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POWDER RIVER BASIN
Resource Council

Via hand-delivery

January 27, 2017

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RECEIVED

Kyle Wendtland, Administrator
Land Quality Division of the Department of Environmental Quality
200 W. 17th Street, Suite 10
Cheyenne, WY 82002

Re: Objections to Brook Mining Co., LLC Coal Mining Permit Application

Dear Mr. Wendtland,

On behalf of the members of the Powder River Basin Resource Council ("Resource Council"), our organization hereby submits these objections to the proposed coal mining permit for Brook Mining Co., LLC ("company" or "applicant") in Sheridan County.

Pursuant to W.S. § 35-11-406(k), the Resource Council requests an informal conference with the Director to discuss our objections and hopefully resolve them to the benefit of our members and the DEQ. We request that such an informal conference be held in Sheridan, the location of the proposed mining operation. Given the complexity of the issues presented, we would be willing to stipulate to hold the informal conference at a period beyond the 20 days provided for under § 406(k) to allow all parties adequate time to prepare. Although the issues are complex, we believe an informal conference will be appropriate to allow the parties an opportunity to resolve some of the objections and to allow local landowners an opportunity to participate in the proceedings.

Organizational Interest in the Coal Mining Permit

The Resource Council is a grassroots, member-based organization that has worked to address the impacts of coal mining on people and the environment since our inception in 1973.

Many of our members work, live, and recreate in Sheridan County adjacent to and on the site of the proposed Brook Mine permit. We have members who live next to the proposed Brook Mine permit boundary that will experience aesthetic impacts, impacts to their property, and impacts to their livelihoods as a result of the mine's proposed operations. We are therefore an "interested person" within the meaning of W.S. § 35-11-406(k).

Given their proximity to the mine's proposed location, some of our members received personal notice of the opportunity to submit objections and will be submitting their own objections. Other members with recreational and aesthetic interests in the area will also be submitting objections. Our organizational objections are intended to supplement, not supplant, the individual objections of our members. However, their own stated objections and interests further support our organizational interest in the proceeding.

Objections and Concerns

1. General Objections to the Mine Plan

The core of any coal mine permit is the mine plan. The mine plan establishes how much coal will be mined in what time period, and it describes the impacts to land, air, and water resources. It establishes the basis for the DEQ or impacted members of the public to enforce the terms of the permit, and the associated reclamation plan as the timing and measures needed in the reclamation plan are based on the mine plan, and if the mine plan is too vague or unrealistic, enforcement will prove problematic in the future.

In the case of the Brook Mine, the mine plan is based on a plan that will never occur. The mine plan estimates annual production at a level that is in direct conflict with statements of the company's representatives explaining the company's plans for the area. And in fact, the company's own statements have contradicted each other.

According to the mine plan, annual coal production will be as follows:

Table MP.1-2. Estimated Annual Production

Year	Production (tons)
1	548,000
2	1,796,000
3	1,890,000
4	2,028,000
5	2,070,000
6-10	9,999,000
11-12	1,941,000
Total	**20,272,000**

Note: [1]Year 0 corresponds to the year 2016
Source: Cardno MM&A, October 2013

However, early statements by the company estimated 6-8 million tons a year of production over 20 years,[1] and this is still the only information available from the company on their website. As such, the mine plan would underestimate the amount of production the company plans (except in years 6-10 where it overestimates), and the mine plan would underestimate the anticipated life of the mine (the mine plan says 12 years but the company's plans anticipate at least 20 years of mining).

Alternatively, more recent statements also contradict the mine plan and show that its estimated production overestimates the amount of production. Now, Ramaco executives are stating that production will be on a "very limited basis" with "no more than a couple hundred

[1] *See* Ramaco, LLC, Brook Mine Overview, Feb. 2015, http://www.ramacollc.com/upload/Brook%20Presentation%20-%20WEBSITE%20February%202015.pdf

thousand tons a year just to get started" and employment of "under 20 people."[2] The company has stated that the coal produced would likely be sold locally.

So which is it? It is clear that the company's plans are in flux and the permit application is merely a placeholder for things yet to come. Our coal mining regulations require more; as described below, they require accurate, complete, and current information detailing anticipated production levels and an accurate, complete, and current estimate of the life of the mine. At the very least, the permit application should have fully disclosed that the company's plans are not finalized and the permit application should have presented a range of anticipated production, or even production level alternatives based on different options of company investment, to allow DEQ to assess the completeness and technical adequacy of the permit application, along with any impacts to land, air, and water resources.

There is also an unresolved conflict between the mine plan and the company's own air quality permit, which limits annual production to 2 million tons per year.[3] DEQ should ensure consistency between these two permits and should require revision of the mine plan to reflect the production limits of the air quality permit.

In other words, the mine plan does not reflect the actual production proposed at the mine site by the company and as a result it does not accurately anticipate impacts to land, air, and water resources. An accurate estimate of production is necessary for members of the public to be able to intelligently comment on the mine plan and proposed permit and for the public to fully understand anticipated impacts. Equally important, an accurate mine plan, with production estimates and limits and corresponding surface and subsurface disturbance projections, is important for DEQ to be able to enforce the conditions of the permit. An accurate mine plan is also necessary for DEQ to accurately verify the reclamation plan and corresponding reclamation bond estimate. Mere guesswork is not sufficient to achieve these objectives.

It is for these reasons that DEQ regulations require information in a permit application to be "current" . . . "accurate and complete." DEQ Land Quality Division Rules and Regulations, Ch. 2 § 1. The mine plan must include "[a] complete operations plan proposed to be conducted during the life of the mine" with an accurate estimate of "the number of acres that will be affected annually" and the "anticipated annual and total production by tonnage." *Id.* at § 5(a)(i).[4] The mine plan at issue here does not contain current, accurate, or complete information and does not meet the requirements of DEQ's regulations.

Additionally, it is clear that Brook Mining Co., LLC and its parent companies, Ramaco, LLC and newly formed Ramaco Resources, Inc. are focused on metallurgical mines in the

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[2] *See* http://trib.com/business/energy/energy-journal-q-a-randall-atkins-ramaco/article_7834a593-c06d-5785-aeea-8f3b5637a337.html (attached)

[3] The air quality permit is mentioned in MP.16.3 but the plan merely states that the permit will be submitted. It does not explain the results of the air quality permit process and restrictions placed upon mining operations. This information should have been updated through the technical review process as the air quality permit review took place before the mine permit went to public notice.

[4] *See also* W.S. § 35-11-406(n)(i). The applicant "has the burden" in meeting these requirements.

Eastern U.S. The company's recent Initial Public Offering ("IPO") is focused exclusively on its Eastern U.S. mines and there is no mention of investment or production at the Brook Mine here in Wyoming.[5] We question whether the company will even put sufficient capital resources into development of the Brook Mine and if not whether the mine plan will fall even further behind its production schedule proposed in the mine plan.[6]

2. Specific Objections to the Mine Plan & Associated Appendices

Coal Storage and Hauling: Section MP.1.5 merely states that "[c]oal will either be temporarily stored in the pit or directly hauled off site." Alternatively, Section MP.2.2 states "The crushed coal will be loaded in the pit and hauled using coal trucks." Reading the two sentences together, it is unclear whether coal will be stored in the pit or hauled immediately. Nevertheless, both sections of the mine plan lack specificity about the exact locations of coal storage and how long coal will be stored and in what amounts. The plan does not even specify how coal will be stored, e.g. in silos or other facilities, or just in stockpiles in the pit. This is important information given that coal is naturally combustible and may create pit fires if not stored correctly, an impact which is particularly concerning given the history of coal fires in the area. It also could create dust that will travel to adjacent lands on windy days, i.e. creating an off-site impact from the mine's operations.

In regards to coal transport, there is no information in the mine plan about the estimated amount of coal truck traffic. Section MP.3.3 states that there will not be conveyer systems so presumably all coal will be transported through trucks. Additionally, there is no information about loadout facilities or direct sale facilities or any other information that explains what will happen to the coal when it leaves the pit. Again, mere speculation about what *could* happen does not provide the level of detail necessary to approve the permit application.

Relationship and Impact to the Big Horn Coal Mine: Section MP.1.9, describing the Brook Mine's relationship and impact on existing structures and adjacent mining operations, does not mention the Big Horn Coal Mine and impacts to that mine or its current or proposed operations.[7] This is a material omission from the permit application. Additionally, we remain concerned about the lack of surface owner consent and support the objections raised by Big Horn

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[5] *See* Ramaco Resources, Inc., Amendment No. 2 to Form S-1 REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933, Jan. 23, 2017 *https://www.sec.gov/Archives/edgar/data/1687187/000119312517014628/d272210ds1a.htm?mkt_tok=eyJpIjoiTW1Oa01HSTJNamt3TXpjNCIsInQiOiJzaWNPQVJRcE5sQ1wvSUZIditcL2t6U253TkZxeEYraHNodUg5WmpWZUNjckVwVmNVYkQ4MWMydGpIWVwvSWpwTFwvZlQzKzA4V0xsQ2hESnpwbzBVUEQwMm5RaTlyQit1cSt6MDdkd044RFM0WndFRUw5eDBlWXo5WG42Z1ZyamhadEIifQ%3D%3D*

[6] Alternatively, if Ramaco's IPO changes the company's ownership or control in regards to the Brook Mine, the permit application will no longer be complete as it will not contain the requirements of Ch. 2 §§ 2(a)(i)(B)-(F). This information is necessary for DEQ to complete an accurate search in the Applicant Violator System prior to permit approval.

[7] Section MP.22 mentions the "dual permitted" area of Big Horn Coal but does not explain the Brook Mine's relationship to the Big Horn Coal mine or anticipated impacts that will result from the cross-over in mine permit boundaries. This section also misrepresents that "Agreement between the permittees are located in the Adjudication File."

Coal (Lighthouse Resources) regarding questions about legal access and rights for the Brook Mine.

This section also neglects to mention other mines in proximity to the Brook Mine, and especially the legacy issues surrounding idle and abandoned coal mining operations and AML activities and remediation. The permit application should explain how new mining operations will interact with and impact legacy mines in the area. While Section MP.15 briefly mentions some of these previous "significant mining activities," the section provides only cursory information without little support or analysis.

DEQ must ensure it is meeting its regulatory requirements that "no permit shall be approved unless the Administrator also finds in writing that . . . [t]he proposed operation will not be inconsistent with other surface coal mining and reclamation operations proposed or contemplated in pending or approved mining permits . . ."

Impact to Conservation Easements and Recreation Access: Section MP.1.9 also states that the mine "will only have marginal impact on existing man-made structures." The section mentions right-of-ways and roads (although it does not discuss any of them in any detail) but does not discuss impacts to conservation easements and recreation access facilities within the permit area.

Impact to Traffic & Road Use: Section MP.1.9 also states that "[i]nterruption to traffic flow will be mitigated through previously formulated plans" but it does not explain what those plans are, who made them or approved them, how local landowners or local government agencies were consulted, and what level of impact will exist after their implementation. Even with mitigation, there will likely be impacts to traffic flow and road use given the number of mine trucks and workers.

Blasting Intensity and Timing: The mine plan does not describe how frequently blasting will occur or in what amounts. Instead, Section MP.4.3.1 merely states "Standard drilling and blasting methods will be used."[8] Our members have concerns about impacts from blasting operations given the mine's close proximity to many homes and ranch structures and it is important for the permit application to contain accurate and complete information about the proposed blasting operations at the mine.

Dewatering: According to the mine plan, the targeted coal seams have "high moisture content."[9] The mine plan should disclose the estimated amount of water that will be removed from the coal seams and the proposed water removal and transport methodologies, i.e. the system of pit sumps and pipes/ditches necessary for dewatering. The mine dewatering plan in Section MP.5.8 is not complete as it does not explain how many pit sumps, dewatering wells, and associated infrastructure will be needed. Instead of including this information upfront as required

[8] The other sections mentioning blasting (including MP.14) do not provide these details either and the "blasting plan" merely provides an example of the public notice that will be provided when blasting will occur. No details are provided that explain how often blasting is anticipated to occur.

[9] This statement conflicts with a later statement at MP-45 that "The Target Coal seams are predominantly dry . . ."

in the permit application, the mine plan says that a dewatering plan will be submitted later on to DEQ detailing this information. MP-40. The plan must also more accurately reflect an estimate of groundwater drawdown.

Surface Disturbance: The mine plan downplays impacts to surface land and water resources because of the nature of the underground mining. However, as explained below, we believe there is a significant risk of subsidence from the mining operations that is not taken into account in describing or mitigating anticipated impacts (or in bonding for their reclamation and remediation).

Impacts to the Tongue River & Goose Creek: As they are important waterways in our county, are frequently used for fishing and recreation purposes, and are an important source of water supply, our members are very concerned about runoff, sedimentation, and other impacts to water quality of the Tongue River and Goose Creek. As the mine plan notes, "the first trench (T-1) will be mined . . . near the confluence of Goose Creek and the Tongue River . . . [and] will be located in surface that drains both to Goose Creek and the Tongue River." MP-41. The mine plan states that "little runoff" will occur but does not specify how much and what that means in terms of impacts to water quality and compliance with the TMDLs for those waterways. More detail is needed to fully evaluate the impacts to Goose Creek and the Tongue River.

