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Header @ 1

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General Information | [Contact](#) | [Default Values](#) | [Discount](#) | [Document Information](#) | [Clarification Request](#)

Procurement Folder: 1257392

Procurement Type: Central Purchase Order

Vendor ID:

Legal Name: RESPEC COMPANY LLC

Alias/DBA:

Total Bid: \$1,750,000.00

Response Date:

Response Time:

Responded By User ID:

First Name:

Last Name:

Email:

Phone:

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Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Solicitation Response

Proc Folder: 1257392
Solicitation Description: EOI - 2023 AML Contract N2
Proc Type: Central Purchase Order

Solicitation Closes	Solicitation Response	Version
2023-08-29 13:30	SR 0313 ESR08282300000000979	1

VENDOR
VC0000099853
RESPEC COMPANY LLC

Solicitation Number: CEOI 0313 DEP2400000006

Total Bid: 1750000 **Response Date:** 2023-08-28 **Response Time:** 10:38:02

Comments:

FOR INFORMATION CONTACT THE BUYER

Joseph E Hager III
(304) 558-2306
joseph.e.hageriii@wv.gov

Vendor		
Signature X	FEIN#	DATE

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	Bridgeport (Tomes) Landslide				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments:

Extended Description:

Bridgeport (Tomes) Landslide

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	Burl Gould Highwall				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments:

Extended Description:

Burl Gould Highwall

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
3	Burl Gould Landslides				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments:

Extended Description:

Burl Gould Landslides

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
4	Fairmont (Windsor Dr) Subsidence & Highwall				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments:

Extended Description:

Fairmont (Windsor Dr) Subsidence & Highwall

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
5	Falls Run (Abruzzino) DH & DS				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments:

Extended Description:

Falls Run (Abruzzino) DH & DS

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
6	Glade Run Highwall				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments:

Extended Description:

Glade Run Highwall

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
7	Glade Run Landslides				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments:

Extended Description:

Glade Run Landslides

RESPEC



RESPEC

SUBMITTED TO:

DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON STREET EAST
CHARLESTON, WV 25305-0130

SUBMITTED BY:

RESPEC COMPANY, LLC
101 CARRIAGE WAY, SUITE 201
HURRICANE, WV 25526

EXPRESSION OF INTEREST - **2023 AML CONTRACT 2 PROJECT NORTH**

SOLICITATION #: CEOI 0313 DEP2400000006

RSI/P-8888 // DUE AUGUST 29, 2023



August 29, 2023

Joseph E. Hager III
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Dear Mr. Hager,

**RE: Response to Expression of Interest (EOI)—2023 AML Contract N2 CEOI 0313
DEP2400000006 (RSI/P-8888)**

RESPEC Company, LLC (RESPEC) is pleased to submit our Expression of Interest (EOI) in response to the West Virginia Department of Environmental Protection (WVDEP), Division of Land Restoration, Office of Abandoned Mine Lands and Reclamation—published EOI for the 2023 AML Contract 2 Project—North (CEOI 0313 DEP2400000006). This response provides WVDEP with an overview of our general approach to performing and managing the project.

Our team is committed to solving your challenges. Since our founding in 1969, RESPEC has united applied sciences with technology so that clients get cutting-edge outcomes on a variety of projects. Using this approach, RESPEC has grown to be 100 percent employee-owned, with 525 employee-owners across 26 offices. Delivering integrated solutions provides our clients with customized approaches to their projects. RESPEC has successfully completed hundreds of projects in and related to the mining industry, consisting of work across the whole mine life cycle, from prefeasibility to reclamation each year.

RESPEC looks forward to continuing working with the WVDEP on AML projects. We have established a new market sector dedicated completely to reclamation of Abandoned Mined Land (AML). In addition to the work, we are doing in West Virginia, RESPEC continues to be active in the AML program nationally and currently are working on the Horse Creek Reclamation Project, the Rattlesnake Quarry reclamation project, and the Wyoming statewide abandoned mine mapping project.

We also continue to support the mining industry in the State of West Virginia with current ongoing projects for Mettiki Coal, LLC, Greer Industries, and the Friends of Decker Creek. We also continue to support WVDEP through our participation in the permitting Quality Assurance / Quality Control panel and the Special Reclamation Fund Advisory Council. Furthermore, RESPEC has been involved in addressing the liabilities of post 1977 reclamation in West Virginia with diverse projects such as the Buffalo Coal bankruptcy, the F&N Coal bankruptcy, and the Essar – Frasure Creek permit revocation.

RESPEC is eager to continue our work with WVDEP on the Contract N2 project. We understand the importance of addressing the issues on each of the seven sites included in this contract due to our experience on projects with similar problems. We have the experience, knowledge, and

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capability to analyze and address the issues on each site and develop a comprehensive plan to remedy on-site issues.

To offer the full range of AML services to the WVDEP, RESPEC has included the following three subconsultants in its team:

- / Tiff Hilton to assist with acid mine drainage issues
- / GMS Mine Repair & Maintenance's Morgantown office to support construction management services
- / New River Engineering, Inc. of Shrewsbury, West Virginia, to provide surveying services
- / Novel Geo-Environmental, LLC of St. Albans, West Virginia, to provide geotechnical/drilling services

We consistently meet and exceed our clients' needs; our past performances on all AML projects presented in this proposal serve as a reference for our quality of work. RESPEC's project management team for this EOI brings 94 years of combined experience to ensure that all projects included in the contract will be successfully completed.

Thank you for the opportunity to present our qualifications and experience for these services. Please contact John Morgan (telephone: 859.259.0959 or 859.361.8392; email: John.Morgan@respec.com) or Whitney Faulkner (telephone: 773.218.5866; email: Whitney.Faulkner@respec.com) if you have any questions regarding our proposal.

Sincerely,

John S L Morgan
Senior Vice President

Whitney Faulkner, PE
Manager, Reclamation Services

JM:msp
Enclosure
cc: Project Central File 996-8888 — Category B



TABLE OF CONTENTS

Corporate Summary	1
Scope of Work	3
Performance History	13
Relevant Experience	15
Available Resources	46
/ Current Staffing	46
» Organizational Chart	46
» Staff Biographies	49
/ Surveying/Mapping	69
/ Drilling/Geotechnical	70
APPENDIX A. AML Consultant Qualification Questionnaire & AML Related Project Experience Matrix	
APPENDIX B. Résumés	
APPENDIX C. Licenses, Certifications and Degrees	
APPENDIX D. Signed Expression of Interest Form	
APPENDIX E. Designated Contact Form	
APPENDIX F. Addendum Acknowledgment Form	
APPENDIX G. AML Contractor Information Form (AVS)	



CORPORATE SUMMARY

➤ MANAGEMENT SUMMARY/ COMPANY OVERVIEW

We are a team committed to solving your challenges. Since our founding in 1969, RESPEC has united applied sciences with technology so that clients get cutting-edge outcomes. These integrated solutions give our clients more. We serve several markets, and our worldwide clients choose us because they trust us to be their partner and propel them forward with an innovative, clear vision. Our 100 percent employee-owned company, with 525 employee-owners across 26 offices, does just that. In 2022, we generated \$105 million in revenue. No matter the challenge or market, RESPEC finds answers that work.

RESPEC has a diverse set of capabilities and expertise across four business units—Mining & Energy (M&E), Water & Natural Resources (WNR), Infrastructure (INF), and Data & Technology Solutions. This year, RESPEC created a market sector within M&E that works exclusively in the reclamation of abandoned mines. This multidisciplinary team spans multiple states to find intelligent, innovative, and cost-effective solutions for hazards associated with AMLs. As detailed in our project examples, RESPEC has a track record of successfully completing projects of various sizes, from evaluation to construction.



POINT OF CONTACT **WHITNEY FAULKNER, PE**

773.218.5866
Whitney.Faulkner@respec.com



RESPEC AND AML

RESPEC Company, LLC (RESPEC) understands both mining and reclamation and has been involved nationally in the Abandoned Mine Land (AML) program for more than 38 years. RESPEC has completed more than 100 AML projects for state and federal agencies during this period.

INDUSTRIES SERVED



MINING & ENERGY

- » Surface Mine Reclamation
- » Subsidence
- » Feasibility Studies
- » Mine Design
- » Ventilation



WATER & NATURAL RESOURCES

- » AML Reclamation
- » Stream Design
- » Flood Studies
- » Water/Wastewater Treatment
- » NEPA Permitting



INFRASTRUCTURE

- » Geotechnical Evaluation
- » Impoundment Design
- » Waterlines
- » Road Design
- » Slope Stabilization

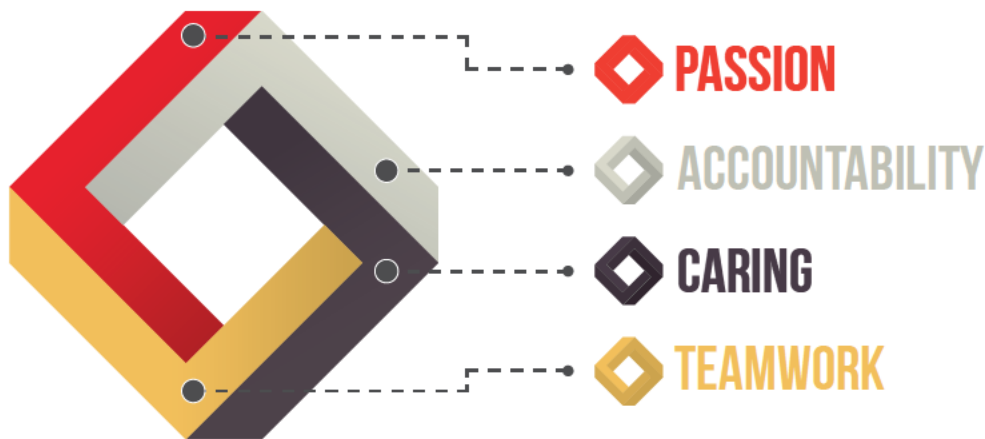


RESPEC is continuing to expand its Mine Closure and Reclamation team—both in West Virginia and nationally—to respond to the new funding for the AML program, thereby allowing RESPEC to support multiple concurrent projects.

➤ RESPEC EMPLOYEES SHARE COMMON VALUES

PASSION. ACCOUNTABILITY. CARING. TEAMWORK.

We call it our RESPEC PACT, and it defines us. It manifests in every interaction that we undertake. We share successes with each other and with our partners. We collaborate, always willing to integrate many perspectives. Most important, RESPEC believes in the value of what we do. RESPEC wants to work with you because we know what you want to accomplish is meaningful.



THE EXPERIENCED AML TEAM

- » Completed AML projects in more than 10 states
- » Involved with the AML program for over 38 years
- » Experience with mine closure for active mines and Asset Retirement Obligation calculations
- » Worked on significant projects in West Virginia for subsidence analysis, water quality treatment, permit review, and reclamation liability estimates
- » Worked with bonding companies to evaluate reclamation liabilities
- » associated with inactive permits
- » Worked with the Office of Surface Mining Reclamation and Enforcement (OSMRE) on major projects including the Stream Protection Rule and the Tennessee Lands Unsuitable petition
- » Retained by the U.S. Department of Justice to evaluate reclamation liabilities of mining operations in Appalachia
- » Awarded OSMRE awards for its AML reclamation projects
- » Focused on safety



UNDERSTANDING OF PROJECT SCOPE

(SCOPE OF WORK)

RESPEC is submitting this proposal in response to the West Virginia Department of Environmental Protection (WVDEP), Division of Land Restoration, Office of Abandoned Mine Lands and Reclamation's Expression of Interest (EOI) for the 2023 AML Contract N2 (CEOI 0313: DEP24*06). This proposal provides an overview of our general approach to performing and managing the project, including the primary objectives, the general approach for each project specification in the EOI, and project-specific understanding and approaches.

➤ PROJECTS AND GOALS

RESPEC will manage each project under this contract with the primary goals of maintaining compliance with state and federal policies and regulations, determining legal land ownership, managing required permits, developing vproject designs and plans, and providing project representation, management, and general oversight. The goals of the projects under this contract are as follows:

- / Maintain compliance with NEPA tasks and the Infrastructure, Investment, and Jobs Act
- / Determine legal ownership of properties and provide legal documentation to substantiate legal ownership findings (if required)
- / Develop construction plans, technical specifications, and engineer's estimate for all aspects to reclaim mine portals, drainage controls and systems, slope stabilization, coal refuse reclamation, stream restoration, highwall reclamation, limits of disturbance, stormwater and erosion and sediment control, regrade and revegetation, and all other conditions encountered on the project sites
- / Obtain/maintain/release all required permits
- / Provide resident project representative, certify quality assurance/quality control (QA/QC), and prepare daily field activity logs summarizing construction activities



➤ PROJECT APPROACH

RESPEC has included a task-specific understanding and general approach for each project included in the EOI. A summary and the general approach for all projects included in the EOI is provided below. The projects under this contract include the following 7 projects in Harrison and Marion counties in West Virginia:

1. Bridgeport (Tomes) Landslide
2. Burl Gould Highwall
3. Burl Gould Landslides
4. Fairmont (Windsor Dr) Subsidence & Highwall
5. Falls Run (Abruzzino) DH & DS
6. Glade Run Highwall
7. Glade Run Landslides

➤ PROJECT TASK SPECIFICATIONS

RESPEC has summarized the general approach and considerations for each project-specific task outlined in the EOI as follows:

/ **Infrastructure Investment Jobs Act (IIJA) compliance**

- » Ensuring compliance to IIJA is important to ensuring the overall success of a project. Proper consideration must be given to ensure all funding is applied properly. RESPEC will ensure all compliance requirements are met through a detailed understanding of IIJA in relation to the WVDEP projects, including but not limited to the Davis-Bacon Act and the Build America, Buy American Act.

/ **Environmental consultations**

- » During the planning phase of a project, RESPEC recognizes the importance of initiating environmental consultations early on to avoid construction delays. We will work diligently to complete all required consultations, including but not limited to the National Environmental Policy Act (NEPA), West Virginia Division of Natural Resources (WVDNR), West Virginia Historic Preservation Office (SHPO), West Virginia Regional Planning consultation, U.S. Forest Service consultations, and U.S. Fish and Wildlife Service (USFWS). RESPEC will coordinate with WVDEP throughout these processes. We will also conduct an Environmental Assessment (EA) for each site and submit it to the Office of Surface Mining & Reclamation Enforcement (OSMRE). To ensure compliance with environmental and public safety requirements, RESPEC will maintain detailed records in coordination with the project owner throughout the project, facilitating timely and efficient completion.

/ Determine legal ownership of properties

- » As part of accessing the project sites, RESPEC will determine the legal ownership of all properties related to the reclamation work in coordination with WVDEP. The identification of the property owners of each affected property will be conducted by research of Property Value Administrator (PVA) records and subsequent verification with deeds in the courthouse if needed. Effective communication will be maintained with property owners by establishing a positive and open relationship in coordination with WVDEP. RESPEC has experience with the consents and clearance task because we perform this task as an integral part of the projects conducted for the Wyoming DEQ/AML. RESPEC recently completed a detailed review of the property ownership and mineral leases for the Jay-Bee Blackrock case. It is recognized that property ownership could vary from large landowning companies to small individual property owners.

/ Exploratory and construction rights of entry

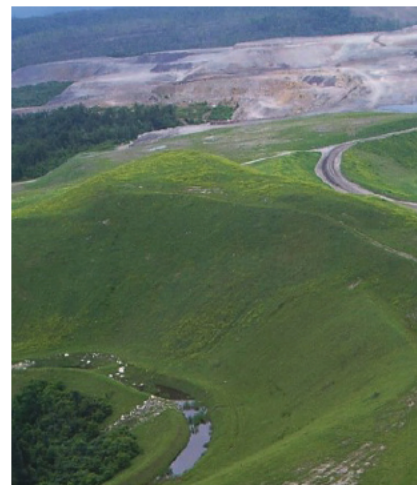
- » RESPEC will obtain exploratory and construction right of entry for each property owner prior to performing activities related to the reclamation work. Effective communication will be maintained with property owners by establishing a positive and open relationship in coordination with WVDEP. Any concerns and issues being raised by the stakeholders will be addressed promptly.

/ Provide legal documentation to substantiate legal ownership findings

- » As part of accessing any project site, RESPEC will document and substantiate the legal ownership of all properties related to the reclamation and construction work in coordination with WVDEP. Documentation of the legal status of the property owner and any lessor will be provided. The need for a title opinion and potentially title insurance will be discussed with WVDEP.

/ Mapping, survey, and related services

- » Using detailed and accurate surveys, mapping, and images in plan development is key to hitting the ground running on any major project. Designs and plans without accurate and up-to-date survey and mapping information are not properly set up for success. RESPEC will use innovative technology to ensure all required survey and map information related to the project designs and plans is collected. Technologies that RESPEC will deploy include the latest land surveying equipment, drones, laser scanners, and borehole deviation tools. One unique and innovative tool owned and operated by RESPEC is the cavity auto laser scanner (C-ALS). The C-ALS can be safely and remotely deployed into underground void areas for a complete analysis of the project site. All surveys will be stamped by a Professional Surveyor in the State of West Virginia for deliverables.



/ Site and geotechnical investigations

- » Site and geotechnical investigations are essential to understanding each site's issues and how to properly mitigate them. RESPEC will perform complete site and geotechnical investigations and analysis as required for each project. These investigations include, but are not limited to, exploratory drilling of mine portals and underground mines, surveying of all drainage features on-site, and water quality and titration testing. RESPEC will attend all site visits required by WVDEP.

/ Engineering

- » RESPEC is committed to fully removing and mitigating any hazards found on-site to protect the safety of private individuals or the public currently present. We will not introduce any new dangers to these sites. All plans will be stamped by a Registered Professional Engineer in the State of West Virginia for deliverables.

/ Obtain, maintain, and release all required permits

- » Proper permitting is essential to ensuring the overall success of a project because it ensures protection for the environment, public safety, and the project owner. Without proper permitting, projects can harm the environment, endanger the public, cause delays, and increase costs. RESPEC will work closely with WVDEP and regulatory agencies to identify and complete all required permitting, as determined at the Pre-Design Meeting. These permits may include a National Pollutant Discharge Elimination System construction stormwater General Permit, West Virginia Department of Highways MM-109 encroach permit, U.S. Army Corps of Engineers (USACE) consultation documents, Department of Health permits, and County permits. RESPEC will establish and maintain the necessary permits in coordination with the project owner throughout the project, ensuring compliance with environmental and public safety requirements in a timely and efficient manner.

/ Design multiple portal seals and regrades

- » As part of reclamation design, the project site and surrounding areas, including portal seals, often require being reclaimed to reflect pre-mining conditions. This usually includes reclaiming the terrain to be regraded to mimic nearby terrain conditions. Proper drainage and slopes will be incorporated in this design to ensure long-term stability and establish a vegetation cover. RESPEC will use historical mappings and surveys of the project regions and updated mappings and surveys to develop a project-specific regrade design and plan incorporating all portal and mine seals



to be approved by WVDEP. Bat assessments will be completed on portals to aid in the reclamation design. The construction of the regrade designs and plans will be managed by RESPEC in coordination with WVDEP.

/ **Design stormwater, sediment, and erosion control**

- » Water management is key to protecting the longevity of reclamation projects. Proper water management and control will ensure that water drainage is not destructive to the overall reclamation designs or processes and that it maintains or exceeds established water quality standards. RESPEC will design and implement drainage channels, underdrains, and other water management and control systems to effectively store or convey water off the reclamation site. Treatment systems, if needed, will be designed to properly treat any source of potential contamination prior to discharge. As needed, streams and channels will be restored. All water conveyed off-site will meet or exceed any established water quality standards.

/ **Slope stabilization**

- » Historical mining projects can leave behind steep and/or unstable slopes, including highwalls, waste piles, slips, and refuse piles. These slopes can be hazardous to the environment and the public if they are not properly stabilized, controlled, and maintained. RESPEC will investigate and review the project locations for potential landslides and provide solutions for stabilizing identified landslide hazards. Slope and landslide stabilization will consist of implementing engineering and design solutions such as removal of material, diversion of surface water, installation of underdrains, slope redesign and regrade, rock and gabion walls, and other ground-support methodologies. During the remediation stage, RESPEC will provide on-site management services to ensure work is completed to meet design requirements.

/ **Design reclamation of exposed coal refuse and mine spoil**

- » A major aspect of the reclamation of historical coal mines is the remediation of exposed coal refuse and mine spoil. These waste piles can have a wide range of effects on the surrounding public and environment. RESPEC will develop regrade and revegetation designs to reclaim these areas to pre-mining activity conditions. This will include effective cleanup and containment of the refuse and spoil in addition to implementation of appropriate water management systems and coverage of exposed waste material.



/ Design subsidence repair

- » The long-term stability of features left from historical mining operations is crucial for public safety around AMLs. A component of this soundness is the surface stability above underground excavations associated with historical mining operations. RESPEC will conduct a geotechnical and stability analysis on each project's active and potential subsidence areas, as required. This analysis will involve reviewing historical mining records and geological and geotechnical conditions at the site. We will use the resulting data to develop designs and plans that promote the project area's long-term stability.

/ Temporary and permanent access or accesses for construction and future maintenance

- » Remote and special access is often required to adequately assess and mitigate hazards associated with AMLs. This access can be both temporary for the term of the project or permanent for future access and maintenance of the site. RESPEC will maintain high safety standards to ensure all personnel, property, and equipment are protected during the assessment and remediation of all areas affected by historical mine operations. This encompasses ensuring safe access for personnel to any area related to mine workings or reclamation such as portals, highwalls, waste dumps, refuse piles, and underground workings. RESPEC will identify the correct property owners and maintain effective communication with property owners by establishing a positive and open relationship in coordination with WVDEP. Site access will only be established if the proper planning, permissions, and permitting have been completed.

/ Regrading and revegetation

- » After mining operations have ceased, the project and surrounding areas must be reclaimed to reflect pre-mining conditions. This typically includes reclaiming the terrain to match nearby terrain conditions and constructing proper drainage and slopes to maintain stability and establish a vegetation cover. RESPEC will use historical mappings and surveys, as well as updated mappings and surveys, to develop a project-specific regrade design and plan, which will be approved by WVDEP. The construction of the regrade designs and plans will be managed by RESPEC in coordination with WVDEP.

/ Construction QA/QC

- » RESPEC's project representative will coordinate and manage QA/QC certification of the construction activities related to the reclamation work on the projects. The QA/QC findings will provide RESPEC and WVDEP personnel with a detailed understanding of the project progress and opportunities for improving and optimizing the work on the project.

/ Resident project representative/inspector

- » Oversight of all in-field work is essential to the overall success of the reclamation projects because it ensures the project remains on schedule and that all work is completed according to the project designs and specifications. RESPEC will provide resident representation while field work is ongoing to provide oversight of the project.

/ Daily construction activity logs summarizing activities

- » RESPEC's project representative will coordinate and manage daily construction activity logs of the activities related to the reclamation work on the projects. RESPEC will compile contractors reports and summarize daily construction activities into daily logs. These logs will provide RESPEC and WVDEP personnel with a detailed understanding of the project progress and opportunities for improving and optimizing the work on the project.

/ Engineering support and services throughout construction

- » Continual communication with WVDEP and contractors with timely technical support is the key to success for this project. This will help ensure that designs and plans are implemented correctly and in a timely and efficient manner. Additionally, engineering support allows the project team to effectively address and manage any unforeseen circumstances. RESPEC's engineering staff will provide regular support and be available as needed throughout the full term of the project to ensure its success.

/ Engineers certification report

- » Engineer certification of designs and plans provides long-term verification and assurance in the confidence and effectiveness of the designs and plans. This is a key aspect of the WVDEP projects in ensuring the protection of RESPEC, WVDEP, the public, and the environment. RESPEC will include project engineers certified in the state of West Virginia on all WVDEP projects under this contract. Proper engineering certification for project completion, along with the final report, will be provided to WVDEP.

» RESPEC PROJECT MANAGEMENT APPROACH

RESPEC has a team of experienced West Virginia Professional Engineers who are well-equipped to serve as project managers for AML and permitting projects or projects with similar requirements. Each has a history of successfully managing projects of varying complexity, size, and budget. They excel in coordinating technical staff and contractors; maintaining communication between the design team, the client, and stakeholders; managing conflict; and overseeing the financial aspects of the project. Through frequent communication, detailed budget tracking, and diligent task scheduling and reporting, the project manager ensures the successful completion of projects that exceed client expectations.

The project manager's responsibilities will include the following, at a minimum:

- /** Direct project team activities to achieve strategic goals and objectives
- /** Assign work tasks and deadlines to key project team personnel
- /** Provide open communication between WVDEP and the project team
- /** Coordinate project team meetings, reporting, and documentation

- / Ensure that project schedule and budget compliance are met
- / Encourage participation by stakeholders to avoid conflicts and prevent project interruptions
- / Coordinate all of the investigation and/or pre-design activities with the affected owners early in the project to avoid costly conflicts with current and future interests
- / Ensure that all work is completed safely throughout all phases of engagement
- / Perform additional ancillary items as required by the contract

This technical approach serves as a standard outline for RESPEC's approach to guide our response to all design projects. RESPEC recognizes that successful projects begin with a solid foundation built upon pre-coordination and a project kickoff meeting to conduct pre-commencement alignment on the project scope and details with all key parties and individuals involved. Our project framing approach is detailed below.

STEP 1: PROJECT MANAGER INITIAL RESPONSIBILITIES

The project manager's initial responsibilities will involve collaborating with WVDEP to develop a task implementation plan. This plan will include the following, at a minimum:

- / Detailed description of work and services to be completed
- / Project schedule and budget
- / Clear definition of the deliverable(s) required
- / Assembly of the optimal design team to meet the project objectives
- / Planning, coordination, and leadership of a kick-off meeting
- / Assignment of work tasks and deadlines to key project team personnel
- / Direction of project team activities to achieve strategic goals and objectives
- / Provision of open communication between WVDEP and the project team
- / Coordination of project team meetings, reporting, and documentation
- / Ensuring compliance with the project schedule and budget

The project manager will provide monthly status reports to the WVDEP, promptly reporting any potential problems discovered during the project. These reports will include a description of the problem, its potential impacts, and the recommended course(s) of action.

STEP 2: SITE INVESTIGATION

RESPEC will provide boots-on-the-ground services for project planning related to projects.

STEP 3: COMPILE OPTIMUM TEAM FROM RESPEC STAFF

The project manager will assemble a team based on the specific requirements of the project and the results from the initial site investigation. The team will be tailored to match the needs of each project. Most of our staff have expertise in multiple areas. Where specific expertise is needed, we may add subcontractors to the team. During the project, staff may cross over on tasks, and task leads may be alternated based on the particular needs of the project and personnel availability.

STEP 4: PLAN FOR COLLECTING DATA

The project manager and selected RESPEC team will develop a plan for data collection, using technology for enhanced data collection, monitoring, and management.

STEP 5: DESIGN/REMEDATION PLAN

Once the necessary background data has been gathered, the task teams will develop designs to address the identified issues. The design plans will consider various limitations, such as property rights, site access, potential critical habitats, and permitting requirements. Communication among team members will be frequent to ensure that all components of the issues are properly addressed in the plan. If additional site data is required, it will be collected as needed. The project manager will maintain regular updates with WVDEP, sharing the project status, design concepts, and any project concerns. The goal of the design process is to provide the agreed-upon deliverable(s) to WVDEP.

STEP 6: CONSTRUCTION MANAGEMENT

RESPEC has extensive experience in construction management, which involves careful planning, effective communication, and diligent cost and time tracking. The construction manager is the main point of contact for onboarding a general contractor, which may include assisting with the Request for Proposals document; interview process; and collaboration between the owner, designer, and contractor. Depending on the specific project, cooperation with multiple federal and state government agencies and reviews may be required. When necessary, the construction manager may need to research alternative design means and methods. In all cases, the construction management is a lead in ensuring that the project is completed safely.

SAFETY

Through our extensive work in mining operations, RESPEC is acutely aware of the hazards mining features entail and the varying condition previously or partially completed reclamation works may hold. Through our combined industry and site-specific experience, RESPEC produces job hazard analyses and work plans for planned and performed work on-site, as well as final remediation and mitigation designs and construction strategies that preserve the health and safety of our employees and the general public.

RESPEC is committed to the health and safety of our employees and the public; it is our highest priority, as illustrated by RESPEC's zero Mine Safety and Health Administration (MSHA) incident rating history. Abandoned mine workings pose obvious potential dangers to the public and anyone working near them. Fortunately, RESPEC employees work routinely in and around both operating and abandoned mines and are experienced in safely navigating the inherent hazards that may be present. In addition to numerous employees with MSHA training certifications for surface, underground, and shafts, RESPEC has specialized training directly applicable to these hazards with its Society of Professional Rope Access Technicians) certified rope team. RESPEC will develop and implement a Jobsite Safety and Health Program that complies with all Occupational Safety and Health Administration's standard site plans in conjunction with the WVDEP project manager, RESPEC's health and safety director, RESPEC's project manager, and team members to ensure the continued health and safety of all involved



PERFORMANCE HISTORY

➤ RESPEC AND MINING

Since its founding in 1969, RESPEC has supported the mining industry and has been involved in all aspects of the Surface Mining Control and Reclamation Act (SMCRA), both Title IV and Title V. These projects have been completed throughout the U.S. for various stakeholders, including state governments, the federal government, mining companies, landowning companies, environmental organizations, watershed groups, and law firms.

RESPEC and its employees have also actively participated in developing the mining industry regulatory framework through activities such as the Approximate Original Contour guidelines for West Virginia, the Surface Water Runoff Analysis guidelines for West Virginia, the Mountaintop Mining Environmental Impact Statement (EIS) for the Environmental Protection Agency, and the Stream Protection Rule for OSMRE. Representatives have also served on the West Virginia Special Reclamation Fund Advisory Council and the WVDEP Permitting QA/QC Panel.

RESPEC has been active in major mine permitting projects throughout West Virginia, such as the Hobet 45 Section 404 permit, the Huff Creek SMCRA/404 permit for Patriot Coal, and the Canebrake SMCRA/404 permit for Hampden Coal. RESPEC continues to support the industry in West Virginia with ongoing projects for companies like Mettiki Coal.

RESPEC also supports other mining activities in the state, such as Greer Industries for their new underground lime mine in Pendleton County and their Decker's Creek Limestone operation.

The breadth of RESPEC's involvement also includes the review of mine reclamation liabilities, such as the Buffalo Coal bankruptcy, the F&N Coal bankruptcy, and the Essar mining permit forfeiture case.

RESPEC is very aware of the legacy of prelaw mining on the State's land and water resources and has previously completed numerous AML projects for the State, including the watershed review of the North Branch of the Potomac, to define Acid Mine Drainage (AMD) treatment priorities.

West Virginia has a significant legacy of coal mining, as it has produced the second-largest tonnage of coal in the U.S. (just behind Pennsylvania), with 20 percent of U.S. coal production from 1800 to 1977 being mined in the state.

RESPEC'S COMMITMENT

38 years of mine reclamation experience – Having earned four national awards from OSMRE, RESPEC has been the "A Team" for abandoned mine reclamation work throughout the U.S. over the past 38 years.

Never say it can't be done – RESPEC has always, and will always, go the extra mile to ensure our work is completed in a timely and cost-effective manner. We pride ourselves in being flexible in our schedules so that we are available at a moment's notice when a deliverable needs to be created and submitted or a WVDEP or a landowner requests a field investigation.

Litigation-free projects – RESPEC is committed to continuing its history of litigation-free projects, as we have done for more than 100 AML projects.

➤ PROJECT MANAGEMENT – OUR COMMITMENT TO QUALITY AND RESPONSIVENESS



EXPERIENCED PROFESSIONALS

We have assembled a team of experienced professionals who know how to solve mining-related issues and complete projects within time and budget constraints. Our staff can manage unexpected changes to mine-related projects.



SCHEDULE

After determining the schedule, we will set major meetings. This system will provide the RESPEC team with set deliverable dates so that a project will remain on track and meetings will not be rescheduled because of other commitments. The project manager and task leaders will conduct frequent coordination meetings via telecommunication to discuss the project status and goals and share and obtain updated information.



QA/QC

The project manager will establish a QA/QC program specifically tailored to each project. Fundamental features will include using standard operating practices, staff training, and project checklists. The program will include technical reviews applied while preparing designs, calculations, drawings, details, specifications, quantities, cost opinions, reports, and construction documents. The QA/QC documentation will be provided during the design process to illustrate our commitment to high-quality plans and documentation.



COMMUNICATION AND METHOD OF INTERFACE

Communication is critical. The project scope will include a reporting schedule to WVDEP, which will set the minimum. We will routinely communicate via telephone calls, emails, or intermittent progress reports. Our communication philosophy is to be extremely responsive; if we miss a telephone call, we will respond the same day as the voice message.



SCOPE AND BUDGET CONTROL

We plan to maintain the schedule and budget control through regular team meetings and status reports. A comprehensive project task schedule will be established at each project start-up to ensure clarity in project flow and benchmarks. These tools are highly effective in communicating the current project status, identifying potential schedule issues, providing a record of project milestones, and reconciling conflicts. RESPEC will use appropriate project management and cost-tracking software (e.g., Microsoft Project, earned value tracking, and Deltek accounting systems).



CLIENT SATISFACTION

RESPEC's role is to assist WVDEP in completing the project to WVDEP's specifications. Technical and nontechnical project requirements will be addressed to achieve final products that meet WVDEP goals and objectives.



RELEVANT EXPERIENCE

➤ RESPEC QUALIFICATIONS, EXPERIENCE AND PAST PERFORMANCE

RESPEC has completed and is currently working on AML projects in multiple states. RESPEC has been involved with AML projects for more than 38 years and has completed projects in 10 states. With the funding in the IIJA, RESPEC is working on AML projects in West Virginia, Pennsylvania, Wyoming, and Colorado. In addition to AML projects, RESPEC and our professional staff have completed projects with similar components. These projects have been completed or are ongoing in multiple states and have been conducted for OSMRE, the Bureau of Land Management, and many private companies. These projects have covered wide-ranging commodities.

RESPEC has experienced significant growth through strategic partnerships, including the acquisition of Morgan Worldwide in 2014. Morgan Worldwide brings extensive

experience in AML projects and SMCRA-related projects. "RESPEC" is used throughout this EOI to refer to RESPEC and its acquisitions.

Descriptions are included for selected projects to present RESPEC's experience in the various aspects of mine reclamation. The projects are separated into the following groups better facilitate the WVDEP's review of our project history:

- / AML West Virginia Projects
- / AML Projects in Other States
- / Other Relevant Mining Projects

The projects presented in the "AML AND RELATED PROJECT EXPERIENCE MATRIX," which are included in Appendix A, are separated into the same three categories.



➤ PAST PROJECT EXPERIENCE

BECKLEY SOCCER COMPLEX

Client: WVDEP // Client Contact: Jonathan Holbert // Client Address: 601 57th Street SE, Charleston, WV 25304



The Beckley Soccer Complex is located in Beckley, West Virginia. It has walking, hiking, and biking trails; soccer fields used daily by the public; and a parking lot plagued with subsidence and sinkholes. RESPEC is tasked with analyzing the causes of subsidence and mitigation designs. The site's existing topography indicated the scarp line occurred along the crest of historic spoil fill. Five boring holes were proposed in the parking lot and along the scarp line. Results of the drilling program indicated two boring holes did not reach bedrock for approximately 61 to 76 feet.

The original strategy was to remove all the soft material down to the bedrock and construct a stable base for the parking lot. However, it

was discovered that a power company is currently installing power poles and lines along the scarp line. We are currently proposing the use of a geogrid. This additional support will act like a bridge across the soft material, allowing us to avoid the power pole location. Using the geogrid will limit the amount of material that must be excavated, thus saving money on construction costs. We are currently looking at on-site spoil disposal areas to further reduce construction costs.

The next design phase will be to finalize the design, develop construction drawings, technical specifications, and engineer's estimate



MACARTHUR SUBSIDENCE PHASE III

Client: WVDEP // Client Contact: Jonathan Holbert // Client Address: 601 57th Street SE, Charleston, WV 25304

The MacArthur Subsidence Phase III project is located near MacArthur, West Virginia. The area has experienced subsidence issues because of an old underground mine with depths of cover ranging from 40 to 80 feet. Phase III is approximately 170 acres and could potentially affect 150 landowners. RESPEC has designed the initial exploratory drilling program. Twenty-one drill holes are proposed within the right-of-way (ROW) of state and county roads. The exploratory drilling will allow us to better understand the subsidence issues and risks within the project boundary. We expect the drill holes will encounter either a coal block, mine void, or a rubblization zone. This information will allow us to design a grouting plan suitable for the situation encountered.

Once the exploratory drilling is completed, RESPEC will evaluate all structures within areas deemed a risk for subsidence. After all structures with foundations have been identified within the risk area, we will begin obtaining construction right-of-entry from property owners within the risk area. The ultimate goal of this project will be to mitigate the subsidence risk for the property owners.



AML WEST VIRGINIA PROJECTS

NORTH BRANCH POTOMAC RIVER ACID MINE DRAINAGE STUDY

Project Location: West Virginia / Maryland // Client: West Virginia Division of Environmental Protection, Maryland Bureau of Mines, OSMRE
// Client Contact: Rob Rice, 304.926.0440 // Client Address: 601 57th Street Southeast, Charleston, WV 25304

A comprehensive AMD study of the North Branch Potomac River, upstream of the Jennings Randolph Dam, was completed through an interstate agreement between Maryland Bureau of Mines, West Virginia Division of Energy, and OSMRE. The various phases of the study incorporated a water sampling program to evaluate all flowing stream and point sources in low, high, and average flow conditions; an AML inventory; the location and evaluation of all possible sources of acid drainage; and the development of a computerized pollutant loading model.

The goal of the project was to provide the AML agencies in both states with a study that evaluated where reclamation could be done that produced the greatest effect on the subwatershed and, ultimately, the North Branch.

The sampling program was conducted with an excess of 800 samples collected for three different sample sweeps. The sample program was followed up with an investigation of all acid discharging sites for thorough cataloging of distinct features, reclamation potential, and any other information that could be used to facilitate reclamation design.

The final approach to achieving the goal of optimum reclamation for the least funds was accomplished through the pollutant loading model. The model incorporated a chemical analysis for determining the water's neutralization potential that was developed especially for this project. The analysis is called the Neutralization Equivalent and is determined by titration to a particular pH; in this case, a pH of 6.0 was targeted. A total of 19 scenarios were simulated in which different reclamation plans were constructed. In comparing the results of these scenarios with a list of the largest acid producers, reclamation of the worst discharges did not necessarily produce the greatest effect on the watershed; therefore, the model was a tool that helped achieve the goal of receiving the most benefit from the funds available.

Flow modeling was achieved by calibrating the TVA HYSIM program to the regional factors available. These values were cross-checked with U.S. Geological Survey data to help calibrate the model.



HARTFORD "B" PROJECT

Client: WVDEP

The Hartford "B" project consisted of two sites with different AML-related problems. The first site consisted of several draining portals, which saturated the outslope spoil and destabilized a large mine structure. An impoundment of this drainage was built below the portals, but the refuse dam was also unstable. The second site was located approximately 2,000 feet to the north-northeast of the first and consisted primarily of an inundated and abandoned deep mine shaft. This shaft was approximately 20 feet west of Sliding Hill Creek and was an unattractive nuisance to residents. Effluent from the shaft was estimated to be as great as 500 gallons per minute. This effluent had generated an erosion path from the shaft to Sliding Hill Creek. "Yellow boy" was prominent immediately around the shaft and throughout the erosion path. The shaft was relatively unobstructed over a depth of 40 feet or more, and shaft dimensions were approximately 8 feet square. In addition to the environmental damage and property encroachment, limited potential for instability of the shaft walls also existed.



RESPEC staff investigated these sites with extensive subsurface drilling and testing the refuse and spoils for engineering properties. The remedial measures designed by RESPEC staff encompassed breaching and draining of the impoundment, structure demolition, stream reconstruction, installing an extensive underdrain system, and providing free-draining portal closures for all entries.

STOWE STRUCTURES COMPLEX PROJECT

Client: WVDEP

RESPEC staff were contracted to investigate the surface and subsurface conditions of a large coal mining and processing complex near Stowe, West Virginia. Disturbances associated with the Stowe Structures Complex affected an area of about 40 acres. Five general types of disturbances; were abandoned surface structures, mine portals, surface drainage features caused by severe erosion, unstable and burning spoil and refuse, and minor occurrences of trash dumped by local residents.

The main problem concerned numerous abandoned structures located across the site. The largest of the surface structures was a preparation/loadout facility adjacent to the north bank of Buffalo Creek. Other structures encompassed conveyors, transformer stations, storage bins, tipple houses, fan houses, and loadouts. RESPEC staff conducted physical inspections of the structures and photo-documented the hazardous conditions associated with each one. An extensive subsurface drilling/testing program followed. RESPEC analyzed soil for engineering and chemical properties and evaluated the intensity and extent of fires burning in a very large hollow fill. Designs for reclamation were based on the results of both site investigations. Because the extent of fire in the spoil and refuse was limited, WVDEP determined that no action was required at that time. The design that RESPEC staff developed entailed removing and disposing of all surface structures in an approved fashion and to approved sites. Plans also encompassed backfilling of highwalls to eliminate all shear rock faces and closure and drainage methods for 10 portals. A comprehensive drainage control plan was designed to repair the effects of past erosion, prevent future erosion, and control surface waters. The plan also encompassed collecting AMD, preventing ponding and subsurface seepage, and providing positive control from the site to Buffalo Creek. All spoil and refuse materials were reggraded or excavated and recontoured into a stable configuration. A geosynthetic grid was used for slope reinforcement. This was a new technique for use by WVDEP.



BEAVER CREEK HIGHWALL PROJECT

Client: WVDEP

This project encompassed the reclamation of more than 2,000 feet of 40- to 60-foot highwall. Other associated problems included one open discharging portal, unstable outslope spoil, areas devoid of vegetation, and a high volume of AMD. The AMD had potentially degraded the local potable water supply. The area was extensively deep mined, which posed further problems addressing the AMD. The state also decided to reclaim the area as wildlife habitat based on the present site condition.

To reroute the AMD, RESPEC designed an underdrain system to direct the water to several natural drainage channels. The portal was closed with a wet seal to provide positive drainage directed to one of the natural channels. The unstable spoil was removed and used to backfill the highwall. In areas where backfill material was unavailable, the highwall was blasted down. For revegetation, a seed mix was used that supports wildlife and controls erosion. Many areas on-bench had naturally revegetated to pine and hardwood thickets. When possible, these areas were left undisturbed and remained part of the final reclamation plan.

Water supply degradation was not determined conclusively to be caused by AMD. However, because the evidence pointed to AMD as a cause, a full water supply study was conducted. Field investigations encompassed more water sampling of resident wells, Beaver Creek, and mine discharges in the Beaver Creek watershed. An adjacent unmined watershed was also evaluated, and water sampling was conducted as a check of probable pre-mine water quality. A cation/anion analysis was also performed in the Beaver Creek watershed to isolate the main contaminant of the drinking water supply. The study entailed a cost analysis of possible water supply options, including cleanup of the existing water supplies, drilling new wells, or extending existing county water lines to all impacted residents.





TWIN BRANCH COMPLEX PROJECT

Client: WVDEP

This project involved site evaluation, a field survey, and design to reclaim an abandoned Fordson Coal Company (Ford Motor Company) mine. The major problem associated with the site was a Class A impoundment that would overtop during a probable maximum precipitation storm event. Additional problems associated with the site were areas of unstable refuse material perched above houses, refuse banks and impoundments, red dog piles, numerous open portals, and several thousand feet of unstable highwall.

The field survey established horizontal and vertical control for photogrammetrically derived mapping, established baselines, and located all boreholes and sample sites. Field activity encompassed drilling geotechnical evaluation boreholes in both the coal refuse material and all of the impoundments. Piezometers were also installed in several holes in the Class A impoundment.

The Class A impoundment was structurally and hydrologically evaluated using REAME and SWASE stability programs. The National Weather Service DAMBRK program was used for structural stability analysis, and the SEDIMOT program was used for the hydrologic analysis. As-built impoundment plans were obtained and used to evaluate the existing concrete spillway and the pond drainage system.

Designs encompassed restoration measures for the main impoundment structure, especially the concrete spillway. A plan was made for sealing the pond drainage system and demolishing all surficial aspects of this system. Portal closure details, regrading of the refuse piles, removal of abandoned structures, and removal of two unstable impounding coal refuse structures were planned. These designs were intended to restabilize drainage through the valley.

The regrade design was complicated by the proposed future development of the area as a county park. This required that the final configuration include as much usable flat-lying area as possible. This was accomplished by using relatively deep gabion-lined structures to decrease the total width of channels, which increased the width of flat areas. Channels were also aligned toward the side of the valleys.



WIDEN REFUSE RECLAMATION PROJECT

Client: WVDEP

This project involved the field evaluation and reclamation design for a 4.5-million-cubic-yard refuse pile, part of which was burning. The project also addressed two large, abandoned slurry ponds with unstable refuse embankments as dams.

The field effort encompassed baseline and location surveying, confirmation by aerial mapping, and geotechnical drilling and sampling to obtain stability parameters on the refuse and slurry. RESPEC also performed sampling to evaluate the remining potential of both the refuse and slurry. The streams adjacent to and receiving discharge from the refuse and slurry were evaluated. Several open mine portals were assessed, some of which were discharging water. Surface and downhole temperature probing was conducted over the refuse pile to determine the extent of active burning. Several areas were evaluated for potential as topsoil borrow areas and as riprap production areas.

AML PROJECTS IN OTHER STATES

MARYLAND - BUREAU OF MINES: VINDEK REFUSE PROJECT

Client: Maryland Bureau of Mines // Client Contact: John Eilers, 301.689.8020 // Client Address: 160 South Water Street, Frostburg, Maryland 21532

The Vindex Refuse project consisted of approximately 125 acres of abandoned mined lands. Problems encountered on site involved AMD, open portals, toxic coal refuse piles, and garbage dumps. Unstable outcrops, dangerous structures, potentially dangerous impoundments, degraded streams, and massive sediment production were also present.

RESPEC staff investigated the site to inventory these problems and provided information as a basis for design. A control survey was performed to generate mapping and cross-sections. A subsurface investigation was performed to determine piezometric levels in the mine workings, determine the overall geology of the site, provide estimates of refuse depths, and procure samples for testing. Geotechnical analyses were performed for stability determinations. Water levels were monitored to determine the potential for mine blowouts. Water quality data from the North Branch AMD project were examined to determine whether or not passive treatment measures could be used.

Design for the project encompassed backfill of the highwalls, storage of potentially "marketable" refuse, and restoring the Left Prong of Three Forks Run. RESPEC also undertook the following tasks: improving surface and subsurface drainage, buttressing the county road, installing portal closures, routing AMD, controlling subsidence, and designing a domestic waste-disposal area.

MARYLAND - MARYLAND BUREAU OF MINES: FROSTBURG SUBSIDENCE RECLAMATION PROJECT

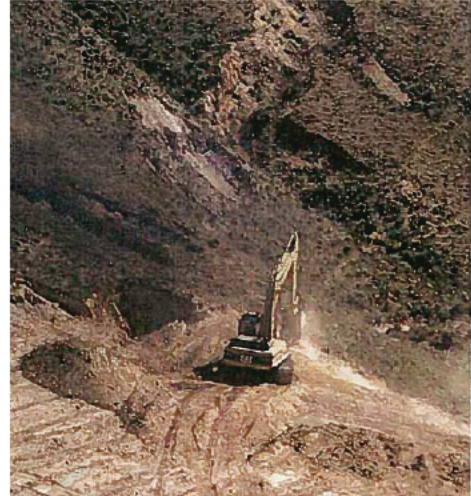
Client: Maryland Bureau of Mines // Client Contact: John Eilers, 301.689.8020 // Client Address: 160 South Water Street, Frostburg, Maryland 21532

This project entailed investigation, design, and construction management related to a collapsing road in a residential neighborhood of Frostburg. Very shallow mine workings were extensively developed just below a road and neighborhood. A drilling investigation confirmed the unstable subsurface features and assisted in qualifying feasible stabilization solutions. The selected design used a stabilization technique entailing grouting at low pressures.

CRAWFORD MOUNTAINS AMLS STUDY

Project Location: Rich County, Utah // Client: Utah Division of Oil, Gas and Mining

The Utah Division of Oil, Gas & Mining awarded this project to RESPEC to conduct a site evaluation of the abandoned phosphate operation in Crawford Mountain in northeastern Utah. Following the site evaluation and developing a database to categorize the hazards present, RESPEC staff studied the historic mining record to develop various reclamation alternatives. The evaluation indicated that one phosphate bed had been folded to form a syncline structure with the two steeply dipping limbs outcropping on the ridgeline of the Crawford Mountains. The phosphate had been principally underground mined and left access raised up to the surface, and numerous areas where the crown pillars remained were insufficient to provide long-term stability. The two outcroppings extended for seven miles along the ridgeline and contained approximately 200 vertical and horizontal openings that, in some cases, extended to depths of over 800 feet. The site evaluation provided hazard rankings for the features, but because of the significant vertical drops and unstable edges of the openings, most of the features received the most critical rankings. The evaluated reclamation alternatives encompassed backfilling the workings with on-site materials or via slurry-transported borrow materials, blasting the hanging walls, and installing concrete caps on the openings. The Report of Investigations includes the site evaluation, hazard disturbance, hazard rankings, aerial photographs, reclamation alternatives, and cost estimates.



WASHINGTON - OFFICE OF SURFACE MINING: WINGATE HILL MINE RECLAMATION

Project Location: Carbonado, Washington // Client: Washington Office of Surface Mining // Client Contact: Ginger Kaldenbach, Retired

RESPEC staff was contracted to design innovative closures for six deep mine shafts. The shafts were very large and extended to estimated depths of 500 feet. All entries were located approximately 1 mile south of Carbonado, Washington. The shafts were situated in heavily vegetated new forest growth owned by a large timber company. Although the access roads were fenced and gated, hunters and recreationists were permitted paid access to this site year-round, which increased the risk of injury.

To minimize cost and provide an effective closure, a wire mesh and cable net closure was developed. Initial clearing and excavation were required to establish a competent connection to in situ soils.

Grouted soil anchors were designed to connect 7,000-pound galvanized aircraft cables securely to the indigenous glacial fill. The anchors were arranged in a circular pattern that provided a 4-foot × 4-foot square cable grid system. The grid was overlaid with high-strength gabion wire mesh commonly used for rockfall protection. The anchor and the exterior circumference of the cable/mesh system were then covered with compacted earth to permanently protect the net system. The area directly over the shaft was completely covered with the cable net, providing long-term protection to loggers and recreational visitors.

RESPEC staff provided a full-time construction inspector throughout this project. Inspection duties encompassed daily logs, contractor/client coordination, and equipment and personnel monitoring.



HORSE CREEK ABANDONED MINE RECLAMATION

Project Location: Cheyenne, Wyoming // **Client:** Wyoming DEQ, AML Division // **Client Contact:** Lindsey French, 307.335.6965 // **Client Address:** 510 Meadowview Drive, Lander, WY 82520

RESPEC was selected by WY AML to investigate and evaluate mining features associated with the underground Horse Creek limestone mine. RESPEC conducted both surface and subsurface investigations at the mine. The first phase of investigations was concerned with the surface impacts of the mine. During the investigations, RESPEC recorded 83 individual surface features, including subsidence, portals, shafts, highwalls, hazardous equipment and facilities, and areas that were environmentally degraded because of mining activities. The investigation team used the ArcGIS Collector application to collect and inventory all features in a geospatial database and recorded pertinent information for each feature.

For the second phase of the investigation, RESPEC engineers evaluated more than 40 million cubic feet of underground workings that posed safety risks to the public. Initial underground void scans, survey data, and historical mapping were used to generate a 3D model of the inaccessible underground workings and voids, which were verified with additional scanning. We collected a total of 22 underground void scans using a Carlson C-ALS remote void scanning system. The 3D models of the workings and updated surface surveys were used to perform a stability analysis of the area. Industry-standard methodology and calculations determined the factor of safety along the full length of the concerned area. We identified priority areas requiring further investigation, potential remediation, and potential solutions.

RESPEC is currently working with WY AML to develop the next phase of investigation for the priority areas. Final remediations will be developed and initiated once the priority areas have been fully investigated.



ROCK SPRINGS DRILL AND GROUT PROJECT FOR SUBSIDENCE MITIGATION

Project Location: Rock Springs, Wyoming // **Client:** Wyoming DEQ, AML Division // **Client Address:** 200 West 17th Street, Cheyenne, WY 82002

Rock Springs has been plagued by mine subsidence problems since mining operations along the Union Pacific Railroad began in the late 1800s. This work, which was conducted by RESPEC staff, involved providing subsidence investigation, engineering, analysis, mitigation design, public relations, construction, and geotechnical expertise for abating the Rock Springs Mine Subsidence liability. The scope of the project was extensive. Subsidence modeling was used to define the potential for subsidence related to the No. 3, No.1, and No. 7 seam coal mine workings underlying the city. This analysis was performed to determine limits for mitigation construction because subsidence prediction was the key project element determining areas where grouting or stabilization were needed. Grouting plans using state-of-the-art techniques and innovative applications were crucial for minimizing costs. Assessment and verification of the grouting work by geophysical methods and empirical derivation was the cornerstone of the "final warranty" of the grouting work.



STORM KING MINE ABANDONED MINE RECLAMATION

Project Location: Sheridan, Wyoming // Client: Wyoming DEQ, AML Division // Client Contact: Josh Oakleaf, 307.335.6934; josh.oakleaf@wyo.gov // Client Address: 200 West 17th Street, Cheyenne, WY 82002

The Storm King Mine is an abandoned underground coal mine that opened in 1919 in Sheridan County, Wyoming. The mine was especially active during the 1930s through the 1940s and into the early 1950s but was abandoned soon afterward. Over time, sinkholes began to develop above the shallow mine, creating a hazard and impacting drainage.

In early 2008, AML directed RESPEC to conduct investigations, develop designs, and manage construction to mitigate several developing sinkholes. Over the course of several years, sinkhole development over the underground mine workings located in the Nelson Draw area dramatically increased, specifically in a livestock field and near a residential home. RESPEC continued to conduct investigations, develop designs, and manage construction to mitigate the developing sinkholes.

The overall goal of the AML Division was to eliminate safety hazards and repair environmental damage caused by the mine subsidence. To accomplish this goal, in 2018, RESPEC initiated work on a subsidence investigation and developed a subsidence prediction model to facilitate the development of designs to mitigate the safety hazards and minimize the development of future subsidence features. Mitigation designs included excavation, grouting, mine-wide grouting, a rock and concrete wedge, and backfilling. Because of the severe erosion happening in the Nelson Draw, a series of drop structures were built in the drainage channel, and an emergency spillway was constructed in the Thomas Krout Stock Pond, which was being threatened by the erosion.



