support the mining activity" and "will be located in an otherwise undeveloped area." *Id.* at 1244.

The Resource Council also points to a proposed haul road connecting Montana's Spring Creek Mine with Wyoming's Young's Creek Mine. The Montana Department of Environmental Quality required Spring Creek Mining to obtain a permit amendment before constructing this transportation corridor. Montana Department of Environmental Quality,

Draft Environmental Impact Statement for the Proposed Addition of a Haul Road to the Spring Creek Mine.[9] Spring Creek Mining planned to haul coal from Youngs Creek to Spring Creek, "where the coal would be processed and then transported off site." *Id.* at ii. The nine-mile haul road would create 970 acres of new surface disturbance, with construction requiring approximately 6.5 million cubic yards of cut and fill. *Id*. at iii-iv. The proposed road will be reclaimed following its last projected use in 2030 or 2031. *Id.* at v.

The haul road examples in Alaska and Montana differ from Highway 345 in several important respects. Most importantly, they involve new surface disturbance. Brook proposes no disturbance of Highway 345. Because the Alaska and Montana haul roads represent newly-affected lands, they will have to be reclaimed by the mine permittees in compliance with state SMCRA provisions. Brook, by contrast, has no obligation to reclaim Highway 345. Finally, the purpose of the Alaska and Montana haul roads was to get coal from the mine site to a point of sale. The Brook Mine's point of sale is the coal storage pad shown on Exhibit MP.2-1. (Barron Aff. ¶ 24). Brook's transport of coal from the open pit and highwall mining areas to the point of sale will occur entirely within Brook's permit area. (*Id.* ¶ 26; DEQ Ex. 5 at 145).

Because Brook is not using Highway 345 as a haul road or affecting Highway 345 with its mining operations, Brook appropriately excluded this road from its permit application.

[9] Available at: https://deq.mt.gov/Portals/112/Public/EIS/Documents/Spring%20Creek/Draft%20SCM%20EIS_June%202018_WEBversion.pdf

C. Brook sufficiently described its use of county roads.

The Resource Council also argues that Brook did not disclose its use of county roads to haul coal within the permit area. (PRBRC Pet. ¶ 43). The Resource Council contends that Brook should have estimated truck traffic on these roads, disclosed potential impacts to the roads, and described Brook's arrangements with state and county authorities for road use, repair, and compensation. (*Id*. ¶ 44). Both assertions miss the mark. Brook has disclosed its use of county roads. The additional requirements described by the Resource Council do not exist in the Act or Rules.

The Act and Rules require identification of roads within the permit area, as well as plans for new road construction. *See*, e.g., Wyo. Stat. Ann. § 35-11-406(a)(ix) (calling for a "map based on public records showing ... all roads … on or immediately adjacent to the land to be affected"). Brook satisfied its application requirements by identifying the roads within its permit area, classifying their use, and describing the future reclamation of those that will not be retained for an approved post-mining land use. (DEQ Ex. 5 at 23-25; 145). Brook discloses that its future highwall mining will be adjacent to county roads. (DEQ Ex. 5 at 92). Brook also explains that it will use Ash Creek Road for transportation within the permit area. (*Id.*). Where required, Brook will implement measures to facilitate the public's continued use of county roads. (*Id.*). Nothing further is required under the Act or Rules. There is no basis for the Resource Council's assertion that Brook, prior to receiving its permit, must estimate truck traffic, evaluate road impacts, or create road use agreements with state and county authorities for roads within the permit area.

D. Brook was not required to provide buffers or a road relocation plan at the application stage.

Finally, the Resource Council maintains that Brook's application must establish a buffer around public roads or include an approved plan to relocate any roads impacted by mining operations. (Pet. ¶ 45). Here, the Resource Council mistakes an ongoing environmental performance standard for a permit application requirement.

Mine operators cannot conduct surface coal mining operations within 100 feet of the right-of-way line of any public road, not counting areas where mine roads meet up with a public road. 30 U.S.C. § 1272(e)(4); Wyo. Stat. Ann. § 35-11-406(n)(iv) (incorporating SMCRA restrictions by reference). However, under certain conditions, the Department can authorize an operator to relocate, close, or disturb lands within 100 feet of a public road. *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 12, § 1(a)(v)(D). Before authorizing such impacts, the Department must provide public notice, an opportunity for public comment, and, upon request, a hearing in the locality of the mining operations. *Id.* The Administrator must find in writing that "the interests of the public and the affected landowners will be protected from the proposed operation." *Id.*

The Department has not authorized Brook to relocate, close, or disturb lands within 100 feet of any public road. Brook's application does not propose any of these specific scenarios, but recognizes they could occur in the future: "If mining activities require relocating a county road, plans will be submitted to and approved by Sheridan County and the affected surface land owners, if applicable. Any approved road relocation will be constructed and approved prior to the existing road being disturbed by mining operations."

(DEQ Ex. 5 at 192). In addition to Brook's planned mitigation measures, the Department must adhere to Chapter 12's procedural requirements. If and when Brook proposes to relocate, close, or disturb lands within 100 feet of a public road, the public will receive notice and an opportunity to be heard. Nothing requires Brook to initiate this process before receiving its coal mine permit.

There are no factual disputes regarding Brook's treatment of facilities and roads within or outside of its permit area. As a matter of law, Brook's application sufficiently covers the facilities and roads that will be used in its mining operations. As such, the Council should grant summary judgment for the Department on this issue.

III. Brook's application includes the required estimates of coal production.

The Rules require coal mine permit applicants to describe their "anticipated annual and total production by tonnage." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 2, § 5(a)(i)(A). The Resource Council argues that an applicant must prove these figures are accurate by identifying "proposed buyers or opportunities to use the coal." (Pet. ¶ 51). Nothing in the Act or Rules requires such justification.

Brook provided its estimated annual and total production in Table MP.1-2. (DEQ Ex. 5 at 105). While the Resource Council may question these numbers based on past statements of Brook representatives, nothing in the Act or Rules lets the Department do the same. The Rules require nothing more than an estimate of annual and total production. *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 2, § 5(a)(i)(A). Brook satisfied this application requirement.

The Resource Council further asserts that accurate coal production estimates are necessary to establish the overall duration and potential impacts of mining operations. (Pet. ¶ 50). It suggests that any inaccuracies could limit "enforcement by DEQ once a permit is issued." (*Id.*). Again, the Resource Council focuses on a singular application requirement and ignores Brook's ongoing responsibilities as a mine operator. Brook must report annually on its mining progress, including "[t]he extent to which expectations and predictions made in the original or any previous reports have been fulfilled, and any deviation therefrom, including but not limited to the quantity of overburden removed, the quantity of minerals removed, and the number of acres affected." Wyo. Stat. Ann. § 35-11-411(a)(ii)(C). These annual reports are available to the public and will give the Department everything it needs to monitor Brook's mining activity. Moreover, the Act's reporting requirement explicitly contemplates deviations from the operator's prior "predictions." *Id.* Using the term "predictions" would make no sense if permit applicants were required to provide exact production figures up front, rather than estimates.

As a matter of law, the Council should determine that Brook provided the required "anticipated annual and total production by tonnage."

IV. Brook was not required to name an operator at the application stage.

According to the Resource Council, Brook does not currently have the staff it needs to operate the Brook Mine. (Pet. ¶ 54). The Resource Council asserts that if any party apart from Brook operates the mine, "that party must be identified in the permit application." (*Id.*). This contention, however, mischaracterizes the actual application requirements.

Neither the Act nor the Rules required Brook to name an operator at the application stage. An applicant must only provide the "names, addresses and telephone numbers of any operators, **if different from the applicant**." *Rules Wyo. Dep't of Envtl. Quality, Land Quality-Coal*, ch. 2, § 2(a)(i)(B) (emphasis added). Brook is currently the only operator for the Brook Mine. (*See* DEQ Ex. 11).

Brook acknowledges that, to run the mine, 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). The Act clearly allows Brook to select a new operator after the permit is issued. "Any operator desiring to engage in a mining operation shall make a written application to the administrator on forms furnished by the administrator for a license to mine." Wyo. Stat. Ann. § 35-11-410(b). This application process is available at any time. The Act specifically authorizes the Administrator to issue licenses to applicants "other than **the permit holder**," contingent on an "instrument of permission from **the permit holder** granting to the applicant the rights thereto." *Id.* § 35-11-410(b)(ii) (emphasis added). By using the term "permit holder," this section explicitly authorizes the Administrator to issue licenses to mine after the initial permit issuance. Brook, as the permit holder, can grant a new operator the right to mine under its approved permit.

As a matter of law, the Council should determine that Brook was not required to name an operator at the application stage.

CONCLUSION

Over the past six years, Brook's permit application has been through twelve rounds of technical review, two rounds of public comment, a seven-day contested case hearing,

and an informal conference. Following the Council's 2017 decision, the Department conducted a top-to-bottom peer review of Brook's application and solicited extensive feedback from a geotechnical engineering expert. No coal mine permit in Wyoming's history has received this level of scrutiny.

Where the Department found problems with Brook's permit application, it took appropriate steps under the Act and Rules to fix them. The Department has taken every available measure to ensure that Brook's permit application is accurate, complete, and complies with all applicable laws. For this reason, the Department asks the Council to grant its motion for summary judgment.

Dated this 28th day of October, 2020.

Matt VanWormer, WSB# 7-5804
Senior Assistant Attorney General
Wyoming Attorney General's Office
2320 Capitol Avenue
Cheyenne, WY 82002
(307) 777-6199
matt.vanwormer@wyo.gov

Attorney for the Wyoming
Department of Environmental Quality

CERTIFICATE OF SERVICE

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

Wyoming EQC (Original) – **By Inter-Agency Mail**
Attn: Joe Girardin
2300 Capitol Ave.
Hathaway Bldg. 1st, Room 136
Cheyenne, Wyoming 82002

Shannon Anderson – **By E-mail**
Powder River Basin Resource Council
934 N. Main St.
Sheridan, WY 82801
sanderson@powderriverbasin.org

Patrick J. Crank – **By E-mail**
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Cheryl Lobb, Paralegal
Wyoming Attorney General's Office

BEFORE THE ENVIRONMENTAL QUALITY COUNCIL
STATE OF WYOMING

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

AFFIDAVIT OF ALAN EDWARDS

I, Alan Edwards, being of lawful age and first duly sworn upon oath, depose and state as follows:

1. I am over eighteen years of age and am competent to provide this affidavit. The information contained in this affidavit is based on my personal knowledge.
2. I am currently employed by the Wyoming Department of Environmental Quality ("WDEQ") as the Administrator of the Abandoned Mine Land program. From December 2014 to September 2020, I also served as the Deputy Director of WDEQ.
3. Starting in May 2015, I was assigned to the role of Acting Administrator of the Land Quality Division ("LQD") for the purpose of decisions made on the Brook Mine application.

4. I have been involved in the Brook Mining Co., LLC coal mine permit PT0841 since May 2015 and along with the LQD staff and outside consultants have been overseeing the entire team and all actions that led to my recommendation that the WDEQ Director issue the Brook Mine permit.
5. Prior to recommending approval of the Brook Mine permit, the LQD staff and I carefully considered and reviewed all state statutes, rules, and regulations we deemed to apply to the Brook Mine permit application. It is my opinion that the recommendations I have made about the Brook Mine permit comply with state and federal law.
6. With regard to subsidence control requirements, WDEQ/LQD regulates Brook's proposed highwall mining activities as a form of auger mining. This is because of the similarities identified by Brook between highwall mining and auger mining, namely that both use a remotely operated machine to remove coal without creating surface disturbance and with no mine personnel present in the underground workings.
7. In the spring of 2020, WDEQ/LQD received public comments on the Brook application.
8. Included in the public comments were matters raised by Dr. Gennaro Marino of Marino Engineering Associates, Inc. in his reports. Dr. Marino was hired by the Powder River Basin Resource Council ("PRBRC") to consult in regard to the Brook Mining permit application.
9. WDEQ/LQD had previously hired Dan Overton, a recognized geotechnical engineering expert, to provide independent expertise and opinion on Brook's subsidence-related permit application submittals.