Impacts to Other Rivers and Streams: Given that the area is in the Tongue River Valley with numerous tributaries and small streams, there are a variety of waterways that could be impacted by mining activities. Additionally, the area is prone to flooding, especially in high snowmelt runoff years. We are concerned that the sedimentation and runoff control structures identified in the mine plan will not protect impacts from flooding, especially when adding the water from mine dewatering activities. The analyses presented in the application regarding estimation of flood magnitudes and frequencies and volumes of water that will need to be managed (run-off / run-on) during mining operations did not consider extreme precipitation events. Given the occurrence of extreme events in Northeast Wyoming in recent years, it is important to model extreme events.

The mine plan contends that impacts will be "minimal due to the ephemeral nature of the drainages and the short period of time that the trenches will be open" but it does not explain the basis for this conclusion. MP-42. Words like "minimal" "most" and "small" are prevalent in the hydrologic impacts section but rarely are they quantified or justified.

Impacts to Water Rights: Our members are concerned about impacts to ground and surface water rights, and impacts to water wells. The mine plan simply states that "[t]he mine will minimize impacts," but it does not specify the measures that will be taken to minimize the impacts nor does it disclose what impacts are likely to occur as not all impacts will be prevented.

Additionally, there are very large uncertainties associated with the results of the groundwater modeling contained in the hydrology appendices. This is due primarily to the very small amount of site specific hydrologic data and too many simplifying assumptions. These uncertainties mean that there are significant error bars on the estimates of groundwater level

drawdowns in the alluvium and nearby domestic wells that will result from dewatering associated with mining.

Lowering of the groundwater levels (water table or potentiometric surface) could significantly impact groundwater discharge to Slater Creek and the Tongue River which will reduce water available for agriculture. The applicant has not met its burden to ensure compliance with the requirements of W.S. § 35-11-406(n)(v).

Dewatering could also impact nearby water wells in a way not anticipated in the mine plan because of the lack of data and analysis.

There is also no analysis about how subsidence (discussed below) will likely impact surface or underground hydrology and/or impact hydrologic conditions and water rights. One of the main requirements of coal mining operations is to "prevent material damage to the hydrologic balance outside the permit area." W.S. § 35-11-406(n)(iii). The applicant has not met their burden in demonstrating that this condition is met.

3. Objections related to Alluvial Valley Floor Determinations

It is our understanding that DEQ has made a determination regarding at least one alluvial valley floor (AVF) designation in the permit boundary. However, DEQ failed to include that determination in the public notice published on the Brook Mine permit.

Additionally, we question whether DEQ is fulfilling the requirements of its regulations which state:

> For the purposes of alluvial valley floors, prior to determining that an application is suitable for publication in accordance with W.S. § 35-11-406(j) and upon the basis of sufficient information, the Administrator shall make a determination in writing as to the existence and extent of an alluvial valley floor within the permit area or on adjacent areas where the mining operation may affect surface water or groundwater that supply an alluvial valley floor . . .

There are numerous AVFs in the permit area and adjacent areas that must be protected under the Wyoming Environmental Quality Act, SMCRA, and corresponding state and federal regulations. The permit application states that the AVF status of streams in the area "have not yet been declared" by the DEQ. D11-1. There was a DEQ determination made on February 24, 2016 regarding the Slater Creek AVF,[10] but this determination is only for "lands within the proposed permit boundary" and does not include adjacent areas. Moreover, the determination acknowledges that the status of another AVF "is currently pending." The mine permit application should not be approved until the Administrator has made a determination on all potential AVFs within the permit boundary and adjacent areas that could potentially be impacted by proposed mining operations.

[10] Letter from Bjarne Kristiansen (DEQ) to Randall Adkins, Feb. 24, 2016. The letter is attached to these objections.

4. Objections to Baseline Water Monitoring

From our review of the permit application, the water resource monitoring plan is inadequate in several key ways, including, but not limited to:

- Only four surface water monitoring locations were established for background characterization– two on Slater Creek and two on Hidden Water Creek. There are no pump samplers on the Hidden Water Creek locations and therefore there is no water quality data. There are no stations on Tongue River. Water quality sampling stations should be established on the Tongue River upstream and downstream of permit area (within ½ mile of permit boundaries).
- The baseline monitoring period was too short for all four for baseline locations to adequately determine pre-mining conditions with only one month in fall and one summer season.
- The permit application does not include flow data for Slater Creek or Hidden Water Creek from Oct-March (6 months) – because monitoring equipment removed for winter – and therefore it is unknown if any water flows during the Oct-March period.
- The screened intervals in groundwater monitoring wells (Masters, Carney, alluvium) vary by as much as 20 feet, which is too long and results in dilution of groundwater samples.
- Appendix D6 contains very little site specific hydraulic conductivity data. Only one value for each coal seam and only in the eastern part of the mine permit area is presented. There is no site specific hydraulic conductivity data for the alluvial aquifers, overburden or interburden. A single storage co-efficient /specific yield value and a single porosity value was used for the entire formation.
- According to the data presented, the potentiometric surface associated with groundwater in the coal seams in the eastern part of permit area was lowered by 40-80 feet due to CBM operations. However, there is no discussion of how much recharge in the coal seams has occurred since CBM operations have stopped and there is not current data presented.

5. General Objections to the Reclamation Bond

A sufficient reclamation bond is a critical component of any coal mine permit. W.S. § 35-11-406(m)(ix) (requiring denial of a permit application if "[t]he operator is unable to produce the bonds required.") The bond is necessary to protect the public interest and achieve the objectives of the Wyoming Environmental Quality Act and SMCRA.

Based on our review of the reclamation bond estimate, it is too low to protect the public interest.[11] Notably, the bond does not include all required amounts and instead defers some of those calculations to future reviews. However, the required bond must at all times cover the *entire* cost of surface and water reclamation and this bond *must* be posted *prior* to any mining on the site. *See* W.S. § 35-11-416(c)(i) (the bond should equal the "cost of reclaiming the affected

[11] The Resource Council consulted with experts at the Center for Science in Public Participation in developing comments on the reclamation bond amount.

land disturbed" . . . "plus the administrator's estimate of the additional cost to the state of bringing in personnel and equipment should the operator fail or the site be abandoned.").

A sufficient reclamation bond is particularly important here where the applicant has no history of operating mines in Wyoming (or really anywhere in the country). The applicant also lacks the demonstrated financial capacity and solvency to maintain its proposed mining operations.

Guideline 12 is just that – a guideline. It is not notice and comment rulemaking nor does it alter or amend the legal requirements provided for in the Wyoming Environmental Quality Act, SMCRA, and corresponding federal and state regulations.

6. Specific Objections to the Reclamation Bond

Incremental bond: The incremental bond total comes to approximately $583 per acre which is low, even in the earliest phases of mining ($187,318 divided by 321 acres). The mine must ensure that all acres that are proposed to be disturbed are included in the bond at all times. Disturbed areas should be included in a forward-looking manner, and should cover the life of the mine.

While early disturbances will not include mine debris and wastes, the site will still include trench mine activities and associated facilities. These operations still require reclamation and while some elements of reclamation may not be as costly/difficult to reclaim as a more developed mine site, the reclamation costs are still substantial. An important distinction between early and later costs is that early costs are accrued before the mine has started coal production/sales - meaning that the company has no direct income to pay for these expenses. Early costs are borne as the mine's negative cash flow, as compared to later years when actual production income (hopefully) meets or exceeds operational expenses. It is not unreasonable for the company to want to keep-down the costs during the pre-production/pre-profit period but that lack of profit underscores the financial condition of the company and the need to ensure that public resources are protected by a suitable bond.

Monitoring Costs Included in the Bond Calculation: The amount bonded for monitoring should be increased to reflect actual costs at the mine. Monitoring should include the costs for personnel and analysis, maintaining monitoring locations/sites/equipment, and developing new monitoring sites as appropriate. Any "additional cost to the state of bringing in personnel and equipment" should also be included.

Costs to Restore Hydrologic Conditions: The bond fails to include sufficient funds to carry out all operations needed to restore to pre-mine hydrologic conditions within the permit area – and in any offsite areas that are impacted. At a minimum, there must be a thorough analysis of aquifer recharge capacity, what engineering techniques would be used to restore the aquifer to pre-mining capacity and water quality conditions, and what timetable and costs would be involved with such reclamation. The same must be done for surface water, and all associated costs must be included in the reclamation bond.

Miscellaneous Contingency Items: For the following reasons, the contingency is too low.

Independent Reclamation Design. The costs for an independent design firm for final reclamation design should be included. There is no explanation given for why this important amount is not included in the bond estimate. It is reasonable for the bond to reduce this cost based on project size, but the project exists and if there are any disturbances, the cost to design a final reclamation plan should be included at the onset. If an amount is to be estimated, rather than reduce the amount by 100%, it seems appropriate to at a minimum use half, which is the amount by which the security costs were reduced from the Guideline 12 minimum. This would be $125,000, which might still be low but at least ensures that some funds are available for this requirement.

Independent Management of Reclamation. While the bond uses Appendix R's lowest estimated amount of $10,000 (5.5%), this amount fails any reasonableness test of fairly estimating anticipatable costs for an independent firm to manage even minimal reclamation activities.

Monitoring. The $1,873.18 for monitoring is notably low. This is $187/year - as a matter of analytical costs or consultant time (let alone collecting samples) is not sufficient for even one hour of billed time. Table 5 lists groundwater and surface water monitoring sites - and these (if any are to remain) and other sites should be included in the on-site monitoring program. Reclamation costs should also include these items, as per Guideline 12.

Long term administration and accounting. Guideline 12 suggests this amount should be between $315,000-$505,000, which can be reduced based on project size. To reduce this item to $10,000 seems particularly unreasonable given that administration and accounting must happen each year - regardless of size. Rather than reduce the amount by 30-50 times it seems appropriate to at a minimum use half, which is the amount by which the security costs were reduced from the Guideline 12 minimum.

Miscellaneous Contingency. As with all numbers in the financial security calculation, the Miscellaneous Contingency ($184,639) should be revised to reflect all changes made to other portions of the calculations (the category itself is appropriate but the amount is low).

Our recommendations for improving the bond calculations of miscellaneous contingency items to a required amount are as follows:

Recommended Miscellaneous Contingency Estimate for Year 0		
Item	**Cost**	**Comments**
Independent Design Firm	$125,000	Starting year 0 reflecting half of the Guideline 12 amount. The mine proposed a 50% reduction from the Guideline 12 amount for Security and that reduction is adopted/proposed here for Year 0. However, this amount should be adjusted up

		as mine activities progress in year two.
Contractor overhead	$25,287.94	13.5% Guideline 12 amount.
Preconstruction investigation	$2,809.77	1.5% Guideline 12 amount.
Independent management	$25,000	The mine proposed using the lowest amount on the Guideline 12 sliding scale. It is suggested that the minimum amount to retain an independent manager could be at least $25,000, increasing as the mine's impacts increase. For this reason it is recommended that $25,000 be used.
On-site monitoring	$1,873.18	1% Guideline 12 amount.
Site Security	$125,000	The mine proposed this reduction from the Guideline 12 amount of $250,000. This seems reasonable for Year 0, as long as the perimeter of operations is still secured and the amount is increased beyond Year 0 to ensure that it captures mine growth.
Long term administration	$205,000	The mine proposed a 50% reduction from the Guideline 12 amount for Security and that 50% reduction is adopted/proposed here for Year 0. This number is derived by averaging $315,000 and $505,000 ($410,000) and multiplying by 50%. However, this amount should be increased as mine activities progress in year two.
Unknown Costs	$9,365.90	5% from Guideline 12
Total	$519,336.79	

7. Objections to Proposed Post-Mine Use

The Reclamation plan states that:

> As discussed in Appendix Dl, lands within the permit area have been used extensively for industrial purposes primarily mining. Postmine industrial land use may include rock quarries, oil and gas exploration and coal mining. These uses are similar to premining industrial land uses.

RP.2 .1.2.

The mine should not be allowed to leave coal in the ground under disturbed areas. The current economics of mining should not dictate that lands be repeatedly disturbed and reclaimed as this will further damage land resources in the area and further impact the hydrologic balance of aquifer systems and surface water sources. SMCRA's discouragement of "high grading' should prevent this area from being used for designating post-mine land uses as "industrial" for the purposes of future coal mining.

Additionally, the pre-mining land use was not "for industrial purposes" and according to the permit notice from DEQ, "The land, after mining, will be returned to a grazing land use." The reclamation standard and corresponding bond should conform to the post-mining land use as stated in the permit notice. An assumption of industrial use minimizes the reclamation expense to the mine operator, and limits the potential land use for future users.