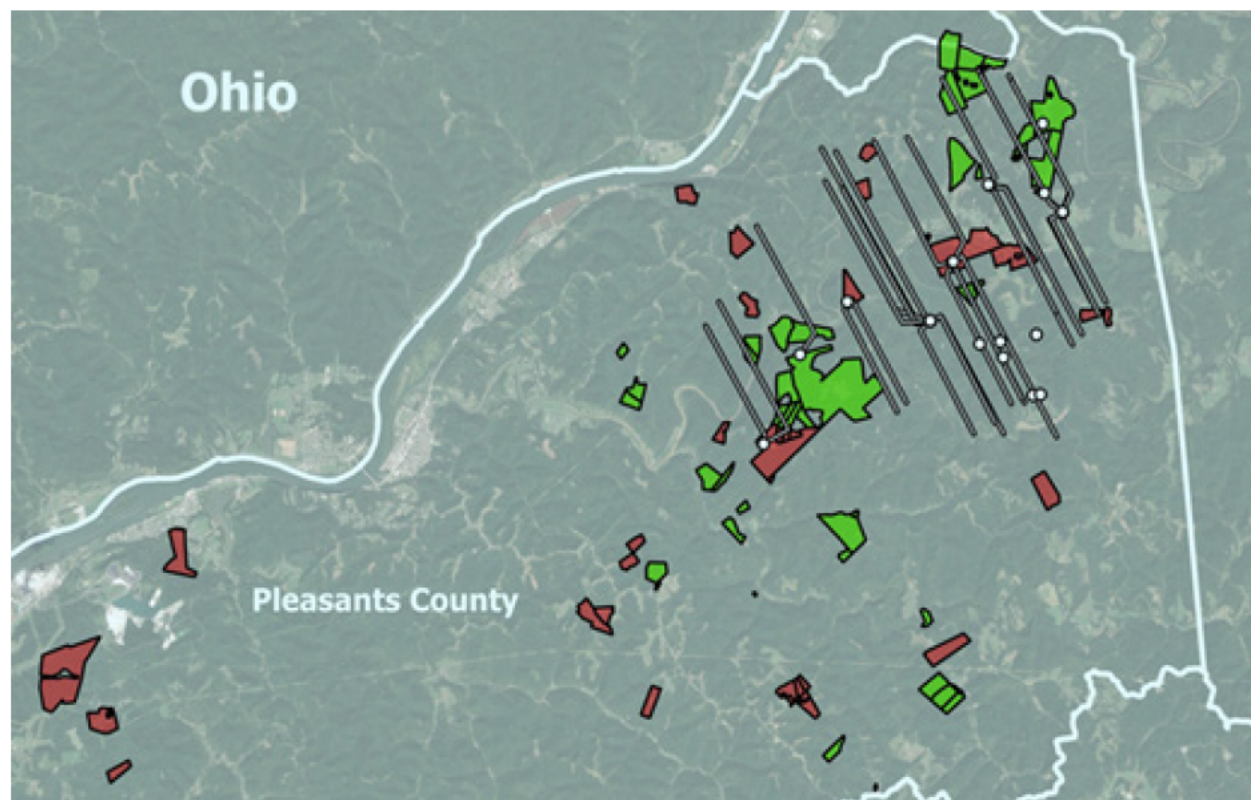
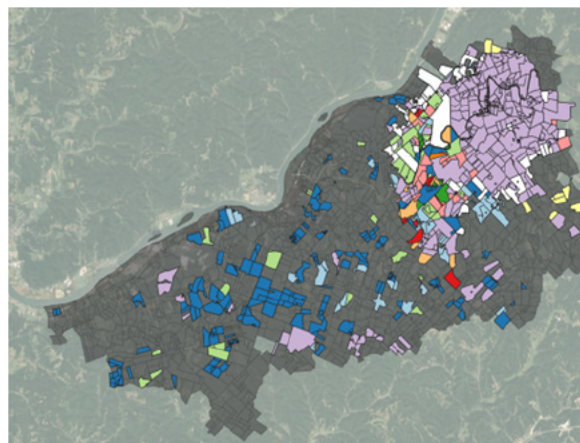
OTHER RELEVANT MINING PROJECTS

JAY-BEE EXPLORATION — BLACKROCK LITIGATION

Project Location: Pleasants County, WV // Client: Bailey Glasser // Client Contact: Brian Swiger, 304.340.7879, bswiger@baileyglasser.com
// Client Address: 209 Capitol Street, Charleston, WV 25301

RESPEC provided technical support and expert testimony in evaluating several oil and gas wells in Pleasants County, West Virginia. The review included detailed mapping of the individual property ownership, drilling unit boundaries, well bore tracks, and the location of drilling pads.

The verification of property ownership was a key component of the task. The property parcel data were obtained from the Pleasants County PVA, and then individual leases were obtained from courthouse records and reviewed to confirm the property boundaries and ownership interests. The various layers of property parcels, drilling boundaries, and wellbore tracks were compiled using RESPEC's GIS system. The layers were used to denote lease execution dates, lease expiration dates, and lessor.



DILLAN CREEK AMD REMEDIATION

Project Location: Reedsville, West Virginia // Client: Friends of Deckers Creek // Client Contact: Brian Hurley, 304.292.3970, brian@deckerscreek.org // Client Address: P.O. Box 877, Dellslow, WV 26531

Friends of Deckers Creek (FODC) is a nonprofit watershed group working to clean up decades of environmental degradation with the Deckers Creek Watershed. RESPEC partnered with Dr. Paul Ziemkiewicz, Director of the West Virginia Water Research Institute, to design/permit an AMD treatment system located on Dillan Creek, a subsidiary of Deckers Creek. The treatment system will treat multiple AMD seeps emitting from pre-SMCRA mines. FODC requested that the treatment system be passive, so RESPEC designed a passive treatment system that consists of a self-flushing limestone leach bed. RESPEC's Mike Cross is the project manager for this project, which involves preparing and submitting permits to the USACE and WVDEP. These permits are currently pending.

RESPEC designed the treatment pond based on the initial conceptual plans. Open limestone channels were designed to collect the drainage from AMD seeps and convey the water into the treatment pond. Approximately 1,400 tons of 1.5- to 3-inch limestone will be placed into the treatment pond. Based on the flow from the seeps, the treatment pond will fill in approximately 24 hours, allowing the AMD water sufficient time to react with the limestone. An Agri Drain is proposed to be installed in the treatment pond dam that will be computer/timer controlled to open once per day to drain the treated water and to flush the precipitates out of the pond before they coat the limestone and reduce the effectiveness/life of the limestone. Once open, the AgriDrain will drain the treated water in approximately 1 hour before closing. After closing, the treatment pond will start to fill and start the cycle again. The self-flushing system has a projected 30-year life.



IDARADO MINE MILL-LEVEL TUNNEL FLOW-CONTROL BULKHEAD

Project Location: Telluride, Colorado // Client: Newmont Corporation // Client Contact: Devon Horntvedt, PE, 303.863.7414 // Client Address: Ouray County, CO

RESPEC worked on a multi-company team to prevent pollution from mine-water discharge by creating the wholly unique design of a flow-control bulkhead at the Newmont Idarado Mine legacy site outside Telluride, Colorado. RESPEC's performance led to additional assignments and increased responsibilities. We ultimately served as the construction manager in executing the project, which was valued at approximately \$5 million.

The high, mountainous regions of the area drain through the mine and discharge near the town of Telluride. Changing weather patterns have caused spring snowmelt flows that are increasingly unpredictable. These flows can exceed 15,000 gallons per minute and threatened to overtop infiltration ponds.

The bulkhead regulates discharge into the settling ponds through redundant piping and automated instrumentation so that water quality and quantity standards are not exceeded. The uniqueness of the bulkhead design is related to its accessibility. A watertight, stainless-steel door (essentially a submarine hatch) is located on the bulkhead and designed for a water pressure of nearly 400 pounds per square inch (psi). At low flow, the inby (wet) side of the bulkhead can be accessed to perform maintenance. The design will safely reduce the risk of pollution through unplanned discharge with a largely passive system and eliminate significant energy consumption in water pumping.

Construction encompassed a concrete bulkhead measuring approximately 15 feet high by 15 feet wide by 15 feet long, with a taper suitable to hold a static pressure behind the bulkhead of approximately 400 psi. The bulkhead encompassed pipe penetrations for a 24 inch primary conveyance pipe, an 8-inch overflow pipe, and a 1-inch pressure pipe. The bulkhead also encompassed a 6-foot-square accessway with a railway track to allow for access behind the bulkhead. This requirement was accomplished by installing an approximately 9 ton pressure door on the inby side of the bulkhead that could withstand the static pressure loads.

Major construction activities were completed in early 2020 and handed over to the owner for final commissioning under restricted site working conditions because of the COVID-19 pandemic.



METTIKI AMD TREATMENT - ALKALINE REINJECTION PLAN

Project Location: Tucker County, West Virginia // Client: Mettiki Coal (WV), LLC // Client Contact: Hunter Burrow, 304.334.5396 // Client Address: 292 Table Rock, Oakland, MD 21550

RESPEC assisted Mettiki Coal (WV), LLC (Mettiki) in the design and permitting of a longwall deep mine for WVDEP in the Upper Freeport Seam in the North Branch of the Potomac River and Black Water River Watershed. The Upper Freeport Seam is an acid-producing seam. An alkaline reinjection plan was developed as part of the original permitting process to address the production of AMD-generated post-mining. RESPEC worked with Mettiki and other Mettiki consultants in the development of this plan, under which water is pumped from the mine,



treated with an alkaline material, and reinjected back into the mine to ensure that any water that leaves the underground permit area via barrier leakage will be alkaline. This process will continue until the water in the mine is compliant. The plan included predicting a definable and reasonable "endpoint" to ensure that at no point in the reclamation process will AMD leave the underground permit area. The alkaline addition will also shorten the definable endpoint for AMD. The alkaline reinjection designs are based on the mine seepage calculations conducted by RESPEC. Work is continuing to expand the underground mine area and monitor the quality of the mine water to determine the effectiveness of the alkaline reinjection system. In addition to permitting the original Surface Mine Application, RESPEC has also prepared, submitted, and obtained approval for 21 Subsidence Control Plan (SCP) revisions over the past 20 years to add additional reserves to extend the life of the mine. RESPEC has conducted all of the seepage calculations for all of the SCPs. The alkaline injection and withdraw points have been modified based on the additional mine areas added by the SCPs and their projected final mine pools.

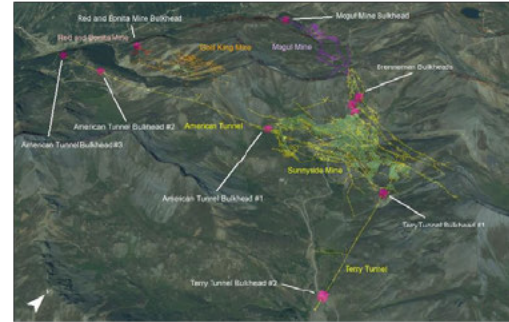


SUNNYSIDE MINE, DOJ

Project Location: SW Colorado // Client: Environment and Natural Resources Division, Environmental Enforcement Section, US Department of Justice // Client Contact: John Moscato, Senior Counsel // Client Address: 999 18th Street, South Terrace, Suite 370, Denver, CO 80202

RESPEC was retained by the US DOJ to evaluate the configuration and extent of the Sunnyside Mine and the adjacent mines in the Bonita Peak Mining District. Before its closure in 1991, the Sunnyside Mine was the largest underground metal mine in southwestern Colorado, located 6 miles north of Silverton in the San Juan Mountains.

RESPEC used Surpac to construct a 3D model of the Sunnyside Mine workings and the nearby Mogul, Gold King, and Red and Bonita mines, plus details of the American Tunnel. The model also encompassed geologic features, such as major fault zones and surface mapping information.



RESPEC used historic mining maps, drilling information, and survey data to re-create the Sunnyside Mine 3D model. In many cases, multiple maps showed an area of the Sunnyside Mine at different dates; some maps had handwritten notes or edits marked on one version and additional details on a separate map generated at a different time. Some mine maps focused on a specific area of interest, such as a particular portion of the mine that was active at the time of the mapping, and subsequent maps may omit details from areas that are no longer active.

Major faults that intersect mine workings were also modeled, based on notations from maps produced by mine operators, USGS data, and observations documented during mine operations. The Bonita Peak Fault intersects Gold King workings and the American Tunnel. Observations during the 1960 American Tunnel extension verified the fault zone intersection.

The final model allowed the interrelationship of the various mine workings to be identified and the volume of excavation to be calculated by elevation, thus allowing the hydrostatic pressure on the various bulkheads to be reviewed.



CAMP BRANCH WATERSHED LITIGATION

Project Location: Letcher County, Kentucky // Client: Getty & Childers, PLLC // Client Contact: Joe Childers, 859.259.1900 // Client Address: 250 West Main Street, Suite 1900, Lexington, KY 40507

Residents of the Camp Branch Watershed of eastern Kentucky experienced impaired water quality over several years following underground mining in the area. The state agency determined that some of the groundwater impacts were related to mining, but the determination was not made for all of the residents in the area. A group of area residents filed a lawsuit after the state's investigation concluded that the mine (operated by Golden Oak Mining Company) did not cause the groundwater impacts on their specific property. RESPEC was retained by the residents' Counsel to evaluate the mine mapping and to review the pre-mining groundwater inventory reports, the permits, and the analyses of post-mining water quality and quantity. Based on the data review, RESPEC concluded that the groundwater issues were related to mining and presented these findings at a hearing in Letcher County Circuit Court. Over \$650,000 in damages was awarded to five families whose water supply was impacted by the underground mining. In total, the water supply of 100 families was affected by the mine. Other lawsuits were settled privately.



PATRIOT COAL — HOBET 45 MINE PLANNING AND PERMITTING

Project Location: Madison, WV // Client: Patriot Coal



Patriot Coal requested RESPEC to review the pending SMCRA and 404 permit applications for the Hobet 45 surface mine in West Virginia to see if the mining impacts could be reduced. After a detailed review of the mine plan and mining economics, we developed a revised mine plan. This new plan reduced the stream impact by 52 percent, reduced the permit acreage by 18 percent, and increased the efficiency of the spoil placement while reducing the recoverable coal by only 9 percent. RESPEC assisted in presenting the alternatives to the Environmental Protection Agency and USACE and got the 404 permit issued. RESPEC prepared the revisions to the 404 permit and the SMCRA permit.

BUFFALO COAL LITIGATION

Project Location: Northwest Virginia // Thorp Reed & Armstrong, LLP

RESPEC was retained by Counsel to evaluate the available information regarding the operations of Buffalo Coal before and after the termination of its Coal Supply Agreement(s) with Virginia Electric and Power Company (Vepco) and its impact on the company's bankruptcy.

The project included a detailed review of the coal supply agreements, historic production, remaining reserves, and permitting history.



A review of WVDEP's records indicated that in 2005 Buffalo had 24 active mining permits and 12 in various phases of bond release. Buffalo had historically reclaimed mines with proceeds from its next operation, but when Buffalo ceased operation as of February 2006, there were no funds to reclaim the previously mined permits. After the termination of the Vepco contract, Buffalo ceased operations, and the reclamation liability for the mine permits was transferred to the State of West Virginia.

To define the reclamation liability at each of the permitted sites controlled by Buffalo, RESPEC prepared a separate review of each permit. As there was no mapping to describe the site condition after the permit was revoked, RESPEC obtained both photographic and Lidar imagery of the sites. Using the permit mapping, the boundaries of each permit were digitized and used to define the limits of each permit's reclamation liability.

As the mine permit requires the site to be restored to the approved post-mining configuration, RESPEC staff also digitized the approved post-mining contours. Using the existing contours combined with the required contours, we determined the volume of material required to backfill each site.

One component of the reclamation cost was the earthmoving required to re-create the approved post-mining topography. The cost was separated into three classifications: the spoil that could be placed using a dozer; material requiring the use of a loader and truck; and, for those sites where there was inadequate material on-site, the cost of transporting material from off-site borrow areas.

In addition to the earthmoving task, the other major component was the ongoing water treatment cost, final grading, and revegetation.



F&N COAL BANKRUPTCY

Project Location: Nicholas County, West Virginia // Client: Bailey & Glasser, LLP // Client Contact: Brian Glasser, 304.345.6555, bglasser@baileyglasser.com // Client Address: 1209 Capitol Street, Charleston, WV 25301

RESPEC was retained by Bailey & Glasser, LLP to evaluate the permit history and mining performance of Sunset Fuels as the Contract Miner on F&N Coal mine sites and provide expert testimony for the litigation. RESPEC evaluated F&N Coal's permit history, including the two incremental boundary revisions (IBR#4 and IBR#5).

A review of the mining sequence indicated Sunset Fuel's approach to the property and the sequential use of the excess spoil disposal areas. The production target of the mine plan was 50,000 tons per month. However, Sunset Fuels failed to produce the required tonnage and did not complete the required contemporaneous reclamation. The lack of reclamation at the mine site left behind exposed high walls, incomplete valley fills, unreclaimed roads, and incomplete sediment control structures, which posed severe environmental impacts and hazardous conditions.

In addition, RESPEC provided Expert Testimony in the United States Bankruptcy Court for the Southern District of West Virginia regarding the lack of value added to the estate due to the efforts of a contract miner operating on the property, plus a determination of the increase in environmental liabilities due to their actions.



FRASURE CREEK PERMIT REVOCATIONS

Project Location: Multiple Counties, West Virginia // Client: Intact Surety Group // Client Contact: Terry Dahl, 212.440.6550, tdahl@intactinsurance.com // Client Address: One State Street Plaza, 31st Floor, New York, NY 10004

A subsidiary of Intact Insurance Surety Group issued reclamation surety bonds associated with 23 West Virginia surface mining permits held by Frasure Creek Mining, LLC. WVDEP revoked fifteen (15) of those permits and issued “show cause” notices for four (4) of those permits. RESPEC was retained by the client to assess the reclamation liability and assist in developing a resolution.

RESPEC conducted a review of the WVDEP surface mining permits. The review included documenting all pending actions by WVDEP against the permits and permitted reclamation obligations. RESPEC conducted site visits meeting with current mine operators, mineral owner, potential purchasers, and WVDEP representatives. We also conducted a thorough review of the outstanding violations, classifying them by severity and deadline. The visits, combined with a review of the approved reclamation plan and current violations, allowed us to evaluate the most recent reclamation liability estimates.

RESPEC then assisted the client in evaluating various solutions, including bond forfeiture, the client subcontracting the reclamation, or facilitating the sale of some or all the assets. While solutions were being considered, we assisted the client with communications with WVDEP to ensure the permits could still be reinstated and did not advance to bond forfeiture.



HARBISON WALKER — HYBRID PASSIVE TREATMENT SYSTEM

Project Location: Ohiopyle State Park, Pennsylvania // Client: Pennsylvania DEP



Harbison Walker was a reclaimed clay mine site in Ohiopyle State Park in Pennsylvania. The site had drainage seeps in and below the mine, which had water that needed to be treated before entering the receiving stream, Laurel Run. Initial sampling from three different seeps indicated the water had elevated levels of pH/acidity, iron, manganese, and aluminum. Because of the three raw water quality types, an all-encompassing hybrid passive treatment system was designed to remediate the quality to current effluent limit requirements. The treatment system consisted of three separate systems, and in each system, several treatment components were designed based on flow and quality. The three systems worked together to remediate water quality to meet effluent standards at the discharge location into Laurel Run. The three systems had numerous components, such as vertical flow ponds, flush ponds, settling ponds, wetlands, and a limestone bed. The success of this project was based on the flow distribution paths as it directly relates to retention time, which is directly related to contact time. A dye test conducted during construction revealed the system needed horizontal and vertical flow. The overall results showed an average decrease of approximately 47 percent in conductance, iron, manganese, aluminum, and sulfates. The pH was increased to 6.53, which makes it no longer acidic.

PUDDLEDOCK OPERATION

Client: Vulcan Construction Materials // Client Address: 5601 Iron Bridge Parkway, Chester, VA 23831

Working On People's Environmental Concern (WOPEC) was contracted by Vulcan Construction Materials to determine the cause of low pH water encountered in the Main Pit and propose remediation and treatment recommendations. The site has two ponds: Pit Pond and Blue Pond. To start the evaluation, seven overburden samples were taken for acid-base analysis. Six of the samples were dried and prepared for leachate testing. We also took three water samples for analysis and titration testing. The results from the acid-base accounting revealed four of the overburden samples were producing acid, but one sample had a pyritic content of 1.21 percent. The results from the leachate study indicated a moderate acidity in the pit water. The results from the water quality testing were compared to water samples three years before with similar values except for an increase in sulfates, which indicates an active and ongoing environment associated with pyrite oxidation.

The water in Pit Pond is characterized as approaching a low level of AMD. During the site visit, several locations of pooling water were observed and indicated "hot spots" containing higher concentrations of pyrites. The client also reported severe corrosion problems encountered at the Pit Pond pump. Based on this information, it is believed there were intermittent localized changes in the Pit Pond pool quality sufficient to cause a near-immediate pump failure. At this point, an analysis was completed using AMDTreat software developed by the Office of Surface Mining to determine which pond is more cost-effective to treat.

The final recommendations for this site were to treat the hot spots with the following regimen:

- / Add an alkaline amendment
- / Apply limestone fines to a reclaimed upper slope area
- / Apply a mixture of hydrated lime to the exposed highwall
- / Monitor Pit Pond water quality to determine the effects of the alkaline amendments
- / Initiate an exploration drill program to identify the vertical and horizontal extents of AMD-producing materials in future mining
- / Develop a spoil plan to segregate AMD overburden
- / Replace the existing Pit Pond pump with one that can work in harsh conditions
- / Monitor Blue Pond to confirm it continues to offer amelioration assistance to Pit Pond
- / Continue to treat Pit Pond with quick lime and install an automatic ammonia or sodium hydroxide system to treat the wash plant water





COMPREHENSIVE STUDY OF THE POTENTIAL OF EXTRACTING AND PROCESSING CRITICAL MINERALS FROM COAL-BASED RESOURCES

Client: U.S. Department of Energy // Client Contact: Christian Robinson, 304.285.4396, Christian.robinson@netl.doe.gov // Client Address: 3610 Collins Ferry Road; Morgantown, WV 26507

U.S. Executive Order 13817, titled A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals, was issued on December 20, 2017, and listed a group of 37 minerals deemed critical to the United States' national security and economy. Critical minerals (CMs) are vital in defense applications, clean technology, and modern high-technology industries (e.g., fuel cells, mobile phones, high-capacity batteries, permanent magnets, phosphors, and metal catalysts). Funded by the U.S. Department of Energy, RESPEC joined forces with researchers at West Virginia University to complete a comprehensive study of the potential to extract CMs from coal-based resources. Bringing industry and academia expertise to the project, our team-built concepts for quantifying and extracting CMs found in conventional and unconventional coal-based sources, including in situ coal, coal refuse and tailing, AMD, and coal combustion residuals. Detailed analysis was conducted of the potential applications of these minerals in advancing alloys or component production that are essential to the U.S. economy or national security.

Our research successfully addressed the following fundamental issues relative to the availability of CMs:

- / The production of all CMs from conventional resources, including the methodologies applied in industrial processing, quantity of annual production, and use of all CMs
- / Details on the production of CMs from unconventional, coal-based resources, such as the CM concentrations in several types of coal-based resources that range from anthracite, lignite, ash, and AMD
- / Potential application and transfer of conventional industrial technology for extracting, separating, and recovering CMs from coal-based resources
- / Previous state-of-the-art techniques used for extracting, separating, and recovering CMs from coal-based resources
- / Possible phases of CMs as a final product after processing (e.g., metals, oxides, and salts)

CIVIL ENGINEER SERVICES FOR FEE IN LIEU OF (FILO) PROJECTS

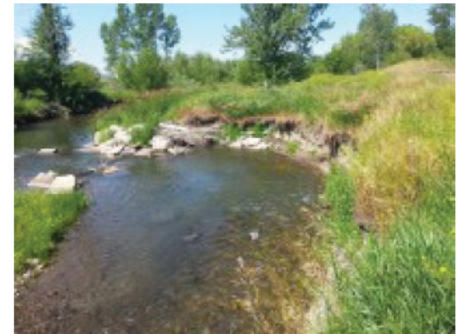
Project Location: Eastern Kentucky // Client: Kentucky Department of Fish and Wildlife // Client Contact: Jessie Boles, 502.564.5262, jessie.boles@ky.gov // Client Address: 1 Sportsman's Lane, Frankfort, KY 40601



RESPEC was on a team selected by the Kentucky Department of Fish and Wildlife (Fish & Wildlife) to serve as their consultant and provide services on multiple FILO mitigation projects in eastern Kentucky. As Fish & Wildlife's consultant, we are responsible for the following:

- / Identifying potential mitigation sites
- / Landowner outreach
- / Stream and wetland rehabilitation and restoration engineering designs
- / Biological assessments
- / Surveying sites
- / Coordination with local, state, and federal agencies
- / Cultural resources surveys
- / Environmental permitting

In addition to the tasks listed above, Fish and Wildlife, in coordination with the USACE, have requested RESPEC conduct an After-Action Review (AAR) on existing stream and wetland mitigation sites. To execute the AAR, we are reviewing the engineering design of these existing sites and subsequent monitoring reports to determine whether a site was successful. If a site is not performing to meet the established design criteria, we are evaluating the design and construction to determine why this site did not meet the specifications.



ASH GROVE 404 PERMITTING AND MITIGATION

Project Location: Little River County, Arkansas // Client: Ash Grove Cement Company // Client Contact: Bob Rawls, 913.209.9914 // Client Address: 4343 Highway 108 West, Foreman, AR 71836

Ash Grove Cement Company (Ash Grove) planned to expand its chalk mining operation in Little River County, Arkansas, to continue operation. The proposed expansion directly impacted approximately 12,300 linear feet of jurisdiction streams and 8.7 acres of wetlands. RESPEC was retained by Ash Grove to be responsible for negotiating with local, state, and federal agencies; obtaining a USACE Individual Permit; locating, designing, and securing mitigation for the environmental impacts; and providing project management. The proposed mitigation included the purchase of 62,499 stream credits and 35 wetland credits from Maniece Bayou Mitigation Bank.

The site investigations included stream and wetland delineation and classification. The wetland delineation performed using the 1987 USACE's Corps of Engineers Wetlands Delineation Manual required the sampling of vegetation, hydrology, and soils at 29 locations.

Issuance of the permit required addressing several other concerns, including cultural resources and protected species. The subject property was evaluated for the potential of containing protected species and protected species habitat. The evaluation located seven species listed by the U.S. Fish and Wildlife Services as federally threatened, endangered, or candidate for Little River County, as well as species listed by the State as threatened, endangered, and sensitive.

To obtain the permit, several alternatives were considered; however, the Ash Grove mining plan was determined as the preferred alternative results in the least amount of impact to jurisdictional waters while still meeting the project objective. Avoidance to direct impacts to wetlands and streams and minimization of the extent of direct impacts are requirements of the USACE 404 individual permit.



➤ ADDITIONAL PROJECT EXPERIENCE IN AML RECLAMATION AND REMEDIATION

The following is a partial list of AML projects for state or federal agencies completed by RESPEC or RESPEC staff. No listing is included of similar projects completed for private clients.

Bureau of Land Management (BLM):

- / War Eagle Mountain Project

Kentucky Division of AML:

- / Buck Branch Reclamation Project
- / Mare Creek Refuse Reclamation Project
- / Ridge Top Reclamation Project
- / Williams Branch Reclamation Project

Maryland Bureau of Mines:

- / Midlothian Acid Mine Drainage Project
- / Franklin Hill Slide Project
- / Shallmar Refuse Project
- / Vindex Refuse Project
- / Bartlett Hill Landslide Project
- / Frostburg Subsidence Reclamation Project

Ohio AML:

- / Abandoned Coal Mine Reforestation Projects

Oklahoma Conservation Commission:

- / Horsepen Creek Reclamation Project
- / Adams Creek North Reclamation Project

Montana DEQ, Abandoned Mine Section (AMS):

- / Wibaux County Mines Project

Utah Division of Oil, Gas and Mining:

- / Crawford Mountains AML Study
- / Brazier Demonstration Project

- / Molly's Canyon Project

- / Arickaree Project
- / Coal Hollow Project
- / Trespass Coal Mine Closure Project
- / Horse Canyon Coal Mine Fire Project
- / Silver Reef Project

Virginia Department of Natural Resources:

- / Wolfpen Gob Pile Project
- / Roaring Fork Landslide Project
- / Dorchester Drainage Project
- / Arno Sedimentation Project
- / Dorchester Drainage Project 2

Office of Surface Mining – Washington State:

- / Wilkeson AML Investigations
- / Buckley No. 2 Mine Reclamation
- / Wingate Hill Mine Reclamation
- / Van Zant Abandoned Mine Investigation
- / Hamilton/Minkler Lake Mine Reclamation
- / Spiketon Emergency Reclamation Project
- / Pack/Dupuis Reclamation Project

West Virginia Division of Environmental Protection:

- / Cook Refuse Reclamation Project
- / Nellis Complex Reclamation Project
- / Florence Hollow Project
- / Whitman Refuse Project
- / Roaring Creek Highwall Project

- / Saltwell Drainage Project
- / Hartford B Project
- / Stowe Structures Complex Project
- / Omar Complex Project
- / Carbondale Portals Project
- / Dillon Landslide Project
- / Sabine Refuse Project
- / Beaver Creek Highwall Project
- / Gypsy II Project
- / Twin Branch Complex Project
- / Browning Fork Slide Project
- / Ottawa Portals Project
- / Widen Refuse Reclamation Project

Wyoming DEQ:

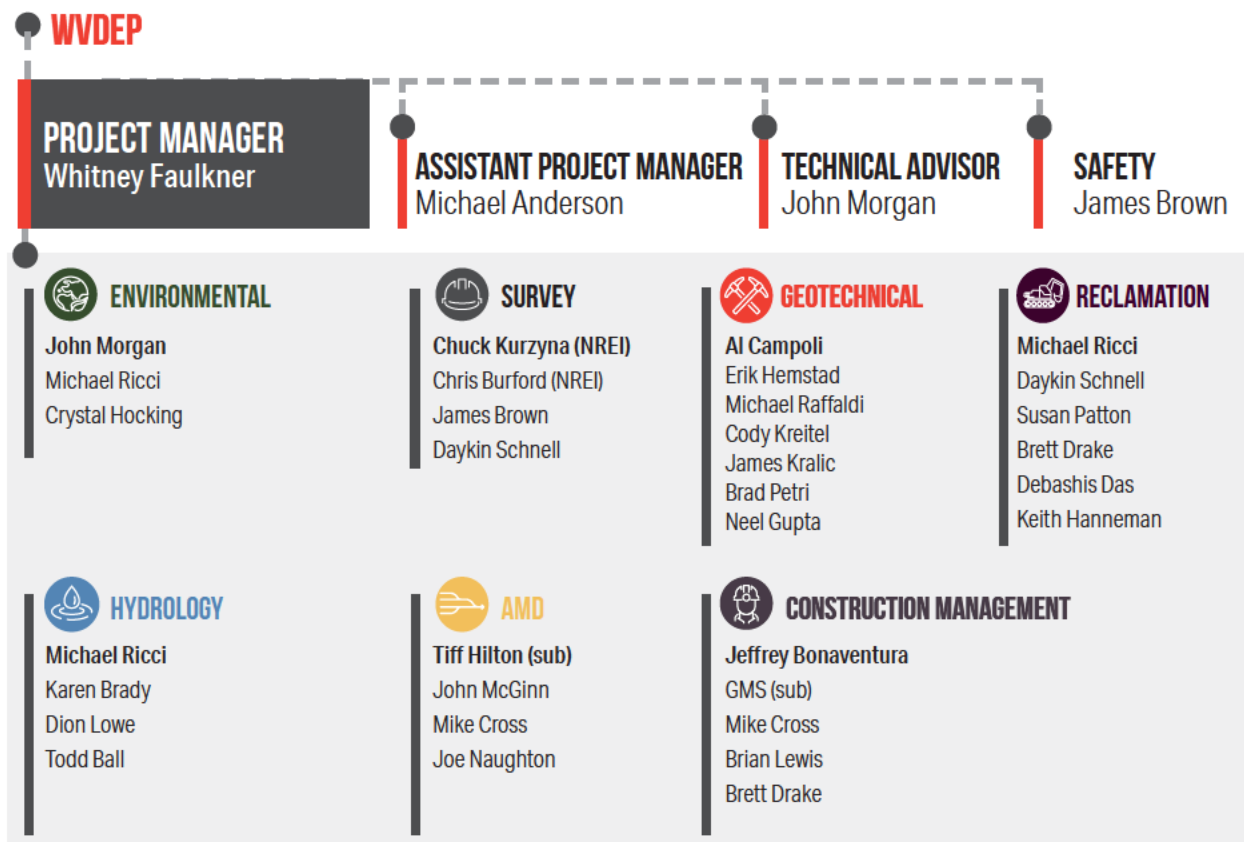
- / Horsecreek Project Phase 1B Horsecreek Project Phase 2
- / Project 17D - Mine Shafts, Subsidence Holes & Flood Control FMC Corporation
- / Copper Mountain Mine Reclamation
- / Double Dee Abandoned Mine Stabilization
- / Snake River Grave Pit and Wetland Reclamation
- / Kirwin Abandoned Mine Stabilization
- / Seahorn-Ramsey Coal Mine Reclamation
- / Gebo Coal Mine Reclamation Phase I and II
- / Little Mo-Arrowhead Uranium Mine Reclamation
- / Northwest Wyoming Abandoned Coal Mine Reclamation
- / Hidden Waters Mine Sites – Reclamation of Big Horn, Randall & Ash Creek Strip Mines
- / Kleenburn Coal Mine Project Hazard Assessment and Mitigation
- / Plachek Mine & Goose Creek Investigation and Mitigation Design
- / Storm King Coal Mine Sinkhole Remediation
- / Drainage Channel Reconstruction for Storm Kind Abandoned Mine
- / Record-Eveland Mine Reclamation
- / Wyoming Statewide Abandoned Coal Mine Reclamation
- / Abandoned Bentonite Mine Hazard Mitigation
- / Demonstration Plot for Bentonite Pit Reclamation
- / Restoration of Historical Carissa Gold Mine Mill
- / 3D Imaging to Restore Carissa Mine Shaft and Cage
- / Reclamation of Abandoned Wicker-Baldwin Uranium Mine
- / Reclamation of Abandoned Layland Canyon Phosphate Mine
- / Sheridan Mine Fire Supervision
- / Savory Mountain Mine/Thomas Abandoned Mine Reclamation
- / American Nuclear Corporation Uranium Tailings Cleanup and Reclamation
- / Shirley Basin Abandoned Uranium Mines Reclamation
- / Kemmerer Coal Mine Fire Hazard Mitigation
- / Wyoming AML Central Wyoming Non-Coal Contract
- / Rock Springs Drill & Grout Subsidence Abatement
- / Glenrock Mine Subsidence Peer Review



AVAILABLE RESOURCES

> CURRENT STAFFING

The summary organizational chart below illustrates the RESPEC project team expertise grouped into seven general qualification areas relevant to this EOI. The first staff member listed in each category is expected to serve as the team leader. This list is not exhaustive, and the staffing composition may be adjusted to meet the specific requirements of each project.



RESPEC has a substantial number of staff with the expertise required to complete AML projects.

We believe the success of any project depends on responsiveness and communication with the client. To facilitate this, RESPEC has established a dedicated sector within our M&E business unit that focuses solely on AML reclamation projects throughout the United States. This multidisciplinary team, spanning multiple states, is committed to finding smart, innovative, and cost-effective solutions for hazards associated with AMLs. To support this sector and handle additional AML projects in West Virginia, RESPEC has hired new employees specifically in West Virginia and our Lexington office. With the support of senior employees in Lexington and other offices, RESPEC has a substantial number of staff members with the expertise to successfully complete AML projects.

Our team has the capacity and talent to meet the requirements of the EOI. With an adjustable backlog of active and future projects, as well as a versatile and adaptable workforce, RESPEC can effectively manage projects and workload to deliver high-quality work within the specified timeframe.

Brief biographies are included in the following pages for our project managers, team leaders, and potential team leaders. Résumés for our professional staff are included in Appendix B and supporting licenses, certifications, and degrees are included in Appendix C.

TECHNICAL/MANAGEMENT STAFF

RESPEC's key personnel possess the necessary expertise, and our project team has a proven track record of successful collaboration. With our experience on similar

projects, we are confident in our ability to carry out all the required activities for these projects.

The number of employees with the required expertise enables us to quickly expand our team or provide additional support as needed.

RESPEC has developed a collaborative working system for seamless file sharing and accessibility across all offices. The system has enabled us to successfully complete large projects during the pandemic using staff from various locations. As a result, our entire staff is available company-wide, ensuring efficient project execution.

ADMINISTRATIVE STAFF

RESPEC uses state-of-the-art software for tracking employee time and project expenses while generating accurate invoices. As with our technical staff, clerical and support staff, such as AutoCAD technicians, are routinely and efficiently shared between offices.

GMS MINE REPAIR & MAINTENANCE



RESPEC is partnering with GMS Mine Repair & Maintenance (GMS). GMS is a mining contractor with offices throughout North America. With three offices in West Virginia, GMS will provide the team with fast access to the West Virginia coal fields.

GMS has offered underground and surface mining services for more than 40 years. Their experienced engineers have a history of solving the most challenging projects, with many projects in the West Virginia coal fields. The GMS staff brings years of hands-on construction experience to the team and valuable insight into solutions that have been proven successful.

NEW RIVER ENGINEERING, INC.



New River Engineering, Inc. (NREI) is an engineering surveying and consulting

firm that has provided quality service to industries for more than 20 years. NREI primarily serves the coal, oil and gas, timber, and construction industries. The staff combines advanced technology with many decades of surveying, mining, and engineering experience and includes two professional engineers, one professional surveyor, four degreed engineers, AutoCAD/engineer technicians, and 10 full-time survey crews. As a full-service engineering and surveying firm, NREI provides a whole host of services, including but not limited to the following:

- / Construction design
- / Construction management
- / Construction surveying
- / Geotechnical engineering and drilling management
- / Environmental Permitting (WVDEP, National Pollutant Discharge Elimination System [NPDES], Office of Air Quality, and USACE)
- / Underground/surface mining surveying
- / Aerial mapping
- / Compaction testing with nuclear density gauge
- / Subsurface utility locate surveys with ground-penetrating radar and pipe and cable locators
- / Boundary and property/topographical surveying

NGE CONSULTING



NGE Consulting is an award-winning engineering firm founded by a sibling team with

more than 25 years of experience. NGE pairs the personal touch of a family-owned business with highly qualified employees with a deep knowledge of their discipline. As a Woman-Owned Small Business, NGE is positioned to help clients meet their governmental contracting goals. Services provided include the following:

- / Geotechnical engineering
- / In-house drilling crews
- / Laboratory services
- / Environmental compliance
- / Remediation
- / Waste management
- / Construction inspection
- / Drill cuttings management



JOHN MORGAN **MINING TECHNICAL ADVISOR**

Education: BS in Mining Engineering // **Experience:** 46 years

John Morgan will serve as a Technical Advisor on this project. He is a mining consultant with extensive experience in both surface and underground mining for extracting metalliferous ores, coal, and industrial minerals. John has a Bachelor of Science in mining engineering from the Royal School of Mines in London, United Kingdom. He has been the project manager on several mine technical reviews, mining operation appraisals, many subsidence investigations, and reviews of environmental compliance and liability analyses for both operating and abandoned mining operations. John was the project manager for the Rock Springs Mine Subsidence project for the Wyoming DEQ/AML. He was also the project manager for the North Branch Potomac AMD study as a joint effort of the Maryland Bureau of Mines, WVDEP, and OSMRE.

John currently serves on the West Virginia Special Reclamation Fund Advisory Council, overseeing the special reclamation fund for post-1977 bond forfeiture sites. His other major projects encompass the Stream Protection Rule EIS for OSMRE and the Tennessee Lands Unsuitable petition, also for OSMRE.

In Pennsylvania, John worked with the Pennsylvania Department of Environmental Protection on both the UMC0 Energy litigation and the Consol Energy Clean Water Act case for the Bailey complex. He was the PM for the permit review of the Rustic Ridge permit. John has been actively involved in projects worldwide, including in Indonesia, Vietnam, Russia, India, Finland, Ukraine, Poland, Bulgaria, Romania, Peru, and Trinidad. In addition to working in every region of the United States, John has worked at several gold mines in South Africa and has been a mine planning engineer for an open-cast coal site in Britain.

EXPERTISE

- » Active and Passive Water Treatment Systems
- » Project Management
- » Wastewater Treatment Systems
- » Water Storage, Pumping, and Piping Systems
- » Construction Administration
- » Feasibility and Cost Analysis
- » Regulatory Compliance



ENVIRONMENTAL

AWARDS

Awarded the 1995 AML Reclamation Award by the U.S. Department of the Interior for the Rock Springs, Wyoming, subsidence mitigation program. Founding member of the West Virginia Special Reclamation Fund Advisory Council.





LICENSED STATES

Professional Engineer in
WV, KY, and PA

EXPERTISE

- » AML Reclamation
- » Surface Mine Reclamation
- » Project Management
- » Environmental Permitting
- » Stormwater Management
- » Site Development



WHITNEY FAULKNER, PE **PROJECT MANAGER**

Education: BS in Civil Engineering // **Experience:** 21 years

Whitney Faulkner will be the Project Manager on this project. She has 21 years of experience in civil and environmental engineering. She is currently managing AML projects in West Virginia and Pennsylvania. Whitney is responsible for a team of professionals who serve as consultants to the Kentucky Department of Fish & Wildlife Resources. As a land development engineer, Whitney managed professional consultants on 1,500-acre projects that involved working closely with city officials and maintaining a \$140 million budget.

Whitney was an engineer permit reviewer for 9 years for the Kentucky Department of Natural Resources Division of Mine Permits. She was responsible for reviewing each application that contained a coal-waste-disposal impoundment, high-hazard dams, breakthrough potential, or mining near an impoundment; evaluating the proposal based on its complexity; and assigning the application to the most qualified reviewer. Whitney reviewed approximately 115 applications, which required reviewing stability analyses, seepage analyses, hydraulic modeling, dynamic analyses, pipe deflection analyses, and breakthrough analyses. Whitney's unique skills as a project manager, knowledge of mining and its hazards, and understanding of state government will allow her effectively lead the West Virginia AML projects.

ACCOLADES

"I'm honored to have had the opportunity to meet all of you through the years. You all are the best and make my job easier and with less stress."

– Mike Sharp, Alden Resources



LICENSED STATES

Professional Engineer in WV, and AL

EXPERTISE

- » Surface Mine Reclamation
- » Site Development
- » Operations and Project Management
- » Mine Planning and Design
- » Drill and Blast Design

MICHAEL ANDERSON, PE ASSISTANT PROJECT MANAGER

Education: BS in Mining Engineering // Experience: 12 years

Michael Anderson has 12 years of combined experience in mining engineering and project management. He is currently assisting in project management of AML projects in West Virginia. Michael has worked as a mining engineer, operations manager, and project manager at large open pit and underground limestone mines. He has experience working on surface and underground mining projects in several states and was responsible for developing two new underground limestone mines in West Virginia. Michael has a wide range of experience in mine design, mine planning, project scheduling, drill and blast design, optimization studies, surveying, mapping, bulk material handling design, site development, expert witness, and quality control.

Michael's technical expertise, attention to detail, and team attitude make him a very competent and reliable leader



LICENSES/ CERTIFICATIONS/ REGISTRATIONS

FAA Part 107 UAV Pilot Certification/
Occupational Safety and Health Administration
40 Hour HAZWOPER Certification/MSHA Part 46 and 48 Mine Training

JAMES BROWN HEALTH AND SAFETY MANAGER

Education: BS in Environmental Science // Experience: 9 years

James Brown's responsibilities will encompass assisting in environmental permitting and closure support by reviewing biological assessments and safety plans. James has experience in environmental field services combined with experience as a health and safety professional. His past project-specific technical experience includes subsurface laser scanning, emergency response, multiparameter water and soil analyses, groundwater user surveys, stream flow and hydromodification surveys, rapid bioassessment protocols, benthic macroinvertebrate sampling, threatened and endangered species surveys, and jurisdictional determinations.

EXPERTISE

- » AML Reclamation
- » Surface Mine Reclamation
- » Project Management
- » Environmental Permitting
- » Stormwater Management
- » Site Development





LICENSED STATES

Professional Engineer in WV, IL, IN, KY, MD, NC, NH, OH, TN, VA, and WY

EXPERTISE

- » Surface Mine Reclamation
- » Post-Construction Stormwater
- » Environmental Permitting



MICHAEL RICCI, PE **MINING ENGINEER**

Education: BS in Mining Engineering // **Experience:** 42 years

Mike Ricci will be part of the environmental compliance and permitting section and the hydrology and stream restoration team. He has experience with environmental permitting, geologic modeling, mine planning and evaluation, and regulatory compliance. After receiving his Bachelor of Science from the University of Kentucky, Mike entered the consulting industry. His early career focused on compliance with the newly implemented SMCRA. He was responsible for the primary components of the SMCRA permit, including stability analyses, hydrologic/sedimentologic modeling, volumetric design, and establishing baseline surface-water and groundwater monitoring plans. Mike has 41 years of experience with environmental permitting, including the many aspects of SMCRA permitting, USACE 404 permitting, and NPDES permitting for coal and other commodities. He has completed projects in multiple states.

Mike joined Environmental Resources Management Consulting Company (ErMC2) in 2004. ErMC2 was formed to represent the interest of a national insurance company that held millions of dollars of reclamation bonds related to surface mine reclamation for Horizon Natural Resources (HNR). HNR filed for bankruptcy in 2004; as part of the settlement, Lexington Coal Company (LCC) was created and assumed most of the outstanding reclamation liabilities for the HNR properties. Mike participated in or oversaw tasks such as monitoring and reporting reclamation progress quarterly, maintaining an estimate of reclamation costs, approving the quarterly operating budget of LCC, and subcontracting selected reclamation projects.

OTHER ACCOMPLISHMENTS

Developed the only alternative sediment control design method currently approved by the Kentucky Department for Natural Resources.

Environmental representative on the WVDEP QA/QC Board.



LICENSED STATES

Professional Engineer
in FL, ME, NJ, NH, SD,
and WY

Professional Geologist in
LA, NY, TX, and WY

EXPERTISE

- » Environmental and Mine Permitting
- » NEPA Analysis
- » Hydrogeological Site Characterization
- » Groundwater Modeling



ENVIRONMENTAL

CRYSTAL HOCKING, PG, PE ENVIRONMENTAL COMPLIANCE AND PERMITTING

Education: MS in Mining Engineering, MS in Structural Engineering, BS in Civil Engineering //

Experience: 16 years

Crystal Hocking will support all aspects of permit review, including completeness and compliance reviews, review of groundwater and hydrology, well-plugging plans, water quality geotechnical assessments, and baseline studies. She will assist with the design of water quality monitoring wells, piezometers, or other instrumentation to supplement data collection. Crystal has supported environmental site assessments, hydrogeological characterizations, groundwater modeling, geologic mapping, geospatial analyses, mine permit application preparation, and technical reviews. Crystal has written and reviewed several large-scale mine permit applications and has experience with environmental and permitting regulations in several states. She helped prepare county and state permits for Wharf Resources' Green Mountain and Boston mine expansions, including project management and assembly of the entire permit application and baseline assessment packet. Crystal has led two large-mine EIS projects for Montana DEQ, including an EIS for the Golden Sunlight Mine gold tailings reprocessing project and an EIS for the Barretts Minerals talc mine expansion. She also participated in technical reviews of two separate in situ uranium permits for the Wyoming DEQ. She has developed and analyzed aquifer pumping tests for a small quarry and in situ uranium project.

ACCOLADES

"The professionalism and quality of work that was completed by RESPEC and their staff were indispensable in the approval of our new large-scale mine permit."

– Ken Nelson, Operations Manager, Wharf Resources



LICENSED STATES

Professional Land Surveyor
in WV. Professional
Engineer in WV, OH, PA, VA,
KY, and GA

EXPERTISE

- » Surveying
- » Construction

CHARLES (CHUCK) KURZYRNA, PE, PLS

PROFESSIONAL SURVEYOR/ ENGINEER

Education: Bachelor of Science Mine Engineering Technology //

Experience: 30 years

Chuck Kurzyrna has more than 30 years of experience in surveying and engineering for the mining and construction industries. He will serve as the Professional Land Surveyor for these projects. Chuck is experienced in surface and underground mine design, planning, and surveying; environmental and safety permitting; project and construction management. Prior to joining NREI, he served as the senior engineer for a surface coal mining operation and chief engineer for a small mining and construction company. Chuck is a member of the Contractors Association of West Virginia.



SURVEY



CERTIFICATIONS

Certified Underground Coal Miner, Certified Surface Coal Miner, MSHA Certified Limited Instructor, APNGA Portable Nuclear Gauge Safety

EXPERTISE

- » Surveying Management
- » Construction Management

CHRISTOPHER BURFORD **SURVEY MANAGER**

Education: AA in Mine Civil Engineering Technology // **Experience:** 16 years

Christopher Burford has over 15 years of experience in environmental permitting, surveying, safety, and construction management in mining and civil projects. He will manage the surveying and mapping portions of the project. Although it is not Christopher's primary responsibility on this project, his experience in construction management and oversight strengthens the team's capabilities in this role.

Christopher is a member of the Contractors Association of West Virginia and the West Virginia Rural Waters Association.



LICENSED STATES

Professional Engineer in KY

EXPERTISE

- » Operations, Project, and Contractor Management
- » Quality Control and Operational Auditing
- » Health and Safety
- » Abandoned Mine Investigation
- » Remote Scanning and Mapping
- » Mine Planning and Design
- » Drill and Blast Design, Guidance, and Optimization
- » Blast Data Collection and Interpretation

DAYKIN SCHNELL **ASSISTANT PROJECT MANAGER/EXPLOSIVE ENGINEER**

Education: MS in Explosives Engineering, BS in Mining Engineering // **Experience:** 9 years

Daykin Schnell will serve as Assistant Project Manager and has 9 years of combined experience in mining and explosives engineering. He has worked on surface and underground coal, limestone, and metal mining projects in North America, Europe, and Asia. Daykin has technical experience in abandoned mine investigation; remote scanning and mapping; mine planning and design; drill and blast design, guidance, and optimization; blast data collection and interpretation; operations, contracting, and project management; and quality control and operational auditing. Daykin is also experienced in health and safety and emergency response with his mine rescue, first aid, firefighting, Emergency Medical Technician, and Hazardous Waste Operations and Emergency Response (HAZWOPER) experience and training.

OTHER ACCOMPLISHMENTS

Project manager for multiple underground investigation projects using remote scanning instrumentation





LICENSED STATES

Professional Engineer in WV, AL, IL, KY, PA, TN, UT, and VA

EXPERTISE

- » Engineering Management
- » Subsidence Prediction and Control
- » Mine Fire Evaluation and Control
- » Coal- and Rock-Pillar Design
- » Rock Reinforcement
- » Standing Support
- » Groundwater Containment
- » Methane Drainage
- » Ventilation Controls

ALAN CAMPOLI, PhD, PE, SME-RE GEOTECHNICAL/MINING ENGINEER

Education: PhD in Mining Engineering, MS in Engineering Management, BS in Mining Engineering // **Experience:** 46 years

Dr. Al Campoli is part of our Mine Fires and Closure Teams and is our Subsidence Team lead. He has more than 45 years of engineering and sales experience in the mining and tunneling industries. He has experience from previous roles as Vice President of Special Projects at Jennmar, business development manager, consulting engineer, US Bureau of Mines researcher, and coal miner. His focus has been on pillar design, rock reinforcement, standing support, groundwater containment, methane drainage, subsidence, mine fire, and ventilation issues for tunneling, mining, and construction. Al taught mineral economics and mine valuation at the University of Kentucky and has authored more than 40 technical publications. He has delivered numerous formal presentations at forums, including the Society for Mining, Metallurgy, and Exploration (SME) and the American Mining Congress. He is a distinguished member and former chairman of the Pittsburgh and Central Appalachian Sections of the SME and served on the Peer Review Editorial Board, Professional Engineers Exam Committee, Research Council, and Program Committee.



GEOTECHNICAL





ERIK HEMSTAD **GEOTECHNICAL ENGINEER**

Education: MS in Civil-Geotechnical Engineering, BS in Geological Engineering //

Experience: 12 years

LICENSED STATES

Professional Engineer in
CO and NM

EXPERTISE

- » Project Management
- » Geological and Geotechnical Characterization and Analysis
- » Exploration Program Development and Management
- » Solution-Mining Engineering Design and Assessment
- » Geomechanical Testing and Soils and Rock Analysis
- » Geophysical and Field Instrumentation Methods and Techniques



GEOTECHNICAL

Erik Hemstad has more than 10 years of experience in geological and geotechnical engineering. He has an established breadth of knowledge and experience across the geological, civil, and mining engineering and geology fields, coupled with project, business, and personnel management capabilities and effective decision-making and judgment. For these projects, Erik will focus on project management and geotechnical engineering while applying previous knowledge from other mine reclamation and abandonment projects. Erik has experience performing project management functions for various geotechnical and geological clients in the mining and civil industry sectors. His work encompasses an array of small- to large-scale projects. Examples include designing and managing geotechnical and core-drilling investigations for USACE and multimillion-dollar underground mine reclamation and abandonment projects for OSMRE. Erik's project management and leadership pursuits are embodied through robust professional development and experience while personifying the contributions and skillsets of fellow colleagues and team members to meet and exceed client needs and expectations.

ACCOLADES

Provided technical support, management, and oversight to drillers while collecting samples and downhole data from the Axial Mine Located at the historic Streater Mine near Craig, Colorado, where in situ temperatures generated from the fire exceeded 350 degrees Fahrenheit.





LICENSED STATES

Professional Engineer in KY

EXPERTISE

- » Excavation and Pillar Stability
- » Ground Support
- » Geomechanical Analysis
- » Geotechnical Instrumentation
- » Material Testing

MICHAEL RAFFALDI, PE **GEOTECHNICAL/ MINING ENGINEER**

Education: MS in Mining Engineering, BS in Mining Engineering // **Experience:** 8 years

Mike Raffaldi has substantial industry and research experience in rock mechanics and geotechnical engineering. His primary areas of expertise include the design and analyses of underground excavations, pillars and pillar layouts, and ground support. Mike has experience with various empirical, analytical, and numerical analysis methodologies and in selecting and applying these tools appropriately to solve engineering problems. Mike also has a background in selecting and installing geotechnical instrumentation, interpreting data acquired from these instruments, designing test programs, testing rock and backfill materials to determine engineering properties, and testing ground-support products to measure their mechanical performance.