10. WDEQ also reviewed the report and analysis provided by Brook's consulting experts, Tom Vandergrift and Tim Ross with Agapito Associates, Inc., as well as the public comments submitted in regard to Brook's permit application.
11. During Rounds 8 through 12 of the permit review process, LQD also utilized an internal independent third-party, District II LQD Supervisor, Nancy Williams, to review and provide her opinion as to the completeness and accuracy of the application and compliance with the rules and regulations governing surface coal mines in Wyoming.
12. In addition, WDEQ had the benefit of the oral comments from the informal conference.
13. Following the informal conference, the WDEQ asked Mr. Overton to review all of the written comments on the application, as well as the oral comments and documents provided during the informal conference.
14. WDEQ and Mr. Overton reviewed all expert analysis, all public comments, and all information presented at the May 13, 2020 informal conference, between May 14, 2020, and July 7, 2020, the day the Brook Mine Permit was issued.
15. Brook Mine Permit Conditions 9 and 10 were added to address the input from Mr. Overton, public comments, and the expert analysis of Dr. Marino, the mine engineering expert hired by the PRBRC.
16. Pursuant to the July 7, 2020, permit, Brook is not entitled to mine any highwall mining panel until it has complied with the Conditions 9 and 10, which are incorporated into the approved mining permit.
17. Condition 9 of the permit requires that Brook provide the WDEQ/LQD with the results from geophysical property testing of cores from a minimum of at least three geotechnical core holes for each highwall panel to be mined.

18. Consistent with the comments of Mr. Overton and Dr. Marino, 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.
19. Condition 9 requires that samples be collected from each core hole and must include the roof, coal, and floor samples of the proposed highwall mining panel.
20. Condition 9 requires that for all future core holes, Atterberg limits and consolidated-drained triaxial testing be performed in addition to the testing procedures performed on core hole 2017-4.
21. Condition 9 also requires that the results of the core laboratory testing be reviewed and analyzed by a Wyoming registered professional geologist or engineer. The mine plan and subsidence control plan will then be revised, if necessary, based upon the additional data and analysis.
22. Condition 10 requires that all data and analysis from the geotechnical testing required in Condition 9 be submitted to WDEQ/LQD in the form of non-significant revisions to the mine plan and subsidence control plan. After completion of the additional testing and study, all results must be supplied to WDEQ for WDEQ's consideration and regulatory action.
23. The subsidence control plan incorporated in the permit is complete and accurate and provides appropriate protection for Wyoming and its citizens and the environment and is designed to prevent subsidence and material damage to the surface above any highwall mining panel.
24. WDEQ/LQD possesses the authority under Chapter 13 of LQD's Coal Rules to delineate the format of non-significant revisions.

25. In drafting the language of Condition 10, I suggested the use of "non-significant revision" as a way to guide Brook on incorporating the new data and analysis into its existing mine plan and subsidence control plan. WDEQ/LQD maintains its complete discretion to determine if a submission is a significant deviation from the approved mine or reclamation plans, which would then trigger public notice and hearing requirements.

26. Brook Mine cannot commence mining in any highwall mining panel until WDEQ/LQD has provided written approval of any corresponding revision.

27. Conditions 9 and 10, along with the application and the permit, create a subsidence control plan that gives Brook and its professional geologist and/or engineer and WDEQ/LQD the ongoing benefit of understanding each panel and the results of testing and analysis and the results of mining before providing Brook the opportunity to begin working any other highwall mining panel. As WDEQ analyzes submissions for each highwall mining panel, in future years, Brook and WDEQ will have access to the knowledge of the physical characteristics present in the mine. This knowledge of the geology, hydrology, and other physical characteristics in the Brook Mine will aid in preventing subsidence during the life of the mine.

28. Notwithstanding Brook's measures to prevent subsidence, Brook is required under Chapter 7, section 2(a) of LQD's Coal Rules to complete full reclamation, including backfilling, grading, and contouring, of any substantial surface disturbance that results from subsidence within five years of Brook's completion of mining.

29. The WDEQ/LQD correctly determined that matters raised by the PRBRC were not deficiencies in the application and set forth a process for the submission of additional information in future years of the permit.

30. The mining permit is a living document directing future actions of the operator and the WDEQ/LQD over the time periods set in the permit.

31. All existing coal mines in Wyoming operate in a manner as mandated by this permit and requests for modification of permits and mining plans for both non-significant revisions and significant revisions throughout the lifetime of the mining permit occur frequently.

32. The permit issued here is consistent with historical practice of WDEQ/LQD in permitting and monitoring coal mines in Wyoming, and all federal and state rules regulations and statutes.

33. In my professional opinion, WDEQ has complied with WEQA which requires that the application be complete and accurate and that the reclamation plan can accomplish what it must.

FURTHER YOUR AFFIANT SAYETH NAUGHT.

DATED this 7th day of October, 2020.

Alan Edwards

Alan Edwards

STATE OF Wyoming)
) ss
COUNTY OF Laramie)

Subscribed and sworn to before me by Alan Edwards this 7th day of October, 2020.

Witness my hand and official seal.

JODY L. PAESSLER - NOTARY PUBLIC
COUNTY OF LARAMIE STATE OF WYOMING
MY COMMISSION EXPIRES JULY 26, 2023

SEAL

Jody L. Paessler

Notary Public

My commission expires:
July 26, 2023

BEFORE THE ENVIRONMENTAL QUALITY COUNCIL
STATE OF WYOMING

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

AFFIDAVIT OF JEFF BARRON, P.E.

I, Jeff Barron, P.E., being of lawful age and first duly sworn upon oath, depose and state as follows:

1. I am the responsible engineer on the Brook Mining Inc., LLC ("Brook") permit to mine application.
2. I am over eighteen years of age and am competent to provide this affidavit. The information contained in this affidavit is based on my personal knowledge.

3. I have over 15 years of experience as an engineer and licensed professional engineer in Wyoming since 2011.
4. I am employed as the Civil Department Manager of WWC Engineering in Sheridan, Wyoming.
5. I am a certified Professional Civil Engineer in the state of Wyoming and Montana.
6. I have been working on the application and mine plan for Brook since 2013.
7. Myself and my staff are responsible for all documentation and materials that have been submitted, on behalf of Brook, as part of the mine plan and application.
8. The subsidence control plan indicates that Brook will mine both the upper and lower Carney seams, west of the Carney coal split. The plan mentions the alignment of highwall miner holes to create "pillar stacking" as a subsidence prevention measure. However, Brook's mine plan does not currently call for mining both Carney seams. Figure MP-6-11 shows that west of split, Brook is only targeting one seam of the Carney coal in each highwall mining panel. Additionally, Brook is not planning to target the Masters seam with highwall mining anywhere within the permit area.
9. All roads and facilities to be used by Brook are set forth in the mine plan.
10. All roads were mapped and designed by my firm and such designs and maps were prepared in accord with the professional standards and laws and regulations governing the same.
11. iCam is envisioned as a research center to develop alternative uses for coal. iCam will be located adjacent to the iPark. iCam is wholly owned by Ramaco Carbon.
12. iPark is envisioned as a business park for the development and production of products derived from coal and coal-based products. iPark is wholly owned by Ramaco Carbon.

13. iCam and various entities housed adjacent to iPark are expected, as a part of their research and production activities, to perform some forms of chemical or physical processing of coal that conform to the current (currently I-2) zoning requirements of Sheridan County, WY.
14. Neither iPark or iCam are located within the permit boundary of the Brook Mine.
15. Neither iPark or iCam will have any direct involvement in the mining of coal or sale of coal under Permit # PT0841 issued for the Brook Mine.
16. Both iCam and iPark will be end-users of coal from Brook or other coal mines. No raw or processed coal will leave the iCam or iPark for other destinations and uses. Instead, the only materials leaving the iCam and iPark will be in the form of products made from coal-derived carbon, such as carbon fiber, carbon nanotubules, graphene, graphite, or resins for additive manufacturing.
17. As described within the mine plan and the many rounds of technical revisions (which are part of the application and mine plan), iPark and iCam are separate legal entities.
18. While the parent company of both these facilities and of Brook, Ramaco Carbon, may intend to use some of the coal mined at Brook in these facilities, the research park and the processing facility are separate legal entities.
19. iCam and iPark may purchase coal from third parties, as they do not mine coal, to supply their respective facilities.
20. Brook is one of the independent third parties that intends to sell coal to iCam, iPark and other customers.
21. If iCam and iPark receive or process coal from Brook, it is not part of the application or mine plan that was permitted in the operation of Brook.

22. Brook will not be transporting coal to iCam or iPark.

23. The Brook operation does not intend to transport any coal out of the permitted area.

24. Any coal that leaves the permitted area will be sold, to a third party, at the pad identified in the mine plan.

25. That coal 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.

26. Any mine haulage that takes place within the mine will terminate at the pad.

FURTHER YOUR AFFIANT SAYETH NAUGHT.

DATED this 6TH day of October 2020

JEFF BARRON

STATE OF WYOMING)
) ss
COUNTY OF SHERIDAN)

Subscribed and sworn to before me by Jeff Barron this 6TH day of October 2020.

Witness my hand and official seal.

SEAL

Notary Public

My commission expires: 1/22/2023

HEIDI ROBINSON
COUNTY OF SHERIDAN STATE OF WYOMING
MY COMMISSION EXPIRES JANUARY 22, 2023

BEFORE THE ENVIRONMENTAL QUALITY COUNCIL
STATE OF WYOMING

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

AFFIDAVIT OF DANIEL D. OVERTON, P.E., D.GE

I, Daniel D. Overton, P.E., D.GE, being of lawful age and first duly sworn upon oath, depose and state as follows:

1. I am over eighteen years of age and am competent to provide this affidavit. The information contained in this affidavit is based on my personal knowledge.
2. I am the President and Principal Geotechnical Engineer at Engineering Analytics, Inc., ("EA") of Fort Collins, CO.
3. I obtained my Bachelor of Science in Civil Engineering from Colorado State University in 1985 and my Masters of Science in Civil Engineering from the University of California in 1988.
4. I am a registered Professional Engineer in the States of Arizona, Arkansas, Colorado, Idaho, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, Oklahoma, South Dakota, Texas, Utah, Washington, and Wyoming. Additionally, I am a Registered Civil and Geotechnical Engineer in California. I am a Diplomate of Geotechnical Engineering with the Academy of Geo-Professionals. I am a Fellow with the American Society of Civil Engineers and a Faculty Affiliate at Colorado State University.

5. I have over 35 years of experience as a professional engineer, with an emphasis in the areas of geotechnical design and mine reclamation. My technical specialties include cover design, tailings consolidation analysis, seepage and groundwater analysis, stability analysis, infiltration modeling, and grading plans.
6. I have written over fifty technical papers on various aspects of geotechnical engineering and am the co-author of a text book titled "Foundation Engineering for Expansive Soils."
7. I have previously provided mining-related technical reviews for state and federal agencies including the Wyoming Department of Environmental Quality, the Colorado Division of Reclamation, Mining and Safety, the Virginia Department of Environmental Quality, and the United States Environmental Protection Agency.
8. My previous work with the Wyoming Department of Environmental Quality ("WDEQ") includes settlement modeling, burn and subsidence modeling, and burn cavity predictions for an underground coal gasification project.
9. Starting in June 2018, I have contracted with the WDEQ Land Quality Division ("LQD") to provide expert review of subsidence-related submittals from Brook Mining Company, LLC ("Brook") and review of written and oral public comments submitted to WDEQ/LQD for the proposed Brook Mine near Sheridan, Wyoming. I have prepared four technical memoranda for WDEQ/LQD, which are attached to this affidavit as Exhibits 1 through 4 and incorporated herein as if fully set forth.
10. My initial work on the Brook Mine involved reviewing Brook's February 3, 2018 subsidence sampling and analysis plan. I prepared a technical memorandum dated June 29, 2018 summarizing my review, *See* Ex. 1. Brook's February 2018 subsidence sampling and analysis plan proposed conducting two core samples to test the strength of

materials in the roof, coal, and under-burden in the first highwall panels proposed for years 6 through 10. I noted in my Technical Memorandum dated June 29, 2018 that this plan was deficient. The plan provided no discussion "justifying testing rock from only two borehole locations, and not a larger geological area." Ex. 1 at 3. I also noted that details for data collection, rock strength testing and analysis were not presented in the plan. I presented some possible alternatives which would, in my opinion, better address the requirements of the WDEQ/LQD.