8. Objections to the Subsidence Control Plan

Attached to these comments is a report prepared by Dr. Gennaro Marino, a Wyoming licensed professional engineer. As the report speaks for itself, we hereby incorporate all findings and analysis contained in the report into these objections.

Main conclusions of the report include:

- The mine subsidence potential investigation provided in the mine application is wholly inadequate and thus renders it impossible to perform an adequate peer review;
- There is a serious risk of surface subsidence from roof collapse in the proposed mining area; and
- Both sag and pit subsidence would be expected at the Brook Mine.

Subsidence "constitutes a public nuisance or endangers the public and safety" of local landowners. W.S. § 35-11-406(m)(vii). It also has implications for whether the "reclamation plan can accomplish reclamation as required." *Id.* at § 406(n)(ii).

9. Failure to Include Information on an Important MSHA Requirement

The Subsidence Control Plan references a Ground Control Plan that is approved by MSHA and is required under 30 C.F.R. § 77.1000. However, no such plan exists. We submitted a Freedom of Information Act (FOIA) request to MSHA requesting a copy of the Ground Control Plan (after learning that DEQ did not have it as part of the permit application and had no intention of reviewing it) and MSHA replied that they could not locate a responsive record.[12]

DEQ land quality regulations require "[a] list identifying the Mine Safety and Health Administration identification number for all mine facilities that require MSHA approval and licenses, permits or approvals needed by the applicant to conduct the proposed operation, whether and when they have been issued, the issuing authority, and the steps to be taken to comply with the requirements" as part of the permit application. Ch. 2 § 2(a)(v).

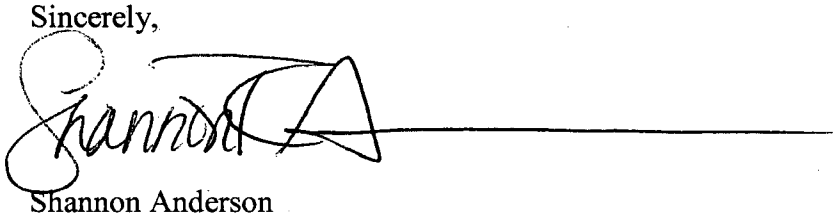
This information appears to be missing from the permit application.

[12] A copy of MSHA's response is attached to these objections.

Conclusion

Thank you for your time and consideration of these objections. We look forward to your scheduling of an informal conference to discuss these objections.

Sincerely,



Shannon Anderson
Staff Attorney

Energy Journal Q&A: Randall Atkins, Ramaco

trib.com/business/energy/energy-journal-q-a-randall-[illegible]/article_[illegible]-8f3b5337a037.html
GREG FLADAGER10/15/2016

Sheridan County may soon see its first new coal mine in 50 years.

On Sept. 28, the Wyoming Environmental Quality Council settled a surface owner dispute involving the proposed Brook Mine and clearing the way for the final permitting process. In the face of a down industry, Ramaco LLC of Kentucky wants to develop some of the most accessible and highest-BTU coal in the Powder River Basin using an uncommon form of mining for Wyoming.

The following are excerpts are of an interview with Ramaco CEO Randall Atkins.

What are your next steps following the EQC decision?

I believe the technical progression is that the EQC sends to the DEQ the ruling, which I guess they are in the process of drafting as we speak. At that point the DEQ issues us a conditional permit, which we then have to publish, and the public has the right to comment on that for a 30-day period, at which point — unless there is a technical deficiency in the permit — the final permit is issued.

What are you looking at as a timeline for opening the mine?

Assuming we get the permit approved — I am going to guess it's going to be before the end of the year, but probably sort of in the middle of the winter — so we would then anticipate trying to initiate our first steps in the mining process next spring.

You're looking at a at least a two-step plan, where you would start relatively small and then expand later. Could you explain that?

I can explain it in part. We will probably start in the spring on a very limited basis, mining some tons, which we will probably market locally on what they call a "stoker coal" basis, and then our plans for the broader use of the property is what we are deferring commenting on until after the permit process is through, but it will be a very interesting nontraditional use of the property.

Can you say a little more about the first part? How many acres, and how many tons?

I would say it will be very limited acreage and tons. I anticipate probably mining no more than a couple hundred thousand tons a year just to get started, and to prove out the basic delineation of the mine plan and property.

Will it be like 350 acres?

Probably less than that. Unlike the mines you're probably more familiar with in the southern Powder River Basin down around Gillette, we are not doing a large open-pit operation.

We would be doing primarily in our first phase "high wall" mining — it is not "long wall," which is an entirely different form. But under high wall mining, all you basically do is dig a reasonably narrow trench, and then you put a high wall miner down into that trench, and do an auger type of mining.

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What kind of equipment will you be using?

There's different types of high wall mining, and you might want to go online and Google Addcar (High Wall Mining System), which is the form of high wall mining that we would probably end up using. Our operating folks are familiar with that particular equipment, and it lends itself well to the type of property that we are mining.

These would be fairly big augers you're talking about?

Basically you dig (a trench), which is probably 15 to 20 feet across and probably several feet high, and then the auger goes in. It is connected to a traditional conveyor belt.

You've got a guy, frankly, with the joystick in a cab directing the auger as it goes in. It can go horizontally probably as much as 2,000 feet. The only other manpower you've probably got is people feeding additional conveyor belts as the auger penetrates further.

How many workers might you have to start, and what are some of the financial aspects at the beginning?

It will be modest to start with. We will probably start with under 20 people, just to come out of the gate, and probably several millions of dollars of equipment, and of course we ramp up.

What do you see as the life of the mine?

We have about 1.1 billion tons of coal. By doing further forms of exploratory drilling we would probably increase that amount. The life of the mine right now we anticipate being 20-25 years, but depending upon the form of marketing, that might be extended, and the amount might be increased.

Do you have experience in this type of mining?

Personally am not a miner; I am more of a coal investment banker by background. However, the gentleman that is in charge of operations is a friend of ours by the name of Ken Woodring, who is our chief operating officer. Ken was the chief former operating officer for Arch Coal. He's the one who helped put in the Black Thunder mine, and has probably put in more mines in the Powder River Basin than any other person around. So the short answer is yes, we do have experience.

Other coal companies are cutting back. What do you see in the market that some of the major coal companies don't see?

That will be made apparent when we announce our plans for the overall project.

You're not letting the cat out of the bag.

I am certainly trying not to.

One more question: How did you come up with the name Brook Mine?

Well to be honest there are several reasons. One is I view the Tongue River as, well, kind of like a large brook; but, perhaps more importantly, I have a daughter named Brook.

6 2/025

Department of Environmental Quality

To protect, conserve, and enhance the quality of Wyoming's environment for the benefit of current and future generations

Matthew H. Mead, Governor

Todd Parfitt, Director

February 24, 2016

Mr. Randall Atkins
c/o WWC Engineering
1849 Terra Ave.
Sheridan, WY 82801

RE: AVF Determination, Brook Mine Coal Mine Permit Application, TFN 6 2/025

Dear Mr. Atkins

The Land Quality Division has evaluated potential Alluvial Valley Floor (AVF) lands within the proposed permit boundary of the Brook Mine. An AVF determination was initiated on September 24, 2015 when a group of LQD personnel visited the proposed mine site for a field evaluation of one drainage, Slater Creek. The entire length of the stream within the permit boundary was walked for evaluation purposes. The geomorphology, vegetation, and hydrology of the drainage was observed. Photos were taken to assist in AVF characterization. Upon completing the field examination of Slater Creek and evaluation of aerial photography, Big Horn Coal Permit 213 AVF assessments, historic geologic maps, available literature, and personal communication within LQD, a determination of the AVF characteristics of the drainage within the Brook Mine proposed permit boundary has been made. The analysis of the potential Slater Creek AVF has determined that 13.11 acres within the Brook Mine Permit Boundary are considered to be AVF and have been declared as such. The declaration statement was crafted as a memorandum to file and placed within the active TFN for the Brook Mine permit application, TFN 6 2/025. The document is available for review at the Sheridan LQD office as well as the LQD office in Cheyenne.

Further determination of the status of AVF potential for Slater Creek one-half mile upstream from the proposed Brook Mine permit boundary is pending. The acreage in question is owned by Mr. Tony Bocek and permission to access his property to complete the AVF determination is required at this time. It is the responsibility of the mine permit applicant to obtain written permission to facilitate the final AVF determination. Upon receipt of written permission for LQD personnel to access Mr. Bocek's property, a field evaluation of the acreage in question will be scheduled. An invitation will be extended to your representative to accompany LQD personnel on the site analysis. LQD will provide the name of the staff member or members who will be present at the field evaluation.

An evaluation of the lands within one-half mile of the proposed Brook Mine permit boundary that may qualify as AVF has concluded. The Hidden Water Creek valley floor is located to the north of the proposed permit boundary as well as within the acreage in the northeastern quadrant of the projected

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(307) 673-9337 · FAX (307) 672-2213

permit. It has been determined that the Hidden Water Creek streambed materials do not qualify as AVF at this time.

The lands south of and adjacent to the Brook Mine submittal, within one-half mile, are located along the valley of the Tongue River. Previous AVF analyses were made for the Big Horn Coal Company (BHC) coal mining permit (No. 213) in 1981 and the Tongue River flood plain was determined to be AVF at that time. This determination covered affected lands downstream from BHC as well as all acreage upstream, terminating at the west section line of section 21, T57N, R84W. The Tongue River bottom lands need to have a field survey for AVF characteristics from that location in section 21 to a distance of approximately four miles upstream of the Interstate 90 Bridge which crosses the Tongue River. The acreage in question is all fee surface ownership and permission to access the properties is required prior to AVF evaluation. Unfortunately, there are 27 owners of record who would need to be approached for permission to trespass. This places AVF determination in a difficult position as it is strongly expected that some of the property owners will not grant LQD access to perform their studies. These positions have been indicated in personal communication to LQD staff by some of the landowners.

Because of this, final declaration of the Tongue River valley as an AVF cannot yet be completed. The acreage within one-half mile of the proposed Brook Mine permit boundary was defined as potential AVF by the Brook Mine permit application, Appendix D-11, Alluvial Valley Floors. This characterization is corroborated by LQD analysis. Because of this, the Tongue River acreage within one-half mile of the southern boundary of the proposed permit is assumed to be AVF at this time.

A tributary of the Tongue River, Goose Creek, is also located within one-half mile of the proposed Brook Mine permit boundary. This was determined to be AVF and was included in the previously mentioned Big Horn Coal mine permit 213. Since the acreage adjacent to Goose Creek has already been declared AVF, no further declaration needs to be made unless the Brook Mine permit boundary is modified in future amendments to include lands south of the present permit application.

This letter serves as notification that Appendix D11, and other relevant sections of the submitted coal mine permit application must be updated to reflect the findings of AVF by LQD. Please contact Bj Kristiansen or Mark Rogaczewski at the LQD District 3 office with questions or comments.

Sincerely,

Bjarne Kristiansen, PG
Natural Resources Program Principal
WDEQ-LQD District III

Cc: Cheyenne LQD files

U.S. Department of Labor

Mine Safety and Health Administration
P.O. Box 25367
Denver, Colorado 80225-0367

Coal Mine Safety and Health
District 9

December 2, 2016

Mr. Shannon R. Anderson
River Basin Resource Council
934 N. Main St.
Sheridan, WY 82801

Re: Freedom of Information Act Request – Tracking No. 819075

Dear Mr. Anderson:

This letter is a final response to your November 22, 2016, Freedom of Information Act (FOIA) request. You requested records pertaining Brook Mining Co., LLC. A copy of your request is enclosed.

We conducted a thorough search for the records you requested but did not locate any record responsive to item 1 of your request. Records responsive to item 2 are enclosed. The fees associated with the processing of this record were minimal therefore, no costs were assessed.

If you need any further assistance or would like to discuss any aspect of your request please do not hesitate to contact Michelle Seider at 202-693-9442 or the DOL FOIA Public Liaison, Thomas Hicks, at 202-693-5427 or by email at hicks.thomas@dol.gov. Alternatively, you may contact the Office of Government Information Services National Archives and Records Administration (OGIS) to inquire about the mediation services they offer. The contact information for OGIS is as follows:

Office of Government Information Services
National Archives and Records Administration
8601 Adelphi Road, College Park, MD 20740-6001
Phone – (202) 741-5770
Toll free – (877) 684-6448
Fax – (202) 741-5769
Email - ogis@nara.gov

If you are not satisfied with the response to this request, you may administratively appeal by writing to the Solicitor of Labor within 90 days from the date of this letter. The appeal must state in writing the grounds for the appeal, and it may include any supporting statements or arguments, but such statements are not required. In order to facilitate processing of the appeal, please include your mailing address and daytime telephone number, as well as a copy of the initial request and copy of this letter. The envelope and letter of the appeal should be clearly marked "Freedom of Information Act Appeal." Any amendment to the appeal must be made in writing and received prior to a decision.