GEOTECHNICAL



LICENSED STATES

Professional Engineer in AK

EXPERTISE

- » Geotechnical Engineering
- » Subsurface Explorations and Evaluations
- » Numerical Modeling
- » Instrumentation
- » Laboratory Testing
- » Permafrost and Arctic Engineering

CODY KREITEL, PE **GEOTECHNICAL ENGINEER**

Education: MS in Arctic Engineering, BS in Civil Engineering // **Experience:** 15 years

Clients count on Cody Kreitel to provide a lay of the land—literally and figuratively. His can-do attitude, combined with thousands of hours of field explorations, sets a good foundation with design teams and their facilities. Cody, who will lead our Geotechnical Team, has worked on a variety of geotechnical/civil engineering projects, including data collection for mine tailings dams on permafrost, mining infrastructure, and mine portal closures, as well as inspection and design of water supply dams, multistory buildings, highways, marine structures, municipal roads, bridges, aboveground pipelines, and residential developments. He can switch between a range of office tasks, laboratory testing, and extended fieldwork in remote locations. Cody is an expert at planning geotechnical field exploration programs designed to capture all of the data required, and only the data required, to support design and construction. He has experience with numerous forms of subsurface exploration, including hollow-stem augers, solid-stem augers, direct push, mud rotary, air rotary, diamond coring, and sonic drilling. He regularly works with geophysicists to supplement the data collected with invasive drilling methods and is well-versed in the capabilities of in situ resistivity testing, downhole and cross-hole seismic testing, and ground-penetrating radar. With field experience across all Alaskan regions, Cody is intimately familiar with the challenges associated with geotechnical evaluations and construction in remote locations and harsh conditions.



GEOTECHNICAL



BRADLEY PETRI, PE **STRUCTURAL / MINING ENGINEER**

Education: MS in Mining Engineering, MS in Structural Engineering, BS in Civil Engineering //

Experience: 14 years

Brad Petri has project experience with surface and underground operations in limestone, coal, and hard-rock deposits in North and South America, Europe, and Asia. Brad's professional experience includes structural design and assessment, project coordination, geotechnical evaluations of mine sites, including reclaimed sites, refuse mine waste piles and spoil reclamation, mine design and development, geologic modeling, slope stability analysis, mine closure and bulkhead design, and mine permit applications and compliance. Brad is well-versed with Manifold® System, HEC-HMS, GEOVIA Surpac™ and MineSched, and FLAC3D. He is also experienced in the American Concrete Institute and American Institute of Steel Construction design standards and application.

LICENSED STATES

Professional Engineer in
AL, CO, KY, MS, NM, and TN

EXPERTISE

- » Structural Assessment and Design
- » Project Management and Coordination
- » Mine Planning and Design
- » Geologic Modeling and Validation
- » Slope Stability Analysis and Remediation
- » Mine Closure and Bulkhead Design
- » Mine Permit Applications



GEOTECHNICAL





NEEL GUPTA, PhD MINING ENGINEER

Education: PhD in Mining Engineering, M. Tech & B. tech in Mining Engineering // **Experience:** 12 years

EXPERTISE

- » Geomechanical Analyses of Underground Mines
- » Surface Subsidence
- » Creep Characterization of Shale
- » Image Processing
- » Two-Phase Fracture Flow



Dr. Neel Gupta is a project engineer in RESPEC's M&E business unit, based in Rapid City, South Dakota. Since working for RESPEC, Neel has been involved in many projects that require analytical technique and numerical modeling software to conduct analyses in salt, potash, and marble mines. Neel is proficient in interpreting the well logs to determine the local geology and mechanical properties of stratigraphic layers surrounding the mine, as well as evaluate laboratory test results to develop material properties for numerical models. Neel has performed geomechanical analyses to forecast the surface subsidence from underground mine development or brine cavern expansion, evaluate the current mine design to identify ground-control issues, and forecast the mine response to future developments. During his doctoral research at West Virginia University and his time working as a post-graduate researcher at National Energy Technology Laboratory in Morgantown, West Virginia, Neel developed expertise in processing X-ray computed tomography images of rock cores, an essential technique in the non-destructive testing of rock specimens. He is familiar with software such as FLAC3D, ImageJ, Bruker CTAn, and MATLAB. Neel is proficient in English and Hindi.

ACCOLADES

Neel was one of 13 future leaders from all over the world selected to be included in the American Rock Mechanics Association Future Leader, Class of 2021. Neel was also awarded the Syd S. and Felicia F. Peng Ground Control Scholarship, 2018, from the Society of Mining, Metallurgy & Exploration.





LICENSED STATES

Professional Engineer in
AL, CO, MT, NM, and SD

EXPERTISE

- » Mining Engineering
- » Mine Ventilation
- » Reserve Reporting
- » Coal Mining
- » Mine Waste Management



RECLAMATION

SUSAN PATTON, PhD, PE, SME **MINING ENGINEER**

Education: PhD in Mining/Environmental Engineers, PSc in Mineral Engineering, BSc in Mining Engineering // **Experience:** 40 years

Dr. Susan Patton is a principal consultant in RESPEC's M&E business unit, and as our Mine Fires Team Lead, she will provide engineering design oversight on this project. She is a diverse technical mining professional and project manager with extensive expertise in underground coal mine design, including in-depth ventilation system modeling. She frequently leads scoping, pre-feasibility, and feasibility studies; due diligence; productivity and material handling analysis; operating and capital cost estimates; and financial evaluations. Susan is a Qualified/Competent Person for economic analysis and mineral reserve reporting (US Securities and Exchange Commission [SEC] S-K 1300 and National Instrument 43-101) for brine and bedded deposits using dry or solution-mining extraction techniques. She has extensive ventilation expertise in coal, metal, and nonmetal mines and mined caverns, including troubleshooting, modeling, design, and shaft sizing. She has academic research expertise in mine gob evaluation and waste management.



LICENSED STATES

Professional Engineer in WY

EXPERTISE

- » Project Management
- » Construction Management
- » Mine Land Reclamation, Planning, and Design
- » Mine-Closure Design
- » Equipment Operation
- » Surveying



RECLAMATION



CONSTRUCTION
MANAGEMENT

BRETT DRAKE, PE **PROJECT ENGINEER**

Education: BS in Architectural Engineering // **Experience:** 12 years

Brett Drake will be the Construction Management Team Lead on this project. He has 10 years of experience in AML reclamation project management and construction management services for a variety of abandoned underground and surface hard-rock mine sites that pose hazards to public health and safety or constitute an environmental hazard. Brett has been the project manager and on-site project engineer for the reclamation of shafts, adits, portals, highwalls, open pits, and other abandoned-mine-related features. His responsibilities have included observing the quality of executed work and determining whether the work is proceeding in accordance with the contract documents. Brett has prepared the daily and weekly reports and quantities of work completed to facilitate preparing the contractor's application for payment. He also has experience in project design work, including preparing AutoCAD drawings and 3D models of proposed reclamation contours. Brett has also assisted in various surveying-related projects, including topographic surveys, construction staking, section breakdowns, mining claims, subdivision surveys, corner locations, boundary relocations, pin locations, encroachment surveys, record researching, drafting, and plat creation.



DEBASHI (DEBA) DAS, PE MINING ENGINEER

Education: MS in Mining Engineering, MTech in Mining Engineering, BTech in Mining Engineering // **Experience:** 12 years

Deba Das has experience in mine planning, permitting, and reclamation; geologic modeling; pit design; resource and reserve estimation; and mining financial modeling for mineral commodities such as coal, iron ore, aggregates, potash, and rare earths. He has been involved in mine feasibility studies, due-diligence studies, mine permit applications, reclamation studies, and mine plan preparation. Deba also has experience working with multiple software applications, including Minex, Surpac, AutoCAD, Carlson, QGIS, Whittle, and Global Mapper. Deba is proficient in English, Hindi, and Bengali.

LICENSED

Professional Engineer in KY

EXPERTISE

- » Mine Planning
- » Mining Feasibility and Due Diligence
- » Mine Permit Applications
- » Shale Rock Characterization



RECLAMATION

ACCOLADES

Deba received a graduate research assistantship at West Virginia University for his MS work. He developed a new technique to visualize shale rock grains, and the work was published in the *International Journal of Mining Science and Technology*.



KEITH HANNEMAN, PE CIVIL ENGINEER / TRANSPORTATION DIRECTOR

Education: BS in Civil Engineering // **Experience:** 36 years

Solving problems for the client with cost-effective, low-maintenance solutions and setting them up for the future is Keith Hanneman's top priority. Keith has designed, managed, and either led or supported the owner's side construction management on a broad background of civil work throughout northern Alaska, primarily rural highways/access roads and utilities supplemented with site and drainage design. Industrial projects include extensive work for Golden Valley Electric, the Interior Gas Utility, and Doyon Utilities. Drawing on 35 years of road and highway experience, Keith guides his team in all types of transportation projects. He uses lessons learned from projects spanning 175 miles of rural highway (federal and interstate) and rural industrial/mining access roads. His broad experience in safety improvements, geotechnical (including permafrost soils), insulated and reinforced embankments, material source development, hydrology, aufeis, and fish passage culverts means he is ready to help in nearly any area.

LICENSED

Professional Civil / Environmental Engineer in AK

EXPERTISE

- » Mining/Industrial Access Road Design
- » Small Community Roads
- » Rural Highways Evaluation/Engineering
- » Access Roads to Remote Sites
- » Fish Passage and Large Culvert Design



RECLAMATION



KAREN BRADY, PE UTILITY ENGINEER

Education: BS in Civil Engineering // Experience: 22 years

LICENSED STATES

Professional Civil and
Environmental Engineer
in AK

EXPERTISE

- » Project Management
for Multidisciplinary
Projects
- » Hydraulic Modeling
- » Thermal Analysis for
Heat Loss in Water and
Wastewater Piping
- » Water and Wastewater
System Condition
Assessment
- » Civil Site Design
- » Utilidor Systems



Karen Brady will lead our Water Lines/Sewage Treatment Team, performing civil site and water management design activities for this project. She will use her past experience with design, permitting, and construction administration to bring thoughts and ideas to the feasibility stage of the project to help decision-makers in this vital stage of the project choose the path that is right for the long term. Karen has more than 20 years of experience providing planning, design, and construction administration services on water, sewer, and civil site projects. She currently manages the utility group at RESPEC and remains involved through each stage of a project. She has a solid, practical understanding of how technical drawings and specifications relate to the construction process in the field. Karen's utility experience includes hydraulic modeling, fire flow capacity analysis, thermal modeling, alignment and profile development, and storm drainage. Karen enjoys working with a multidisciplinary team, collaborating to resolve potential issues. She finds it especially rewarding to be involved from the scoping stage through the design and permitting and then construction. Karen was born and raised in the coal country of northeast Wyoming, so she is accustomed to local viewpoints on reclaiming the land to support the needs of the nearby residents. On the recent Manh Choh mine project, she was involved in the scoping, feasibility study, and design of water management features as well as drinking water and sewerage facilities at the Personnel Camp.





LICENSED STATES

Professional Engineer in SD

EXPERTISE

- » Erosion and Sediment Control
- » Utility and Drainage Design and Management
- » Stormwater Pollution Prevention Plans

DION LOWE, PE **CIVIL ENGINEER**

Education: BS in Civil Engineering // Experience: 15 years

For more than 15 years, Dion Lowe has designed and managed the erosion and sediment control requirements associated with projects ranging from multi-million-dollar commercial buildings to small sub-divisions in Rapid City, South Dakota, and the surrounding areas. This included involvement in all stages, from design to implementation to final stabilization.



EXPERTISE

- » Natural Stream Design
- » USACE 404 Permitting and Mitigation
- » Stream Stabilization



ENVIRONMENTAL



HYDROLOGY

TODD BALL **STREAM RESTORATION SCIENTIST**

Education: BS in Environmental Biology // Experience: 34 years

Todd Ball is part of our Post-mining Stormwater/Stream Mitigation Team and will assist with stream stabilization, stream design, and reconstruction on this project. Todd has more than 34 years of experience providing planning, design, and construction administration services on projects related to streams and wetlands. He has directed numerous projects involving the permitting, design, and restoration of streams and wetlands throughout the eastern United States. His work has been concentrated in North and South Carolina, Georgia, Texas, Arkansas, Louisiana, and Tennessee. Todd has provided technical and management experience to state, federal, and local agencies, as well as private clients, from major golf course designers to Fortune 100 companies, for stream restoration using Rosgen Natural Channel Design. Todd has extensive experience directing the conception, design, and implementation of mitigation banking. His technical expertise has brought millions of dollars in cost-saving measures, increased land appraisal values, improved commodity management, and expanded nonregulated acreage.



TIFF HILTON **MINING ENGINEER**

Education: BS in Mining Engineering // **Experience:** 48 years

Tiff Hilton has 48 years of experience in mining engineering, with an emphasis on AMD. He will be an instrumental part of our team with his vast experience in AMD. Tiff has authored or coauthored more than 15 publications on AMD and water treatment. He formed WOPEC in 1989 and has evaluated AMD sites for more than 35 coal companies and has further branched out into non-coal evaluations. Tiff is also an experienced surface and underground mine foreman in West Virginia and a certified blaster. Tiff's unique knowledge of AMD, remediation, and preventive solutions, along with coal mining experience, specifically in West Virginia, demonstrates to WVDEP how he will be an asset to AML projects.

EXPERTISE

- » Active AMD Treatment
- » Passive AMD Treatment
- » AMD Site Evaluation





LICENSED STATES

Professional Engineer in
CA and CO

EXPERTISE

- » Active and Passive Water Treatment Systems
- » Project Management
- » Wastewater Treatment Systems
- » Water Storage, Pumping, and Piping Systems
- » Construction Administration
- » Feasibility and Cost Analysis
- » Regulatory Compliance



JOHN MCGINN, PE WATER / WASTEWATER PROJECT ENGINEER

Education: BS in Civil Engineering // Experience: 45 years

John McGinn, our AMD/Water Treatment Team Lead, is also part of our Water Lines/Sewage Treatment Team and will serve as a project engineer for this project. His responsibilities will encompass engineering services for feasibility studies and design of active and passive AMD treatment facilities; evaluation of waterline extension/water supply replacement; and remediation, operation, monitoring, maintenance, and rehabilitation of existing passive and active AMD treatment systems. John has more than 40 years of experience in civil engineering, including the analysis, planning, permitting, and design of water and wastewater treatment facilities. John's experience also includes water and aquifer contaminant remediation, water distribution and wastewater collection facilities, groundwater systems, pumping and lift station facilities, raw and potable water storage, utility rate and revenue analysis and municipal systems, district management, water resource planning and studies, construction administration, grant application, expert witness/representation, and administration and project management.

John has completed the design of numerous water and wastewater treatment plants, remediation facilities, and pilot studies. In addition to general water treatment, John has completed treatment schemes for targeted pollutants such as:

- / Iron and manganese
- / pH and corrosion control/management
- / Radionuclides (radon, radium, and uranium)
- / Biological reaction systems and bioreactors, both continuous-feed and batch reaction
- / Organics, such as perchloroethylene (PCE) and per- and polyfluoroalkyl substances (PFAS) compounds
- / Arsenic and other metals

ACCOLADES

In 2016, PFAS contamination was discovered in the Widefield Aquifer, which supplied drinking water for three communities and over 30,000 people. John was the Principal-in-Charge of water for remedial treatment for removing PFAS using ion-exchange systems. Such a method was the first of its kind for municipal water remediation, and the task from the pilot study to a complete water system was accomplished in 6 months.



MICHAEL CROSS **CONSTRUCTION MANAGEMENT**

Education: BS in Mining Engineering // **Experience:** 43 years

Mike Cross has more than 40 years of mine design and permitting experience and has worked directly for and as a consultant to the mining industry. He will assist with project design and is part of our AMD/Water Treatment and Geotechnical Teams for this project. His vast knowledge in mine design and permitting spans West Virginia, Kentucky, Ohio, Maryland, Indiana, Tennessee, and Virginia. As a consulting engineer and office manager, Mike was responsible for designing, preparing, and managing environmental and other associated permits for the mining industry. He is experienced in all aspects of SMCRA permitting, USACE 404 permitting, State 401 Water Quality Certifications, and NPDES permits for mining and commercial projects in various states.

Mike has been responsible for overseeing contractors conducting reclamation at coal surface mine operations. He has worked on multiple projects related to the treatment of AMD.

EXPERTISE

- » Design Services
- » Mining Subsidence Control Plans
- » Construction Oversight
- » AMD Seepage Analysis
- » Mine-Closing Costs
- » Mine Liability Cost Studies



JOSEPH NAUGHTON **PROJECT BIOLOGIST**

Education: MS in Fisheries and Wildlife Management, BS in Fisheries and Wildlife Management // **Experience:** 17 years

Joe Naughton is the monitoring group manager for the environment division of the WNR business unit at RESPEC and will provide monitoring oversight as part of our Post-mining Stormwater/Stream Mitigation Team. He has 17 years of experience conducting ecological research and monitoring to assess the effects of various contaminants on the environment, particularly in scientific investigations necessitated by the Comprehensive Environmental Response, Compensation, and Liability Act. Since 2014, Joe has been the project manager and lead scientist for comprehensive environmental monitoring of Superfund remedies by the state of Montana for the Streamside Tailings Operable Unit of Silver Bow Creek and the Clark Fork River Operable Unit. He also has a major, ongoing role as a technical lead supporting the Saskatchewan First Nations Natural Resource Centre of Excellence in investigating the impacts of multiple contamination issues in the province. Joe has a background in fisheries, and before joining RESPEC, he worked for the U.S. Geological Survey, Oregon Department of Fish and Wildlife, U.S. Forest Service, and National Park Service.

EXPERTISE

- » Project Management
- » Biological Assessments
- » Water Quality Assessments
- » Stream Habitat Assessments
- » Statistical Analysis
- » Technical Writing





JEFF BONAVENTURA **CONSTRUCTION MANAGER**

Education: BS in Civil Engineering // **Experience:** 18 years

Jeff Bonaventura has had success in various industries throughout his career. As a staff engineer, he completed permitting requirements, budgets, quality assurance/quality control, as-built drawings, boundary surveying, ROW staking, smoke testing, and contract documents for bidding purposes. When becoming an area engineer, Jeff budgeted, tracked, constructed, and projected capital-funded projects for multiple landfill operations year-over-year. During his stint as a construction coordinator, Jeff documented, scheduled, and assisted with wetland/stream mitigation. While as a project manager, he assisted with design, planned, constructed, cost projected, managed and analyzed crew production rates, and problem-solved grouting issues. Jeff has a great work ethic and is very passionate about his work.

EXPERTISE

- » Project Management
- » Construction Management
- » Project Cost Projections



CONSTRUCTION
MANAGEMENT



PATRICK WIECK, PE **MINING ENGINEER**

Education: BS in Mining Engineering // **Experience:** 17 years

Patrick Wieck, part of our Construction Management Team, is an experienced professional engineer in project management, construction management, project engineering, and operations. Patrick is currently the project manager for a large, multiyear project through the WVDEP focused on the remediation of surface subsidence features at the Horse Creek Mine. His experience also includes owner's representation and project engineering for the construction of the Collom Mine in northwest Colorado, which encompassed the construction of a 5.5-mile-long access road, facilities pad construction, crushing and loadout facilities, and associated enabling infrastructure. Patrick also worked as a production engineer and alternate operations manager for Cliffs Natural Resources at its 11 million-tonne-per-year iron ore operation in Western Australia, where he focused on target optimization and cost control measures to reduce capital and operating costs for the operation.

LICENSED

Professional Engineer in
CO and WY

EXPERTISE

- » Project Management
- » Construction Management and Owner's Representation/Engineer
- » Mine Design and Mine Optimization



CONSTRUCTION
MANAGEMENT



LICENSED

Licensed Blaster in KY
and IN



CONSTRUCTION
MANAGEMENT

PAUL (BRIAN) LEWIS SENIOR DRILL AND BLAST SPECIALIST

Education: BS in Business Management // Experience: 30 years

Brian Lewis will assist with blasting and construction oversight needs. Brian is a technical expert in the review of blasting operations, blast design, and construction oversight. Brian has extensive experience with drilling, blasting, and seismograph monitoring. While serving as the lead project manager and blast design consultant for blasting and drilling operations, he completed numerous high-profile, close-quarter blasting jobs. He has successfully won and completed these contracts according to their scopes of work and sets himself apart through his substantial involvement in on-the-ground fieldwork.

AWARDS

International Society of Explosives Engineers President's Award 2021



➤ SURVEYING/MAPPING

A solid design starts with a clear plan. Using detailed and accurate surveys and images in developing a clear plan for renderings makes the plan come to life. RESPEC has extensive experience with topographic mapping. We also have comprehensive and robust experience using drones at mines of all types and sizes. From volumetric calculations to orthomosaics and 3D modeling, our drones can supplement, replace, and acquire new data.

Our design team includes a West Virginia–licensed professional surveyor. The surveyor is responsible for property line surveys, deed research and plotting, establishment of control points, and oversight of topographic mapping. RESPEC’s surveyors are MSHA certified with years of experience. Drone pilots are at the forefront of survey and mapping-grade data collection. RESPEC’s surveys are Federal Aviation Administration (FAA) Part 107 certified, allowing for the commercial use of drones in survey applications. Drones can obtain orthomosaics, point clouds, and contours to support—or replace—data collected by traditional survey methods. This data can then be combined for powerful visualization creation and modeling.

Drone use at inactive mine sites makes it possible to reach the impossible-to-reach areas, allowing large expanses to be mapped and processed with improved safety. We use the latest technology to process the data and incorporate it into AutoCAD and ArcGIS formats.

Computing volume changes in stockpiles, material sites, or mining operations can be a tedious, potentially dangerous task. With drones, we can measure any shape or size object with an accuracy equivalent to traditional surveying methods. Any type of material can be measured, including aggregates, biomass, minerals, and even snow.

In addition to calculating volumes, drones allow our team to collect high-resolution photography of the site that can be applied in generating 3D renderings and uploaded and implemented into the data modeling process. Captured digital photos complement the survey data to visually show site changes over time to facilitate interpretation and decision-making.

RESPEC is also experienced with the mapping and scanning both accessible and inaccessible underground void areas, including historical abandoned mines. Remote scanning equipment is typically deployed down a drillhole into void areas to collect 3D point clouds data and map out void areas. This deployment method allows all field personnel to remain safely on the surface while collecting essential data. The 3D scan data are tied to the site’s coordinate system, allowing for accurate mapping of the void areas. Once the voids are scanned and mapped, the data can be used for a detailed geotechnical and stability analysis, development of reclamation alternatives, and determining the optimal reclamation methods, among other applications.

➤ DRILLING/GEOTECHNICAL

RESPEC's experience in geotechnical slope stability analysis and stable slope designs for mines spans a wide variety of project types in highly variable geologic conditions. The problems associated with stability are diverse and often focus on the interaction between manufactured waste placement and the natural environment. RESPEC provides comprehensive field and analytical services to assist in defining safe operating conditions. RESPEC designs, fabricates, and installs robust extensometer systems to monitor potentially unstable slopes. The custom extensometer system can continuously monitor slope movement at multiple locations and communicate wirelessly to monitoring sites. Slope stability analyses for reclaimed sites is performed using 2D finite element analysis and 2D limit equilibrium software.

RESPEC personnel perform ground-surface subsidence studies to calculate surface displacements, strains, and tilts over conventional mines and solution-mined caverns. We use these studies to help delineate regions of mine-induced subsidence, establish adequate standoff distances, sequence mine development to minimize the effects on the surface caused by underground mining, and maximize available reserves. These data have also been used to identify surface

benchmark locations where comparing measured and predicted subsidence patterns reveals the most information about the actual mine and overburden behavior.

Drilling is used to locate features such as mine voids and fracturing and to obtain rock and soil samples. RESPEC designs and manages geotechnical and core-drilling investigations for USACE and multimillion-dollar underground mine reclamation and abandonment projects for OSMRE and private clients to generate reserve estimates and create geologic models. RESPEC is experienced with numerous forms of subsurface exploration, including hollow-stem augers, solid-stem augers, direct push, mud rotary, air rotary, diamond coring, and sonic drilling.

RESPEC intends to subcontract drilling services to NGE. NGE has a history of providing drilling and geotechnical services to multiple clients and industries, including WVDEP and the Department of Highways. Expertise includes core drilling, soils drilling, soil testing, piezometer and well installations. NGE is also certified as a Woman Business Enterprise, Disadvantaged Business Enterprise, and an Economically Disadvantaged Woman-Owned Small Business.



APPENDIX A.

AML CONSULTANT QUALIFICATION QUESTIONNAIRE (ATTACHMENT A)
& AML RELATED PROJECT EXPERIENCE MATRIX (ATTACHMENT B)

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION AML CONSULTANT QUALIFICATION QUESTIONNAIRE				Attachment "A"	
PROJECT NAME WVDEP – 2023 AML Contract N2		DATE (DAY, MONTH, YEAR) 08/29/2023		FEIN 83-2898293	
1. FIRM NAME RESPEC Company, LLC		2. HOME OFFICE BUSINESS ADDRESS 3824 Jet Drive, Rapid City, South Dakota, 57703		3. FORMER FIRM NAME	
4. HOME OFFICE TELEPHONE 605.394.6400	5. ESTABLISHED (YEAR) 1969	6. TYPE OWNERSHIP <input type="checkbox"/> Individual <input checked="" type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Joint-Venture		6a. WV REGISTERED DBE (Disadvantaged Business Enterprise) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE 146 East Third Street, Lexington, Kentucky 40508					
8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM Todd Kenner – CEO: Jason Love – President: Phil Welling – CFO: Jay Nopola – Senior Vice President, John Morgan – Senior Vice President			8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS Whitney Faulker: Project Manager 773.218.5866		
9. PERSONNEL BY DISCIPLINE					
<u>62</u> ADMINISTRATIVE _____ ARCHITECTS <u>3</u> BIOLOGIST <u>16</u> CADD OPERATORS <u>1</u> CHEMICAL ENGINEERS <u>86</u> CIVIL ENGINEERS <u>2</u> CONSTRUCTION INSPECTORS _____ DESIGNERS _____ DRAFTSMEN	<u>1</u> ECOLOGISTS _____ ECONOMISTS <u>16</u> ELECTRICAL ENGINEERS _____ ENVIRONMENTALISTS _____ ESTIMATORS <u>29</u> GEOLOGISTS _____ HISTORIANS <u>5</u> HYDROLOGISTS	_____ LANDSCAPE ARCHITECTS <u>31</u> MECHANICAL ENGINEERS <u>37</u> MINING ENGINEERS _____ PHOTOGRAMMETRISTS <u>4</u> PLANNERS: URBAN/REGIONAL _____ SANITARY ENGINEERS <u>1</u> SOILS ENGINEERS _____ SPECIFICATION WRITERS	<u>12</u> STRUCTURAL ENGINEERS <u>5</u> SURVEYORS _____ TRAFFIC ENGINEERS <u>79</u> COMPUTER PROGRAMMERS <u>19</u> ENVIRONMENTAL ENGINEER / SCIENTIST <u>8</u> GIS SPECIALIST <u>20</u> WATER RESOURCE ENGINEER <u>59</u> OTHER <u>496</u> TOTAL PERSONNEL		
TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE:: <u>4</u>					
*RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.					

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION AML CONSULTANT QUALIFICATION QUESTIONNAIRE			Attachment "A"	
PROJECT NAME WV-DEP – 2023 AML Contract N2		DATE (DAY, MONTH, YEAR) 08/29/2023		FEIN 56-0764054
1. FIRM NAME New River Engineering, Inc / S&S Engineers		2. HOME OFFICE BUSINESS ADDRESS 202 School Drive; Shrewsbury, WV 25015		3. FORMER FIRM NAME
4. HOME OFFICE TELEPHONE 304.595.3290	5. ESTABLISHED (YEAR) 1998	6. TYPE OWNERSHIP <input type="checkbox"/> Individual <input checked="" type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Joint-Venture		6a. WV REGISTERED DBE (Disadvantaged Business Enterprise) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE 202 School Drive; Shrewsbury, WV 25015 / 304.595.3290 / Christopher Burford				
8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM Chris Burford – President- NRE; Jessie Parker – President S&S;		8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS		
9. PERSONNEL BY DISCIPLINE				
2 ADMINISTRATIVE	ECOLOGISTS	LANDSCAPE ARCHITECTS	1 STRUCTURAL ENGINEERS	
1 ARCHITECTS	ECONOMISTS	1 MECHANICAL ENGINEERS	22 SURVEYORS	
BIOLOGIST	ELECTRICAL ENGINEERS	2 MINING ENGINEERS	TRAFFIC ENGINEERS	
4 CADD OPERATORS	ENVIRONMENTALISTS	PHOTOGRAMMETRISTS	OTHER	
CHEMICAL ENGINEERS	ESTIMATORS	PLANNERS: URBAN/REGIONAL	1 GIS Analyst	
CIVIL ENGINEERS	GEOLOGISTS	1 SANITARY ENGINEERS		
2 CONSTRUCTION INSPECTORS	HISTORIANS	SOILS ENGINEERS		
2 DESIGNERS	HYDROLOGISTS	SPECIFICATION WRITERS	49 TOTAL PERSONNEL	
DRAFTSMEN				
TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE:: 5				
*RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.				
10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION AML CONSULTANT QUALIFICATION QUESTIONNAIRE			Attachment "A"	
PROJECT NAME WV-DEP – 2023 AML Contract N2		DATE (DAY, MONTH, YEAR) 08/29/2023		FEIN N/A - Individual
1. FIRM NAME Tiff Hilton		2. HOME OFFICE BUSINESS ADDRESS 727 Crowfield Circle, Lewisburg, WV 24901		3. FORMER FIRM NAME N/A
4. HOME OFFICE TELEPHONE 304.392.1156	5. ESTABLISHED (YEAR) N/A	6. TYPE OWNERSHIP <input checked="" type="checkbox"/> Individual <input type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Joint-Venture		6a. WV REGISTERED DBE (Disadvantaged Business Enterprise) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE 727 Crowfield Circle, Lewisburg, WV 24901				
8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM Tiff Hilton		8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS N/A		
9. PERSONNEL BY DISCIPLINE				
_____ ADMINISTRATIVE _____ ARCHITECTS _____ BIOLOGIST _____ CADD OPERATORS _____ CHEMICAL ENGINEERS _____ CIVIL ENGINEERS _____ CONSTRUCTION INSPECTORS _____ DESIGNERS _____ DRAFTSMEN	_____ ECOLOGISTS _____ ECONOMISTS _____ ELECTRICAL ENGINEERS _____ ENVIRONMENTALISTS _____ ESTIMATORS _____ GEOLOGISTS _____ HISTORIANS _____ HYDROLOGISTS	_____ LANDSCAPE ARCHITECTS _____ MECHANICAL ENGINEERS <u>1</u> _____ MINING ENGINEERS _____ PHOTOGRAMMETRISTS _____ PLANNERS: URBAN/REGIONAL _____ SANITARY ENGINEERS _____ SOILS ENGINEERS _____ SPECIFICATION WRITERS	_____ STRUCTURAL ENGINEERS _____ SURVEYORS _____ TRAFFIC ENGINEERS _____ COMPUTER PROGRAMMERS _____ ENVIRONMENTAL ENGINEER / SCIENTIST _____ GIS SPECIALIST _____ WATER RESOURCE ENGINEER _____ OTHER _____ TOTAL PERSONNEL	
TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE:: <u>N/A</u>				
*RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.				

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION AML CONSULTANT QUALIFICATION QUESTIONNAIRE			Attachment "A"	
PROJECT NAME WV-DEP – 2023 AML Contract N2		DATE (DAY, MONTH, YEAR) 08/29/2023		FEIN 52-2365940
1. FIRM NAME Novel Geo-Environmental, Inc.		2. HOME OFFICE BUSINESS ADDRESS 171 Montour Run Road Moon Township, PA 15108		3. FORMER FIRM NAME Novel Geo-Environmental, LLC.
4. HOME OFFICE TELEPHONE 304-201-5180	5. ESTABLISHED (YEAR) 2002	6. TYPE OWNERSHIP <input type="checkbox"/> Individual <input checked="" type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Joint-Venture		6a. WV REGISTERED DBE (Disadvantaged Business Enterprise) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE 650 MacCorkle Ave SW St. Albans, WV 25177				
8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM Amy Veltri, CEO; John Nottingham, President		8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS		
9. PERSONNEL BY DISCIPLINE				
<u>3</u> ADMINISTRATIVE ____ ARCHITECTS ____ BIOLOGIST <u>1</u> CADD OPERATORS ____ CHEMICAL ENGINEERS <u>4</u> CIVIL ENGINEERS ____ CONSTRUCTION INSPECTORS ____ DESIGNERS ____ DRAFTSMEN	____ ECOLOGISTS ____ ECONOMISTS ____ ELECTRICAL ENGINEERS ____ ENVIRONMENTALISTS ____ ESTIMATORS <u>2</u> GEOLOGISTS ____ HISTORIANS ____ HYDROLOGISTS	____ LANDSCAPE ARCHITECTS ____ MECHANICAL ENGINEERS ____ MINING ENGINEERS ____ PHOTOGRAMMETRISTS ____ PLANNERS: URBAN/REGIONAL ____ SANITARY ENGINEERS ____ SOILS ENGINEERS ____ SPECIFICATION WRITERS	____ STRUCTURAL ENGINEERS ____ SURVEYORS ____ TRAFFIC ENGINEERS ____ COMPUTER PROGRAMMERS <u>4</u> ENVIRONMENTAL ENGINEER / SCIENTIST ____ GIS SPECIALIST ____ WATER RESOURCE ENGINEER <u>21</u> OTHER <u>35</u> TOTAL PERSONNEL	
TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE:: <u>3</u>				
*RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.				

10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE?

☐ YES ☒ NO

11. OUTSIDE KEY CONSULTANTS/SUB-CONSULTANTS ANTICIPATED TO BE USED. Attach "AML Consultant Qualification Questionnaire."

NAME AND ADDRESS: New River Engineering, INC; 202 School Drive, Shrewsbury, WV 25015

SPECIALTY:
Surveying

WORKED WITH BEFORE

☐ Yes

☒ No

NAME AND ADDRESS:

Tiff Hilton; 727 Crowfield Circle, Lewisburg, WV 24901

SPECIALTY:

Acid Mine Drainage

WORKED WITH BEFORE

☐ Yes

☒ No

NAME AND ADDRESS:

GMS Mine Repair & Maintenance; 3337 Contrary Creek Road; Raven, VA 24639

SPECIALTY:

Construction Management

WORKED WITH BEFORE

☐ Yes

☒ No

NAME AND ADDRESS:

Novel Geo-Environmental, LLC, 650 MacCorkle Avenue West; St. Albans, WV 25177

SPECIALTY:

Drilling and Geotechnical

WORKED WITH BEFORE

☐ Yes

☒ No

NAME AND ADDRESS:

SPECIALTY:

WORKED WITH BEFORE

☐ Yes

☐ No

NAME AND ADDRESS:

SPECIALTY:

WORKED WITH BEFORE

☐ Yes

☐ No

NAME AND ADDRESS:

SPECIALTY:

WORKED WITH BEFORE

☐ Yes

☐ No

NAME AND ADDRESS:

SPECIALTY:

WORKED WITH BEFORE

☐ Yes

☐ No

12.	<p>A. Is your firm's personnel experienced in Abandoned Mine Lands Remediation/Mine Reclamation Engineering? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Description and Number of Projects: RESPEC's Senior Vice President/Technical Advisor and employees have worked on more than 100 abandoned mine land (AML)-related projects dating back to the 1980s. These projects include refuse impoundments, mine portals, mine shafts, investigation in surface and subsurface conditions, highwall reclamation and stabilization, acid mine drainage, shallow underground mine works, refuse fills, landslides, and mine drainage. RESPEC staff has experience analyzing AML projects and designing and constructing solutions that provide safe and long-term stable sites. RESPEC has been awarded two Office of Surface Mining Reclamation and Enforcement (OSMRE) reclamation awards for projects in Wyoming.</p>
	<p>B. Is your firm experienced in Soil Analysis? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Description and Number of Projects: RESPEC's staff has extensive experience working on more than 30 projects with soil analysis on AML and mining sites. These projects included both geotechnical and environmental analyses of soils. RESPEC has performed slope stability analyses on highwalls, soil testing to determine acid-base accounting, and designed plans to ensure excavated materials would not generate acid mine drainage. RESPEC has designed and implemented re-vegetation plans on both reclaimed highwalls and coal refuse impoundments.</p>
	<p>C. Is your firm experienced in hydrology and hydraulics? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Description and Number of Projects: RESPEC staff has significant experience in hydrology and hydraulics related to AML and mining sites with more than 100 projects. RESPEC has designed sediment control structures, diversions, channels, and culverts. Our staff have performed storm modeling ranging from a 10-year, 24-hour storm event through a Probably Maximum Precipitation storm event on a high-hazard Class C structure. RESPEC has designed stormwater management plans for AML projects, current surface mining, and underground mining sites. Many of these projects are located in Appalachia, and RESPEC is experienced in designing a stormwater management plan that is unique to the topography in this region.</p>
	<p>D. Does your firm produce its own Aerial Photography and Develop Contour Mapping? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Description and Number of Projects: RESPEC can create a contour map to be used in a design through aerial mapping and photogrammetry software on approximately 30 projects. RESPEC has extensive experience using ground control points and drones to capture the data needed to develop a contour map. Existing LiDAR information from public sources is routinely obtained and used to generate contour mapping.</p>
	<p>E. Is your firm experienced in domestic waterline design? (Include any experience your firm has in evaluation of aquifer degradation as a result of mining.) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Description and Number of Projects: RESPEC staff has experience with domestic waterline design and has worked on more than 30 projects. These projects include water management and septic design at a personnel camp for a mining operation, upgrades designs to the water system in a subdivision located in the North Pole, evaluation of water and sewer system components, conditions and deficiencies, and providing a strategic plan for the utilities in the next 50 years.</p>
	<p>F. Is your firm experienced in Acid Mine Drainage Evaluation and Abatement Design? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Description and Number of Projects: RESPEC and the team have significant experience in acid mine drainage (AMD) drainage evaluation and abatement design on AML, mining, and other sites. The team has worked on 35+ AML sites with high volumes of AMD, performed studies to evaluate possible sources of acid drainage, and designed and implemented optimum reclamation designs to alleviate AMD. RESPEC has designed and permitted an AMD treatment system related to pre-Surface Mining Control and Reclamation Act (SMCRA) mines seeps. In addition, the Team has published more than 15 articles related to AMD evaluation, remediation, and preventive measures.</p>

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Morgan, John Senior Vice President/Technical Advisor	YEARS OF AML DESIGN EXPERIENCE: 41	YEARS OF AML RELATED DESIGN EXPERIENCE: 41	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities John Morgan will serve as a Technical Advisor for this project based on his significant experience in AML-related work. He has extensive experience in both surface and underground mining. He has served as the project manager for the Rock Springs Mine Subsidence project for the Wyoming DEQ/AML, the North Branch Potomac AMD study, and currently serves on the West Virginia Special Reclamation Fund Advisory Council, overseeing the special reclamation fund for post-1977 bond forfeiture sites. John has significant experience in AML projects, active mining operations, and mine closure activities throughout West Virginia. Using his extensive experience, John will assist RESPEC staff in evaluating each site, identifying major issues, and providing expertise in developing an effective solution.			
EDUCATION (Degree, Year, Specialization) BS, 1977, Mining Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS Society for Mining, Metallurgy, & Exploration (SME); American Institute for Minerals Appraisers		REGISTRATION (Type, Year, State)	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Faulkner, Whitney Project Manager	YEARS OF AML DESIGN EXPERIENCE: 3	YEARS OF AML RELATED DESIGN EXPERIENCE: 13	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Whitney Faulkner will serve as the Project Manager for this project. She will be the primary contact between the West Virginia Department of Environmental Protection (WVDEP) and the team. She has 21 years of experience in civil and environmental engineering. She is the manager of RESPEC's Reclamation Services and currently manages AML projects in West Virginia and Pennsylvania. She will be able to evaluate each site and determine a cost-effective, timely plan to remediate the site. Her ability to communicate successfully with clients and staff will demonstrate her ability to be an efficient PM.			
EDUCATION (Degree, Year, Specialization) BS, 2002, Civil Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) PE, 2019, WV; 2009, KY; 2023, PA	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Anderson, Mike Assistant Project Manager	YEARS OF AML DESIGN EXPERIENCE: 1	YEARS OF AML RELATED DESIGN EXPERIENCE: 1	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Mike Anderson will serve as the Assistant Project Manager for this project. He has 12 years of experience in surface mining, underground mining, and managing projects. He will work closely with Whitney in evaluating sites and developing the best solutions for remediation. His unique knowledge of both office and field work will allow him to effectively manage a diverse range of projects.			
EDUCATION (Degree, Year, Specialization) BS, 2010, Mining Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) PE, 2021, WV; 2019, AL	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Brown, James Health & Safety Expert	YEARS OF AML DESIGN EXPERIENCE: 0	YEARS OF AML RELATED DESIGN EXPERIENCE: 7	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities James. Brown will serve as the Health and Safety Expert for this project. Each site's proximity to potential residences will require proper precautions to be observed for potential site visits. James will design a health and safety plan to ensure public and personnel safety. He will also serve a dual role with his experience in environmental field services. His past project-specific technical experience includes subsurface laser scanning, emergency response, multiparameter water and soil analyses, groundwater user surveys, stream flow and hydromodification surveys, rapid bioassessment protocols, benthic macroinvertebrate sampling, threatened and endangered species surveys, and jurisdictional determinations.			
EDUCATION (Degree, Year, Specialization) BS, 2014, Environmental Science			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State)	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.) Ricci, Michael Mining Engineer	YEARS OF EXPERIENCE:		
	YEARS OF AML DESIGN EXPERIENCE: 3	YEARS OF AML RELATED DESIGN EXPERIENCE: 42	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0

Brief Explanation of Responsibilities

Michael. Ricci will be part of the Environmental Compliance and Permitting section, as well as the hydrology and Stream Restoration team. He has experience with environmental permitting, geologic modeling, mine planning and evaluation, and regulatory compliance. His early career focused on compliance with the newly implemented SMCRA. He was responsible for the primary components of the SMCRA permit, including stability analyses, hydrologic/sedimentologic modeling, volumetric design, and establishing baseline surface water and groundwater monitoring plans. He has 41 years of experience with environmental permitting, including the many aspects of SMCRA permitting, USACE 404 permitting, and National Pollutant Discharge Elimination System permitting for coal and other commodities. He has completed projects in multiple states.

EDUCATION (Degree, Year, Specialization)

BS, 1981, Mining Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

SME

REGISTRATION (Type, Year, State)

PE, 1987, WV; 2014, IL; 2015, IN; 1985, KY; 2021, MA; 2020, NC; 2020, NH; 2001, OH; 1987, TN; 2015, WY

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.) Kurzyrna, Charles "Chuck"	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 1	YEARS OF AML RELATED DESIGN EXPERIENCE: 31	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:

Brief Explanation of Responsibilities

Charles "Chuck" Kurzyrna has more than 30 years of experience in surveying and engineering for the mining and construction industries. He will serve as the Professional Land Surveyor for these projects. Chuck is experienced in surface and underground mine design, planning, and surveying; environmental and safety permitting; and project and construction management. Before joining NREI, he served as the senior engineer for a surface coal mining operation and chief engineer for a small mining and construction company.

EDUCATION (Degree, Year, Specialization)

BS, 1977, Mine Engineering Technology

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

Contractors Association of West Virginia

REGISTRATION (Type, Year, State)

PLS, 1995, WV; PE, 1989, WV; 2019, GA; 2016, KY; 2013, OH; 2013, PA; 2016, VA

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Burford, Christopher	YEARS OF AML DESIGN EXPERIENCE: 1	YEARS OF AML RELATED DESIGN EXPERIENCE: 16	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Brief Explanation of Responsibilities Christopher Burford has more than 15 years of experience in environmental permitting, surveying, safety, and construction management in mining and civil projects. He will manage the surveying and mapping portions of the project. Although it is not Christopher's primary responsibility on this project, his experience in construction management and oversight strengthens the team's capabilities in this role			
EDUCATION (Degree, Year, Specialization) BS, 2004, Civil Engineering Technology			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS: Contractors Association of West Virginia; West Virginia Rural Waters Association		REGISTRATION (Type, Year, State)	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Schnell, Daykin Assistant Project Manager	YEARS OF AML DESIGN EXPERIENCE: 2	YEARS OF AML RELATED DESIGN EXPERIENCE: 9	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Daykin Schnell is a mining engineer. He has technical experience in abandoned mine investigation, remote scanning and mapping, mine planning and design, and blast design and optimization. Daykin has extensive experience managing projects, including AML reclamation projects, underground investigation, blast optimization, ground vibration control, mine sequence, and planning. His unique knowledge of both office and fieldwork management will allow him to effectively manage a diverse range of projects. Daykin is also experienced in health and safety and emergency response with his mine rescue, first aid, firefighting, Emergency Medical Technician, and Hazardous Waste Operations and Emergency Response (HAZWOPER) experience and training.			
EDUCATION (Degree, Year, Specialization) MS, 2018, Explosives Engineering; BS, 2015, Mining Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS: International Society of Explosives Engineering; SME		REGISTRATION (Type, Year, State) PE, 2021, KY	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.) Campoli, Alan Geotechnical/Mining Engineer	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 46	YEARS OF AML RELATED DESIGN EXPERIENCE: 46	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Brief Explanation of Responsibilities Dr. Al Campoli will serve as the Geotechnical/Mining Engineer for this project. He has extensive experience in pillar design, rock reinforcement, standing support, groundwater containment, methane drainage, mine fire control, subsidence, and ventilation issues for tunneling, mining, and construction. This experience will be crucial in evaluating sites and developing a plan to address the on-site conditions. Al has designed and led the control of coal mine fires from the surface through surface boreholes. Furthermore, he has authored over 40 technical publications.			
EDUCATION (Degree, Year, Specialization) PhD, 1994, Mining Engineering; MS, 1984 Engineering Management; BS, 1981, Mining Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS Pittsburgh and Central Appalachian Sections of the SME Professional Engineers Exam Committee, Research Council and Program Committee		REGISTRATION (Type, Year, State) PE, 1996, WV; 2013 AL; 2014, IL; 1996, KY; 2011, PA; 2013, TN; 2012, UT; 2008, VA	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.) Hemstad, Erik	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 1	YEARS OF AML RELATED DESIGN EXPERIENCE: 11	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Erik Hemstad has more than 10 years of experience in geological and geotechnical engineering. He has an established breadth of knowledge and experience across the geological, civil, and mining engineering and geology fields, coupled with project, business, and personnel management capabilities and effective decision-making and judgment. He applies these skills to projects of all sizes to meet client needs and specific project objectives. Erik excels at undertaking diverse and complex projects and tasks in non-routine environments, as well as creating and managing solutions focused on project execution and client satisfaction. His primary roles include project development, execution, and management for RESPEC's Mining & Energy business unit, and he also contributes to overall marketing and business development for current and prospective clients.			
EDUCATION (Degree, Year, Specialization) MBA, 2022, Business Administration; MS, 2011, Civil-Geotechnical Engineering; BS, 2005, Geological Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS: SME		REGISTRATION (Type, Year, State) PE, 2020, CO	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Patton, Susan Mining Engineer	YEARS OF AML DESIGN EXPERIENCE: 1	YEARS OF AML RELATED DESIGN EXPERIENCE: 40	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Dr. Susan Patton is a principal consultant within RESPEC's Mining & Energy business unit and, as our Mine Fires Team Lead, will provide engineering design oversight on this project. She is a diverse technical mining professional and project manager with extensive expertise in underground coal mine design, including in-depth ventilation system modeling. Susan frequently leads scoping, pre-feasibility, and feasibility studies; due diligence; productivity and material handling analysis; operating and capital cost estimates; and financial evaluations. She is a Qualified/Competent Person for economic analysis and mineral reserve reporting (U.S. Securities and Exchange Commission [SEC] S-K 1300 and National Instrument [N.I.] 43-101) for brine deposits and bedded deposits using dry or solution-mining extraction techniques. Susan has extensive ventilation expertise in coal, metal, and nonmetal mines and mined caverns, including troubleshooting, modeling, design, and shaft sizing. She has academic research expertise in mine gob evaluation and waste management.			
EDUCATION (Degree, Year, Specialization) PhD, 1993, Mining/Environmental Engineering, MSc, 1989, Mineral Engineering, BSc, 1983, Mining Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS SME		REGISTRATION (Type, Year, State) PE, 2022, WV; 1994, AL; 1995, CO; 2022, KY; YEAR, 2000; 2021, NM; 2022, PA;	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Drake, Brett Project Engineer	YEARS OF AML DESIGN EXPERIENCE: 11	YEARS OF AML RELATED DESIGN EXPERIENCE: 11	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Brett Drake will serve as a Project Engineer on the reclamation design team. He has 10 years of experience in AML reclamation project management and construction management services for a variety of abandoned underground and surface hard-rock mine sites that pose hazards to public health and safety or constitute an environmental hazard. Brett has been the project manager and on-site project engineer during the reclamation of shafts, adits, portals, highwalls, open pits, and other abandoned mine-related features. His responsibilities have included observing the quality of the executed work and determining whether the work is proceeding in accordance with the contract documents.			
EDUCATION (Degree, Year, Specialization) BS., 2011, Architectural Engineer			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) PE, 2019, WY; 2023, NM	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Brady, Karen Utility Engineer	YEARS OF AML DESIGN EXPERIENCE: 0	YEARS OF AML RELATED DESIGN EXPERIENCE: 1	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 21
Brief Explanation of Responsibilities Karen Brady will lead our Water Lines/Sewage Treatment Team, performing civil site and water management design activities for this project. She will use her experience with design, permitting, and construction administration to bring thoughts and ideas to the feasibility stage of the project to help decision-makers in this vital stage of the project choose the right path for the long term. Karen has more than 21 years of experience providing planning, design, and construction administration services on water, sewer, and civil site projects.			
EDUCATION (Degree, Year, Specialization) BS, 2001, Civil Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) PE (Civil), 2006, AL; PE (Environmental), 2013, AL	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Lowe, Dion Civil Engineer	YEARS OF AML DESIGN EXPERIENCE: 0	YEARS OF AML RELATED DESIGN EXPERIENCE: 15	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Dion Lowe has 15 years of experience in erosion and sediment control and will be part of our hydrology team. He has experience designing and managing erosion and sediment control requirements associated with small and large sites. Dion also has experience in construction inspection and will lend his knowledge to our construction observer.			
EDUCATION (Degree, Year, Specialization) BS, 2001, Civil Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:		REGISTRATION (Type, Year, State) PE, 2005 SD	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.) Hilton, Tiff	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 48	YEARS OF AML RELATED DESIGN EXPERIENCE: 48	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Tiff Hilton has 47 years of experience in mining engineering, with an emphasis on AMD. He will be an instrumental part of our team with his vast experience in AMD. Tiff has authored or coauthored more than 15 publications on AMD and water treatment. He formed Working on People's Environmental Concerns in 1989 and has evaluated AMD sites for more than 35 coal companies and has further branched out into non-coal evaluations. Tiff is also an experienced surface and underground mine foreman in West Virginia and a certified blaster. His unique knowledge of AMD, remediation, and preventive solutions, along with coal mining experience, specifically in West Virginia, demonstrates to WVDEP how he will be an asset to AML projects.			
EDUCATION (Degree, Year, Specialization) BS, 1975, Mining Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State)	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.) Cross, Mike Project Engineer	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 42	YEARS OF AML RELATED DESIGN EXPERIENCE: 42	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Mike Cross will serve as a Project Engineer on this project. His extensive experience in mine design and environmental permitting will be invaluable to this project. He has experience in AMD remediation, highwall reclamation, reclamation liabilities studies, and reclamation cost estimates. Mike has spent his career in West Virginia and Appalachia mining and is skilled at understanding mining issues that can be encountered on AML sites and the solutions to fix them that are cost-effective and timely.			
EDUCATION (Degree, Year, Specialization) BS, 1980, Mining Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State)	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Bonaventura, Jeff Project Manager	YEARS OF AML DESIGN EXPERIENCE: 0	YEARS OF AML RELATED DESIGN EXPERIENCE: 15	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Brief Explanation of Responsibilities Jeff Bonaventura has 15 years of construction experience in water/sewer, surveying, landfill development, slide remediation, and quality assurance/quality control (QA/QC) for construction projects. Jeff will be QA/QC for construction drawings and managing the on-site employees who will be observing the construction activities.			
EDUCATION (Degree, Year, Specialization) BS, 2008, Civil Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:		REGISTRATION (Type, Year, State)	

13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
Lewis, Brian Senior Drill and Blast Specialist	YEARS OF AML DESIGN EXPERIENCE: 0	YEARS OF AML RELATED DESIGN EXPERIENCE: 30	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Brian Lewis will assist with blasting and construction oversight needs. Brian is a technical expert in the review of blasting operations, blast design, and construction oversight. Brian has extensive experience with drilling, blasting, and seismograph monitoring. While serving as the lead project manager and blast design consultant for blasting and drilling operations, he completed numerous high-profile, close-quarter blasting jobs. Brian has successfully won and completed these contracts according to their scopes of work and sets himself apart through his substantial involvement in on-the-ground fieldwork.			
EDUCATION (Degree, Year, Specialization) BS, 2003, Business Administration			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) Licensed Blaster, 1997, KY; 2014, IN	

14. PROVIDE A LIST OF SOFTWARE AND EQUIPMENT AVAILABLE IN THE PRIMARY OFFICE WHICH WILL BE USED TO COMPLETE AML DESIGN SERVICES)

Acoustic Doppler Current Profiler equipment; Autodesk AutoCAD; Autodesk LDD; Autodesk Civil 3D; AQUATOX; Bentley MicroStation; Bentley InRoads; Bentley FlowMaster; Bentley ProjectWise; Carlson Software; Carlson Cavity Auto Laser Scanner (C-ALS); Carlson Boretrak2 (BT2); Colorado Urban Hydrograph Procedure (CUHP); DJI Mavic Mavic 2 Drone; EPA SWMM; Esri ArcGIS; FHWA HY8; Flo-2D; FLUX/Bathtub; Global Mapper; HEC-GeoRAS; HEC-GeoHMS; HEC-HMS; HEC-RAS; Hydrologic Simulation Program–Fortran (HSPF); HyDrone equipment for bathymetric surveys; Nomis Seismographs; Optical televiewer; Rockscience; REAME; SRH-2D; ShotTrack Accelerometer (ViB); ShotTrack; Velocity of Detonation (VOD 305); SEDCAD; SWAT; WASP; UDSewer; USGS PKFQ; USGS WSPRO

15. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS THE DESIGNATED ENGINEER OF RECORD

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	NATURE OF YOUR FIRM'S RESPONSIBILITY	ESTIMATED CONSTRUCTION COST	PERCENT COMPLETE
MacArthur Subsidence Phase III	WVDEP Office of Abandoned Mine Lands and Reclamation;	Design of Subsidence mitigation plan	\$10.4M	0%
Beckley Soccer Complex	WVDEP Office of Abandoned Mine Lands and Reclamation;	Design a mitigation plan for the subsidence in the parking lot and seal mine portals	\$1.1M	0%
Price Hill Complex Pond Cleaning	WVDEP Office of Abandoned Mine Lands and Reclamation;	Design a pond cleaning plan for four sediment ponds and re-build dikes	\$500,000	0%
Summerlee Water Treatment	WVDEP Office of Abandoned Mine Lands and Reclamation;	Design AMD remediation plan	\$500,000	0%
Crown Hill Refuse, slide and discharge	WVDEP Office of Abandoned Mine Lands and Reclamation;	Design of mine portal closures and stabilize slide	\$616,875	0%
WVU Tech Drainage Morris Creek	WVDEP Office of Abandoned Mine Lands and Reclamation;	Design acid mine drainage remediation plan	\$1.2M	0%
Dillian Creek AMD Remediation	Friends of Deckers Creek; P.O. Box 877, Dellslow, WV 26531	Designed the treatment pond based on their conceptual plans	\$144,000	0%
Mettiki AMD Treatment – Alkaline Reinjection Plan	Mettiki Coal, LLC, 292 Table Rock, Oakland, MD 21550	Designed an alkaline reinjection plan due to an acid-producing seam. This plan is ongoing as mining progresses	\$800,000 annually	Ongoing
Rustic Ridge Review	Mountain Watershed Association P.O. Box 408/1414-BICV Road Melcroft, PA 15462	Technical review of pending underground mine permit and assist in the development of agreed	N/A	95%

		conditions Continue monitoring compliance of the ongoing U/G mining operation		
Northern-Delivery System-Segment C – Water Transmission Project	Triview Metropolitan District; 16055 Old Forest Point, Suite 300; Monument, CO 80132	Providing planning, permitting, and design of the entire 9-mile-long Northern Water Delivery System Providing the construction administration, submittals review, and general construction oversight Portions of this project are very complex as the pipeline crosses endangered species habitat (Preble's Meadow Jumping Mouse), and another portion traverses urban development.	\$1.65M	5%
Alden SMCRA Permitting	Alden Coal, LLC 332 West Cumberland Gap Parkway; Corbin, KY 40701	Completed SMCRA applications which include reclamation design, sediment control, stability analysis	\$100,000 (engineering costs)	Ongoing
Alliance Permitting and SEC reporting	Alliance Coal Company, LLC 1146 Monarch Street, Suite 350; Lexington KY 40513	Completed SMCRA applications which include reclamation design, sediment control, stability analysis Prepared their SEC S-K 1300 Technical Summary, which included reserve/resource analysis and financial modeling	\$250,000 (engineering costs)	Ongoing
Manh Choh	Kinross Gold	Design and construction management of access road to a new gold mine in Alaska, plus water treatment and infrastructure	\$100M	0%
Rattlesnake	Wyoming Department of Environmental Quality; 200 West 17 th Street; Cheyenne, WY 82002	Site Investigation, design, and construction management of abandoned quarry	\$2.1M	0%
AML Project 10C, Horse Creek Mine Subsidence Remediation	Wyoming Department of Environmental Quality; 200 West 17 th Street; Cheyenne, WY 82002	Surface and underground investigation of historical mine-related subsidence	\$2.0M	0%

Greer Lime	Greer Industries: 5630 Earl L. Core Road Morgantown, WV	Design and site support for new underground limestone mine	~\$1.5M	10%
Rapid City Quarry	Pete Lien & Sons: 3811 Universal Drive Rapid City, SD 57702	Design and construction support for new aggregate processing plant	\$1.5M	0%
Potash Mine Decommissioning Project	The Mosaic Company; 1700-2010 12 th Avenue; Regina Saskatchewan, Canada S4P 2L1	Conducted geomechanical and hydrogeological modeling to aid in the design Consulted with subcontractors on the concrete mixture design for the shaft plug system and the interface grouting between the existing liner and plug system, as well as the grouting of the surrounding geological formation and backfill design from shaft plug to surface	Confidential	85%
Salt Pocket Repair at Waste Isolation Pilot Plant; Carlsbad, NM	Nuclear Waste Partnership LLC, P.O. Box 2078 GSA-20; Carlsbad, NM 8821	Developed a design to remove the existing salt pocket steel structure and re-establish it to the original design	\$18.5M	0%
SURF Research facility	Thyssen Mining, INC; 420 West Main Street; Lead, SD	Assisting with several structural review tasks, such as lift reviews for slinging large equipment underground Performing the geotechnical monitoring of the underground caverns with inclinometers, multiple point borehole extensometers, and seismographs	\$75M	33%
Civil Engineer Services for Fee in Lieu of Projects	Kentucky Department of Fish & Wildlife (F&W); 1 Sportsman Lane; Frankfort, KY 40601	Serve as F&W's engineering consultant, which includes identifying potential mitigation sites, stream design, and construction monitoring and permitting	\$3.0M	0%
TOTAL NUMBER OF PROJECTS: Overall projects 2,424		TOTAL ESTIMATED CONSTRUCTION COSTS: \$221M		

16. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS SERVING AS A SUB-CONSULTANT TO OTHERS

[illegible]

17. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
Idarado Mine Mill-Level Tunnel Flow-Control Bulkhead; Telluride, Colorado	Newmont Corporation; 6900 E. Layton Avenue, Suite 700; Denver, CO 80237	\$5M	2018	Yes
Subsurface Investigation of Historic Gold Mine; South Pass City, Wyoming	Wyoming, DEQ, AML; 200 West 17 th Street, Cheyenne, WY 82002	\$8.5M	2019	Yes
Haile Gold Mine Kershaw, South Carolina	OceanaGold; 6911 Snowy Owl Road; Kershaw, SC 29067	\$139,000	2019	Yes
Northeast Wyoming Coal Mine Reclamation	Wyoming Department of Environmental Quality; 200 West 17 th Street; Cheyenne, WY 82002	\$17M	2017	Yes/Ongoing
Moose Creek Water Expansion	City of North Pole; 125 Snowman Lane; North Pole, Alaska 99705	\$35.0M	2021	Yes
West Water System Expansion – Water Transmission & Storage Project	Woodmen Hills Metropolitan District; 8046 Eastonville Road; Falcon, CO	\$3.9M	2020	Yes
Clear Creek Ecological Restoration	Colorado Department of Transportation	\$300,000	2019	Yes
Huber Underground Mine Grouting and Development	Confidential	\$5.0M	2019	Yes
Rolling Hills Transmission Line and	Widefield Water and Sanitation District; 8495 Fontaine Blvd, Fountain CO 80925	\$3.4M	2022	Yes

18. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM HAS BEEN A SUB-CONSULTANT TO OTHER FIRMS (INDICATE PHASE OF WORK FOR WHICH YOUR FIRM WAS RESPONSIBLE)

[illegible]

19. Use this space to provide any additional information or description of resources supporting your firm's qualifications to perform work for the West Virginia Abandoned Mine Lands Program.

