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Header 1

List View

General Information | Contact | Default Values | Discount | Document Information | Clarification Request

Procurement Folder: 1047664

Procurement Type: Central Purchase Order

Vendor ID: VC0000099853

Legal Name: RESPEC COMPANY LLC

Alias/DBA:

Total Bid: $750,000.00

Response Date: 06/27/2022

Response Time: 16:07

Responded By User ID: WFaulkner80

First Name: Whitney

Last Name: Faulkner

Email: whitney.faulkner@respec

Phone: 7732185866

SO Doc Code: CEOI

SO Dept: 0313

SO Doc ID: DEP2200000018

Published Date: 6/1/22

Close Date: 6/28/22

Close Time: 13:30

Status: Closed

Solicitation Description: EOI - 2022 AML Contract 9 Project North

Total of Header Attachments: 1

Total of All Attachments: 1

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:	1047664
Solicitation Description:	EOI - 2022 AML Contract 9 Project North
Proc Type:	Central Purchase Order

Solicitation Closes	Solicitation Response	Version
2022-06-28 13:30	SR 0313 ESR06272200000008109	1

VENDOR

VC0000099853
RESPEC COMPANY LLC

Solicitation Number: CEOI 0313 DEP2200000018

Total Bid: 750000 **Response Date:** 2022-06-27 **Response Time:** 16:07:26

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	Professional Svcs - Three Fork Creek Watershed Restoration				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments: Contract amount is assumed to be greater than $250,000.

Extended Description:

Professional Svcs - Three Fork Creek Watershed Restoration

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	Professional Svcs - Abram Creek AMD Treatment Phase II				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments: Contract amount is assumed to be greater than $250,000.

Extended Description:

Professional Svcs - Abram Creek AMD Treatment Phase II

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
3	Professional Svcs - Richard (Shaver) Drainage				250000.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments: Contract amount is assumed to be greater than $250,000.

Extended Description:

Professional Svcs - Richard (Shaver) Drainage

RESPEC

SUBMITTED TO:

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

SUBMITTED BY:

RESPEC
101 CARRIAGE WAY, SUITE 201
HURRICANE, WV 25526

EXPRESSION OF INTEREST -
2022 AML CONTRACT 9 PROJECT NORTH

SOLICITATION #: CEOI 0313 DEP2200000018

RSI/P-7292 // DUE JUNE 28, 2022

June 28, 2022

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)—2022 AML Contract 9 Project North CEOI 0313 DEP22*18 (RSI/P-7292)

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 2022 AML Contract 9 Project—North (CEOI 0313 DEP22*18). This response provides WVDEP 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 456 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 working with the WVDEP, again, especially as we 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 continues to be active in the Abandoned Mined Land (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.

RESPEC is eager to continue our work with WVDEP on the Contract 9 Project – North project. We understand the importance of addressing the issues on each of the three sites included in this contract due to our experience on projects with similar problems. We have the experience, knowledge, and capability to analyze and address the issues on each site and develop a comprehensive plan that will remedy onsite issues.

146 EAST THIRD STREET
LEXINGTON, KY 40508
P.O. BOX 888 // LEXINGTON, KY 40588
859.259.0959

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

- Mr. Tiff Hilton to assist with AMD issues
- GMS Mine Repair & Maintenance's Morgantown office to support construction management services, and,
- Cheat Road Engineering of Morgantown WV to provide surveying and construction management 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 with them to ensure 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 Michael Ricci (telephone: 859.361.4540; email: Michael.Ricci@respec.com) if you have any questions regarding our proposal.

Sincerely,

John S L Morgan
Senior Vice President

Michael Ricci, PE
Principal Consultant

JM:msp
Enclosure
cc: Project Central File 996-7292 — Category B

TABLE OF CONTENTS

CORPORATE SUMMARY

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 partners and propel them forward with an innovative, clear vision. Our 100 percent employee-owned company, with 456 employee-owners across 26 offices, does just that. In 2021, we generated $85 million in revenue. No matter the challenge or market, RESPEC finds answers that work.

RESPEC consists of four business units: Mining & Energy, Water & Natural Resources, Infrastructure, and Data & Technology Solutions. Our AML team consists of members of the Mining & Energy, Water & Natural Resources, and Infrastructure business units. The combined resources of these three business units have expertise in tasks that help successfully mitigate mine-related impacts. As detailed in the project examples, RESPEC has completed both small and large projects from evaluation through construction.

POINT OF CONTACT
MICHAEL RICCI, PE
859.361.4540
Michael.Ricci@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 37 years. RESPEC has completed 100-plus 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

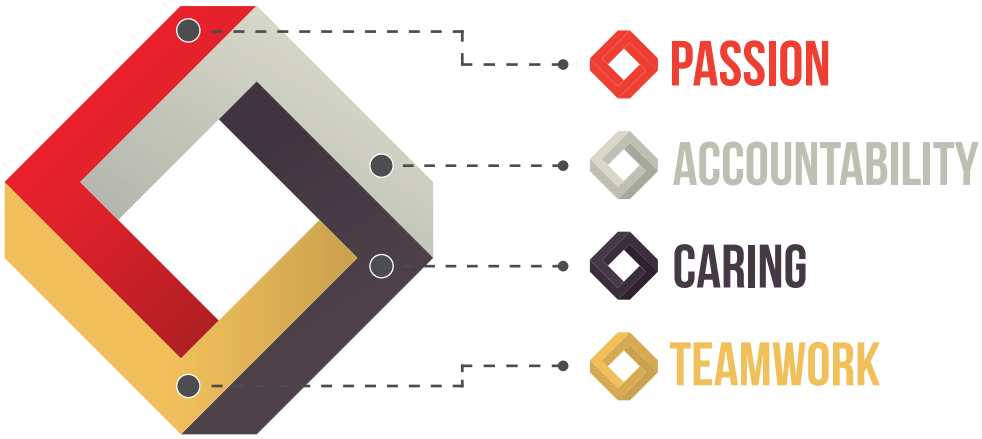
- Geotechnical Evaluation
- Impoundment Design
- Waterlines
- Road Design
- Slope Stabilization

CORPORATE SUMMARY

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 37 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 US 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)

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 Expression of Interest (EOI) for the 2022 AML Contract 9 Project – North (CEOI 0313: DEP22*18). This proposal provides WVDEP an overview of our general approach to performing and managing the project. Included in this scope of work (SOW) are RESPEC's summaries on the primary objectives for managing the various projects, the general approach for each project specification included in the EOI, and project-specific understanding and approaches.

PROJECT GOALS

RESPEC will manage each project under this contract with the same primary goals and in coordination with WVDEP. RESPEC will assist WVDEP to the extent requested to maintain compliance with federal policies and regulations; determine legal land ownership; manage required permits; develop project designs and plans; and provide project representation, management, and general oversight. The goals of the projects under this contract are as follows:

- Maintain compliance with National Environmental Policy Act (NEPA) tasks and the Infrastructure, Investment, and Jobs Act (IIJA).
- Determine legal ownership of properties and provide legal documentation to substantiate legal ownership findings (if required).
- Develop construction plans and technical specifications for all aspects to reclaim mine portals, drainage controls and systems, slope stabilization, coal refuse reclamation, stream restoration, highwall reclamation, limits of disturbance, storm water 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.

SCOPE OF WORK

PROJECT APPROACH

RESPEC has included a project-specific understanding and general approach for the purpose of this proposal. A summary and the general approach for each project included in the EOI for this contract is included below:

PROJECT 1 - THREE FORK CREEK WATERSHED RESTORATION

RESPEC's understanding is that the Three Fork Creek Watershed Restoration project site, located in Preston County, has four existing pelletized lime active treatment systems and facilities that require replacement treatment systems. Although these sites are in the Three Fork Creek watershed, they are on separate tributaries that converge to form Three Fork Creek or discharge into downstream. RESPEC will analyze the operating and design criteria of the existing treatment system before the design and implementation of the replacement system to ensure the future operating conditions and safety requirements of the environment and public are met. At the design stage of the project, treatment system and technology deployed at the North Birds Creek (Pell Road) facility will be part of the consideration to ensure compatibility. On WVDEP approval of the plan, RESPEC will coordinate with WVDEP to lead the contractor procurement process and oversee the project execution work to ensure the project is delivered on time and on budget and meets the design requirements. In addition to the general project management, as detailed in the "Project Goals" section of this SOW, RESPEC assumes the following design task items to be the focus for this project:

- Ensure public, personnel, and environmental safety.
- Replace existing treatment systems with similar technology and equipment at or near existing systems.
- Complete system integration required for all treatment systems and controls.
- Perform hydrologic and hydraulic analyses.
- Regrade/develop sites as necessary.
- Install drainage channels, underdrains, and/or other controls to safely convey water off-site (if applicable).
- Demolish and dispose of existing treatment systems and facilities.

SCOPE OF WORK

- Install fully automated in-stream auger-feeding hydrated lime dosing active treatment systems and facilities (including silos, controls systems and buildings, utilities infrastructure, in-stream mixing systems, and foundations, etc.).
- Obtain required permits as determined at the Pre-Design Meeting.

/ PROJECT 2 - ABRAMS CREEK ACID MINE DRAINAGE (AMD) TREATMENT PHASE II

» RESPEC's understanding is that the Abrams Creek AMD Treatment Phase II project site, located in Mineral and Grant counties, has three existing pelletized lime active treatment systems and facilities that require replacement treatment systems. RESPEC will evaluate the operating and design criteria of the existing treatment systems before the design and implementation of the replacement system to ensure future operating conditions and safety requirements of the environment and public are met. At the design phase of the project, RESPEC will deploy technology and equipment that is similar to what is used in the current facilities for all sites with treatment and controls systems to be integrated. On WVDEP approval of the plan, RESPEC will coordinate with WVDEP to lead the contractor procurement process and oversee the project execution work to ensure the project is delivered on time and on budget and meets the design requirements. In addition to the general project management, as detailed in the "Project Goals" section of this SOW, RESPEC assumes the following design task items to be the focus for this project:

- Ensure public, personnel, and environmental safety.
- Replace existing treatment systems with similar technology and equipment at or near existing systems.
- Complete system integration required for all treatment systems and controls.
- Perform hydrologic and hydraulic analyses.
- Regrade/develop sites as necessary.
- Install drainage channels, underdrains, and/or other controls to safely convey water off-site (if applicable).
- Demolish and dispose of existing treatment systems and facilities.

SCOPE OF WORK

- Install fully automated in-stream auger-feeding hydrated lime dosing active treatment systems and facilities (including silos, controls systems and buildings, utilities infrastructure, in-stream mixing systems, and foundations, etc.).
- Obtain required permits as determined at the Pre-Design Meeting.

/ PROJECT 3 - RICHARD (SHAVER) DRAINAGE PROJECT

» RESPEC's understanding is that AMD at the Richard (Shaver) Drainage site, which is located southeast of the City of Sabraton in Monongalia County along WV Route 7, is impacting multiple homes and businesses in several locations. In addition, AMD is emanating off the sites discharging directly into Decker Creek. RESPEC will evaluate the AMD impact to these areas before developing a comprehensive mitigation solution. As part of the mitigation plan, RESPEC will design remediation of collapsed and draining portals, installation of additional drainage controls and systems, subsurface drain systems, and an AMD pumping system to existing facilities and systems to meet the site-specific conditions. On WVDEP approval of the plan, RESPEC will coordinate with WVDEP to lead the contractor procurement process and oversee the project execution work to ensure the project is delivered on time and on budget and meets the design requirements. In addition to the general project management, as detailed in the "Project Goals" section of this SOW, RESPEC assumes the following design task items to be the focus for this project:

- Ensure public, personnel, and environmental safety.
- Mitigate and reclaim collapsed and draining portals.
- Install additional drainage controls and systems
- Install subsurface drain systems

SCOPE OF WORK

- Install AMD pumping system into existing AML treatment facility with remote terminal systems.
- Establish access or accesses as required.
- Perform geotechnical investigation and analyses.
- Perform hydrologic and hydraulic analyses.
- Clear and grub affected areas.
- Regrade/develop sites as necessary.
- Install drainage channels, underdrains, and/or other controls to safely convey water off-site (if applicable).
- Install fully automated in-stream auger-feeding hydrated lime dosing active treatment systems and facilities (including silos, controls systems and buildings, utilities infrastructure, in-stream mixing systems, and foundations, etc.).
- Condition and revegetate all disturbed areas.
- Obtain required permits as determined at the Pre-Design Meeting.

PROJECT TASK SPECIFICATIONS

Related to project-specific tasks, RESPEC has summarized the general approach and considerations of each of these tasks as follows:

/ Public, personnel, and environmental safety.

» The most important part of every project is to ensure the safety of the public, project, and environment. Safety will be RESPEC's top priority throughout all projects. RESPEC strives for zero incidents and will consider the potential safety hazards for the public, project, and environment continuously, in coordination with WVDEP and all concerned parties, and at the kickoff, review, design, management, and completion stages of the projects.

/ Access or accesses as required.

» Remote and special access is often required to adequately assess and mitigate hazards associated with abandoned mine lands. 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. It also includes implementing innovative remote investigation and analysis methods.

SCOPE OF WORK

- As part of accessing any project site, RESPEC will identify the correct property owners and maintain effective communication with them by establishing a positive and open relationship 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 court house. RESPEC has experience with the consents and clearance task as it performs this task as an integral part of the projects conducted for the Wyoming DEQ/AML. RESPEC recently completed detailed review of the property ownership and mineral leases for the Jay-Bee Blackrock case. The need for a title opinion and potentially title insurance will be discussed with WVDEP. It is recognized that the property ownership could vary from large landowning companies to small individual property owners.
- Site access will only be established if the proper planning, permissions, and permitting have been completed. The need for a National Pollutant Discharge Elimination System (NPDES) permit for the project will be identified and RESPEC will prepare and coordinate the application.

/ Geotechnical investigation and analyses.

- The long-term stability of features remaining from historical mining operations is crucial in ensuring the public safety of abandoned mine lands. This includes the stability of surface excavations (highwalls, dump slopes, etc.) and underground excavations (longwalls, stopes, headings, etc.) and general ground stability associated with historical mining operations. RESPEC will perform a complete geotechnical analysis, as required for each project. Stability analysis will cover

SCOPE OF WORK

the following conditions: ultimate pit slope stability, highwall stability, crown pillar thickness, pillar thickness, subsidence potential, and other considerations.

/ **Hydrologic and hydraulic analyses.**

» Mining activities can affect the hydrology of water on and adjacent to the mine site. This can encompass water both on and below the surface and water availability and quality. RESPEC will analyze the direct and indirect effects of reclamation and historical mining activity on the local and regional hydrology as required for each project. This will include looking at the quantity and quality of water flow both on the surface and subsurface and observing the effect any reclamation or historical mining activities have had on the hydrology. Any concerns with hydrology will be identified and discussed with WVDEP with recommendations for mitigation of the concerns provided by RESPEC.

/ **Clearing and grubbing of affected areas.**

» Some areas may need to have vegetation cleared out as part of the reclamation process. This could encompass establishing access to another part of the project area, regrading, establishing new drainage, or other reclamation/ construction activities. RESPEC will coordinate the clearing and grubbing of affected areas based on the needs of each project. Clearing and grubbing will be minimized and will be implemented only on an as-needed basis to minimize the disturbance of the reclamation work.

/ **Regrade/develop sites as necessary.**

» After mining operations have concluded, the project and surrounding areas are often required to be reclaimed to reflect pre-mining conditions. This usually

SCOPE OF WORK

includes regrading the terrain to mimic nearby terrain conditions. Proper drainage and slopes should also be constructed to maintain stability and establish a vegetation cover. RESPEC will use historical mappings and surveys of the project regions in addition to updated mappings and surveys to develop a unique regrade design and plan specific to the project to be approved by WVDEP. RESPEC will manage the construction of the regrade designs and plans in coordination with WVDEP.