The appeal should be addressed to the Solicitor of Labor, Division of Management and Administrative Legal Services, U.S. Department of Labor, 200 Constitution Avenue, NW, Room N2420, Washington, DC 20210. Appeals may also be submitted by email to foiaappeal@dol.gov. Appeals submitted to any other email address will not be accepted. You may also fax your appeal to: (202) 693-5538.

Sincerely,

Russell Riley
District Manager

SURNAME	DATE
Lemons	5/25/16
Jan	6/7/16
Rennie	6/7/16
RJR	6/9/16

Coal Mine Safety and Health
District 9

JUN - 9 2016

Randall W. Atkins
Chief Executive Officer
Brook Mining Co., LLC
1101 Sugarview Drive
Sheridan, Wyoming 82801

RE: Brook Mine
ID No. 48-01799
Legal Identity Report
Form

Dear Mr. Atkins:

This is to acknowledge receipt of your electronically submitted Legal Identity Report Form 2000-7, signed by Randall Atkins, establishing a new mine ID for Brook Mine. All future correspondence regarding this mine should reference the Federal Mine Identification Number, 48-01799.

When filing your Legal ID Report, be certain that all items are completed, if they are applicable. The Online Filing for Form 2000-7 is located on our website at www.msha.gov.

Under the Mine Health and Safety Information section, The Person at the Mine in Charge of Health and Safety should be the name of the person with whom the District Manager should confer regarding plans. This person will be located at the mine and will most likely be the highest ranking official located there. The Person at Mine in Charge of ALL Health and Safety can be the same person as previously stated but does not have to be the same person. This would be the person with overall responsibility for a health and safety program. The Address of Record can be, but does not have to be, the same person. This person does not have to be located at the mine. This person will receive service of process, if necessary.

The following identifies the contacts for District Management and other necessary numbers:

Russell J. Riley
District Manager

303-231-5458

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Ronnie Free Acting Assistant District Manager/Technical Programs	303-231-5560
Peter Saint Acting Assistant District Manager/Enforcement Programs	303-231-5572
Qualification and Certification	303-231-5472
Fax Machine-District Office	303-231-5553

The enclosure also includes the New Mine Packet. This packet will assist with the reporting requirements of establishing the new mine.

Should our web site not be available to you, or if you have any questions, please contact the District Office at (303) 231-5458.

Sincerely,

Russell J. Riley
District Manager

Enclosure

Bcc: Legal ID
Denver Dust (letter/attach)
FO (letter/attach)
UMF (letter/attach)
USDOL (letter/attach)
DM Files (letter/attach)
D-9 Chron (surname letter)

DATE FWD. 6/9/16
INITIALS MS

EDocument ID: 2281486
EDocument Status: Submitted
Current District: Denver, CO(C0900) Reassign District
Current Assigned Person: Reassign Person

MSIS Document ID:
Show Review History

Submit & Approve | Return To Listing | Reject

Mine ID Request (7000-51)

New Mine Status

Status to create the mine with * NewMine

Status Date * 5/4/2016

Field Office to assign this Mine ID * Gillette WY Field Office - C0904

Qualifying Questions

Type of Operation Coal Mine or Coal Handling Facility

Will this operation change location periodically? No

Mine Information

Operating Company Name Brook Mining Co., LLC Search for similar names

Mailing Address for Document Delivery 1101 Sugarview Drive Sheridan, WY 82801

Mine/Plant Name Brook Mine

Effective Date 05/04/2016

Contact Official

Name Randall W. Atkins
Title Chief Executive Officer
Phone (307) 674-8000
Ext.
Fax
Email Address

Mine Location

Nearest Town Sheridan
State WY
County Sheridan

Submission

Submitted by Jeff Barron on 5/4/2016

LQD

JAN 27 2017

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·ENCOURAGING RESPONSIBLE DEVELOPMENT TODAY ~ FOR TOMORROW

934 N. MAIN ST. SHERIDAN, WY 82801 (307) 672-5809 FAX (307) 672-5800
INFO@POWDERRIVERBASIN.ORG WWW.POWDERRIVERBASIN.ORG

POWDER RIVER BASIN
Resource Council

November 22, 2016

Mine Safety and Health Administration
District 9
P.O. Box 25367
Denver Federal Center
Denver, CO 80225-0367
Submitted via electronic mail to: foiarequest@dol.gov

Re: Freedom of Information Act Request

To whom it may concern:

This is a request made pursuant to the Freedom of Information Act (FOIA), 5 U.S.C. §§ 552, *et seq.* regarding information relevant to MSHA's administration of its coal program. I am a staff member of the Powder River Basin Resource Council ("Resource Council"). The Resource Council is a nonprofit corporation, tax-exempt under Section 501(c)(3) of the Internal Revenue Code, that educates and empowers our organizational members and other Wyoming residents to raise a coherent voice in the decisions that will impact their environment and rural lifestyle.

On behalf of the Resource Council, I request that a copy of the following documents containing the following information, be provided to me:

1) The Ground Control Plan submitted by Brook Mining Co., LLC (or its parent or subsidiary companies, including, but not limited to Ramaco, LLC) to MSHA, as required by 30 C.F.R. § 77.1000 for the proposed Brook Mine in Sheridan County, Wyoming; and

2) Any correspondence between Brook Mining Co., LCC (or its parent or subsidiary companies, including but not limited to Ramaco, LLC) and MSHA regarding the company's proposed Brook Mine.

If the search for responsive records in item 2 is anticipated to take longer than the 20 working day response time under FOIA, please provide the specific record requested in item 1 separately. Please provide all records electronically, if possible.

Request for Fee Waiver

We request a waiver of all fees for this request pursuant to 5 U.S.C. § 552(a)(4) and the Department of Labor's FOIA regulations, 29 C.F.R. § 70.41. The requested records relate to MSHA determinations regarding a proposed coal mine and its oversight functions for public health and safety where coal mining may occur. The requested analysis and correspondence, and the policies and procedures on which they are based, define projects and activities of MSHA or otherwise define the scope of MSHA management coal mine operations and are thus clearly "operations or activities of the government."

Additionally, disclosure of the requested information to our organization is in the public interest because it is likely to contribute significantly to public understanding of the operations or activities of the government. There is a lot of public interest about the proposed Brook Mine. Our organization represents and works with neighboring landowners and other interested citizens who are concerned with the likely impacts of the mining operation. As the Ground Control Plan is not available to the public via the Wyoming Department of Environmental Quality permit application or other sources, any disclosure of this information will significantly improve the public's understanding of the issue.

The information we obtain will contribute significantly to public understanding because it will be disclosed, free of charge, to our members and the public-at-large. We frequently correspond with members of the media, provide public testimony and comments to federal, state, and local agencies, post information on our website, and otherwise disclose information to the public. Additionally, we regularly communicate with our members through individual and group meetings, phone calls, and other correspondence, and through a publication called *Powder River Breaks*, which is published six times a year. *Powder River Breaks* is mailed to all of our members, reporters, libraries throughout the state of Wyoming, agencies, legislators, other interested individuals, and is available on our website. We will disclose any pertinent information we learn through this request via these avenues and others available to us.

As a nonprofit organization, we have no commercial interest in the information. As mentioned above, the requested records will be used for the furtherance of our educational mission to inform the public on matters of importance to the environment and natural resources.

A fee waiver has been granted for similar FOIA requests from our organization in the past.

If a fee waiver is not granted, if our fees are expected to be greater than $50, please obtain my authorization before any such charges are incurred.

If you have any questions or need additional information, please do not hesitate to contact me at (307) 672-5809 or via e-mail at sanderson@powderriverbasin.org Thank you for your consideration of this request.

Sincerely,

/s/ Shannon R. Anderson
Shannon Anderson
River Basin Resource Council
934 N. Main St., Sheridan, WY 82801

cc: Michelle Seider seider.michelle@dol.gov

Ramaco's plan for new coal mine in Sheridan County hits legal roadblock

1 HOUR AGO • BENJAMIN STORROW 307-335-5344, BENJAMIN.STORROW@TRIB.COM

SHERIDAN -- A legal dispute over surface access threatens to derail a Kentucky company's plans to open a new coal mine here, jeopardizing the firm's permit application with the state and casting doubt over what would be the first new mine in Sheridan County in more than 50 years.

Ramaco Wyoming Coal's plans to mine 8 million tons of coal annually from the newly dubbed Brook Mine northwest of Sheridan were greeted with considerable fanfare when the company applied for a state permit last year. Gov Matt Mead called the proposal "a tremendous development for Wyoming's economy," citing a study that found the mine would create 600 jobs and $30 million in annual wages.

But the Lexington-based firm has failed to reach a surface use agreement with a second coal company, Lighthouse Resources Inc., over access to the proposed mine site, court filings show. Ramaco filed a lawsuit in Sheridan District Court in November claiming a 1954 deed to the property gives it the right to mine coal at the site. Big Horn Coal Co., a Lighthouse subsidiary, has sought to block Ramaco's right to access the property, saying it has not consented to the Kentucky firm's development and reclamation plan.

The outcome of the case is pending.

The dispute has thrown the company's permit application to the Wyoming Department of Environmental Quality into limbo. DEQ initially issued Ramaco a letter in November saying its application was complete. But in an April 2 letter, the department said it had identified deficiencies in the application. The letter included comments from the Wyoming Attorney General's office, which noted the company failed to include surface access agreements and consent forms in its application to the DEQ's Land Quality Division. The Attorney General's office requested the company supply documents related to the ongoing court case as well as the necessary surface use agreements.

"The Land Quality Division has determined that this application is deficient and is not yet technically adequate and suitable for publication," the Attorney General's office wrote.

Keith Guille, a DEQ spokesman, said it is not uncommon for the agency to ask for more information during a permit review. Permits are highly technical documents and companies rarely submit all the needed information on first go-around, he said, noting Ramaco has yet to respond to the state's inquiry.

Randall Atkins, Ramaco CEO, did not respond to a request for comment.

The involvement of the Attorney General's office is unusual in a permit review, said Shannon Anderson, a lawyer at the Powder River Basin Resource Council in Sheridan.

"The fact the AG's office is involved shows some pretty big deficiencies and a big controversy Ramaco didn't mention to the agency in their permit application," Anderson said. "Both of these companies have not been transparent with the community on their plans and what they want to do with the property out there."

Sheridan County has a long mining history, but the area has not had any active coal mines since the Big Horn Coal mine closed in the 1980s.

Ramaco's plans for the Brook Mine call for using a technique called highwall mining, where a 12-foot auger is drilled into the side of a coal seam. The process is cheaper than traditional methods because it requires fewer miners and there is no need to remove the topsoil covering the coal.

Plans for the mine come at a time when coal prices are mired in a rut. Supply is outpacing demand, and low natural gas prices have eaten into mining firms' margins, prompting speculation about some companies' ability to stay in business.

Ramaco executives have nonetheless expressed confidence in the Brook Mine.

In a recent interview with the Star-Tribune, Atkins said the mine's low production costs and the high heat content of its coal make the operation viable even at low prices.

"We're contrarians. We've not acquired any of our assets with any idea that we are buying them for a huge price rebound," Atkins said then. "We felt comfortable that (the coal) could be mined at a low enough cost structure that it would be competitive even in today's market."

Lighthouse Resources was formerly Ambre Energy North America. The company, which owns the Decker Mine in Montana and the Black Butte Mine in southwestern Wyoming, changed its name in April. It marks the firm's second rebranding within a year.

Ambre Energy, based in Brisbane, Australia, revealed in regulatory filings last year it had accumulated $32 million in debt since 2013 and was struggling to raise money to finance its operations. The firm's troubles prompted one of its long-time investors, Resource Capital Fund, of Denver, to purchase Ambre's North American assets in December. The new company was initially rechristened Ambre Energy North America before changing its name to Lighthouse Resources.

Lighthouse Resources CEO Everett King did not respond to a request for comment.

The dispute over access to the Brook Mine site centers on a 1954 deed. The deed gives Ramaco the right to the property's mineral estate and Big Horn Coal, the Lighthouse subsidiary, ownership of the surface. Ramaco contends that the deed gives it the right to mine the property while Big Horn Coal argues the document entitles it to review and approve development plans.

Ramaco filed a lawsuit seeking a court judgement to give it the right to mine at the site. The company maintained it has regularly informed Big Horn Coal of its intent to mine the

property since 2011. Big Horn Coal chose not engage Ramaco about its plans, the Kentucky firm claimed.

In January, Sheridan District Court Judge William J. Edelman rejected a motion by Big Horn Coal to dismiss Ramaco's lawsuit.

Big Horn Coal tells a different story about its relationship with Ramaco. The two firms signed an exploratory agreement, which allowed Ramaco to probe the property's potential, Big Horn Coal attorney Lynne Boomgaarden wrote in a letter to the DEQ in March. The agreement ended in 2014. Big Horn Coal has written to Ramaco to express its support for coal mining. But in October 2014, the company sent a letter to Ramaco saying the mining plans did not conform with its own development plans for the property, Boomgaarden said.