11. I later reviewed the subsidence-related portions of Brook's Round 7 permit application submittal, which included Attachment MP-6, the July 2015 Subsidence Control Plan, and Attachment MP-6-A, the September 13, 2018 document, "Geotechnical Design and Operational Considerations for Highwall Mining – Brook Mine," prepared by Agapito Associates, Inc. (Agapito). I prepared a technical memorandum dated January 14, 2019 summarizing my review, *See* Ex. 2. The Agapito report presented a substantial improvement in the subsidence evaluation of the proposed mining activities. I noted in my Technical Memorandum dated January 14, 2019 that the "Agapito Report furthers the approach for a geotechnical sound design and stability analysis for the Brook Mine plan and it follows the standard approach for geotechnical design of a highwall mine as confirmed by the literature…" Ex. 2 at 6. I commented to WDEQ/LQD that the Agapito report tested only one core sample in the TR-1 area, which was identified as 2017-4. I recommended that Brook "should indicate whether there are plans for an additional borehole analysis for this panel and how will physical characterization be performed for the additional panels in the mine plan and for potential subsidence." Ex. 2 at 7. I also noted: "The applicant should indicate the plan, or best practices implemented to perform

subsidence evaluations in the event of unexpected subsidence." Ex. 2 at 7. I also noted: "The applicant should make a specific recommendation for the thickness of coal to be left on the roof and the floor." Ex. 2 at 7.

12. I reviewed the subsidence-related portions of Brook's Round 8 permit application submittal. In the Round 8 submittal, Agapito provided clarification regarding the issues I had previously raised. I prepared a technical memorandum dated March 15, 2019 summarizing my review, *See* Ex. 3.

13. In May 2020, EA was tasked by WDEQ/LQD to provide an evaluation of subsidence-related public comments submitted in regard to the published version of Brook's permit application, as well as oral comments provided during the May 13, 2020, informal conference held by WDEQ/LQD. For this task, I reviewed public comments from fifteen parties, including the written objections of the Powder River Basin Resource Council and the written reports and oral comments of Dr. Gennaro G. Marino of Marino Engineering Associates, Inc., of St. Louis, Missouri, and the oral comments of Tim Ross of Agapito Associates, Inc. My review and response to these comments is documented in my June 9, 2020 Technical Memorandum to WDEQ/LQD. *See* Ex. 4.

14. In my June 9, 2020 Technical Memorandum, I noted Brook's continued reliance on geotechnical analysis from a single core hole, despite committing to the sampling additional core holes at earlier phases of the permitting process. I commented that 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." Ex. 4 at 2. I also noted how Dr. Marino, in his written comments, expressed similar concerns regarding Brook's reliance on analysis from a single core

hole. Ex. 4 at 3. I recommended that a minimum of two additional core holes be drilled and sampled in the proposed TR-1 highwall mining panel. I also provided recommendations for additional geotechnical testing and analysis.

15. Between June 9, 2020, and the WDEQ's issuance of Brook's mining permit, I worked with WDEQ/LQD staff to address my own concerns about Brook's subsidence analysis and the subsidence-related objections from the public, including the comments presented by Dr. Marino.

16. In late June 2020, I consulted with WDEQ/LQD on the requirements within Conditions 9 and 10, which are incorporated into Brook's permit dated July 7, 2020. These permit conditions directly address the concerns I expressed in my Technical Memorandum dated June 9, 2020. These permit conditions were designed to address the written and oral comments from the public, including Dr. Marino.

17. I have reviewed the Petition filed by the PRBRC with the EQC on August 6, 2020. The comments attributed to me in that Petition fail to address the consultation work that I did with the WDEQ between June 9, 2020 and the issuance of the mine permit by the WDEQ on July 7, 2020.

18. The comments included in the Petition which have been attributed to me are included in a Technical Memorandum that I issued to the WDEQ on June 9, 2020. The comments accurately represent my professional opinion at that time. These comments do not represent my opinion as to Brook's current overall Subsidence Control Plan, as supplemented by the mine permit conditions adopted on July 7, 2020.

19. The WDEQ imposed two very important permit conditions in that mine permit related to mine subsidence. Conditions 9 and 10 of the mining permit require Brook to complete

geotechnical testing and analysis (including Atterberg limits and consolidated-drained triaxial testing) from a minimum of three core holes to assess the strength of the roof, coal, and floor layers in each future highwall mining panel. The permit conditions require that the results of the core laboratory testing be reviewed and analyzed by a Wyoming registered Professional Geologist or Engineer, and that the Mine Plan and Subsidence Control Plan be revised, if necessary, based on the data and analyses. The results from these tests must be submitted to WDEQ/LQD and approved before Brook proceeds with operations in any highwall mining panel. These conditions address the concerns I expressed in my Technical Memorandum dated June 9, 2020, as well as similar concerns expressed by Dr. Marino in his written and oral comments.

20. In September of 2020, I reviewed a submittal from WWC Engineering dated August 31, 2020. The submittal included a revised Addendum MP-6 (Subsidence Control Plan) which incorporates the language from the aforementioned Permit Conditions 9 and 10.

21. Brook's current 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. Even before the issuance of the permit conditions, Brook's Subsidence Control Plan included specific measures intended to reduce the risk of trough and sinkhole subsidence. These are discussed in the Agapito report and include the use of a minimum 1.6 stability factor for pillars, a minimum 1:1 width-to-height pillar ratio, and maximum highwall mining widths of 11 to 11.5 feet. These measures result in a lower coal extraction ratio of 39 percent.

22. Conditions 9 and 10 in the approved permit establish a mechanism by which sufficient geotechnical data must be collected and analyzed with respect to mine subsidence. The

permit conditions require the data and analyses to be submitted to the WDEQ/LQD and approved before mining can take place in each highwall mining panel. It is my professional opinion, to a reasonable degree of scientific certainty, that 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.

FURTHER YOUR AFFIANT SAYETH NAUGHT.

DATED this 9TH day of October, 2020

Daniel D. Overton

STATE OF COLORADO)
) ss
COUNTY OF LARIMER)

ANN M HOCHWORTER
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20094005379
MY COMMISSION EXPIRES DECEMBER 1, 2023

Subscribed and sworn to before me by Daniel D. Overton this 9TH day of October, 2020.

Witness my hand and official seal.

SEAL

Notary Public

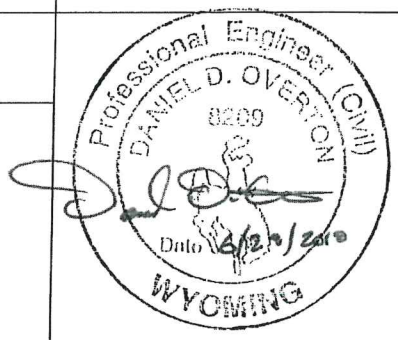
My commission expires: 12/1/2023

Engineering Analytics, Inc.
1600 Specht Point Road • Suite 209 • Fort Collins, CO 80525 • 970.488.3111 • www.EngAnalytics.com

2008 CELEBRATING 10 YEARS 2018

Technical Memorandum

To:	Mr. B.J. Kristiansen, P.G.	From:	Daniel D. Overton, P.E.
Company:	Wyoming Department of Environmental Quality – Land Quality Division	Date:	June 29, 2018
EA No.:	110875		
Re:	Review of Brook Mine Subsidence Sampling and Analysis Plan		



1.0 INTRODUCTION

Engineering Analytics, Inc. (EA) was tasked by the Wyoming Department of Environmental Quality (DEQ) Land Quality Division (LQD) to provide an evaluation of a subsidence sampling and analysis plan submitted by the Brook Mine. The Brook Mine is a sub-bituminous coal mine located approximately 8 miles north of the City of Sheridan in Sheridan County, Wyoming.

On September 28, 2017, the State of Wyoming Environmental Quality Council (EQC) issued the *Findings of Fact, Conclusions of Law, and Order* (Order) regarding Docket 17-4802, In Re Brook Mine Application (TFN 6 2-025). On February 3, 2018, RAMACO submitted to DEQ the "*2018 Hydrology and Subsidence Sampling and Analysis Plan to Address Environmental Quality Council Findings and Order*" (the Plan) prepared for RAMACO by WWC Engineering. The Plan was prepared in response to a DEQ letter to the Brook Mine dated January 18, 2018, requesting Brook to submit their plan to address the subsidence issues raised by the EQC Order.

This Technical Memorandum provides an evaluation of the Brook Mine's subsidence sampling and analysis plan, and the adequacy of addressing each subsidence finding in the EQC Order; as well as recommendations for alternative approaches to address the subsidence-related EQC findings.

2.0 SUBSIDENCE-RELATED FINDINGS OF THE ENVIRONMENTAL QUALITY COUNCIL ORDER

A review of the EQC Order Section V. Findings of Fact (Findings) indicates the items relevant to subsidence include: Findings No. 50 through No. 61, (pages 16 and 17). Each of the subsidence-related Findings is listed below.

50. There have been inadequate studies and testing done to draw any scientific conclusions as to the long-term risk of subsidence at the permit area. *Transcript – Marino testimony, pp. 1200, 1246.*

Exhibit 1

51. The deficiencies and lack of a subsidence plan were explained by Dr. Marino

52. The permit application does not provide sufficient information to provide a meaningful review with respect to subsidence potential. *Transcript – Marino testimony, pp 1237, 1284-85*

53. Appropriate data was not collected to do a site-specific assessment of the strength and stability of the roof, floor, and pillar materials at the permit area. *Transcript – Marino testimony, pp. 1211, 1228-122.*

54. The subsidence control plan exhibits a lack of geomechanical understanding of the long-term and short-term stability of the mine. *Transcript – Marino testimony, p. 1228.*

55. There is insufficient information or data in the permit application and very limited analysis of subsidence risk in the documents such that the subsidence potential cannot be assessed. *Transcript – Marino testimony, p. 1228.*

56. The calculation in the mine plan improperly used coal strength data for bituminous coal rather than the sub-bituminous coal which exists at the site. *Transcript – Marino testimony, pp. 1226-1227, 1234, 1247.*

57. Complete subsidence control plans are typically stamped by a professional engineer and such plan is part of the permit application. *Transcript – Marino testimony, pp. 1238-1239.*

58. The mine plan is not complete due to the lack of proper testing and analysis to determine the risk of subsidence due to mining activities. *Transcript – Marino testimony, p. 1244.*

59. Brook admitted that the studies and work suggested by Dr. Marino are necessary steps for a proper mine subsidence plan. *Transcript – Barron testimony, pp. 674-675.* However, Brook did not perform those studies or work as part of its subsidence control plan. *Transcript – Barron testimony, pp. 1532-33.* Brook chose not to perform the necessary engineering work in the permit application for permitting efficiency purposes. *Transcript- Barron testimony, pp. 1532 -1535.*

60. Brook plans to do the necessary engineering work Dr. Marino suggests as part of the ground control plan. Transcript – Barron testimony, pp. 1532-1533.

61. The risk of subsidence and subsidence control have not yet properly been studied or assessed.

The subsidence-related Findings Nos. 50 though 61 generally state there is:

- A lack of information, inadequate studies and data collection, and lack of testing and analysis to date for a site-specific evaluation of strength of ground conditions (e.g., sampling and analysis plan). (Findings No. 50, 53, 55, 56, 58, and 59)
- A need for an understanding of short-term and long-term stability (e.g., stability analysis), and the lack of an evaluation for the potential risk for subsidence (e.g., understand failure mechanisms and risk), and resultant extent of subsidence. (Findings No. 50, 52, 53, 54, 55, and 56)
- The need for an approach, or plan to mitigate subsidence, via a subsidence control plan, or a ground control plan (as a part of the mine plan). (Findings Nos. 51, 57, 60, and 61)
- A commitment by the Brook Mine to do the appropriate studies per Dr. Marino's suggestions to move towards a proper mine subsidence plan. (Findings No. 59 and 60)

3.0 REVIEW OF SAMPLING AND ANALYSIS PLAN

The Plan submitted to DEQ in February 2018 consists of three sections: an Introduction (Section 1.0), Hydrologic Monitoring (Section 2.0), and Subsidence Sampling Plan (Section 3.0). The focus of this subsidence evaluation is Section 3.0.

The narrative presented in the Subsidence Sampling Plan is summarized as follows:

- Coring will be conducted at two locations to obtain samples for subsidence materials testing.
- Strength testing will be performed on roof, coal, and underburden core samples for the first highwall panels proposed for years 6 through 10; strength testing on future panels will occur prior to mining.
- Two 2-inch piezometers will be installed in the Carney overburden (578415-OVB-1 and 578415-OVB-2) following coring to characterize overburden saturation, even if the overburden produces water.
- Procedures are provided for drilling a pilot hole for geophysical logging, then coring approximately 20 feet from the pilot hole to retrieve core; then completion of boreholes with screened intervals based on the geophysical logging, and installation of piezometers.