20. The foregoing is a statement of facts.

Signature: _____

Title: Senior Vice President

Printed Name: John Morgan

Date: August 29, 2023

AML AND RELATED PROJECT EXPERIENCE MATRIX Attachment "B"																							
PROJECT	Exp. Basis C=Corp. P=Personnel*	Additional Info Provided in Section(s)**	PROJECT EXPERIENCE REQUIREMENTS															PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional					
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	\Hydrologic/Hydraulic Design/Evaluation	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/ Mitigation/ Replacement	Construction Inspection/ Management	Water Treatment	Equipment/ Structure Removal	Stream Restoration	Geotechnical/ Stability	John Morgan	Mike Ricci	Whitney Faulkner	Michael Anderson	Jeff Bonaventura	
Beckley Soccer Complex	Both	15	X	X	X			X		X		X								P,M	P	P	
MacArthur Subsidence Phase III	Both	16		X				X		X		X				X			P,M	P	P		
North Potomac River AMD Study	Both	18	X			X					X		X				P,M						
Hartford "B" Project	Both	19		X	X	X					X		X	X	X	X	P, M						
Stowe Structures Complex Project	Both	20	X		X	X		X			X		X		X		P, M						
Beaver Creek Highwall Project	Both	21	X		X	X					X	X		X			P, M						
Twin Branch Complex Project	Both	22	X			X					X		X				P, M						
Widen Refuse Reclamation Project	Both	22	X		X			X		X							P, M						
Cook Refuse Reclamation Project	Both		X								X		X		X		P, M						
Nellis Complex Reclamation Project	Both					X				X							P, M						
Florence Hollow Project	Both			X	X	X						X				X	X	P, M					
Whitman Refuse	Both					X				X	X	X					X	P, M					
Roaring Creek Highwall Project	Both		X								X					X	X	P, M					

* List whether project experience is corporate or personnel based or both.
** Use this area to provide specific sections or pages if needed for reference.
*** List Primary Design personnel and their functional capacity for the projects listed.

AML AND RELATED PROJECT EXPERIENCE MATRIX Attachment "B"																							
PROJECT	Exp. Basis C=Corp. P=Personnel*	Additional Info Provided in Section(s)**	PROJECT EXPERIENCE REQUIREMENTS															PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional					
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	\Hydrologic/Hydraulic Design/Evaluation	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/ Mitigation/ Replacement	Construction Inspection/ Management	Water Treatment	Equipment / Structure Removal	Stream Restoration	Geotechnical/ Stability	John Morgan					
Saltwell Drainage Project	Both			X										X		X	X	P, M					
Omar Complex Project	Both				X	X						X	X				X	P, M					
Carbondale Portals Project	Both			X	X	X				X			X	X			X	P, M					
Dillon Landslide Project	Both				X	X											X	P, M					
Sabine Refuse Project	Both			X	X	X												P, M					
Gypsy II Project	Both			X	X	X			X									P, M					
Browning Fork Slide Project	Both		X			X										X	X	P, M					
Ottawa Portals Project	Both			X	X	X									X			P, M					
																		P, M					

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** Use this area to provide specific sections or pages if needed for reference.

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AML AND RELATED PROJECT EXPERIENCE MATRIX Attachment "B"																							
PROJECT	Exp. Basis C=Corp. P=Personnel*	Additional Info Provided in Section(s)**	PROJECT EXPERIENCE REQUIREMENTS															PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional					
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	\Hydrologic/Hydraulic Design/Evaluation	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/ Mitigation/ Replacement	Construction Inspection/ Management	Water Treatment	Equipment/ Structure Removal	Stream Restoration	Geotechnical/ Stability	John Morgan	Mike Ricci	Daykin Schnell	Brett Drake		
Vindex Refuse Project	Both	22	X		X					X	X	X	X				X	P, M					
Frostburg Subsidence Reclamation Project	Both	22			X				X								X	P, M					
Crawford Mountains Abandoned Mine Lands Study	Both	23		X					X		X						X	P, M					
Wingate Hill Mine Reclamation	Both	24		X	X				X				X					P, M					
Horse Creek Abandoned Mine Reclamation	Both	25		X	X				X		X		X					P, M					
OSM Mine Closure Investigation at Wilkeson and Carbonado, WA	Both			X	X													P, M					
Gebo Coal Mine Reclamation, Phases I and II	Both		X	X	X	X			X	X							X	P, M					
Plachek Mine and Goose Creek Investigation and Mitigation Design	Both		X			X											X	P, M					

* List whether project experience is corporate or personnel based or both.
** Use this area to provide specific sections or pages if needed for reference.
*** List Primary Design personnel and their functional capacity for the projects listed.

AML AND RELATED PROJECT EXPERIENCE MATRIX Attachment "B"																							
PROJECT	Exp. Basis C=Corp. P=Personnel*	Additional Info Provided in Section(s)**	PROJECT EXPERIENCE REQUIREMENTS															PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional					
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	\Hydrologic/Hydraulic Design/Evaluation	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/ Mitigation/ Replacement	Construction Inspection/ Management	Water Treatment	Equipment/ Structure Removal	Stream Restoration	Geotechnical/ Stability	Mike Ricci	Mike Cross	Brett Drake	John Morgan	Susan Patton	Erik Hemstad
Restoration of Historical Carissa Gold Mine Mill	Both			X	X					X		X	X							P			
Silver Reef Project	Both			X	X																		
Michigan Coal Mine Reclamation	Both			X	X				X								X					P, M	P
Dugout Canyon Gob Heating Event	Both							X														P, M	
Wolfpen Gob Pile Project	Both		X			X											X				P, M		
Roaring Fork Landslide	Both					X											X				P, M		
Mare Creek Refuse Reclamation Project – Floyd County, Kentucky	Both			X	X											X	X				P, M		
Horsepen Creek Reclamation Project	Both		X			X						X				X					P, M		

* List whether project experience is corporate or personnel based or both.
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*** List Primary Design personnel and their functional capacity for the projects listed.

AML AND RELATED PROJECT EXPERIENCE MATRIX Attachment "B"																								
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			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Evaluation	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/ Mitigation/ Replacement	Construction Inspection/ Management	Water Treatment	Equipment/ Structure Removal	Stream Restoration	Geotechnical/ Stability	Mike Ricci	Mike Cross	Brad Petri	John Morgan	Patrick Wieck	Honore Rowe	
Dillan Creek AMD Remediation	Both	29										X		X				M	P					
Idarado Mine Mill-Level Tunnel Flow-Control Bulkhead	Both	30			X						X		X			X				M, P		M, P		
Mettiki AMD Treatment - Alkaline Reinjection Plan	Both	31										X		X				M	P					
Sunnyside Mine, U.S. Department of Justice (DOJ)	Both	32		X		X								X		X					M		P	
Camp Branch Watershed Litigation	Both	33		X		X						X									P, M			
Development of the Technical Handbook for Mine Drainage Control Structures	Both					X					X										P			
Patriot Coal – Hobet 45	Both	34										X			X						P, M			
OSM Stream Protection Rule Environmental Impact Statement (EIS) and Regulatory Impact Assessment	Both					X					X										P, M			

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** Use this area to provide specific sections or pages if needed for reference.
*** List Primary Design personnel and their functional capacity for the projects listed.

AML AND RELATED PROJECT EXPERIENCE MATRIX Attachment "B"																								
PROJECT	Exp. Basis C=Corp. P=Personnel*	Additional Info Provided in Section(s)**	PROJECT EXPERIENCE REQUIREMENTS																PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional					
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	\Hydrologic/Hydraulic Design/Evaluation	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/ Mitigation/ Replacement	Construction Inspection/ Management	Water Treatment	Equipment/ Structure Removal	Stream Restoration	Geotechnical/ Stability	John Morgan	Daykin Schnell	Mike Ricci	Whitney Faulkner			
Subsidence Analysis of Proposed UMCO Energy 6E Panel Mining	Both					X			X									P, M						
Bailey and Enlow Fork Mine Complex Drainage Study	Both											X		X				P, M						
Subsurface Investigation of Historic South Carolina Gold Mine	Both								X				X				X		P					
Tennessee Lands Unsuitable Petition EIS	Both																	P, M						
Spruce Mine Litigation	Both					X											X	P, M			P			
Alpha Natural Resources ARO Audit	Both																	P, M		P, M				
Rock Springs Drill and Grout Project for Subsidence Mitigation	Both	26		X					X								X	P, M						
Penneco Foundation Coal Mine Expert Witness Report	Both																	P, M						
WV QA/QC Panel	Both					X												P		P	P			

* List whether project experience is corporate or personnel based or both.
** Use this area to provide specific sections or pages if needed for reference.
*** List Primary Design personnel and their functional capacity for the projects listed.

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WV AOC+ Policy	Both										X		X					P, M					
DOJ – Massey/Arch/Magnum	Both											X		X				P, M					
KY AOC Policy	Both										X							P, M					
U.S. Environmental Protection Agency – Mountaintop Mining EIS	Both																	P, M					
Hampden Coal – Pete Branch	Both					X										X	X	P, M					
Fola Coal	Both					X										X	X	P, M					
Mullens	Both					X												P, M					
Sylvester	Both																	P, M					
Frazier Creek	Both																	P	P, M				
Rustic Ridge	Both																		P, M				

* List whether project experience is corporate or personnel based or both.
** Use this area to provide specific sections or pages if needed for reference.
*** List Primary Design personnel and their functional capacity for the projects listed.



APPENDIX B.

RÉSUMÉS



JOHN S. L. MORGAN

SENIOR VICE PRESIDENT

TECHNICAL EXPERTISE

- / Mine Planning
- / Mine Permitting
- / Environmental Regulation Compliance
- / Aggregate Processing Facility Design and Operation
- / Expert Witness Testimony on Mining Issues

EDUCATION

- / BS in Mining Engineering (Upper Second), Royal School of Mines, University of London, London, UK (1977)

PROFESSIONAL MEMBERSHIPS

- / Society for Mining, Metallurgy, & Exploration
- / American Institute for Minerals Appraisers

WORK HISTORY

- / RESPEC (1995–Present)
- / Weir International Mining Consultants (1992–1995)
- / Morgan Mining & Environmental Consultants Ltd. (1990–1995)
- / Howard Needles Tammen & Bergendoff (1984–1990)
- / Taylor Woodrow Construction and Mining (1977–1984)

OVERVIEW

John Morgan is a mining consultant with extensive experience in both surface and underground mining for extracting metalliferous ores, coal, and industrial minerals. He has a degree in mining engineering from the Royal School of Mines in London, United Kingdom. He has been the project manager on several mine technical reviews, mining operation appraisals, subsidence investigations, and reviews of the environmental compliance and liability analyses for both operating and abandoned mining operations. In addition to working in every region of the United States, John has been actively involved in projects worldwide, including in Indonesia, Vietnam, Russia, India, Finland, Ukraine, Poland, Bulgaria, Romania, Peru, and Trinidad.

PROJECT EXPERIENCE

CRH, Dublin, Ireland. John is the project manager for the raw materials workstream for the Lafarge Holcim asset acquisition and the provision of reserve modeling and mine planning services for the legacy CRH operations. Efforts include developing reserve models and mine plans in the following countries: the Philippines, France, Poland, Ukraine, and Germany. He also participated in determining the mineral reserve valuation and calculation of restoration provisions.

Continental Cement, Hannibal, Missouri. John was the project principal for preparing a feasibility study for developing an underground limestone mine for Continental Cement in Hannibal, Missouri. As the project proceeded, he was responsible for performing design and technical support to Continental in developing the mine slope, initial underground development, ventilation shaft, conveyor package, and reclaim tunnel.

U.S. Office of Surface Mining, Washington, DC. John was the project manager for the proposed stream protection rule; he developed the concept of using model mines to analyze the effect of the various alternatives being evaluated on each mining type in each region. He also managed the rule impacts analyses on longwall mining and coal preparation plant waste disposal.

U.S. Environmental Protection Agency (EPA), Washington, DC. John was the project manager for the review of the Spruce Mine in West Virginia to evaluate alternative mine configurations and fill locations that would minimize stream impacts while still mining the same coal resource.

PennFuture, Pittsburgh, Pennsylvania. John was the expert witness before the Pennsylvania Environmental Hearing Board regarding the potential effects of a shallow longwall mine operated by UMC0 on the adjacent streams. The preparation included reviewing subsidence modeling, surface water inventories, and stream characterization data.

Hilltop Big Bend Quarry LLC, Brandenburg, Kentucky. John was the project manager for the design and construction of a new 800-ton per-hour aggregate-processing plant consisting of a jaw crusher station, two cone stations, two screens, and a reclaim tunnel. The project included all the subcontractor bidding and selection, as well as full-time site supervision.

AOC+ Policy/RAM145 Policy, West Virginia and Kentucky. John developed the procedure and policies for optimizing excess spoil placement for steep slope coal mining in Appalachia. The procedures evaluated and ranked possible excess spoil disposal locations based on their excess spoil capacity per foot of stream impact. These policies were developed in participation with the mining industry, state mining regulators, the EPA, and the U.S. Army Corps of Engineers.



National Quarries, Trinidad and Tobago. John completed a restructuring analysis of the quarrying and aggregate industry in Trinidad and Tobago, including a detailed technical audit of National Quarries and an environmental assessment of the industry. The study included determining current and future markets and the economic reserves as well as analyzing import/export potential. The recommendations included a privatization strategy, regulatory framework, and technical improvements.

PRC Holdings, Charleston, West Virginia. John was the project manager for evaluating the coal, gas, and timber resources on 26,000 acres of property in West Virginia. The evaluation developed coal-seam mapping and provided a detailed review of historic and current mining, as well as determining surface minable reserves.

Aneka Tambang, Indonesia. As part of the restructuring and privatization process, John completed an environmental review of the mining and processing operations of Aneka Tambang. The review included detailed analyses and recommendations of the environmental performance of the bauxite, ferronickel, iron sand, and gold operations of the company. The project's implementation phase included developing and monitoring detailed construction schedules for the upgraded environmental program. The program included performing hydrologic design, conducting integrated mine planning, revegetating, handling hazardous materials, and developing an environmental policy.

MINE CLOSURE EXPERIENCE

- / **Reviewed restoration liabilities associated with two large surface mines in the Powder River Basin for Alpha Natural Resources** that included recalculation of the current restoration liability, revised regrade, cast blasting usage, and revised operating costs for shovel truck and dozer fleets. The analysis resulted in significant reductions in the required reclamation bond amount.
- / **Evaluated the reclamation liabilities associated with three mining complexes in West Virginia for Frasure Creek Mining** to determine current liabilities, current bonding, regulatory compliance, and options for the restructuring of operations to reduce liability and allow ongoing economic coal removal.

MINE SUBSIDENCE EXPERIENCE

- / **Project manager** for the evaluation of the optimum reclamation of an abandoned limestone mine in Kansas City to alleviate subsidence impacts on the overlying property so it could be used for commercial development.
- / **Designed a mitigation plan** to stabilize the open voids underlying a critical support structure of a new conveyor support pier. Construction included the use of zero slump grout to construct a barrier wall to stop down dip migration of high slump backfill grout.
- / **Geophysical analysis of karst-induced subsidence** in Florida that created an operating hazard to an active mine. Developed ground penetrating radar approach, combined with karst feature mapping and resistivity surveys.
- / **Conducted a peer review of the ongoing projects in Rock Springs, Wyoming**, to model the geology of the mined area plus analysis of potential residual subsidence and effect of grouting effort. The review included an analysis of contractor performance.
- / **Developed a drill and grout project for the Wyoming Department of Environmental Quality** that involved the design and contract management for the reclamation of numerous underground coal mines under Rock Springs, Wyoming. John's role as project manager included preparation of bid packages, CADD compiled designs, grout design, subsidence potential evaluation, and the management of the full-time construction management activity. This project had a total estimated construction cost of \$12 million. The project was awarded the 1995 Abandoned Mine Land Reclamation Award by the U.S. Department of the Interior.
- / **Designed a grouting plan** to reinforce the existing gate road pillars to minimize subsidence effects on a high-voltage transmission tower. This project included detailed design construction documents, contractor selection, and construction management.
- / **Reviewed structural damage of a manufacturing facility in eastern Kentucky** to evaluate the contribution of mine subsidence-related damage. The project included evaluation of the costs of ongoing maintenance and repair because of the subsurface conditions. Subsidence impacts were included in the valuation of the property.
- / **Expert witness testimony and analysis for a construction claim** relating to the grouting of mine voids under a new sewage treatment basin in Iowa to prevent potential subsidence effects.
- / **Expert witness testimony relating to the causes of damage** to a property in southern Indiana and the reasons it was not mining related.



MINE RECLAMATION EXPERIENCE

- / **Evaluated the potential of combining power plant scrubber sludge, fly ash, and bottom ash** into a pumpable grout that could be disposed of in an adjacent abandoned underground mine. The review included an economic analysis of the project and bench-scale testing of grout mixes and leachate potential.
- / **Compiled a surface mine drainage handbook for the state of Maryland** that included liaison with state and federal agencies, plus with the local coal operators to ensure the optimum mix of design and calculation approaches.
- / **Managed the design and construction for the abandoned Horse Creek limestone mine reclamation project** in southeast Wyoming. The mine excavated two near-vertical limestone beds using shrinkage stoping and was experiencing crown pillar and hangingwall failure. The project was for selective backfilling hangingwall reduction and crown pillar stabilization.
- / **Managed the evaluation, design, and construction of a stream improvement** to rectify the stream capture by an abandoned underground limestone mine in southeast Wyoming. The design included the installation of an impervious liner, geotextile, and rip rap adequate to pass a 100-year storm event.
- / **Managed the Crawford Mountain reclamation project for the state of Utah** to determine the optimum method of reclaiming the abandoned phosphate operations that were experiencing crown pillar subsidence and failure. The design analysis included an underground review of the operations as well as an inventory of all hazards. Designs for each construction package included underground closure of crosscuts.
- / **Managed a cooperative agreement-funded project between the Office of Surface Mining and the states of West Virginia and Maryland** to review the acid mine drainage sources in the North Branch of the Potomac River. The project included developing a routing model that allowed the effect of various remediation approaches to be prioritized.
- / **Managed the site evaluation and reclamation design of the Widen reclamation project** that consisted of a 4.5 million cubic yard burning refuse pile and two coal slurry impoundments.
- / **Managed the site evaluation and design of two coal mine reclamation projects** in Oklahoma, including highwall reduction and significant drainage modeling.
- / **Managed five reclamation projects for the Kentucky Division of Abandoned Lands.**
- / **Managed nine reclamation projects for the West Virginia Department of Energy.**



WHITNEY FAULKNER, PE

MANAGER, RECLAMATION SERVICES

OVERVIEW

Whitney Faulkner has 21 years of experience in civil and environmental engineering. She is the manager of Reclamation Services and is currently working on Abandoned Mine Land (AML) projects in West Virginia and Pennsylvania. These projects include subsidence mitigation, acid mine drainage, reclamation of dangerous highwalls, and closure of underground mine portals. She worked as an engineer permit reviewer for 9 years for the Kentucky Department of Natural Resources (DNR) Division of Mine Permits, which included reclamation of mining sites, backfill and grading, excess spoil structures, sediment-control structures, and coal waste-disposal areas. She also has experience in stormwater detention design, sanitary sewer and watermain design, project management, and stormwater modeling. She can collaborate and work with multiple agencies to secure permits in a timely manner. As a land-development engineer, Whitney managed professional consultants on 1,500-acre projects that involved working closely with city officials and maintaining a \$140 million budget. Whitney has experience working with various software programs, including SEDCAD, GeoStudio, REAME, AutoCAD, Carlson, and ArcMAP.

TECHNICAL EXPERTISE

- / Permitting
- / Project Management
- / Stormwater Management
- / Site Development

EDUCATION

- / BS in Civil Engineering, University of Kentucky, Lexington, KY (2002)

REGISTRATIONS & LICENSES

- / Professional Engineer in Kentucky, West Virginia, Pennsylvania, and Illinois

WORK HISTORY

- / RESPEC (2018–Present)
- / Kentucky DNR Division of Mine Permits (2009–2018)
- / Cambridge Homes (2006–2008)
- / Bollinger, Lach & Associates (2002–2006)
- / H. W. Lochner (1998–2002)

TECHNICAL EXPERIENCE

Mine Site Reclamation. Whitney is working on (AML) projects in West Virginia and Pennsylvania. She is the project manager on these projects. The reclamation includes subsidence mitigation of 150 acres, closures of collapsed and draining underground mine portals, acid mine drainage ponds, and reclaiming dangerous highwalls and slides. She is responsible for preparing the scope of services, budget, and communication with state officials and subcontractors.

Project Management. Whitney serves as the project manager for the Kentucky Department of Fish & Wildlife Resources (Fish & Wildlife). She manages a team of professionals responsible for mitigating and rehabilitation of streams and wetlands. Her responsibilities include scoping of work and budget, scheduling subcontractors, communication with Fish & Wildlife, and invoicing.

Whitney served as project manager for a 1,500-acre construction project. She managed a large, multidisciplinary team, led communications with internal and external consultants, and worked closely with city officials to obtain the necessary permits and record survey plats. She maintained a \$140 million budget. She also completed quality assurance/quality control (QA/QC) and time-and-cost budgeting.

Permitting. Whitney works directly with mining companies in Kentucky, West Virginia, and Indiana to submit and obtain numerous mining applications and permits. She has been responsible for permitting surface- and underground mining operations. These mining operations required additional permits from the U.S. Army Corps of Engineers (USACE) and National Pollutant Discharge Elimination permits.

While working at the Kentucky DNR Division of Mine Permits, Whitney reviewed surface mining permits to ensure they met the appropriate regulations. She was responsible for reviewing each application that contained a coal waste-disposal impoundment, high-hazard dams, breakthrough potential, or mining near an impoundment, evaluating the proposal based on its complexity, and assigning the application to the most qualified reviewer. Whitney also maintained the “slurry list,” which listed each permitting action currently under review and all of the approved permitting actions. During her tenure with the Division of Mine Permits, Whitney reviewed approximately 115 applications dealing with coal waste structures and disposal. These permitting actions required reviewing stability analyses, seepage analyses, hydraulic modeling, dynamic analyses, pipe deflection analyses, and breakthrough analyses.



Stormwater Management. Whitney designed and permitted stormwater management features for land-development projects. Her work included reviewing governing agency regulations and designing detention and retention ponds based on those regulations. She developed a stormwater detention model for various phases of an ongoing construction project and was responsible for permitting Stormwater Pollution Prevention Plans.

Site Development. Whitney designed and permitted site plans for private developers, which included grading plans and storm sewer, sanitary sewer, and water main designs. She coordinated with city officials to obtain permits and approvals. Whitney also conducted QA/QC for engineering plans to ensure that the most cost-effective designs were implemented.

PROJECT EXPERIENCE

Civil Engineer Fee in Lieu of Eastern Kentucky, Department of Fish & Wildlife Resources, Kentucky. Whitney serves as the project manager for Fish & Wildlife. She manages a team of professionals responsible for mitigating and rehabilitation of streams and wetlands. Her responsibilities include scoping of work and budget, scheduling subcontractors, communication with Fish & Wildlife, and invoicing. She also assists in an After-Action Review. This includes reviewing previous stream and wetland mitigation designs and monitoring to determine the success of each site.

Security and Exchange Commission (SEC) SK-300 Technical Report Summary, Alliance Coal, LLC, Lexington, Kentucky. Whitney assisted in the preparation of 6 SK-1300 Technical Report Summary (TRS) required by the SEC. The TRS was required under Federal Regulations to report exploration results, mineral resources, and mineral reserves. The report included a detailed history of each site, mineral resource and reserve estimates, environmental requirements, and an economic analysis of the viability of each site. Whitney served as one of the Qualified Persons validating the information.

Calculation of Asset Retirement Obligations, Confidential Client, West Virginia. Whitney assisted in estimating the Asset Retirement Obligations for a coal company in West Virginia. The ongoing operations are covered by 59 Surface Mining Control and Reclamation Act (SMCRA) permits. She estimated the direct reclamation costs to satisfy the SMCRA, 402, and 404 permit conditions for those operations, which included surface mines, underground mines, processing facilities, and mine support structures. The estimate components included consideration for grading to achieve the Approximate Original Contour, pond removal, continued water monitoring with scheduled reductions in frequency, revegetation, costs for perpetual monitoring, stream reconstruction, and road removal.

Illinois Coal Basin Due Diligence, Confidential Client, Confidential. Whitney assisted in the due diligence of approximately 20 coal mine sites for possible purchase. The due diligence included researching each site to determine the extent of reclamation. This allowed her to calculate the direct reclamation cost for each site. The estimation components included consideration for grading, pond removal, continued water monitoring with scheduled reductions in frequency, revegetation, stream reconstruction, road construction, and removal.

Hominy No. 2 Surface Mine, Quinwood Coal Company, West Virginia. Whitney served as a project engineer who was responsible for all of the permitting required before mining. Permits from the West Virginia Department of Environmental Protection (WVDEP) Division of Mining Reclamation and USACE were required. To obtain these permits, a mining plan had to be designed that included a reclamation plan, sediment structure designs, excess spoil structures, water quality samples, and wetland and stream determination.

Quinwood No. 1 Haul Road, Quinwood Coal Company, West Virginia. Whitney served as a project engineer who was responsible for all of the permitting requirements for a proposed haul road. Permits from the WVDEP Division of Mining Reclamation and USACE were required. The haul road will be used to connect a surface- and underground-mining job. This project required coordination between all of the permits to ensure that the mining plans were feasible and the timing was accurate.

Carlisle Mine, Sunrise Coal, LLC, Sullivan County, Indiana. Whitney served as a project engineer who was responsible for permitting a 4,600-acre underground permit through the Indiana DNR. This project involved ensuring that the application met all of the current SMCRA regulations, the subsidence-control plan, water quality data, and groundwater protection.

Alden Resources, LLC, Corbin, Kentucky. Whitney is responsible for designing the sediment-control structures on Alden Resources, LLC mining permits. She works closely with the client to provide a suitable design that is feasible in the field and meets all SMCRA regulations.



Buckeye Impoundment Crest Raise Review, Kentucky DNR Division of Mine Permits, Perry County, Kentucky. Whitney was the engineer permitting reviewer who reviewed and ultimately approved a 100-foot stage increase to a slurry impoundment that did not have a working decant system. The proposal was for two 50-foot increases. Stability analyses for both stages were verified and reviewed to ensure that each stage met the required safety factor for the static and pseudostatic conditions. Hydraulic modeling for the probable maximum precipitation (PMP) event was reviewed to ensure that the impoundment had 3.0 feet of freeboard and could decant 90 percent of the PMP storm volume within 10 days per regulation. A pipe deflection analysis had to be conducted to ensure that the proposed decant pipe would not deflect more than 5 percent under the weight of the 100-foot impoundment raise.

Stacy Branch Mine Review, Kentucky DNR Division of Mine Permits, Perry County, Kentucky. Whitney was the engineer permitting reviewer who reviewed and approved a permit that proposed the fill placement optimization process. This process maximized the amount of spoil returned to the mine area while minimizing the amount of spoil placed into excess spoil disposal sites. This protocol was used to facilitate issuing a corresponding USACE 404 permit.

Camp 9 Slurry Impoundment Review, Kentucky DNR Division of Mine Permits, Union County, Kentucky. Whitney reviewed a horizontal and vertical expansion of a four-sided diked impoundment and the associated closure plan. Her review included stability analysis, seepage analysis, groundwater analysis, and hydraulic modeling.

Big Branch Impoundment, Kentucky DNR Division of Mine Permits, Knott County, Kentucky. Whitney reviewed a crest increase of an upstream impoundment. The review required that she conduct a finite element quake analysis to ensure that the impoundment met the regulatory requirements of the pseudostatic safety factor.



MICHAEL ANDERSON, PE

SENIOR MINING ENGINEER

TECHNICAL EXPERTISE

- / Mine Planning
- / Project Management and Mine Development
- / Multisite Engineering and Operations
- / Exploration Planning and Geologic Modeling
- / Optimization and Efficiency
- / GIS, Mapping, and Surveying

EDUCATION

- / BS in Mining Engineering, Missouri University of Science and Technology, Rolla, MO (2010)

REGISTRATIONS & LICENSES

- / Professional Engineer in AL (2022–Present)
- / Professional Engineer in WV (2021–Present)

CERTIFICATIONS & TRAINING

- / Mine Safety and Health Administration (MSHA) Part 48, Underground and Surface
- / Federal Aviation Administration (FAA) Certified Remote Pilot

WORK HISTORY

- / RESPEC (2022–Present)
- / Greer Industries, Inc. (2020–2022)
- / RiverStone Group, Inc. (2017–2020)
- / Lhoist North America (2010–2017)

OVERVIEW

Michael Anderson has held operations, engineering, project management, and technical support roles in the mining industry. He specializes in project management, mine planning, geologic modeling, and GIS. Michael has spent most of his career in the aggregate and quicklime industries. He was the project manager for developing two new underground limestone mines and has experience with bulk material handling system design and layout and improving operations. He enjoys making detailed and practical mine plans, improving operations, and managing projects. Michael has a degree in mining engineering from Missouri University of Science and Technology.

TECHNICAL EXPERIENCE

Mine Planning. Throughout his career, Michael has been responsible for mine planning of multiple surface and underground limestone mines. He excels at collaborating with site personnel to design thorough mine plans at all stages in the life of a mine. Michael has extensive experience with AutoCAD, Carlson, Surpac, Global Mapper, AggFlow, and many vendor-supported software programs. He has experience with drill and blast designs, overburden storage layouts, and equipment selection.

Project Management and Mine Development. Michael was the project manager and engineer for developing two new underground limestone mines in West Virginia. He was responsible for the highwall stabilization and initial portal development. Michael oversaw highwall scaling and the installation of ground support, including rock fences, rockfall netting, rock bolts, mesh, and shotcrete. He made all plans, schedules, and layouts for the initial mine development, including drill and blast designs, grading and drainage plans, site infrastructure, 3D cave mapping, mine layout, ventilation maps, electrical resistivity, and void mapping. He has extensive contractor management experience and understands the value of proper oversight to a project's success.

Michael collaborated with a well-known conveyor design company to evaluate designs and layouts for a single 6,000-foot conveyor flight in an underground limestone mine. This project included modeling different equipment layouts and belt configurations to reduce long-term production and maintenance costs. He completed field reconnaissance and office engineering to produce drawings and calculations for the system and worked with the firm to produce the best layout and designs. These included equipment layout, site infrastructure, structure clearances, equipment access, schedules, and estimated costs. The final design was a single belt conveyor that led to a reduction in fines, elimination and less wear on transfer points, and a decrease in maintenance costs.

Multisite Engineering and Operations Experience. Michael has spent several years working in the field involved with the production and coordination at multiple mine sites. He was responsible for mine planning at more than 20 mine sites, including sequence plans and volume reconciliation for surface and dredge operations. Michael also held engineering positions at complex surface limestone mines that mined more than 10 million tons annually. He collaborated with site personnel to make plans for mining with mobile primary crushing and conveying systems. He was the mine planning lead for the unique planning and development challenges associated with mobile crushing systems.

Exploration Planning and Geologic Modeling. Michael was responsible for exploration planning, modeling, and resource/reserve estimates for limestone deposits. He has experience making geologic models for complex limestone deposits. Michael led a program to improve the recovery of a dolomite deposit by blending material previously labeled as waste. He was boots on the ground to test and track



ore quality. He developed a system of three separate quality piles. One pile consisted of material that was previously wasted, leading to a reduction in costs and an increase in reserves.

Optimization and Efficiency. Michael has experience modeling crushing and screening plants to improve throughput and product yields. He has modeled multiple aggregate processing facilities using AggFlow software and digital image processing of blasted rock to increase throughput and production yields. One project includes optimizing equipment settings to reduce recirculating load and improve product gradation, resulting in increased crushing system throughput. Michael spent his early career working alongside plant personnel in maintaining crushing plants and understands the value of good design to the bottom line. He has experience optimizing mobile fleets plus drill and blast designs to reduce costs and improve fragmentation.

GIS, Mapping, and Surveying. Michael has experience with GIS software, market competition mapping, surveying, and volume reconciliation. He completed aerial surveys and volume calculations for all aggregate stripping jobs.



JAMES M. BROWN

DIRECTOR, HEALTH AND SAFETY

TECHNICAL EXPERTISE

- / Developing Health and Safety Programs
- / Pandemic Preparedness and Response
- / Wetland Performance Monitoring
- / Stream Assessments
- / Geotechnical Surveys Using C-ALS

EDUCATION

- / BS in Environmental Science, Northern Kentucky University, Highland Heights, KY

CERTIFICATIONS & TRAINING

- / FAA Part 107 UAV Pilot Certification
- / OSHA 40-Hour HAZWOPER Certification
- / MSHA Part 46 & 48 Mine Training
- / Wetland Training Institute Certification for Wetland Delineation Training
- / Professional Association of Diving Instructors Open Water Diver

WORK HISTORY

- / RESPEC (2015–Present)
- / Sanitation District #1 (2014)
- / Northern Kentucky University (2012–2014)
- / Retail Manager, Operations, Various (2003–2011)
- / U.S. Marine Corps (1998–2002)

OVERVIEW

James Brown has 9 years of combined experience in environmental field services and 4 years of experience as a health and safety professional. In 2019, James was appointed as the Corporate Health and Safety Director and tasked with developing a comprehensive health and safety program and has since taken on other roles in corporate risk management. His past project-specific technical experience includes emergency response, gas chromatography, multiparameter water and soil analyses, groundwater user surveys, stream flow and hydromodification surveys, Rapid Bioassessment Protocols, benthic macroinvertebrate sampling, threatened and endangered (T&E) species surveys, and jurisdictional determinations.

PROJECT EXPERIENCE

Emergency Response, Weston Solutions, U.S. Environmental Protection Agency (EPA) Superfund Technical Assessment and Response Team (START) Program, Northern California. James has experience in performing hazardous materials, site surveys, and removal in support of the EPA's START program. James led a team of site monitors and rapid response personnel to inventory and remove household hazardous and industrial materials left behind from the 2017 Northern California wildfires. Responsibilities included conducting site reconnaissance, coordinating two rapid response teams, inventory and removal of hazardous materials, and creating geospatial records to track progress.

COVID-19 Pandemic Preparedness and Response. James supported RESPEC's response plan for the COVID-19 pandemic by coordinating with senior leadership, human resources, and support staff to develop action plans to minimize exposure risks for employees at work and during essential business travel. Action items have included developing a corporate pandemic preparedness plan, COVID-19 daily medical screenings, COVID-19 travel safety plans, office-specific mitigation plans, and a COVID-19 informational dashboard.

Corporate Health and Safety Program Development, Various Locations in the U.S. James was appointed Corporate Health and Safety Director for RESPEC in July 2019. Since then, James has been working to create a comprehensive health and safety program to support office and field projects. James coordinates with a network of Safety Officers from each RESPEC office to assist in implementing and carrying out the health and safety program by cultivating awareness, providing training, and overseeing all health and safety aspects in their respective locations across the U.S. Additionally, James works with senior leadership and project managers to provide guidance and support on field projects to ensure employees' safety.

Three-Dimensional Precision Laser Scanning, Strategic Partnership With Carlson Software, Various Locations in the U.S. and Canada. James performed sales demonstrations, training sessions, and field services as a part of RESPEC's strategic contract with Carlson Software. James has experience operating the C-ALS Borehole Deployable Laser Scanner to accurately scan inaccessible voids and mine workings in a variety of environmental settings across a wide range of industry applications. These applications include abandoned mine reclamations, drill and blast operations, sewer assessments, and recreational developments.

T&E Species Surveys, Various Clients and Locations in the U.S. James has experience in conducting T&E surveys for a variety of state and federally listed plants and animals. These surveys often support development projects related to infrastructure in the public and private sectors.

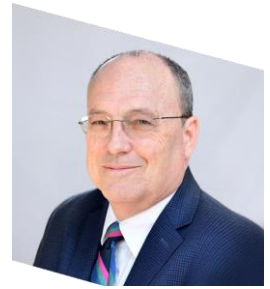


Water Quality Studies, EPA Office of Wetlands, Oceans, and Watersheds, Various Locations in the U.S. James has experience in conducting water quality studies to support the EPA's Office of Wetlands, Oceans, and Watersheds. The studies involved monitoring and quantifying the effectiveness of up-dip versus down-dip mining as a best management practice (BMP) for surface-coal mining. A total of 54 sites were monitored for a suite of parameters, including flow, conductivity, general chemistry, habitat, and functional capacity. The data collected, along with the appropriate permit data, will be used to establish a custom database that was developed by RESPEC for the EPA. This database will allow the EPA to graph, analyze, and query current and future data collected from multiple mining operations.

Stream Stability Surveys, Sanitation District 1, Northern Kentucky. James has experience in conducting stream stability surveys as a part of the SD1's Consent Decree with the EPA. The Consent Decree established long-term monitoring and reporting to measure the influence of stormwater runoff on streams within the service area. The influences include the hydromodification of stream channels, habitat assessments, benthic macroinvertebrate and fish response, and water quality. These surveys will help determine the effects of runoff in stream ecosystems and establish BMPs to improve stormwater management.

Stormwater Wetland Performance Monitoring, Northern Kentucky University (NKU), Boone County, Kentucky. While at NKU, James spent the majority of his research time monitoring stormwater wetlands for a variety of functions. In 2013, he monitored a small constructed wetland near an elementary school to determine stormwater retention and nutrient uptake. His findings determined that the wetland was retaining stormwater for up to 48 hours, which was allowing discharge into the stream at a reduced rate while reducing all the measured amounts of ammonium, nitrate, and phosphate.

In 2014, James studied another constructed wetland in a county park. During this study, he determined the discharge rates of runoff into and out of the wetland, as well as retention and lag times. These data supported the wetland design to ensure that Q_{crit} was met, which influences potential rates of erosion to downstream bank stabilization. The client was interested in design parameters that would optimize the efficiency of future stormwater wetlands and minimize the size and cost of construction. The data were also used to determine if additional runoff could be directed into the wetland to maximize management practices within the watershed.



MICHAEL RICCI, PE

PRINCIPAL CONSULTANT
MANAGER, MINING TECHNICAL SERVICES

TECHNICAL EXPERTISE

- / Environmental Permitting and Coordination
- / Surface-Water Drainage Design
- / AutoCAD/SurvCADD/Carlson
- / Geographic Information Systems (GIS) Application

EDUCATION

- / BS in Mining Engineering, University of Kentucky, Lexington, KY (1981)

REGISTRATIONS & LICENSES

- / Professional Engineer in IL, IN, KY, MD, NC, NH, OH, TN, VA, WV, and WY

WORK HISTORY

- / RESPEC (2017–Present)
- / Environmental Resources Management Consulting, LLC (2004–2016)
- / CBC Engineers and Affiliates (formerly Robert Ray and Associates) (1986–2004)
- / HNTB (formerly Eneco Resources) (1981–1986)

OVERVIEW

Michael Ricci has experience with environmental permitting, geologic modeling, mine planning and evaluation, and regulatory compliance. After receiving his Bachelor of Science degree from the University of Kentucky, he entered the consulting industry. His early career focused on compliance with the newly implemented Surface Mining Control and Reclamation Act (SMCRA). He was responsible for the primary components of the SMCRA permit, including stability analyses, hydrologic/sedimentologic modeling, volumetric design, and establishing baseline surface-water and groundwater monitoring plans. He has 42 years of experience with environmental permitting, including the many aspects of the SMCRA permitting, USACOE 404 permitting, and National Pollutant Discharge Elimination System (NPDES) permitting for coal and other commodities. He has completed projects in multiple states.

Mike joined Environmental Resources Management Consulting Company (ErMC2) in 2004. ErMC2 was formed to represent the interest of a national insurance company that held millions of dollars of reclamation bond related to surface mine reclamation for Horizon Natural Resources (HNR). HNR filed for bankruptcy in 2004; as part of the settlement, Lexington Coal Company (LCC) was created and assumed most of the outstanding reclamation liabilities for the HNR properties. Mike participated in or oversaw tasks such as monitoring and reporting reclamation progress on a quarterly basis, maintaining an estimate of reclamation costs, approving the quarterly operating budget of LCC, and subcontracting selected reclamation projects.

PROJECT EXPERIENCE

Calculation of Asset Retirement Obligations, Confidential Client, West Virginia. Mike was responsible for estimating the Asset Retirement Obligations for a coal company in West Virginia. The ongoing operations are covered by 59 SMCRA permits. He estimated the direct reclamation costs to satisfy the SMCRA, 402, and 404 permit conditions for those operations, which included surface mines, underground mines, processing facilities, and mine-support structures. The estimate components include consideration for grading to achieve the Approximate Original Contour, pond removal, continued water monitoring with scheduled reductions in frequency, revegetation, costs for perpetual monitoring, stream reconstruction, and road removal.

HNR Bankruptcy, ErMC2, Kentucky, West Virginia, Tennessee, Indiana, and Illinois. Mike joined ErMC2 in 2004. ErMC2 was formed to represent the interest of a national insurance company that held millions of dollars of reclamation bond for HNR. HNR filed for bankruptcy in 2004; as part of the settlement, LLC was created and assumed most of the outstanding reclamation liabilities for the HNR properties. Mike participated in or oversaw tasks such as monitoring and reporting reclamation progress on a quarterly basis, maintaining an estimate of reclamation costs, approving the quarterly operating budget of LLC, and subcontracting selected reclamation projects.

Mine Reclamation Audit, Confidential Client, Multiple Counties, West Virginia. An audit was conducted for a client that operates several Appalachian coal mines. The audit was performed to analyze the ongoing reclamation efforts at various surface- and underground-mining complexes. The audit required field verification of reported reclamation sites as well as estimates of remaining reclamation exposure. Each site was visited to determine the outstanding reclamation necessary to achieve bond release from the state. Earthwork quantities were estimated from field reconnaissance and unit cost rates were developed as site-specific values used at the different operations. In addition to calculating earthwork, the final reclamation numbers included review of approved permits for post-mining land uses and applying

planting costs to unreclaimed areas. Also, water treatment costs were considered and calculated for each site through final bond release.

Mine Reclamation Audit, Alpha Natural Resources, Multiple Counties in Kentucky and West Virginia. A reclamation audit was conducted to verify ongoing reclamation costs and assumptions reported by Alpha Natural Resources (Alpha) to each state regulating agency. The initial phase of the audit focused on permits with a "reclamation only" status. A sample set was developed to represent all of Alpha's permits across various states. The sample set included mines that represent varying degrees of reclamation as well as designated mine types. Each site was visited to verify reclamation requirements for the permit and validate reclamation estimates provided by Alpha to each state. Along with validating the anticipated reclamation plan, unit costs and assumptions made by Alpha were reviewed for reasonableness and applicability to the currently approved reclamation plan. A database was developed to compare reclamation data provided by Alpha to internal reclamation calculations.

Environmental Audit, Confidential Client, Eastern Kentucky. An audit was conducted for a client that operates several Appalachian coal mines. The audit was performed to analyze compliance with the NPDES permits and with the quarterly monitoring requirements in the SMCRA permits. The project considered 15 SMCRA permits and more than 2,250 identified monitoring locations. The analysis included determining start and end dates of NPDES sampling locations, missing samples, missing parameters within a sample, and possible exceedances of both daily and average limitations. SMCRA permitting and mining histories were reviewed to verify the presence of discharge locations and identify dates for which the effluent limitations changed because of changes in the reclamation status.

U.S. Army Corps of Engineers (USACE) 404 Permit, ICG Thunder Ridge, Knott County, Kentucky. ICG's USACE 404 permit was challenged in a lawsuit. One of the application components challenged was fill minimization. ErMC2 was charged with developing a repeatable and defensible methodology to meet the Approximate Original Contour regarding standards of the SMCRA while satisfying the USACE's requirements of minimizing the extent of stream disturbance. This methodology was intended to become the accepted standard by state and federal agencies as well as the industry. ErMC2 presented this methodology to the Environmental Committee of the Kentucky Coal Association and to a group of production managers and engineers from various ICG operations. ErMC2 also conducted a half-day training class to instruct other consulting companies on using the methodology.

Frasure Creek Mining Complex Permitting and Planning, Floyd County, Kentucky. The Frasure Creek complex is a large, multiseam, surface mining operation in Floyd County, Kentucky. The site is covered by six surface mining permits granted by the Kentucky Department for Surface Mining. The following services were provided at this complex:

- / Development of a full geologic model based on flown mapping and more than 300 drillholes.
- / Preparation and pursuit through Issuance 8 revisions.
- / Preparation and pursuit through Issuance 2 amendments.
- / Lead consultant in pursuit of Clean Water Act (CWA) 404 permits: The 404 permit considered the potential construction of a state highway through the project area. A physical, three-dimensional (3D) model of the final proposed regrading configuration was developed for presentation purposes.
- / Development of a cumulative regrading plan and subsequent analysis of alternative material handling plans as dictated by mining conditions.
- / Development of the fill minimization analysis, which is required for CWA 401 and 404 permitting. The minimization analysis considered several mining sequences.
- / Development of a methodology for the sedimentologic modeling of interior porous-rock checks within a channel.
- / Completion of engineering certifications of construction.

PUBLICATIONS & PRESENTATIONS

Rouse, N. and M. Ricci, 2018. *Perry County, Ohio, Properties Mining Limit*, RSI-2833, prepared by RESPEC, Lexington, KY, for Blackhawk Land and Resources, LLC, Lexington, KY.

Ricci, M., 2016. "SurvCADD 101," presented at the *Indiana Society of Mining and Reclamation Technology Transfer Seminar*, Evansville, IN, December 5.

Ricci, M., 1997. "ViewPro and Imaging Utility," presented at the *Computer Applications for Electronic Permitting Seminar*, Denver, CO, June 30–July 2.



CRYSTAL M. HOCKING, PG, PE

PROJECT GEOLOGIST

TECHNICAL EXPERTISE

- / Environmental and Mine Permitting
- / NEPA Analysis
- / Technical Writing
- / Hydrogeological Site Characterization

EDUCATION

- / MS in Geology and Geological Engineering, South Dakota School of Mines & Technology, Rapid City, SD (2007)
- / BS in Geological Engineering, South Dakota School of Mines & Technology, Rapid City, SD (2014)
- / BS in Geology, South Dakota School of Mines & Technology, Rapid City, SD (2005)

REGISTRATIONS & LICENSES

- / Professional Engineer in South Dakota (No. 13165), Wyoming (No. 16253), Maine (No. 15295), New Jersey (24GE05546200), New Hampshire (16423), and Florida (No. 87563)
- / Professional Geologist in Wyoming (No. 3794), Louisiana (No. 184), Texas (No. 12482), and New York (No. 491)

PROFESSIONAL MEMBERSHIPS

- / Society for Mining, Metallurgy & Exploration (SME)
- / International Association for Geoscience Diversity

CERTIFICATIONS & TRAINING

- / OSHA 40-Hour HAZWOPER
- / MSHA 32-Hour Miner Training
- / First Aid and CPR
- / Blood Borne Pathogens

HONORS & AWARDS

- / SDSM&T Outstanding Recent Graduate (2015)

WORK HISTORY

- / RESPEC (2007–Present)
- / South Dakota School of Mines & Technology (2004–2007)
- / US Geological Survey (2005)

OVERVIEW

Crystal Hocking is a Professional Geologist and Professional Engineer. She has supported a myriad of activities including environmental site assessments, hydrogeological characterizations, groundwater modeling, geologic mapping, geospatial analyses, and mine permit application preparation and technical review. Crystal has worked on writing and reviewing several large-scale mine permit applications and has working knowledge of environmental and permitting regulations in several states.

PROJECT EXPERIENCE

Golden Sunlight Mines, Inc. Environmental Impact Statement (EIS), Whitehall, Montana. Golden Sunlight Mines, Inc. proposed an amendment to its Golden Sunlight Mine to excavate and reprocess old tailings material. RESPEC was retained by the Montana Department of Environmental Quality (MT DEQ) to perform scoping, prepare the Draft EIS, respond to public comment, and prepare the Final EIS. Crystal was the project manager for this project and was involved in public scoping and writing sections of the EIS.