In the DEQ's letter to Ramaco, the state also sought a surface use agreement from the Padlock Ranch Co. It is unclear if Padlock and Ramaco have come to an agreement over access to Padlock's surface lands. An attorney representing the ranch did not respond to request for comment.

MARINO ENGINEERING ASSOCIATES, INC.

January 23, 2017

Ms. Shannon Anderson
Acting Director
Powder River Basin Resource Council
934 Main St.
Sheridan, WY 82801

Re: Brook Mine Permit Application

Ms. Anderson,

As you have requested, I have reviewed the mine application for the proposed Brook Mine by Ramaco, LLC. This proposed mining is located about 8.5 miles north of Sheridan, WY (see Figure 1.1). In my evaluation of the Ramaco mine application, I performed a cursory to detailed review of the following documents:

- Mine Plan
    - Addendum MP-1: Alternative Sediment Control Measures
    - Addendum MP-3: Groundwater Model
    - Addendum MP-6: Subsidence Control Plan
    - Addendum MP-7: Blasting Plan Supplemental Materials
- Appendix D2: History
- Appendix D5: Topography, Geology, and Overburden Assessment (Oct. 2014 and Jul. 2015)
    - Addendum D5-1: Drill Hole Tabulations (State Plane Coordinates)
    - Addendum D5-2: Lithologic and Geophysical Logs

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  - Addendum D5-3: Geologic Cross-Sections
  - Addendum D5-4: Isopach Maps
  - Addendum D5-5: Overburden, Roof and Floor Sample Analysis Tables
  - Addendum D5-6: WDEQ/LQD Overburden Sampling Frequency Waiver
  - Addendum D5-7: Soil Analysis Reports
- Appendix D6: Hydrology
  - Addendum D6-1: HEC-HMS Model
  - Addendum D6-2: Miller Regression Analysis
  - Addendum D6-3: HEC-RAS Model
  - Addendum D6-4: Surface Water Hydrographs
  - Addendum D6-7: Monitor Well Completion Data
  - Addendum D6-8: Pumping Test Report
- Appendix D11: Alluvial Valley Floors
- Bond Estimate
- Reclamation Plan
- Effects of Coal Mine Subsidence in the Sheridan, Wyoming Area, USGS Paper 1164 by C. Dunrud and F. Osterwald, 1980
- Technical Report on the Welch Ranch Coal Fire by E. Heffern, J. Queen, and K. Henke, April 28, 2003
- 2014-2019 Sheridan County, WY Multi-Hazard Mitigation Plan
- USDA Soil Survey of Sheridan County Area, Wyoming

SITE TOPOGRAPHY

The topography of the mine site is shown in Figure 1.2. As seen in Figure 1.2, except for the southeastern "leg" of the application area, the proposed mine site is just north of the meandering east-west Tongue River, with the overall ground surface within this application area draining to the Tongue River. The main drainage features trend NW-SE (e.g. Early Creek, E. Fork Early Creek, Slate Creek, and Hidden Water Creek) approximately conjugate to known fault traces. Between each tributary or drainage incision, the surface elevations reach about 3,840 ft. – 4,100 ft., with relief from the valley of typically 150 ft. to 200 ft. The lowest point is shown at about 1,680 ft. El. at the Tongue River whereas the highest point depicted is centrally located near the north limits of the application area at Elevation about 4,100 ft. In the smaller southeastern "leg" of the application area, the ground basically drains west into Goose Creek or to the north into the Tongue River.

GEOLOGIC CONDITIONS

Within the mine application area, the relevant geologic materials are reported to be weathered to unweathered rock and colluvium from mass wasting. These rock beds belong to the Union Fort Formation of Tertiary age with the coal bearing strata in the lower sequences of the Tongue River Member. See Figure 2.1. Below the Tongue River Member is the Lebo Member which regionally consists of mainly clayey shale.

Mineable heights of the site sub-bituminous coal beds are discontinuous across the site. The main seams that will be mined are the Carney and the lower Masters. The Carney

seam splits to the west into the upper and lower Carney benches. This claystone parting is reported to reach a thickness in excess of 30 ft. Where the Carney is vertically continuous, it is stated to be 15 to 20 ft. thick, but when it splits, the upper unit is 2 to 6 ft. thick, and the lower, which typically has better quality, is 4 to 10 ft. thick. The thickness of the underlying Masters, where present, was found to be 4 to 6 ft.

There is also the potential that the overlying Monarch and other more localized coal beds will be mined. It is noted that much of the Monarch seam has been burnt into scoria.

The interburden thickness between the Carney and the Masters has been measured to be from less than 1 ft. at the eastern mine application limit to over 50 ft. As described in the mine application, the vast majority of the coal measures are composed of claystone with fairly localized layers of moderately to well cemented sandstone to siltstone lenses. In other words, the floor of the mineable coal seams is claystone. The Lebo member which underlies the Master Coal measures is described as mudstone.

The application area is known to be faulted. Normal faults are reported which trend NE-SW causing a horst and graben structure across the mine area, the dip of this faulting, or the character of it's broken zone are not known. Based on the surface drainage features conjugate structure may also be present. The dip of the beds in the faulted blocks is reported to be about 2 degrees in the south-southeast direction.

GEOTECHNICAL CONDITIONS

From review of the relevant portions of the permit application, all the reported geotechnical laboratory results for the coal measures in the reserve are summarized in Table 3.1. As can be seen here, there has been scant few rock mechanics testing. And consequently no sense of the important engineering properties and their spatial variations of the relevant coal measures through the reserve can be realistically achieved. The rock mechanics testing should include:

- Moisture content
- Liquid and plastic limits determinations
- Rock durability
- Tensile strength
- Uniaxial compression or Point load strengths
- **Consolidated-drained** triaxial strength
- Swell potential

Furthermore, from a geotechnical engineering standpoint, the rock descriptions for the borings drilled are wholly inadequate. This includes:

- No RQD measurements
- No fracture descriptions – are fissures or slickensides present and at what frequency?
- No to inadequate (uncodified) hardness descriptions
- No codified description of rock classifications

From a geotechnical engineering perspective, there is a severe concern given that the vast majority of the coal measures are described as claystone. Claystone represents very poor mine roof and floor conditions in addition to highwall stability problems. Fine-grained rocks are likely to significantly reduce in strength over time as they swell/soften and deteriorate (Marino and Osouli, 2012). Also, there appears to be mischaracterization as some of the reported claystone as it is described to be fissile, which indicates bedding (not a non-bedded rock).

To properly understand the engineering material nature of fine-grained rocks, sufficient testing of the rock plasticity (Atterberg Limits) and rock durability should be performed (Marino and Osouli, 2012).

MINE PLAN

Ramaco plans to mine with the reserve area mainly in two coal seams. They are the Carney and Masters coals. In the western part of the reserve, the Carney coal seam splits into upper and lower beds. Because these mineable beds are covered, Ramaco plans to create highwalls to expose them by excavating mainly slots or areas by strip mining. Once the mineable seam(s) are exposed, they will be extracted utilizing a remote-controlled continuous miner and conveyor system. An illustration of this proposed highwall operation was provided by Ramaco in Figure 4.1.

The plan showing the areas of proposed mining are depicted in Figure 4.2. This plan shows the blocks of highwall mining and associated strip mining areas. In Figure 4.3,

the delineated coal blocks have been numbered for future reference from 1 to 20 east to west. As noted in the application, Ramaco plans to mine essentially from east to west.

The coal blocks will be mined from benches along the highwall by driving parallel entries into the highwall face apparently perpendicular to the highwall. A remote continuous miner system will be utilized to drive the rooms to depths of up to 2,000 ft. The mining equipment that will be used is an ADDCAR highwall mining system with accuracy of 0.1m in 384m of penetration. However, potentially more significant in determining the actually cut pillar widths is the azimuth accuracy which is not discussed. Using this continuous miner, it is noted that typical extraction heights of 30 in. to 28 ft. can be achieved.

The proposed room and pillar configuration is depicted in Figure 4.4. As can be seen in Figure 4.4, there is no definitive geometry stipulated in the application as much of the identified dimensions are qualified. Using the "typical" web pillar widths and room width, the panel extraction ratio would vary from 59% to 70% in the panels.

Ramaco also states that where multiple coal seams will be mined in a block the pillars will be stacked. With apparently the parallel entries of about the same width, this means the pillar width would be the same for all seams of different thickness. Ramaco states the pillar width will be determined by the seam with the greater thicknesses [MP-6-7].

In order to better understand the ground conditions in the areas of proposed mining, the mining layout given in Figure 4.3 has been superimposed over the various isopach exhibits for the Carney and Masters seams provided in the mine application. These drawings are shown in Figures 4.5 to 4.12. Also, the mine block areas had been delineated on the various geologic cross-sections drawn by Ramaco across the site (see Figure 4.3). The modified cross-sections showing the mine block locations are shown in Figures 4.13 to 4.24. From this reported information, the Dietz, Monarch, Carney, and Masters related conditions per block have been summarized in Table 4.1.

Other considerations are noted below.

- There is no discussion that could be found on reclamation of the mine openings in the highwalls which are left after an area is complete. Depending upon the seal (if any) and dip of the coal, groundwater (and runoff if not sealed) can pool in the entry. Also, if any of these areas are contoured, these entries, as a source of water, can have a detrimental effect of the stability of the reclaimed slope.

- The mine application notes oil and gas wells are present. There is no discussion that could be found on how these wells will be addressed during mining, or how they will be handled if the well is mislocated or was unknown when encountered during mining.

- Ramaco has not addressed the potential for the significant portion of the pillar being composed of claystone from mining in the blind where the coal has significantly variable thickness, or clay parting(s).

MINE STABILITY ANALYSIS

An integral part of assessing the subsidence potential for any proposed coal mining is the determination of whether the coal mine structure will be stable in the short and long term. The mine application, however, provides no calculations of the planned and expected roof, pillar, or floor conditions. In fact, the only governing criteria provided is that "support pillars will be designed to have a width equal to or exceeding the maximum extraction thickness" [MP-6-4]. Ramaco states that this is based on the NIOSH pillar stability program and the recommended stability factor (i.e. safety factor) and that "pillar dimension will also be in accordance with Brook Mine's Ground Control Plan approved by MSHA". Contact with MSHA found that no ground control plan has been filed. They stated that such a plan applies to open pit conditions and thus would not address pillar dimensions (although the NIOSH pillar program manual for highwall mining notes it is part of the MSHA ground control plan). Moreover, approval from MSHA (whose responsibility is safety) is irrelevant as the concern here is land subsidence.

In stating the pillar width to height ratio will be one or greater, none of the input assumptions or output for the pillar dimension criteria have been provided to evaluate how this criterion was arrived at. For example, the assumed coal strength for the

various subbituminous seams (without any substantial test data), assumed coal extraction, and the assumed overburden depth are not known. Also, there is no discussion in the mine application of the effect of multiple seam mining (including overlying or subjacent old works presence) [NISOH ARMPS-HWM]. Moreover, the proposed utilization by Ramaco of the coal tensile strength to assess pillar strength is not standardly done in the industry [D5-10].

There is no governing roof and floor design criteria on what will dictate the barrier and web pillar width and spacing, and panel width to avoid complete overburden instability, based on the variable ground/mining conditions which may be encountered (see Figure 5.1). This is especially problematic given the reported very poor roof and floor consisting mostly of claystone although resistance augmented siltstone and sandstone zones exist there locally (see Figure 4.13 to 4.24).

With the poor identification of the following conditions, it is impossible to obtain a reasonable understanding of the short and long term stability of the proposed mining (or even the slope/highwall). This includes:

- More definitive room-and-pillar layout.

- Sufficient understanding of the engineering properties of the roof, pillar, and floor materials.

- Sufficient understanding of the geologic structure including the nature and orientation (strike and drip) of all faults and shears; and fissure/slickenside concentrations.

An idea of the mine stability conditions can be obtained, however, from the available information. From Table 4.1, mine depths of over 400 ft. are planned with extraction heights reaching 18+ ft. Given the mine depths and planned panel extraction ratios, tributary pillar pressures up to close to 1,300 psi will exist. Even assuming a higher bituminous coal strength at pillar width to heights of one (as proposed), the stability factor calculates to an unacceptable value of less than one at this pillar pressure where the panels are sufficiently wide.[1] This was calculated using the Mark-Bieniawski pillar strength equation, which is the same one used by Ramaco and cited by MSHA. Also, this pillar bearing load will be well in excess of the reported claystone roof and floor (Marino and Bauer, 1989).