Based on review of the Subsidence Sampling Plan (Section 3.0 of the Plan), it appears drilling and coring at two locations is intended to be multi-purpose; for subsidence materials testing and for hydrologic monitoring. From piezometer locations presented on Exhibit 2 – Ground Water and Surface Water Monitoring (578415-OVB-1 and 578415-OVB-2), these boreholes are within the northwest quarter of Section 15, although the text does not reference Exhibit 2. It is unclear from the text description and Exhibit 2, the relevance of these two core locations to the proposed highwall panels, or mining location (proposed for years 6 through 10). In addition, given the extent of mining, no discussion is provided to justify testing rock from only two borehole locations, and not a larger geological area.

In regards to sampling, the narrative lacks specificity for core drilling and logging, collection of core for sampling, and strength testing. The text states strength testing will be performed on roof, coal and underburden core samples from two locations. However, estimated depths of drilling and stratigraphic intervals are not provided, nor number and volume of core samples to be retrieved from each zone within each borehole. The procedures described do not include specificity for documentation of rock structure and characteristics, logging, and recording the rock quality designation (RQD). The text indicates that strength testing will be performed but details for the various rock mechanics tests are not provided (e.g., tensile strength, uniaxial compression or point load strength, or consolidated-drainage triaxial strength) and specific ASTM standards are not referenced.

Overall, the Subsidence Sampling Plan commits to two locations for coring and piezometer installation. However, details for sampling and analysis for rock strength testing and analysis are not presented. Therefore, the text does not present a full understanding for the intent of data collection for strength testing, and how the data will be analyzed to technically evaluate the rock stability, and subsequent subsidence prediction due to planned mining.

4.0 ALTERNATIVE APPROACHES TO ADDRESS SUBSIDENCE-SPECIFIC FINDINGS

The Subsidence Sampling Plan (Section 3.0 of the Plan) indicates it "*is meant to address Findings No. 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, and 61 of the Order*". In terms of the Subsidence Sampling Plan adequately addressing each subsidence-related Finding listed above from the EQC Order, two points can be made. One point is overall, none of the Findings have been fully addressed by the Subsidence Sampling Plan. However, the second point is the Brook Mine committed to do the appropriate studies (Finding No. 60), and the Subsidence Sampling Plan shows intent to begin preliminary work, although it is not sufficient as presented.

Each of the EQC Findings related to subsidence were reviewed followed by a review of the Subsidence Sampling Plan. These Findings were summarized above and can generally be are grouped into three categories that are required for the Brook Mine: data collection, testing, and analysis; stability analysis and subsidence prediction; and a subsidence control plan.

Some possible alternatives to address the Findings listed above would be to consider the following approach, with participation of a professional engineer experienced with mine subsidence.

- Data Collection, Testing and Analysis – A sampling and analysis plan needs to be developed to collect appropriate core data from representative geological structures of the proposed mine area. The core requires testing by a geotechnical lab to collect strength parameters necessary for stability analysis and subsidence prediction. All work needs to follow the industry accepted ASTM standards.
- Stability Analysis and Subsidence Prediction – Following acceptance of reviewed geotechnical test data, stability analysis should be performed to understand the areas that may be impacted by subsidence (e.g., pillar failure analysis, roof entry analysis, roof/floor bearing analysis). Consideration should be made for geological features (e.g., faults), as well as the hydrologic conditions and how these may influence stability and the potential for subsidence. These analyses will allow for the development of subsidence prediction for the planned mining.
- Subsidence Control Plan – Upon completion of stability analysis and subsidence prediction for the planned mining, a subsidence, or ground control plan should be developed to mitigate potential impacts.

The EQC Findings note that the Brook Mine permit application was deficient in the areas of hydrology, subsidence, and blasting plan (Finding No. 96). In addition the EQC Findings note that the subsidence control plan concludes there will be no subsidence, but the EQC disagrees with the conclusion (Finding No. 98), and deemed the Brook Mine permit application deficient.

In regards to subsidence, it is our opinion that the proposed investigation, testing, analyses, subsidence prediction and subsidence control plan remains deficient. We recommend that a work plan be developed detailing the three-phase approach identified above to assist in advancement of the understanding of the site conditions, the potential for subsidence, and the approach for subsidence control.

5.0 REFERENCES

State of Wyoming Environmental Quality Council, 2017. Findings of Fact, Conclusions of Law, and Order, Docket 17-4802, In RE Brook Mine Application, TFN 6 2-025, filed September 28, 2017.

WWC Engineering, 2018. 2018 Hydrology and Subsidence Sampling and Analysis Plan to Address Environmental Quality Council Findings and Order, prepared for: RAMACO, prepared by: WWC Engineering.

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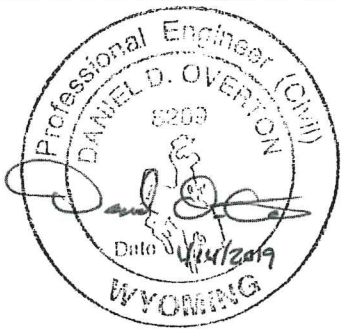
Technical Memorandum

To:	Mr. B.J. Kristiansen, P.G.	From:	Daniel D. Overton, P.E.
Company:	Wyoming Department of Environmental Quality – Land Quality Division	Date:	January 14, 2019
EA No.:	110875		
Re:	Review of Brook Mine Permit to Mine Application Specific to Subsidence: Response to EQC Finding of Facts and Conclusions of Law, WDEQ Comments Round 7, and Supplemental Materials.		

1.0 INTRODUCTION

Engineering Analytics, Inc. (EA) was tasked by the Wyoming Department of Environmental Quality (DEQ) Land Quality Division (LQD) to provide an evaluation of subsidence-related documentation regarding the Brook Mine Permit to Mine Application (TFN 6 2/025). The specific documentation is included in *Response to EQC Finding of Facts and Conclusions of Law, WDEQ Comments Round 7* (Round 7 Submittal) submitted by WWC Engineering on behalf of RAMACO Wyoming Coal, LLC to DEQ, on October 29, 2018. The Round 7 Submittal includes responses to specific subsidence-related comments and also references supplemental materials provided as part of the Mine Plan.

The Brook Mine is a sub-bituminous coal mine located approximately 8 miles north of the City of Sheridan in Sheridan County, Wyoming. On September 27, 2017, the State of Wyoming Environmental Quality Council (EQC) issued *Findings of Fact, Conclusions of Law, and Order (Order) regarding Docket 17-4802, In Re Brook Mine Application (TFN 6 2-025)* (Order).

On February 3, 2018, RAMACO submitted to DEQ the "*2018 Hydrology and Subsidence Sampling and Analysis Plan to Address Environmental Quality Council Findings and Order*" (Subsidence SAP) prepared for RAMACO by WWC Engineering. The Subsidence SAP was prepared in response to a DEQ letter to the Brook Mine dated January 18, 2018, requesting the Brook Mine to submit a plan to address the subsidence issues raised by the EQC Order. On behalf of the DEQ, EA provided comments in a memorandum (EA SAP Review Memo) dated June 29, 2018, regarding the Subsidence SAP submitted by the Brook Mine and how it addressed the findings of the September 27, 2017 Order.

This Technical Memorandum provides an evaluation of the subsidence-related comments in the Brook Mine's Round 7 Submittal, including the subsidence-related Findings No. 50 through No. 61, and the supplemental materials referenced, including:

- Mine Plan Addendum MP-6 Subsidence Control Plan dated July 30, 2015; and
- Attachment MP-6-A *Geotechnical Design and Operational Considerations for Highwall Mining – Brook Mine*, by Agapito Assoicates, Inc. dated September 13, 2018.

Exhibit 2

Agapito Associates, Inc. was contracted by Ramaco Carbon, LLC (Ramaco) to evaluate highwall mining for the Brook Mine. This Agapito Report was specific to the TR-1 area in Section 15 of T57N, R84W (Exhibit MP.4-1). The mining will consist of a box cut mined to expose the Carney Seam to develop the highwall mining.

2.0 SUBSIDENCE-RELATED FINDINGS AND ROUND 7 SUBMITTAL RESPONSES

A review of the EQC Order Section V. Findings of Fact (Findings) indicates the items relevant to subsidence include: Findings No. 50 through No. 61, (pages 16 and 17). Each of the subsidence-related Findings is listed below.

50. There have been inadequate studies and testing done to draw any scientific conclusions as to the long-term risk of subsidence at the permit area. *Transcript – Marino testimony, pp. 1200, 1246.*

51. The deficiencies and lack of a subsidence plan were explained by Dr. Marino.

52. The permit application does not provide sufficient information to provide a meaningful review with respect to subsidence potential. *Transcript – Marino testimony, pp 1237, 1284-85*

53. Appropriate data was not collected to do a site-specific assessment of the strength and stability of the roof, floor, and pillar materials at the permit area. *Transcript – Marino testimony, pp. 1211, 1228-122.*

54. The subsidence control plan exhibits a lack of geomechanical understanding of the long-term and short-term stability of the mine. *Transcript – Marino testimony, p. 1228.*

55. There is insufficient information or data in the permit application and very limited analysis of subsidence risk in the documents such that the subsidence potential cannot be assessed. *Transcript – Marino testimony, p. 1228.*

56. The calculation in the mine plan improperly used coal strength data for bituminous coal rather than the sub-bituminous coal which exists at the site. *Transcript – Marino testimony, pp. 1226-1227, 1234, 1247.*

57. Complete subsidence control plans are typically stamped by a professional engineer and such plan is part of the permit application. *Transcript – Marino testimony, pp. 1238-1239.*

58. The mine plan is not complete due to the lack of proper testing and analysis to determine the risk of subsidence due to mining activities. *Transcript – Marino testimony, p. 1244.*

59. Brook admitted that the studies and work suggested by Dr. Marino are necessary steps for a proper mine subsidence plan. *Transcript – Barron testimony, pp. 674-675.* However, Brook did not perform those studies or work as part of its subsidence control plan. *Transcript – Barron testimony, pp. 1532-33.* Brook chose not to perform the necessary engineering work in the permit application for permitting efficiency purposes. *Transcript- Barron testimony, pp. 1532 -1535.*

60. Brook plans to do the necessary engineering work Dr. Marino suggests as part of the ground control plan. Transcript – Barron testimony, pp. 1532-1533.

61. The risk of subsidence and subsidence control have not yet properly been studied or assessed.

The Round 7 Submittal responses related to subsidence are the EQC Findings No. 50 through No. 61 as follows:

Response EQC 50 – Round 7

> *Brook Mine selected Agapito Associates, Inc. of Colorado to prepare the geotechnical design of the TR-1 highwall mine area. The report that they prepared is included in Mine Plan Addendum MP-6. This report includes an evaluation of the potential subsidence for the proposed mining area.*
>
> *The highwall mining plan for the Brook Mine has been developed to minimize the likelihood of trough subsidence.*

Response EQC 53 – Round 7

> *Please see response to Comment 50. The site specific test program includes:*
>
> > *Uniaxial compression tests (UCS) with elastic properties (Young's modulus (E) and Poisson's ratio (v)), axial and diametral point load tests (PLT), and slake durability tests.*

Response EQC 60 – Round 7

> *Brook contracted Agapito Associates, Inc. to prepare highwall report for the TR-1 in Section 15 of T57N, R84W (Exhibit MP.4-1). This report can be found in Mine Plan Addendum MP-6.*

Response EQC 51-52, 54 – 59, and 61 – Round 7

> *Please see response to Comment 50.*

3.0 REVIEW OF THE MINE PLAN ADDENDUM MP-6

3.1 Attachment MP-6 – Subsidence Control Plan

The Subsidence Control Plan, dated July 2015 provides a highwall mining plan, a review of previous mining activity, subsidence monitoring and assessment, and subsidence control and remediation. The highwall mining plan (Section MP-6.1) indicates use of an ADDCAR highwall mining system with the capability to cut an 11.0-foot wide opening and a maximum height of 15.1 feet. The plan includes a hole penetration depth of 2000 feet. The plan discussed highwall mining of two spilts of the Carney seam and one thicker Carney seam and support pillars with a width equal to or exceeding the maximum extraction thickness, at least 1:1, providing conformance with the National Institute for Occupational Safety and Health (NIOSH) ARMPS-HWM stability program.