- **Installation of drainage channels, underdrains, and/or other controls to safely convey water off site (water management).**
  - 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. All water conveyed off site will meet or exceed any established water quality standards.
- **Existing treatment systems and facilities demolition and disposal.**
  - Some reclamation project sites have older structures that are no longer in use and present a hazard to the public safety and environment. These older structures will need to be demolished, removed from the site, and properly disposed of. RESPEC will safely investigate each structure and identify any potentially hazardous waste (e.g., chemicals, asbestos, solutions, solvents). RESPEC will also analyze structures to identify the optimal method for demolition and removal. RESPEC will properly dispose of all general and hazardous waste in a manner that will protect the public, project personnel, and environment, in accordance with any relevant regulations and industry standards.
- **Install fully automated in-stream auger-feeding hydrated lime dosing active treatment systems and facilities (including silos, controls systems and buildings, utilities infrastructure, in-stream mixing systems, and foundations, etc.).**
  - The effective and efficient treatment of AMD and other drainage is essential in long-term success of reclamation projects. If AMD and other drainage is not treated properly, it can cause undo harm to the safety of the public and environment. RESPEC will review the effectiveness of existing and proposed treatment systems and facilities to ensure that they work efficiently and meet all standards and regulations concerning AMD and drainage treatment. In addition, RESPEC will give attention to systems and controls integration during design

SCOPE OF WORK

work. Compatibility between existing and proposed technologies and equipment is crucial for seamless transition while ensuring long-term operational stability.

- **Conditioning and revegetation of all disturbed areas.**
  - Mine sites and the surrounding areas are often temporarily disturbed by both mining and reclamation activities. The affected area will need to be conditioned and revegetated to properly complete the reclamation of a historical mining site. RESPEC will develop specifications and plans through various design and engineering methods to effectively reclaim the project sites. This will consist of plans for final grading, seeding, and post-reclamation control and management.
- **Obtaining required permits as determined at the Pre-Design Meeting.**
  - Proper permitting is essential to ensuring the overall success of a project. Successful permitting on a project will provide protection for the environment, public safety, and the project owner. Without proper permitting, projects can harm the environment, endanger the public, delay projects, and increase costs associated with the projects. RESPEC will identify and complete all required permitting in coordination with WVDEP and regulatory agencies as determined at the Pre-Design Meeting. The determined permits will be established and maintained by RESPEC in coordination with the project owner throughout the project to ensure the project complies with environmental and public safety and is completed in a timely and efficient manner.

RESPEC PROJECT MANAGEMENT APPROACH

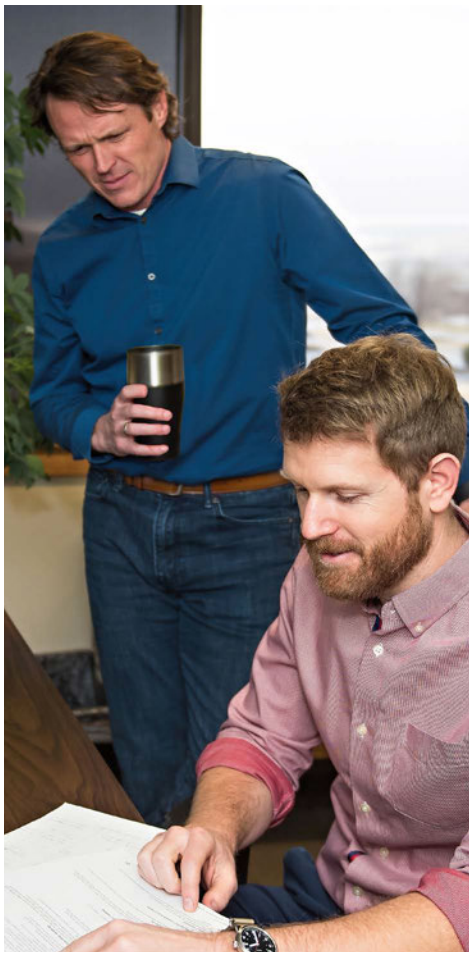
RESPEC has many professionals with experience in managing AML and permitting projects or those with similar project requirements. Our team of experienced West Virginia Professional Engineers will serve as potential project managers. Each has a history of successfully managing projects of varying complexity, size, and budget. These individuals have experience in coordinating technical staff and contractors; maintaining communication among the design team, the client, and stakeholders; managing conflict; and managing the financial aspects of the project. With frequent communication, detailed budget tracking, and diligent task scheduling and reporting, the project manager ensures that projects are completed successfully and exceed client expectations.

The project manager's responsibilities will include the following, as 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

SCOPE OF WORK

- Ensure that project schedule and budget compliance are met
- Encourage participation by stakeholders to avoid conflicts and prevent project interruptions
- Coordinate all 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 the approach that RESPEC would use to guide our response to all design projects. RESPEC recognizes that successful projects begin with a solid foundation built on pre-coordination and a project kick-off meeting to align on the project scope and details with all the 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 be to work 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
- Assemble the optimal design team to meet the project objectives
- Plan, coordinate, and lead a kick-off meeting
- Assign work tasks and deadlines to key project team personnel
- Direct project team activities to achieve strategic goals and objectives

SCOPE OF WORK

- Provide open communication between the WVDEP and the project team
- Coordinate project team meetings, reporting, and documentation
- Ensure that project schedule and budget compliance are met

The project manager will generate periodic status reports to the WVDEP. Any potential problems discovered during the project will be reported to the WVDEP, describing the nature of the problem, potential impacts, and the recommended course(s) of action.

STEP 2: SITE INVESTIGATION

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

STEP 3: COMPILATION OF OPTIMAL TEAM FROM RESPEC STAFF

The project manager will assemble their team based on the specific requirements of the project and the results from the initial site investigation. Teams will be tailored to match the needs of each specific project. Most of our staff have expertise in multiple areas. Where specific expertise is needed, subcontractors may be added to the team. Once a project begins, we expect staff crossover on tasks. Task leads may alternate based on the 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 the data collection required wherever possible using technology for enhanced data collection, monitoring, and management.

STEP 5: DESIGN/REMEDIATION PLAN

Having gathered the necessary background data, the task teams will develop designs to remediate the defined pertinent issues. The plans must consider other limitations, such as property rights, site access, potential critical habitats, and permitting requirements. As design solutions are considered, additional site data may require collection. Communication will be frequent among team members to ensure that all components of the issue are addressed in the plan. The project manager will update WVDEP frequently, sharing the project status, design concepts, and any project concerns. The goal of the design process is to provide the agreed-on deliverable(s) to WVDEP.

STEP 6: CONSTRUCTION MANAGEMENT

RESPEC has extensive experience in construction management. Planning the job, communication by and between parties, and tracking costs and time are paramount in

SCOPE OF WORK

the management of construction projects. The Construction Manager is the main point of contact for onboarding a general contractor; the Construction Manager's duties may include assisting with the Request for Proposal document; the interview process; and collaboration among the owner, designer, and contractor. Specific projects may require cooperation with multiple federal and state government agencies and reviews. When necessary, the Construction Manager may need to research alternative design means and methods. In all cases, the Construction Manager takes the lead in ensuring the project is completed safely.

SAFETY

Through our extensive work at mining operations, RESPEC is acutely aware of the hazards mining features entail and the varying conditions of previously or partially completed reclamation works. 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 both our employees and the 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 an obvious potential danger 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 also has specialized training that is directly applicable to these hazards with its Society of Professional Rope Access Technicians (SPRAT) certified rope team. RESPEC will develop and implement a Jobsite Safety and Health Program (JSHP) that complies with all Occupational Safety and Health Administration's (OSHA) 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

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 US 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 (AOC) guidelines for West Virginia, the Surface Water Runoff Analysis (SWROA) guidelines for West Virginia, the Mountaintop Mining Environmental Impact Statement (EIS) for the Environmental Protection Agency (EPA), and the Stream Protection Rule for the Office of Surface Mining Reclamation and Enforcement (OSMRE). Representatives have also served on the West Virginia Special Reclamation Fund Advisory Council and the West Virginia Department of Environmental Protection (DEP) 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 is also supporting 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 Frasure Creek 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 Abandoned Mine Lands (AML) projects for the State, including the watershed review of the North Branch of the Potomac, to define AMD treatment priorities.

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

RESPEC'S COMMITMENT

37 years of mine reclamation experience – Having earned four national awards from OSM, RESPEC has been the "A Team" for abandoned mine reclamation work throughout the US over the past 37 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 effected matter. We pride ourselves in our ability to be flexible in our schedules so that we are available at a moment's notice when a deliverable needs created and submitted or a field investigation is requested by AML or land owner.

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

PERFORMANCE HISTORY

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 the mine-related projects.

SCHEDULE

After determining the schedule, major meetings will be set. 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. Frequent coordination meetings will be conducted via telecommunication between the project manager and task leaders to discuss the project status and goals as well as share and obtain updated information.

QA/QC

The project manager will establish a QA/QC program that is 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

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 37 years and has completed projects in 10 states. The firm has not completed any recent AML projects in West Virginia, but however, our current staff has extensive experience with West Virginia AML projects, as well as projects in other states. 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 the OSMRE, the Bureau of Land Management, and many private companies. These projects have covered wide-ranging commodities.

RESPEC has grown significantly through the acquisition of strategic partners. Of note, in 2014, RESPEC acquired Morgan Worldwide, a consulting firm with 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 grouped to better facilitate the WVDEP's review of our project history. The groups are:

- AMD and other Relevant Mining Projects
- AML West Virginia Projects
- AML Projects in Other States

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

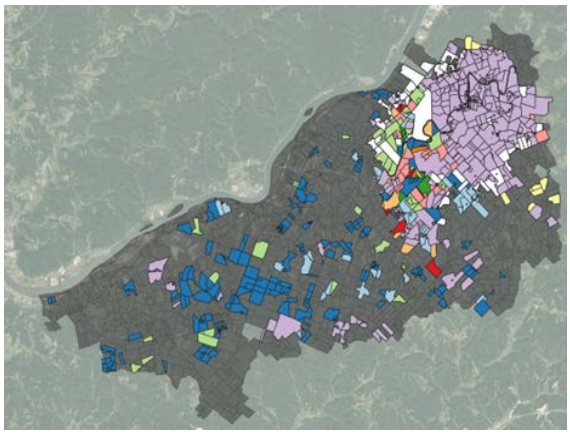
RELEVANT EXPERIENCE

PAST PROJECT EXPERIENCE

AMD AND OTHER RELEVANT MINING PROJECTS

JAY-BEE EXPLORATION – BLACKROCK LITIGATION

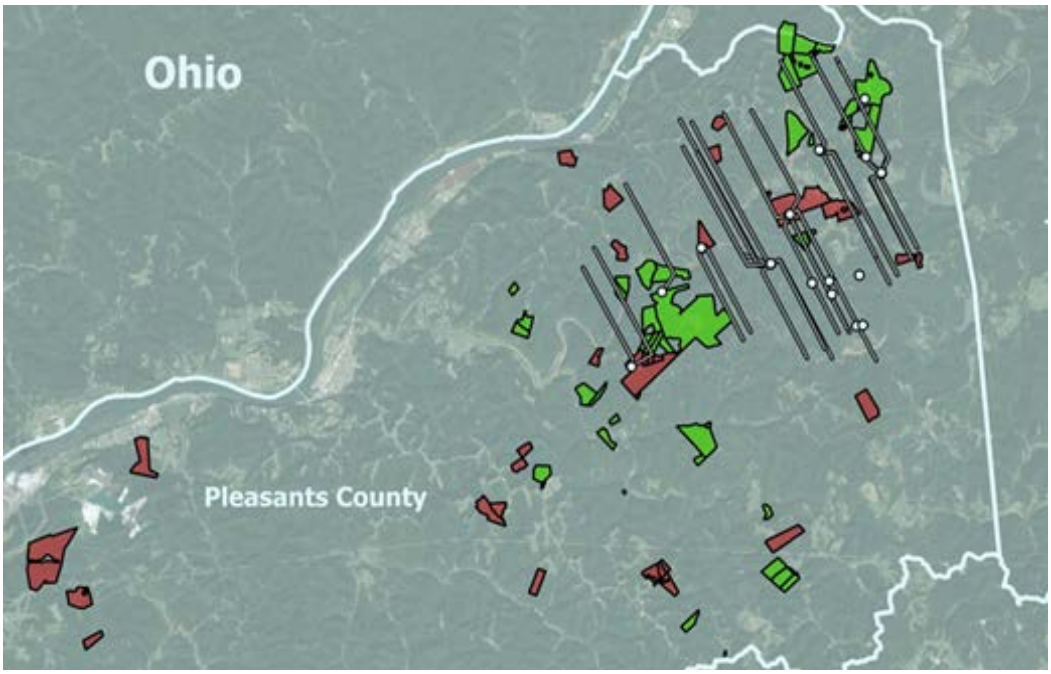
Project Location: Pleasants County, WV // Client: Bailey Glasser // Client Contact: Brian Swiger, 304.340.7879, bswiger@baileyglasser.com // Client Address: 209 Capitol Street, Charleston, WV 25301



RESPEC provided technical support and expert testimony in the evaluation of a number of oil and gas wells located in Pleasants County, WV. The review include detailed mapping of the individual property ownership, drilling unit boundaries, well bore tracks, and location of drilling pads.

The verification of the 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 well bore tracks were compiled using RESPEC's GIS system. The layers were used to denote lease execution dates, lease expiration dates, and lessor.



RELEVANT EXPERIENCE

DILLAN CREEK ACID MINE DRAINAGE REMEDIATION

Project Location: Reedsville, West Virginia // Client: Friends of Deckers Creek // Client Contact: Mr. 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 that is 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 a passive system, so RESPEC designed a passive treatment system that consists of self-flushing limestone leach bed. RESPEC's Mike Cross is the project manager for this project, which involves preparing and submitting permits to the US Army Corps of Engineers (USACE) and the West Virginia Department of Environmental Protection. These permits are currently pending.

RESEPEC 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.

RELEVANT EXPERIENCE

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%. 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 is indicative of 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 there are "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 enough 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 Hydrate Lime to 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 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

RELEVANT EXPERIENCE

HARBISON WALKER – HYBRID PASSIVE TREATMENT SYSTEM

Project Location: Ohiopyle State Park; Pennsylvania // Client: Pennsylvania Department of Environmental Protection

Harbison Walker was a reclaimed clay mine site located 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 to include horizontal flow as well as vertical flow. The overall results showed an average decrease of approximately 47% in conductance, iron, manganese, aluminum, and sulfates. The pH was increased to 6.53, which makes it no longer acidic.

RELEVANT EXPERIENCE

METTIKI AMD TREATMENT - ALKALINE REINJECTION PLAN

Project Location: Tucker County, West Virginia // Client: Mettiki Coal (WV), LLC // Client Contact: Mr. 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 the West Virginia Department of Environmental Protection (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 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 the permitting of 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. All of the seepage calculations for all of the SCPs have been conducted by RESPEC. The alkaline injection points and withdraw points have been modified based on the additional mine areas added by the SCPs and their projected final mine pools.

RELEVANT EXPERIENCE

ASH GROVE 404 PERMITTING MITIGATION

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

Ash Grove Cement Company (Ash Grove) planned to expand its chalk mining operation in Little River County, Arkansas in order 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 US Army Corps of Engineers 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 US Army Corps of Engineers' 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 US Fish and Wildlife Services as federally threatened (T), endangered (E), or candidate (C) for Little River County, as well as species listed by the State as threatened, endangered, and sensitive species.