Other concerns which have not been addressed but can play a role in the stability of the proposed mine workings include:

- The effect of flooding or pooling of groundwater. Saturation or repeated cycles of wet and dry of the clay roof, pillar (partings) and floor can dramatically effect it's inplace strength, and subsequently causing failure. Inflows of groundwater are

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[1] Note the MSHA criteria for pillar strength were based on pillar heights of 7 ft. or less whereas 18 ft. heights are proposed.

noted by Ramaco from drainage and where aquifers are saturated [MP-45]. Although a 500 ft. coal barrier is planned between the old works and the Brook Mine [MP67-8], there is also the potential that the proposed mining can be inundated from the presence of adjacent old Carney workings that may contain water. This risk is attributed to unmapped workings and unknown geologic structures. Note on Figure MP-6.1-1, the old works are not shown buffered with barrier pillars 500 ft. in width. Moreover, the drainage of pool or flooded old workings can reactivate or cause additional land subsidence in those areas.

- Effect of stacking of pillars on stability with change in interburden thickness; and the accumulated void height and the effect on chimney subsidence.

- As noted in the permit application, a clay parting cuts the Carney seam into upper and lower benches. There is not discussion or analysis of when the parting becomes sufficiently thick to cause pillar instability and consequently resort to mining the upper or lower bench. How the remote continuous miner "blindly" cuts just coal is not discussed.

Although not a mine subsidence concern, there can be serious slope/highwall instability given the extent of claystone throughout the reserve in addition to the evidence of faulting. The proposed benches for support of mining equipment and personnel are also similarly subjected to instability, especially since these claystone areas will tend to collect slope runoff and minewater.

SUBSIDENCE POTENTIAL

The subsidence of the proposed Brook Mine is discussed in the Subsidence Control Plan of the mine application. Subsidence can basically come in the form of pits (sinkholes) and sags. Pits form on the ground surface from the complete collapse of the overburden into a mine entry. Sags are mine subsidence events which are bowl-shaped depressions. They are caused by overburden collapse in the mine entry, a pillar failure, and a bearing failure in the roof or floor. Entry-induced sag events tend to be significantly smaller than those from a pillar or bearing failure. (See MEA Engineering UPDATE Issue 14).

The pit subsidence over the old workings in the mine application area can be seen in the aerial photographs as shown in Figure 7.1 to 7.5. These photographs show areas of more isolated to intense patterns of pit subsidence indicating poor overburden roof conditions. This is consistent with the vast majority of the rock overburden described as claystone without resistant durable interbeds. There also appears to be some subsidence-induced slop instability (i.e. slump features in Area 2, Figure 7.2). The mine depth is estimated to reach up to 160 ft. in visible subsidence areas. Broader subsidence events (i.e. sags) from pillar or pillar bearing failure or mine fire are not noticeable on aerials photographs examined but also are reported in the region.

Ramaco's subsidence analysis treats entry-induced subsidence (i.e. chimney subsidence) by analyzing pit subsidence over the historic Mine No. 44 by utilizing a roof

stoping equation by Dyne, 1998 for a four-way equal width room intersection which is provided below.

$$z = 12/(\pi (k-1)(d_{base}^2 + d_{surf}^2 + d_{base}d_{surf}))(\pi/12t (d_{base}^2 + D^2 + Dd_{base}) - ((D-w)/6 \tan\theta)$$

$$(D^2 \arccos(w/D) = D^2/2 \sin(2\arccos(w/D)) - \pi D^2/4 + w^2))$$

The equation is based on the following variables:

- w = width of mine rooms (ft.)
- t = height of seam (ft.)
- k = bulking factor = V_B/V where V is the initial volume and V_B is the volume of rubble
- θ = angle of repose of caved rock within mine room
- d_{base} = diameter of collapse-chimney at base (ft.)
- d_{surf} = diameter of collapse-chimney at surface (ft.)
- D = diameter of caved rock foot print on mine room floor (ft.)

Ramaco "confirms" that with use of the above relationship that this relationship is representative of the observations of pit subsidence to a depth of 150 ft.[2] by assuming certain parameter values. Ramaco does not, however, use this same stoping relationship which was 'confirmed' based on historic pit subsidence to actually assess

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[2] Using assumed parameter values by Ramaco, z calculates to 124 ft. and 145 ft. for chimney diameters/roof spans of 25 ft. and 20 ft., respectively.

the stoping potential of the proposed mining. It is only stated that the "proposed highwall mining opening widths of 11 to 11.5 ft. are significantly less than" the historic Mine No. 44 [MP-6-7]. When assuming the above chimney subsidence relationship, with intersecting entries were assumed at 11-11.5 ft., as proposed, and considering the same Ramaco assumed parameter values, z (or the stoping depth) becomes 219-227 ft. However, assuming a four-way equal room width intersection, as in the above stoping equation, does not represent any of the actual pit locations as indicated by the mine map.

Considering pit subsidence along entries without intersections, which is more representative of the underlying historic subsidence conditions, and assuming a repose angle of slaked claystone cavein of 20° and the other Ramaco assumptions, a bulk factor of 1.33 is calculated. Under the proposed mining conditions and considering this back-calculated bulking factor, the potential stoping height (or mine depth) becomes about 225 ft. Clearly, with the claystone overburden of limited reported resistant, durable beds, reported Carney thickness of 15-20 ft. (in lieu of the assumed thickness of 14 ft.), and greater mine depths experiencing pit subsidence reaching up to about 160 ft. (see Figures 7.1 to 7.5), there is a serious risk of surface subsidence from roof collapse in the proposed mining. Also, Ramaco does not address the proposed stacking of mine entries (i.e. pillar stacking) effect on the upward chimney propagation. Clearly the accumulated void height could produce greater exposure to land surface subsidence.

Although there is no substantial geotechnical exploration or testing or analyses that were, or could be performed - from our experience with the claystone roof and floor, the proposed mining can result in sag subsidence. Pillar failure can also result in sag subsidence. Calculations and assumptions made by Ramaco to demonstrate that short and long term failure from pillar crushing are not provided. Ramaco asserts that pillars with width to height ratios in excess of one are adequate without any substantial coal strength or clay parting data and further states that an approved MSHA-approved ground control will be obtained. This statement is "putting the cart before the horse" when this is a requirement of the subsidence control plan. Moreover, the ground control that is required by MSHA will likely not include mine stability analysis as highwall mining does not require miner ingress.

SUMMARY AND CONCLUSIONS

As requested by the Powder River Basin Resource Council, MEA has performed a subsidence engineering review of the proposed Brook Mine application submitted by Ramaco, LLC. This investigation primarily consisted of examination and evaluation of pertinent sections of the application to assess the subsidence potential of the proposed plan. The findings from this investigation are provided immediately below, however this report should be read in its entirety to obtain a complete understanding of its contents.

1. The proposed Brook Mine is located about 8.5 miles north of Sheridan, WY. The mine plans to mine primarily two sub-bituminous coal seams. These seams are the Carney and the underlying Masters. The Carney Seam is reported to split in

the western half of the application area into upper and lower beds. The clay parting between the upper and lower beds is said to reach more than 30 ft.

2. The coal will be extracted primarily by highwall mining methods. The highwalls will be created by strip mining slots or areas.

3. Based on the reported data, for the Carney, Masters, and other overlying seams, the mining depth is expected to range from near the surface to about 420 ft. with extraction heights that can range as low as 2.5 ft. and exceed 18 ft.

4. The vast majority of the associated coal measures are described as claystone with isolated interbeds of sandstone/siltstone. These coarser grained interbeds are laterally discontinuous but where present exist up to a thickness of 36 ft.

5. The proposed highwall mining is expected to result in 11-11.5 ft. wide parallel entries up to 2,000 ft. into the highwall face with panel extraction ratios of 60 to 70%. Given this range of extraction and mine depth, tributary pillar pressures up to close to 1,300 psi can be expected.

6. A detailed and advanced subsidence engineering analysis is required given the reported geologic and mining conditions. However, the mine subsidence potential investigation provided in the mine application is wholly inadequate and thus renders it impossible to perform an adequate peer review. Of most particular

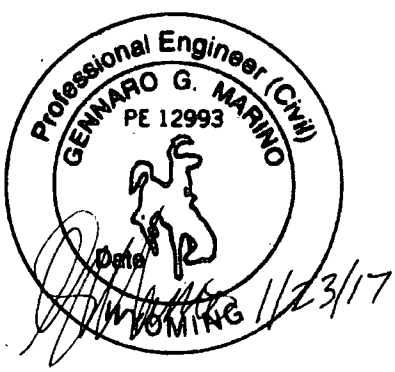
concern is: 1. the lack of codified rock mass classifications, geologic structure, and geotechnical properties of the relevant coal measures; 2. essentially no short and long term mine stability analyses of all potential failure modes that can lead to surface subsidence; and 3. no appropriate examination of risk, severity, and types of potential subsidence.

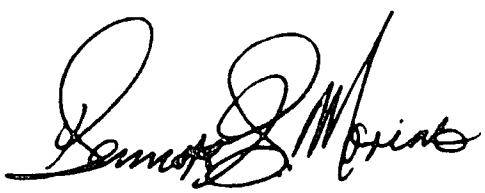
7. Given the pervasive extent of claystone reported above, throughout, and below the proposed mining interval, there is serious concern for short and long term mine instability. There are a number of problematic conditions which are discussed above.

8. There is a massive amount of surface subsidence in the area at mine depths similar to that proposed. Based on the reported data, chimney subsidence analyses, and examination of historic air photos in the area, both sag and pit subsidence would be expected at the Brook Mine.

If you have any questions, please don't hesitate to contact me.

Sincerely,





Gennaro G. Marino, Ph.D., P.E., D.GE
President

Enclosures:

FIGURE 1.1	LOCATION OF PROPOSED MINING
FIGURE 1.2	LOCATION OF MINE APPLICATION AREA FOR THE PROPOSED BROOK MINE SUPERIMPOSED ON QUAD TOPO MAP
FIGURE 2.1	GEOLOGIC COLUMN FOR PROPOSED MINE SITE (SEE P. D5-F4)
FIGURE 4.1	ILLUSTRATION OF PROPOSED HIGHWALL MINING OF COAL VIA STRIP-MINED TRENCH EXCAVATIONS (SEE P. MP-F2)
FIGURE 4.2	PROPOSED MINE PLAN (SEE EXHIBIT MP.15-1)
FIGURE 4.3	PLANNED TRENCH AND COAL BLOCK AREAS WITH FAULTS AND CROSS SECTION LINES
FIGURE 4.4	PROPOSED HIGHWALL MINING ROOM AND PILLAR CONFIGURATION (SEE P. MP-F3)
FIGURE 4.5	CARNEY COAL SEAM OVERBURDEN ISOPACH MAP (UPPER CARNEY WEST OF CARNEY SPLIT) WITH PROPOSED MINE LAYOUT
FIGURE 4.6	CARNEY COAL SEAM THICKNESS ISOPACH EAST OF SEAM SPLIT WITH PROPOSED MINE LAYOUT
FIGURE 4.7	UPPER CARNEY COAL SEAM THICKNESS ISOPACH MAP WEST OF CARNEY SEAM SPLIT WITH PROPOSED MINE LAYOUT
FIGURE 4.8	UPPER AND LOWER CARNEY COAL SEAM INTERBURDEN ISOPACH MAP, WEST OF SEAM SPLIT WITH PROPOSED MINE LAYOUT
FIGURE 4.9	LOWER CARNEY COAL SEAM THICKNESS ISOPACH MAP, WEST OF SEAM SPLIT WITH PROPOSED MINE LAYOUT
FIGURE 4.10	CARNEY AND MASTERS COAL SEAM INTERBURDEN ISOPACH MAP WITH PROPOSED MINE LAYOUT
FIGURE 4.11	MASTERS COAL THICKNESS ISOPACH WITH PROPOSED MINE LAYOUT
FIGURE 4.12	MASTERS COAL BOTTOM ELEVATION ISOPACH WITH PROPOSED MINE LAYOUT

FIGURE 7.1	MINE APPLICATION BOUNDARY AND OUTLINE OF VISIBLE MINE SUBSIDENCE OVER EXISTING UNDERGROUND WORKINGS
FIGURE 7.2	AREA 1 MINE SUBSIDENCE FROM UNDERGROUND MINING OF THE CARNEY NO. 44 MINE. MINE DEPTH IN NOTED SUBSIDENCE AREA RANGED FROM 50 TO 310 FT.
FIGURE 7.3	AREA 2 MINE SUBSIDENCE FROM UNDERGROUND MINING OF THE OLD ACME NUMBER 3 MINE IN THE UPPER CARNEY SEAM. MINE DEPTH IN THE NOTED SUBSIDENCE AREA IS 0 TO ABOUT 75 FT.
FIGURE 7.4	AREA 3 MINE SUBSIDENCE FROM UNDERGROUND MINING OF THE OLD MONARCH MINE IN THE CARNEY SEAM. MINE DEPTH IS APPROXIMATELY 50 TO 360 FT.
FIGURE 7.5	AREA 4 MINE SUBSIDENCE FROM UNDERGROUND MINING OF DIETZ MINES NO. 5 TO 8 IN THE CARNEY SEAM. MINE DEPTH IS NOTED TO BE 230 TO 530 FT.
TABLE 3.1	SUMMARY OF LABORATORY TEST RESULTS ON ROCK MOISTURE, DENSITY, AND BRAZILIAN TENSILE AND UNIAXIAL COMPRESSION STRENGTHS
TABLE 4.1	DIETZ, MONARCH, CARNEY, AND MASTERS RELATED CONDITIONS PER BLOCK

REFERENCES

Dunrud, C. Richard., and Frank W. Osterwald, 1980. Effects of Coal Mine Subsidence in the Sheridan, Wyoming Area. Washington: U.S. Govt. Print. Off.