The review of the previous mining activity (Section MP-6.2) in the area includes maps from the Sheridan Wyoming Coal Company Mine No. 44 and review of aerial imagery, indicating chimney subsidence. The chimney subsidence occurred in the southwestern portion of the historic mine, in areas that indicate panel rooms of 20 feet in width, with connecting mains and submains of 15 feet in width, and connecting crosscuts of 10 feet or less in width. The subsidence appeared in areas of overburden cover depth of less than 120 to 150 feet. Calculations using the Dyne equation (1998) indicate that chimney subsidence may occur with these types of spans (20 to 25 feet) in the 16-foot high Carney seam, at 150 feet in height. Therefore, the Brook Mine plan proposed highwall mining opening width of 11 to 11.5 feet. The plan

concludes that surface subsidence should not occur due to the guidance system for straight hole alignment, the conservative pillar wide, pillar stacking for multiple-seam mining, and narrow entries.

The subsidence monitoring and assessment (Section MP-6.3) provides for initial assessment of the ground surface six months prior to monitoring, as well as visual monitoring on a monthly basis, and six months following completion of mining. In addition, stream profiles will be developed and surveyed semi-annually. Subsidence control and remediation (Section MP-6.4) would follow the Reclamation Plan for seeding, after appropriate restoration is made for the by backfilling and self-healing.

As presented in the discussion below, the Agapito Report furthers the subsidence analysis from the Subsidence Control Plan for the Brook Mine. The Agapito Report includes some of the similar design components of the narrow opening width of 11.5 feet, but does not include multiple seam mining, only mining of the thicker Carney seam. The analysis in the Subsidence Control Plan of the nearby Mine No. 44 is noteworthy as it provides useful information that is considered in the Agapito Report in the subsidence evaluation (Section 6.1).

3.2 Attachment MP-6A – Geotechnical Design and Operational Considerations for Highwall Mining – Brook Mine (Agapito Report)

The Agapito Report, as stated above, focuses on site characterization, engineering design, and operational considerations. The Agapito Report includes a review of mine area specific core, observations and geotechnical testing of the core (Section 2). Analyses was performed for the highwall mining for opening dimensions, including evaluation of the roof and floor stability, and with regards to protection of surface structures (Section 3). Pillar design under various depths of over and at various mining heights was evaluated, and with various recoverable volumes (Section 4). To confirm the approach to mining, numerical modeling was performed using standard practice methodologies of LaModel Analysis and UDEC Analysis (Section 5). Finally, a subsidence evaluation is presented, and recommendations are made for operations (Section 6).

The site geology and mining setting are described in the Section 2 site characterization, including reference to the nearby Acme 2 Mine that mined the Carney Seam with 25-feet wide rooms. Testing of core from 2017-4, a recent geotechnical core hole provided physical properties for analyses include UCS, E, Poisson's ratio, Slake, PLCS, PCT-D, density, and moisture. Core observations indicate a profile of sandstone, mudstone, coal and carbonaceous mudstone. The Agapito Report indicates the results of the strength characteristic data of the Carney seam is found to be similar to those at surface mines in the western U.S. However, the report states the coal-bounding strata are indicated to be similar, although are marginally weaker than those found at western strip operations. The appendices provide the core logs and rock mechanics testing (uniaxial compressive strength test data and plots, point load data, and slake durability data).

The highwall mining geometry is presented in Section 3. The mining opening dimensions are presented for an ADDCAR Systems, LLC highwall mining system with consideration of the coal thickness ranging from 14 to 16 feet. As the dip of the seam is shallow, during mining the mining height will not be reduced more than 0.5 feet. Protection of surface structures is presented with a recommendation of establishment of a buffer with a fixed offset of 50 feet and an angle of critical deformation of 25 degrees. Regarding roof stability, rock mass rating (RMR) and Q values were calculated from the core, site conditions, and engineering judgment. A stand-up time is estimated at 77 days, and it is recommended to leave 6 to 12 inches of top coal to improve roof conditions and reduce dilution. Regarding floor stability, the coal seam is underlain by a thin layer of weak carbonaceous mudstone that may affect pillar and floor

stability. Therefore, it is proposed to leave a 1-foot thick coal layer on the floor to provide additional stability.

The design includes both an empirical pillar design and numerical modeling to confirm the design performance following standard industry practice, including the Mark-Bieniawski formula, and the LaModel and UDEC models, respectively. The empirical design results presented in Section 4 show web pillar design and barrier pillar design charts for the 1.6 stability factor, as well as recoverable resources. A proposed panel layout is presented based on the parameters of a 14 ft mining height, 90% of the maximum cover depth, and average penetration depths. An appendix is included with alternate design charts for the 1.8 stability factor.

The numerical models presented in Section 5 are based on the deepest cover of 373 feet, and a 14 ft mining height with an 18.3-ft web pillar and 58.1-ft barrier pillar, based on the 1.6 stability factor. The LaModel numerical modeling method checked the web and barrier pillar design and the design for cascading pillar failure potential. The report indicates the vertical stresses agree with the expected 619 psi average pillar stress under the deepest cover depth, or design depth. In addition, the analyses indicate the design is not prone to cascading failure, even in the case of a complete failure of an entire pillar. The UDEC modeling analyses was performed to confirm the empirical and LaModel results, check roof and floor stability and other potential failure mechanisms. Overall the results from both models indicate the roof and floor will remain stable, however, the report indicates the roof is predicted to be weak.

An evaluation for subsidence is presented in Section 6 along with operational considerations. The following summarizes this section:

- Regarding trough subsidence, the highwall mining plan has been designed to minimize trough subsidence based on the substantial pillar size, 1:1 width to height pillar ratio, reduced in-situ coal strength for the Carney seam, LaModel modeling results demonstrate cascading failure is unlikely, and use of 1.6 and 1.8 stability factors.
- Sinkhole subsidence has been evaluated and the risk is considered to be low, although should still be recognized as a possibility in the area of the shallow cover areas near the box cut. Various studies note the possibility of sinkhole subsidence at mines with shallow cover, including the Mine No. 44 near the Brook Mine at cover depths less than 140 feet.
- The Matheson equation is used, using a model from a Colorado Springs Mine, by accounting for a thicker coal seam at the Brook Mine, to evaluate probability of a collapse reaching the surface. The estimate concludes that 5 sinkholes may develop in shallow cover less than 140 feet in depth.
- Another analysis using the Mine No. 44 sinkhole data, with openings of 25-feet wide, indicated that in the 86 acre development section of the Brook mine ranging between 140 to 150 foot depth of cover, the sinkhole frequency is 0.19 holes/acre.
- Overall the evaluation indicates the Brook Mine is less susceptible to subsidence than historic mines, with narrow opening (11.5 feet compared to 25 feet), development only mining as opposed to retreat mining that allows for collapse, no intersections or crosscuts, and a lower extraction ratio (39% compared to 50%).

4.0 REVIEW OF WYOMING ADMINISTRATIVE CODE

A review of the Department of Environmental Quality (020) regulations related to Land Quality – Coal (0006) of the Wyoming Administrative Code (WAC) were reviewed in regards to subsidence for underground coal mining. Pertinent sections with citations relevant to subsidence include:

- Chapter 1: Authorities and Definitions for Surface Coal Mining Operations (020.0006.1.08272014)
- Chapter 2: Permit Application Requirements (020.0006.2.08272014)
- Chapter 4: Environmental Protection Performance Standards (020.0006.4.12172012)
- Chapter 7: Underground Coal Mining (020.0006.7.04112011)

In general, the Subsidence Control Plan and the Agapito Report appear to provide information requested by the code related to evaluating for the potential of subsidence for the planned underground coal mine. The documents provide geotechnical analyses based on local core, with standard approaches to design for stability with the intent to minimize subsidence, as well as provide for monitoring and remediation in the event of subsidence.

5.0 COMMENTS

The Agapito Report furthers the approach for a geotechnical sound design and stability analysis for the Brook Mine plan and it follows the standard approach for geotechnical design of a highwall mine as confirmed by literature (e.g., Mo et al., 2016; Ross et al., 2018; Zipf, 2005). The design is based on test results from site-specific core and provides conservatism with 1.6 and 1.8 safety factors. The Executive Summary presents a list of issues and concerns and provides findings and recommendations based on the geotechnical evaluation within the report. The issues and concerns address the overall stability of the mine plan and potential for surface subsidence. The findings indicate that there may be roof falls over time in the highwall mining openings. However, the propagation of the falls to the surface are considered unlikely, and therefore, the design is not prone to development of trough or sinkhole subsidence features. Evaluation of subsidence using existing data and historic local information demonstrates the Brook Mine will be less susceptible to subsidence than historic mines. Of note is the subsidence evaluation in both the Subsidence Control Plan and in the Agapito Report, and the consideration of the historic local subsidence of the Mine No. 44, in close proximity to the Brook Mine TR-1 panel. Regarding regulatory requirements, the Wyoming Administrative Code was reviewed in terms of subsidence requirements in Chapters 1, 2, 4, and 7 and it appears the intent of both the Subsidence Control Plan and the Agapito Report provide the information required by the code.

Specific comments are submitted that include the following:

1. In the EA SAP Review Memo a comment was made in regards to the Subsidence SAP, Section 3.0. stating:

   "Based on review of the Subsidence Sampling Plan (Section 3.0 of the Plan), it appears drilling and coring at two locations is intended to be multi-purpose; for subsidence materials testing and for hydrologic monitoring. From piezometer locations presented on Exhibit 2 – Ground Water and Surface Water Monitoring (578415-OVB-1 and 578415-OVB-2), these boreholes are within the northwest quarter of Section 15, although the text does not reference Exhibit 2. It is unclear from the text description and Exhibit 2, the relevance of these two core locations to the proposed highwall panels, or mining location (proposed for years 6 through 10). In addition, given the extent of mining, no discussion is provided to justify testing rock from only two borehole locations, and not a larger geological area."

Based on the Subsidence SAP, coring was to be conducted at two locations to obtain samples for subsidence materials testing. In addition, the Subsidence SAP states that strength testing will be performed on roof, coal, and underburden core samples for the first highwall panels proposed for years 6 through 10, with strength testing on future panels occurring prior to mining.

It is understood that the core evaluated in the Agapito Report was identified as 2017-4. The borehole location is not noted in the Subsidence Control Plan or the Agapito Report. However, EA received the coordinates from WDEQ of Lat: 44.919101, LON: 106.985681; and N: 1,938,754, E: 1,402,386; and confirmed the location is within Panel 1 depicted on Figure 10 of the Agapito Report.

There does not appear to be a discussion in the Subsidence Control Plan or in the Agapito Report for an additional borehole core testing as indicated in the Subsidence SAP, or for demonstration of how much geotechnical testing is suitable. The applicant should indicate whether there are plans for an additional borehole analyses for this panel and how will physical characterization be performed for the additional panels in the mine plan and for potential subsidence.

2. The Subsidence Control Plan provides for monitoring, and in the event of subsidence, provides plans for reclamation. The applicant should indicate the plan, or best practices implemented to perform subsidence evaluations in the event of unexpected subsidence.

3. In regards to the slake durability test discussion, Section 2.2.1 of the Agapito Report states:

   "Poor floor conditions are likely to be encountered within the highwall miner opening; therefore, AAI recommends leaving 6 to 12 inches of floor coal, which should improve trafficability."

   In regards to the roof stability analysis, Section 3.3 of the Agapito Report states:

   "If roof competence proves to be an issue during mining, leaving 6 to 12 inches of top coal should improve roof conditions and reduce dilution".

   In the Operational Considerations, Section 6.2 of the Agapito Report states:

   "The calculated stand-up times for the roofs of all HWM areas indicates that the roofs should be sufficiently stable to allow highwall mining. However, the rocks types are generally classified as weak (CMRR) and occasional roof falls may occur. AAI recommends leaving a 1-ft thick layer of top coal to reduce weathering of the CMS layer and improve stability". If mining exposes the CMS layer in the floor, trafficability problems are considered likely; therefore, AAI recommend leaving a 1-ft-thick layer of floor coal to improve conditions."

   And the Executive Summary of the Agapito Report states in the 3rd bullet:

   "Marginal roof stability and floor trafficability is likely to be encountered; therefore, AAI recommends leaving roof and floor coal to mitigate these issues."