Federal Railroad Administration (FRA) Categorical Exclusions, South Dakota and South-Western Minnesota. Crystal is the project manager for four individual Categorical Exclusions being prepared for railroad improvement projects for submission to the FRA by Civil Design Inc. Three of these projects are located in eastern South Dakota and one is located near Belle Fourche, South Dakota. These projects involve railroad and track maintenance, bridge repair, and new segments of track. As part of preparing the Categorical Exclusion information and assessment documents, Crystal is serving as project manager and performed impacts analysis for most of the environmental resources.

Barretts Minerals, Inc. (BMI) EIS, Dillon, Montana. BMI proposed an amendment to its mine permit to expand its existing talc-mining operation. RESPEC was retained by MT DEQ to perform scoping, prepare the Draft EIS, respond to public comment, and prepare the Final EIS. Crystal was the project manager, coordinating with MT DEQ, BMI, and resource specialists to prepare the EIS. She also was involved in resource analysis and writing sections of the EIS on impacts to geology, geotechnical engineering, transportation, air quality, and noise.

Wharf Green Mountain Large-Scale Mine Expansion Permitting and Environmental Assessment (EA), Lead, South Dakota. Wharf Resources is a heap-leach gold mining operation in the northern Black Hills of South Dakota. In preparation for Green Mountain expansion, RESPEC was involved in all aspects of permitting the mining project, including successfully obtaining county and state mining permits. As project manager, Crystal coordinated schedules and budgets and facilitated communication with local and state agencies, as well as with the mine and environmental studies contractors. For the mine expansion, she was responsible for compiling the entire permit applications for county land-use and state mining permits, including writing sections on geology and groundwater, reviewing and summarizing all baseline studies, and coordinating with the mine to incorporate operational and reclamation plans into the permit application. Crystal also performed an analysis of alternatives and environmental impacts of the project to write an EA for lands that are administered by the Bureau of Land Management and located within the project area.

Wharf Mine Hydrogeology and Groundwater Modeling, Lead, South Dakota. Crystal has knowledge of the hydrogeology and groundwater flow system at the Wharf Mine site based on more than 10 years of projects for the mine. Groundwater flow is predominantly fracture-driven flow within the Precambrian bedrock, but also within the overlying Paleozoic and Tertiary units. In support of groundwater discharge permits, Crystal has conducted fate and transport modeling in a saturated system using MODFLOW. She



has created and updated the site conceptual and three-dimensional (3D) groundwater models several times over the past decade. These models are used to determine the water quality impacts of waste rock and spent ore disposal., primarily focused on impacts to nitrate, fluoride, selenium, and arsenic. Crystal has assisted in siting new production wells, improved groundwater quality and water-level monitoring systems, and used predictive models to allow the mine to revise their rock disposal plans. In support of local and state mine expansion permits, Crystal has evaluated and summarized site hydrogeologic conditions.

Wyoming Department of Environmental Quality (WDEQ) Land Quality Division (LQD) In Situ Recovery (ISR) Permitting Review and Support Services. RESPEC conducted comprehensive, multidisciplinary technical reviews of two separate mine permit applications in accordance with all applicable statutes, rules, guidelines, and memoranda of understanding (MOU) and in compliance with the applicable timelines for the WDEQ LQD. RESPEC provided professional support to the LQD in identifying deficiencies in the in situ mining permit applications and specifying the information necessary to correct those deficiencies. These reviews covered the following items: adjudication, land use, history, cultural resources, climatology, geology, hydrology, soils, vegetation, wildlife, wetlands, alluvial valleys, mine plans, and reclamation plans. Additionally, RESPEC revised LQD guidelines for in situ mine permitting and the state decision document (SDD) format. Crystal was the project manager and provided expert support for review of the two mine permit applications and revisions to the in situ guidelines and SDD, including scoping meetings with industry and regulators.

Dakota Territory Resource Corporation Exploration Permitting, Lead, South Dakota. Crystal has provided assistance to Dakota Territory preparing two Exploration Notice of Intent applications for the South Dakota Department of Agriculture and Natural Resources. This included coordination of archaeological surveys and development of reclamation plans for the drill sites.

Barrick Phase 1 Environmental Site Assessments, South Dakota. Crystal has been project manager and completed Phase 1 Environmental Site Assessments for three historic mining properties in the Black Hills including Maitland, Richmond Hill, and Homestake Mines. The assessments included environmental records review, site reconnaissance, and interviews with site operators. The assessments were completed for Barrick as part of a due-diligence evaluation of the properties.

FRA Categorical Exclusions, South Dakota and South-Western Minnesota. Crystal was the project manager for four individual Categorical Exclusions prepared for railroad improvement projects for submission to the FRA by Civil Design Inc. Three of these projects are located in eastern South Dakota and one is located near Belle Fourche, South Dakota. These projects involve railroad and track maintenance, bridge repair, and new segments of track. As part of preparing the Categorical Exclusion information and assessment documents, Crystal served as project manager and performed impacts analysis for most of the environmental resources.

Aquifer Pumping Test and Impacts Analysis, East Sioux Quarry, Rowena, South Dakota. LG Everest retained RESPEC to evaluate impacts to groundwater from deepening and expansion of its existing East Sioux Quarry. RESPEC conducted two aquifer pumping tests to evaluate the hydraulic conductivity of the upper and lower Sioux Quartzite. The pump test results were analyzed and reviewed to assess potential impacts to the local water table and nearby well owners.

Gilt Edge Mine Superfund Site Tailings Sampling, Lead, South Dakota. As project manager, Crystal developed and executed a sampling and analysis plan/quality assurance project plan for mapping and characterizing bank material along Strawberry Creek at the Gilt Edge Mine Superfund site. RESPEC helped design and execute the U.S. Environmental Protection Agency (EPA)-approved sampling plan, mapping, and sample collection. Tailings samples were collected and analyzed to estimate the volume of tailings material in the project area and evaluate water quality impacts of historical tailings.

Deep Borehole Draft EA, Haakon County, South Dakota. For the Department of Energy (DOE) efforts to research methods of nuclear waste disposal, RESPEC was involved in Phase I planning that included public outreach and EA support for a proposed deep borehole project site in South Dakota. Crystal led RESPEC's team to provide the DOE with the information necessary to generate an EA document. As project manager, Crystal coordinated with numerous environmental disciplines to collect baseline data and draft sections for the EA document. The project was terminated before completion because of changes in federal administration priorities.

Groundwater Modeling and Well Pressure Analysis, Confidential Client, Louisiana. For this client, Crystal constructed a reservoir simulation to model hazardous waste plume migration and pressure for a Class 1 Underground Injection Control permit for EPA Region 6 at a site in Louisiana. The reservoir simulation was built in the Sandia Waste-Isolation Flow and Transport (SWIFT) model for fractured media. Multiple runs were simulated in SWIFT to model plume migration for a waste stream above and below the density of the reservoir brine and build a composite plume geometry based on the permitted injection rate and a 10,000-year migration post-operations. Additional wells were included in the simulation based on current and past injection into the same



sand interval from other operators in the area that might influence the waste stream migration. A pressure buildup simulation was created in Predict-W to model the pressure cone of influence from operational injection rates. A critical pressure was calculated based on well logs for abandoned wells in the area of the new injection and using mud weights; the critical pressure is a limit to restrict possible communication between other potential reservoirs in existing wells and the waste stream.

Geotechnical Investigation, Dell Rapids Quarry, South Dakota. LG Everest retained RESPEC to evaluate the overburden slope angle that could be developed in its proposed quarry expansion area. Crystal developed and implemented a field exploration and laboratory testing program for the site. After review and analysis of the site data, Crystal performed an engineering analysis and preliminary slope design.

Hydrogeology of the Middle North Platte, Belle Fourche, Niobrara/Lower North Platte, and Medicine Bow Watershed Studies, Wyoming. Crystal was the project geologist for completing the watershed studies and responsible for completing the geologic and groundwater sections of the study reports. Crystal also provided expertise for the site-specific geologic investigations needed for any proposed projects, as well as oversight of watershed study reports and quality control throughout the process.

Sinkhole Hydrogeology and Subsidence Response, Louisiana. RESPEC provided field engineering and hydrogeologic support for a major solution-mining operator to characterize and monitor a sinkhole that developed on a salt dome in the Gulf Coast region. As part of this multidisciplinary study, RESPEC has been involved with drilling investigations, 3D seismic surveys, microseismic monitoring, physical and chemical hydrogeologic investigations, gas emissions monitoring and analysis, and subsidence surveys. Amidst snakes and alligators, RESPEC engineers and scientists traveled by airboat to maintain and monitor in-place inclinometers, tiltmeters, swamp water levels, and gas detection instrumentation. Crystal supported many aspects of this project, including but not limited to GIS database development and mapping, 3D stratigraphic modeling, field support, pumping test analyses, shallow gas monitoring and sampling, subsidence analyses, and monitoring and remediation work plans.

WDEQ LQD ISR Permitting Review and Support Services. RESPEC conducted comprehensive, multidisciplinary technical reviews of two separate mine permit applications in accordance with all applicable statutes, rules, guidelines, and MOU and in compliance with the applicable timelines for the WDEQ LQD. RESPEC provided professional support to the LQD in identifying deficiencies in the in situ mining permit applications and specifying the information necessary to correct those deficiencies. These reviews covered the following items: adjudication, land use, history, cultural resources, climatology, geology, hydrology, soils, vegetation, wildlife, wetlands, alluvial valleys, mine plans, and reclamation plans. Additionally, RESPEC revised LQD guidelines for in situ mine permitting and the SDD format. Crystal was the project manager and provided expert support for review of the two mine permit applications and revisions to the in situ guidelines and SDD, including scoping meetings with industry and regulators.

Hydrogeologic Atlas of the Northern Black Hills, South Dakota. The goal of this project was to map the groundwater sources within Butte, Meade, and Lawrence Counties of the northern Black Hills, South Dakota. The study focused on four major aquifers in the region—Inyan Kara Group, Minnelusa Formation, Madison Limestone, and Deadwood Formation. Compiling existing data sources from structural contour maps, oil and gas wells, monitoring wells, and hundreds of water well logs, Crystal generated a suite of elevation (structure) contour and depth-to-aquifer maps.

Hydrogeological Site Characterization of the Dewey Burdock Proposed In Situ Uranium Mine, Edgemont, South Dakota. For a proposed in situ uranium mine in the southern Black Hills, Crystal was involved in planning, conducting, and reporting detailed hydrogeological site investigations. For this project, Crystal collected field samples; performed statistical water quality analysis; completed aquifer pumping test design, implementation, and analysis; interpreted geophysical logs; and generated a 3D geologic model. Crystal wrote geology and groundwater reports for insertion into state and federal permit applications. She also testified as an expert groundwater witness and has drafted both temporary discharge permits and groundwater rights applications for the client.



Charles "Chuck" Kurzyna, P.E., P.S.

Senior Engineer / Senior Surveyor

New River Engineering, Inc.

Green and Associates, LLC

New River Safety, LLC

Ellison Ridge Mining, LLC

Former President and Principal Owner of New River Engineering Inc., established in 1998. New River Engineering has been performing surveying and engineering for the coal mining and construction industries.

Mr. Kurzyna has over 31 years of engineering and management experience in the mining industry and consulting business. He specializes in surface and underground mine design, planning, and surveying; environmental and safety permitting; project and construction management.

Project Manager for a consulting engineering firm, responsible for job estimates and bidding, supervise office staff in engineering related projects including surface mine surveying, reclamation and permitting, reserve studies, etc.

Chief Engineer for a small mining and construction company, responsible for mine planning, production tracking, construction job bidding, construction engineering, etc.

Chief Engineer, Senior Engineer for the Lady Dunn Surface Mine & Preparation Plant; coal reserve evaluations; project engineering for mine related facilities; environmental permits for large surface and deep mining operation; etc.

EDUCATION

Bachelor of Science

Mine Engineering Technology

West Virginia Institute of Technology

May 1979

Associate of Science

West Virginia Institute of Technology

May 1977

CERTIFICATIONS

Professional Engineer (WV)

Professional Engineer (OH)

Professional Engineer (PA)

Professional Engineer (VA)

Professional Engineer (KY)

Professional Engineer (GA)

Professional Surveyor (WV)

Underground Mine Foreman

Surface Mine Foreman

PROFESSIONAL AFFILIATIONS

Contractors Association of West Virginia



Christopher D. Burford

COO / Project Manager: S & S Engineers, Inc.

President: New River Engineering, Inc.

Green and Associates, LLC

New River Safety, LLC

Ellison Ridge Mining, LLC

Mr. Burford has been with NREI for over fifteen years. As the President and Project Manager for New River Engineering, Inc., he oversees Surface and Underground Mining Permit Applications, is the Manager of Surveying Crews, manages State and Federal Safety Plans and Permits, oversees Construction Oversight & Construction Management, and Mine Planning.

Green and Associates, LLC, St. Clairsville OH – manager and supervisor of survey crews and office personnel, business development, and coordination with clients on various projects.

New River Safety, LLC, – manager and Supervisor of safety instructors, electrical inspectors, and office personnel, business development, and coordination with clients and government entities.

Ellison Ridge Mining, LLC – management and oversight of various sub-contractors over mining, reclamation, and civil site construction projects, business development, and coordination with clients and government entities.

Trimble Schools Building

Additions and Remodeling - \$400,000. Alexander Schools Renovations and Maintenance Facility - \$500,000. HVCRC Gymnasium and Classroom Design - \$3,000,00

EDUCATION

Associate of Science

Civil Engineering Technology
West Virginia University Institute of Technology
May 2004

CERTIFICATIONS

Certified Underground Coal Miner
Certified Surface Coal Miner
MSHA Certified Limited Instructor
MSHA Certified Gravimetric Dust Sampling
MSHA Certified Gravimetric Dust Calibration & Maintenance

Heartsaver First Aid, CPR & AED Certified
Safe Land USA PEC Safety
MSHA – Methane / Oxygen Deficiency Qualified
APNGA Portable Nuclear Gauge Safety &
USDOT Hazmat Certified
(#299-160-926-311)
APNGA Certificate of Achievement
Radiation Safety Officer Class
(#299-160-994-3161)

PROFESSIONAL AFFILIATIONS

Contractors Association of West Virginia
West Virginia Rural Waters Association
West Virginia Coal Association
Friends of Coal Association



DAYKIN SCHNELL, PE

EXPLOSIVES ENGINEERING MANAGER

TECHNICAL EXPERTISE

- / Abandoned Mine Investigation
- / Remote Scanning and Mapping
- / Mine Planning and Design
- / Drill and Blast Design and Guidance
- / Drill and Blast Optimization
- / Blast Data Collection and Interpretation
- / Operations, Project, and Contractor Management
- / Quality Control and Operational Auditing

EDUCATION

- / MS in Explosives Engineering, Missouri S&T, Rolla, MO (2018)
- / BS in Mining Engineering, Missouri S&T, Rolla, MO (2015)

REGISTRATIONS & LICENSES

- / Professional Engineer in KY

PROFESSIONAL MEMBERSHIPS

- / International Society of Explosives Engineering (ISEE)
- / Society of Mining, Metallurgy & Exploration (SME)

CERTIFICATIONS & TRAINING

- / MSHA 40-Hour Miner Training
- / KY PE Licensing (2021)
- / Remote Pilot Certification (2021)
- / CPR/First Aid (2021)
- / HAZWOPER (2020)
- / Fire Fighter I/II (2017)
- / Mine Rescue Training

WORK HISTORY

- / RESPEC (2018–Present)
- / Freeport-McMoRan Inc. – Safford Operations (2015–2018)
- / Missouri S&T Mining Engineering Department (2013–2015)
- / Freeport-McMoRan Inc. – Morenci Operations (2014)
- / Central Plain Cement (2013)

OVERVIEW

Daykin Schnell has 9 years of combined experience in the fields of mining and explosives engineering. He has worked on surface and underground limestone and metal deposit mining projects in North America, Europe, and Asia. Daykin has technical experience in abandoned mine investigation; remote scanning and mapping; mine planning and design; drill and blast design, guidance, and optimization; blast data collection and interpretation; operations, contracting, and project management; and quality control and operational auditing. Daykin is also experienced in health and safety and emergency response with his mine rescue, first aid, firefighting, EMT, and HAZWOPER experience and training.

PROJECT EXPERIENCE

WY AML Horse Creek 10C Underground Investigation, Wyoming, United States. Daykin managed the underground void scanning and mapping of historical underground mine workings for the underground report of investigation to be provided to the WY AML. The underground investigation included over 40 million cubic feet of underground workings that posed safety risks to the public. All of the work for the project was done from the surface using existing openings and remote scanning methods.

Oceana Gold Underground Investigation, South Carolina, United States. Daykin managed the underground void scanning and mapping of historical underground mine workings. The maps of the void areas were used to refine the geotechnical plan and to develop safe blasting and mining methods for remediating the void area.

LG Everist Blast Vibration Analysis and Review, South Dakota, United States. Daykin managed a comprehensive review of historical blasting at the site and developed up to date blast vibration prediction equations to help manage blast vibrations at structures adjacent to the mine property. Daykin has continued to manage the blast vibration analysis for each of the closest structures to the mine operation and provided the client with regular updates on the changes to predicting the blast vibrations.

Wharf Blast Vibration Analysis and Review, South Dakota, United States. Daykin managed a comprehensive review of historical blasting at the site and developed up to date blast vibration prediction equations to help manage blast vibrations at structures adjacent to the mine property. A final review of the findings and recommendations for mitigating blast vibrations at the nearby was provided to the client.

Oceana Gold Quality Control and Engineering Support, South Carolina, United States. Daykin has worked with operations teams to create new technical roles related to the drill and blast processes based on the needs of each individual operation. He has also spent extended time on sites while establishing and adjusting the roles and responsibilities of drill and blast engineers to meet various client.

Nyrstar Blast Vibration Monitoring and Review, Tennessee, United States. Daykin managed the installation and monitoring of surface seismographs near Nyrstar's underground mines in Middle Tennessee. He also manages the active reporting of seismograph readings for each blasting and quarterly updates to the blast vibration analysis and predictions

Twin Metals Minnesota Vibration Impact Study, Minnesota, United States. Daykin managed a third-party review analyzing the potential effects of construction and blast vibrations for a new mining project. Data was incorporated from site and similar active operations in industry to determine the predicted vibration levels.



Republic Cement High-Profile Blast Planning and Implementation, Manila, Philippines. Daykin assisted with reviewing drill and blast operations in a high-profile location to aid in advancing the mine plan while ensuring the safety of personnel, the cement plant, and the public. Detailed procedures and methods for blasting and were developed, tested, and implemented in the high-profile area directly above and adjacent to the cement plant and the public.

PUBLICATIONS & PRESENTATIONS

Lewis, B., D. Schnell, 2022. "The Explanation, Application, and Importance of Velocity of Detonation and Monitors in the Blasting Process / Mining & Exploration: Operations: Drilling & Blasting in Operations," presented at the *Mine Exchange: 2022 SME Annual Conference & Expo*, Society for Mining Metallurgy and Exploration, Salt Lake City, UT, February 27–March 2, 2022.

Schnell, D., and B. Lewis, 2022. "Case Study: Blasting with Air Decks to Maintain Performance While Saving Costs," presented at the *Mine Exchange: 2022 SME Annual Conference & Expo*, Society for Mining Metallurgy and Exploration, Salt Lake City, UT, February 27–March 2, 2022.

Schnell, D., 2022. *Slag Blasting and Structural Analysis on Soda Ash Silo*, RSI, prepared by RESPEC, Lexington, KY, for Genesis Alkali, Green River, WY.

Schnell, D., 2021. "Remote Underground Investigation and Stability Analysis of Historical Limestone Mines," presented at the *Kentucky Crushed Stone Association Underground Stone Safety Seminar*, Louisville, KY, December 6.

Schnell, D. and B. Jones, 2021. *Blasting and Vibration of the Wharf Boston Expansion Project*, RSI-3154, prepared by RESPEC, Lexington, KY, for Coeur Wharf, Rapid City, SD.

Schnell, D., 2021. "Remote Underground Investigation and Stability Analysis of a Historic Limestone Mine," presented at the *Kentucky Professional Engineers in Mining Conference*, Lexington, KY, August 30.

Schnell, D., 2021. "Case Study: Subsurface Investigation of a Historic Underground Mines for Reclamation and Remediation Efforts," virtual webinar, presented for the *Pennsylvania Aggregates and Concrete Association*, March 12.

Schnell, D. and B. Lewis, 2021. *MTI Solo Blastbags Study*, RSI-3109, prepared by RESPEC, Lexington, KY, for MTI Group, Stanton, KY.

Schnell, D., 2021. "Blast Optimization with Instrumentation", virtual webinar, presented to the *International Society of Explosive Engineers Peruvian Student Chapters*, March 12.

Schnell, D. and B. Lewis 2020. "Blasting in Close Quarters: From Construction to Quarry," virtual webinar, presented by RESPEC, November 13, 2020, <https://www.respec.com/presentation/blasting-in-close-quarter-environments-from-quarry-to-construction-projects>.

Slezak, M. and D. Schnell, 2020. "Make Blast Reporting Great Again," presented at the *2020 SME Annual Conference & Expo*, Society of Mining, Metallurgy & Exploration, Phoenix, AZ, February 23–26.

Schnell, D., N. Rouse, and P. Wendlandt, 2020. "Case Study: Systematically Improving Drilling and Blasting Operations in Hard-Rock Mines," presented at the *46th Annual Conference on Explosives and Blasting Technique*, International Society of Explosives Engineers, Denver, CO, January 26–29.

Rouse, N., D. Schnell, and T. Worsey, 2020. "Surface Blast Vibration Regression Model for Underground Mines," presented at the *46th Annual Conference on Explosives and Blasting Technique*, International Society of Explosives Engineers, Denver, CO, January 26–29.

Schnell, D., N. Rouse, and P. Wendlandt, 2019. "Systematically Improving Drill and Blast Operations," *Proceedings, Kentucky Blasting Conference*, Kentucky Blasting Conference, Lexington, KY, December 5–5.

Schnell, D. and N. Maronde, 2019. "Instrumentation for Production Efficiencies," *Proceedings, Technology Demonstration Day*, Sauls Seismic and Nomis Seismographs, Franklin, TN, November 7.

Rouse, N., D. Schnell, and T. Worsey, 2019. *Regression Model for Surface Vibrations from Underground Operations*, RSI-2957, prepared by RESPEC, Lexington, KY, for Twin Metals Minnesota LLC, St. Paul, MN.

Rouse, N., T. Worsey, and D. Schnell, 2018. *Twin Metals Minnesota LLC 2018 Blast Vibrations Analysis*, RSI-2887, prepared by RESPEC, Lexington, KY, for Twin Metals Minnesota LLC, St. Paul, MN.

Klein, B. A., R. Stancil-Bacon, D. Schnell, B. Abel, J. Verslues, and K. Awuah-Offei, 2014. "Optimal Number of Factors for Choice Experiments in Mining Community Consultation," *Proceedings, 2014 Undergraduate Research Conference*, Missouri University of Science and Technology, Rolla, MO, April 16.



ALAN A. CAMPOLI, PhD, PE, SME-RE

PRINCIPAL CONSULTANT

OVERVIEW

Dr. Alan Campoli has more than 46 years of engineering and sales experience in the mining and tunneling industries. He has experience from previous roles as Vice President of Special Projects at Jennmar, business development manager, consulting engineer, United States Bureau of Mines researcher, and coal miner. His focus has been on pillar design, rock reinforcement, standing support, groundwater containment, methane drainage, mine fire control, subsidence, and ventilation issues for tunneling, mining, and construction. Alan taught mineral economics and mine valuation at the University of Kentucky and has authored more than 40 technical publications. He has delivered numerous formal presentations at forums including the Society for Mining, Metallurgy, and Exploration (SME) and the American Mining Congress. He is a distinguished member and former Chairman of the Pittsburgh and Central Appalachian Sections of the SME and served on the Peer Review Editorial Board, Professional Engineers Exam Committee, Research Council, and Program Committee.

TECHNICAL EXPERIENCE

Engineering Management. Alan managed and developed the skills of numerous engineers and scientists. He selected and expedited technologies to the marketplace. He also developed and commercialized significant advances in underground coal mine roof support technology, mine structural design, ventilation seals, water bulkheads, rock grouting, coal mine fire control, subsidence prediction and mitigation, and coalbed methane drainage systems.

Coal Mine Fire. Alan has designed and led the control of Pennsylvania coal mine fires from the surface through surface boreholes.

Subsidence. Alan has predicted and designed controls of coal mine subsidence.

Coal- and Rock-Pillar Design. Alan is an expert in the prevention of high-stress coal-pillar failure during deep underground room-and-pillar and longwall mining. He participated in developing the National Institute for Occupational Safety and Health (NIOSH) programs Analysis of Retreat Mining Pillar Stability (ARMPS) and Analysis of Longwall Pillar Stability (ALPS), which are routinely used to verify the safety factor of proposed mine designs.

Rock Reinforcement. Alan is an expert in roof-bolt design and installation with an emphasis on polyester roof-bolt resin and cable-bolting technology. His unique knowledge of chemical grouts is used to reinforce and control water through fractured rock.

Standing Support. Alan was part of the leadership of Jennmar subsidiary JennChem during the development of unique, pumpable standing support for longwall gateroads. This system now dominates longwall gateroad support replacing wooden cribbing.

Groundwater Containment. Alan designed and successfully installed cementitious water-retention bulkheads in various underground coal mine strata and water pressures.

Methane Drainage. Alan was part of the leadership of underground cross-measure borehole drainage of methane from longwall gobs. The system successfully intercepts methane gas and pipes it to the surface to prevent mixture with mine-ventilation air. He patented a unique gas/water separation system that was critical to system success.

TECHNICAL EXPERTISE

- / Engineering Management
- / Mine Fire Evaluation & Control
- / Subsidence Prediction & Control
- / Coal- and Rock-Pillar Design
- / Rock Reinforcement
- / Standing Support
- / Groundwater Containment
- / Methane Drainage

EDUCATION

- / PhD in Mining Engineering, Virginia Tech, Blacksburg, VA (1994)
- / MS in Engineering Management, University of Pittsburgh, Pittsburgh, PA (1984)
- / BS in Mining Engineering, University of Pittsburgh, Pittsburgh, PA (1981)

REGISTRATIONS & LICENSES

- / Professional Engineer in Alabama, Illinois, Kentucky, Pennsylvania, Tennessee, Utah, Virginia, and West Virginia

PROFESSIONAL MEMBERSHIPS

- / Society for Mining, Metallurgy, and Exploration (1979–Present)
- / American Society of Testing Materials International (2008–Present)

CERTIFICATIONS & TRAINING

- / First-Class Coal Mine Foreman (1990)
- / Health and Safety Trainer (1995)

HONORS & AWARDS

- / Distinguished Member, SME (2018)
- / Peng Ground Control in Mining, SME (2019)

WORK HISTORY

- / RESPEC (2020–Present)
- / SynTerra Corporation (2018–2020)
- / Jennmar (2007–2018)
- / Minova (1997–2007)
- / GAI Inc. (1995–1997)
- / U.S. Bureau of Mines (1979–1995)
- / Crescent Hills Coal Company (1977–1979)

Ventilation Controls. Alan designed and implemented unique coal mine ventilation seals directly after the Sago Mine fatal explosion. This work was made possible through close working relationships with federal and state safety enforcement personnel.

PUBLICATIONS & PRESENTATIONS

Campoli, A. A., 2003. "Coal Mine Water Retention Bulkhead Design and Construction," presented at the *2003 SME Annual Meeting and Exhibit*, Cincinnati, OH, February 15–18.

Campoli, A. A., 2001. "Variables Affecting Polyester Resin Anchorage Performance With United States Roof Bolting Systems," *Proceedings, 4th International Symposium on Roof Bolting in Mining*, Aachen University of Technology, Aachen, Germany, June 25–27.

Campoli, A. A., M. R. Amick, P. S. Mills, and A. J. Rohaly, 1997. "Yielding Cement Roof Supports for Longwall Mining," *Proceedings, 16th International Conference on Ground Control in Mining*, West Virginia University, Department of Mining Engineering, College of Engineering and Mineral Resources, Morgantown, WV, August 5–7.

Campoli, A. A., T. P. Mucho, and R. K. Zipf, 1995. "Bump Control Design Protocol for Room-and-Pillar Coal Mining," *Proceedings, Mechanics and Mitigation of Violent Failure in Coal and Hard Rock Mines*, Washington, DC, US Bureau of Mines, Spokane, PA, Special Publication 01-1995, pp. 181–199

Campoli, A. A., F. E. McCall, G. L. Finfinger, and M. D. Zuber, 1995. "Potential for Improved Longwall Dust Control by Surface Borehole Water Infusion," *Proceedings, SME Annual Meeting and Exhibit*, Denver, CO, March 6–9, AIME/SME Preprint 95-139, p. 8.

Chase, F. E., C. Mark, and A. A. Campoli, 1995. "Analysis of Retreat Mining Pillar Stability," *Proceedings, SME Annual Meeting and Exhibit*, Denver, CO, March 6–9, AIME/SME Preprint 95-237, p. 13.

Campoli, A. A., T. M. Barton, F. C. VanDyke, and M. Gauna, 1993. *Gob and Gate Road Reaction to Longwall Mining in Bump-Prone Strata*, US Bureau of Mines Report of Investigations 9445, prepared by the United States Department of the Interior, Bureau of Mines, Washington, DC, p. 48.

Campoli, A. A., J. Cervik, and R. L. King, 1986. *Triboelectric Effects on Polyethylene Methane Drainage Pipelines*, US Bureau of Mines Report of Investigations 9017, prepared by the United States Department of the Interior, Bureau of Mines, Washington, DC, pp. 14.

Campoli, A. A., J. Cervik, and S. J. Schatzel, 1983. *Control of Longwall Gob Gas by Cross-Measure Boreholes*, US Bureau of Mines Report of Investigations 8841, prepared by the United States Department of the Interior, Bureau of Mines, Washington, DC, p. 17.



ERIK HEMSTAD, PE

PROJECT MANAGER AND GEOTECHNICAL LEAD

OVERVIEW

Erik Hemstad has more than 12 years of experience in geological and geotechnical engineering. He has an established breadth of knowledge and experience across the geological, civil, and mining engineering and geology fields coupled with project, business, and personnel management capabilities and effective decision-making and judgement. He applies these skills toward projects of all sizes to deliver upon client needs and specific project objectives. Erik excels at undertaking diverse and complex projects and tasks in nonroutine environments as well as creating and managing solutions focused on project execution and client satisfaction. His primary roles include project development, execution, and management for RESPEC's Mining & Energy business unit, and he also contributes to overall marketing and business development for current and prospective clients.

TECHNICAL EXPERIENCE

Project Management. Erik has experience in performing project management functions for various geotechnical and geological clients in the mining and civil industry sectors. His work encompasses an array of small- to large-scale projects. Examples include designing and managing geotechnical and core drilling investigations for the U.S. Army Corps of Engineers (USACE) to multimillion-dollar underground mine reclamation and abandonment projects for the Office of Surface Mining Reclamation and Enforcement (OSMRE). Erik's project management and leadership pursuits are embodied through robust professional development and experience while personifying the contributions and skillsets of fellow colleagues and team members to meet and exceed client needs and expectations.

Geotechnical Characterization and Analysis. Erik's geotechnical engineering experience includes slope stability assessments and analysis; geotechnical rock-mass characterization for surface and underground applications, including mining and tunneling operations; geotechnical core-logging techniques, including core-orientation methods and analysis through downhole acoustic logging techniques; and geologic hazard analysis and assessment for complex issues, such as slope failures and underground karst structures. He also provides classification, testing methods, and engineering assessments pertaining to soils engineering, exploration, and behavior.

Surface and Underground Geological Evaluation. Erik is well versed in geological evaluations in performing surface and underground assessments of rock masses using geological evaluation tools. These skills are combined with his engineering experience in applying observed and collected quantifiable field data into compiling and generating comprehensive geomechanical models and studies applicable to project-specific objectives.

Exploration Program Development and Management. Erik has extensive project experience pertaining to developing, executing, and managing geological field exploration campaigns and performing subsequent geological analysis, engineering, modeling, interpretation, and reporting. His exploration project work has focused on both domestic and international exploration developments for existing and startup operations. This work involves conventional and solution-mining applications with a focus on industrial minerals, including evaporites and phosphates.

Solution-Mining Engineering Design and Assessment. Erik contributes to the implementation of solution-mining operations from the initial geologic and feasibility assessment to designing, engineering, and constructing solution-mining wells, wellfields, and accompanying infrastructure. He has a diverse background in providing solution-mining expertise for clients operating in potash, salt, trona, and borate

TECHNICAL EXPERTISE

- / Project Management
- / Geotechnical Characterization and Analysis
- / Surface and Underground Geological Evaluation
- / Exploration Program Development and Management
- / Solution-Mining Engineering Design and Assessment
- / Resource and Reserve Calculation and Reporting
- / Geomechanical Testing and Soils and Rock Analysis
- / Geophysical and Field Instrumentation Methods and Techniques

EDUCATION

- / MBA, Colorado Mesa University, Grand Junction, CO (Expected 2022)
- / MS in Civil-Geotechnical Engineering, Michigan Technological University, Houghton, MI (2011)
- / BS in Geological Engineering, Michigan Technological University, Houghton, MI (2005)

REGISTRATIONS & LICENSES

- / Professional Engineer in Colorado

PROFESSIONAL MEMBERSHIPS

- / Society for Mining, Metallurgy & Exploration (SME), Member

CERTIFICATIONS & TRAINING

- / First Aid and CPR Certification, Red Cross (2020)
- / MSHA Certification, Surface and Underground (UG) Metal/Non-Metal, Shafts and Coal (2021)

WORK HISTORY

- / RESPEC (2021–Present)
- / Agapito Associates, Inc. (2011–2021)
- / U.S. Marine Corps (2005–2009)



mineral extraction as well as experience in the geomechanical assessment and design of storage caverns for hydrocarbon applications

Resource and Reserve Calculation and Reporting. Erik is involved in all aspects of resource and reserve reporting, including the definition of resource and reserve deposit types and extents. He provides quality assurance/quality control (QA/QC) throughout the data collection and management process, including core-sample preparation, sample analysis, security, and procedural verification for laboratory testing. He also has experience in subsequent geological model production and geostatistical analysis using industry-leading software platforms conforming to National Instrument (NI) 43-101 and Joint Ore Reserves Committee (JORC) compliant reporting standards.

Geomechanical Testing and Soils and Rock Analysis. Erik has a background in performing geomechanical testing for rock-core samples and disturbed and undisturbed soil specimens. He has additional experience in the design, operation, implementation, and subsequent analysis for in situ stress measurement determinations using overcoring and hydrofracture techniques in rock as well as pressure-meter analysis in unconsolidated materials. Erik combines field- and laboratory-collected data to provide practical and meaningful evaluations for clients.

Geophysical and Field Instrumentation Methods and Techniques. Erik combines his expertise in drilling program design and management with a breadth of knowledge in downhole and surface geophysical methods to deliver solutions that optimize client objectives for characterizing geological deposits and correlating stratigraphic boundaries and structural features. He also effectively contributes to QA/QC protocols.

MILITARY EXPERIENCE

US Marine Corps, Various Locations. Erik served as an infantry officer in the U.S. Marine Corps. Obtaining the rank of captain, he deployed on numerous occasions to various locations in the Middle East, where he contributed to active wartime campaigns and operations. Erik's military experience has contributed to the development of his leadership and management skills while forming the basis for working cooperatively and effectively across a diverse range of cultures.

PUBLICATIONS & PRESENTATIONS

Haveman, B. R., E. A. Hemstad, A. L. Shaffer, L. J. Gilbride, and C. Kamp, 2020. "Horizontal Principal Stress Measurement and Determination of Stress Gradient at the New Afton Mine, Kamloops, British Columbia," presented at the *MassMin 2020: Eighth International Conference & Exhibition on Mass Mining*, SRK Consulting, Virtual Conference, December 9–11.

Shaffer, A., L. Gilbride, E. Hemstad, B. Haveman, R. Goodrich, C. Forsha, and B. Keaton, 2018. "In-Situ Stress Measurements and Instrumentation Installation, Duke Energy Walters Dam, Waynesville, North Carolina," presented at the *Dam Safety 2018 Conference*, Association of Dam Safety Officials, Inc., Seattle, WA, September 9–13.



MICHAEL J. RAFFALDI, PE

STAFF ENGINEER

TECHNICAL EXPERTISE

- / Excavation and Pillar Stability
- / Ground Support
- / Geomechanical Analysis
- / Geotechnical Instrumentation
- / Materials Testing

EDUCATION

- / MS in Mining Engineering, University of Kentucky, Lexington, KY (2015)
- / BS in Civil Engineering, Louisiana State University, Baton Rouge, LA (2012)

REGISTRATIONS & LICENSES

- / Professional Engineer in Kentucky

CERTIFICATIONS & TRAINING

- / MSHA Part 48, 40-Hour Training

PROFESSIONAL MEMBERSHIPS

- / Society for Mining, Metallurgy & Exploration
- / American Rock Mechanics Association
- / National Society of Professional Engineers

WORK HISTORY

- / RESPEC (2019–Present)
- / The National Institute for Occupational Safety and Health (NIOSH) (2014–2015)
- / RESPEC (2014)
- / University of Kentucky (2012–2014)

OVERVIEW

Michael Raffaldi has nearly 8 years of industry and research experience in rock mechanics and geotechnical engineering. His primary areas of expertise include design and analyses of underground excavations, pillars and pillar layouts, and ground support. Mike has experience with various empirical, analytical, and numerical analysis methodologies and in the appropriate selection and application of these tools to solve engineering problems. Mike also has background in selecting and installing geotechnical instrumentation and interpreting data acquired from these instruments, designing test programs and testing rock and backfill materials to determine engineering properties, and testing ground support products to measure their mechanical performance. He has worked on projects for various active underground metal, salt, and potash mines and other rock projects across the United States.

TECHNICAL EXPERIENCE

Excavation and Pillar Stability. Mike has evaluated the stability of underground excavations and pillars in salt and hard rock mines by employing empirical, analytical, and numerical methods. Mike has working knowledge of several numerical modeling software packages and experience applying these tools to evaluate rock structures. Mike also employs various empirical design tools, such as the NGI Q-System support chart and the Mathews Stability Graph. He has a solid understanding of pillar mechanics; experience using the NIOSH S-Pillar design/analysis methodology for stone pillars; and is familiar with other pillar design databases and methods, such as the Lunder-Pakalnis Pillar Stability Graph.

Ground Support. Mike has working knowledge of rock support design principles and experience evaluating, designing and specifying ground support for underground excavations in salt and hard rock. He has designed rock anchors to support infrastructure for underground projects. Mike can employ empirical, analytical, and numerical approaches to fit specific rock conditions and problems. He also has experience specifying quality assurance tests and evaluating the results of such tests to verify design performance. Additionally, he has a strong background in testing and evaluating the mechanical performance of ground support and, in particular, surface support for underground mines. His testing experience includes large-scale laboratory testing of surface support, including reinforced shotcrete, chain-link, welded-wire mesh, and synthetic mesh products for underground metal mines.

Geomechanical Analysis. Raffaldi has working knowledge of rock mechanics and application of advanced geomechanical analysis tools that use the finite element, finite difference, and boundary-element (BEM) methods. Mike has working knowledge of rock mechanics and application of advanced geomechanical analysis tools that use the finite element, finite difference, and boundary-element (BEM) methods. He has experience applying numerical modeling software packages for structural analyses of pillars and excavations in rock, including Itasca's *FLAC3D* and UDEC programs. He also has experience using the Rocscience finite element software RS2 and LaModel BEM software. Mike can perform static, creep, and dynamic analyses.

Geotechnical Instrumentation. Mike has experience in selecting and installing geotechnical sensors for monitoring rock and mine backfill stress changes and displacements, as well as evaluating data from measurements made with these instruments. He is familiar with a variety of sensor types, including biaxial stress meters, pressure cells, multipoint borehole extensometers, joint meters, and RESPEC's suite of closure poles and extensometers.

Materials Testing. Mike has experience selecting corehole locations and test samples from core to determine the physical and mechanical properties of rock for use in engineering design. He has also designed laboratory test programs to determine the strength and deformation properties of mine backfills, including cemented rockfill and cemented paste backfill for use in backfill span designs at several underhand cut-and-fill mines.

PUBLICATIONS

Haugen, B. and M. Raffaldi, 2020. "A Method for Calculating the Capacity of Shipping Containers to Resist Rockfall Impacts," Preprint 20-XXX, *Proceedings, SME Annual Conference & Expo 2020: Mine Xchange*, Phoenix, AZ, February 23–26.

Warren, S. N., R. Pakalnis, M. J. Raffaldi, D. J. Benton, L. Sandbak, and C. K. Barnard, 2019. "Ground Support Design for Weak Rock Mass: Quantifying Time-Dependent Closure in Squeezing Ground," *Proceedings, Ground Support 2019: Ninth International Symposium on Ground Support in Mining and Underground Construction*, J. Wesseloo (ed.), Australian Centre for Geomechanics, Sudbury, ON, Canada, October 23–25.

Raffaldi, M. J., J. B. Seymour, L. A. Martin, J. Richardson, E. Zahl, and M. Board, 2019. "Cemented Paste Backfill Geomechanics at a Narrow-Vein Underhand Cut-and-Fill Mine," *Rock Mechanics and Rock Engineering*, Vol. 52, pp. 4925–4940.

Seymour, J. B., L. A. Martin, M. J. Raffaldi, S. N. Warren, and L. A. Sandbak, 2019. "Long-Term Stability of a 13.7 × 30.5-m (45 × 100-ft) Undercut Span Beneath Cemented Rockfill at the Turquoise Ridge Mine, Nevada," *Rock Mechanics and Rock Engineering*, Vol. 52, pp. 4907–4923.

Raffaldi, M. J., S. N. Warren, L. A. Martin, M. A. Stepan, R. Pakalnis, and L. A. Sandbak, 2018. "Reinforced Shotcrete Performance: Quantifying the Influence of Ground Support Installation Sequence," ARMA 18-566, *Proceedings, 52nd US Rock Mechanics/Geomechanics Symposium*, Seattle, WA, June 17–20.

Raffaldi, M. J., J. B. Seymour, H. Abraham, E. Zahl, and M. Board, 2018. "Cemented Paste Backfill Geomechanics at the Lucky Friday Mine," ARMA 18-815, *Proceedings, 52nd US Rock Mechanics/Geomechanics Symposium*, Seattle, WA, June 17–20.

Warren, S. N., M. J. Raffaldi, K. K. Dehn, J. B. Seymour, L. A. Sandbak, J. Armstrong, and M. Ferster, 2018. "Estimating the Strength and Mechanical Properties of Cemented Rockfill for Underhand Cut-and-Fill Mines," ARMA 18-873, *Proceedings, 52nd US Rock Mechanics/Geomechanics Symposium*, Seattle, WA, June 17–20.

Seymour, J. B., M. J. Raffaldi, S. N. Warren, L. A. Martin, and L. A. Sandbak, 2018. "Long-Term Stability of a Large Undercut Span Beneath Cemented Rockfill at the Turquoise Ridge Mine," ARMA 18-1008, *Proceedings, 52nd US Rock Mechanics/Geomechanics Symposium*, Seattle, WA, June 17–20.

Warren, S. N., M. J. Raffaldi, L. A. Martin, R. Pakalnis, and C. Barnard, 2018. "Ground Support Design Curves: Squeezing Ground in Nevada," ARMA 18-750, *Proceedings, 52nd US Rock Mechanics/Geomechanics Symposium*, Seattle, WA, June 17–20.

Warren, S. N., M. J. Raffaldi, K. K. Dehn, J. B. Seymour, L. A. Sandbak, and J. Armstrong, 2018. "Estimating the Unconfined Compressive Strength of Emplaced Cemented Rockfill from QA/QC Cylinder Strengths," Preprint 18-031, *Proceedings, SME Annual Conference & Expo 2017: Creating Value in a Cyclical Environment*, Minneapolis, MN, February 19–22.

Seymour, J. B., M. J. Raffaldi, and H. Abraham, 2017. "Monitoring the In Situ Performance of Cemented Paste Backfill at the Lucky Friday Mine," *MineFill 2017: Proceedings of the 12th International Symposium on Mining With Backfill*, Denver, CO, February 19–22.

Raffaldi, M. J., L. A. Martin, D. J. Benton, C. B. Sunderman, M. A. Stepan, and M. J. Powers, 2017. "Quasi-Static and Mechanical Shock Testing of Reinforced Shotcrete Surface Support," *Proceedings, Deep Mining 2017: Eighth International Conference on Deep and High-Stress Mining*, J. Wesseloo (ed.), Australian Centre for Geomechanics, Perth, Australia, October 23–25.

Raffaldi, M. J., D. J. A. Chambers, and J. C. Johnson, 2017. "Numerical Study of the Relationship Between Seismic Wave Parameters and Remotely Triggered Rockburst Damage in Hardrock Tunnels," *Proceedings, Deep Mining 2017: Eighth International Conference on Deep and High-Stress Mining*, J. Wesseloo (ed.), Australian Centre for Geomechanics, Perth, Australia, October 23–25.

Raffaldi, M., D. Benton, L. Martin, J. Johnson, and M. Stepan, 2016. "Toughness of Large-Scale Shotcrete Panels Loaded in Flexure," *Transactions of the Society of Mining, Metallurgy, and Engineering*, Vol. 340, pp. 82–91.

Raffaldi, M. J., K. L. DeVries, and J. D. Nieland, 2014. *Geomechanical Analysis of Solids Disposal Caverns for Tervita/CCS Midstream Services, Lindbergh Facility, Alberta, Canada*, RSI-2458, Revision 2, prepared by RESPEC, Rapid City, SD, United States, for Tervita Corporation, Calgary, AB, Canada.



CODY J. KREITEL, PE

SENIOR GEOTECHNICAL ENGINEER

TECHNICAL EXPERTISE

- / Geotechnical Engineering
- / Subsurface Explorations and Evaluations
- / Numerical Modeling
- / Instrumentation
- / Laboratory Testing
- / Permafrost and Arctic Engineering

EDUCATION

- / MS in Arctic Engineering, University of Alaska Anchorage, Anchorage, AK (2013)
- / BS in Civil Engineering, Brigham Young University, Provo, UT (2009)

REGISTRATIONS & LICENSES

- / Registered Civil Engineer in Alaska, CE14064 (2013)

PROFESSIONAL MEMBERSHIPS

- / American Society of Civil Engineers (ASCE)

WORK HISTORY

- / RESPEC (2020–Present)
- / PDC Engineers (2017–2020)
- / Northern Geotechnical Engineering, Inc. (2008–2017)

OVERVIEW

Clients know Cody Kreitel to provide a lay of the land—literally and figuratively. His can-do attitude, combined with thousands of hours doing field explorations, sets a good foundation with design teams and for their facilities. Cody has worked on a variety of geotechnical/civil engineering projects, including mine tailings dams on permafrost, mining infrastructure, mine portal closures, multistory buildings, highways, marine structures, water supply dams, municipal roads, bridges, aboveground pipelines, and residential developments. He can switch between a range of office tasks, laboratory testing, and extended fieldwork in remote locations. Cody was an employee of PDC Engineers, Inc., which RESPEC acquired in 2020.

TECHNICAL EXPERIENCE

Geotechnical Engineering. Cody's geotechnical engineering experience includes a wide variety of projects across all regions of Alaska and various geologic conditions. His geotechnical engineering experience includes both deep and shallow foundations, slope-stability analysis, marine structures, dams, streets/highways, retaining walls, and pipelines.

Subsurface Explorations and Evaluations. Cody has logged thousands of subsurface explorations using wide-ranging exploration techniques, including hollow-stem augers, mud rotary, air rotary, solid-stem augers, sonic drilling, split-spoon sampling, thin barrel sampling, direct push, excavated test pits, and hand probing. He also works closely with geophysicists to combine his subsurface explorations with geophysical methods to provide a better understanding of the subsurface conditions.

Numerical Modeling. Cody is well versed in numerical modeling of geotechnical engineering problems using GeoStudio's suite of numerical modeling software. His numerical modeling experience includes analysis of braced cuts, excavation shoring, slope stability, tie-back sheetpile walls, marine sheet pile bulkheads, frost-penetration modeling, and thermal modeling for artificial freezeback of thawed permafrost.

Instrumentation. Cody has extensive field experience in installing geotechnical instrumentation as well as interpreting data collected from these instruments. His instrumentation experience includes vibrating wire piezometers, settlement monitoring, inclinometers, monitoring wells, and thermistor strings.

Laboratory Testing. Early in his career, Cody spent much of his time in a geotechnical soils laboratory, and he is well versed in performing various geotechnical laboratory testing for soils. As his career has progressed, he has spent less time in the laboratory performing the testing and more time developing laboratory testing programs for large projects as well as interpreting laboratory results.

Permafrost and Arctic Engineering. Cody's unique graduate education in arctic engineering and his field and design experience in arctic and subarctic Alaska make him an expert in cold region geotechnical engineering. His arctic experience includes frozen core dams, aboveground pipelines, thermosyphon retrofits for existing buildings, shallow-frost-protected footings, insulated pavement sections, and tower foundations in permafrost.

PROJECT EXPERIENCE

Livengood Gold Mine Geotechnical Drilling, Livengood, Alaska. Cody served as a field engineer on a large team of engineers and geologists to collect subsurface data to support the design of mining infrastructure in Livengood which include man camps, process facilities, roads, tailings dams etc. A custom system mud



circulation and chilling system was designed to allow the use of super chilled drilling fluid to preserve ice content of permafrost soils and bedrock.

Ross Adams Uranium Mine Portal Closure, Prince of Wales Island, Alaska. Cody is currently serving as a geotechnical engineer for this project to reclaim a former uranium mine in remote Alaska. Cody's roll is to collect data for and assist with the design of the portals to the underground mine workings. Cody conducted a site visit to the summer of 2021 in support of development of the exploration plan with will be conducted during the summer of 2022.

VORTAC Dam Upgrades, Kotzebue, Alaska. Cody was the geotechnical engineer of record for this project which consisted of adding new outlet works piping through an existing frozen core earthen dam in remote Alaska. Cody safely conducted subsurface explorations through the frozen core da and provided recommendations to the designers regarding construction timing and subsurface insulation required to reduce the thermal impact to the frozen core of the dam

Moose Creek Water Expansion, City of North Pole, North Pole, Alaska. Cody was on a team that worked quickly to design an expansion of the City of North Pole water system after wells in the nearby community of Moose Creek became contaminated with polyfluoroalkyl substances (PFAS), threatening the safety of its residents. The team completed the design in just 11 months and the permitting in 15 months. A design plan was created to increase the capacity of the city's wells and water treatment system, construct a new pumphouse and storage tank, lay approximately 18 miles of transmission and distribution mains, and provide approximately 200 water services. The team's design needed approval from eight government agencies to move forward, including the Alaska Department of Natural Resources (DNR) and the U.S. Environmental Protection Agency (EPA). Cody oversaw an extensive geotechnical field exploration program with 41 boreholes and prepared a detailed geotechnical report, which included recommendations for deep ground improvements to reduce the risk of liquefaction-induced settlements beneath the storage tank and pumphouse. The water mains, pumphouse, and storage were constructed in 2020. The well upgrades and services were installed in 2021. The team provided full-time inspection services during construction.

Wastewater Treatment Plant Design, City of Hoonah, Hoonah, Alaska. Cody was on a team that was contracted to design a new wastewater treatment plant and verify capacity needs for the next 20 years. The team accepted the \$1.18 million contract in February 2019. The team's plant design allows for a sequencing batch reactor with a maximum daily flow of 450,000 gallons. The team repurposed the existing Cantex wastewater plant as an equalization basin and chlorine contact chamber. A multidisciplinary team, including a surveyor, a geotechnical expert, an architect, and a HAZMAT specialist, provided solutions. Cody served as the geotechnical expert; he coordinated and executed the field explorations, prepared a detailed geotechnical report, and coordinated with civil and structural designers to ensure that his geotechnical recommendations were properly incorporated into the design. The 2-year construction process concluded with the team providing record drawings and assisting the City of Hoonah in getting Final Approval to Operate from the Alaska Department of Environmental Conservation. Operations began in August 2021.

Transfer Station Upgrades, Matanuska-Susitna Borough (MSB), Big Lake, Alaska. Cody was on a team that designed the upgrade of the transfer station for the MSB Solid Waste Division by modeling two cohesive, adjacent sites. The team designed incoming and outgoing vehicle scales, a scale house, two warm storage buildings for vehicle and HAZMAT storage, a recycling canopy, and new LED lighting around the facility for the upgrade. The team also provided surveying, geotechnical work, and civil site design services, including traffic flow analysis and optimization. Cody planned and executed subsurface explorations and prepared a detailed geotechnical report with recommendations for the design and construction of pavement sections, building/scale house foundations, and retaining walls. The team developed strong working relationships with client personnel and learned their operations to improve efficiency. The contract was valued at \$353,000 and began in 2018. The design was completed in 2020 and met all MSB deadlines along the way.

Arts Campus Underground Parking, Sealaska Heritage Institute, Juneau, Alaska. Cody coordinated and oversaw the subsurface explorations and laboratory testing and prepared the geotechnical report in support of this challenging design-build project in downtown Juneau. The project included the construction of an underground parking garage for approximately 45 vehicle stalls constructed below where an existing asphalt-surface parking lot was previously located. The new subsurface parking lot connects with existing basement parking at the Sealaska Building and shares a new single-vehicle access point connecting with Main Street. The project also included a new nine-stall parking lot at the surface with a covered canopy connection to the Sealaska Building as well as Americans with Disabilities Act (ADA) parking. Cody provided geotechnical recommendations for excavation, shoring, dewatering, and foundation preparation in the tight physical constraints of downtown Juneau.



BRADLEY S. PETRI, PE

PROJECT ENGINEER

OVERVIEW

Bradley Petri has more than 14 years of diverse experience that spans several engineering sectors. He is educated in civil, structural, and mining engineering. Brad is professionally licensed in six U.S. states and has project experience with surface and underground operations in limestone, coal, and hard-rock deposits in North and South Americas, Europe, and Asia.

Brad's work experience includes structural design and assessment, project coordination, mine design and development, geologic modeling, slope stability analysis, mine closure and bulkhead design, and mine permit applications and compliance. He has in-depth knowledge of AutoCAD and Carlson Software for mine planning and geologic modeling. Brad is well versed with Manifold® System, HEC-HMS, GEOVIA Surpac™ and MineSched, and FLAC^{3D}. He is also experienced in American Concrete Institute and American Institute of Steel Construction design standards and application.

TECHNICAL EXPERIENCE

Structural Assessment and Design. Brad has conducted structural assessments for various elements of mine sites, including design and structural integrity analyses of existing structures. He was the project engineer responsible for the structural design of various reinforced-concrete and steel structures for both surface and underground applications. Previous surface designs include concrete spillways, reinforced reclaim tunnels, and conveyor supports and foundations as well as innovative overturning support for widespan-conveyor arrangements. Underground designs include crusher foundations, and ventilation fan support walls.