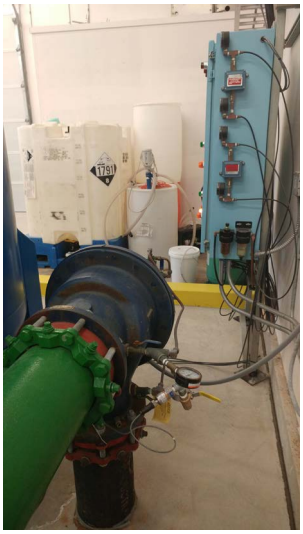
In order to obtain the permit, several alternatives were considered, however, Ash Grove mining plan was determined as the preferred alternative results in the least amount of impact to jurisdictional waters while still meeting the project objective. Avoidance to direct impacts to wetlands and streams;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

RELEVANT EXPERIENCE

WOODMEN HILLS IRON AND MANGANESE REMOVAL FILTER PLANT NO 3

Project Location: Falcon, CO // Client: Woodmen Hills Metropolitan District // Client Contact: JD Shivers, 719-896-0274 // Client Address: 8046 Eastonville Road, Falcon, CO 80831

RESPEC staff completed the design, permitting and construction assistance on a design-build basis for the FP-3 Iron and Manganese Removal Plant. Design included chemical feed/storage/containment systems, flocculation-reaction vessels, filtration, back-wash systems, chlorination, internal booster re-pumping station and Instrumentation and Control. Secondary chemical feed systems and reaction vessels are included of additional future contaminant removal, but to date have not been required. Project also involved the design of foundation, building, wells, CDPHE permitting, field piping design, complete construction drawings, and on-site observation.



COLORADO CENTRE MANGANESE REMOVAL PLANT

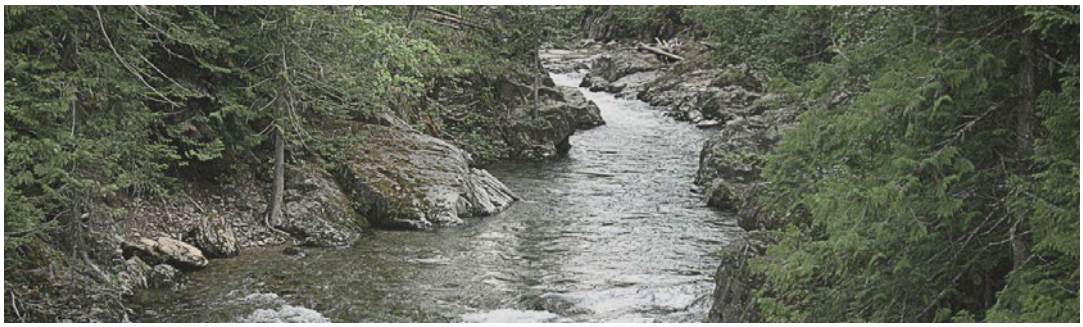
Project Location: Colorado Springs, CO // Client: Colorado Centre Metropolitan District // Client Contact: Al Testa, PE, PhD, 719 232-6793 // Client Address: 4770 Horizonview Dr., Security, CO 80925

RESPEC staff completed the design, permitting and construction assistance on a design-build basis for the primary system Manganese Removal Plant. Design included chemical feed/storage/containment systems, flocculation-reaction vessels, filtration, back-wash systems, and Instrumentation and Control. This facility can remove both iron and manganese, but manganese is the major Project also involved the design of foundation, building, CDPHE permitting, field piping design, complete construction drawings, start-up, and on-site observation.

RELEVANT EXPERIENCE

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 US Army Corps of Engineers, 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 if a site was deemed to be 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.

RELEVANT EXPERIENCE

MARYLAND - BUREAU OF MINES: DEVELOPMENT OF THE TECHNICAL HANDBOOK FOR MINE DRAINAGE CONTROL STRUCTURES

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

This handbook was developed by RESPEC staff for the Maryland Bureau of Mines. The purpose of the handbook was to provide permit applicants with a preapproved procedure for the design of drainage control ponds, ditches, culverts, and other mine drainage control structures.

RESPEC staff developed hydrologic methods based on the Soil Conservation Service publication "Urban Hydrology for Small Watersheds" (TR 55, 1986) for inclusion in the handbook. The hydrologic procedure allows the applicant to determine design storm flows for the various drainage control structures.

We developed pond routing design procedures for compliance with Maryland Stormwater Drainage regulations, OSMRE regulations, and Mine Safety and Health Administration Title 30 CFR, Section 77.218. The procedures allow coal permit applicants to design drainage control ponds in conformance with regulations. The procedures developed were based on the use of a dewatering pipe; a 24-hour detention time for the 2-year, 24-hour storm event; and a combined principal and emergency spillway. Nomographs, charts, and typical details were provided with the handbook.

Construction specifications for earthen dams were written to provide applicants with criteria for construction. Specifications of materials utilized, construction requirements, construction procedures, and dimensions were included to help the operator construct a safe impoundment.

Inspection and maintenance of the dams constructed represented another major portion of the handbook. Discussions on what to look for when inspecting embankments and maintenance procedures were developed. An inspection checklist was provided in the handbook to help mine operators keep their impoundments safe.

RELEVANT EXPERIENCE

CAMP BRANCH WATERSHED LITIGATION

Project Location: Letcher County, Kentucky // Client: Getty & Childers, PLLC // Client Contact: Mr. Joe Childers, 859.259.1900 // Client Address: 250 W 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 to 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.

RELEVANT EXPERIENCE

IDARADO MINE MILL-LEVEL TUNNEL FLOW-CONTROL BULKHEAD

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

RESPEC worked on a multicompany 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 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 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 will eliminate significant energy consumption in water pumping.

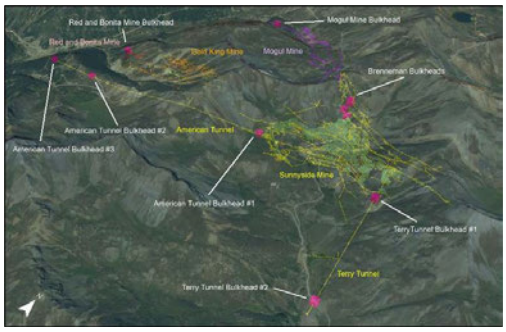
Construction encompassed a concrete bulkhead measuring approximately 15 feet high by 15 feet wide by 15 feet long, with a taper suitable to hold a static pressure behind the bulkhead of approximately 400 psi. The bulkhead encompassed pipe penetrations for a 24-inch primary conveyance pipe, an 8-inch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

RELEVANT EXPERIENCE

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.

RELEVANT EXPERIENCE

PATRIOT COAL – HOBET 45 MINE PLANNING AND PERMITTING

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

RESPEC was requested by Patriot 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 detailed review of the mine plan and mining economics, we developed a revised mine plan. This new plan reduced the stream impact by 52%, reduced the permit acreage by 18%, and increased the efficiency of the spoil placement while reducing the recoverable coal by only 9%. RESPEC assisted in presenting the alternatives to the Environmental Protection Agency and the US Army Corps of Engineers and succeeded in getting the 404-permit issued. RESPEC prepared the revisions to the 404 permit and the SMCRA permit.

RELEVANT EXPERIENCE

BUFFALO COAL LITIGATION

Project Location: Northern West 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 detailed review of the coal supply agreements, historic production, remaining reserves, and permitting history.

Review of the records of the West Virginia Department of Environmental Protection 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.

RELEVANT EXPERIENCE

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, 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 permit history including the two incremental boundary revisions (IBR#4 and IBR#5).

Review of the mining sequence indicated Sunset Fuel's approach to the property and the sequential use of the excess spoil disposal areas. Production target of the mine plan was at 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, un-reclaimed roads, and incomplete sediment control structures, which posed severe environmental impact and hazardous conditions.

In addition, RESPEC provided Expert Testimony in 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.

RELEVANT EXPERIENCE

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, 31th 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. The West Virginia Department of Environmental Protection (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 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 evaluation 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.

RELEVANT EXPERIENCE

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

Client: US 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) play a vital role 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, Acid Mine Drainage (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 toward 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 acid mine drainage (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).

RELEVANT EXPERIENCE

PAST PROJECT EXPERIENCE

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 // Client Contact: Mr. Rob Rice, 304.759.0523 // Client Address: 601 57th Street Southeast, Charleston, WV 25304

A comprehensive Acid Mine Drainage (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 abandoned mine land (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 to 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 to 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 US Geological Survey data to help calibrate the model.

RELEVANT EXPERIENCE

HARTFORD "B" PROJECT

Client: West Virginia Department of Environmental Protection

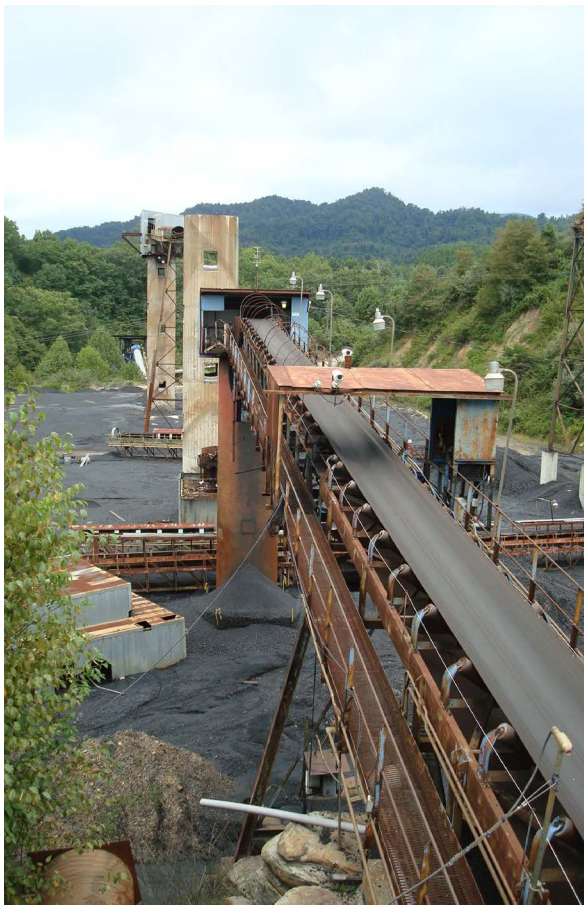
The Hartford "B" Project consisted of two sites with different abandoned mined land–related problems. The first site consisted of several draining portals, which saturated the outslope spoil and destabilized a large mine structure. An impoundment of this drainage was built below the portals, but the 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 to the west of Sliding Hill Creek and was an unattractive nuisance to local 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 both 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 walls of the shaft also existed.

RESPEC staff investigated these sites with extensive subsurface drilling and testing of 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.

RELEVANT EXPERIENCE

STOWE STRUCTURES COMPLEX PROJECT

Client: West Virginia Department of Environmental Protection



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/or 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, the 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 as well as closure and drainage methods for ten portals. A comprehensive drainage control plan was designed to repair the effects of past erosion, prevent future erosion, and control surface waters. In addition, the plan encompassed collecting AMD, preventing ponding and subsurface seepage, and providing positive control from the site to Buffalo Creek. All spoil and refuse materials were regraded or excavated and recontoured into a stable configuration. A geosynthetic grid was used for slope reinforcement. This was a new technique for use by the WVDEP.

RELEVANT EXPERIENCE

BEAVER CREEK HIGHWALL PROJECT

Client: West Virginia Department of Environmental Protection

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 in 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 that was directed to one of the natural channels. The unstable spoil was removed and used to backfill the highwall. In areas where backfill material was not available, 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 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. In addition, an adjacent unmined watershed was evaluated, and water sampling 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 of new wells, or extending existing county water lines to all impacted residents.

RELEVANT EXPERIENCE

TWIN BRANCH COMPLEX PROJECT

Client: West Virginia Department of Environmental Protection

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, and red dog piles, plus 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 evaluated both structurally and hydrologically, 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 plans of the impoundment 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 utilizing relatively deep gabion-lined structures to decrease the total width of channels, which increased the width of flat areas. In addition, channels were aligned toward the side of the valleys.

WIDEN REFUSE RECLAMATION PROJECT

Client: West Virginia Department of Environmental Protection

This project involved the field evaluation and reclamation design for a 4.5M 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, some of which were discharging water, were also assessed. 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.

RELEVANT EXPERIENCE

AML PROJECTS IN OTHER STATES

MARYLAND - BUREAU OF MINES: VINDEX REFUSE PROJECT

Client: Maryland Bureau of Mines // Client Contact: Mr. 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 outslopes, dangerous structures, potentially dangerous impoundments, degraded streams, and massive sediment production were also present.

RESPEC staff investigated the site to inventory these problems and provide 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 potential for mine blowouts. Water quality data from the North Branch Acid Mine Drainage 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: Mr. John Eilers, 301.689.8020 // Client Address: 160 South Water Street, Frostburg, Maryland 21532

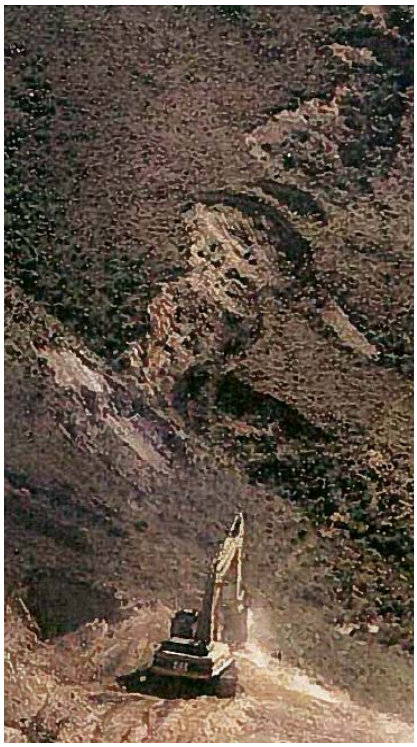
This project entailed investigation, design, and construction management related to a collapsing road in a residential neighborhood of Frostburg. Very shallow mine workings were extensively developed just below a road and neighborhood. A drilling investigation confirmed the unstable subsurface features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

RELEVANT EXPERIENCE

CRAWFORD MOUNTAINS ABANDONED MINE LANDS STUDY

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

This project was awarded to RESPEC by the Utah Division of Oil, Gas & Mining to conduct a site evaluation of the abandoned phosphate operation in Crawford Mountain in northeastern Utah. Following the site evaluation and development of 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 raises up to the surface as well as numerous areas where the crown pillars remaining 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.



RELEVANT EXPERIENCE

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 of the 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.

RELEVANT EXPERIENCE

HORSE CREEK ABANDONED MINE RECLAMATION

Project Location: Cheyenne, Wyoming // Client: Wyoming Department of Environmental Quality (DEQ), Abandoned Mine Land Division (AML) // 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 for 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 and potential remediation along with 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.

RELEVANT EXPERIENCE

ROCK SPRINGS DRILL AND GROUT PROJECT FOR SUBSIDENCE MITIGATION

Project Location: Rock Springs, Wyoming // Client: Wyoming DEQ, Abandoned Mine Land Division (AML)
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 and/or stabilization were needed. Grouting plans, using state-of-the-art techniques and innovative applications, were a crucial element 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.

RELEVANT EXPERIENCE

STORM KING MINE ABANDONED MINE RECLAMATION

Project Location: Sheridan, Wyoming // Client: Wyoming DEQ, Abandoned Mine Land 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 that creates a hazard and impacted drainage.

In early 2008, AML directed RESPEC to conduct investigations, develop designs, and manage construction to mitigate several sinkholes that were developing. 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.

RELEVANT EXPERIENCE

ADDITIONAL PROJECT EXPERIENCE IN AML RECLAMATION AND REMEDIATION

The following is a partial list of AML projects for state or federal agencies. These projects were 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 Abandoned Mine Lands:

- 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

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

RELEVANT EXPERIENCE

- 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 Mne 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 Recamation
- Kemmerer Coal Mine Fire Hazard Mitigation
- Wyoming Abandoned Mine Lands Central Wyoming Non-Coal Contract
- Rock Springs Drill & Grout Subsidence Abatement
- Glenrock Mine Subsidence Peer Review

AVAILABLE RESOURCES

AVAILABLE RESOURCES

CURRENT STAFFING

The summary organizational chart below illustrates the RESPEC project team expertise into seven general qualification areas relevant to this EOI. The first staff member listed in each task classification is expected to serve as the team leader. This list is not a comprehensive list of employees with this experience. This staff list will be modified as needed to meet the needs of the project.