Dyne, L.A., 1998. The Prediction and Occurrence of Chimney Subsidence in Southwestern Pennsylvania. Virginia Polytechnic Institute and State University, January, 1998.

Marino, G. G., and Bauer, R. A., 1989, Behavior of Abandoned Room and Pillar Mines in Illinois, Int'l Journal of Mining and Geological Engineering, 11 pp.

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FIGURE 1.1 LOCATION OF PROPOSED MINING

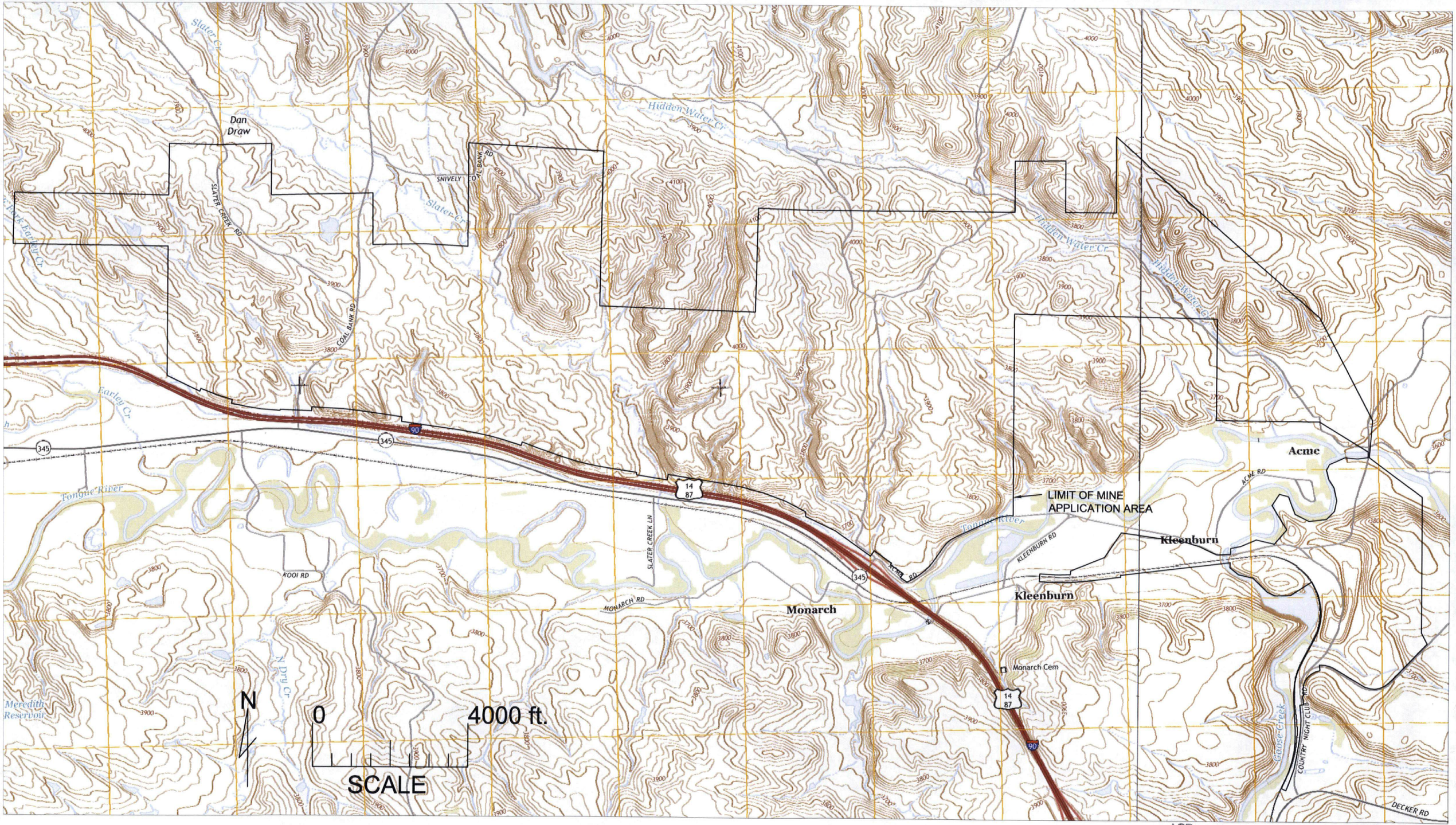

FIGURE 1.2 LOCATION OF MINE APPLICATION AREA FOR THE PROPOSED BROOK MINE SUPERIMPOSED ON QUAD TOPO MAP

Carney lies above the Masters and "generally mark the bottom of the Tongue River Member" p. D5-10

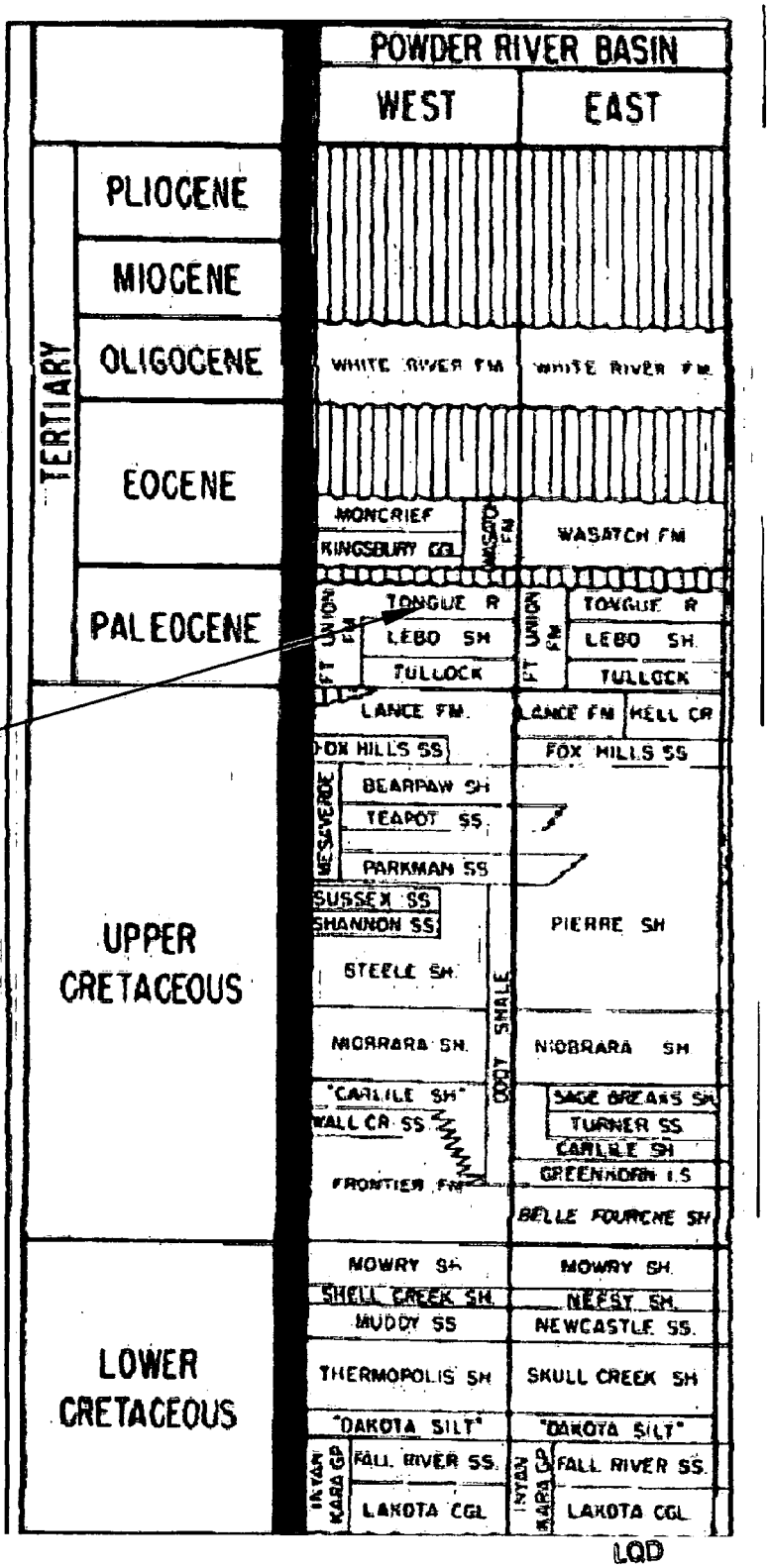

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FIGURE 2.1 GEOLOGIC COLUMN FOR PROPOSED MINE SITE (SEE P.D5-F4)

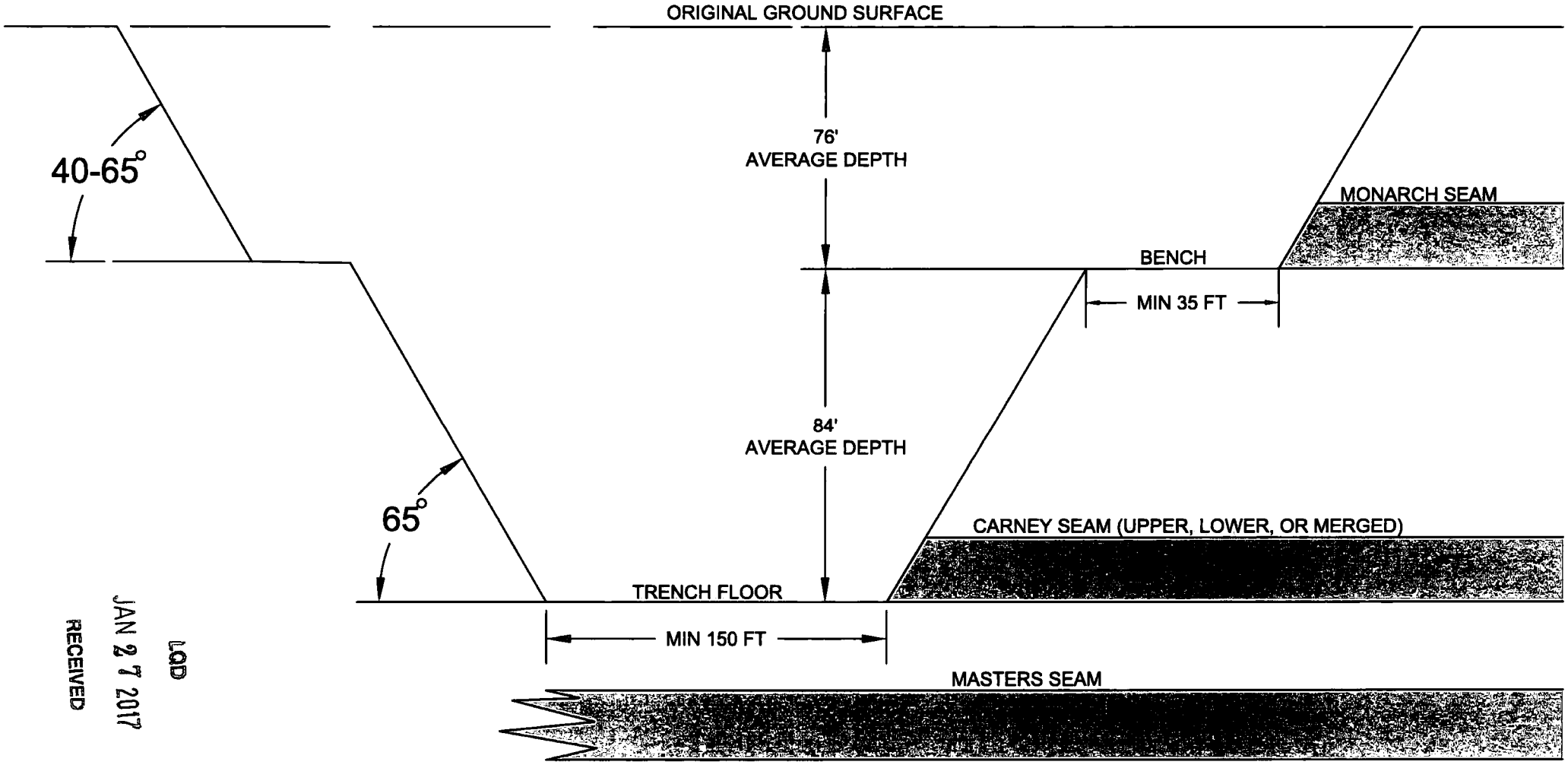


FIGURE 4.1 ILLUSTRATION OF PROPOSED HIGHWALL MINING OF COAL VIA STRIP-MINED TRENCH EXCAVATIONS (SEE P. MP-F2)