Project Management and Coordination. Brad has extensive project management and on-site coordination experience. He has collaborated with contractors and subcontractors in developing underground-mining operations, including conveyor system installation, reclaim tunnel construction, and various infrastructure construction projects. Brad has also been heavily involved in the construction management and documentation for each mine closure structural design.

Mine Planning and Design. Brad has provided on-site technical assistance and engineering in developing a new underground limestone mine. Additional tasks included designing surface-water runoff control, conducting site and ventilation surveys, and assisting with various supplementary designs. His experience also includes short- and long-term mine planning of surface and underground limestone operations in North and South Americas, Europe, and Asia as well as providing sequencing and optimization support for multiple operations. Brad has performed mine planning in Carlson Software and GEOVIA MineSched.

Geologic Modeling and Validation. Brad has experience with resource modeling that uses block-modeling techniques in both Carlson Software and GEOVIA Surpac™. His experience focuses primarily on clinker-grade limestone deposits. He has also performed geologic model validations of previously constructed block models based on drillhole and geologic studies. His experience includes rock-mechanics testing and geologic structural design.

Slope Stability Analysis and Remediation. Brad was the lead engineer for a slope stability analysis and remediation of a damaged oil pipeline. Rocscience Slide was used to recreate the existing conditions as well as the failure mechanism. He was then responsible for establishing remediation and construction plans.

TECHNICAL EXPERTISE

- / Structural Assessment and Design
- / Project Management and Coordination
- / Mine Planning and Design
- / Geologic Modeling and Validation
- / Slope Stability Analysis and Remediation
- / Mine Closure and Bulkhead Design
- / Mine Permit Applications

EDUCATION

- / PhD Candidate, Mining Engineering, University of Kentucky (2018)
- / MS in Mining Engineering, University of Kentucky, Lexington, KY (2014)
- / MS in Structural Engineering, University of Kansas, Lawrence, KS (2008)
- / BS in Civil Engineering, University of Mississippi, University, MS (2006)

REGISTRATIONS & LICENSES

- / Professional Engineer in Alabama, Colorado, Kentucky, New Mexico, Mississippi, and Tennessee

PROFESSIONAL MEMBERSHIPS

- / Society of Mining, Metallurgy, & Exploration (SME)
- / American Society of Civil Engineers (ASCE)

CERTIFICATIONS & TRAINING

- / MSHA Certified Experienced Underground, Surface, Nonmetal

WORK HISTORY

- / RESPEC (2013–Present)
- / Morgan Worldwide Consultants, Inc. (2010–2013)
- / Earl Swensson Associates, Inc. (2008–2009)
- / University of Kansas Civil, Environmental and Architectural Engineering Department (2007–2008)



Mine Closure and Bulkhead Design. Brad has experience in both vertical and horizontal mine closures. He held a lead role in the design of the Idarado Mine Mill bulkhead project as well as an oversight role during the construction document stage. This design provided flow control as well as access beyond the bulkhead through an integrated steel door. He has additional experience in the design and construction documentation of shaft closures for the decommissioning of Mosaic Esterhazy operations in Saskatchewan. Each design incorporated creative structural design solutions for the closure of abandoned potash and metal mines.

Mine Permit Applications. Brad assisted in collaborative work with federal agencies to gain approval for a new, 745-acre surface mine in West Virginia. His work included Surface Mining Control and Reclamation Act permits, compensatory mitigation plans, and Clean Water Act permits. He performed surface-water runoff analysis studies, valley-fill volumetric comparisons, and slope stability analysis. Brad has also managed permit applications for granite and marble operations in the southeastern United States.

PUBLICATIONS & PRESENTATIONS

Petri, B. and N. Rouse, 2015. "Zero Slump Grout for Remote Closure of Mine Openings," *Proceedings, 2015 American Society of Mining and Reclamation and Appalachian Regional Reforestation Initiative National Conference*, Lexington, KY, June 7–11.

Rouse, N. and B. Petri, 2015. "Maximum Charge Weight Equation for Underground Blast Overpressures," *Proceedings, 2015 Society for Mining, Metallurgy, and Exploration Annual Conference*, Denver, CO, February 15–18.

Rouse, N. and B. Petri, 2014. "Air Overpressure Monitoring for Underground Production Blasting Operation in Limestone," *Blasting and Fragmentation*, Vol. 8, No. 2, pp. 133–151.

Petri, B. S., 2008. *Finite Element Analysis of Steel Welded Coverplate Including Composite Doublers*, MS Thesis, University of Kansas, Lawrence, KS.



NEEL GUPTA, PhD

PROJECT ENGINEER

TECHNICAL EXPERTISE

- / Geomechanical Analyses of Underground Mines
- / Surface Subsidence
- / Creep Characterization of Shale
- / Image Processing
- / Two-Phase Fracture Flow

EDUCATION

- / PhD in Mining Engineering, West Virginia University, Morgantown, WV (2019)
- / B. Tech & M. Tech (Dual Degree) in Mining Engineering, Indian School of Mines, Dhanbad, India (2015)

HONORS & AWARDS

- / American Rock Mechanics Association Future Leader, Class 2021
- / Outstanding Merit Fellowship for Continuing Doctoral Student, West Virginia University (2018)
- / Syd. S. and Felicia F. Peng Ground Control Scholarship, Society for Mining, Metallurgy & Exploration (2018)
- / Erasmus Mundus Action 2 India4EU II Scholarship, European Commission (2013)

WORK HISTORY

- / RESPEC (2020–Present)
- / National Energy Technology Laboratory (2018–2019)
- / West Virginia University (2015–2019)

OVERVIEW

Dr. Gupta is a project engineer within Mining & Energy business unit of RESPEC, based out of Rapid City, South Dakota. Since working for RESPEC, Dr. Gupta has been involved in many projects that require numerical modeling software to conduct analyses in salt, potash, and marble mines. Dr. Gupta also has expertise in processing X-ray Computed Tomography (CT) images. He is familiar with software such as FLAC3D, ImageJ, Bruker CTAn, and MATLAB. Dr. Gupta is proficient in English and Hindi.

TECHNICAL EXPERIENCE

Geomechanical Analyses of Salt and Potash Mines. Dr. Gupta has performed geomechanical analyses to forecast the surface subsidence, analyze the current mine design, mine response to proposed excavations of underground mines in Quebec, Canada; Brazil; and US. He has experience in modeling mines in both bedded and domal evaporite deposits. Dr. Gupta extensively uses the three-dimensional (3D) modeling program *FLAC3D* to conduct geomechanical analyses.

Surface Subsidence. Dr. Gupta has been involved in performing ground-surface subsidence studies that analyzes the history of mine development and data from surface benchmark locations to calculate surface displacements, strains, and tilts over evaporite mines and solution-mined brine caverns in bedded and domal evaporite deposits. These studies were helpful to delineate regions of mine-induced subsidence.

Creep Characterization of Shale. Dr. Gupta has extensively worked on understanding the fundamental reason of creep failure of Marcellus shale specimens from the outcrop in Western New York. He has performed triaxial laboratory experiments on shale, including pre- and post-experiment scanning of the shale specimens using an industrial X-ray CT scanner. The experimental research found that the slow growth of preexisting and stress-induced new microcracks in axial and radial directions was responsible for permanent deformation in brittle Marcellus shale specimens.

Image Processing. Dr. Gupta used the image analysis software ImageJ and Bruker CTAn to process the X-ray CT images of Marcellus shale specimens. He used a new workflow of image processing on ImageJ for efficiently converting 16-bit grayscale images into binary images of microcracks. He also used different built-in plugins in ImageJ to determine the length, aperture, and volume of microcracks.

Two-Phase Fracture Flow. Dr. Gupta designed an experimental setup for a two-phase flow cell experiment. The experimental setup involved a high-speed camera constantly capturing images of a three-dimensional fracture saturated with water or mineral oil and sandwiched between transparent glass plates on a vertically movable platform. He processed the images using ImageJ and determined the volume of saturation phase. The experimental results analyzed the influence of the hydraulic head on the relative permeability and rate of displacement of wetting fluid (water and mineral oil) by non-wetting fluid (air).

PUBLICATIONS & PRESENTATIONS

Das, D., B. Mishra, and N. Gupta, 2021. "Understanding the Influence of Petrographic Parameters on Strength of Differently Sized Shale Specimens Using XRD and SEM," *International Journal of Mining Science and Technology*, Vol. 31, No. 5, pp. 953–961.

Gupta, N. and B. Mishra, 2021. "Experimental Investigation of Time-Dependent Deformation in Brittle Marcellus Shale," *Mining, Metallurgy & Exploration*, Vol. 38, pp. 1943–1953.



- Gupta, N. and B. Mishra, 2021.** "Influence of Stress-Induced Microcracks on Viscoplastic Creep Deformation in Marcellus Shale," *Acta Geotechnica*, Vol. 16, No. 5, pp. 1575 - 1595.
- Gupta, N. and B. Mishra, 2021.** "Experimental Investigation of the Influence of Bedding Planes and Differential Stress on Microcrack Propagation in Shale Using X-Ray CT Scan," *Geotechnical and Geological Engineering*, Vol. 39, No. 1, pp. 213 - 236.
- Yakaboylu, G., N. Gupta, E. M. Sabolsky, and B. Mishra, 2020.** "Mineralogical Characterization and Strain Analysis of the Marcellus Shales," *International Journal of Rock Mechanics and Mining Sciences*, Vol. 130.
- Gupta, N., D. Das, and B. Mishra, 2018.** "Analysis of Crack Propagation in Shale using Microscopic Imaging Techniques," ARMA 2018-461, *Proceedings, 52nd U.S. Rock Mechanics/Geomechanics Symposium*, Seattle, WA, June 17-20, American Rock Mechanics Association, Alexandria, VA.
- Gupta, N. and B. Mishra, 2017.** "Creep Characterization of Marcellus Shale," ARMA-2017-0879, *Proceedings, 51st U.S. Rock Mechanics/Geomechanics Symposium*, San Francisco, CA, June 25-28, American Rock Mechanics Association, Alexandria, VA.
- Trivedi, R., T. N. Singh, N. Gupta, and S. Bhandari, 2015.** "Soft Computing Approach to Predict Blast-Induced Flyrock," *Proceedings, 11th International Symposium on Rock Fragmentation by Blasting*, Sydney, Australia, A. T. Spathis, D. P. Gribble, A. C. Torrance, and T. N. Little (eds.), The Australasian Institute of Mining and Metallurgy, Carlton Victoria, Australia, August 24-26, Publication Series No. 7/2015, pp. 455-462.
- Trivedi, R., T. N. Singh, and N. Gupta, 2015.** "Prediction of Blast-Induced Flyrock in Opencast Mines Using ANN and ANFIS," *Geotechnical and Geological Engineering*, Vol. 33, No. 4, pp. 875-891.
- Trivedi, R., T. N. Singh, K. Mudgal, and N. Gupta, 2014.** "Application of Artificial Neural Network for Blast Performance Evaluation," *International Journal of Research in Engineering and Technology*, Bangalore, India, Vol. 3, No. 5, pp. 564-574.
- Gupta, N., M. S. Anwar, and S. Sourav, 2013.** "Mine Reclamation Planning of Jharia Area (Bastacola) Through Multi-Temporal Remote Sensing and GIS," *Proceedings, 14th Esri India User Conference*, Delhi, India, December 11-12.



SUSAN B. PATTON, PHD, RM-SME

PRINCIPAL CONSULTANT

OVERVIEW

Dr. Susan Patton is a principal consultant within RESPEC's Mining & Energy business unit. She is a diverse technical mining professional and project manager with extensive expertise in underground coal mine design including in-depth ventilation system modeling. She frequently leads scoping, pre-feasibility, and feasibility studies; due diligence; productivity and material handling analysis; operating and capital cost estimates; and financial evaluations. She is a Qualified/Competent Person for economic analysis and mineral reserve reporting (U.S. Securities and Exchange Commission [SEC] S-K 1300 and National Instrument [NI] 43-101) for brine deposits and bedded deposits using dry or solution mining extraction techniques. She has extensive ventilation expertise in coal, metal, and nonmetal mines and mined caverns, including troubleshooting, modeling, design, and shaft sizing. She has academic research expertise in mine gob evaluation and waste management.

TECHNICAL EXPERTISE

- / Mining Engineering
- / Mine Ventilation
- / Reserve Reporting
- / Coal Mining
- / Mine Waste Management

EDUCATION

- / PhD in Mining/Environmental Engineering, University of Alabama, Tuscaloosa, AL (1993)
- / MSc in Mineral Engineering, University of Alabama, Tuscaloosa, AL (1989)
- / BSc in Mining Engineering, New Mexico Institute of Mining and Technology, Socorro, NM (1983)

REGISTRATIONS & LICENSES

- / Professional Engineer in Alabama, Colorado, Kentucky, Montana, New Mexico, Pennsylvania, West Virginia, and South Dakota

PROFESSIONAL MEMBERSHIPS

- / Society for Mining, Metallurgy & Exploration – Registered Member
- / National Academies of Science Committee on Earth Resources (2004–2006)
- / Accreditation Board for Engineering and Technology – Program Evaluator and Alternate Mining Commissioner

CERTIFICATIONS & TRAINING

- / MSHA 5000.23 Certified Underground and Surface

WORK HISTORY

- / RESPEC (2021–Present)
- / Agapito Associates, Inc. (2007–2021)
- / Montana Technological University (1994–2007)
- / Novak Engineering Consultants, Inc. (1991–1995)
- / Pittsburg & Midway Coal Company (1983–1985)

TECHNICAL EXPERIENCE

Mining Engineering. Susan has more than 40 years of varied experience in mining engineering, including solution mining. Her depth of expertise is broad across many mining sectors with a primary focus on underground mining of bedded deposits using mechanical and solution methods. Susan's expertise includes due diligence, feasibility studies, economic evaluations, cost estimations, ventilation, productivity analysis, and reserve reporting of phosphate, coal, trona, potash, and salt. She has been the lead coordinator for evaluating solution mining options in bedded trona deposits. Susan has experience in project management for in situ solution mining of trona and potash with directional drilled caverns and flooding of abandoned mines.

Mine Ventilation. Susan's ventilation expertise includes coal, metal, and nonmetal mines and underground structures in the United States and worldwide. Her extensive capabilities include mine ventilation surveys, system troubleshooting, emission reduction strategies, monitoring, operations support, system analysis using three-dimensional [3D] simulation software (Ventsim™, VNet, MineFire), fan selection, shaft sizing, life-of-mine planning, audits, training, capital and operating cost estimates, and Mine Safety and Health Administration (MSHA) representation for petitions for modifications.

Reserve Reporting. Susan was an integral member of the team preparing the technical reports as the basis for the initial listing of a major Chinese gold company on the Hong Kong Exchange (HKE), a major U.S. potash operator on the New York Stock Exchange (NYSE), and a phosphate producer listed on the Toronto Stock Exchange (TSX). She is a Qualified/Competent Person for mineral resource/reserve reporting for bedded deposits and economic analysis following SEC S-K 1300 and NI 43-101 reporting standards.

Coal Mining. Susan has extensive experience in underground coal mine design. She is a team leader for feasibility of bedded deposits. Her coal mine ventilation experience includes the evaluation of ventilation systems to manage the spontaneous combustion of the gob zone. Susan has operating experience in surface coal mine engineering. She is also experienced in capital and operating cost estimation.

Mine Waste Management. Susan taught the spectrum of core coursework in the mining engineering program at Montana Technological University and developed coursework to enhance the environmental engineering components of the curriculum. She has completed funded research projects in mine waste management and mine closure.



PUBLICATIONS & PRESENTATIONS

- Patton, S. B., G. L. Skaggs, and S. Britton, 2012. "Ventilation Design for the Boleo Project," *Proceedings, 14th U.S./North American Mine Ventilation Symposium*, June 17–20, F. Calizaya and M. Nelson (eds.), University of Utah, Salt Lake City, UT, pp. 39–45.
- Adu-Acheampong, A., S. Patton, and J. Breen, 2010. "Ventilation Planning for the Agnico-Eagle Pinos Altos Gold-Silver Project," *Proceedings, 13th U.S./North American Mine Ventilation Symposium*, June 13–16, S. Hardcastle and D. L. McKinnon (eds.), Laurentian University, Sudbury, ON, Canada, pp. 231–235.
- Adu-Acheampong, A., S. Patton, J. Dawson, and K. Huffman, 2008. "Old Mines – New Regulations: The Re-Opening of the Gordonsville, Elmwood, and Cumberland Mines Under New DPM Regulations," *Proceedings, 12th U.S./North American Mine Ventilation Symposium*, Reno, NV, June 9–11, K. G. Wallace (ed.), pp. 71–77.
- Patton, S. B. and B. Hall, 2000. "Pit to Trailhead: One Community's Success Story," *Proceedings, International Conference on Environmental Issues and Management of Waste in Energy and Mineral Production*, Calgary, AB, Canada, May.
- Patton, S. B. and H. Gerbrandt, 2000. "Cyanide Custom Mill Site Closure," *International Journal of Surface Mining, Reclamation and Environment*, Vol. 14, pp. 35–41.
- Patton, S. B., H. Gerbrandt, and C. Wassmann, 1999. "Closure of a Cyanide Tailings Pond," *Proceedings, International Tailings and Mine Waste '99*, Fort Collins, CO, January 24–27, A. A. Balkema, Rotterdam, Netherlands, pp. 785–790.
- Patton, S. B. and R. Dorvall, 1997. "Electronic Bird Control in Tailings Impoundments," *Proceedings, International Tailings and Mine Waste*, Fort Collins, CO, January.
- Patton, S. B., Y. Jiang, D. Deb, T. Novak, and D. Park, 1995. "Role of Longwall Gob Formation in Coalbed Methane Emission," *Proceedings, INTERGAS '95 Unconventional Gas Symposium*, Tuscaloosa, AL, May.
- Patton, S. B. and T. Novak, 1994. "Realizing CAD's Full Potential in Ventilation Simulation," *Society for Mining, Metallurgy & Exploration 1994 Annual Transactions*.
- Patton, S. B., F. Hong, T. Novak, P. W. Johnson, and R. L. Sanford, 1994. "A Simulator for Degasification, Methane Emission Prediction and Mine Ventilation," *Mining Engineering*, pp. 341–345.
- Patton, S. B., H. Fan, T. Novak, P. W. Johnson, and R. L. Sanford, 1993. "Degasification Model Incorporates Reservoir Simulator With Ventilation Package," *COAL*, Vol. 98, No. 2, pp. 52–53.
- Patton, S. B. and R. L. Sanford, 1990. "Coal Blending Using Genetic Algorithms," presented at *Use of Computers in the Coal Industry*, Morgantown, WV.
- Patton, S. B., 1993. *Quantitative Study of the Benefits to Mine Ventilation of Coalbed Methane Degasification*, PhD Dissertation, University of Alabama, Tuscaloosa, AL.
- Patton, S. B., 1989. *Comprehensive Approach to Development and Organization of Expert Systems for Electrical Fault Diagnosis in Mining Machinery*, MS Thesis, University of Alabama, Tuscaloosa, AL.



BRETT M. DRAKE, PE

PROJECT MANAGER/SENIOR PROJECT ENGINEER

OVERVIEW

Brett Drake has experience in Abandoned Mine Land (AML) reclamation and construction management services for a variety of abandoned underground and surface hard-rock mine sites that pose hazards to public health and safety or constitute an environmental hazard. Brett has been the on-site project engineer during the reclamation of shafts, adits, portals, highwalls, open pits, and other abandoned mine-related features. His responsibilities have included observing the quality of the executed work and determining if the work is proceeding in accordance with the contract documents. Brett has prepared the daily and weekly reports and quantities of work completed to facilitate in preparing the contractor's application for payment. He also has experience in project design work, including preparing AutoCAD drawings and three-dimensional models of proposed reclamation contours. Brett has also assisted in various surveying-related projects, including topographic surveys, construction staking, section breakdowns, mining claims, subdivision surveys, corner locations, boundary relocations, pin locations, encroachment surveys, record researching, drafting, and plat creation.

TECHNICAL EXPERTISE

- / Project Management
- / Construction Management
- / Mine Land Reclamation, Planning, and Design
- / Mine-Closure Design
- / Equipment Operation
- / Surveying

EDUCATION

- / BS in Architectural Engineering, College of Engineering and Applied Science, University of Wyoming (2011)

REGISTRATIONS & LICENSES

- / Professional Engineer in Wyoming

CERTIFICATIONS & TRAINING

- / MSHA Training (2020)

WORK HISTORY

- / RESPEC (2012–Present)
- / Terracon (2011)

PROJECT EXPERIENCE

AML 17.7, Wyoming Department of Environmental Quality (DEQ), Abandoned Mine Land (AML) Division, Wyoming. The purpose of the AML 17.7 project is to provide engineering and geographic information services (GIS) to create a statewide GIS database with information containing mine subsidence insurance data, drilling data from past and present AML grouting projects, underground mine maps, and subsidence potential isopach maps. Brett acts as the Project Manager for the AML 17.7, Abandoned Mine Mapping and Outreach project. Brett oversees the project team in all matters, including the design sprint, database and dataset creation, mine subsidence insurance data collection and implementation, and the quality assurance/quality control of the dataset.

AML 10C, Wyoming DEQ, Abandoned Mine Land Division, Wyoming. As a project engineer for the AML 10C project, Brett assisted with field investigations for all of the hazardous mine features at the Horse Creek Limestone Mine and Rattlesnake Hills Quarry. He also assisted in producing the technical reports for the surface and subsurface investigations at the Horse Creek Limestone Mine. Brett provided oversight for the designs for the Rattlesnake Hills Quarry highwall mitigation project, revegetation of the Pathfinder Quarry, and access roads for the Horse Creek Limestone Mine.

AML 17J, Wyoming DEQ, Abandoned Mine Land Division, Wyoming. Brett has performed project management, construction management, investigations, and design services for the AML 17J project for more than 10 years. Brett has prepared a variety of design and specification sets for sinkhole mitigations and projects in the northern Sheridan area. He also conducted surveys for the Plachek Pit and assisted with the Goose Creek realignment designs.

AML 67-NC, Wyoming DEQ, Abandoned Mine Land Division, Wyoming. Brett managed the investigatory team and aided in creating a field investigation protocol that would be used for all sites investigated in the AML 67-NC project. Brett also participated in field investigations and prepared the Report of Investigation that covered the first nine sites investigated in the South Pass Mining District.

AML 17F, Wyoming DEQ Abandoned Mine Land Division, Wyoming. This project included construction management for repairing and restoring historical structures in the Kirwin and Copper Mountain Mining Districts, performing construction management for the French drain installation at the historical Carissa Gold Mine site, and performing construction management for the structural stabilization of the Carissa



mill building south wall, as well as mitigating safety hazards associated with shafts, adits, portals, subsidence holes, dilapidated structures, open pits, and other abandoned mine-related features.

AML 17B-II, Wyoming DEQ, Abandoned Mine Land Division, Wyoming. As the Project Engineer and Construction Manager, Brett performed construction inspection duties, including soil-density testing using a nuclear gauge throughout the project, and aided AVI Engineering with construction management and reviewing embankment placement. This project involved reclaiming a phosphate mine highwall, which reached 200 feet tall, by using 1.5 million cubic yards of embankment with an engineered slope of 2:1 and 3:1.

AML 64-NC, Wyoming DEQ, Abandoned Mine Land Division, Wyoming. Brett was the Investigation Lead and Project Engineer for the AML 64-NC Non-Coal project, which included locating, investigating, and inventorying 69 hard-rock precious metal mine sites located in the Medicine Bow National Forest. Brett recorded features using hand-held GIS devices and interpreted the data into maps for the pre-design report (PDR). He also prepared site reports and cost estimates for each site. Brett prepared Scopes of Work and created drawings for multiple task orders associated with the project. Brett also performed multiple construction management duties at the Carissa Gold Mine. These task order projects included constructing foundations for historical buildings, applying expanding structural polymer to stabilize historical structures, and constructing retaining walls to stabilize approaches to the mill building.

AML 66-NC, Wyoming DEQ, Abandoned Mine Land Division, Wyoming. Brett was the Project Engineer and Investigation Lead for the AML 66-NC Non-Coal project that included locating, investigating, and inventorying six uranium mine sites across the state of Wyoming. Brett recorded features using hand-held GIS devices and interpreted the data into maps for the PDR. He also prepared site reports and cost estimates for each site.

AML 61-P3, Wyoming DEQ, Abandoned Mine Land Division, Wyoming. As the Investigation Lead and Project Engineer for the AML 61-P3 project, Brett was involved in locating, investigating, and inventorying 31 coal mine sites across the state of Wyoming. Brett recorded features using hand-held GIS devices and interpreted the data into maps for the PDR; he also prepared site reports and cost estimates for each site. In addition, Brett prepared Scopes of Work and created drawings for multiple task orders associated with the project.



DEBASHIS DAS, PE

MINING ENGINEER

TECHNICAL EXPERTISE

- / Mine Planning
- / Mining Feasibility and Due Diligence
- / Mine Permit Applications
- / Shale Rock Characterization

EDUCATION

- / MS in Mining Engineering, West Virginia University, Morgantown, WV (2018)
- / MTech in Mining Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, India (2015)
- / BTech in Mining Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, India (2014)

REGISTRATIONS & LICENSES

- / Professional Engineer (PE) in Kentucky

PROFESSIONAL MEMBERSHIPS

- / Society for Mining, Metallurgy & Exploration

CERTIFICATIONS & TRAINING

- / MSHA Part 48 40-Hour (2019)

WORK HISTORY

- / RESPEC (2019–Present)
- / West Virginia University (2017–2018)
- / DMT India (2015–2016)
- / Technical University of Madrid (2013–2014)
- / Tata Steel (2013)
- / Uranium Corporation of India Ltd. (2012)
- / Tata Steel (2011)

OVERVIEW

Debashis Das has experience in geologic modeling, pit design, resource and reserve estimation, and mining financial modeling for mineral commodities such as coal, iron ore, limestone, granite, sand, and potash. He has been involved in projects such as mine feasibility studies, due-diligence studies, mine permit applications, and mine plan preparation. Debashis also has experience in working with multiple software applications, including Minex, Surpac, AutoCAD, Carlson, QGIS, Whittle, and Global Mapper. Debashis is proficient in English, Hindi, and Bengali.

TECHNICAL EXPERIENCE

Mine Planning. Debashis has prepared mine plan applications for minerals such as coal and iron ore. He has experience in short- and long-term planning, pit and dump design, and pit optimization. He has also been involved in mine fleet calculation, production scheduling, mine CAPEX and OPEX estimation, and cash flow model development.

Mining Feasibility and Due Diligence. Debashis has assisted in feasibility and due diligence studies for multiple mineral commodities, including coal, iron ore, crushed stone, dimension stone, frac sand, clay, construction sand, and rock salt. He has performed market studies, transportation analyses, and financial feasibility analyses based on enterprise and royalty approaches. He has also developed conceptual pits and dumps and has prepared stage plans for the lives of mines.

Mine Permit Applications. Debashis has prepared mining, air, and National Pollutant Discharge Elimination System (NPDES) permits for the states of Arkansas and Louisiana. He has experience in watershed delimitation, pond sizing, spillway design, and runoff calculations for NPDES permits. He has also prepared various maps such as the drainage and site location maps that are required for permit applications.

Shale Rock Characterization. Debashis worked extensively to characterize shale rock and understand the relationship between its strength and petrographic parameters. He performed uniaxial and triaxial compressive strength tests to assess the mechanical strength of the rock. The petrographic parameters such as grain size, grain shape, grain orientation, porosity, quartz content, and clay content were studied using Scanning Electron Microscopy, X-Ray Diffraction, and X-Ray Computed Tomography.

PUBLICATIONS & PRESENTATIONS

Das, D., B. Mishra, and N. Gupta., 2021. "Understanding the influence of petrographic parameters on strength of differently sized shale specimens using XRD and SEM," *International Journal of Mining Science and Technology*, Sep 2021, Vol. 31-5, pp. 953-961.

Das, D., 2018. *Shale Characterization and Size-Effect Study Using Scanning Electron Microscope and X-Ray Diffraction*, MS Thesis, West Virginia University, Morgantown, WV.

Gupta, N., D. Das, and B. Mishra, 2018. "Analysis of Crack Propagation in Shale Using Microscopic Imaging Techniques," ARMA-2018-461, *Proceedings, 52nd US Rock Mechanics/Geomechanics Symposium*, Seattle, WA, June 17–20, 2018, American Rock, Mechanics Association.



KEITH L. HANNEMAN, PE

PRINCIPAL CIVIL ENGINEER – TRANSPORTATION DIRECTOR

OVERVIEW

Solving problems for the client with cost-effective, low-maintenance solutions and setting them up for the future is Keith's top priority. Keith has designed, managed, and either led or supported the owner's side construction management on a broad background of civil work throughout northern Alaska, primarily rural highways/access roads and utilities supplemented with site and drainage design. Industrial projects include extensive work for Golden Valley Electric (GVEA) the Interior Gas Utility (IGU) and Doyon Utilities.

Drawing on 36 years of road and highway experience, Keith guides his team in all types of transportation projects. He uses lessons learned from projects spanning 175 miles of rural highway (federal and interstate), and rural industrial/mining access roads. His broad experience in safety improvements, geotechnical (including permafrost soils), insulated and reinforced embankments, material source development, hydrology, aufeis, and fish passage culverts means he is ready to help in nearly any area.

PROJECT EXPERIENCE

Manh Choh Mine Development, Peak Gold, Tetlin, Alaska. In 2021, Keith managed the fast-paced development of the multi-disciplinary team that provided the infrastructure support and development aspects of the scoping and feasibility study. In addition, he managed the IFC engineering for the development of the 5-mile Tetlin Twin Road, 11-mile Mine Access Road, pioneer mine road, water management ditches/treatment, loadout facility, mine infrastructure pad (including fuel storage, generators, maintenance buildings, and offices), and explosives storage pad. In the first half of 2022 Keith managed the value engineering and the concept design of the re-design of the mine access road from a single lane 10% maximum grade 777 mine ore haul truck road to a two-way haul road reduced to a 6% maximum grade to allow the highway ore haul trucks to reach the mine site.

Eva Creek Wind Farm, Ferry Alaska. Project Manager and Engineer of Record. Keith led the fast-tracked design to support the Michels/Brice/PDC design-build team to develop a wind farm on the ridges above Ferry, Alaska. After 4 months, design and on-site engineering supporting construction efforts turned the narrow, winding, steep 10-mile road from a single-lane mining road into an access road capable of handling 380,000-pound loads, wind turbine blades 150 feet long, and all the construction traffic to build 12, 410-foot-tall wind turbine generators. The access road design minimized ongoing aufeis and wind-drifting maintenance of the road and impacts to wetlands, migratory birds, and the surrounding fragile alpine environment. Support infrastructure included a 170-person temporary camp, two maintenance and operations (M&O) buildings. In January 2013, only 18 months after design began, all 12 wind turbines were producing power for this 24.6-megawatt (MW) plant for Golden Valley Electric Association

IGU Distribution System, Phase I, North Pole, Alaska. Principal in Charge and Project Manager: Keith managed the design, permitting, and construction administration for more than 70 miles of high-density polyethylene (HDPE) gas distribution piping for Phase 1 of the IGU system. Keith managed the work of specialty subconsultants to develop IGU's utility design standards and to recommend a cost-effective means of meeting IGU's gradually increasing need for LNG storage capacity during the build-out. Successes include meeting a rigorous schedule to get construction completed 15 months after the start of design, working effectively with more than 10 permitting agencies, and construction administration of 5 contractors performing \$18 million of construction in 7 months.

TECHNICAL EXPERTISE

- / Mining/Industrial Access Road Design
- / Small Community Road Improvements
- / Rural Highways Evaluation/Engineering
- / Access Roads to Remote Sites
- / Fish Passage and Large Culvert Design

EDUCATION

- / BS in Civil Engineering, University of Alaska Fairbanks, Fairbanks, AK (1985)

REGISTRATIONS & LICENSES

- / Registered Civil Engineer in Alaska, C8058 (1990)
- / Registered Environmental Engineer in Alaska, V13908 (2013)

PROFESSIONAL MEMBERSHIPS

- / American Council of Engineering Companies (ACEC); past State Director
- / American Society of Civil Engineers (ASCE); past State President
- / Water Environment Federation (WEF)

HONORS & AWARDS

- / Fairbanks Engineer of the Year, Alaska Society of Professional Engineers (ASPE) (2015)

WORK HISTORY

- / RESPEC (2020–Present)
- / PDC Engineers (1985–2020)



Alaska Highway MP 1222-1235 Rehabilitation, DOT&PF, Alaska. Keith was part of a team that completed the final design of this fast-tracked, stimulus-funded project, which rehabilitated the pavement structure over permafrost and foundation failure areas; resurfaced the pavement; improved ditch drainage and repaired or replaced culverts; repaired the settled embankment at the abutment to Scottie Creek Bridge; stabilized rock cuts; upgraded guardrail and signs; and upgraded pull-outs to provide safer and more comfortable amenities to travelers. The major success of this project was the team's ability to meet the schedule. In just 4 months, the project team took this 13-mile-long 3R project from a signed environmental document through a Design Study Report to final Plan Specifications and Estimates. To accomplish this, the team quickly took over the Preliminary Design from the DOT&PF and progressed it as our own, which included keeping our design solutions within the "bounds" of the previously completed environmental document. The team designed rehabilitation for the pavement structure over soft-soil foundation areas and made improvements to drainage, as well as provided new approaches, such as signing and striping, and other site-specific repairs.

Dalton Highway Milepost (MP) 289-305 Rehabilitation, DOT&PF – Northern Region, Alaska. Principal in Charge. This 16-mile stretch of the Dalton Highway is notorious for getting blocked by drifting snow in the winter. Thawing permafrost and consolidation of the foundation soils/subgrade have caused the roadway to settle into the surrounding terrain, leading to maintenance challenges from the weakening of the embankment and poor drainage and the buildup of severe snowdrifts during winter storms.

Raising the embankment uniformly above the surrounding ground will improve safety and reduce maintenance costs by reducing snow drifting, smoothing the road profile, and widening the road surface to a uniform 32 feet. To improve drainage, the project will also replace failing culverts and fill areas of ponding in settled areas at the embankment toe. The project evaluated different embankment shapes to find the best combination of meeting clear zone requirements, providing a smoother cross section for snow to blow over and reducing the roadway footprint to minimize disturbed area.

Close coordination with the M&O foreman and crews—including two site visits—during the Design Study Report and preliminary design stages was vital to identifying the locations and depth of snow drifting so that we could optimize the new profile and ensure that the limited construction budget was directed towards the most beneficial improvements.

Nome Bypass Road (Greg Kruschek Ave.), DOT&PF – Northern Region, Alaska. Project Manager. Keith managed design of upgrades along two miles of roadway to streamline maintenance and support development in and around Nome. Improvements included widening of the roadway to provide 12-foot lanes in each direction, with provisions made for pedestrians and bicycles; vertical realignment, with a general grade raise of 1.5 to 2 feet in most areas to reduce snow drifting; replacement and/or lengthening of culverts as needed; minor drainage improvements; reconstruction of street intersections and approaches; and intersection lighting.

Elliott Highway MP 107.7-120.5 Reconstruction, DOT&PF—Northern Region, Alaska. Keith was part of a team that completed this 13-mile reconstruction design in advance of the schedule, which allowed for the project to be bid one construction season earlier than the DOT&PF had originally planned. The DOT&PF's objective for this project was to improve safety and reduce maintenance costs by bringing the road alignment into compliance with current highway standards for a 50-mile-per-hour (mph) design speed and mitigating problems with ice and snowdrifts accumulating on the road surface. Approximately 2.7 miles of the roadway were realigned, while the remaining 10 miles were reconstructed on top of the existing embankment. The project involved more than 1,000,000 cubic yards of excavation—one of the largest earth-moving projects in recent DOT&PF Northern Region history.

Steese Highway MP 10-81. Project Manager and Engineer of Record. Repair of slope and embankment failures was an important component of these seven 3R projects, which rehabilitated and resurfaced a total of 70 miles of rural highway. To protect two vulnerable locations from encroachment by the Chatanika River, our design utilized 1,000 feet of riprap revetment with launching aprons. Damaged and/or undersized culverts at six creek crossings were replaced with 10- to 12-foot fish passage culverts complete with headwalls at each end, riprap protection at the inlets, and stilling basins at the outlets. At six bridges, we designed repairs for settled abutment embankments, damaged pile caps, and washed-out riprap. These simple, cost-effective erosion repairs have essentially eliminated river- and creek-related M&O efforts for the entire 70-mile corridor—even though several near-design-level flood events have occurred since these projects were constructed. All but one of the seven projects bid for slightly less than our Engineer's Estimate, and the other was less than 10% above. These accurate cost estimates helped the Department maximize the amount of work that could be accomplished using the available funds.



KAREN A. BRADY, PE

PRINCIPAL ENGINEER

TECHNICAL EXPERTISE

- / Project Management for Multidisciplinary Projects
- / Hydraulic Modeling
- / Thermal Analysis for Heat Loss in Water and Wastewater Piping
- / Water and Wastewater System Condition Assessment
- / Civil Site Design
- / Utilidor Systems

EDUCATION

- / BS in Civil Engineering, South Dakota School of Mines & Technology, Rapid City, SD (2001)

REGISTRATIONS & LICENSES

- / Professional Civil Engineer in Alaska, CE11523 (2006)
- / Professional Environmental Engineer in Alaska, EN13911 (2013)

PROFESSIONAL MEMBERSHIPS

- / American Society of Civil Engineers (ASCE)
- / American Water Works Association (AWWA)

CERTIFICATIONS & TRAINING

- / Alaska Certified Erosion and Sediment Control Lead (AK-CESCL)

HONORS & AWARDS

- / Engineer of the Year, Fairbanks Chapter, ASPE (2019)

WORK HISTORY

- / RESPEC (2020–Present)
- / PDC Engineers (2001–2020)

OVERVIEW

Karen Brady manages the utility group at RESPEC and remains involved in planning, design, and construction administration. Over the years, she has added site design work and expanded her capabilities as a well-rounded civil/environmental engineer. She has a solid, practical understanding of how technical drawings and specifications relate to the construction process in the field. Karen's utility experience includes hydraulic modeling, fire flow capacity analysis, thermal modeling, alignment and profile development, and storm drains. Her site design experience includes parking lots, access, grading, and drainage. Karen enjoys working with a multidiscipline team, collaborating to resolve potential issues. She finds it especially rewarding to be involved from the planning stage, through the design and then construction. Karen was an employee of PDC Engineers, Inc., which RESPEC acquired in 2020.

PROJECT EXPERIENCE

Manh Choh Mine, Tok, Alaska. Karen led the civil design for water management as well as well and septic design for the Personnel Camp. The Manh Choh mine near Tok, Alaska is a new gold mine. RESPEC has been working with Peak Gold, LLC over the past year to provide scoping studies for the mine access road, mine facilities, water management, and Personnel Camp. In the first phase of the project the team designed a water management system to capture, convey and treat stormwater run-off from the mine site as well as a new mine access road and upgrade of the Tetlin Village Road for the Manh Choh project. The road is designed for a combination of mine vehicles and the highway ore trucks that will haul the ore to Fairbanks. The intersection of the mine access road and the Tetlin Village Road, along with the intersection to the Alaska Highway, are being designed to maximize the truck driver's sight distance and accommodate the fully loaded B-train-sized highway ore trucks. Minimizing the potential for accidents with the village or public traffic is the top priority for highway haul operation safety. The water management system consists of approximately 4.5 miles of ditch around the perimeter of the site with two retention basins and about 2.3 miles of piping to a treatment plant that will use reverse osmosis.

Moose Creek Water Expansion, City of North Pole, North Pole, Alaska. Karen was part of a team that worked quickly to design an expansion of the City of North Pole water system after wells in the nearby community of Moose Creek became contaminated with polyfluoroalkyl substances (PFAS), which threatened the safety of its residents. The team completed the design in just 11 months and the permitting in 15 months. The team created a design plan to increase the capacity of the city wells and water treatment system, construct a new pumphouse and storage tank, lay approximately 18 miles of transmission and distribution mains, and provide approximately 200 water services. The design needed approval from eight government agencies to move forward, including the Alaska Department of Natural Resources and the U.S. Environmental Protection Agency. Karen managed the project from conceptual design through construction. She led a team of multidisciplinary engineers and coordinated with permitting agencies, the City of North Pole, the U.S. Air Force, and the U.S. Army Corps of Engineers. The water mains, pumphouse, and storage were constructed in 2020. The well upgrades and services were installed in 2021.

Long Range Discrimination Radar (LRDR) Design, U.S. Missile Defense Agency, Clear Space Force Station (SFS), Alaska. Karen was part of a team that facilitated the implementation of a new site for an LRDR. The LRDR needed persistent midcourse Ballistic Missile Defense System discrimination capability, and the chosen site had to provide assessments of potential threat trajectories in the Pacific to improve homeland defense capabilities. The team provided the site planning, programming, and conceptual design development for the project. The team also gave input to the Facilities Requirements Document (FRD), developed planning level cost estimates, and supported input to the DD Form 1391. Karen worked closely with a large, multidisciplinary design team to design the campus wide water, wastewater, and storm drain



systems; a several-thousand-foot fire hydrant loop; district heating; electrical, communication, and fuel distribution lines; and a 30-inch cooling water discharge pipeline. The 80-acre campus will have self-sufficient utilities requiring domestic and cooling water wells, a single septic system serving the entire campus, maintenance and security facilities, and a 25-megawatt (MW) backup power plant to support the radar. Throughout construction, Karen has been responsive to Requests for Information and submittal reviews.

Campus Improvements, Holland America Princess, Denali, Alaska. Karen was on a team contracted to review the existing water and sewer infrastructure to add 120 rooms to the Holland America Princess resort. This project encompassed evaluating water supply, storage, distribution, and the wastewater collection system. Karen compared existing water use against anticipated water use based on adding rooms. She coordinated with the system's operator to obtain details about operation and maintenance concerns and summarized them alongside alternatives in a concept memorandum. Then, she met with stakeholders to determine the best path forward for the water and sewer systems. Finally, she managed a multidisciplinary team to design the proposed improvements, obtained ADEC approval to operate, and coordinated with the construction contractor throughout construction to clarify design intent and make modifications when necessary. On project completion, the team provided record drawings and coordinated with ADEC for Approval to Operate.

Utility System Characterization Studies, Doyon Utilities, Fort Greely Military Base, Alaska. Karen was on a team that provided an inventory and evaluation of the water and sewer system components, condition, and deficiencies as well as the strategic planning to identify the best direction to take the utilities for the next 50 years, given the existing infrastructure and its condition. At Fort Greely, work involved evaluating the water supply, storage, and treatment facilities; 3.8 miles of water distribution lines and 3.5 miles of sewer collection piping; two lift stations; and a wastewater treatment plant. For supply and treatment facilities, Karen coordinated the evaluation by a subconsultant. In addition, she led the creation of a new model for both the water and sewer from geographic information system (GIS) information, which was spot-checked for accuracy in the field and updated to reflect recent construction. At Fort Wainwright, she led the inventory and evaluation of the sewer system's components, condition, and deficiencies and provided strategic planning. This work involved inspecting, modeling, and evaluating 22 miles of sewer collection piping and 19 lift stations.

Galena Water and Sewer Improvements – Environmental Assessment, Galena, Alaska. As part of a project team, Karen was involved in developing the Environmental Assessment for Phases II to IV of the improvements recommended in the Galena Water and Sewer Master Plan to secure funding from the U.S. Department of Agriculture (USDA) for the water expansion and additional sewer improvements. The team researched hazmat spills, historical and cultural sites, and wetlands and prepared a wetlands permit. The team kept the public informed and involved through newsletters, a questionnaire, and public meetings. Once funding was secured, the team completed the design for the water and sewer improvements. The water system expansion provided piped water service to 70 homes and stubs to 40 vacant lots. Approximately 2.4 miles of new arctic water main were installed along with 1.5 miles of road grade raise and upgrades to the water treatment plant. Individual sewerage systems were provided for these homes. Depending on the size of the lot and soil conditions, the home received a septic and leach field, an individual sewerage treatment plant (XSTP), or a holding tank. This project was constructed with Force Account (local) labor. Karen provided construction documents and ADEC permitting. During construction, she provided submittal reviews, DCVR responses, and periodic site inspections.

Stillmeyer Water and Street Improvements and City Sewer Upgrades, North Pole, Alaska. Karen was on a team that provided the design for upgrades to the water system in Stillmeyer Subdivision in North Pole. Initial steps required a Preliminary Engineering Report that described and evaluated design alternatives to support the environmental document prepared for the U.S. Environmental Protection Agency (EPA). Next, the team developed the design for the water main to replace existing piping and multiple pump stations that had been costly to maintain. Karen provided hydraulic modeling; identified the existing and abandoned utilities throughout the subdivision; performed route planning; gave presentations to the public; provided cost estimates; and oversaw multidisciplinary coordination. She also prepared ADEC applications for construction; developed plans and specifications; provided construction administration, including the role of the resident project representative; and coordinated record drawings.



DION LOWE, PE

PROJECT ENGINEER

OVERVIEW

Dion Lowe is a highly experienced engineering manager with a proven track record of successfully working with various disciplines to accomplish project objectives. With 30 years of experience, he possesses strong strategic planning, analytical thinking, and decisive leadership skills. As an experienced business leader, Dion has demonstrated expertise in strategic planning, problem-solving, and team building, enabling him to effectively recruit and train staff to handle customer and business needs. Dion is also known for his motivational, diplomatic, and respectful approach when dealing with people from different backgrounds.

TECHNICAL EXPERIENCE

Erosion and Sediment Control. For more than 15 years, Dion designed and managed the erosion and sediment control requirements associated with projects ranging from multi-million-dollar commercial buildings to small sub-divisions in Rapid City and the surrounding areas. This included involvement in all stages, from design to implementation to final stabilization.

Utilities and Drainage Project Design and Management. Dion has designed multiple road, utility, and drainage projects. He has been the project manager for many of these types of projects while working as a project engineer for the City of Rapid City.

Floodplain Administration. While working as a project engineer for the City of Rapid City, Dion was tasked with being the Floodplain Administrator for the City. He attended Federal Emergency Management Agency (FEMA) floodplain training in Maryland to become a certified Floodplain Administrator. Dion managed all duties associated with construction regulations related to any work in the FEMA-designated floodplain.

MS4 Program Manager. While working as a project engineer for the City of Rapid City, Dion oversaw the Municipal Separate Storm Sewer Systems (MS4) Program. Operating under a National Pollutant Discharge Elimination System (NPDES) MS4 permit, the NPDES MS4 permit requires permittees to develop and implement a comprehensive Storm Water Management Program that must include pollution prevention measures, treatment or removal techniques, monitoring, use of legal authority, and other appropriate measures to control the quality of stormwater discharged to the storm drains and thence to waters of the United States. Dion managed and maintained this program for Rapid City.

Staff Training and Development. Dion has extensive experience in training and developing staff while running Dioten Engineering. Dion was in charge of on-site safety training and training staff in installing, maintaining, and inspecting project site erosion and sediment control devices and processes. Dion also trained and guided the staff in working well with contractors, citizens, and the various governing agencies.

Construction Inspection. Dion has performed construction inspection services for various projects while working for the City of Rapid City and private design firms in Rapid City, San Diego, and Denver, Colorado.

TECHNICAL EXPERTISE

- / Erosion and Sediment Control
- / Utilities and Drainage Project Design and Management
- / Floodplain Administration
- / MS4 Program Manager
- / Staff Training and Development
- / Construction Inspection
- / Communication and Public Relations
- / SWPPP Processes and Inspection

EDUCATION

- / BS in Civil Engineering, University of Colorado Denver, Aurora, CO (2001)

REGISTRATIONS & LICENSES

- / Professional Engineer in South Dakota (2005)

CERTIFICATIONS & TRAINING

- / Professional Development Hour Completion (2005-Present)
- / CESCL Certified
- / U.S. Navy (USN) Quality Control Certification (1995)
- / USN Oxygen Generation Machine Certification (1994)
- / USN Nuclear Prototype School (1992)
- / USN Nuclear Power School (1991)
- / USN Electrical A School (1990)

WORK HISTORY

- / RESPEC (2023-Present)
- / Dioten Engineering, Inc (2008-2023)
- / City of Rapid City (2004-2008)
- / Dream Design International (2004)
- / Kirkham Michael (2001-2003)
- / USN (1990-1996)



Communication and Public Relations. Dion has developed excellent communication and public relations skills while working for the City of Rapid City and running Dioten Engineering. The Floodplain Administration and MS4 Programs required significant communication and public relations. Dion coordinated daily with the public, city council, city engineer, and public works director. Running Dioten Engineering required coordinating daily with contractors, various city entities, and the public.

Stormwater Pollution Prevention Plan (SWPPP) Processes and Inspection. Dion has created many Storm Water Pollution Prevention Plans and performed the inspections associated with those plans while running Dioten Engineering and working at RESPEC. He is a certified SWPPP inspector through the Certified Erosion and Sediment Control Lead program.



M. TODD BALL

SENIOR SCIENTIST, STREAM RESTORATION

TECHNICAL EXPERTISE

- / Natural Resource Commodity Management
- / Stream Restoration and Design
- / Regulatory Permitting and Mitigation Design

EDUCATION

- / BS in Environmental Biology (Minor in Chemical Biology), East Carolina University, Greenville, NC (1988)

PROFESSIONAL MEMBERSHIPS

- / National Association of Environmental Professionals

CERTIFICATIONS & TRAINING

- / Certified Rosgen Specialist, Levels I-V
- / North Carolina Water Quality Aquatic Benthic Certification for Stream Restoration and Mitigation (2000)
- / Certified Wetland Delineator (National)

WORK HISTORY

- / RESPEC (2022–Present)
- / Stream Restoration Concepts, LLC

OVERVIEW

With 34 years of experience, Mr. Ball is among the leaders in natural resource practices for the southern states. As a Certified Rosgen Specialist in fluvial geomorphology and stream restoration, Mr. Ball leads company projects in: (1) natural resource commodity discovery, assessment, and management; (2) mitigation banking; (3) wetland creation and management; (4) dredge/spoil management; (5) mitigation option analysis; (6) natural resource compliance and permitting; and (7) National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) reporting and management.

Mr. Ball has directed numerous projects that involve the permitting, design, and restoration of streams and wetlands throughout the eastern United States. His work has been concentrated in North and South Carolina, Georgia, Texas, Arkansas, Louisiana, and Tennessee. Mr. Ball has provided technical and management experience to state, federal, and local agencies, as well as private clients from major golf course designers to Fortune 100 companies for stream restoration using Rosgen Natural Channel Design (Rosgen). Mr. Ball has extensive experience directing the conception, design, and implementation of mitigation banking.

The natural resource projects that Mr. Ball has contributed to entail the improvement of water quality through innovative design. Extended detention wetlands and stream floodplains were designed to act as natural water purifiers for contaminated sources, thus adding extreme value to each project in design and avoiding regulatory fines. His technical expertise has brought millions of dollars in cost saving measures, increased land appraisal values, commodity management, and expansion of nonregulated acreage.

Mr. Ball has performed hundreds of Phase I Environmental Audits and Checklists throughout the eastern United States. He is certified as a Federal Deposit Insurance Corporation (FDIC) contractor to perform work associated with bank closings and acquisitions across the country.

Recently, Mr. Ball has directed the Fort Worth, Galveston, Albuquerque, and Tulsa Districts of the U.S. Army Corps of Engineers (USACE) in the practice of stream restoration concepts, principals, and practices. He is known in these regions as an expert in natural channel design.

PROJECT EXPERIENCE

Ash Grove Cement (Ark)-Foreman, Ark. (2018) Mr. Ball was principal scientist for securing US Army Corps or Engineers Individual Permit for 16,000 lf stream impact. Individual Permit allowed Ash Grove Cement to expand the existing mine footprint for fifty years of reserves.

Various Mitigation Banks,, Arkansas. Mr. Ball established multiple stream mitigation banks in Arkansas. He was responsible for the design and the USACE permitting for 88,000 liner feet of stream by using natural channel design methods. One of the bank projects included the restoration of adjacent wetlands, which supports a Blackland prairie enhancement.

Brightwood Farm, Inc., Guilford County, North Carolina. Mr. Ball was the project director for the permitting and stormwater design for a 2,500-lot subdivision, which included the design of extended detention stormwater wetlands and use of cross vanes for energy dissipation. His use of cross vanes was a new approach to stabilizing stream resources adjacent culvert placements.

Albemarle Plantation, Hertford, North Carolina (2021). Mr. Ball was the principal marina designer and Coastal Area Management Act (CAMA) permit coordinator. He designed a breakwater, marina expansion and secured a CAMA Major Permit Variance for largest inland marina on the East coast.

Georgia Department of Veteran Services, Georgia. Mr. Ball was the principal mitigation specialist for construction of a 15-acre lake, which involved a dam placement across a perennial stream. He designed the on-site wetland creation and restoration, provided off-site stream restoration through stream bank stabilization measures, and effectively argued with the U.S. Fish and Wildlife Service regarding how the project would not negatively impact an endangered fish species known to use the stream.

Former Military Munitions/Unexploded Ordnance (MEC/UXO) Site, New Jersey. Mr. Ball was the senior scientist for Natural Resource Commodity's (NARC's) strategy at a 395-acre redevelopment site. The current owner, Brownfield Development Company, assumed all of the risk and liability. Although the company's environmental risk strategy and future development plans worked on the surface, the New Jersey Department of Environmental Protection's (NJDEP's) opinion regarding threatened and endangered species as well as wetland and habitat mitigation had unexpectedly resulted in a negative return-on-investment (ROI) exit strategy. Mr. Ball was part of a team that was engaged to assist in developing a positive NARC exit strategy that provided new sources of funding and revenue as well as created positive biodiversity and ecosystem public relations capital.

Hackney County, Tennessee. Mr. Ball was the director for permitting and design of a wetland and stream compensatory mitigation plan for a county industrial park. He used Rosgen techniques to restore 2,800 linear feet of degraded stream and provided a plan to create 10 acres of adjacent riparian wetlands. This work involved intercepting groundwater and relocating hydric soils that were found on the project site.

Koury Corporation, North Carolina. Mr. Ball was the principal in charge of the design and restoration of 3,200 linear feet of stream as a mitigation for a commercial development. This project involved the abandonment of the old streambed with a new channel constructed within the existing floodplain and integrated with adjacent stormwater best management practices (BMPs).

City of Kingsport, Tennessee. Mr. Ball was principal in charge of a stream restoration plan that used natural geomorphic techniques involving a degraded channel downstream of an existing dam. He designed a stable channel using structures to reconnect the existing stream to its floodplain along a 2,000-linear-foot reach. Mr. Ball's duties also involved obtaining permits from state and federal agencies.