ENVIRONMENTAL | SURVEY | GEOTECHNICAL | RECLAMATION | HYDROLOGY | AMD | CONSTRUCTION MANAGEMENT

The general qualification categories are described as follows:

ENVIRONMENTAL (federal and state), compliance & permitting, and closure support, protection

SURVEY land services, mapping, drones, site investigation, public interface, and remote scanning

GEOTECHNICAL engineering, slope stability, landslide mitigation, grouting, explosives, bulkheads, and subsidence

RECLAMATION, hazard classification and remediation, mitigation design, process optimization

HYDROLOGY modeling, surface waters management, ground water management and stream restoration

AMD geochemistry; waste water characterization, encapsulation design, and water treatment

CONSTRUCTION MANAGEMENT plan and design execution, data management, planning and scheduling, and safety

WVDEP

PROJECT MANAGER
Michael Ricci

ASSISTANT PROJECT MANAGER
Daykin Schnell

TECHNICAL ADVISOR
John Morgan

SAFETY
James Brown

ENVIRONMENTAL
John Morgan
Todd Ball
Crystal Hocking

SURVEY
CRE (sub)
James Brown
Daykin Schnell

GEOTECHNICAL
Al Campoli
Erik Hemstad
Michael Raffaldi
Cody Kreitel
James Kralic
Brad Petri
Neel Gupta
Honore Rowe

RECLAMATION
Michael Ricci
Daykin Schnell
Susan Patton
Brett Drake
Debashis Das
Keith Hanneman

HYDROLOGY
Whitney Faulkner
Karen Brady
Alicia Gilley
Todd Ball

AMD
Tiff Hilton (sub)
John McGinn
Mike Cross
Joe Naughton

CONSTRUCTION MANAGEMENT
GMS (sub)
Mike Cross
Patrick Wieck
Brian Lewis
Brett Drake

AVAILABLE RESOURCES

RESPEC has a substantial number of staff with the expertise required to complete AML projects. We have a history of successfully completing large projects with short deadlines. We are able to access our staff from their various offices to ensure the project is assigned adequate resources. Our team has the capability, both in numbers and talent, to meet the requirement of the EOI. RESPEC has an adjustable backlog of active and future projects in addition to its versatile and adaptable workforce. This flexibility allows us to effectively manage our projects and overall workload to deliver high-quality work on time.

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

The expertise of our key personnel, the proven ability of our project team to work together, and our experience on similar projects will enable us to successfully carry out all the required activities related to these projects.

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

By adapting the way that we work, RESPEC successfully navigated through the COVID-19 pandemic while always keeping our employees' health and safety first. We have become proficient at working collaboratively across offices and developing a system where our files are readily available to all team members, regardless of where they sit. We have successfully completed large projects during the pandemic using staff from many of our offices. These new skills make all of our staff available throughout the company.

ADMINISTRATIVE STAFF

RESPEC maintains 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.

AVAILABLE RESOURCES

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 fast access to the West Virginia coal fields. GMS has been offering underground and surface mining services for more than 40 years. Their experienced engineers have a history of solving the most challenging projects, with many of those 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.

CHEAT ROAD ENGINEERING

Cheat Road Engineering (CRE) is a civil engineering firm located in Morgantown, West Virginia. Since CRE's inception, they have provided civil site, utility, grading, lot layout,roadway, erosion and sediment control, and hydrologic and Hydraulic Design Services. Using the latest equipment along with attention to detail to ensure accuracy and quality, CRE can provide project surveying needs including existing site condition mapping, topographic surveys, flood studies, settlement/landslide monitoring, construction layout, and construction as-builts. They also are experienced in construction observation including concrete testing, soil compaction testing, asphalt compaction testing, shallow foundation bearing capacity confirmation, and utility installation. CRE will provide surveying services as needed. Although CRE has a West Virginia professional Land Surveyor (LS) on staff.

AVAILABLE RESOURCES

JOHN MORGAN MINING TECHNICAL ADVISOR

Education: BS in Mining Engineering // Experience: 45 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. He has a Bachelor of Science 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, many subsidence investigations, and reviews of environmental compliance and liability analyses for both operating and abandoned mining operations. He was the project manager for the Rock Springs Mine Subsidence project for the Wyoming DEQ/AML. He was also the PM 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 Environmental Impact Statement (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 UMCO 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 Abandoned Mine Land Reclamation Award by the US Department of the Interior for the Rock Springs, Wyoming, subsidence mitigation program. Founding member of the West Virginia Special Reclamation Fund (WVSRF) Advisory Council.

AVAILABLE RESOURCES

MICHAEL RICCI, PE PROJECT MANAGER

Education: BS in Mining Engineering // Experience: 41 years

LICENSED STATES

PROFESSIONAL ENGINEER IN WV, IL, IN, KY, MD, NC, NH, OH, TN, VA, & WY

EXPERTISE

- SURFACE MINE RECLAMATION
- POST-CONSTRUCTION STORMWATER
- ENVIRONMENTAL PERMITTIN

RECLAMATION

Michael Ricci will serve as Project Manager for this project. He 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 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 (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 on a quarterly basis, 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 Quality Assurance/Quality Control (QA/QC) Board.

AVAILABLE RESOURCES

DAYKIN SCHNELL ASSISTANT PROJECT MANAGER/EXPLOSIVES

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

Daykin Schnell will serve as Assistant Project Manager and has 8 years of combined experience in the fields of 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.

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

OTHER ACCOMPLISHMENTS

Project manager for multiple underground investigation projects using remote scanning instrumentation.

SURVEY

RECLAMATION

AVAILABLE RESOURCES

JAMES BROWN HEALTH AND SAFETY EXPERT

Education: BS in Environmental Science // Experience: 8 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.

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

EXPERTISE

- DEVELOPING HEALTH AND SAFETY PROGRAMS
- PANDEMIC PREPAREDNESS AND RESPONSE
- WETLAND MONITORING
- STREAM ASSESSMENTS
- GEOTECHNICAL SURVEYS

SURVEY

TIFF HILTON MINING ENGINEER

BS in Mining Engineering // Experience: 47 years

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 and/or co-authored over 15 publications on AMD and water treatment. He formed Working on People's Environmental Concerns (WOPEC) in 1989 and has evaluated AMD sites for 35+ coal companies and has further branched out into non-coal evaluations. In addition, Tiff is 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 EVAULATION

AMD

AVAILABLE RESOURCES

JOHN MCGINN, PE WATER / WASTEWATER PROJECT ENGINEER

BS in Civil Engineering // Experience: 44 years

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

AMD

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 providing 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/or 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 the removal of PFAS using ion-exchange systems. Such a method was the first of its kind for municipal water remediation, and the task from pilot study to a complete water system was accomplished in six months.

AVAILABLE RESOURCES

TODD BALL STREAM RESTORATION SCIENTIST

BS in Environmental Biology // Experience: 21 years

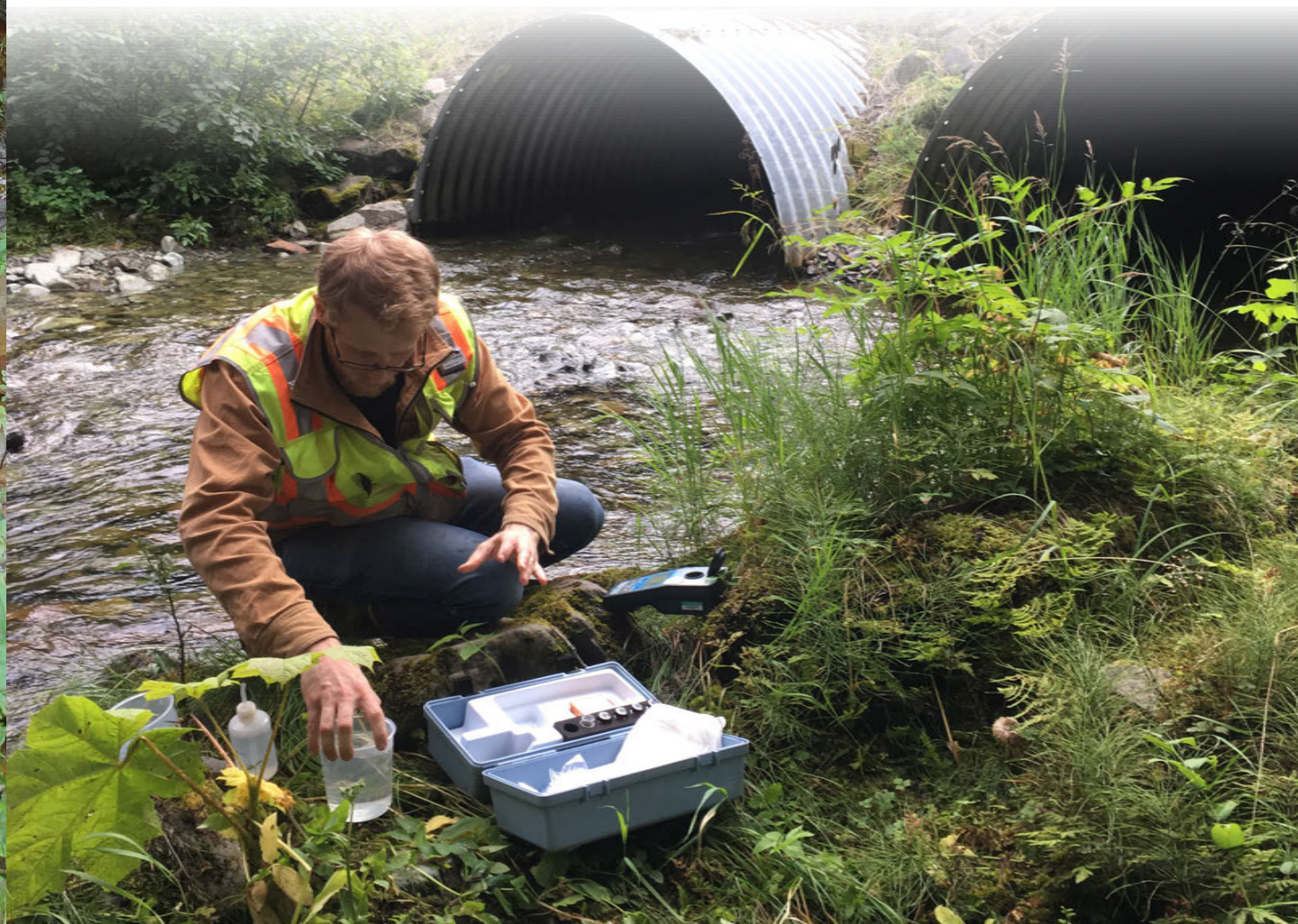
Todd Ball is part of our Post-mining Stormwater/Stream Mitigation Team and will assist with stream stabilization, stream design, and reconstruction on this project. Todd has more than 34 years of experience in providing planning, design, and construction administration services on projects related to 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 in 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.

EXPERTISE

- NATURAL STREAM DESIGN
- USACE 404 PERMITTING AND MITIGATION
- STREAM STABILIZATION

ENVIRONMENTAL

HYDROLOGY



AVAILABLE RESOURCES

KAREN BRADY, PE UTILITY ENGINEER

BS in Civil Engineering // Experience: 21 years

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 in 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 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

HYDROLOGY

AVAILABLE RESOURCES

ALICIA GILLEY, PE WATER / WASTEWATER PROJECT ENGINEER

MS in Biosystems Engineering, BS in Agricultural Engineering //
Experience: 23 years

Alicia Gilley will lead our Post-Mining Stormwater/Stream Mitigation Team for this project, providing engineering services for waterline extension/ water supply replacement; AMD remediation; design of active and passive AMD treatment facilities and evaluation; and the operation, monitoring, maintenance, and/or rehabilitation of existing passive and active AMD treatment systems. As a senior water and wastewater engineer, Alicia is responsible for project management for water and wastewater infrastructure planning, design, and construction projects at RESPEC. Alicia has 23 years of experience in monitoring, inspecting, planning, designing, operating, and maintaining both industrial and domestic water and wastewater systems and associated regulatory requirements. She has worked directly as a utility employee for more than 13 years and has managed collection systems, distribution systems, water and wastewater treatment operations, and biosolids management programs. Alicia's knowledge and experience include designing sampling programs for soil and water environments as well as industrial stormwater, municipal separate storm sewer systems (MS4), and construction stormwater compliance inspections. She provides engineering operational support, monitoring, and regulatory reporting for water, wastewater, and stormwater systems and previously supervised a National Environmental Laboratory Accreditation Program (NELAP) Water and Wastewater Laboratory.

LICENSED

PROFESSIONAL ENGINEER IN KS

EXPERTISE

- REGULATORY COMPLIANCE
- WATER AND WASTEWATER TREATMENT SYSTEM OPERATION AND MAINTENANCE
- ENVIRONMENTAL MANAGEMENT SYSTEMS
- UTILITY ENGINEERING
- PROJECT MANAGEMENT
- WATER AND WASTEWATER SYSTEM MASTER PLANNING
- CONSTRUCTION MANAGEMENT

HYDROLOGY

ACCOLADES

"While each RESPEC staff I have met has been knowledgeable and a pleasure to work with, I would like to highlight the invaluable contributions of Alicia Gilley (program manager/industrial pretreatment program) for her regulatory expertise, critical thinking skills, and attention to detail in the deliverables to the regulated community and to the regulatory agencies. Since 2019, RESPEC's technical knowledge and understanding of our environmental compliance programs has allowed for program growth, strength, and continued compliance amidst increasingly stringent regulatory requirements." Jocelyn Brink, Environmental Compliance Specialist, City of Louisville, Colorado

AVAILABLE RESOURCES

DARWIN MAUST, PLS PROFESSIONAL SURVEYOR

Graduate Salisbury Elk-Lick High School // Experience: 25 years

LICENCED STATES
WEST VIRGINIA ASSOCIATION OF LAND SURVYORS

SURVEY

Darwin Maust has 25 years of diversified surveying experience. His role with this project will be lead surveyor. His experience includes AML sites, commercial and industrial construction layout, property surveys, deed research and plotting, survey computations and drafting, development of topographic mapping, and GPS ground control. As a survey manager, he directs and coordinates the day-to-day activities of the survey in response to construction layout requested by clients. Darwin's experience demonstrates that he will be a vital member of our team.

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

PhD in Mining Engineering, MS in Engineering Management, BS in Mining Engineering // Experience: 40 years

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

GEOTECHNICAL

Dr. Alan (Al) Campoli is part of our Mine Fires and Closure Teams and is our Subsidence Team lead. He has more than 40 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.

AVAILABLE RESOURCES

ERIK HEMSTAD GEOTECHNICAL ENGINEER

MS in Civil-Geotechnical Engineering, BS in Geological Engineering //
Experience: 11 years

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 judgement. 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 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 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.

LICENSED STATES

PROFESSIONAL ENGINEER IN CO & NM

EXPERTISE

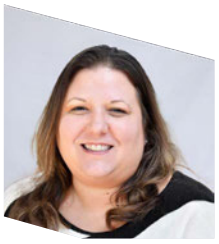
- PROJECT MANAGEMENT
- GEOLOGICAL AND GEOTECHNICAL CHARACTERIZATION AND ANALYSIS
- EXPLORATION PROGRAM DEVELOPMENT AND MANAGEMENT
- SOLUTION MINING ENGINEERING DESIGN AND ASSESSMENT
- GEOMECHANICAL TESTING AND SOILS AND ROCK ANALYSIS
- GEOPHYSICAL AND FIELD INSTRUMENTATION METHODS AND TECHNIQUES

GEOTECHNICAL

ACCOLADES

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

AVAILABLE RESOURCES



WHITNEY FAULKNER, PE ENVIRONMENTAL / CIVIL ENGINEER

BS in Civil Engineering // Experience: 20 years

Whitney Faulkner has 20 years of experience in civil and environmental engineering and is part of our General Reclamation and Post-mining Stormwater/Stream Mitigation Teams. She worked as 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 currently serves as project manager for a Fee in Lieu Of associated with the Kentucky Department of Fish and Wildlife (Fish & Wildlife). She is responsible for a team of professionals who serve as consultants to Fish & Wildlife and is managing multiple projects for Fish & Wildlife.