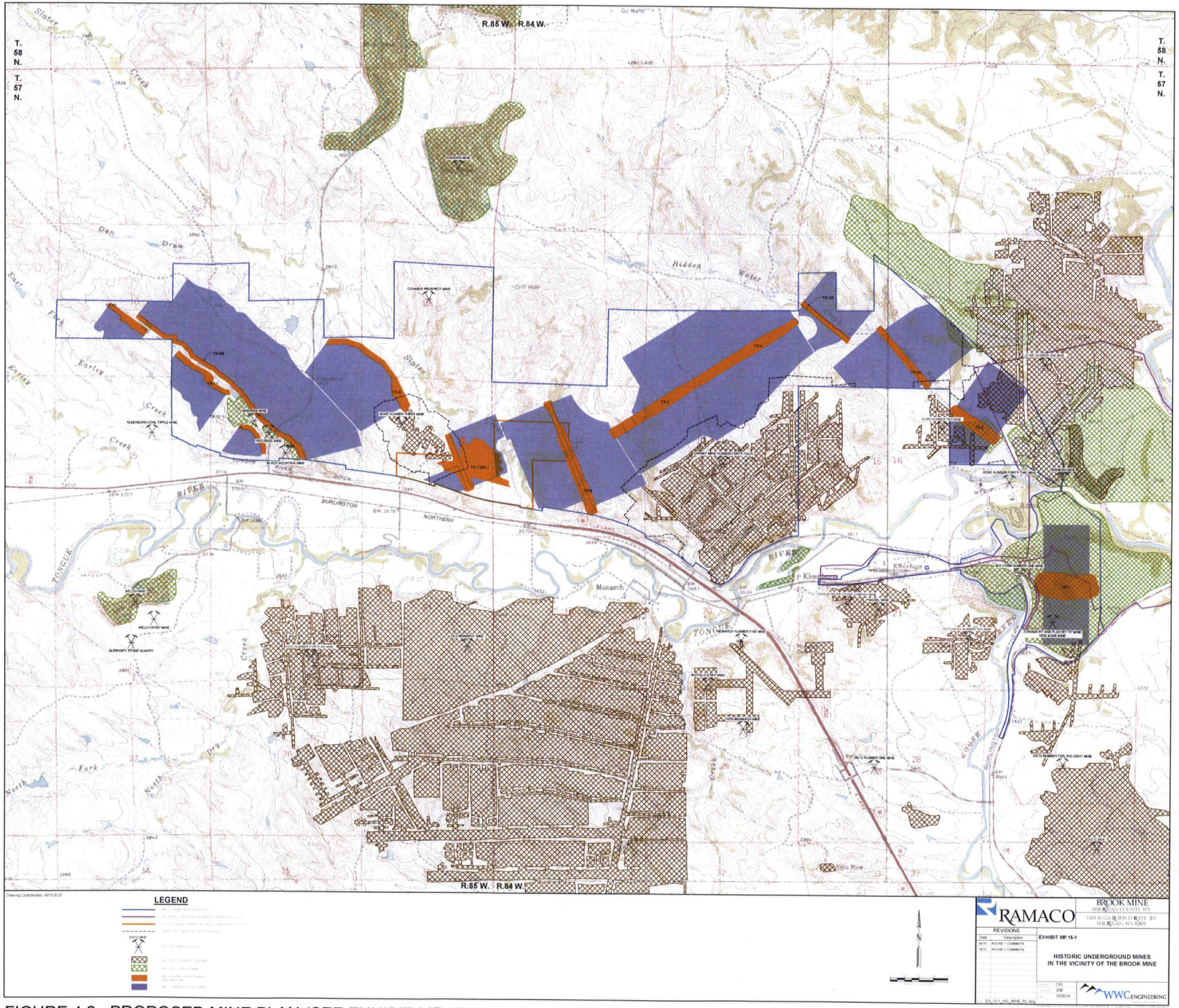


FIGURE 4.2 PROPOSED MINE PLAN (SEE EXHIBIT MP.15-1)

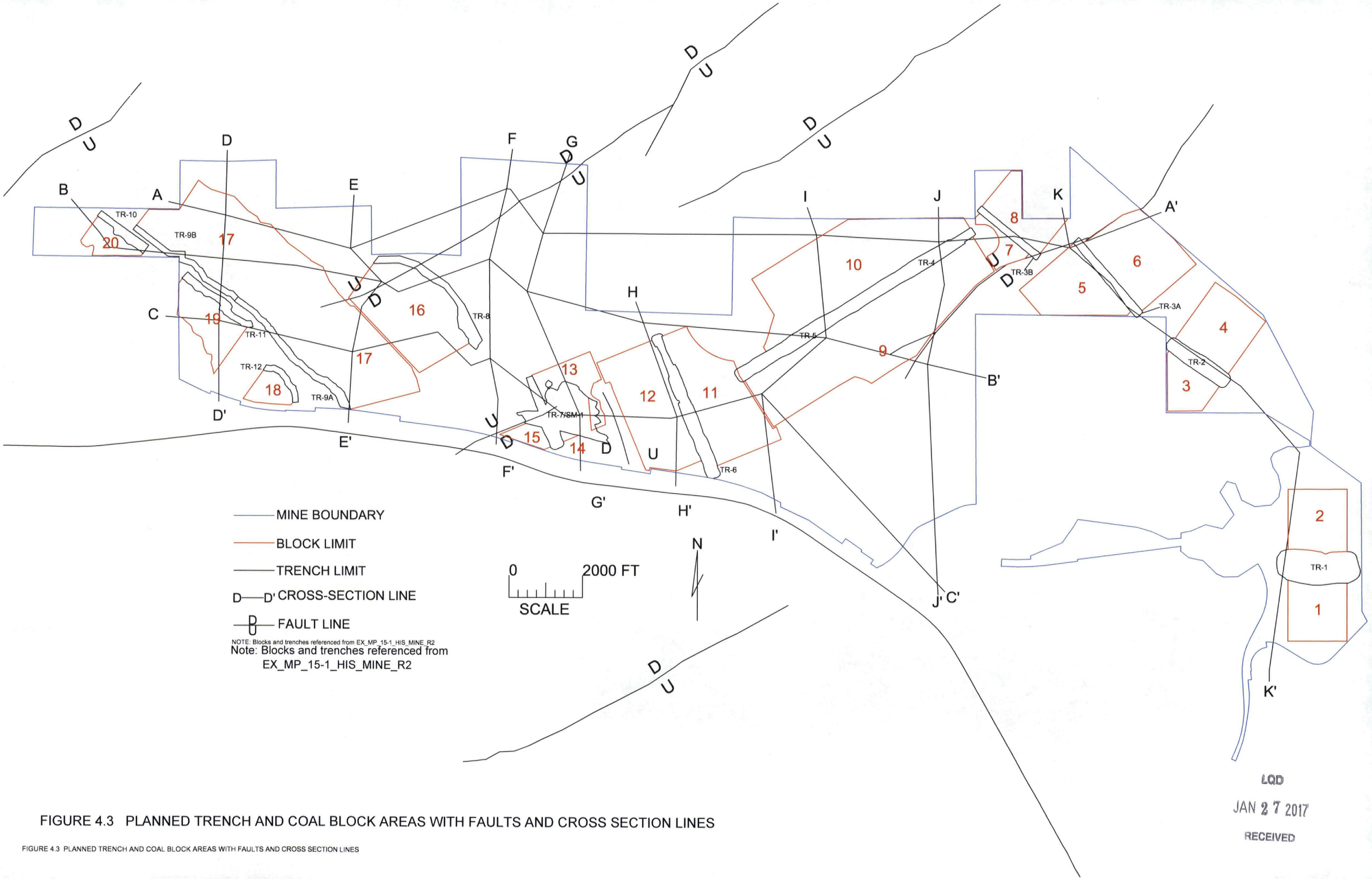
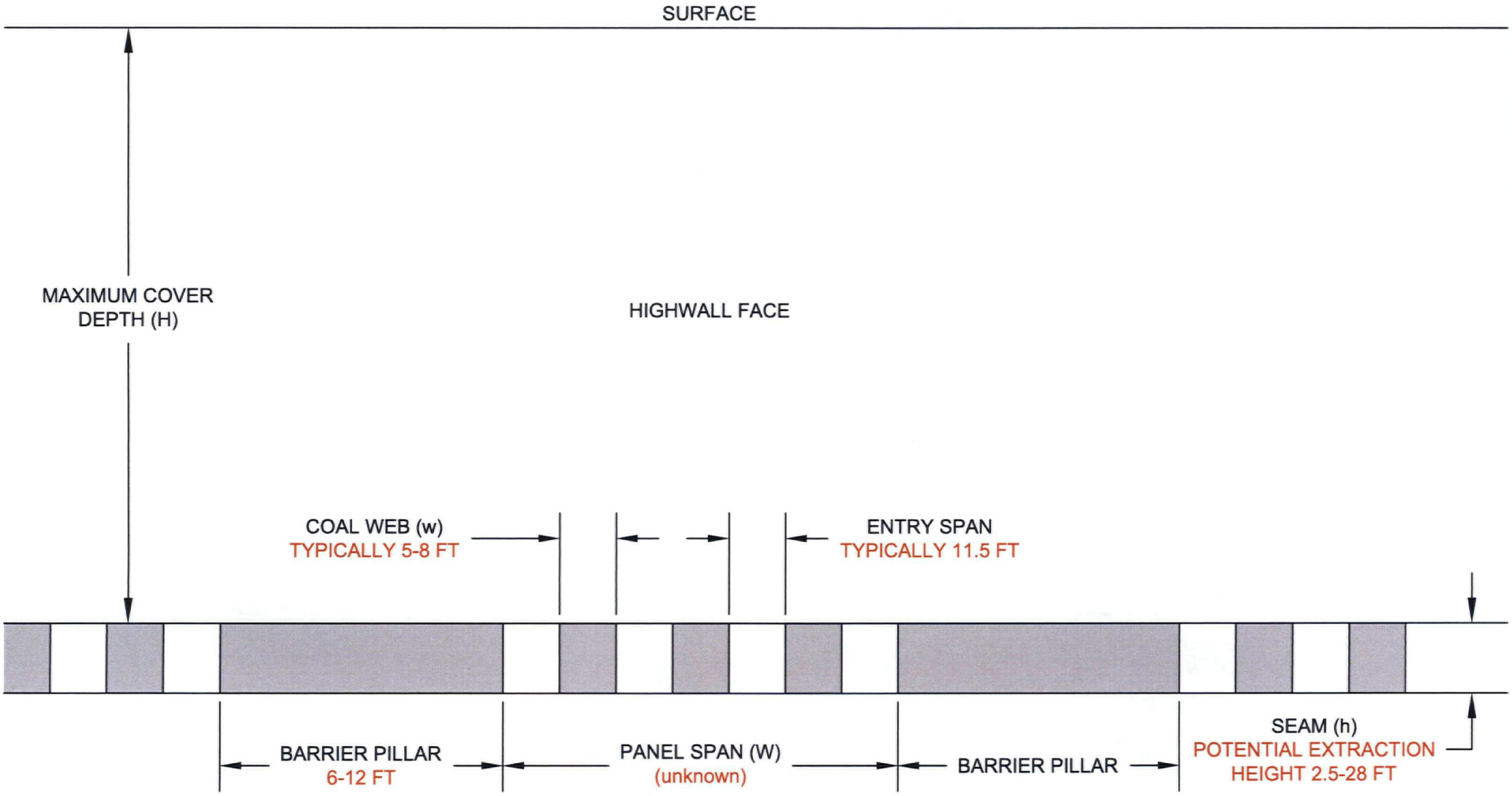


FIGURE 4.3 PLANNED TRENCH AND COAL BLOCK AREAS WITH FAULTS AND CROSS SECTION LINES

FIGURE 4.3 PLANNED TRENCH AND COAL BLOCK AREAS WITH FAULTS AND CROSS SECTION LINES



NOMENCLATURE FOR GUIDELINES - HIGHWALL MINING

NOT TO SCALE

FIGURE 4.4 PROPOSED HIGHWALL MINING AND PILLAR CONFIGURATION (SEE P. MP-F3)

MINE BOUNDARY

BLOCK LIMIT

TRENCH LIMIT

CARNEY SPLIT

CARNEY NO COAL LINE

NOTES:

1) Blocks and trenches referenced from EX_MP_15-1_HIS_MINE_R2
2) Drawing developed from reference Addendum D5-4 Exhibit 1

0 2000 FT

SCALE

N

FIGURE 4.5 CARNEY COAL SEAM OVERBURDEN ISOPACH MAP (UPPER CARNEY WEST OF CARNEY SPLIT) WITH PROPOSED MINE LAYOUT

FIGURE 4.5 CARNEY COAL SEAM OVERBURDEN ISOPACH MAP (UPPER CARNEY WEST OF CARNEY SPLIT) WITH PROPOSED MINE LAYOUT