Town of Villa Rica, Georgia. Mr. Ball was the project director of a stream/wetland restoration plan for an industrial park. His responsibilities included the design of a stream restoration, which would effectively create 5 acres of adjacent wetlands while establishing a stable natural channel.

PUBLICATIONS & PRESENTATIONS

Ball, M. T. and E. J. McClanahan, 2003. "Stream Restoration as an Important Component of Wetlands Permitting" *CLE – Carolina Wetlands Conference*,

Ball, M. T. and A. Reese,. "New Direction in Stormwater Management," *ASCE-Continuing Education*.

TIFF HILTON

EDUCATION: B.S in Mining Engineering-1975-Va. Tech

PREVIOUS POSITIONS HELD:

1. Vice President of Engineering
2. Division Superintendent
3. Assistant Superintendent
4. Section Foreman
5. Belt Foreman
6. Construction Foreman
7. Fireboss
8. Resident Engineer
9. Mining/Environmental Consultant

PREVIOUS CERTIFICATIONS:

1. Mine Foreman (WV)
2. Mine Foreman (VA)
3. Certified Blaster (WV)
4. Surface Mine Foreman (WV)

PUBLICATIONS: (Authored and Co-Authored)

1. The Magic of Water Treatment
2. Acid Mine Drainage Treatment Systems: Chemicals and Costs
3. Ammonia Handbook-For Use in Treating Mine Waters
4. Technical Information For Fighting Acid Mine Drainage
5. Special Chemicals For Treating Acid Mine Drainage
6. Overview of Acid Mine Drainage Treatment with Chemicals
7. Manganese Toxicity to Aquatic Organisms
8. West Virginia's Manganese Protocol
9. Evaluation of Mine Drainage Liability During Preacquisition Site Assessments
10. Did You Call Me A SAPS (Successive Alkalinity Producing System)
11. Advancement in Vertical Flow-Hybrid Passive Treatment Systems
12. Harbison Walker-A Hybrid Passive Treatment System
13. Low pH Iron Oxidation
14. Effect of Alkaline Fills on AMD Control
15. Comparison of Three Methods to Measure Acidity of Coal-Mine Drainage
16. ZEO What?
17. Distribution of Flow in Active and Passive Treatment Systems

INVOLVEMENTS & PRESENTATIONS TO: (Past/Present)

1. WV Surface Mine Drainage Task Force AMD training seminars (Present)
2. WV Coal Association-Annual Symposium (Several _ Past)
3. Tennessee Mine Institute-AMD related presentation (Past)
4. Va. Tech Mining Engineering Department—AMD Treatment lecture (Past)
5. WV Coal Assoc. Charleston Symposium-Several AMD presentations (Past)
6. WV Water Quality Advisory Comm. (Past)
7. Member of AMDTreat Software Development Team
8. WV Manganese Protocol Comm. (Past)
9. Training of WVDEP personnel in treatment/evaluation AMD (Past)
10. Member WV Coal Assoc.-Environmental Technical Committee (Past)
11. Member Manganese Protocol Committee (Past)
12. Approved Mine Drainage Expert Witness in WV

WORK EXPERIENCE:

1. Longwall and Shortwall Design (My Early Years)
2. Underground and Surface Foreman Work
3. Underground and Surface Construction Work
4. Shaft Construction
5. Slope Construction
6. Plant Construction
7. Extensive Mine Design and Short/Long Term Projections
8. Roof Control Evaluation and MSHA Roof Control Plans
9. Ventilation Evaluation and MSHA Ventilation Plans
10. Exploration Drilling (Core/Rotary & Elogging)
11. Washabilities/Petrographics/etc....
12. Plant Flowsheets
13. Surface Mine Planning (Cuts/Spoiling based on \$/Yd.-Clean Ton)
14. Executive Presentations For Operations/Engineering/Environ.
15. Coal Sales Presentations
16. Work Closely With Safety Personnel in Training and Permitting
17. Deep Mine and Surface Mine Permitting
18. Currently use AutoCad/MS Word/MS Excel/AMDTreat/Others

PAST COMPANY EMPLOYMENT:

1. Eastern Associated Coal Corporation (Pittsburgh Seam)
2. Pittston Coal (Jewell Ridge Coal Corp.-Red Ash/Jawbone)
3. Jewell Smokeless Coal Co. (Multiple Seams-Mid. Vol.)
4. Leckie Smokeless Coal Co. (Mid. Vol. New River/Poca.)
5. Westmoreland Coal Co. (Allegheny/Kanawha Formations)
6. Greenbrier Smokeless Coal Mining (New River/Poca.)
7. Coronado Global Resources

PAST & PRESENT MINE DRAINAGE EVALUATION RELATED TREATMENT CLIENTS

- | | |
|---------------------------------|---|
| 1. CONSOL | 19. OSM |
| 2. Peabody Coal Company | 20. Newport Trading Company |
| 3. Arch Coal | 21. Argus Energy |
| 4. Ashland Coal | 22. Buena Vista Mines |
| 5. Addington Resources | 23. GAI Engineering |
| 6. Bethlehem Steel | 24. United Coal Company |
| 7. Stelco | 25. Marathon Engineering |
| 8. Massey Energy | 26. Mary Ruth Coal Company |
| 9. Alpha Natural Resources | 27. C&K Coal Company |
| 10. Amvest | 28. Marshall Miller and Associates |
| 11. Harris Export | 29. Grier Limestone |
| 12. ICG | 30. Kyanite Mining |
| 13. Harding Lawson | 31. Huddleston, Bolen, Beatty, Porter,
and Copen |
| 14. Chester Engineering | 32. Columbia Natural Resources |
| 15. Action Mining | 33. Crowell-Moring |
| 16. Green Mountain Construction | 34. Progress Fuels |
| 17. Jackson Kelly PLLC | 35. Vulcan Materials |
| 18. WVDEP | |

PERSONAL/PROFESSIONAL REFERENCES

1. Dr. Jeffrey Skousen—WVU Professor of Soils Science
2. Ben Faulkner—Environmental Consultant-Bratton Farms
3. Larry Emerson-Environmental Consultant
4. Ron Hamric-Environmental Manager-Arch Coal (Retired)
5. Brent Means—Office of Surface Mining



JOHN P MCGINN, PE

TECHNICAL ADVISOR

TECHNICAL EXPERTISE

- / Project Management
- / Water and Wastewater System Planning, Design, and Construction
- / Rate and Revenue Analysis
- / Water Resources
- / Construction Administration
- / Grant Funding

EDUCATION

- / BS in Civil Engineering, Colorado State University, Fort Collins, CO (1978)

REGISTRATIONS & LICENSES

- / Professional Engineer in Colorado (19534) and California (44353)

WORK HISTORY

- / RESPEC (2021–Present)
- / JDS Hydro (2001–2021)
- / Kiowa Engineering (1993–2001)

OVERVIEW

John McGinn has over 40 years of experience in civil engineering, which includes the analysis, planning, permitting, and design of water and wastewater treatment facilities; water and aquifer contaminant remediation; water distribution; wastewater collection facilities; groundwater systems; pumping and lift station facilities; raw and potable water storage; and utility rate and revenue analysis and municipal systems. John is also versed in district management, water resource planning and studies, construction administration, grant application, expert witness/representation, administration, and project management.

PROJECT EXPERIENCE

1.30-Million Gallon Day (MGD) Iron and Manganese Removal Water Treatment Plant, Woodmen Hills Metropolitan District, Falcon, Colorado. John was the project manager for the permitting, design, and bidding of 1.30 MGD of iron and manganese removal for a water treatment plant for the Woodmen Hills Metropolitan District. The system included multiple chemical feed system, reaction vessels, filtration, backwash systems, disinfection, chlorine contact, supervisory control and data acquisition (SCADA), clear well, and booster pumping station.

2.0-MGD Surface Water Treatment Plant, City of Woodland Park, Woodland Park, Colorado. John was the project manager for the permitting, design, and construction of this project. The project included direct filtration plant, backwash system, pH control, laboratory facilities, and office space for a four-member staff that overlooked the filtration units. This project also included upgrades to the 75-foot-high Loy Gulch Dam that fed the plant.

Design and Construction of a \$7.47 Million Wastewater Treatment Facility Expansion, City of Woodland Park, Woodland Park, Colorado. John was the project principal for this work. The design and construction consisted of constructing expanded aeration bioreactor basins, solids bioreactors as well as installing new blowers, final clarifier, screw press dewatering and composting facility, ultraviolet (UV) disinfection, pH control, and tertiary treatment for treated effluent reuse for golf-course irrigation. The entire plant SCADA was replaced, and a new electrical service and backup power was installed. During construction, no permits were exceeded.

1.5-MGD Manganese Removal Treatment Facility for Colorado Centre Metropolitan District, Colorado Springs, Colorado. John was the principal in charge for this project. The system included Colorado Department of Public Health and Environment (CDPHE) permitting, shallow aquifer wells, filtration, disinfection, backwash recovery, multiple chemical feed systems, and SCADA/Control systems.

3.0-MGD Southmoor Per- and Polyfluorinated Substance (PFAS) Water Treatment and Remediation Facility, Widefield Water and Sanitation District, Colorado. John was the principal in charge for the fast-track design, permitting, and construction of this project. The project included an ion exchange system for treating the PFASs, well conversions, pretreatment, SCADA, and auxiliary facilities. The project also involved a design build function and all of the permitting, design, and construction-related services.

Full-Scale Pilot and Demonstration Studies for Radionuclide Precipitation Using Hydrated Manganese, Triview Metropolitan District, Colorado. John was the project principal for this work. This full-scale pilot and demonstration study was carefully observed and followed by several public and state entities. No permits were exceeded during construction phase.

Regional Water Reclamation Facility Design and Construction, Woodmen Hills Metropolitan District, Peyton, Colorado. John was the project principal for this project that included the planning, permitting,

design, and construction of a new 1.3-MGD Biological Nutrient Removal (BNR) water reclamation facility. Efforts included new bioreactors that were constructed to convert to membrane bioreactors, pH control, process modeling, and development of system hydraulics that were used as a basis for equipment specifications.

2.0-MGD Iron and Manganese Removal Treatment Facility, Falcon Area Water and Wastewater Authority, Falcon, Colorado.

John is currently the project manager for the planning, permitting, and design of this project. The project is currently in design and includes pH Control, wells, filtration, disinfection, backwash recovery, multiple chemical feed systems, and SCADA/control systems.

Ethylene Dibromide (EDB) and Radionuclide Water Treatment and Blending Facility., Woodland Park, Colorado. John was the project manager for the planning, design, permitting, and construction of this project. The project included a granulated activated carbon system for the treatment of EDB, passive treatment of Radon, and blending treatment for Uranium. This project included raw water collection from a wellfield, repumping, a 3-mile water delivery system, SCADA, and a blending station.

Wastewater Treatment Plant Technology Improvements, Widefield Water and Sanitation District, Colorado Springs, Colorado.

John was the project manager for the planning, permitting, design, and construction of the Widefield Water and Sanitation District's Wastewater Treatment Plant (WWTP) Technology Improvements. This project was developed to improve the facility's existing secondary treatment process to incorporate BNR processes to assist with the removal of nitrogen and phosphorus, as well as enhance the existing sludge handling process. Improvements included the converting a basin to an anaerobic zone, constructing a new anoxic zone, adding two new screw presses and a sludge handling facility, and constructing a new chemical building to promote the addition of alum and caustic soda.

Membrane Surface Water Treatment Plant, Red Rocks Water District, Colorado Springs, Colorado. John was the principal in charge for the grant funding, permitting, design, and construction administration. The design included a new membrane treatment system, pump station, multiple backwash systems, SCADA controls and several chemical feed systems.

Royal Gorge Surface Water Treatment Plant, Canon City, Colorado. John was the principal in charge for this project that included several unique features, such as a surface water intake in the rapids of the Arkansas River; pumping up out of a 1/4-mile-deep canyon, direct filtration surface water treatment plant, repumping, chlorine disinfection, SCADA, and clear well storage.

3.0-MGD Air Stripping Water Treatment Plant, Widefield Water and Wastewater District, Colorado. John was the principal in charge for the planning, permitting, design, and construction administration. This facility included an air stripping treatment system, chlorination, repumping, and raw water collection manager for the groundwater remediation of tetrachloroethylene (PCE) contaminants in the Widefield Aquifer.

High-Pressure Non-Potable Water System, Colorado Springs Utilities, Colorado Springs, Colorado. John was the project manager for the design, bidding, and construction of the South Fountain extension of the high-pressure non-potable water system. The 2-mile extension of the 16- and 18-inch water lines was constructed in Colorado Department of Transportation (CDOT) right-of-way.

Regional Wastewater Pumping System, Widefield Water and Sanitation District, Colorado Springs, Colorado. John was the project manager for the new Regional Jimmy Camp Wastewater Pumping System. Facility construction included 2 miles of 12-inch force main, a concrete wet well, auxiliary storage systems, high head pumping system, backup power systems, and SCADA support systems.

Groundwater and Wastewater Reuse Development Study, Colorado Springs Utilities, Colorado Springs, Colorado. John was the project manager for the study and development of groundwater and wastewater reuse.

Southmoor PFAS Water Remediation Plant, Widefield Water and Sanitation District, Colorado. John was the principal in charge for the design and permitting of this project. The project was a conversion of an existing air stripping facility to an ion exchange water treatment plant for the removal of PFAS. The project was unique in that the Widefield Inhouse staff completed the actual demolition and construction.

Non-Potable Water System, Water World, Federal Heights, Colorado. John was the project manager for the design, bidding, and construction of the non-potable water system for Water World. The project included collection facilities, storage, pump station, and transmission lines.

Reuse Pumping Facility, Colorado Springs Utilities, Colorado Springs, Colorado. John was the project manager for the design, bidding, and construction of a new 10-MGD, high head reuse pumping facility at the Las Vegas WWTP in Colorado Springs, Colorado.



MICHAEL L. CROSS

PROJECT ENGINEER / ENGINEER III

OVERVIEW

Michael Cross has more than 43 years of mining design and permitting experience and has worked directly for and as a consultant to the mining industry. His vast knowledge in extensive mine design and permitting experience spans West Virginia, Kentucky, Ohio, Maryland, Indiana, Tennessee, and Virginia. Mike has designed and permitted some of the largest surface mines and deep mines in West Virginia.

As a consulting engineer and office manager, Mike was responsible for designing, preparing, and managing environmental and other associated permits for the mining industry, including Surface Mine Applications (SMAs), Incidental Boundary Revisions (IBRs), subsidence control plan revisions, renewals, other revisions, transfers, operator assignments, quarry permits, and National Pollution Discharge Elimination System (NPDES), modifications. He has prepared and submitted requests for Jurisdictional Determinations for streams and wetlands to the US Army Corps of Engineers (USACE) in various USACE offices as well as USACE 404 Individual Permits (IP), USACE After-the Fact 404 IPs, Nation Wide Permits (NWP), State Individual 401 Water Quality Certifications, and Isolated Wetland Permits for mining and commercial projects in various states.

Mike completed major projects that included establishing and managing a drilling program to prove coal reserves, conducting detailed coal reserve studies, and preparing unmined mineral tax reports. He also conducted extensive title searches to identify tax tracts, coordinated taxes with county and state tax officials, and appealed appraised values before the Clay County Review and Equalization Board. Mike managed the marketing of coal reserves and the sale of surface/timber tracts, assisted with the design and permitting of a rock quarry, and assisted with the preliminary designs for an industrial park.

Before his career as a consulting engineer, Mike worked at GEX Kentucky, where he held a variety of positions. Mike was responsible for the direct supervision of the engineering department, survey crew, and coal analysis laboratory. He was directly responsible for all engineering aspects of operating six underground deep mines; a 300-ton-per-hour (TPH) heavy-media cyclone preparation plant; and a slurry/refuse impoundment. Engineering budgets and cost estimates for all of the engineering-related projects were prepared by Mike. He was also responsible for all environmental activities related to mining permits and coordinated reclamation inspections with the Kentucky Department for Surface Mining Reclamation and Enforcement (Ky DSMRE). He prepared and submitted mining/reclamation permits to the Ky DSMRE, established a reclamation program for abandoned mines and obtained bond releases, established a surface-water and groundwater monitoring program, and assisted in designing and implementing a water treatment facility to treat acid mine drainage (AMD). Mike conducted ventilation surveys in all active deep mines, obtained approval of all ventilation plans submitted to the Mine Safety and Health Administration (MSHA), and assisted with surface and underground mine surveying.

As the mine engineer and site supervisor at Island Creek, Mike was responsible for supervising the survey crew and permitting/environmental department. He was directly responsible for mine engineering for Island Creek's Holden 29 and Twin Branch mining complex in southern West Virginia. The mining complex included contract surface mines and both company and contract deep mines. The surface mines involved mountaintop removal and multiple seam contour mining. The mining complex also included a coal preparation plant, clean and raw coal loadout facilities, and a refuse impoundment disposal facility. Mike was responsible for all mine planning and projections, and he prepared engineering budgets and cost estimates for all engineering-related projects. He also conducted reclamation liabilities studies (e.g., surface mines) and closing costs estimates (e.g., deep mines, reparation plants, and coal loading facilities). Mike prepared unmined mineral taxes and was responsible

TECHNICAL EXPERTISE

- / Permitting
- / Coal Reserves
- / Management
- / Bond Releases
- / Mine Closing Costs
- / Mine Liability Cost Studies

EDUCATION

- / BS in Mining Engineering, West Virginia University, Morgantown, WV (1980)

CERTIFICATIONS & TRAINING

- / Kentucky Underground Miner's Card
- / West Virginia Underground Miner's Card (1982)
- / MSHA Qualified Slurry Impoundment/Dam Inspector (1984)

WORK HISTORY

- / RESPEC (2019–Present)
- / CBC Engineers (2005–2019)
- / Summit Engineering, Inc. (2000–2005)
- / Eagle Environmental Group (1999–2000)
- / Island Creek Coal Company (1987–1998)
- / GEX Kentucky Inc. (1980–1987)



for all environmental activities related to mining permits. He was the site superintendent for the surface mine and deep mine reclamation projects and coordinated reclamation inspections with the West Virginia Department of Environmental Protection (WVDEP). He also prepared and submitted mining/reclamation permits to the WVDEP, managed and coordinated the surface-water and groundwater monitoring program, and assisted with developing and constructing the Southern West Virginia Regional Jail and installing related utilities. Before the Island Creek property was purchased by CONSOL in July 1993, Mike was a senior engineering specialist who was responsible for all phases of permitting, environmental, reclamation, and mine planning activities related to obtaining and complying with mining permits for Island Creek's eastern Kentucky mining operations and Island Creek's southern West Virginia mining operations. The mining permits included both surface and deep mines.

As the Island Creek reclamation site superintendent, Mike directed and managed the reclamation of the Mutual Surface Mine (contractor mine). He abated all outstanding violations and negotiated and obtained inactive statuses for permits with remaining reserves. Mike directed and managed the reclamation of the 20 DB deep mine (company mine) as well as the Magnet #1 and Magnet #2 surface mines (contractor mine). Various outstanding violations were abated, and the property was sold to A.T. Massey before the reclamation work was completed.

Mike directed and managed the reclamation and normal maintenance of various surface mines, deep mines, preparation plants, and refuse impoundments. He directed and managed the final reclamation of various surface and deep mines to obtain bond releases. Mike directed and managed the breakdown, benching, and final reclamation of multiple durable rock-end- dump valley fills on various surface mines.

PROJECT EXPERIENCE

Various Permitting, E Mine, Mettiki Coal, LLC, Near Bayard, West Virginia. Mike was the project manager for preparing and obtaining various state and federal permits that were required for an underground coal mine operation. The permits included an SMA and NPDES permit. The E Mine is in the Upper Freeport seam, which is an acid-producing seam. Mike determined the mine seepage and final mine pool elevations in the mine that were used in designing an alkaline reinjection system to treat the mine water. He assisted Mettiki Coal in defending the permit approval in the WVDEP Mine Board hearings.

Mike continues to prepare subsidence control plan revisions, IBRs, and Underground Injection Permits as part of the continued E Mine expansion. E Mine was ranked as the 8th to 13th largest producing deep mine in West Virginia for the years 2008 through 2014.

Subsidence Coal Plan Revisions, Backbone Mine, Mettiki Coal, LLC, Near Table Rock, Maryland. Mike was the project manager for preparing and submitting an amendment to expand the mine reserves. Mike determined the mine seepage and final mine pool elevations in the mine and prepared plans for mine abandonment that included the construction design of various piezometers to monitor and pump the water to another mine for treatment.

Various Permitting, Friends of Deckers Creek, near Morgantown, West Virginia. Mike is the project manager for the design of an AMD remediation project in Preston County, WV. This project involves the preparing and submitting permits to the USACE and the WVDEP, Division of Water and Waste Management. These permits are currently pending. A passive treatment restoration consisting of self-flushing limestone leach beds. Mike designed the treatment pond based on the conceptual plans.



JOSEPH (JOE) NAUGHTON

SENIOR BIOLOGIST

TECHNICAL EXPERTISE

- / Project Management
- / Biological Assessments
- / Water Quality Assessments
- / Stream Habitat Assessments
- / Statistical Analyses
- / Technical Writing

EDUCATION

- / MS in Fisheries and Wildlife Management, Montana State University, Bozeman, MT (2013)
- / BS in Fisheries and Wildlife Management, Oregon State University, Corvallis, OR (2004)
- / BS in Sociology, Southern Oregon University, Ashland, OR (1999)

PROFESSIONAL MEMBERSHIPS

- / American Fisheries Society
- / American Water Resources Association
- / HAZWOPER

HONORS & AWARDS

- / Butte Greenway Service District Research and Monitoring Grant (2011)
- / Montana State University, Clow and Belsley Memorial Awards (2010–2011)
- / Montana Water Center, Research Fellowship (2011)
- / Montana State University, Graduate Research Fellowship (2009–2011)

WORK HISTORY

- / RESPEC (2013–Present)
- / Atkins (2012–2013)
- / Montana State University (2009–2012)
- / U.S. Forest Service (2008)
- / Oregon Department of Fish and Wildlife (2007–2008)
- / National Park Service (2005)
- / U.S. Geological Survey (2003–2005)

OVERVIEW

Joe Naughton is the monitoring group manager for the environment division of the Water & Natural Resources business unit at RESPEC. He has 17 years of experience in conducting ecological research and monitoring to assess the effects of various contaminants on the environment, particularly scientific investigations necessitated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Since 2014, Joe has been the project manager and lead scientist for comprehensive environmental monitoring of Superfund remedies by the State of Montana for the Streamside Tailings Operable Unit of Silver Bow Creek and the Clark Fork River Operable Unit. He also has a major, ongoing role as a technical lead supporting the Saskatchewan First Nations Natural Resource Centre of Excellence for investigating the impacts of multiple contamination issues in the province. Joe has a background in fisheries and, before joining RESPEC, he worked for the U.S. Geological Survey, Oregon Department of Fish and Wildlife, U.S. Forest Service, and National Park Service.

PROJECT EXPERIENCE

Performance Monitoring of the Streamside Tailings and Clark Fork River Superfund Operable Units, Montana Department of Environmental Quality (DEQ), Montana. Joe is the project manager and lead scientist for comprehensive environmental monitoring of the Streamside Tailings and Clark Fork River Operable Units. These long-term monitoring programs evaluate the responses of multiple environmental media to large-scale remediation and restoration actions for mining contamination from copper mining and smelting activities in the upper Clark Fork River Basin. Environmental media monitored include surface water, groundwater, vadose zone water, and instream sediment chemistry; aquatic biota (fish, macroinvertebrates, and periphyton); terrestrial biota (bird and mammal populations and vegetation); and stream geomorphology.

Performance Monitoring for Black Pine Mine Reclamation, DEQ, Montana. Joe is the project manager and lead scientist for performance monitoring of reclamation actions at the Black Pine Mine site near Philipsburg, Montana. The site was the source of metals contamination to surrounding water resources and the reclamation and monitoring is funded through the ASARCO trust.

Blacktail Creek Stream Restoration Design and Permitting, Montana Department of Justice, Natural Resource Damage Program (NRDP), Butte, Montana. Joe is the project manager for two stream restoration projects intended to limit spawning habitat for nonnative Brook Trout (*Salvelinus fontinalis*) and improve movement corridors for native Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisii*). This project includes draft and final engineering designs, permitting, and construction bid packages.

Groundwater Monitoring for Milltown Reservoir Sediments Site, Booth Consulting, Missoula, Montana. Joe manages RESPEC's groundwater monitoring team for collection of long-term data to assess rates of attenuation of metals in groundwater at the Milltown Reservoir Sediments Superfund site.

Montana River Inventory, DEQ, Montana. Joe conducted an assessment of Montana data collected by the Environmental Protection Agency (EPA) under the National Aquatic Resource Surveys (NARS) program to assess broad-scale, national water quality trends. Project tasks included data analysis, reporting, and presentation.

Performance Monitoring for Flat Creek Iron Mountain Mine and Mill Site Remedial Action, DEQ, Montana. Joe is the project manager for ongoing performance monitoring at the Flat Creek site near Superior,

Montana. Major remedial actions for the site have been completed and monitoring consists of collection and analysis of groundwater and surface-water data, primarily to assess the effectiveness of the site waste repository.

Ecological Risk Assessment for the Streamside Tailings Operable Unit, DEQ, Montana. Joe is currently conducting an ecological risk assessment for a major Superfund site in western Montana where remedial actions have been completed. Although most risk assessments are completed before site remedy, at that time, essentially no macroscopic aquatic receptors existed because of the severity of contamination; therefore, this risk assessment is being conducted a posteriori.

Blacktail Creek Stream Restoration Design and Permitting, Montana Department of Justice, Natural Resource Damage Program (NRDP), Butte, Montana. Joe is the project manager for two stream restoration projects intended to limit spawning habitat for nonnative Brook Trout (*Salvelinus fontinalis*) and improve movement corridors for native Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*). This project includes draft and final engineering designs, permitting, and construction bid packages.

Warm Springs Pond Water Quantity and Quality Model, Montana Department of Justice, NRDP, Helena, Montana. Joe was the project manager for a geochemical analysis of water quantity and quality in the Warm Springs Ponds tailings pond complex. The project provided an analysis of the implications of altered water management in the pond system through mass-balance modeling applications.

Characterization of Groundwater-Surface-Water Interaction in the Streamside Tailings Operable Unit, DEQ, Montana. Joe assessed the influence of contaminants in groundwater on the attainment of surface-water contaminant concentrations for a major Superfund site in western Montana. This characterization was completed at the request of Montana DEQ in response to a requirement from the US EPA in the 2016 5-year review for the Operable Unit.

Performance Standards Assessment for Streamside Tailings Operable Unit, DEQ, Montana. Joe completed a performance standards assessment for a major Superfund site in western Montana. This assessment was completed at the request of Montana DEQ in response to a requirement from the EPA in the 2016 5-year review for the Operable Unit.

Injury Assessment for Manitoba Oil Spill, Undisclosed Client, Canada. Joe provided technical support and supervision of field activities on behalf of a Canadian environmental law firm for an investigation of oil impacts to aquatic resources from a train derailment and oil spill. Aquatic resources impacted included groundwater, surface waters of adjacent oxbow lakes, and river sediments.

Injury Assessment of 16TAN Oil Spill into the North Saskatchewan, Saskatchewan First Nations Natural Resource Centre of Excellence (SFNNRCOE), Saskatchewan, Canada. Joe provided a range of technical support to the SFNNRCOE to investigate environmental contamination in the province, including sampling design, a sampling and analysis plan (SAP) and quality assurance project plan (QAPP), data collection and analysis, reporting, public presentation, and technical review of scientific data and reports.

Smurfit-Stone Remedial Investigation, Newfields, Missoula, Montana. As a subcontractor to Newfields, Joe led a team of field biologists in collecting biological data to support the remedial investigation for contaminant levels in aquatic and terrestrial receptors that were potentially impacted by pollution from a paper mill near Missoula, Montana. Joe also conducted technical oversight of scientists contracted by EPA in support of this remedial investigation.

Assessment of Biotic Ligand Model for Application as a Water Quality Standard, Montana DEQ, Montana. Joe analyzed data collected in Montana to evaluate the relative restrictiveness of hardness-based and Biotic Ligand Model- (BLM-) based aquatic life standards.

Gold King Mine Emergency Response, US EPA, Colorado. While working as a subcontractor to Weston Solutions, Joe was deployed for 3 weeks to Silverton, Colorado, to provide emergency technical support to the EPA. He collected water samples and evaluated data immediately after the release of mining wastewater to the Animas River from the Gold King Mine blowout.

Clark Fork River Fishery Assessment, Flint Creek to Rock Creek Reach, NRDP, Montana. Joe assessed available water quality, physical habitat, and biological data to improve the understanding of the possible factors related to chronic low trout abundance in the Clark Fork River between the confluences of Flint and Rock Creeks.



JEFFERY W. BONAVENTURA

PROJECT ENGINEER

TECHNICAL EXPERTISE

- / Project Management
- / Client Needs Analysis
- / Construction Management
- / Project Cost Projections

EDUCATION

- / BS in Civil Engineering, Fairmont State University, Fairmont, WV (2008)

CERTIFICATIONS & TRAINING

- / Safeland Training for Oil/Gas
- / OSHA 10
- / BNSF -Railroad
- / MSHA

HONORS & AWARDS

- / You Nailed It Award, Geostabilization International (2020)

WORK HISTORY

- / RESPEC (2023–Present)
- / Geostabilization International (2020–2023)
- / Kleinfelder (2019–2020)
- / Waste Management (2012–2019)
- / Thrasher Engineering Inc (2005–2012)

OVERVIEW

Jeff Bonaventura has had success in various industries throughout his career. As a staff engineer, he completed permitting requirements, budgets, quality assurance/quality control, as-built drawings, boundary surveying, right-of-way (ROW) staking, smoke testing, and contract documents for bidding purposes. When becoming an area engineer, Jeff budgeted, tracked, constructed, and projected capital-funded projects for multiple landfill operations year-over-year. During his stint as a construction coordinator, Jeff documented, scheduled, and assisted with wetland/stream mitigation. While as a project manager, he assisted with design, planned, constructed, cost projected, managed and analyzed crew production rates, and problem-solved grouting issues. Jeff has a great work ethic and is very passionate about his work.

PROJECT EXPERIENCE

Raven Rock Slip Repair, West Virginia Department of Highways (WVDOH), St. Mary's, West Virginia. Jeff was the project manager who coordinated with the WVDOH for potholing, excavation, and guardrail removal; the utility departments on potholing and relocations; the railroad on ROWs and railroad flaggers needed during the construction process. He ordered the materials, set up vendors for shotcrete, did a cost analysis for purchasing bagged grout versus ordering premixed grout, created a work breakdown structure based on the budgeted production rates for up to four crews for the duration of the project, tracked and had weekly calls, problem solved grouting issues, and progress billed throughout the project. This was the largest West Virginia MSA project for Geostabilization International and came in at a 46 percent profit margin. It was completed under budget and before the proposed end date that was communicated to the client. The project was approximately \$2.4 million.

Phase 2 Mass Excavation, Waste Management – Northwestern Landfill, Parkersburg, West Virginia. Jeff was the West Virginia area engineer on this project. He worked with third-party engineers to produce a bid package for the excavation and stormwater requirements for the Phase 2 expansion design. Over 1 million cubic yards were removed from the location and stockpiled for daily cover. This capital project was completed over a 3- to 4-month period, which included blasting, excavation, hauling, and grading.

TECHNICAL EXPERIENCE

Construction Project Management. Jeff has worked on approximately 250 soil nail projects in a 3-year window, with values ranging from \$30,000 to \$2.4 million. He managed three to eight crews at a time in different locations throughout West Virginia and averaged approximately \$1.3 million in monthly revenue. His duties included the pre-construction meeting, ordering materials, ordering equipment, scheduling drill transports, project budgets, project forecasting, face-to-face client meetings, assisting in crew selection for projects, and determining crew backlog based on drop-dead dates for billing from the client. Jeff has worked on several kinds of soil nail shotcrete walls, pinned mesh walls, and GCS Walls.

Landfill Capital Project Management. Jeff managed budgetary funds for landfill operations by projecting 5-year workbook projections based on the prior year's configuration. He requested capital funds for each category, including cell construction, leachate management, landfill gas collection, excavation, stormwater management, and site closure. Jeff collaborated with vendors, third-party engineers, and contractors on sourcing materials, design, construction bid documents, and cost projections. He monitored and reallocated capital funds as needed, approved change orders and billing requests, and updated 5-year projection workbooks with current material costs, airspace, engineering fees, leachate, landfill gas, capping/closure costs, and stormwater management projects.



PATRICK WIECK, PE

MANAGER, DENVER MINING DIVISION

TECHNICAL EXPERTISE

- / Project Management, Construction Management, and Owner's Engineer
- / Mine Design and Mine Optimization
- / Cost Models and Financial Analysis
- / Canadian NI 43-101 Compliant Technical Reports
- / Mine Due Diligence Reviews
- / Operating and Capital Budgets

EDUCATION

- / BS in Mining Engineering, Colorado School of Mines, Denver, CO (2006)

REGISTRATIONS & LICENSES

- / Professional Engineer in Colorado and Wyoming

PROFESSIONAL MEMBERSHIPS

- / Society of Mining Engineers

WORK HISTORY

- / RESPEC (2016–Present)
- / Wieck Consulting LLC (2015)
- / Cliffs Natural Resources, Koolyanobbing Operations (2012–2015)
- / Tetra Tech, Inc. (2011–2012)
- / Golder Associates, Inc. (2011)
- / Marston & Marston, Inc. (2006–2011)

OVERVIEW

Patrick Wieck is an experienced professional engineer in the areas of project management, construction management, project engineering, and operations. Patrick is currently the project manager for a large multi-year project through the Wyoming Abandoned Mine Lands Program (WY AML) focused on remediation of surface subsidence features at the Horse Creek Mine. His experience also includes owner's representation and project engineering for construction of the Collom mine in northwest Colorado, which includes construction of a 5.5-mile-long access road, facilities pad construction, crushing and loadout facilities, and associated enabling infrastructure. Patrick also worked as a production engineer and alternate operations manager for Cliffs Natural Resources at their 11 million tonnes per year iron ore operation in Western Australia where he focused on target optimization and cost control measures to reduce capital and operating costs for the operation.

PROJECT EXPERIENCE

Wyoming DEQ – AML Project 10C, Wyoming. Patrick is RESPEC's Project Manager for AML Project 10C, Horse Creek Mine Subsidence Remediation. This project is ongoing and includes surface and underground investigation of historical mine related subsidence features at the Horse Creek mine outside of Cheyenne, Wyoming. This project includes site characterization, investigation, and remediation of active subsidence features, access road construction, detailed surface and sub-surface investigation, reclamation design, and construction management.

Newmont, Colorado. Patrick was the overall Project Manager on behalf of Newmont for the engineering and construction of an innovative flow-control bulkhead at the Idarado Mine in Telluride, Colorado. The project included coordination of multiple design firms, management of the general contractor, schedule and budget tracking, overseeing the construction management, and commissioning and handover to the client.

Confidential Client. Patrick is the Project Manager for an underground tunnel design project in New Mexico. The project includes generating Issue for Bid design drawings, supporting specifications, cost estimation, and construction schedule estimates.

Colowyo Coal Mine, Colorado. Patrick acted as the Owner's Representative for the construction of the Collom pit at the Colowyo coal mine in northwest Colorado. This project included constructing a new 5.5-mile haul road that connects the Collom area with the existing Colowyo operations, developing facilities pads, constructing five sediment ponds and one storage pond, and performing additional tasks, including associated drainage features, drilling and blasting activities, concrete pads and foundations, mechanically stabilized earth (MSE) wall construction, multiplate arch underpass, a railroad-style signal gate crossing, asphalt paving, and as-built documentation. Patrick also assisted with contractor management/oversight, Request for Proposal (RFP) and Scope of Work (SOW) development, and costing and budgeting work related to the project.

Alpha Natural Resources, Powder River Basin, Wyoming. Patrick developed unit-based cost models in support of reclamation bonding for the Eagle Butte and Belle Ayr Mines in the Powder River Basin, Wyoming. This work incorporated historical actual costs, Wyoming Guide 12 costs, and forecasted costs to develop updated reclamation bond liabilities for submittal to the Wyoming Department of Environmental Quality.



Cliffs Natural Resources, Koolyanobbing Operations, Western Australia. Patrick served as the Senior Production Engineer and Deputy Registered Manager for an 11-MTPY, direct ship, iron ore project. The Koolyanobbing Operations included three mining hubs that were spread over 100 kilometers apart and serviced by a gravel haul road using a contract miner. Patrick was accountable for overseeing and performing the contract miner for all of the phases of mining, including drill and blast, load and haul, ancillary support, road haulage, and crusher feed operations. He was also responsible for developing and adhering to an annual operating budget that exceeded \$250 million. Patrick worked closely with the contract mining company to ensure that their corrective action implementation adhered to and met contract key performance indicators (KPIs) on a weekly, monthly, and yearly basis. He was also responsible for operational optimization to sustainably reduce operating costs; his efforts involved targeted cost reduction initiatives that resulted in \$55 million sustained operational cost reduction as well as operational capital cost reductions in excess of \$9 million. These results were delivered ahead of schedule and required minimal operational capital expenditure to achieve.

AngloGold Ashanti, Cripple Creek, Colorado. Patrick performed a functional review of manpower requirements at the Cripple Creek and Victor gold mine in Cripple Creek, Colorado. This project included a functional audit of existing work practices and requirements to determine the current budget-based manpower requirements, zero-based manpower requirements, and best-practice manpower requirement to effectively and efficiently action the life-of-mine (LOM) project plan and budget. Work included site-based audits, reviews, and studies to determine the existing work practices and identify industry-standard work practices that could be implemented over short-, medium-, and long-term periods.

Selwyn Resources Ltd., Yukon Territory, Canada. Patrick developed a feasibility level mine design and mining cost analysis for an underground lead/zinc mine in Yukon Territory, Canada. Work included creating an underground mine design for a primary longhole, sublevel stoping mining technique that was supplemented with overhand cut-and-fill mining as well as developing a first principal mining cost model to support the mine design. Patrick's role also included scheduling ore and ore/waste development from multiple deposits and mining methods to meet the milling capacity requirements.

Western Lithium Corporation, Nevada. Patrick assisted in developing a preliminary feasibility study of the Kings Valley lithium deposit. His responsibilities included developing a first principal mining cost model and performing a total project financial analysis to support a Canadian NI 43-101 compliant reserve report. Patrick interfaced with multiple project teams to compile and develop capital and operating costs.

Youngs Creek Mining Company, Northern Powder River Basin, Wyoming. Patrick developed a feasibility study for a greenfield coal mine in the Northern Powder River Basin. The project included geological and quality modeling, mine planning, pit design, scheduling, cost model and cash-flow analysis, equipment selection and support design parameters, and project management decisions. Patrick interfaced with client contacts and client subconsultants on a weekly basis to support the ongoing engineering and construction designs.

Luminant Mining Company, LLC, Dallas, Texas. Patrick led a team of engineers in performing mine design, scheduling, and cost analysis for a rolling 2-year mine plan, 5-year mine plan, and LOM plan for the Martin Lake complex of lignite mines. He developed cost models for the Martin Lake Mine Complex to budget costs for delivery to the Martin Lake Power Plant. Patrick also collected the operating, maintenance, and overhead costs associated with mining; the costing was completed on a mining-function basis to ensure maximum revenue generation.



PAUL (BRIAN) LEWIS

SENIOR DRILL AND BLAST SPECIALIST

TECHNICAL EXPERTISE

- / Drill and Blast design Improvement and optimization
- / Close-Quarter Blasting
- / Operations, Project, and Contractor Management
- / Explosives Expert Witness
- / Blast Data Collection and Interpretation
- / Seismograph Implementation and Review
- / Safety and Training

EDUCATION

- / BS in Business Management, University of Louisville, Louisville, KY (2003)

REGISTRATIONS & LICENSES

- / Licensed Blaster in Kentucky and Indiana

PROFESSIONAL MEMBERSHIPS

- / International Society of Explosives Engineers (ISEE)
- / ISEE Chapters and Membership Committee
- / ISEE Webinar Blasters Training Committee
- / Past President and board member of the Bluegrass Chapter of the ISEE
- / Kentucky Blasting Conference, Board Member and Committee Chair
- / Special Committee for the Kentucky Department of Transportation, Board Member

CERTIFICATIONS & TRAINING

- / Approved Blaster Trainer in Kentucky (2018)
- / OSHA 30-Hour Course (2018)
- / MSHA Experienced Miner Certification (2021)
- / First Aid and CPR Certified (2022)

HONORS & AWARDS

- / Army Reserve Components Achievement Medal (ARCAM), U.S. Army (1999)
- / Army Commendation Medal (ARCM), U.S. Army (2000)
- / ISEE Presidents Award 2021
- / ISEE KY Bluegrass Chapter Membership Award 2021

WORK HISTORY

- / RESPEC (2020–Present)
- / Bedrock Contracting (1997–2020)

OVERVIEW

Paul (Brian) Lewis has more than 29 years of experience with drilling, blasting, and seismograph monitoring. While serving as the lead project manager and blast design consultant for blasting and drilling operations at Bedrock Contracting, he completed numerous high-profile, close-quarter blasting jobs, including the I-69 Sections 4 and 5 in Bloomington, Indiana, and the Rupp Arena Civic Center expansion in Lexington, Kentucky. Brian has considerable experience with interpersonal relations in securing bids and contracts. He has successfully won and completed these contracts according to their Scopes of Work and sets himself apart through his substantial involvement in on-the-ground fieldwork. Brian has also designed and installed rock/soil anchors and performed a number of slope stabilization projects. His niche in the industry is close-quarter blasting in under-200-foot proximities to structures, with numerous jobs at 25 feet or less.

TECHNICAL EXPERIENCE

Drill and Blast design Improvement and optimization. Brian has designed numerous blast design projects throughout his years in the industry. His experience focused primarily on close in blasting, under 200 feet of existing structures, including historical structures and pipelines along with highway projects, coal, mines, dimension stone, and aggregate quarries. His blast design work has been used to increase safety, predict vibrations, improve fragmentation, and optimize profitability and efficiency. He has consulted on a number of different projects, helping to improve drill and blast practices and implement an effective blast design in areas where caution is required and special conditions exist.

Furthermore, Brian has worked for multiple operations throughout the U.S. and Canada to improve drill and blast operations. He has worked closely with field personnel on the drilling and blasting processes to ensure effectiveness and efficiency. Brian works with drill and blast crews to better understand operations, demonstrate the benefits of various improvement practices, and train personnel during the optimization process to ensure that the operation has continued success after the project is completed. He provides a unique perspective with his experience of different operations and various geological conditions.

Close-Quarter Blasting. Brian's niche in the industry is close-quarter blasting operations ranging from trench structure to production blasting less than 200 feet of existing structures with several of these being within 5 feet of existing structures. Brian has completed a plethora of projects over the past 29 years across four states. He has successfully business developed, bid, acquired under contract, designed, overseen 100+ projects from beginning to end while maintaining safety and quality control throughout all drill and blast operations. Brian supervised and oversaw all supported areas of responsibility within a 30-person team. He has years of experience optimizing drill and blast design for close quarter blasting along with instrumentation to maintain quality control of the blasting design while protecting surrounding infrastructure.

Brian spent many years as an independent drill and blast contractor planning and coordinating blast patterns, powder factors, scheduling, and logistics, as well as delegating and training employees for responsibilities on the job site. He interacted daily with federal, state, and local authorities in charge of explosive regulation as well as bond holders, project owners, and managers.



Operations, Project, and Contractor Management. Brian has worked with operations personnel and contractors at various levels throughout his career. He has managed construction drill and blast and mine operations crews, excavation crews, and contractors in a supervisory role. Brian has been responsible for effectively communicating and coordinating plans while overseeing and ensuring that safe productions goals were achieved. Brian has managed multiple projects under various circumstances related to safety, environmental, and operational aspects.

Explosive Expert Witness. Brian has worked on and testified in several cases regarding explosives claims. Brian's experience and expertise compliments clients that acquire him for expert testimony.

Blast Data Collection and Interpretation. Brian has years of experience with various drill and blast instrumentation methods, including, but not limited to, drillhole deviation tracking, velocity of detonation monitoring, ground vibration and air blast monitoring, drone face profiling, surveying, and regression analysis. He also uses existing blast records, seismograph data, videos, and other blast data from clients to establish a baseline for optimizing drill and blast design. Years of experience in blast data collection and interpretation allows Brian to effectively interpret data and provide feedback on blast events.

Seismograph Implementation and review. Brian has spent many years installing and reviewing data from seismographs he installed to perform post blast reviews on blasts he designed. He has used the data to see how the design performed real world and improve on future performance. He also designed regression analysis of his projects for of existing and previous projects to use on future projects in close proximity with similar geological conditions.

Safety and Training. Brian has personally trained hundreds of individuals on safety and best practices for drilling operations and blast design, loading, timing, and clearing the blast area. Brian is a certified blasters retraining instructor in Kentucky and speaks at numerous conferences and events across the country. He also has presentations used every year for Missouri S&T explosives program and the University of Kentucky mining program. Brian has conducted training for blasters, drillers, and laborers from the east to the west coast.

PUBLICATIONS & PRESENTATIONS

Lewis, B., 2021. *The Explanation, Application & Importance of Velocity Detonation and Monitors in the Blasting Process*, prepared RESPEC, Lexington, KY, Presented to numerous chapters and training sessions along with PACA.

Lewis, B., 2021. *Nitroglycerin Overexposure*, prepared RESPEC, Lexington, KY, Presented to numerous chapters and training sessions along with Exp 5612 Graduate Course, Missouri S & T, Rolla, MO

Schnell, D., B. Lewis, 2021. *MTI Solo Blastbags Study*, RSI-3109, prepared by RESPEC, Lexington, KY, for MTI Group, Stanton, KY.

Lewis, B., 2020. *Designing Blasts for Close Quarter Construction Projects*, prepared by Bedrock Contracting, Inc., Lexington, KY, for the Kentucky Department for Natural Resources, Frankfort, KY.

Lewis, B. and D. Schnell, 2020. *Blasting in Close Quarters: From Construction to Quarry*, virtual webinar, presented by RESPEC, November 18, 2020, <https://www.respec.com/presentation/blasting-in-close-quarter-environments-from-quarry-to-construction-projects>.

Lewis, B., 2020. *Construction Blasting in Close Quarters*, prepared RESPEC, Lexington, KY, for the Kentucky Blasting Conference, Louisville, KY.

Lewis, B., 2020. *Beirut ammonium Nitrate Explosion*, prepared Brian Lewis, Louisville, KY, for the Exp 5721 Graduate course, Missouri S & T, Rolla, MO.

Lewis, B., 2020. *Close Proximity Trench Blasting, Lecture 14.2*, prepared Brian Lewis, Louisville, KY, for the Exp 5721 Graduate course, Missouri S & T, Rolla, MO.



APPENDIX C.

LICENSES, CERTIFICATIONS AND DEGREES



ROYAL SCHOOL OF MINES
Imperial College of Science and Technology
LONDON

The Governing Body of the Imperial College of Science and Technology
has admitted

JOHN SPENCER LEONARD MORGAN

who has completed an approved course of study at the College in
Mining

with Second Class Honours
(Upper Division)

to be an ASSOCIATE of the
ROYAL SCHOOL OF MINES

Sealed by authority of the Governing Body :



Date of award 4 July 1977

B. J. Morgan Rector

P. E. H. Moe Registrar



STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

To all to whom these presents shall come Greeting
"Know Ye" That The State Board of Registration for Professional Engineers
of the State of West Virginia, reposing special confidence in
the Intelligence, Integrity and Discretion of

Whitney Elaine Faulkner

DOES IN PURSUANCE OF AUTHORITY VESTED IN IT

by law hereby certify that she having submitted
satisfactory evidence of her ability and experience is a

REGISTERED PROFESSIONAL ENGINEER

Registration Number 23735

"To Hold" and use such title in the practice of her profession,
subject to the conditions prescribed by law.



Given under the hand of the
Seal of the Board at the Capitol in the
City of Charleston,
This 20th day of August
in the year of our Lord 2019
and of the State
the One Hundred Fifty-Sixth

Members of the Board

Blair S. Saluja

Earl E. Thomas Jr.

Ly C. Rott

University of Kentucky

Upon recommendation of the University Senate and
approval of the Board of Trustees, the President of the University of Kentucky
confers on

Whitney Elaine Faulkner

the degree of

Bachelor of Science in Civil Engineering
Civil Engineering

this fifth day of May, 2002

Lee I. Todd, Jr.

President of the University

Billy Joe Mills

Chairman, Board of Trustees



Thomas W. Latta

Dean of College

Donald E. Witt

University Registrar



STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

To all to whom these presents shall come Greeting

"Know Ye" That The State Board of Registration for Professional Engineers
of the State of West Virginia, reposing special confidence in
the Intelligence, Integrity and Discretion of

Michael D. Anderson

DOES IN PURSUANCE OF AUTHORITY VESTED IN IT
by law hereby certify that he having submitted
satisfactory evidence of his ability and experience is a

REGISTERED PROFESSIONAL ENGINEER


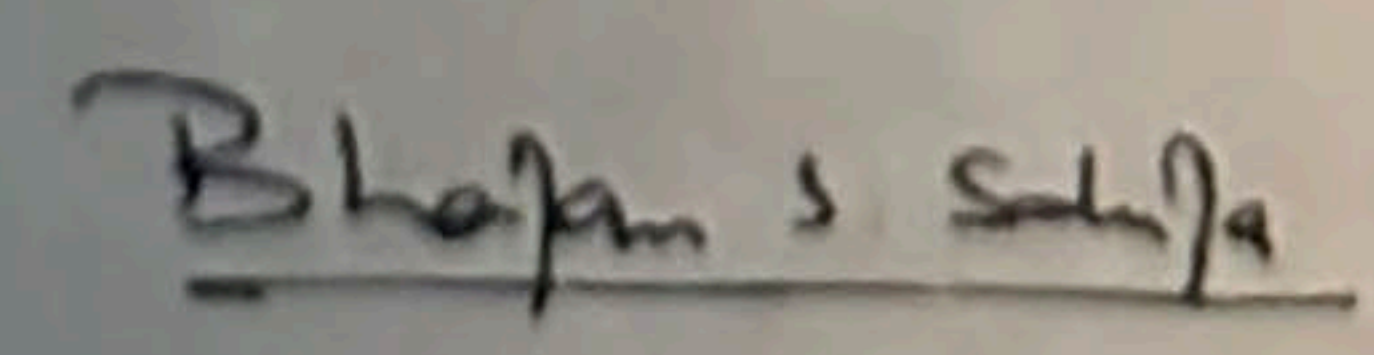
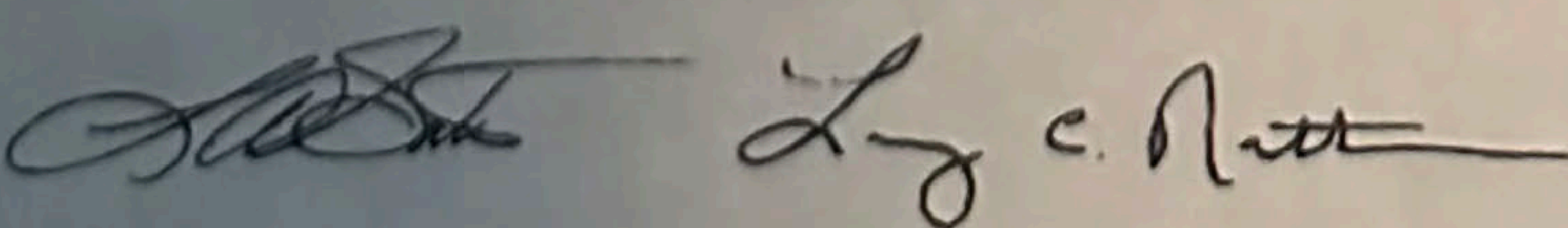
Registration Number 24874

"To Hold" and use such title in the practice of his profession,
subject to the conditions prescribed by law.