LICENSED STATES

PROFESSIONAL ENGINEER IN WV AND KY

EXPERTISE

- PERMITTING
- PROJECT MANAGEMENT
- STORMWATER MANAGEMENT
- SITE DEVELOPMENT

HYDROLOGY

AVAILABLE RESOURCES

EDWARD ZEGLEN CONSTRUCTION MANAGEMENT

BS in Mining Engineering // Experience: 44 years

LICENSED STATES

PROFESSIONAL ENGINEER IN PA

EXPERTISE

- ACTIVE CONSTRUCTION MANAGEMENT
- VENTILATION
- SUBSIDENCE

CONSTRUCTION MANAGEMENT

Edward (Ed) Zeglen with GMS has 44 years of experience in the coal mining industry and will provide construction oversight and ventilation and subsidence support on this project. Except for 1 year in Utah, his career has been in Pennsylvania. He has worked as a general mine foreman, production foreman, senior mine engineer, chief underground engineer, and manager of engineering over his career. He was responsible for mine planning and budgeting for an underground mine with a capital budget of $12 million and an annual operating budget of $10 million. He is experienced with both the design and implementation of remediation plans. He currently serves as project manager and chief mine engineer for GMS. He is experienced in ventilation and subsidence issues. Ed is a licensed professional engineer in Pennsylvania and a certified foreman in Pennsylvania and Utah. He is certified in multiple MSHA testing standards and is a qualified mine rescue instructor.

MICHAEL CROSS CONSTRUCTION MANAGEMENT

BS in Mining Engineering // Experience: 41 years

EXPERTISE

- DESIGN SERVICES
- MINING SUBSIDENCE CONTROL PLANS
- CONSTRUCTION OVERSIGHT
- AMD SEEPAGE ANALYSIS
- MINE-CLOSING COSTS
- MINE LIABILITY COST STUDIES

AMD

CONSTRUCTION MANAGEMENT

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 the oversight of contractors conducting reclamation at coal surface mine operations. He has worked on multiple projects related to the treatment of AMD.

AVAILABLE RESOURCES

CRYSTAL HOCKING, PG, PE ENVIRONMENTAL COMPLIANCE AND PERMITTING

MS in Mining Engineering, MS in Structural Engineering, BS in Civil Engineering // Experience: 15 years

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 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

AVAILABLE RESOURCES

MICHAEL RAFFALDI, PE GEOTECHNICAL/ MINING ENGINEER

MS in Mining Engineering, BS in Mining Engineering // Experience: 7 years

Mike has substantial 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 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.

LICENSED STATES

PROFESSIONAL ENGINEER IN KY

EXPERTISE

- EXCAVATION AND PILLAR STABILITY
- GROUND SUPPORT
- GEOMECHANICAL ANALYSIS
- GEOTECHNICAL INSTRUMENTATION
- MATERIAL TESTING

GEOTECHNICAL

CODY KREITEL, PE GEOTECHNICAL ENGINEER

MS in Arctic Engineering, BS in Civil Engineering // Experience: 14 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 for 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 with 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 that are 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.

LICENSED STATES

PROFESSIONAL ENGINEER IN AK

EXPERTISE

- GEOTECHNICAL ENGINEERING
- SUBSURFACE EXPLORATIONS AND EVALUATIONS
- NUMERICAL MODELING
- INSTRUMENTATION
- LABORATORY TESTING
- PERMAFROST AND ARCTIC ENGINEERING

GEOTECHNICAL

AVAILABLE RESOURCES

JAMES KRALIC MINING ENGINEER

Mining Engineering Program // Experience: 31 years

James Kralic, our Closure Team lead, has extensive experience in the construction, operation, maintenance, and reclamation of mine sites. For the last 31 years, James has been immersed in the mine reclamation industry on all levels, from hazard identification, site survey, design, budgets, and construction to passive water treatment (including construction of a passive limestone drainage corridor and a passive bioreactor to treat mine leachate), revegetation, construction management, and project management. James has been involved in mine reclamation projects in six of the Western US states, from industrial mined minerals to precious metals, coal, and uranium mines. James has reclaimed both underground mines and open-pit mines and worked on projects that range from a few cubic yards to several million cubic yards. The construction management phase of the project is the phase that James most enjoys. He is just a few credits shy of completing a Bachelor of Science degree in mine engineering from Montana Technological University in Butte, Montana, but still enjoys performing engineering tasks. James is currently the PM for the Wyoming DEQ/AML 17J Northeast Wyoming Coal Reclamation project, which consists of nearly two dozen mine sites in four separate counties.

EXPERTISE

- PROJECT MANAGEMENT
- CONSTRUCTION MANAGEMENT
- MINE LAND RECLAMATION AND PLANNING
- MINE CLOSURES
- EQUIPMENT OPERATION
- SURVEYING
- PASSIVE MINE DISCHARGE TREATMENT

GEOTECHNICAL

BRADLEY PETRI, PE STRUCTURAL / MINING ENGINEER

MS in Mining Engineering, MS in Structural Engineering, BS in Civil Engineering // Experience: 13 years

Brad 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 American Concrete Institute and American Institute of Steel Construction design standards and application.

LICENSED STATES

PROFESSIONAL ENGINEER IN AL, CO, KY, MS, NM, & 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

AVAILABLE RESOURCES

NEEL GUPTA, PHD GEOTECHNICAL/ MINING ENGINEER

PhD in Mining Engineering, M. Tech & B. tech in Mining Engineering //
Experience: 11 years

EXPERTISE

- GEOMECHANICAL ANALYSES OF UNDERGROUND MINES
- SURFACE SUBSIDENCE
- CREEP CHARACTERIZATION OF SHALE
- IMAGE PROCESSING
- TWO-PHASE FRACTURE FLOW

GEOTECHNICAL

Dr. Neel Gupta is a project engineer in the Mining & Energy business unit of RESPEC, based out of 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 the 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, WV, 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.

AVAILABLE RESOURCES

HONORE ROWE, PG, CPG GEOLOGIST

MA in Geology and Geophysics, BS in Earth and Planetary Sciences // Experience: 18 years

As part of our Geotechnical Team, Honore Rowe will be responsible for drilling programs and geologic interpretation on this project. She is experienced in the geologic characterizations of ore deposits, using geochemical properties, isotopic determinations, and petrography. She has worked on projects in coal, limestone, sand, and gravel. Honore creates geologic models that are used for the estimation of resources and reserves as well as the development of mine plans. Honore performs geologic investigations on site, logging core, and sampling. She develops exploration drilling programs, evaluates existing drilling programs, and develops plans for improvement. She has completed projects in many states and countries. Honore is proficient in the use of the Carlson and Surpac software packages to compile geologic information into a database, create models, and present 3D representations of the ore body.

LICENSED STATES

PROFESSIONAL GEOLOGIST IN KY, CERTIFIED PROFESSIONAL GEOLOGIST

EXPERTISE

- GEOLOGIC MODELING OF COAL SEAMS
- GEOCHEMICAL ANALYSIS
- ISOTOPIC DETERMINATIONS, GEOCHEMICAL INTERPRETATION, AND PETROGRAPHY
- RESOURCE AND RESERVE ESTIMATION

GEOTECHNICAL

SUSAN PATTON, PHD, PE, SME MINING ENGINEER

PhD in Mining/Environmental Engineers, PSc in Mineral Engineering, BSc in Mining Engineering // Experience: 39 years

Dr. Susan Patton is a principal consultant in RESPEC's Mining & Energy 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 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.

LICENSED STATES

PROFESSIONAL ENGINEER IN WV, AL, CO, MT, NM, PA, AND SD

EXPERTISE

- MINING ENGINEERING
- MINE VENTILATION
- RESERVE REPORTING
- COAL MINING
- MINE WASTE MANAGEMENT

RECLAMATION

AVAILABLE RESOURCES

BRETT DRAKE, PE PROJECT ENGINEER

BS in Architectural Engineering // Experience: 11 years

Brett Drake will be on 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 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 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.

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

DEBASHI (DEBA) DAS MINING ENGINEER

MS in Mining Engineering, MTech in Mining Engineering, BTech in Mining Engineering // Experience: 11 years

Debashis (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

ENGINEER IN TRAINING IN KY

EXPERTISE

- MINE PLANNING
- MINING FEASIBILITY AND DUE DILLIGENCE
- MINE PERMIT APPLICATIONS
- SHALE ROCK CHARACTERIZATION

RECLAMATION

ACCOLADES

He received 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.

AVAILABLE RESOURCES

KEITH HANNEMAN, PE CIVIL ENGINEER / TRANSPORTATION DIRECTOR

BS in Civil Engineer // Experience: 35 years

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 35 years of road and highway experience, Keith guides his team in all types of transportation projects. He uses lessons learned from projects spanning175 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

AVAILABLE RESOURCES

JOSEPH NAUGHTON PROJECT BIOLOGIST

MS in Fisheries and Wildlife Management, BS in Fisheries and Wildlife Management // Experience: 16 years

EXPERTISE

- PROJECT MANAGEMENT
- BIOLOGICAL ASSESSMENTS
- WATER QUALITY ASSESSMENTS
- STREAM HABITAT ASSESSMENTS
- STATISTICAL ANALYSIS
- TECHNICAL WRITING

AMD

Joseph (Joe) Naughton is the monitoring group manager for the environment division of the Water & Natural Resources business unit at RESPEC and will provide monitoring oversight as part of our Post-mining Stormwater/Stream Mitigation Team. He has 16 years of experience in 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 (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 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 US Geological Survey, Oregon Department of Fish and Wildlife, US Forest Service, and National Park Service.

PATRICK WIECK, PE MINING ENGINEER

BS in Mining Engineering // Experience: 16 years

LICENSED

PROFESSIONAL ENGINEER IN CO AND WY

EXPERTISE

- PROJECT MANAGEMENT
- CONSTRUCTION MANAGEMENT AND OWNER'S REPRESENTATION/ENGINEER
- MINE DESIGN AND MINE OPTIMIZATION

CONSTRUCTION MANAGEMENT

Patrick Wieck, part of our Construction Management Team, 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, 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 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.

AVAILABLE RESOURCES

PAUL (BRIAN) LEWIS SENIOR DRILL AND BLAST SPECIALIST

BS in Business Management // Experience: 29 years

Paul (Brian) Lewis will assist with blasting and construction oversight needs. Brian is a technical expert for 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.

LICENSED

LICENSED BLASTER IN KY AND IN

CONSTRUCTION MANAGEMENT

AWARDS

International Society of Explosives Engineers President's Award 2021

AVAILABLE RESOURCES

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, and 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.

Among the benefits of using drones for surveying and mapping are the cost and time saved when compared to traditional methods, which means data are collected more safely in rugged terrain. Also, high-resolution imagery and 3D models are generated to allow for improved decision-making.

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 of 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

AVAILABLE RESOURCES

allows all field personnel to remain safely on the surface while essential data are collected. 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 determination of 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 man-made 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 for 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 for private clients to generate reserve estimates and create geologic models. RESPEC is experienced with numerous forms of subsurface exploration, including with hollow-stem augers, solid-stem augers, direct push, mud rotary, air rotary, diamond coring, and sonic drilling.

RESPEC will subcontract drilling services as needed, after the project is assigned and the initial drilling and subsurface investigation plan is developed. RESPEC has a long history of contracting drilling services.

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	DATE (DAY, MONTH, YEAR)	FEIN
WV-DEP – 2022 AML Contract 9 Project North	06/28/2022	83-2898293

1. FIRM NAME	2. HOME OFFICE BUSINESS ADDRESS	3. FORMER FIRM NAME
RESPEC Company, LLC	3824 Jet Drive, Rapid City, South Dakota, 57703	

4. HOME OFFICE TELEPHONE	5. ESTABLISHED (YEAR)	6. TYPE OWNERSHIP	6a. WV REGISTERED DBE
605.394.6400	1969	☐ Individual ☒ Corporation ☐ Partnership ☐ Joint-Venture	(Disadvantaged Business Enterprise) ☐ YES ☒ 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	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS
Todd Kenner – CEO: Jason Love – President: Phil Welling – CFO: John Morgan – Senior Vice President	Michael Ricci: Project Manager 859.361.4540

9. PERSONNEL BY DISCIPLINE

59	ADMINISTRATIVE	1	ECOLOGISTS		LANDSCAPE ARCHITECTS	11	STRUCTURAL ENGINEERS
	ARCHITECTS		ECONOMISTS	27	MECHANICAL ENGINEERS	9	**SURVEYORS**
3	**BIOLOGIST**	17	ELECTRICAL ENGINEERS	32	**MINING ENGINEERS**		TRAFFIC ENGINEERS
21	**CADD OPERATORS**		ENVIRONMENTALISTS		PHOTOGRAMMETRISTS	75	COMPUTER PROGRAMMERS
1	CHEMICAL ENGINEERS		ESTIMATORS		PLANNERS: URBAN/REGIONAL	15	ENVIRONMENTAL ENGINEER / SCIENTIST
84	**CIVIL ENGINEERS**	22	**GEOLOGISTS**		SANITARY ENGINEERS	11	GIS SPECIALIST
3	CONSTRUCTION INSPECTORS		HISTORIANS	6	SOILS ENGINEERS	20	WATER RESOURCE ENGINEER
	DESIGNERS	5	HYDROLOGISTS		SPECIFICATION WRITERS	34	OTHER
	DRAFTSMEN					456	TOTAL PERSONNEL

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE:: 4

***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: Cheat Road Engineering, INC. 5011 Mid Atlantic Drive Suite 110; Morgantown, WV 26508	SPECIALTY: Surveying	WORKED WITH BEFORE ☐ Yes ☒ No
NAME AND ADDRESS: Tiff Hilton; 727 Crowfied 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:	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
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE ☐ Yes ☐ No

12. **A. Is your firm's personnel experienced in Abandoned Mine Lands Remediation/Mine Reclamation Engineering?** ☒ YES ☐ NO

Description and Number of Projects:

RESPEC's Senior Vice President / Technical Advisor and employees have worked on 100+ AML related projects dating back to the 1980's. 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 with analyzing AML projects and designing and constructing solutions that provide safe and long-term stable sites. RESPEC has been awarded two OSMRE reclamation awards for projects in Wyoming.

B. Is your firm experienced in Soil Analysis? ☒ YES ☐ NO

Description and Number of Projects:

RESPEC's staff has extensive experience working on 30+ projects with soil analysis on AML and mining sites. These projects included both geotechnical and environmental analysis 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.

C. Is your firm experienced in hydrology and hydraulics? ☒ YES ☐ NO

Description and Number of Projects:

RESPEC staff has significant experience in hydrology and hydraulics as it relates to AML and mining sites with 100+ projects. RESPEC has designed sediment control structures, diversions and channels and culverts. Staff have performed storm modeling ranging from a 10-year, 24-hour storm event through a PMP 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.

D. Does your firm produce its own Aerial Photography and Develop Contour Mapping? ☒ YES ☐ NO

Description and Number of Projects:

RESPEC has the ability to create a contour map to be used in a design through aerial mapping and/or 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 utilized to generate contour mapping.

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.) ☒ YES ☐ NO

Description and Number of Projects:

RESPEC staff has experience with domestic waterline design and has worked on 30+ projects. These projects include water management and septic design at a personnel camp for a mining operation, designed upgrades to the water system in a subdivision located in the North Pole, evaluation of water and sewer system components, conditions and deficiencies and provide a strategic plan for the utilities in the next 50 years.

F. Is your firm experienced in Acid Mine Drainage Evaluation and Abatement Design? ☒ YES ☐ NO

Description and Number of Projects:

RESPEC and the Team have significant experience in 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-SMCRA mines seeps. In addition, the Team has published 15+ article related to AMD evaluation, remediation and preventive measures.

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: 40	YEARS OF AML RELATED DESIGN EXPERIENCE: 40	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0

Brief Explanation of Responsibilities: Mr. Morgan's 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. Mr. Morgan has significant experience of AML projects, active mining operations and mine closure activities throughout West Virginia. Using his extensive experience, Mr. Morgan will assist RESPEC staff in evaluating each site, identify major issues, and provide expertise in developing an effective solution.