   The recommendations for the thickness of leaving coal on both the roof and the floor appear to vary and suggest dependency upon the materials encountered in the floor. Given the overall Carney seam thickness is approximately 16 feet, an allowance for leaving coal on both the floor and roof seems feasible for the design. The applicant should make a specific recommendation for the thickness of coal to be left on the roof and the floor.

6.0 REFERENCES

Agapito Associates, Inc., 2018. Attachment MP-6-A Geotechnical Design and Operational Considerations for Highwall Mining- Brook Mine, prepared for RAMACO Carbon, September 13, 2018, 117 p.

Mo, Sungsoon, Dhengguo Zhang, Ismet Canbulat, Paul Hagan (2016). A Review of Highwall Mining Experience and Practice, in Naj Azis and Bob Kininmonth (eds), Proceedings of the 16th Coal Operators' Conference, Mining Engineering, Univeristy of Wollongong, 10-12 February 2016, 522-530.

RAMACO, 2018. Addendum MP-6 Subsidence Control Plan, Brook Mine Permit Application, Volume XI, Mine Plan, October 28, 2018.

Ross, Chris, David Conover, and Jake Baine (2018). Highwall mining of thick, steeply dipping coal – a case study in geotechnical design and recovery optimization, International Journal of Mining Science Technology, http://doe.org/10.1016/j.ijmst.2017.12.022.

State of Wyoming Environmental Quality Council, 2017. Findings of Fact, Conclusions of Law, and Order, Docket 17-4802, In RE Brook Mine Application, TFN 6 2-025, filed September 28, 2017.

WWC Engineering, 2018a. 2018 Hydrology and Subsidence Sampling and Analysis Plan to Address Environmental Quality Council Findings and Order, prepared for: RAMACO, prepared by: WWC Engineering, January 18, 2018.

WWC Engineering, 2018b. Response to EQC Finding of Facts and Conclusions of Law, WDEQ Comments Round 7, Brook Mine Permit to Mine Application, TFN 6 2/025, prepared by WWC Engineering, submitted to Wyoming Department of Environmental Quality, October 19, 2018.

Wyoming Administrative Code, 2018. Wyoming Administrative Code, Department of Environmental Quality, Land Quality – Coal (0006).

Zipf, R. K. (2005). Ground Control Design for Highwall Mining, SME Annual Meeting, pre-print number 05-82, 2005, 9 pp.

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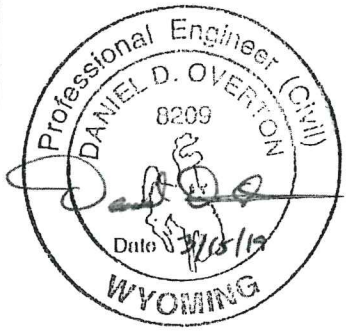
Technical Memorandum

To:	Mr. Bjarne Kristiansen, P.G.	From:	Daniel D. Overton, P.E.
Company:	Wyoming Department of Environmental Quality – Land Quality Division	Date:	March 15, 2019
EA No.:	110875		
Re:	Review of Round 8 Technical Review Response to Comments Specific to Subsidence, Brook Mine Permit to Mine Application (TFN 6 2/025)		



1.0 INTRODUCTION

Engineering Analytics, Inc. (EA) was tasked by the Wyoming Department of Environmental Quality (DEQ) Land Quality Division (LQD) to provide an evaluation of subsidence-related documentation regarding the Brook Mine Permit to Mine Application (Permit Application) (TFN 6 2/025). The Brook Mine is a sub-bituminous coal mine located approximately 8 miles north of the City of Sheridan in Sheridan County, Wyoming. On September 27, 2017, the State of Wyoming Environmental Quality Council (EQC) issued *Findings of Fact, Conclusions of Law, and Order (Order) regarding Docket 17-4802, In Re Brook Mine Application (TFN 6 2-025)* (Order).

EA has reviewed previous Permit Application submittals as documented in memorandums to the DEQ on June 29, 2018 and January 14, 2019. The DEQ provided comments to the Brook Mine in the Round 8 Technical Review, Brook Mine Coal Mine Permit Application, TFN 6 6/025, dated January 17, 2019.

This Technical Memorandum provides an evaluation of the subsidence-related responses and modifications made to Permit Application documentation in the Brook Mine's response to the Round 8 Technical Review. The documents reviewed include:

- Mine Plan, Section MP.13 Subsidence Control dated February 2019 (page MP-65).
- Mine Plan Addendum MP-6 Subsidence Control Plan, Round 8 dated March 2019 (pages MP-6-3 through MP-6-9).
- Response to comments, specifically comments from Bj (Numbers 2 through 4). In addition, the responses were searched for relevant key terminology (e.g., subsidence, strength, SAP, sampling and analysis).
- The RAMACO LLC Index Sheet for Mine Permit Amendments or Revisions dated March 4, 2019, TFN 6 2/025 (pages 1 through 5). This document was cross-checked to identify any relevant subsidence-related changes to text, tables or figures.

Exhibit 3

2.0 SUBSIDENCE-RELATED ROUND 8 SUBMITTAL RESPONSES

Comments from Mr. Kristiansen:

2) Based on the Subsidence Plan, coring was to be conducted at two locations to obtain samples for subsidence materials testing. In addition, the Subsidence Plan states that strength testing will be performed on roof, coal, and underburden core samples for the first highwall panels proposed for years 6 through 10, with strength testing on future panels occurring prior to mining. There does not appear to be a discussion in the Subsidence Control Plan or in the Agapito Report for an additional borehole core testing as indicated in the Subsidence Plan, or for demonstration of how much geotechnical testing is suitable. **The applicant should indicate whether there are plans for an additional borehole analyses for this panel and how will physical characterization be performed for the additional panels in the mine plan and for potential subsidence.**

AAI Response: The corehole tested (2017-4) provides adequate data for the study area addressed in Agapito's report. In future highwall mining blocks outside the study area, additional hole(s) covering a similar area are appropriate, with a similar suite of tests (approximately 20 UCS tests, 10 point load tests, and 5 slake durability tests) of the upper and immediate roof, Carney Seam, and floor. The text in Addendum MP-6 has been updated.

> **EA Comments on Round 8 Responses:** The text from Addendum MP-6 Round 8 was checked, and under Section MP-6.1 Highwall Mining Plan, the last paragraph, on page MP-6-4, a new sentence was added at the end of the last paragraph to read:
> *"In future Highwall mining blocks outside the study area, additional hole(s) covering a similar area are appropriate, with a similar suite of tests (approximately 20 UCS tests, 10 point load tests, and 5 slake durability tests) of the upper and immediate roof, Carney Seam, and floor."*
>
> This new text, acknowledged by the Brook Mine, indicates that the geotechnical testing to date is satisfactory for this panel and that similar geotechnical testing will be performed to address the concerns of subsidence in areas of potential mining.

3) The Subsidence Control Plan provides for monitoring, and in the event of subsidence, provides plans for reclamation. **The applicant should indicate the specific plan, or best practices implemented to perform subsidence evaluations in the event of unexpected subsidence.**

AAI Response: The best practice is to establish the pre-mining surface topography over the highwall mined area, and perform additional survey(s) if/when subsidence is suspected, or on an annual basis, to detect changes from the baseline topography (i.e. subsidence). There are various combinations of satellite, aerial and drone-based systems to accomplish this; a drone-based photogrammetry system is adequate and likely the most cost-effective.

> **EA Comments on Round 8 Responses:** The text from Addendum MP-6 Round 8 was checked, and in Section MP-6.3 Subsidence Monitoring and Assessment, second paragraph, the first sentence on page MP-6-8 was modified as follows with new text underlined: *"The surface of each individual areas to be highwall mined will be evaluated 6 months prior mining <u>with satellite, aerial, and/or drone-based system</u> to determine if there are pipelines, structures, streams or and other items that could be impacted by potential subsidence due to the highwall mining. Any items found during this evaluation will be inspected and documented as their pre-mining condition."*
>
> This new text, acknowledged by the Brook Mine, indicates that state-of-the-art, or best practices available, will be used to provide a baseline of the pre-mining topographic area.

4) The recommendations for the thickness of leaving coal on both the roof and the floor appear to vary and suggest dependency upon the materials encountered in the floor. An allowance for leaving coal on both the floor and roof seems feasible for the design. **The applicant should, however, make a specific recommendation for the thickness of coal to be left on the roof and the floor.**

AAI Response: The need to leave roof or floor coal is driven by the roof or floor conditions encountered during mining. Under normal conditions, it is expected that the roof and floor will remain stable while the mining machinery is in the hole, even if no roof or floor coal is left. Therefore, our base recommendation is that no roof or floor coal is required to be left. If however small falls of roof material occur during mining, leaving 6 to 12 inches of roof coal should alleviate the problem, based on experience. Similarly, our analyses indicate that the floor should remain stable, with no pillar punching, without leaving floor coal. If however trafficability proves to be an issue, leaving 6 to 12 inches of floor coal should remedy the problem.

> **EA Comments on Round 8 Responses:** The text from Addendum MP-6 Round 8 was checked, and in Section MP-6-1 Highwall Mining Plan, third paragraph, page MP-6-3, the following sentences were added: "No roof or floor coals is left. If small falls of roof material occur during mining, leaving 6 to 12 inches of roof coal should alleviate the problem. If trafficability proves to be an issue, leaving 6 to 12 inches of floor coal should remedy the problem."
>
> This new text clarifies the intent of Brook Mine, of whether and under what conditions coal may be left on the top and bottom of the seam.

3.0 REFERENCES

RAMACO, 2019. Index Sheet for Mine Permit Amendments or Revisions, Broom Mine, TFN 6 2/025, RAMACO, LLC. March 4, 2019, 5pp.

RAMACO, 2019. Addendum MP-6 Subsidence Control Plan, Brook Mine Permit Application, TFN 6 2/025, Volume XI, Mine Plan, March, 2019, 9pp.

State of Wyoming Environmental Quality Council, 2017. Findings of Fact, Conclusions of Law, and Order, Docket 17-4802, In RE Brook Mine Application, TFN 6 2-025, filed September 28, 2017.

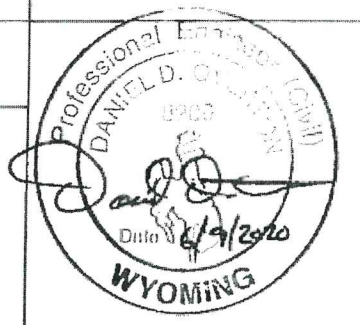
WWC Engineering, 2019. Response to WDEQ-LQD Round 8 Technical Review, Brook Mine Permit to Mine Application, TFN 6 2/025, prepared by WWC Engineering, submitted to Wyoming Department of Environmental Quality.

WWC Engineering, 2019. Mine Plan, Brook Mine Permit Application, Volume XI, February, 2019, 99pp.

Engineering Analytics, Inc. • 1600 Specht Point Rd. • Suite 209 • Fort Collins, CO 80525 • Ph 970.488.3111 • Fax 970.488.3112

Technical Memorandum

To:	Mr. Bjarne Kristiansen, P.G.	From:	Daniel D. Overton, P.E.
Company:	Wyoming Department of Environmental Quality – Land Quality Division	Date:	June 9, 2020
EA No.:	110875		
Re:	Review Response to Public Comments and Informal Conference, Issues Specific to Subsidence, Brook Mine Permit to Mine Application (TFN 6 2/025)		



1.0 INTRODUCTION

Engineering Analytics, Inc. (EA) was tasked by the Wyoming Department of Environmental Quality (DEQ) Land Quality Division (LQD) to provide an evaluation of subsidence-related public comments to the Brook Mine Permit to Mine Application (Permit Application) (TFN 6 2/025) which were received by the DEQ in April 2020, and subsidence-related oral comments provided during the DEQ Brook Mine Informal Conference conducted on May 13, 2020.