Given under the hand of the
Seal of the Board at the Capitol in the
City of Charleston,
This 9th day of August
in the year of our Lord 2021
and of the State
the One Hundred Fifty-Eighth

Members of the Board

State of Alabama



Board of Licensure for Professional Engineers and Land Surveyors

This is to certify that

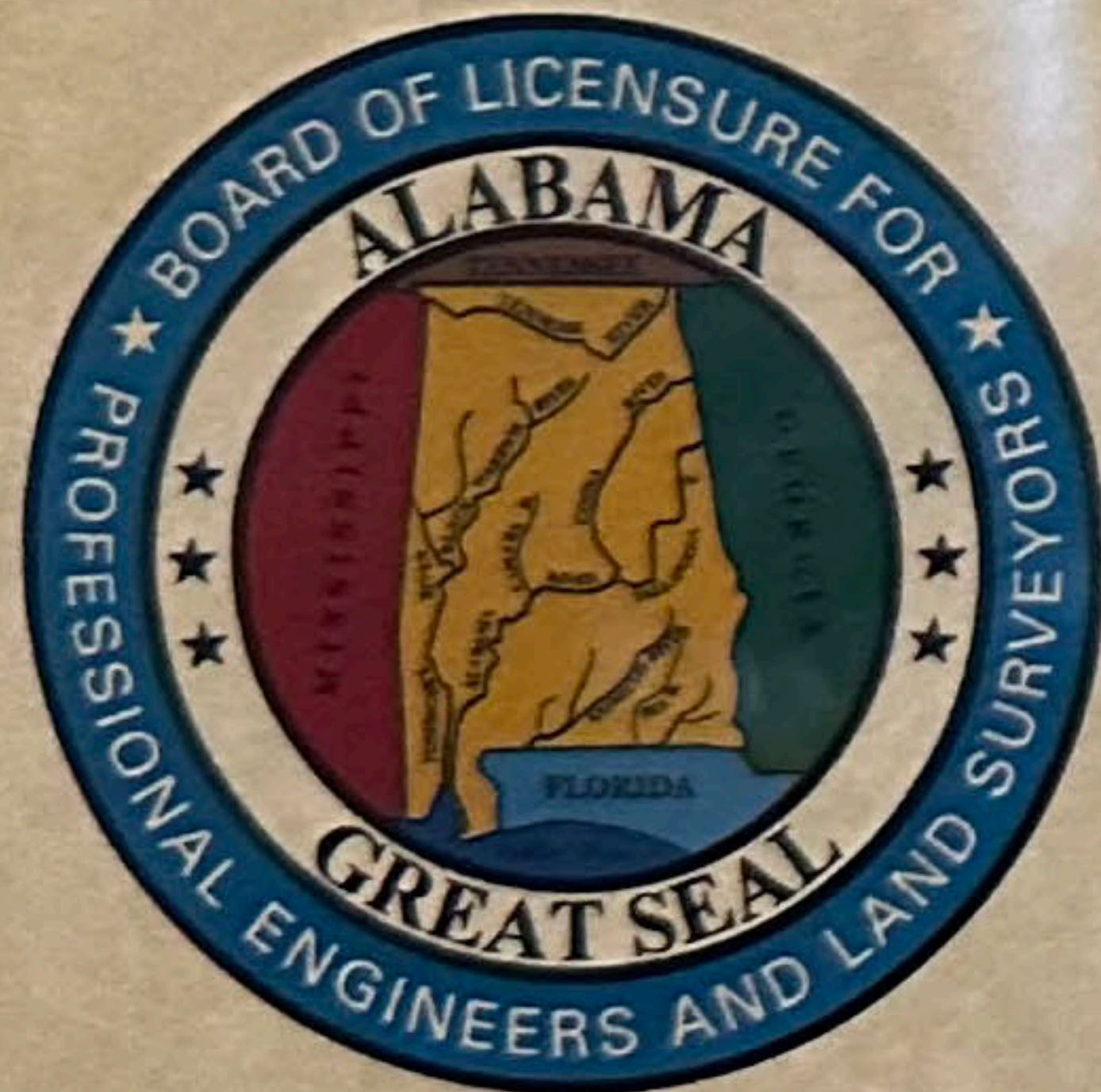
Michael David Anderson

having given satisfactory evidence of the necessary qualifications required by law has been
duly licensed and is hereby authorized to practice in the State of Alabama as a

Professional Engineer

License No. 38917-E

In testimony whereof witness the signature of the Chair and Secretary
under seal of the Board on December 20, 2019

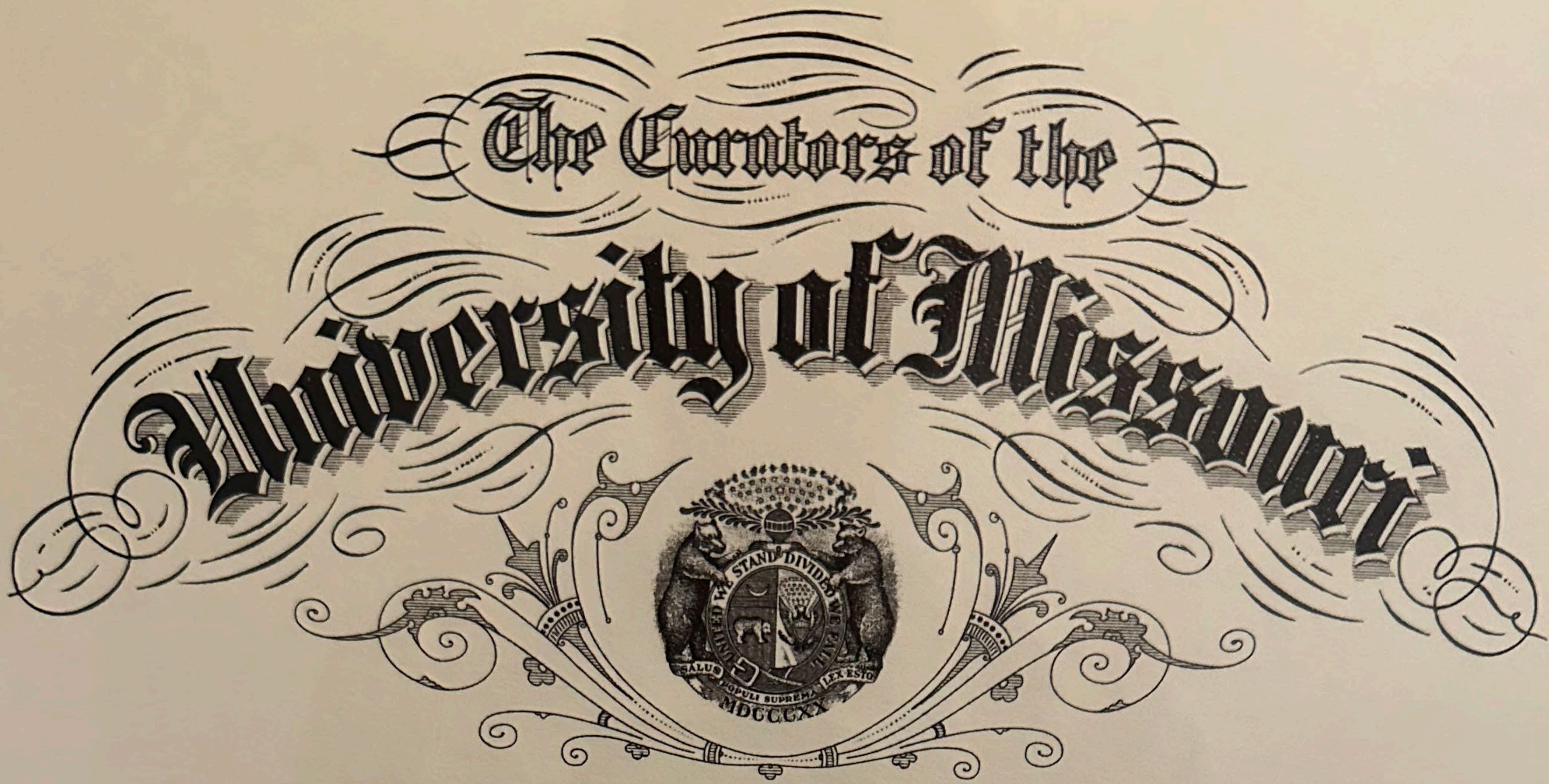


Randall D. Whorton

Randall D. Whorton, Chair

Joseph F. Breighner, Jr.

Joseph F. Breighner, Jr., Secretary



To all whom it may concern
Greeting:

Be it known that the Curators, having been advised by the Faculty that
Michael David Anderson
has completed the Course of Study required of candidates for the degree of
Bachelor of Science in Mining Engineering

and is qualified to receive the same, do confer said degree
with all honors and privileges appertaining thereto.
In testimony whereof the signatures of the proper officials and the
seal of the University are affixed.

Done at
Missouri University of Science and Technology
in the City of Rolla, State of Missouri,
this eighteenth day of December in the year two thousand and ten.

Judith S. Haggard
Chair of the Board of Curators
Seymour C. J. J. J.
President of the University



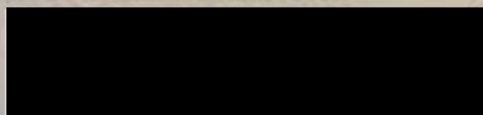
John F. Carnegie
Chancellor
Walter K. Wray
Provost

I **UNITED STATES OF AMERICA** XI
DEPARTMENT OF TRANSPORTATION • FEDERAL AVIATION ADMINISTRATION

IV NAME

JAMES MICHAEL BROWN

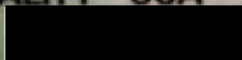
V ADDRESS



U

VI NATIONALITY USA

IVa D.O.B.



SEX HEIGHT WEIGHT HAIR EYES
M 66 175 BROWN GREEN

IX HAS BEEN FOUND TO BE PROPERLY QUALIFIED TO EXERCISE THE PRIVILEGES OF

A

II **REMOTE PILOT**

III CERTIFICATE NUMBER

4210453

X DATE OF ISSUE

20 DEC 2018

XIV

OK Elmer

VII

ACTING ADMINISTRATOR



S



Cincinnati State Technical and Community College
10100 Reading Road
Cincinnati, Ohio 45241

acknowledges that

James Brown

has successfully completed the model training curriculum as prescribed by

**OSHA 40 Hr. HAZMAT (HAZWOPER)
OSHA 29 CFR 1910.120(q) & NFPA 472
USEPA 40 CFR Part 311 & DHS/FEMA NIMS**

October 16-20, 2017

17/FA THZ-105-FAA

A handwritten signature in black ink, consisting of a large, stylized 'B' and 'S' intertwined.

Instructor or Program Manager

Northern Kentucky University

On the recommendation of the faculty and
with approval of the Regents

James Michael Brown

is awarded the degree of

Bachelor of Science

Environmental Science

with all the rights, privileges and honors
as authorized by signatures and the seal of the University.

Given this thirteenth day of December, Two thousand and fourteen.

Magna Cum Laude

Edwin Rogers

Chair, Board of Regents



J. Means

President

Search: Details

Name:	MICHAEL A. RICCI
WV Professional Engineer:	PE License Number: 010303
	PE License Status: Active
	PE Issue Date: 09/15/1987
	PE Expiration Date: 12/31/2022
Continuing Education Claim:	Qualifying Hours from Last Renewal or Reinstatement: 77.00
	Carryover Hours for Next Renewal: 15.00
	Last Renewal or Reinstatement Date*: 12/2/2020
WV Engineer Intern:	EI Certification Number:
	EI Issue Date:
Primary Address of Record:	4140 BRIDGEMONT LANE LEXINGTON, KY 40515
Primary Employer of Record:	RESPEC PO BOX 888 LEXINGTON, KY 40588
	<div> <div>*</div> <div>This date reflects the most recent license renewal (or reinstatement) date for this licensee. Continuing education hours earned prior to this date may not be used for future renewals.</div> </div>

This data was retrieved on 6/21/2022.

University of Kentucky

Upon recommendation of the University Senate and
approval of the Board of Trustees, the President of the University of Kentucky
confers on

Michael Anthony Ricci

the degree of

Bachelor of Science in Mining Engineering

this ninth day of May, 1981

O. A. Singetony
President of the University

John B. Tugue
Chairman, Board of Trustees



R. J. Lusk
Dean of the College

Elbert W. Ockerman
Dean of Admissions and Registrar

***State of South Dakota
Board of Technical Professions***

By virtue of authority vested by law, and after due consideration, does hereby certify that

Crystal Marie Hocking

has been issued this certificate as

Professional Engineer

Registration Number: 13165

Expiration: 12/31/2020



A stylized signature in blue ink.

Michael Albertson, Chairman

A stylized signature in black ink.

Steven O. Thingelstad, Secretary

A stylized signature in black ink.

Kathryn Patterson, Executive Director



South Dakota Board of Technical Professions

Licensee Roster

Search By: Name * PE Disc.

Profession City

Status State

* You can enter any part of a name to search or if searching for a full name enter as Last Name, First Name

Profession	Name	Address	City	State	Zip	Phone	Registration Number	PE Disc.	Expiration Date	Status
PE	Crystal Marie Hocking	219 42nd St	Rapid City	SD	57702	6053946451	13165	MN	12/31/2022	Active



State of Louisiana
BOARD OF PROFESSIONAL GEOSCIENTISTS

Crystal M. Hocking

LICENSE NO. 184

EXPIRING ON OCTOBER 14, 2022

WRS, Chairman of the Board

Please note that your license certificate is not valid proof of licensure unless the license registration card accompanying it is current.

Please contact our office at apply@lbopg.org or by calling 225-505-3766 if you have any questions or if we may be of further assistance to you.

With best regards,
Brenda Macon, Executive Secretary

LOUISIANA BOARD OF PROFESSIONAL GEOSCIENTISTS
9643 Brookline Ave., Ste. 101,
Baton Rouge, LA 70809
225-505-3766

<https://www.lbopg.org>

STATE OF TEXAS

BOARD OF PROFESSIONAL GEOSCIENTISTS

CRYSTAL MARIE HOCKING
Geology

License Number
12482

In accordance with the provisions of the Texas Geoscience Practice Act, the Texas Board of Professional Geoscientists hereby certifies that the above named individual was licensed as a Professional Geoscientist on August 2, 2016.



C. V. Hallmark

Chairman, Texas Board of Professional Geoscientists



Texas map courtesy of the Bureau of Economic Geology, The University of Texas at Austin

South Dakota School of Mines and Technology

The South Dakota Regents of Education on nomination of
the Faculty of the School of Mines and Technology
have conferred upon

Crystal Marie Hocking

the Degree of

Master of Science in Geology and Geological Engineering

With all the Rights, Privileges and Honors as well as the Obligations and
Responsibilities thereto appertaining.



Conferred at Rapid City in the State of South Dakota this
eleventh day of May, 2007.

Harvey C. Jewett
President of the Regents of Education

Charles Paul
President of the School
of Mines and Technology



WEST VIRGINIA Board of Professional Surveyors

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[West Virginia Board of Professional Surveyors](#) > Surveyor Search Results

SURVEYOR SEARCH RESULTS

Charles Benjamin Kurzyna
License Number: 1534
Current Status: Active
Shrewsbury, WV 25015

[Contact Us](#) | [Site Map](#)

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West Virginia State Board of Registration for Professional Engineers

Search: Details

Name:	CHARLES B. KURZYNA
WV Professional Engineer:	PE License Number: 010634
	PE License Status: Active
	PE Issue Date: 02/21/1989
	PE Expiration Date: 12/31/2024
Continuing Education Claim:	Qualifying Hours from Last Renewal or Reinstatement: 46.00
	Carryover Hours for Next Renewal: 15.00
	Last Renewal or Reinstatement Date*: 12/15/2022
WV Engineer Intern:	EI Certification Number: 5439
	EI Issue Date: 08/05/1987
Primary Address of Record:	501 EAGLE MOUNTAIN ROAD CHARLESTON, WV 25311
Primary Employer of Record:	NEW RIVER ENGINEERS, INC. 501 EAGLE MOUNTAIN ROAD CHARLESTON, WV 25311
	<div><div>*</div><div>This date reflects the most recent license renewal (or reinstatement) date for this licensee. Continuing education hours earned prior to this date may not be used for future renewals.</div></div>

This data was retrieved on 8/22/2023.

West Virginia State Board of Registration for Professional Engineers
300 Capitol Street - Suite 910, Charleston, West Virginia 25301
(304) 558-3554 | info@wvpebd.gov

A Century of Service!

1921 - 2021



U

A

S

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

NAME

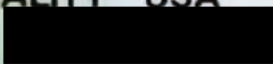
REINHOLD DAYKIN SCHNELI

ADDRESS



VI NATIONALITY USA

IVa D.O.B.



SEX	HEIGHT	WEIGHT	HAIR	EYES
M	72	215	BROWN	BROWN

IX HAS BEEN FOUND TO BE PROPERLY QUALIFIED TO EXERCISE THE PRIVILEGES OF

II REMOTE PILOT

III CERTIFICATE NUMBER

4220560

X DATE OF ISSUE

31 JAN 2019

XIV

OK Elmer

VIII

ACTING ADMINISTRATOR



The Chancellor of

Missouri University
of Science and Technology



having been advised by the Faculty that
Reinhold Daykin J. Schnell

has completed the course of study required of candidates
for the graduate certificate in

Explosives Engineering

In witness whereof this graduate certificate is awarded this day
at Missouri University of Science and Technology

May 13, 2017

Cheryl B. Schrader
Chancellor

David J. Hall
Provost

Your **ACTIVE PE** renewal fee has been received...

Your ACTIVE PE renewal fee has been received. Your pocket card indicating you are entitled to practice engineering in West Virginia until the noted expiration date may be detached and used unless invalidated as a result of Board audit of your renewal form or formal disciplinary action.

IMPORTANT REMINDERS:

1. Please include your WV ACTIVE PE license number on any correspondence to this office.
2. To use this license as a pocket card, please cut along the dotted line and laminate if desired.
3. You are required to immediately notify the Board, in writing, of the following: loss or theft of license or seal, any name change, any address change, or any employment change.

West Virginia State Board of Registration for Professional Engineers

300 Capitol Street, Suite 910
Charleston, West Virginia 25301
304-558-3554 Phone
800-324-6170 Toll Free
www.wvpebd.org

THIS IS ONE FORM OF YOUR RENEWAL RECEIPT

PLEASE SAVE THIS FOR YOUR RECORDS

Date of Renewal: December 3, 2020
Amount Paid: \$70.00



West Virginia State Board of Registration
for Professional Engineers

ALAN A. CAMPOLI
WV PE #012948

This is to certify that the above named PROFESSIONAL ENGINEER has met the requirements of the law, is duly registered and is entitled to practice engineering in the State of West Virginia.

EXPIRES December 31, 2022

ALAN A. CAMPOLI
146 EAST THIRD STREET
PO BOX 888
LEXINGTON, KY 40508

Virginia Polytechnic Institute
and
State University

*The Board of Visitors of the Virginia Polytechnic Institute
and State University has conferred upon*

Alan A. Campoli

upon the recommendation of the Faculty, the degree of

Doctor of Philosophy

Major - Mining and Minerals Engineering

with all the rights, privileges and honors pertaining thereto.

*In testimony whereof, the undersigned, by authority
vested in them, have hereunto affixed their signatures
and the seal of the University at Blacksburg, Virginia
this fourteenth day of May, nineteen hundred and ninety-four.*

CC Garrison

Rector

Edmund H Henneke

Dean



Paul E. Kasper

President

St. Louis

Dean



COLORADO



Department of
Regulatory Agencies

Division of Professions and Occupations

Below are your electronic wallet cards to use as proof of your license. You can also print your license at any time by visiting www.colorado.gov/dora/DPO_Print_License and following the instructions listed.

If you would like a more durable wallet card option, you can order one for a fee by visiting www.nasbastore.org and selecting the "Colorado License Cards" link on the left hand side of the page. If you prefer, you can also contact NASBA by phone at 1-888-925-5237 or by email at nasbastore@nasba.org.

Should you have questions about your credential, or need other information please contact our Customer Service Team at 303-894-7800 or dora_dpo_licensing@state.co.us.

Colorado Department of Regulatory Agencies Division of Professions and Occupations		Colorado Department of Regulatory Agencies Division of Professions and Occupations	
State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors		State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors	
Erik A Hemstad Professional Engineer		Erik A Hemstad Professional Engineer	
PE.0056872 Number	11/01/2021 Issue Date	PE.0056872 Number	11/01/2021 Issue Date
Active Credential Status	10/31/2023 Expire Date	Active Credential Status	10/31/2023 Expire Date
Verify this credential at: dpo.colorado.gov		Verify this credential at: dpo.colorado.gov	
 Division Director: Ronne Hines		 Division Director: Ronne Hines	
Credential Holder Signature		Credential Holder Signature	



Michigan Technological University

HOUGHTON



MICHIGAN

*The Board of Control, upon the recommendation of the Faculty of the
University, has conferred upon*

Erik Arthur Hemstad

the degree of

**Master of Engineering
Civil Engineering**

*with all the rights and privileges pertaining to that Degree, given
this 30th day of April, 2011.*

Martha L. Richardson
Chair of the Board of Control

Alan D. Miller
President of the University



COMMONWEALTH OF KENTUCKY

Be it known that

Michael Jon Raffaldi

*having qualified, as required by act of the General Assembly, is duly licensed
and is hereby authorized to practice in the Commonwealth of Kentucky as a*

PROFESSIONAL ENGINEER

*In Testimony Whereof we have affixed our hand
and seal this 3rd day of July, 2018*

A handwritten signature in dark ink, appearing to read "William A. Bowie, Jr.", written over a horizontal line.

Chair

William A. Bowie, Jr.

Secretary

License No. 33875

Issued by the

Kentucky State Board of Licensure for Professional Engineers and Land Surveyors





Kentucky Board of Engineers & Land Surveyors

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LICENSED](#)

[CONSUMER
INFORMATION](#)

[ALREADY
LICENSED?](#)

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[CALENDAR OF
EVENTS](#)

Name: Michael Raffaldi

Professional Engineer: Number: 33875

Status: Current

Issue Date: 07/03/2018

Expiration Date: 06/30/2024

Professional Land Surveyor:

Address of Record: 256 Shady Lane
Lexington, KY 40503

Responsible Charge For:

Disciplinary Action?:

University of Kentucky

Upon recommendation of the University Senate and
approval of the Board of Trustees, the President of the University of Kentucky
confers on

Michael Jon Raffaldi

the degree of

Master of Science in Mining Engineering

Mining Engineering

this sixth day of August, 2015

Eli Zsiglouto
President of the University

Oliver Keith Gannon
Chair, Board of Trustees

Susan Carvalho
Interim Dean of College

Donald E. Witt
University Registrar



License #: AELC14064
Effective: 12/13/2021
Expires: 12/31/2023

State of Alaska

Department of Commerce, Community, and Economic Development
Division of Corporations, Business, and Professional Licensing

State Board of Registration for Architects, Engineers, and Land Surveyors

Licensee: **CODY JAMES KREITEL**

License Type: **Registered Professional Civil Engineer**

Status: **Active**

Commissioner: Julie Anderson

Relationships

No relationships found.

Designations

No designations found.

CODY JAMES KREITEL
824 W 74TH AVENUE
UNIT B
ANCHORAGE, AK 99518

Wallet Card

State of Alaska Department of Commerce, Community, and Economic Development Division of Corporations, Business, and Professional Licensing State Board of Registration for Architects, Engineers, and Land Surveyors CODY JAMES KREITEL As Registered Professional Civil Engineer		
License AELC14064	Effective 12/13/2021	Expires 12/31/2023

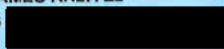
I UNITED STATES OF AMERICA XI

DEPARTMENT OF TRANSPORTATION • FEDERAL AVIATION ADMINISTRATION

IV NAME

CODY JAMES KREITEL

V ADDRESS



U

VI NATIONALITY USA

SEX HEIGHT WEIGHT HAIR

EYES

IVa D.O.B.

M

72

220

BLOND

BLUE

IX HAS BEEN FOUND PROPERLY QUALIFIED TO EXERCISE THE PRIVILEGES OF

A

II REMOTE PILOT

III CERTIFICATE NUMBER

4442045

X DATE OF ISSUE

19 OCT 2020



S

XIV

Steve Dyer

VIII

ADMINISTRATOR

University of Alaska Anchorage

*The Board of Regents of the University of Alaska
upon recommendation of the University Faculty and by virtue
of the Authority vested in Them by Law have conferred upon*

Cody J. Kreitel

the degree of

**Master of Science
Arctic Engineering**

with all Rights, Privileges and Honors pertaining thereto

Given at the University of Alaska Anchorage, this month of May, A.D. 2013



Patricia A. Jackson
Chair of the Board of Regents

Tom Case
Chancellor

TK Goble
President of the University



COMMONWEALTH OF KENTUCKY

Be it known that

Bradley Stephen Petri

*having qualified, as required by act of the General Assembly, is duly licensed
and is hereby authorized to practice in the Commonwealth of Kentucky as a*

PROFESSIONAL ENGINEER

*In Testimony Whereof we have affixed our hand
and seal this 18th day of December 2012*

Paul A. Jones _____ Chair

James David Siler _____ Secretary

License No. **29123**
Issued by the

Kentucky State Board of Licensure for Professional Engineers and Land Surveyors



UNOFFICIAL

Name: Petri, Bradley
 Student SSN: *****
 Student Number: 10776719
 Print Date: 08/28/2014 Page Number: 1 of 1

Issued to:

2012 Spring Semester					
CRS_NUM	COURSE_TITLE	GRADE	HOURS	QPTS	
MNG 699	TOPIC IN MINING ENGR:	A	3.0	12.00	
	TUNNELING FOR MNG				
MNG 531	ADV BLAST DES AND TECH	B	3.0	9.00	
	AHRS EHRS QHRS				
Semester	6.0 6.0 6.0		21.00	3.500	
Cumulative	13.0 13.0 13.0		42.00	3.231	
Status	Good Standing				

2012 Fall Semester					
CRS_NUM	COURSE_TITLE	GRADE	HOURS	QPTS	
CE 643	MECHANICS OF SEDIMENT	B	3.0	9.00	
	TRANSPORT				
	AHRS EHRS QHRS				
Semester	3.0 3.0 3.0		9.00	3.000	
Cumulative	16.0 16.0 16.0		51.00	3.188	
Status	Good Standing				

Requested by: Bradley Petri
 Graduate Academic Record

Transfer Credit Applied to 2013 Spring Semester
 Missouri University of Science and T 09/2011 - 05/2013
 TRANSGRA TOTAL HOURS TRANSFERRED 9.00 TRANSWRK
 Total 9.00

SCHOOLS ATTENDED

Higher Education Institutions:
 Missouri University of Science and T 09/2011 - 05/2013
 Univ Of Kansas 01/2007 - 05/2008
 Degree: Master of Science 05/2008
 Univ Of Mississippi 08/2002 - 12/2006
 Degree: Bachelor of Science in Civil Engineering
 12/2006

Test Scores:

DEGREES AWARDED

Master of Science in Mining Engineering 05/10/2014
 Graduate School
 Major: Mining Engineering
 Cum GPA: 3.238
 Comprehensive Design of Underground
 Limestone Mine Development

2013 Spring Semester					
CRS_NUM	COURSE_TITLE	GRADE	HOURS	QPTS	
MNG 780	SPEC PROBS MINING ENGR	A	2.0	8.00	
MNG 699	TOPS MNG ENG:GEOTECH	B	3.0	9.00	
	ANALYSIS				
	AHRS EHRS QHRS				
Semester	5.0 5.0 5.0		17.00	3.400	
Cumulative	21.0 30.0 21.0		68.00	3.238	
Status	Good Standing				

2014 Spring Semester
 Degree Requirements Completed for Master of Science in
 Mining Engineering.

2014 Fall Semester					
CRS_NUM	COURSE_TITLE	GRADE	HOURS	QPTS	
CE 508	DESIGN & OPTIMIZATION OF	---	3.0	0.00	
	CONSTRUCTION				
	AHRS EHRS QHRS				
Semester	3.0 0.0 0.0		0.00	0.000	
Cumulative	24.0 30.0 21.0		68.00	3.238	

Final Examination - Master's - 04/22/14
 *** End of Graduate Academic Record ***

2010 Fall Semester

Program:
 Graduate School
 Master of Science in Mining Engineering
 Major: Mining Engineering
 Cum GPA: 3.238
 Comprehensive Design of Underground
 Limestone Mine Development

CRS_NUM	COURSE_TITLE	GRADE	HOURS	QPTS	
MNG 551	ROCK MECHANICS	B	4.0	12.00	
MNG 331	EXPLOSIVES AND BLASTING	A	2.0 *	8.00	
	AHRS EHRS QHRS				
Semester	4.0 4.0 4.0		12.00	3.000	
Cumulative	4.0 4.0 4.0		12.00	3.000	
Status	Good Standing				
Status	Good Standing				

2011 Spring Semester

CRS_NUM	COURSE_TITLE	GRADE	HOURS	QPTS	
MNG 463	SURFACE MINE DESIGN &	A	3.0 *	12.00	
	ENVIRONMENTAL ISS				
MNG 264	MINING METHODS	A	3.0 *	12.00	
	AHRS EHRS QHRS				
Semester	0.0 0.0 0.0		0.00	0.000	
Cumulative	4.0 4.0 4.0		12.00	3.000	
Status	Good Standing				

2011 Fall Semester

CRS_NUM	COURSE_TITLE	GRADE	HOURS	QPTS	
MNG 341	MINE VENTILATION	C	3.0 *	6.00	
CE 671	ADVANCED SOIL MECHANICS	B	3.0	9.00	
	AHRS EHRS QHRS				
Semester	3.0 3.0 3.0		9.00	3.000	
Cumulative	7.0 7.0 7.0		21.00	3.000	
Status	Good Standing				

UNOFFICIAL

WEST VIRGINIA UNIVERSITY



BENJAMIN M. STATLER COLLEGE OF ENGINEERING AND MINERAL RESOURCES

*Know all persons by these presents
that the West Virginia University Board of Governors
upon the recommendation of the faculty
has conferred upon*

NEEL GUPTA

The Degree of

DOCTOR OF PHILOSOPHY

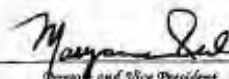
Mining Engineering

*With all the rights, honors, and privileges thereunto
appertaining. Witness the seal of the university and
the signatures of its duly authorized officers hereunto
affixed this twenty-first day of December,
two thousand nineteen.*


President of the University


Chair, West Virginia University
Board of Governors


Dean of the College


Provost and Vice President
for Academic Affairs



West Virginia State Board of Registration
for Professional Engineers

304-558-3554 Phone
304-558-6232 Fax
800-324-6170 Toll Free

www.wvpebd.org

June 15, 2022

SUSAN BRENNAN PATTON
281 33 ROAD
PALISADE, CO 81526

Dear Ms. Patton:

Congratulations! Your application for registration as a Professional Engineer by the West Virginia State Board of Registration for Professional Engineers was reviewed on June 15, 2022. This letter is your authorization to obtain a seal. The use of the seal is governed by Chapter 30, Article 13, Section 16 of the Registration Law and Section 7 of the Rules and Regulations. Your individual seal must conform in design with that prescribed by the Board, shown in the imprint below. It shall bear your original **Registration Number 25416** where the numerals are shown. Upon receipt and approval of the copy of your seal and a final \$25 registration certificate fee, your registration will be made active through December 31, 2022. Your official date of registration will be recorded as the date your seal and final registration fee are received by the Board.


Biennial renewal notices will be sent in November of even numbered years. After receipt of your first renewal, you will be required to list thirty (30) Professional Development Hours (PDHs) before your renewal fee can be processed in the future. Section 7-1-10 of the Board Rules provides additional information on continuing education and the exemption for new licensees renewing for the first time.

As a PE in our state, you need to be aware that firms offering or attempting to offer engineering services in West Virginia must hold a Certificate of Authorization (COA) issued by this office. This authorization is completely separate from the business license obtained from the WV Secretary of State. Only one (1) COA is required for some related firms. Current Board rule states that those who meet the requirements of sole-proprietorship must still obtain a COA but at no cost. All firms and sole-proprietors should consult the website at www.wvpebd.org to determine if their firm has an existing COA, and if necessary, to download the COA application materials and fee structure. If your company is unsure of whether they have a COA or if they are required to obtain a COA, simply call the Board office. You are not legally permitted to practice in our state until the COA has been issued (W.Va. Code §30-13-17(a)).

You are not licensed to practice or offer engineering in the State of West Virginia until we have a copy of your seal on file in our office and the final \$25 registration certificate fee has been received. In order to complete the registration process, please remit a check in the amount of \$25 and return it promptly with a copy of this letter showing your seal in the area indicated below. If appropriate, your company's COA application and appropriate fees should also be included.

Your official WV PE wall certificate and registration card will be mailed to you following our receipt of the copy of your seal and payment of required fees.

Sincerely,


Lesley L. Rosier-Tabor, P.E.
Executive Director



OFFICIAL SEAL SAMPLE



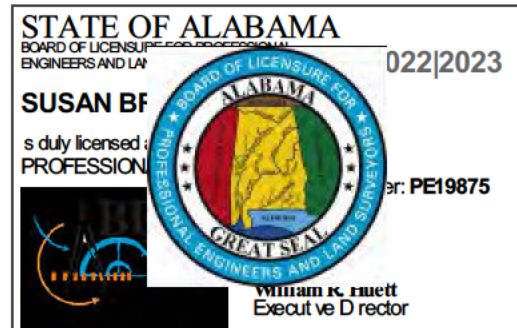
PLEASE AFFIX SEAL HERE

State of Alabama
Board of Licensure for Professional Engineer and Land Surveyors

License Type: Professional Engineer

License Status: Active

SUSAN BRENNAN PATTON
281 33 RD
PALISADE CO 81526



Your license information is printed below. If you have any questions, or if we can be of assistance, please contact the Board office.

Date License Active Until: 12/31/2023

Business Affiliation: RESPEC

PDH Carry Forward Hours: 3

License Status

Active - A person who is current and licensed to practice.

Inactive - A person who is not engaged in the engineering or land surveying practice which requires licensure in Alabama.

Board Contact Information

334-242-5568
866-461-7640 toll free

Mailing Address

PO Box 304451
Montgomery, AL 36130-4451

The University of Alabama

has conferred upon
Susan Brennan Patton
the degree of
Doctor of Philosophy

with all the rights and privileges thereunto appertaining.

In Witness Whereof, this diploma duly signed has
been issued and the seal of the University affixed.

Issued by the Board of Trustees upon recommendation
of the faculty at the University on this the
fifteenth day of May, 1993.



E. Roger Sayers
President

Ronald Rogers
Dean



VERIFY LICENSE

Individual Search: ☒ Firm Search: ☐

Last Name:

First Name:

License Number:

State Or Province:

City:

Zip Code:

Type:

Discipline:

For a more detailed view of a licensee, click the View Details button on the row for which you want detailed information. To clear the search and enter new search, click on the Reset button above.

[Export To Excel](#)

Show: 10 entries

Last Name	First Name	License#	City	State	Country	Action
Drake	Brett	PE 17325	Cheyenne	WY	United States	View Details
<div><div><div>Last Name : Drake</div><div>StreetLine 1 : 623 Phoenix Drive</div><div>City : Cheyenne</div><div>Zip : 82001</div><div>License Date : 06/05/2019</div><div>Business :</div><div>Registration Number : PE 17325</div><div>Expiration Date : 12/31/2022</div></div><div><div>First Name : Brett</div><div>StreetLine 2 :</div><div>State : WY</div><div>Branch : CE/CNE</div><div>Status : Active</div><div>Type : Professional Engineers</div></div></div> <div>← Close detail</div>						

University of Wyoming

The Trustees of the University by virtue of the authority vested
in them and on the recommendation of the faculty of the

College of Engineering and Applied Science

Have conferred the degree of

Bachelor of Science in Architectural Engineering

on

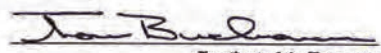
Brett Michael Drake

with all the Rights, Privileges, and Honors pertaining thereto,
given at Laramie, Wyoming, on the 9th day of December, in the year
Two thousand eleven




President of the Trustees


Secretary of the Trustees


President of the University


College Dean



WEST VIRGINIA UNIVERSITY

BENJAMIN M. STATLER COLLEGE OF ENGINEERING AND MINERAL RESOURCES


*Know all persons by these presents
that the West Virginia University Board of Governors
upon the recommendation of the faculty
has conferred upon*

DEBASHIS DAS

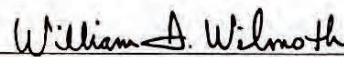
The Degree of

MASTER OF SCIENCE IN MINING ENGINEERING

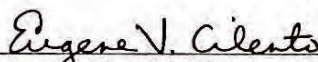
*With all the rights, honors, and privileges thereunto
appertaining. Witness the seal of the university and
the signatures of its duly authorized officers hereunto
affixed this fifteenth day of December,
two thousand eighteen.*



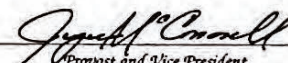
President of the University



Chair, West Virginia University
Board of Governors



Dean of the College



Provost and Vice President
for Academic Affairs



Department of Commerce, Community, and Economic Development
**CORPORATIONS, BUSINESS &
PROFESSIONAL LICENSING**

[INFORMATION](#)[SEARCH LICENSE DATA](#)[DATA DOWNLOADS](#)[MY LICENSE](#)

[State of Alaska](#) / [Commerce](#) / [Corporations, Business, and Professional Licensing](#) / [Search & Database Download](#) / [Professional Licenses](#) / [License Details](#)

LICENSE DETAILS

License #: AELC8058

Program: Architects, Engineers and Land Surveyors

Type: Registered Professional Civil Engineer

Status: Active

Issue Date: 07/09/1990

Effective Date: 12/20/2021

Expiration Date: 12/31/2023

Mailing Address: FAIRBANKS, AK, UNITED STATES

Owners

Owner Name	Entity Number
KEITH L. HANNEMAN	



Department of Commerce, Community, and Economic Development

CORPORATIONS, BUSINESS & PROFESSIONAL LICENSING

[INFORMATION](#)

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[DATA DOWNLOADS](#)

[MY LICENSE](#)

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LICENSE DETAILS

License #: AELV13908

Program: Architects, Engineers and Land Surveyors

Type: Registered Professional Environmental Engineer

Status: Active

Issue Date: 08/16/2013

Effective Date: 12/20/2021

Expiration Date: 12/31/2023

Mailing Address: FAIRBANKS, AK, UNITED STATES

Owners

Owner Name	Entity Number
KEITH LEROY HANNEMAN	

License #: AELC11523
Effective: 12/31/2021
Expires: 12/31/2023

State of Alaska

Department of Commerce, Community, and Economic Development
Division of Corporations, Business, and Professional Licensing

State Board of Registration for Architects, Engineers, and Land Surveyors

Licensee: **KAREN ANN BRADY**

License Type: **Registered Professional Civil Engineer**

Status: **Active**

Commissioner: Julie Anderson

Relationships

No relationships found.

Designations

No designations found.

License #: AELV13911
Effective: 12/31/2021
Expires: 12/31/2023

State of Alaska

Department of Commerce, Community, and Economic Development
Division of Corporations, Business, and Professional Licensing

State Board of Registration for Architects, Engineers, and Land Surveyors

Licensee: **KAREN ANN BRADY**

License Type: **Registered Professional Environmental Engineer**

Status: **Active**

Commissioner: Julie Anderson

Relationships

No relationships found.

Designations

No designations found.

South Dakota School of Mines and Technology

The South Dakota Regents of Education on nomination of
the Faculty of the School of Mines and Technology
have conferred upon

Karen Ann Balo

the Degree of

Bachelor of Science in Civil Engineering

With all the Rights, Privileges and Honors as well as the Obligations and
Responsibilities thereto appertaining.



Conferred at Rapid City in the State of South Dakota this
fifteenth day of December, 2001.

Harvey C. Jewett
President of the Regents of Education

Richard J. Lomen
President of the School
of Mines and Technology

***State of South Dakota
Board of Technical Professions***

By virtue of authority vested by law, and after due consideration, does hereby certify that

Dion Charles Lowe

has been issued this certificate as

Professional Engineer

Registration Number: 8743

Expiration: 03/31/2024



A handwritten signature in blue ink, appearing to be "Colby Flynn".

Colby Flynn, Chairman

A handwritten signature in blue ink, appearing to be "Ryan P. Callaghan".

Ryan P. Callaghan, Secretary

A handwritten signature in blue ink, appearing to be "Kathryn Patterson".

Kathryn Patterson, Executive Director

Certificate of Training

This certifies that

Todd Ball

has successfully completed

Aquatic Insect Collection Protocols Workshop for Stream Mitigation and Restoration

This workshop is intended to instruct participants on how to collect benthic macroinvertebrate (aquatic insect) samples as part of the 401 Certification process and monitoring stream mitigation for these projects in North Carolina. Successful completion of this workshop indicates that students have a basic understanding of ecological principles, collection methods and regulatory requirements as they can apply to the 401 Certification process. This training was based in part on the Technical Guidance: Benthic Macroinvertebrate Monitoring Protocols for Compensatory Stream Restoration Projects.

David Penner
Instructor

This the 18th day of June 2001

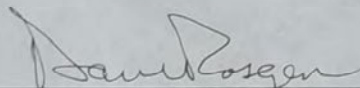
WILDLAND HYDROLOGY, INC.
Research and Educational Center for River Studies

Awards this Training Certificate to

M. Todd Ball

For completion of
Natural Channel Design & River Restoration

10/01/2002
Pagosa Springs, CO



David L. Rosgen, P.H., Instructor

WILDLAND HYDROLOGY, INC.
Research and Educational Center for River Studies

Awards this Training Certificate to

Todd Ball

For completion of
River Restoration Design Implementation
August 1st – 5th, 2005
Colorado

Daniel R. Casper

The Trustees of
East Carolina University

in recognition of
the successful completion of the required courses
of study, and upon the recommendation of the Faculty
hereby confer upon
Michael Todd Ball
the degree of
Bachelor of Science

with all the rights, honors, privileges and responsibilities
thereunto appertaining.

Given under our hands and seal at Greenville, North Carolina

this seventh day of May, nineteen hundred and eighty-eight.

Philip S. Carson
Chairman of the Board of Governors

J. A. Seibert
Chairman of the Board of Trustees



C. D. Spangler Jr.
President of the University of North Carolina

Richard R. Eakin
Chancellor of East Carolina University

STATE OF COLORADO



The Colorado State Board of Licensure
for
Professional Engineers and Professional Land Surveyors

This is to certify that

John Patrick McGinn

*having given satisfactory evidence of the necessary qualifications as
required by provisions of Title 12, Article 26, has been duly licensed
and is hereby authorized to practice as a*

Professional Engineer

in the State of Colorado.

*In testimony whereof witness the signature of
the Chair and Secretary under seal of the Board
this 18th day of June 1982.*

Handwritten signature of Board Chair

Board Chair

Handwritten signature of Board Secretary

Board Secretary



Colorado Department of Regulatory Agencies
Division of Professions and Occupations

No. 19584

State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors

John Patrick McGinn
Professional Engineer

PE 0019534

Number

Active

Credential Status

Verify this credential at: dpo.colorado.gov

11/01/2021

Issue Date

10/11/2023

Expire Date

Handwritten signature

**Colorado Department of Regulatory Agencies
Division of Professions and Occupations**

State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors

John Patrick McGinn

Professional Engineer

PE.0019534

Number

Active

Credential Status

11/01/2021

Issue Date

10/31/2023

Expire Date

Verify this credential at: dpo.colorado.gov

Ronne Hines

1876

John Patrick McGinn

Division Director: Ronne Hines

Credential Holder Signature

WEST VIRGINIA UNIVERSITY



THE COLLEGE OF MINERAL AND ENERGY RESOURCES

KNOW ALL PERSONS BY THESE PRESENTS
THAT THE WEST VIRGINIA BOARD OF REGENTS
UPON THE RECOMMENDATION OF THE FACULTY
HAS CONFERRED UPON

MICHAEL LEE CROSS

THE DEGREE OF

**BACHELOR OF SCIENCE IN
ENGINEERING OF MINES**

WITH ALL THE RIGHTS, HONORS AND PRIVILEGES THEREUNTO
APPERTAINING. WITNESS THE SEAL OF THE UNIVERSITY
AND THE SIGNATURES OF ITS DULY AUTHORIZED OFFICERS
HEREUNTO AFFIXED THIS EIGHTEENTH DAY OF MAY,
NINETEEN HUNDRED EIGHTY.

Harold A. Budig

PRESIDENT OF THE UNIVERSITY

G. L. D. Jacobs

PRESIDENT, WEST VIRGINIA BOARD OF REGENTS


W. H. Howard

DEAN OF THE COLLEGE

Ben C. Morter

CHANCELLOR, WEST VIRGINIA BOARD OF REGENTS

Montana State University

Bozeman  *Montana*

*The Board of Regents of Higher Education by virtue of the authority vested in them
and on the recommendation of the Faculty*

Hereby confer upon

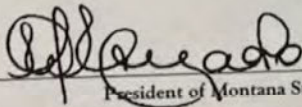
Joseph Naughton

The Degree of

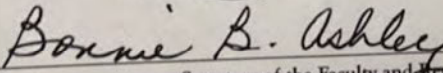
Master of Science in Fish and Wildlife Management

With all the rights, privileges and honors as well as the obligations and responsibilities appertaining

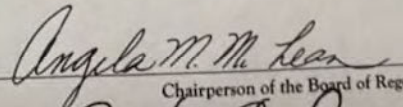
May 3, 2013



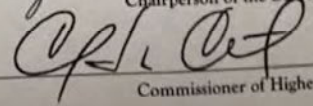
President of Montana State University



Secretary of the Faculty and Registrar



Chairperson of the Board of Regents



Commissioner of Higher Education

Fairmont State University



This Diploma Makes Known

*That the Fairmont State Board of Governors upon the recommendation
of the Faculty of the University has conferred upon*

Jeffery M. Bonaventura

the degree of

Bachelor of Science in Engineering Technology

Civil Engineering Technology

In Testimony thereof, the signatures of the duly authorized officers of

Fairmont State University have been affixed.

Given under the Seal of the State of West Virginia this tenth day of May 2008.

A handwritten signature in cursive script, appearing to read "D. J. Bragg".

PRESIDENT

A handwritten signature in cursive script, appearing to read "Roberta Kittle".

CHAIR, BOARD OF GOVERNORS

A handwritten signature in cursive script, appearing to read "Maria C. Rose".

PROVOST & VP FOR ACADEMIC AFFAIRS

A handwritten signature in cursive script, appearing to read "Eric Branstetter".

REGISTRAR



Lookup Detail View

Licensee Information

This serves as primary source verification of the license*

**Primary source verification License information provided by the Colorado Division of Professions and Occupations, established by 24 34-102 C.R.S.*

Name	Public Address
Patrick Robert Wieck	Littleton, CO 80120

Credential Information

License Number	License Method	License Type	License Status	Original Issue Date	Effective Date	Expiration Date
PE 0045022	E amination	Profe ional Engineer	Active	01/20/2011	11/01/2021	10/31/2023

Board/Program Actions

Discipline
There i no Di cipline or Board Action on file for thi credential

Generated on: 6/14/2022 5:41:26 AM

Colorado School OF Mines



*This Diploma Certifies
that the Colorado School of Mines, on the recommendation of its Faculty
and in consideration of the successful completion of the prescribed
course of study, hereby confers on*

Patrick Robert Wieck
the degree of
Bachelor of Science
(Mining Engineering)

*with all attendant rights and privileges
given under the seal of the said Colorado School of Mines in Golden, State of Colorado,
in the United States of America, by authority of the Board of Trustees and the Faculty,
this day of May 12, 2006*



William P. Stuyk
President, Board of Trustees

Thomas J. [Signature]
Secretary, Board of Trustees

Tim G. [Signature]
Head of the Department of
Mining Engineering

John W. [Signature]
President

David [Signature]
Executive Vice President for Academic Affairs
and Dean of Faculty

INDIANA DEPARTMENT OF HOMELAND SECURITY

This License is issued to

Paul B. Lewis

PSID: 5048-5830

Regulated Explosive Use-Blaster

Issued: 03/21/2014

Expires: 09/10/2023

Michael S. Garvey

Mike Garvey
Director of Training

State Form 42342 (R6 / 6-13)

INDIANA DEPARTMENT OF HOMELAND SECURITY

This License is issued to

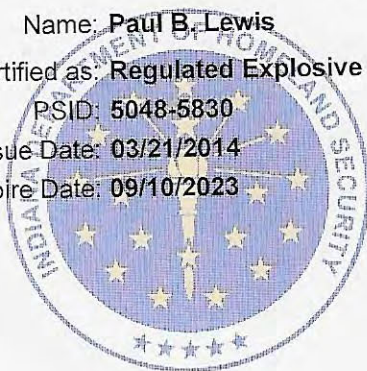
Name: **Paul B. Lewis**

Certified as: **Regulated Explosive Use-Blaster**

PSID: 5048-5830

Issue Date: 03/21/2014

Expire Date: 09/10/2023



State Form 42342 (R6 / 6-13)

INDIANA DEPARTMENT OF HOMELAND SECURITY

This License is issued to

Name: **Paul B. Lewis**

Certified as: **Regulated Explosive Use-Blaster**

PSID: 5048-5830

Issue Date: 03/21/2014

Expire Date: 09/10/2023

State Form 42342 (R6 / 6-13)

WALLET CARD

↑ Detach this wallet card and carry with you for your personal record.

← Detach this 4.25" x 2.375" card for your department.

The University of Louisville

To all to whom these Letters shall come, Greeting:

The trustees of the University on the recommendation of the University faculty and by virtue of the authority vested in them have conferred on

Paul Brian Lewis

who has satisfactorily pursued the studies and passed the examinations required therefor the degree of

Bachelor of Science in Business Administration

with all the rights, privileges and honors pertaining thereto.

Granted at the University of Louisville in the Commonwealth of Kentucky on the Tenth day of May in the year Two Thousand Three.



Jessica S. Loving

Chair of the Board of Trustees

James A. Harlow

President of the University

Kathleen L. Otto

Registrar of the University

John J. Goff

Acting Dean of the College of
Business and Public Administration



APPENDIX D.

SIGNED EXPRESSION OF INTEREST FORM



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Expression of Interest
Architect/Engr

Proc Folder: 1257392

Doc Description: EOI - 2023 AML Contract N2

Reason for Modification:

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2023-08-09	2023-08-29 13:30	CEOI 0313 DEP2400000006	1

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code: 0000099853

Vendor Name : RESPEC Company LLC

Address : 146

Street : East Third Street

City : Lexington

State : Kentucky

Country : USA

Zip : 40508

Principal Contact : John Morgan

Vendor Contact Phone: 859.361.8392

Extension:

FOR INFORMATION CONTACT THE BUYER

Joseph E Hager III
(304) 558-2306
joseph.e.hageriii@wv.gov

Vendor
Signature X

FEIN# 83-2898293

DATE August 29, 2023

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION
The Acquisitions and Contract Administration Section of the Purchasing Division ("Purchasing Division") is soliciting Expression(s) of Interest ("EOI" or "Bids") for the West Virginia Department of Environmental Protection, Division of Land Restoration, Office of Abandoned Mine Lands and Reclamation (WVDEP-DLR-AML) ("Agency"), from qualified firms to provide architectural/engineering services for planning, realty, design, and construction oversight aspects as needed for each project per the attached specifications and terms and conditions.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue
1	Bridgeport (Tomes) Landslide		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Bridgeport (Tomes) Landslide

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue
2	Burl Gould Highwall		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Burl Gould Highwall

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue
3	Burl Gould Landslides		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Burl Gould Landslides

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue
4	Fairmont (Windsor Dr) Subsidence & Highwall		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Fairmont (Windsor Dr) Subsidence & Highwall

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue
5	Falls Run (Abruzzino) DH & DS		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Falls Run (Abruzzino) DH & DS

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue
6	Glade Run Highwall		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Glade Run Highwall

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue
7	Glade Run Landslides		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Glade Run Landslides

SCHEDULE OF EVENTS		
<u>Line</u>	<u>Event</u>	<u>Event Date</u>



APPENDIX E.

DESIGNATED CONTACT FORM

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

(Printed Name and Title) Whitney Faulkner, PE, Project Manager

(Address) 146 East Third Street, Lexington, KY 40508

(Phone Number) / (Fax Number) 773.218.5866 / NA

(Email address) Whitney.Faulkner@respec.com

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that: I have reviewed this Solicitation/Contract in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation/Contract for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that this bid or offer was made without prior understanding, agreement, or connection with any entity submitting a bid or offer for the same material, supplies, equipment or services; that this bid or offer is in all respects fair and without collusion or fraud; that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; that I am authorized by the Vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on Vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

By signing below, I further certify that I understand this Contract is subject to the provisions of West Virginia Code § 5A-3-62, which automatically voids certain contract clauses that violate State law; and that pursuant to W. Va. Code 5A-3-63, the entity entering into this contract is prohibited from engaging in a boycott against Israel.

RESPEC Company, LLC

(Company)

(Signature of Authorized Representative)

John Morgan, Senior Vice President, August 29, 2023

(Printed Name and Title of Authorized Representative) (Date)

859.361.8392 / NA

(Phone Number) (Fax Number)

John.Morgan@respec.com

(Email Address)



APPENDIX F.

ADDENDUM ACKNOWLEDGEMENT FORM

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: [CEOI 0313 DEP2400000006](#)

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|---|--|
| <input type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

[RESPEC Company, LLC](#)

Company

Authorized Signature

[August 29, 2023](#)

Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.



APPENDIX G.

AML CONTRACTOR INFORMATION FORM (AVS)

ABANDONED MINE LANDS (AML) CONTRACTOR INFORMATION FORM

You must complete this form for your AML contracting officer to request an eligibility evaluation from the Office of Surface Mining Reclamation and Enforcement (OSMRE) to determine if you are eligible to receive an AML contract. This requirement can be found under OSMRE's regulations at 30 CFR 874.16. **NOTE:** This form must be signed and **dated within 30 days** of submission to be considered for a current bid.

Part A: General Information

Business Name:	RE/SPEC, INC	RESPEC Company, LLC
Tax ID #:	46-0315848	82-2898293
Address:	3824 Jet Drive	
City, State, & Zip:	Rapid City, SD 57703	
Phone Number:	605-394-6517	
Email Address:	Robyn.beaird@respec.com	

Part B: Obtain an Organizational Family Tree (OFT) from the Applicant Violator System (AVS)

If you plan to certify the existing AVS information or submit updates under Part C, you must include an OFT. Instructions for downloading an OFT from the AVS can be found at: <https://www.osmre.gov/sites/default/files/2022-02/OMB%201029-0119%20instructions.pdf>. If you require assistance you may contact the AVS Office by phone at: 800-643-9748, or by email at: avshelp@osmre.gov.

Part C: Certifying and updating information in the AVS

Select one of the options, follow the instructions for the selected option, sign, and date below.

I, Robyn Beaird, have express authority to certify that:
(Print Name)

- ☐ 1. Our business is listed in the AVS. The information is accurate, complete, and up to date. (If you select this option, you must attach an Entity OFT from the AVS to this form). Do not complete Part D.
- ☒ 2. Our business is in the AVS. The information needs to be updated. (If you select this option, you must attach an Entity OFT from the AVS to this form). Complete Part D to provide the missing or corrected information.
- ☐ 3. Our business is not listed in the AVS. The information needs to be added. Complete Part D to provide the information.

August 10, 2023

Date

Robyn Beaird Digitally signed by Robyn Beaird
Date: 2023.08.10 13:13:48 -0600

Signature

Corporate Accounting Manager

Title

Part D: OFT InformationContractor's Business Name: RESPEC

If the current Entity OFT information for your business is incomplete in the AVS, or if there is no information in the AVS for your business, you must provide all of the following information as it applies to your business. Please include additional copies of this page if the space below is not sufficient to capture all information.

- Every officer (President, Vice President, Secretary, Treasurer, etc.);
- All Directors, Partners, and Members;
- All persons performing a function similar to a Director;
- Every person or business that owns 10% or more of the voting stock in your business;
- Any other person(s) who has the ability to determine the manner in which the AML reclamation project is being conducted.
- **Please list an end date for any person who is no longer with your business.**

Name: Leo Van Sambeek
 Address: 3824 Jet Drive
 City, State, Zip: Rapid City, SD 57703
 Begin Date: 01/01/2011
 End Date: 11/15/2021
 % Ownership: ESOP Shares
 Position/Title: Vice President
 Phone Number: 605-394-6517

Name: Alfred J Serano
 Address: 3824 Jet Drive
 City, State, Zip: Rapid City, SD 57703
 Begin Date: 12/09/2011
 End Date: 06/30/2021
 % Ownership: 0%
 Position/Title: Director
 Phone Number: 605-394-6517

Name: Marv Truhe
 Address: 3824 Jet Drive
 City, State, Zip: Rapid City, SD 57703
 Begin Date: 01/01/2011
 End Date: 07/01/2020
 % Ownership: 0%
 Position/Title: Director
 Phone Number: 605-394-6517

Name: _____
 Address: _____
 City, State, Zip: _____
 Begin Date: _____
 End Date: _____
 % Ownership: _____
 Position/Title: _____
 Phone Number: _____

PAPERWORK REDUCTION STATEMENT

The Paperwork Reduction Act of 1995 (44 U.S.C 3501) requires us to inform you that: Federal Agencies may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a current valid OMB control number. This information is necessary for all successful bidders prior to the distribution of AML funds, and is required to obtain a benefit.

Public reporting burden for this form is estimated to range from 15 minutes to one hour, with an average of 30 minutes per response, including time for reviewing instructions, gather and maintaining data, and completing and reviewing the form. You may direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Office of Surface Mining Reclamation and Enforcement, 1849 C Street, NW, Room 4559, Washington, DC 20240.

RESPEC.COM