EDUCATION (Degree, Year, Specialization)
BS, 1977, Mining Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
Society for Mining, Metallurgy, & Exploration; American Institute for Minerals Appraisers	

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:		
Ricci, Michael Project Manager	YEARS OF AML DESIGN EXPERIENCE: 2	YEARS OF AML RELATED DESIGN EXPERIENCE: 41	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0

Mr. Ricci will serve as Project Manager for this project. He will be the primary contact between WVDEP and the team. Using his experience with environmental permitting, geologic modeling, stability analysis, hydrologic/sedimentology modeling, Mr. Ricci will be able to evaluate each site and determine a cost-effective, timely plan to remediate the site. Furthermore, Mr. Ricci's experience as president of an engineering consulting firm allowed him to oversee multiple projects while maintaining project schedules and budgets efficiently. His ability to communicate successfully with clients and staff will demonstrate his ability to be an efficient PM.

EDUCATION (Degree, Year, Specialization)
BS, 1981, Mining Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
Society for Mining, Metallurgy, & Exploration	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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Schnell, Daykin Assistant Project Manager	2	8	

Brief Explanation of Responsibilities

Mr. Schnell will serve as Assistant Project Manager for this project. Mr. Schnell has technical experience in abandoned mine investigation, remote scanning and mapping, mine planning and design, and blast design and optimization. As Assistant Project Manager, he will work closely with Mr. Ricci with evaluating sites and determining solutions. Mr. Schnell has extensive experience in managing projects including AML redamation projects, underground investigation, blast optimization, ground vibration control, mine sequence and planning. His unique knowledge of both office and field work management will allow him to effectively manage a diverse range of projects. Mr. Schnell is also experienced in health and safety and emergency response with his mine rescue, first aid, firefighting, Emergency Medical Technician (EMT), 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	REGISTRATION (Type, Year, State)
International Society of Explosives Engineering (ISEE); Society of Mining, Metallurgy & Exploration	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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Brown, James Health & Safety Expert	0	6	0

Brief Explanation of Responsibilities

Mr. 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, Mr. Brown will be able design a health and safety plan to ensure public and personnel safety. Mr. Brown 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.)	YEARS OF EXPERIENCE		
Maust, Darwin	YEARS OF AML DESIGN EXPERIENCE: 25	YEARS OF AML RELATED DESIGN EXPERIENCE: 25	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:

Brief Explanation of Responsibilities

Mr. Maust has 25 years of diversified surveying experience. His role with this project will be lead surveyor. His experience includes AML sites, commercial and industrial construction layout, property surveys, deed research and plotting, survey computations and drafting, development of topographic mapping and GPS ground control. Mr. Maust's experience demonstrates that he will be a vital member of our Team.

EDUCATION (Degree, Year, Specialization)

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		
Campoli, Alan Geotechnical / Mining Engineer	YEARS OF AML DESIGN EXPERIENCE: 45	YEARS OF AML RELATED DESIGN EXPERIENCE: 45	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0

Brief Explanation of Responsibilities

Dr. Campoli will serve a 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 conditions onsite. Dr. Campoli 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	REGISTRATION (Type, Year, State)
Pittsburgh and Central Appalachian Sections of the SME, Professional Engineers Exam Committee, Research Council and Program Committee	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.)	YEARS OF EXPERIENCE		
Hilton, Tiff	YEARS OF AML DESIGN EXPERIENCE: 47	YEARS OF AML RELATED DESIGN EXPERIENCE: 47	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0

Brief Explanation of Responsibilities

Mr. Hilton has 47 years of experience in mining engineering, with an emphasis on acid mine drainage (AMD). He will be an instrumental part of our team with his vast experience in AMD. Mr. Hilton has authored and/or co-authored over 15 publications on AMD and water treatment. He formed Working on People's Environmental Concerns (WOPEC) in 1989 and has evaluated AMD sites for 35+ coal companies and has further branched out into non-coal evaluations. In addition, Mr. Hilton is an experienced surface and underground mine foreman in West Virginia and a certified blaster. Mr. Hilton'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.

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.)	YEARS OF EXPERIENCE		
Faulkner, Whitney Environmental / Civil Engineer	YEARS OF AML DESIGN EXPERIENCE: 2	YEARS OF AML RELATED DESIGN EXPERIENCE: 12	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0

Brief Explanation of Responsibilities

Ms. Faulkner will serve as an environmental / civil engineer. She has 20 years of experience with 12 years specially related to AML related design experience. Her knowledge of site reclamation, environmental permitting, sediment control structures, coal refuse waste structures, including both refuse piles and impoundment, and project management will help in addressing issues on AML sites and proposing a solution that will improve each site. Her combination experience with environmental and civil engineering allows a unique insight into solutions for AML sites.

EDUCATION (Degree, Year, Specialization)

BS, 2002, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	PE, **2019, WV;** 2009, 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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Cross, Mike Project Engineer		41	0

Brief Explanation of Responsibilities

Mr. Cross will serve as a project engineer on this project. His extensive experience in mine design and environmental permitting will be invaluable on this project. He has experience in AMD remediation, highwall reclamation, reclamation liabilities studies and reclamation cost estimates. Mr. Cross 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 is 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		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Brady, Karen Utility Engineer	0	0	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 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 21 years of experience in 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		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Drake, Brett Project Engineer	10	10	

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 if 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

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		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Lewis, Brian Senior Drill and Blast Specialist	0	29	0

Brief Explanation of Responsibilities

Brian Lewis will assist with blasting and construction oversight needs. Brian is a technical expert for 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.

EDUCATION (Degree, Year, Specialization)

BS, 2003, Business Administration

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Licensed Blaster, 1997, KY; 2014, IN

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		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Patton, Susan Mining Engineer		39	0

Brief Explanation of Responsibilities

Dr. 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. 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.

EDUCATION (Degree, Year, Specialization)

PhD, 1193, Mining / Environmental Engineering, MSc in Mineral Engineering, BSc in Mining Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
Society of Metallurgy & Exploration	PE, 1994, AL; 1995, CO; 2022, KY; YEAR, 2000; 2021, NM; 2022, PA; 2022, WV: YEAR, 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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Hemstad, Erik	0	10	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 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.

EDUCATION (Degree, Year, Specialization)

MBA, 2022, Business Administration; MS, 2011, Civil-Geotechnical Engineering; BS, 2005, Geological Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:	REGISTRATION (Type, Year, State)
Society for Mining, Metallurgy & Exploration	PE, 2020, CO

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 (ADCP) 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
Dillian Creek Acid Mine Drainage 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 on-going as mining progresses	$800,000 annually	On-going
Rustic Ridge Review	Mountain Watershed Association PO Box 408/1414-B ICV Road Melcroft, PA 15462	Technical review of pending underground mine permit and assist in development of agreed conditions. Continue monitoring compliance of the ongoing U/G mining operation.	N/A	95%
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. Respec is 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)	On-going
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. In addition, prepared their SEC S-K 1300 Technical Summary. This included reserve/resource analysis, financial modeling.	$250,000 (Engineering costs)	On-going
Manh Choh	Kinross Gold	Design and construction management of access road to new gold mine in Alaska plus water treatment and infrastructure	$100M	0%
Rattlesnake	Wyoming Department of Environmental Quality; 200 West 17th 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 17th 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	0%
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 12th Avenue; Regina Saskatchewan, Canada S4P 2L1	Conducted geomechanical and hydrogeological modelling to aid in the design. RESPEC 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 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 and we are also 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 (FILO) Projects	Kentucky Department of Fish & Wildlife (F&W); 1 Sportsman Lane; Frankfort, KY 40601	Serve as F&W's engineering consultant. Tasks include identifying potential mitigation sites, stream design, construction monitoring & permitting	3.0M	0%
TOTAL NUMBER OF PROJECTS: Overall projects 2,772		TOTAL ESTIMATED CONSTRUCTION COSTS: $205 M		

16. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS SERVING AS A SUB-CONSULTANT TO OTHERS					
PROJECT NAME, TYPE AND LOCATION	NATURE OF FIRMS RESPONSIBILITY	NAME AND ADDRESS OF OWNER	ESTIMATED COMPLETION DATE	ESTIMATED CONSTRUCTION COST	
				ENTIRE PROJECT	YOUR FIRMS RESPONSIBILITY

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

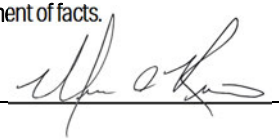
PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
Idarado Mine Mill Level Tunnel Flow Control Bulkhead; Telluride, Colorado	Newmont Corporation; 6900 E. Layton Avenue, Suite 700; Denver, CO 80237	$5 Million	2018	Yes
Subsurface Investigation of Historic Gold Mine; South Pass City, Wyoming	Wyoming, DEQ, AML; 200 West 17th Street, Cheyenne, WV 82002	$8.5 Million	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 17th 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)

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST OF YOUR FIRM'S PORTION	YEAR	CONSTRUCTED (YES OR NO)	FIRM ASSOCIATED WITH

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: Principal Consultant

Printed Name: Michael Ricci, PE

Date: June 28, 2022

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				
North Potomac River Acid Mine Drainage Study	Both	18	X			X						X		X				P,M					
Hartford "B" Project	Both	19		X	X	X					X		X	X	X	X	X	P, M					
Stowe Structures Complex Project	Both	20	X		X	X		X			X		X		X		X	P, M					
Beaver Creek Highwall Project	Both	21	X		X	X					X	X		X			X	P, M					
Twin Branch Complex Project	Both	22	X			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							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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			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	23	X		X					X	X	X	X				X	P, M					
Frostburg Subsidence Reclamation Project	Both	23			X				X								X	P, M					
Crawford Mountains Abandoned Mine Lands Study	Both	24		X					X		X						X	P, M					
Wingate Hill Mine Reclamation	Both	24		X	X				X				X					P, M					
Horse Creek Abandoned Mine Reclamation	Both			X	X				X		X		X					P, M					
OSM Mine Closure Investigation at Wilkeson & 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					

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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	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		

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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					
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Dillan Creek Acid Mine Drainage 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, 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	34				X					X										P		
Patriot Coal – Hobet 45	Both	35										X				X					P, M		
OSM Stream Protection Rule EIS and RIA	Both					X					X										P, M		

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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	27		X					X								X	P, M					
Penneco Foundation Coal Mine Expert Witness Report	Both																	P, M					
WV QA/QC Panel	Both					X												P		P	P		

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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"

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WV AOC+ Policy	Both										X		X					P, M					
US DoJ – Massey / Arch / Magnum	Both											X		X				P, M					
KY AOC Policy	Both										X							P, M					
US EPA – 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.

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION AML CONSULTANT QUALIFICATION QUESTIONNAIRE **Attachment "A"**

PROJECT NAME	DATE (DAY, MONTH, YEAR)	FEIN
WV-DEP – 2022 AML Contract 9 Project North	06/28/2022	N/A - Individual

1. FIRM NAME	2. HOME OFFICE BUSINESS ADDRESS	3. FORMER FIRM NAME
Tiff Hilton	727 Crowfield Circle, Lewisburg, WV 24901	N/A

4. HOME OFFICE TELEPHONE	5. ESTABLISHED (YEAR)	6. TYPE OWNERSHIP	6a. WV REGISTERED DBE
304.392.1156	N/A	☒ Individual ☐ Corporation ☐ Partnership ☐ Joint-Venture	(Disadvantaged Business Enterprise) ☐ YES ☒ 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	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS
Tiff Hilton	N/A

9. PERSONNEL BY DISCIPLINE

____ ADMINISTRATIVE	____ ECOLOGISTS	____ LANDSCAPE ARCHITECTS	____ STRUCTURAL ENGINEERS
____ ARCHITECTS	____ ECONOMISTS	____ MECHANICAL ENGINEERS	____ **SURVEYORS**
____ **BIOLOGIST**	____ ELECTRICAL ENGINEERS	1 **MINING ENGINEERS**	____ TRAFFIC ENGINEERS
____ **CADD OPERATORS**	____ ENVIRONMENTALISTS	____ PHOTOGRAMMETRISTS	____ COMPUTER PROGRAMMERS
____ CHEMICAL ENGINEERS	____ ESTIMATORS	____ PLANNERS: URBAN/REGIONAL	____ ENVIRONMENTAL ENGINEER / SCIENTIST
____ **CIVIL ENGINEERS**	____ **GEOLOGISTS**	____ SANITARY ENGINEERS	____ GIS SPECIALIST
____ CONSTRUCTION INSPECTORS	____ HISTORIANS	____ SOILS ENGINEERS	____ WATER RESOURCE ENGINEER
____ DESIGNERS	____ HYDROLOGISTS	____ SPECIFICATION WRITERS	____ OTHER
____ DRAFTSMEN			____ TOTAL PERSONNEL

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE:: N/A

***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	DATE (DAY, MONTH, YEAR)	FEIN
WV-DEP – 2022 AML Contract 9 Project North	06/28/2022	47-1726270

1. FIRM NAME	2. HOME OFFICE BUSINESS ADDRESS	3. FORMER FIRM NAME
Cheat Road Engineering, Inc.	5011 Mid Atlantic Drive; Morgantown, WV 26508	

4. HOME OFFICE TELEPHONE	5. ESTABLISHED (YEAR)	6. TYPE OWNERSHIP	6a. WV REGISTERED DBE
304.212.5480	2012	☐ Individual ☒ Corporation ☐ Partnership ☐ Joint-Venture	(Disadvantaged Business Enterprise) ☐ YES ☒ NO

7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE

5011 Mid Atlantic Drive; Morgantown, WV 26508

8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS
David Bryte, Owner/President; Scott Copen, Vice President	N/A

9. PERSONNEL BY DISCIPLINE

1 ADMINISTRATIVE	___ ECOLOGISTS	___ LANDSCAPE ARCHITECTS	___ STRUCTURAL ENGINEERS
___ ARCHITECTS	___ ECONOMISTS	___ MECHANICAL ENGINEERS	4 **SURVEYORS**
___ **BIOLOGIST**	___ ELECTRICAL ENGINEERS	___ **MINING ENGINEERS**	___ TRAFFIC ENGINEERS
___ **CADD OPERATORS**	___ ENVIRONMENTALISTS	___ PHOTOGRAMMETRISTS	___ COMPUTER PROGRAMMERS
___ CHEMICAL ENGINEERS	___ ESTIMATORS	___ PLANNERS: URBAN/REGIONAL	___ ENVIRONMENTAL ENGINEER / SCIENTIST
3 **CIVIL ENGINEERS**	___ **GEOLOGISTS**	___ SANITARY ENGINEERS	___ GIS SPECIALIST
2 CONSTRUCTION INSPECTORS	___ HISTORIANS	___ SOILS ENGINEERS	___ WATER RESOURCE ENGINEER
1 DESIGNERS	___ HYDROLOGISTS	___ SPECIFICATION WRITERS	___ OTHER
___ DRAFTSMEN			___ TOTAL PERSONNEL

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE:: 2

***RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.**

APPENDIX B.

RÉSUMÉS

JOHN S. L. MORGAN

SENIOR VICE PRESIDENT, MINING & ENERGY

CAREER SUMMARY

John S. L. Morgan is a mining consultant with extensive experience in both surface and underground mining, for the extraction of metalliferous ores, coal and industrial minerals. He has a degree in Mining Engineering from the Royal School of Mines.

John is the Senior Vice President of RESPEC responsible for its Mining and Energy Division. Previously, John founded Morgan Worldwide Consultants Inc. (MW) in 1995. MW was acquired by RESPEC in January 2014.

John has been the project manager on a number of mine technical reviews, mining operation appraisals, a significant number of subsidence investigations and reviews of the environmental compliance and liability analyses for both operating and abandoned mining operations. He has been actively involved in projects worldwide including: Philippines, Indonesia, Vietnam, Russia, Kazakhstan, India, Finland, France, Ukraine, Poland, Bulgaria, Belarus, Romania, Brazil, Venezuela, Peru, and Trinidad. He has also worked in all regions of the United States. During his career, John has also worked in South Africa, and as a mine planning engineer for an open cast coal site in Britain.

Prior to attending university John served as a Lieutenant in the 3rd Royal Tank Regiment and subsequently as a troop commander in the Royal Monmouthshire Royal Engineers.