1.1 Documents Reviewed

EA has reviewed previous Permit Application submittals as documented in EA memoranda to the DEQ dated June 29, 2018, January 14, 2019, and March 15, 2019 (see References). In addition to the permit documents we have reviewed previously, we reviewed public comments submitted to the DEQ by the following:

1. Shannon Anderson (April 23, 2020). Includes the following as attachments: an Expert Report written by Marino Engineering Associates, Inc. (MEA) regarding mine subsidence, dated April 15, 2020; a Memorandum from Mike Wireman of Granite Ridge Groundwater dated April 16, 2020.
2. James Aksamit (undated).
3. Christine M. Anderson (April 15, 2020).
4. John and Shelley Barbula (April 17, 2020).
5. Bill Bensel regarding Ramaco Brook Mine, dated April 23, 2020.
6. Big Horn Coal Company (April 23, 2020).
7. Anton Bocek (April 5, 2020).
8. John P. Buyok and Vanessa Buyok (April 23, 2020).
9. Wendy Condrat (undated).
10. Louisa Crosby (undated).
11. Mary Brezik-Fisher and David Fisher (April 23, 2020)

Exhibit 4

12. Gillian Malone (undated).
13. Pam Marks (undated).
14. Author unknown (undated).
15. Joan Tellez (April 8, 2020).

We also reviewed public comments provided to the DEQ during the Informal Conference conducted on May 13, 2020. We reviewed the recorded video oral comments provided by Dr. Gennaro Merino of Merino Engineering Associates, Inc. (MEA) and Tim Ross of Agapito Associates, Inc. (AAI).

1.2 Scope of Review

Our review was limited to issues related to potential mine subsidence in the highwall mining area. Our review was also limited to the portion of the proposed mining area currently under permit review. It's our understanding that the current permit review entails a 5-year period and includes the surface mine and panel TR-1 only, as shown on Figure 1. Public comments pertaining to mining in areas outside of this area, including mining of the split Carney Seam, are not addressed in this technical memorandum.

2.0 SUBSIDENCE-RELATED REVIEW COMMENTS

Based on our review of the written public comments, recorded video oral comments, and documents provided to us previously, we provide the following comments.

2.1 Additional Core Holes

It appears that Agapito (AAI, 2018) relied upon the geotechnical parameters from a single core hole (2017-4) for their geotechnical analysis, modeling and subsidence prediction. The location of core hole 2017-4 is shown on Figure 1. Reference is made in AAI (2018) to additional holes which were used to develop the stratigraphic model, but the specific holes used are not referenced, nor are the associated logs provided.

In an earlier phase of the permitting process, the drilling of additional core holes and geotechnical testing was proposed by Ramaco. We reviewed the proposed Sampling and Analysis Plan (SAP) in a previous Technical Memorandum (EA, 2018). The additional sampling and analysis proposed by Ramaco in their SAP was not performed.

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 (Ramaco, 2019a), we note that most of the existing core holes are located well to the west of the TR-1 area. These core hole locations have been overlaid onto the overall mine plan on our Figure 1. We reviewed Cross-Section K-K' on Sheet 14 of Addendum D5-3 Exhibit 2, and 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 (see Figure 1). In our opinion, this distance between core holes is excessive and does not allow an adequate characterization of the TR-1 area. We recommend that

additional core holes be drilled within the TR-1 boundary, especially since this area will be the first area to be highwall mined.

Dr. Marino expresses a similar concern regarding the use of the single core hole in his written report (MEA, 2020) and in his oral comments during the Informal Conference. In bullet #1 on page 4 of his report (MEA, 2020) he states the following:

> *"The one geotechnical boring which was done in the TR-1 area, which is [the] proposed first area to be highwall mined. This boring indicated the roof and floor contains anomalous rock conditions compared to other borings drilled in the application area. Therefore, applying these rock conditions and associated test data to all of the application area or, for the matter, all of TR-1 appears inappropriate."*

It appears from our review that there is some uncertainty regarding the stratigraphy in the area of TR-1. In the fourth paragraph in Section 2.1 on page MP-6-24 of AAI (2018), Agapito discusses the contours of depth of cover, coal seam thickness, etc. shown on Figures 2 through 7 of their report. The paragraph includes the following:

> *"The slope variations seen in the plots seem unusually severe and apparently coincide with the drill holes that were used to construct the contours. It is possible that different series of holes were surveyed and interpreted differently, and the data may contain discrepancies that account for the slope variations. Also, unmapped faults may exist that complicate the seam structure."*

The additional core holes recommended herein should provide additional information regarding the overall stratigraphy, the thickness and extent of the various lithologic units, and the presence of faults that should supplement the applicant's current understanding of the conditions in the proposed highwall mining area.

Furthermore, additional core holes will allow the applicant to better evaluate the strength of the stratigraphic units, in particular the carbonaceous mudstone and mudstone layers which will form the immediate floor of the highwall openings. AAI (2018) describes this material as "weak." AAI (2018) states the following in the first paragraph in Section 2.2.2 on page MP-6-33:

> *"The floor is also composed of carbonaceous mudstone underlain by a weak mudstone."*

In discussing floor stability in the first paragraph in Section 3.4 on page MP-6-38, AAI (2018) states:

> *"The proposed highwall panel pillars are underlain by a thin layer (approximately 2 ft thick) of a weak carbonaceous mudstone (CMS). The laboratory tests (Table 1) indicate a moisture content of 18% for the CMS layer, which tends to weaken such shale-related rocks. Weak floor layers can adversely affect pillar and flor stability as well as the efficiency of mining operations through possible mechanisms of floor heave and pillar punching."*

We reviewed the Rock Mechanics Testing report in Appendix B of AAI (2018). A limited amount of geotechnical testing was performed on the carbonaceous mudstone which will comprise the immediate floor of the highwall openings and pillars. For example, only a single Uniaxial Compressive Strength (UCS) test was conducted for the carbonaceous mudstone (Specimen UCS-16/E). The additional core holes recommended herein should provide additional samples for geotechnical testing which will allow Ramaco and AAI to better evaluate the strength of the stratigraphic units in the proposed highwall mining area, especially the weak units which will comprise the floor.

Determining the sufficient number of core holes to adequately characterize a proposed new underground mining area is somewhat subjective and depends upon many factors. Some researchers have found geostatistical analysis to be useful in determining the maximum spacing between boreholes to adequately characterize coal mine units (Ledvina et al., 1994). We recommend that a geostatistical analysis be performed to determine the adequate number of borings, and that the minimum of two additional core holes be drilled and sampled in the proposed TR-1 highwall mining area. We recommend that the location of the core holes and the associated sampling program be determined by Ramaco in consultation with their geotechnical consultant (AAI) to ensure the data collected meet AAI's needs for modeling and subsidence evaluation.

The data provided from the additional core holes will supplement the currently-available data and allow AAI to refine their analyses and subsidence predictions, and allow Ramaco to revise their Subsidence Control Plan for TR-1 if necessary.

2.2 Geotechnical Testing for Subsidence Evaluation

Samples collected from the additional core holes should include the roof, coal, and floor of the proposed highwall mining area, with special attention paid to the "weak" carbonaceous mudstone and mudstone which will underlie the tunnel openings and pillars. The suite of testing should be similar to that performed by AAI for core hole 2017-4 (including tensile strength, uniaxial compressive strength, axial and diametral point load testing) and any other testing deemed necessary by AAI for a thorough analysis. All testing should be performed in accordance with applicable ASTM standards.

The geotechnical testing should also include testing to evaluate the long-term strength of the roof and floor materials. Dr. Marino expressed concern regarding the long-term strength of the floor layers on pages 7 through 9 and bullet #5 on page 16 of his written report (MEA, 2020), and in his oral comments during the Informal Conference. We recommend that the testing include 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.

The geotechnical data collected from the additional core holes will allow AAI to refine their analyses and subsidence predictions, including the long-term stability of the overall highwall mining area, and allow Ramaco to revise their Subsidence Control Plan for TR-1 if necessary.

2.3 Abandoned Mine Lands Standards

In his oral comments during the Informal Conference on May 13, 2020, Dr. Marino of Merino Engineering Associates, Inc. (MEA) states (at approximately 3:53 in the recorded video oral comments) that the Abandoned Mine Lands standards don't appear to be being applied in the Brook Mine permitting process. He does not specify which standard is not being applied. We reviewed his report (MEA, 2020), and we cannot find reference to a specific standard that is not being applied.

We have previously reviewed the applicable standards, as documented in our Technical Memorandum dated January 24, 2019 (EA, 2019a). Our conclusion is repeated below:

A review of the Department of Environmental Quality (020) regulations related to Land Quality – Coal (0006) of the Wyoming Administrative Code (WAC) were reviewed in regards to subsidence for underground coal mining. Pertinent sections with citations relevant to subsidence include:

- Chapter 1: Authorities and Definitions for Surface Coal Mining Operations (020.0006.1.08272014)
- Chapter 2: Permit Application Requirements (020.0006.2.08272014)
- Chapter 4: Environmental Protection Performance Standards (020.0006.4.12172012)
- Chapter 7: Underground Coal Mining (020.0006.7.04112011)

In general, the Subsidence Control Plan and the Agapito Report appear to provide information requested by the code related to evaluating for the potential of subsidence for the planned underground coal mine. The documents provide geotechnical analyses based on local core, with standard approaches to design for stability with the intent to minimize subsidence, as well as provide for monitoring and remediation in the event of subsidence.

2.4 Applicability of Subsidence Control Plan

The Subsidence Control Plan in Addendum MP-6 dated March 2019 (Ramaco, 2019b) is written in such a way that Ramaco seems to intend it to apply to all proposed highwall mining areas, even areas outside of TR-1 and areas where multiple seams will be mined. The following is stated in the first paragraph in Section MP-6.1 on page MP-6-3:

> *"The majority of highwall mining will be conducted in the two splits of the Carney seam. West of the Carney Seam's split line shown in Figure MP-6.1-1, the highwall mining activity will be concentrated primarily in the Carney lower split due to its greater thickness. East of the split line the two splits merge allowing full seam thickness extraction within the limits of the highwall mining machine. Figure MP-6.1 also shows the additional highwall mining planned in the lower Master's seam."*

The Subsidence Control Plan also first paragraph on page MP-6-8:

> *"Highwall miner holes will be oriented in the same azimuth as the holes in the Carney Seam located directly above. Its pillar dimensions will be sized based on the thicker Carney Seam so that 'pillar stacking' is achieved."*

It must be noted that the Agapito report (AAI, 2020), included in the Subsidence Control Plan as Attachment MP-6-A, evaluated highwall mining in the area of TR-1 only, where the single Carney seam is proposed to be mined. It does not include any analyses of highwall mining outside of the TR-1 area, or areas where multiple seams will be mined, or "pillar stacking." Therefore, it simply does not apply to proposed mining areas other than TR-1. In our opinion, the Subsidence Control Plan should be revised to apply only to the open pit and TR-1 area that is being permitted at this time.

2.5 Web Pillar Stability

AAI (2018) states the following in the fourth paragraph in Section 4.2 on page MP-6-42:

> *"The design charts shown in Figures 9a through 9c are based on the ARMPS recommended web pillar stability factor of 1.6. An additional set of design curves were prepared using a more*

conservative value of 1.8, to further reduce the potential for pillar failure. The charts are included in Appendix C if Ramaco wishes to use the more conservative design."

EA recommends that the applicant indicate which web pillar stability factor (1.6 or 1.8) will be used during highwall mining.

3.0 REFERENCES

Agapito Associates, Inc. (AAI), 2018. *Geotechnical Design and Operational Considerations for Highwall Mining – Brook Mine.* Prepared for Ramaco Carbon. September 13.

Engineering Analytics, Inc. (EA), 2018. Technical Memorandum regarding Review of Brook Mine Subsidence Sampling and Analysis Plan. Prepared for Wyoming Department of Environmental Quality – Land Quality Division. June 28.

Engineering Analytics, Inc. (EA), 2019a. Technical Memorandum regarding Review of Brook Mine Permit to Mine Application Specific to Subsidence: Response to EQC Finding of Facts and Conclusions of Law, WDEQ Comments Round 7, and supplemental Materials. Prepared for Wyoming Department of Environmental Quality – Land Quality Division. January 24.

Engineering Analytics, Inc. (EA), 2019b. Technical Memorandum regarding Review of Round 8 Technical Review response to Comments Specific to Subsidence, Brook Mine Permit to Mine Application (TFN 6 2/025). Prepared for Wyoming Department of Environmental Quality – Land Quality Division. March 15.

Ledvina, C.T., Dowding, C.H., Fowler, S., Hunt, G. and Nance, R., 1994. *Geostatistical Guidance of Exploration in Roof Control – How many Drill Holes are Enough?* Proceedings of the 5th Conference on Ground Control for Midwest U.S. Coal Mines, Collinsville, Illinois, pp. 14-30.