SUPPLEMENTARY DATA/KEY QUALIFICATIONS

- Member of the team to develop an EIS and RIA for the Office of Surface Mining's proposed Stream Protection Rule.
- Managed the review of mine reclamation liabilities and bond amounts associated with restructuring of a major coal company in the Powder River Basin.
- Project Manager for the investigation and design of the reclamation issues relating to the abandoned Horse Creek limestone mine near Cheyenne, Wyoming.
- Expert witness testimony regarding the effects of timbering on the run-off from watersheds in southern West Virginia.
- Conducted the Environmental Review and implementation of Environmental Action Plan for PT Bukit Asam coal mining operations in Indonesia prior to an IPO.
- Conducted the Environmental Review and environmental rehabilitation for PT Aneka Tambang's gold nickel and bauxite operations in Indonesia prior to an IPO.
- Performed an Environmental Assessment of the general coal mining environmental issues in Russia.
- Managed the North Branch of the Potomac River AMD Study to determine the sources of Acid Mine Drainage.
- Performed an Environmental Assessment of Minero Peru as part of the Peruvian privatization program.
- Awarded the 1995 Abandoned Mine Land Reclamation Award by the U.S. Department of the Interior for the Rock Springs, Wyoming subsidence mitigation program.

PERSONAL DETAILS

- **Profession:** Mining Consultant
- **Present Position:** Senior Vice President, RESPEC
- **Date of Birth:** 1955
- **Nationality:** US/British

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 (2014–Present)
- Morgan Worldwide Consultants, Inc. (1995–2014)
- Hilltop Basic Resources (2005-2014)
- 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)

PROJECT EXPERIENCE

A representative subset of John's experience is presented below.

Project Management Experience -- John was the manager for the raw materials due diligence effort conducted in support of CRH's successful evaluation and acquisition of the assets divested by Lafarge and Holcim, as required by their merger. The raw materials review included evaluation of reserves, mining approach, restoration liabilities and reserve valuation for operations in Philippines, Brazil, Serbia, Slovakia, Romania, Germany, France, Canada and the UK.

Project Evaluation Experience --Evaluation of the logical mining unit and federal due diligence requirements relating to the Trona leases controlled by Church & Dwight. The task included detailed review of the Trona lease geology available geologic information and current mining practices. The assignment included preparation of conceptual mine plans and estimated capital and operating costs.

Environmental Services -- Contractor to US OSMRE for the preparation of the Environmental Impact Statement and Regulatory Impact Assessment for the proposed new Stream Protection Rule. John was the project manager for the analysis of the proposed Stream Protection Rule and 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 preparation of the rule impacts analyses on longwall mining and coal preparation plant waste disposal.

Coal Mine Experience -- Analysis of the Spruce Mine for the US EPA. 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.

Mine Closure Experience -- Alpha Natural Resources Review of the restoration liabilities associated with two large surface mines in the Powder River Basin. The analysis included recalculation of the current restoration liability, revised regrade, use of cast blasting and revised operating costs for shovel truck and dozer fleets. The analysis resulted in significant reductions in the required reclamation bond amount.

Mine Subsidence Experience -- Development of a drill and grout project for the Wyoming Department of Environmental Quality, which involved the design and contract management for the reclamation of numerous underground coal mines under Rock Springs, in southwestern Wyoming. John's role of project manager included preparation of bid packages, CADD compiled designs, grout design and subsidence potential evaluation; plus 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.

Mine Reclamation Experience -- Evaluation of the potential of combining power plant scrubber sludge, flyash and bottom ash into a pumpable grout that could be disposed of in an adjacent abandoned underground mine. The review included economic analysis of the project and bench scale testing of grout mixes and leachate potential.

Expert Testimony - Expert for the review of the mining operations that have SMCRA and/or CWA violations, to determine the significance of the violations and the scope of remedying both the violation and underlying causes. The mines were located in West Virginia, Virginia, Kentucky and Tennessee. Also conducted site visits to selected mining operations to determine causes of CWA non-compliances and to review remedial actions taken by company. Retained by US DOJ.

PUBLICATIONS & PRESENTATIONS

Morgan, J. S. L. and S. Kossl, 2013. "Installation and Commissioning of a 700tph Modular Aggregate Plant," *Proceedings, AGG1 Academy Meeting*, Henry B. Gonzalez Convention Center, San Antonio, TX, March 19–21.

Morgan, J. S. L., 2010. "Dealing with Clay in Dredge Deposits," *Proceedings, AGG1 Academy Meeting*, Duke Energy Center, Cincinnati, OH, February 15–18.

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 41 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 defendable 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.

DAYKIN SCHNELL, PE

EXPLOSIVES ENGINEERING MANAGER

OVERVIEW

Daykin Schnell has 7 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.

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)

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.

JAMES M. BROWN

DIRECTOR, HEALTH AND SAFETY

OVERVIEW

James Brown has 6 years of combined experience in environmental field services and 2 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.

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)

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 Qcrit 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.

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
2. Peabody Coal Company
3. Arch Coal
4. Ashland Coal
5. Addington Resources
6. Bethlehem Steel
7. Stelco
8. Massey Energy
9. Alpha Natural Resources
10. Amvest
11. Harris Export
12. ICG
13. Harding Lawson
14. Chester Engineering
15. Action Mining
16. Green Mountain Construction
17. Jackson Kelly PLLC
18. WVDEP
19. OSM
20. Newport Trading Company
21. Argus Energy
22. Buena Vista Mines
23. GAI Engineering
24. United Coal Company
25. Marathon Engineering
26. Mary Ruth Coal Company
27. C&K Coal Company
28. Marshall Miller and Associates
29. Grier Limestone
30. Kyanite Mining
31. Huddleston, Bolen, Beatty, Porter, and Copen
32. Columbia Natural Resources
33. Crowell-Moring
34. Progress Fuels
35. Vulcan Materials

PERSONAL/PROFESSIONAL REFERENCES

1. Dr. Jeffrey Skousen—WVU Professor of Soils Science
2. Ben Faulkner—Environmental Consultant-Bratton Farms
3. Larry Emerson-Environmental Environmental Consultant
4. Ron Hamric-Environmental Manager-Arch Coal (Retired)
5. Brent Means—Office of Surface Mining

JOHN P McGINN, PE

TECHNICAL ADVISOR

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.

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 [redacted] and California [redacted]

WORK HISTORY

- RESPEC (2021–Present)
- JDS Hydro (2001-2021)
- Kiowa Engineering (1993-2001)

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 the75-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 ¼-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.

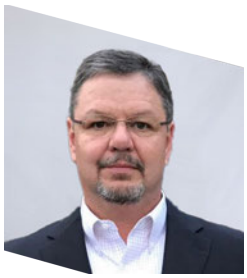
Regional Wastewater Pumping System, Widefield Water and Sanitation District, Colorado Springs, Colorado. John was the project manager for the new Regional Jimmy Camp Wastewater Pumping System. Facility construction included 2 miles of 12-inch force main, a concrete wet well, auxiliary storage systems, 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 C 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.



M. TODD BALL

SENIOR SCIENTIST, STREAM RESTORATION

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.

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

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*.

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, [redacted] (2006)
- Professional Environmental Engineer in Alaska, [redacted] (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.

ALICIA D. GILLEY, PE

SENIOR WATER AND WASTEWATER ENGINEER

OVERVIEW

As a senior water and wastewater engineer, Alicia Gilley is responsible for project management for water and wastewater infrastructure planning, design, and construction projects at RESPEC. Alicia has 23 years of experience in monitoring, inspecting, planning, designing, operating, and maintaining both industrial and domestic water and wastewater systems and associated regulatory requirements. She has worked directly as a utility employee for more than 13 years and managed collection systems, distribution systems, water and wastewater treatment operations, and biosolids management programs. In addition to water and wastewater regulatory expertise, Alicia's knowledge and experience includes designing sampling programs for soil and water environments as well as industrial stormwater, municipal separate storm sewer system (MS4), and construction stormwater compliance inspections. She provides engineering operational support, monitoring, and regulatory reporting for water, wastewater and stormwater systems and previously supervised a National Environmental Laboratory Accreditation Program (NELAP) Water and Wastewater Laboratory.

TECHNICAL EXPERTISE

- Regulatory Compliance
- Water and Wastewater Treatment System Operation and Maintenance
- Industrial Pretreatment Program Management
- Environmental Management Systems
- Project Management
- Utility Engineering
- Water and Wastewater System Master Planning
- Construction Management

EDUCATION

- MS in Biosystems Engineering, Oklahoma State University, Stillwater, OK (2001)
- BS in Agricultural Engineering, Iowa State University, Ames, IA (1995)

REGISTRATIONS & LICENSES

- Professional Engineer in Kansas (No. [redacted])
- Certified Public Manager Program, University of Kansas, Lawrence, KS (2009)

WORK HISTORY

- RESPEC (2018–Present)
- Metro Wastewater Reclamation District (2011–2018)
- City of Olathe (2006–2011)
- Adjunct Instructor, Fort Scott Community College (2007–2010)
- Black & Veatch (2001–2006)

PROJECT EXPERIENCE

Industrial Pretreatment Management, Environmental Compliance Consulting Services, Louisville, Colorado. As the project manager and technical expert for this project, Alicia is responsible for the management of the Industrial Pretreatment; Fats, Oils, and Grease (FOG); Backflow Prevention and Cross Connection (BPCC); and MS4 programs. The scope includes conducting an annual wastewater classification survey of industrial users, identifying categorical industrial users of concern, and identifying noncompliance of wastewater discharge permits. The primary function of the FOG program management is to monitor, document, inspect, and regulate all industrial and commercial businesses that are responsible for operating and maintaining a grease interceptor and inform the City of any potential impacts of commercial and industrial users on the operational efficiencies at the wastewater treatment facility. The approach focuses on the elements that are needed to manage, document, prepare, and submit accurate program information to meet the City's regulatory responsibilities.

Water and Wastewater Authority Engineering Services, Arapahoe County Water and Wastewater Authority, Arapahoe County, Colorado. Alicia provides engineering support for their water and wastewater activities, including planning, design, and constructing capital improvement projects. Alicia also supports ACWWA's developing pretreatment program, identifying industrial activities that may negatively impact the water and wastewater systems. Alicia reviews categorical industries, recommends regulatory requirements for ACWWA, and provides technical support to industries to meet discharge limitations.

Non-Potable Pond Rehabilitation, City of Brighton, Colorado. As the project manager, Alicia is responsible for the design, bidding, and construction services for a new wet well, pump station and intake structure for a non-potable water system used for irrigating City parks.

Forest Hills Booster Pump Station Evaluation, Forest Hills Metropolitan District, Colorado. Alicia served as the project manager, completing a condition assessment report for the treated water Booster Pump Station (BPS). The goals of the investigation included reviewing the BPS for functionality, reliability, maintainability, safety, and cost effectiveness so that the District could make an informed decision whether to update and, as necessary, repair the existing BPS or construct a replacement BPS.

Arapahoe-Elkhorn Well No. 2, Arapahoe County Water and Wastewater Authority, Colorado. Alicia worked as the project engineer during construction of a new groundwater well, well vault, pump station, and chlorination facilities. The project included submittal review, construction inspection, and start-up services.

Lift Station Evaluation, Castroville, Texas. Alicia served as the project engineer, completing an assessment report for the East Side Sanitary Sewer Regional Lift Station (Lift Station). The goals of the investigation included reviewing the Lift Station for expandability, functionality, and cost effectiveness so that the City of Castroville could make an informed decision whether to update and, as necessary, repair the existing Lift Station as new development begins sending wastewater to the Lift Station.

Stormwater Design Standards Update., Greeley, Colorado. Alicia is the project manager responsible for updating the City of Greeley's Stormwater Design Standards. Updates include revisions to design criteria, water quality requirements for new development and redevelopment, permitting considerations, and ecological design specific to the City of Greeley.

Municipal Separate Storm Sewer Systems (MS4) Construction Program, Colorado Department of Transportation (CDOT), Denver, Colorado. Alicia is the project manager responsible for working closely with CDOT's MS4 Construction Program Manager and the five CDOT Regions to design and publish the CDOT MS4 Construction Program Manual (Manual). The Manual compiles standard operating procedures designed to comply with MS4 Permit construction program requirements and findings from the U.S. Environmental Protection Agency's (EPA's) spring 2015 MS4 inspection.

MS4 Program Administrator, City of Lafayette, Colorado. Alicia serves as the Program Administrator of the City of Lafayette's MS4 Program Administrator. As Program Administrator, she manages contract construction stormwater inspectors, tracks compliance with all Colorado Discharge Permit System (CDPS) MS4 permit requirements (COR090000), directs permanent water quality inspections, and is responsible for all reports required by the MS4 Permit, including the City's MS4 PDD and MS4 Annual Report.

MS4 Program Technical Support, Town of Superior, Colorado. Alicia is the project manager, working with the Town to document compliance with MS4 Permit requirements. She also directs MS4 oversite inspections of active construction projects, communicates the Town's expectations for stormwater management to construction contractors, and oversees stormwater plan reviews. RESPEC worked with the Town to provide preliminary floodplain mapping for the Coal Creek and Rock Creek Physical Map Revision for the Town's website.

Engineering Standards Update., Town of Breckenridge, Colorado. Alicia is the project manager responsible for the update to the Town of Breckenridge Engineering Design Standards, which was originally published in 1987. Updates include revisions to design criteria, water quality requirements for new development and redevelopment, permitting considerations, and ecological design that are specific to the Town of Breckenridge.

Technical Advisor, Chatfield Watershed Authority, Colorado. The Chatfield Watershed Authority is comprised of stakeholders within the 400 square mile watershed and is comprised of the Plum Creek basin and South Platte River basin (from the outfall of Strontia Springs Reservoir to Chatfield Reservoir, including the Massey Draw and Deer Creek sub-basins). The members develop and implement projects to protect the watershed, reservoir health and water quality. Alicia serves as the project engineer for the Chatfield Watershed Authority. Her duties include regulatory review, water quality data analysis, site application reviews, and general water quality technical support.

Storm Sewer Condition Assessment, Douglas County, Colorado. Alicia was the project manager and technical lead for this project. The project included reviewing storm sewer inspection videos, recording the condition of the pipe and any irregularities based on the Pipeline Assessment Certification Program (PACP) scale, and adding all attribute information to the GIS. This information will be used to rank which storm sewers are most critical and assist in developing a rehabilitation budget and schedule.

Conservation Practice Standards Review, Natural Resources Conservation Service (NRCS), Colorado. Alicia served as the project manager on a team of engineers and scientists responsible for conducting literature reviews of select peer-reviewed national conservation practice standards (CPSs) and provided NRCS staff with written reports of recommendations for revisions of the standards.

DARWIN MAUST
SURVEY MANAGER

Cheat Road Engineering, Inc.
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Morgantown, WV 26508
304.212.5480 Office
304.290.2174 Cell
304.291.6975 Fax
dmaust@crewv.com

EDUCATION
Graduate Salisbury Elk-Lick High School Salisbury, PA 1995

REGISTRATIONS AND LICENSES
WV Association of Land Surveyors

DIRECT WORK EXPERIENCE AND PRIMARY RESPONSIBILITIES

Cheat Road Engineering, Inc., Morgantown, WV	Survey Manager 2014 - Present
Triad Engineering, Inc., Morgantown, WV	Senior Survey Technician 2000 - 2014
Triad Engineering, Inc., Morgantown, WV	Rodman/Instrument Operator 1998-2000
Randall Myers Land Surveyor, Markleysburg, PA	Survey Technician 1997 - 1998

CURRENT POSITION RESPONSIBILITIES
PROJECT EXPERIENCE SUMMARY

Mr. Maust has **25 years** of diversified surveying experience. His current role as a Survey Manager is to direct and coordinate the day-to-day activities of the Survey Crews in response to Construction layout requests by clients and in house design engineers and construction managers. His experience includes AML, commercial and industrial construction layout, property surveys, deed research and plotting, survey computations and drafting, development of topographic mapping and GPS ground control surveys.