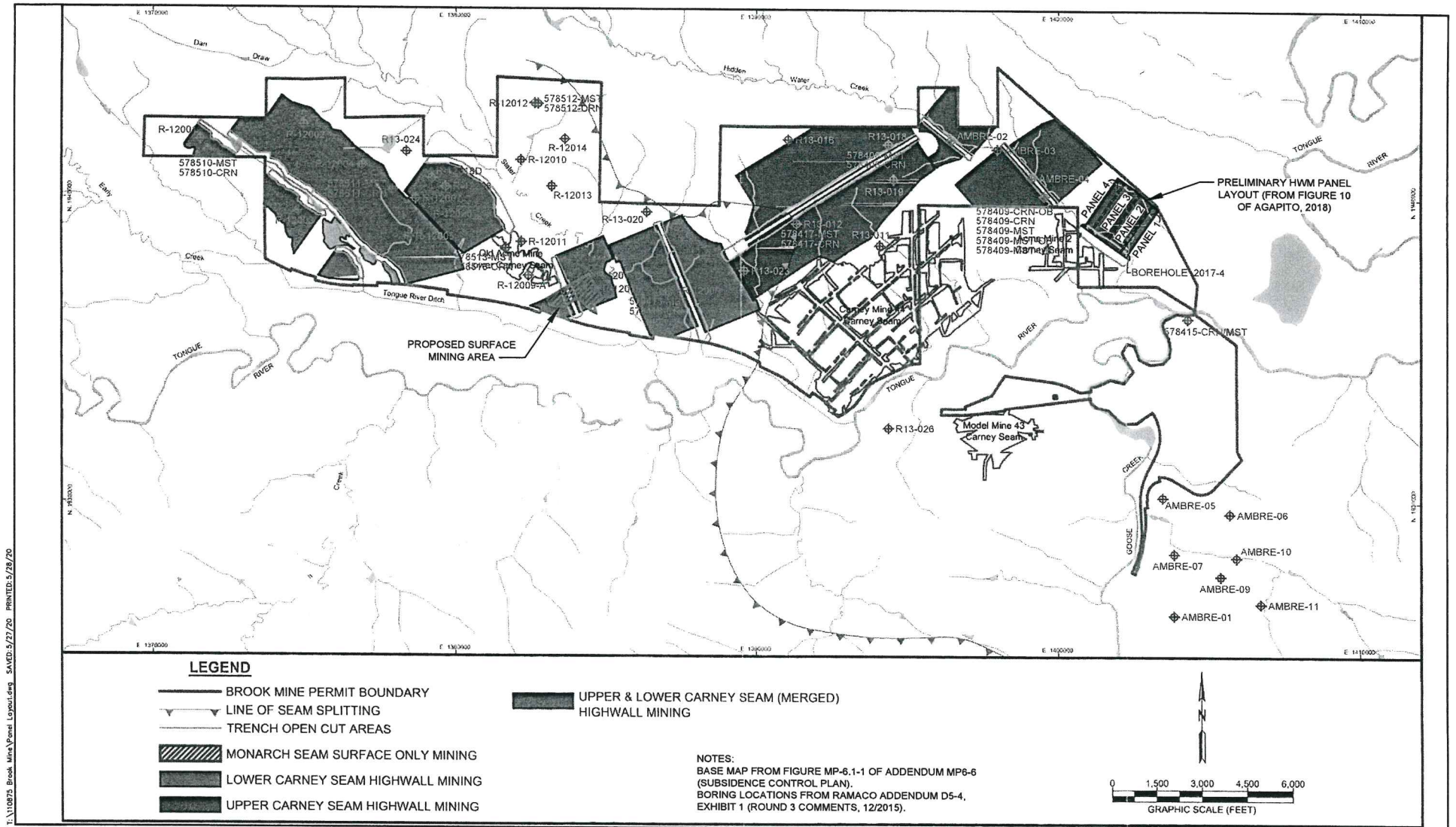
Merino Engineering Associates, Inc. (MEA), 2020. Letter to Ms. Shannon Anderson, Acting Director, Powder River Basin Resource Council regarding Review of Brook Mine Application. April 15.

RAMACO, 2019a. Appendix D5, Topography, Geology and Overburden Assessment, Brook Mine Permit Application TFN 6 2/025. In Volume IV. December.

RAMACO, 2019b. Addendum MP-6, Subsidence Control Plan, Brook Mine Permit Application TFN 6 2/025. In Volume XI, Mine Plan. March.

RAMACO, 2019c. Volume XI, Mine Plan, Brook Mine Permit Application TFN 6 2/025. December.

FIGURE



LEGEND

- BROOK MINE PERMIT BOUNDARY
- LINE OF SEAM SPLITTING
- TRENCH OPEN CUT AREAS
- MONARCH SEAM SURFACE ONLY MINING
- LOWER CARNEY SEAM HIGHWALL MINING
- UPPER CARNEY SEAM HIGHWALL MINING
- UPPER & LOWER CARNEY SEAM (MERGED) HIGHWALL MINING

NOTES:
BASE MAP FROM FIGURE MP-6.1-1 OF ADDENDUM MP6-6 (SUBSIDENCE CONTROL PLAN).
BORING LOCATIONS FROM RAMACO ADDENDUM D5-4, EXHIBIT 1 (ROUND 3 COMMENTS, 12/2015).

N

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GRAPHIC SCALE (FEET)

T:\110875 Brook Mine\Panel Layout.dwg SAVED:5/27/20 PRINTED:5/28/20

Project No. 110875

May 2020

Engineering Analytics, Inc.

FIGURE 1
OVERALL PROPOSED MINING AREA WITH CURRENTLY-PROPOSED HIGHWALL MINING AREA
BROOK MINE, SHERIDAN COUNTY, WYOMING

BEFORE THE ENVIRONMENTAL QUALITY COUNCIL
STATE OF WYOMING

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

AFFIDAVIT OF TODD PARFITT

I, Todd Parfitt, being of lawful age and first duly sworn upon oath, depose and state as follows:

1. I serve as the Director of the Wyoming Department of Environmental Quality ("WDEQ"). I have held this role since November 2012.
2. I am over eighteen years of age and am competent to provide this affidavit. The information contained in this affidavit is based on my personal knowledge.
3. In my role as Director of WDEQ, I supervise the Deputy Director of the WDEQ and the entire staff of WDEQ, including the Land Quality Division (LQD).

4. I have been involved in the Brook Mining Co., LLC coal mine permit PT0841 since the application was filed in 2014 and along with my staff and outside consultants have been overseeing the entire team and all actions that led to my issuance of the permit on July 7, 2020.
5. Prior to approving the Brook permit, the LQD staff and I carefully considered and reviewed all state statutes, rules, and regulations we deemed to apply to the Brook Mine permit application. It is my opinion that the decisions I have made about the Brook Mine permit comply with state and federal law.
6. In the spring of 2020, WDEQ/LQD received public comments on the Brook application.
7. Included in the public comments were matters raised by Dr. Gennaro Marino of Marino Engineering Associates, Inc. in his reports. Dr. Marino was hired by the Powder River Basin Resource Council ("PRBRC") to consult in regard to the Brook Mining permit application.
8. WDEQ/LQD had previously hired Dan Overton, a recognized geotechnical engineering expert, to provide independent expertise and opinion on Brook's subsidence-related permit application submittals.
9. WDEQ also reviewed the report and analysis provided by Brook's consulting experts, Tom Vandergrift and Tim Ross with Agapito Associates, Inc., as well as the public comments submitted in regard to Brook's permit application.
10. During Rounds 8 through 12 of the permit review process, LQD also utilized an internal independent third-party, District II LQD Supervisor, Nancy Williams, to review and provide her opinion as to the completeness and accuracy of the application and compliance with the rules and regulations governing surface coal mines in Wyoming.

11. In addition, WDEQ had the benefit of the oral comments from the informal conference.
12. Following the informal conference, the WDEQ asked Mr. Overton to review all of the written comments on the application, as well as the oral comments and documents provided during the informal conference.
13. WDEQ and Mr. Overton reviewed all expert analysis, all public comments, and all information presented at the May 13, 2020 informal conference, between May 14, 2020, and July 7, 2020, the day the Brook Mine Permit was issued.
14. Brook Mine Permit Conditions 9 and 10 were added to address the input from Mr. Overton, public comments, and the expert analysis of Dr. Marino, the mine engineering expert hired by the PRBRC.
15. Pursuant to the July 7, 2020, permit, Brook is not entitled to mine any highwall mining panel until it has complied with the Conditions 9 and 10, which are incorporated into the approved mining permit.
16. Condition 9 of the permit requires that Brook provide the WDEQ/LQD with the results from geophysical property testing of cores from a minimum of at least three geotechnical core holes for each highwall panel to be mined.
17. Consistent with the comments of Mr. Overton and Dr. Marino, 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.
18. Condition 9 requires that samples be collected from each core hole and must include the roof, coal, and floor samples of the proposed highwall mining panel.

19. Condition 9 requires that for all future core holes, Atterberg limits and consolidated-drained triaxial testing be performed in addition to the testing procedures performed on core hole 2017-4.

20. Condition 9 also requires that the results of the core laboratory testing be reviewed and analyzed by a Wyoming registered professional geologist or engineer. The mine plan and subsidence control plan will then be revised, if necessary, based upon the additional data and analysis.

21. Condition 10 requires that all data and analysis from the geotechnical testing required in Condition 9 be submitted to WDEQ/LQD in the form of non-significant revisions to the mine plan and subsidence control plan. After completion of the additional testing and study, all results must be supplied to WDEQ for WDEQ's consideration and regulatory action.

22. The subsidence control plan incorporated in the permit is complete and accurate and provides appropriate protection for Wyoming and its citizens and the environment and is designed to prevent subsidence and material damage to the surface above any highwall mining panel.

23. WDEQ/LQD possesses the authority under Chapter 13 of LQD's Coal Rules to delineate the format of non-significant revisions and also maintains its complete discretion to determine if a submission is a significant deviation from the approved mine or reclamation plans, which would then trigger public notice and hearing requirements.

24. Brook Mine cannot commence mining in any highwall mining panel until WDEQ/LQD has provided written approval of any corresponding revision.

25. Conditions 9 and 10, along with the application and the permit, create a subsidence control plan that gives Brook and its professional geologist and/or engineer and WDEQ/LQD the ongoing benefit of understanding each panel and the results of testing and analysis and the results of mining before providing Brook the opportunity to begin working any other highwall mining panel. As WDEQ analyzes submissions for each highwall mining panel, in future years, Brook and WDEQ will have access to the knowledge of the physical characteristics present in the mine. This knowledge of the geology, hydrology, and other physical characteristics in the Brook Mine will aid in preventing subsidence during the life of the mine.

26. Notwithstanding Brook's measures to prevent subsidence, Brook is required under Chapter 7, section 2(a) of LQD's Coal Rules to complete full reclamation, including backfilling, grading, and contouring, of any substantial surface disturbance that results from subsidence within five years of Brook's completion of mining.

27. The WDEQ/LQD correctly determined that matters raised by the PRBRC were not deficiencies in the application and set forth a process for the submission of additional information in future years of the permit.

28. The mining permit is a living document directing future actions of the operator and the WDEQ/LQD over the time periods set in the permit.

29. All existing coal mines in Wyoming operate in a manner as mandated by this permit and requests for modification of permits and mining plans for both non-significant revisions and significant revisions throughout the lifetime of the mining permit occur frequently.

30. The permit issued here is consistent with historical practice of WDEQ/LQD in permitting and monitoring coal mines in Wyoming, and all federal and state rules regulations and statutes.

31. In my professional opinion, WDEQ has complied with WEQA which requires that the application be complete and accurate and that the reclamation plan can accomplish what it must.

FURTHER YOUR AFFIANT SAYETH NAUGHT.

DATED this 8th day of October, 2020.

Todd Parfitt

STATE OF Wyoming)
) ss
COUNTY OF Laramie)

Subscribed and sworn to before me by Todd Parfitt this 8th day of October, 2020.

Witness my hand and official seal.

JODY L. PAESSLER - NOTARY PUBLIC
COUNTY OF LARAMIE STATE OF WYOMING
MY COMMISSION EXPIRES JULY 26, 2023

Notary Public

My commission expires: July 26, 2023