Veterans Affairs Medical Center Addition– RBVetCo, LLC., Clarksburg, WV
As a Survey Manager, responsible for the schedule coordination and establishing the horizontal orientation and vertical relative to the existing hospital structure to ensure a best fit scenario. Tasks included construction stakeout of various concrete foundations, anchor bolts, building corners, site grades, curbing and sidewalks.

WV University Health, SE Tower and Addition–W.G. Yates & Sons Construction/ Mosites *Morgantown, WV*
As a Survey Manager, responsible for crew coordination, performed confirmation checks and provided survey control on all eleven floors for various trades to work from. Confirmation and flatness/vertical tolerance checks of the surgical heart floor. Provided construction computations and layout for super structural steel, buried utilities, retaining walls, curbing, sidewalks. Project consisted of new eleven story tower construction.

WV University Medical, Physicians Office Center –W.G. Yates & Sons Construction/ Mosites *Morgantown, WV*
As a Survey Manager, responsible for crew coordination, performed confirmation checks and provided horizontal and vertical survey control on new and existing floors for various trades to work from. Established vertical control based on as-builts of existing finished floor elevation on adjacent tower walkway tie in at existing five floors. Provided construction computations and layout for super structural steel.

Heinz Field Parking Garage – *Massaro Corporation, Pittsburgh, PA*
As a Survey Manager, responsible for crew coordination, drafting, survey computations and construction stakeout of a new precast parking facility. Construction stakeout of foundations, anchor bolts, building corners, site grades and curbing.

Morgantown Readiness Center – The West Virginia Army National Guard, Morgantown, WV
As a Senior Survey Technician, responsible for drafting, survey computations and construction stakeout of a new facility for Massaro. When finished the facility will consist of maintenance buildings, storage, classrooms, assembly halls and auditoriums. Construction stakeout of foundations, anchor bolts, building corners, site grades, curbing and sidewalks.

West Virginia Department of Transportation – Corridor-H, Baker Engineering, *Hardy County, WV*
As Senior Survey Technician, performed construction stakeout from 2001 to 2006. Reported directly to West Virginia Division of Highways project field engineers in a quality control capacity, receiving assignments and reporting survey data. Project consisted of approximately 7.5 miles of virgin road construction. Construction consisted of four bridges and four separate earth sections. Various horizontal and vertical checks were performed of right of way, drainage structures, slopes, earth volumes, concrete forms, piers, girders, decks, and anchor bolts.

Longview Power Plant, *Maidsville, WV*
As Senior Survey Technician, responsible for construction stakeout of various concrete structures, structural steel, underground utility piping, site grade and anchor bolts for ***Aker Construction***. Construction stakeout and as-built survey data reported of micropile layout for ***Shaft Drillers International***. In a QC capacity, receiving assignments and reporting horizontal and vertical survey data of structural steel, anchor bolts, anchor bolt pockets, equipment nozzles, boiler piping for ***Siemens*** and ***Foster Wheeler***.

National Energy Technology Laboratory-Braun Enterprises, *Morgantown, WV*
As Senior Survey Technician, responsible for survey computations, topographic map development, storm and sanitary structure horizontal and vertical location verifications. Construction stakeout of buildings and site grades.

TrAILCo, 502 Junction, Mon Power – *Mount Morris, Pennsylvania*
As Senior Survey Technician, performed property survey of an ALTA survey including five parcels of approximately 425 acres associated with a new substation facility for TrAILCo (Trans-Allegheny Interstate Line) project. Additional construction survey support was performed at various locations along the transmission line's alignment such as property surveys, establishing substation construction baselines, topographic mapping, monitoring concrete foundation movements – developed spreadsheets for subsidence comparisons, utility pole as-builts and other various surveying tasks.

Hatfield's Ferry Power Station –Richard Goettle Inc., *Masontown, PA*
As a Senior Survey Technician, performance of drafting, survey computations and construction stakeout for a new barge unloading facility. Facility consisted of an open cell sheet pile & a H-pile supported crane platform. Stakeout consisted of template placement, monitoring pile movement during construction, building layout, concrete forms, anchor bolt layout and as-builts.

West Virginia University Basketball Practice Facility, Morgantown, WV
As a Senior Survey Technician, performance of drafting, survey computations and construction stakeout for a new men's and women's basketball practice facility for Massaro. Facility consisted of two basketball courts, locker rooms, coaches' offices/suites, and meeting rooms. Construction stakeout of caissons, foundations, anchor bolts, building corners, site grades, curbing, sidewalks, roadway, sanitary and storm structures. Utility and plan revisions were as-built for university records.

West Virginia Department of Transportation – Raleigh Street Extension, Parsons Brinckerhoff Americas, Inc., *Martinsburg, Berkeley County, WV*
As a Senior Survey Technician, performed Court House deed research and property surveys of approximately 70 parcels that were to be impacted by the project. Additional route surveys were conducted at various locations along the alignment to capture intersecting street grades and buried utilities to be potentially impacted. Project consisted of approximately 1.25 miles of road construction. Construction consisted of bridges, various street ties's and spurs.

The New South Preston Area Pre K-8 School – Preston County Board of Education, Kingwood, WV
As a Senior Survey Technician, responsible for drafting, survey computations and construction stakeout of a new facility for Massaro Corporation. Construction stakeout of foundations, anchor bolts, building corners, site grades, curbing and sidewalks.

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

PRINCIPAL CONSULTANT

OVERVIEW

Dr. Alan Campoli has more than 35 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 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)

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.

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 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 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 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)

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

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.

WHITNEY FAULKNER, PE

PROJECT MANAGER/CIVIL ENGINEER

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 KY, WV, and IL

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)

OVERVIEW

Whitney Faulkner has nearly 20 years of experience in civil and environmental engineering. 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 in working with various software programs, including SEDCAD, GeoStudio, REAME, AutoCAD, Carlson, and ArcMAP.

TECHNICAL EXPERIENCE

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) as well as 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.

Project Management. Whitney serves as project manager for a Fee in Lieu of (FILO) associated with Kentucky Department of Fish and Wildlife (Fish & Wildlife). She is responsible for a team of professionals who serve as consultants to Fish & Wildlife. She also 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) as well as time-and-cost budgeting.

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

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.

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 Security and Exchange Commission (SEC). The TRS was required under Federal Regulations to report exploration results, mineral resources, and mineral reserves. The report included 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.

Civil Engineer Services for Fee in Lieu of Projects (FILO), Kentucky Department of Fish and Wildlife, Frankfort Kentucky. Whitney serves as project manager to a team of professionals who serve as consultants for the Department of Fish and Wildlife (Fish & Wildlife). This project includes site identification and design for stream restorations to be used for mitigation credits. Whitney is also participating in an After-Action Review. She and the team are reviewing previously approved and built mitigation sites to evaluate each site's success and failures.

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/or removal.

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.

Hominy No. 2 Surface Mine, Quinwood Coal Company, West Virginia. Whitney served as a project engineer who was responsible for all 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 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 the permits to ensure that the mining plans were feasible, and 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.

Edward F. Zeglen, Jr.

Work Experience

GMS Mine Repair and Maintenance (December 2017 - Present). Chief Mine Engineer/ Project Manager responsible for developing new business, various job bids and overseeing mine rehab and installation projects. Provide Engineering insight at GMS project locations including NIOSH, U.S. Steel Annandale Mine, The Bison Mine, Consol Pa. mines, and The Raven Rock Mountain Complex.

GMS Mine Repair and Maintenance (November 2016 - November 2017). Trainer, Safety Supervisor, Shift Foreman, Coordinator, Chief Mining Engineer, Project Manager. Annual retraining, new miner training and smoke trailer training. Responsible for safety observations of all employees. Responsible for coordinating crews of 175 men, scheduling, and payroll. Developed various job bids and overseeing mine rehab and installation projects.

Mining Engineering Consultant (September 2015-Present). Independent Consultant providing research and consulting for mining, safety and to various Clients Including Penn State University and Virginia Tech.

Alpha Natural Resources (Pa. Services Corporation) (December 2012-August 31, 2015). Chief Engineer II responsible for the managing all underground and surface Engineering, ventilation and degasification for Cumberland and Emerald Mines. Also manage the Environmental, Land and Geologic departments for Pa. Services Corp. Department consists of 29 employees. Manage mine planning for both operations. Also overseeing a team planning two new coal mines. One longwall mine expected production between 6 and 7 million tons annually and the other a super-section continuous mining operation with expected production at 3 million tons. Maintain working relationship with all state and federal agencies.

Alpha Natural Resources (Technical Services Group) (April 2008-December 2012). Chief Underground Engineer responsible for the Underground Mine Ventilation for all Alpha Natural Resources affiliated mines. Ventilation areas include new shaft and fan planning, computer ventilation modeling and troubleshooting. Member of a team planning two new coal mines. One longwall mine expected production between 6 and 7 million tons annually and the other a super-section continuous mining operation with production at 3 million tons. Maintain working relationship with all state and federal agencies.

Emerald Coal Resources, LP, (Emerald Mine) (Sept.1998-March 2008). **Manager Engineering** responsible for an Engineering Department consisting of 3 mining engineers, 3 surveyors, 1 draftsman, coordinated with 1 land agent, 1 environmental engineer, 1 geologist and interns. Responsible for all engineering for a 6.5 million clean tons (9 million raw ton) / year coal mine. Responsible for mine planning, budgeting and coordinating with operations. Responsible for capital budget of $12 million dollars annually and operating budget of $10 million. Responsible for submitting plans to all state and federal agencies. **Senior Mine Engineer** responsible for ventilation and roof control plans for the Mine. Submitted plans and coordinated the sealing of the abandoned portion of the mine. Worked with the UMWA, Pa. DMS, and MSHA for plan submittals. Responsible for longwall tailgate and bleeder support plans and coordination of the installation. Responsible for mine layout and ventilation modeling. Supervised the underground horizontal degasification drilling program. **Production Foreman** responsible for daily longwall gate road and mains development mining. Crews consisting of 8 to 13 men. Responsible for compliance.

Plateau Mining Corp. (Willowcreek Mine) (Cyprus Amax Coal) (Jan 1998- Aug 1998). General Mine Foreman responsible for safe, efficient operation of underground coal mine consisting of 3 continuous mining units and one

longwall. Responsible for the ventilation of the highly gassy coal seam. Continuous miner mains, bleeder and gate road and longwall mining sections were at depths approaching 3,000 feet. Responsible for the health and safety of 350 employees including salaried, hourly, temporary and contracted employees.

Pennsylvania Services Corporation (Cyprus Amax Coal), (Feb 1996-Dec 1997). Senior Staff Engineer responsible for ventilation troubleshooting at Company owned mines in Pennsylvania, Colorado, Utah, as well as 6 coal mines in New South Wales, Australia. Responsible for completion of surface facilities of new underground coal mine in Helper, Utah. Duties included Construction of Bathhouse, Shop, Warehouse, and yard facilities. Also, consulted on continuous miner development sections for two entry gate roads and main entries. Member of Cyprus Amax Project Management Team to establish guidelines for managing all major projects – from $ 5 million +.
Project Manager responsible for pre-feasibility studies for a new coal mine in Greene County, Pa. Duties included site layouts, permitting, transportation logistics, mine ventilation and roof control design, degasification, coal property and lease acquisitions. Also, oversaw core-drilling program for quality and gas content of Freeport coal seam in Greene County, Pa. Responsible for development and implementation of seal plans for an abandoned coal mine. Also, for the demolition of a coal preparation plant salvaging scrap and receiving income from the project.

Cumberland Mine (Cyprus Amax Coal, U.S. Steel Mining, Co., Inc.) (Jan 1984-Jan 1996). **Sr. Mining Engineer** responsible for mine ventilation and roof control plans. Developed mine sealing plans. Maintained mine ventilation model and mine plans. Ventilation troubleshooter for mines in Pennsylvania and Southern West Virginia and Alabama. Supervised survey crews. Supervised gas well plugging and gob ventilation borehole layout and installation. Planned and conducted mine ventilation changes. **Assistant Mine Foreman** responsible for continuous miner development section. Responsible for weekly examinations of air courses underground consisting of air pressure, velocity, and quality measurements. Responsible for implementation of noise surveys, respirable dust sampling program, and rock dust sampling program. Maintenance of self-contained self-rescuers stored throughout the mine.

United States Steel Corporation, **(June 1983-Jan 1984). Management Associate** that assisted in mine surveying, layouts, gas well and degasification borehole locations.

United States Steel Corporation, **(Dec 1978-May 1983.) Co-operative Student** who received training in the following departments: Mine, Electrical, Industrial, and Civil Engineering, Surveying, Safety, and Coal Prep Plant Lab work. Also received training as a UMWA laborer at the Robena Mine. Supervised main intake / return airshaft construction project for 2 months.

Honors, Memberships

- Pa. State Champion – Mine Rescue Team (Briefing Officer) 1999.
- National Mine Rescue Association Member 1991 – present
- Chaplain of the National Mine Rescue Veteran's Association
- Mine rescue team member (Briefing Officer) from 1991-2003.
- Board of Directors SME Pittsburgh Chapter - 2010 Chairman's Award
- 2015 SME Pittsburgh Section Distinguished Member Award
- 2021 SME National Coal and Energy Division Distinguished Service Award

Certifications And Qualifications

- Pa. Registered Professional Engineer PE-049877-E, 1997
- Pa. Mine Foreman, Mine Examiner Certification.
- Utah Underground and Surface Mine Foreman Certification

Education

- Pennsylvania State University, Bachelor of Science in Mining Engineering, 1983, University Park, PA

MICHAEL L. CROSS

PROJECT ENGINEER / ENGINEER III

OVERVIEW

Michael Cross has more than 41 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 (NWPs), 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.

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. [redacted] Wyoming (No. [redacted] Maine (No. [redacted] New Jersey [redacted] New Hampshire [redacted] and Florida (No. [redacted]
- Professional Geologist in Wyoming (No. [redacted] Louisiana (No. [redacted] Texas (No. [redacted] and New York (No. [redacted]

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.

MICHAEL J. RAFFALDI, PE

STAFF ENGINEER

OVERVIEW

Michael Raffaldi has nearly 7 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 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)

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

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CODY J. KREITEL, PE

SENIOR GEOTECHNICAL ENGINEER

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 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)

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-Fstability 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.

JAMES R. KRALIC

PROJECT MANAGER

TECHNICAL EXPERTISE

- Construction Management
- Mine Land Reclamation and Planning
- Mine Closures
- Equipment Operation
- Surveying

EDUCATION

- Mining Engineering Program, Montana College of Science and Technology, Butte, MT (1990)

CERTIFICATIONS & TRAINING

- MSHA Certification for Surface and Underground Operations (2020)
- HAZWOPER Training (2020)

WORK HISTORY

- RESPEC (2011–Present)
- Kralic Enterprises LLC (2001–2011)
- PHC Reclamation, Inc. (2005–2007)
- Pegasus Gold Basin Creek Mine (1993–2005)
- Helena Excavating (2001–2003)
- Lay of the Land Surveying (1999–2000)

OVERVIEW

James Kralic has extensive experience in the construction, operation, maintenance, decommissioning, and reclamation of mine sites. For the last 31 years, he has focused primarily on mine reclamation and mine closure projects. His skill set involves Project Management, involving generating project contracts and scopes of work, preparing National Environmental Policy Act (NEPA) eligibility documents, cost analysis and project estimates, and encompassing the management of multiple projects comprised of managing manpower, budgets, quality control, scheduling, public relations, dispute resolution, progress reporting, and design. Jim has performed construction management on dozens of projects as pertaining to both small and large mine closure projects and has hands-on experience in performing mine closures applying various techniques including polyurethane foam (PUF) closures, block bulkhead, stone bulkhead, steel doors, and bat gate fabrication closures. Jim has mine operation experience in process solution operation and maintenance, operation and maintenance of stormwater control systems, and air and water and soil monitoring, mine production, ore control, land-application discharge systems and maintenance, leach pad construction/decommission, equipment repair/maintenance, and equipment operation. Jim has construction management and "hands-on" experience in historic building restoration projects.

TECHNICAL EXPERIENCE

Senior Project Manager. Jim currently manages the Northeast Wyoming Coal 17J project for the Wyoming Department of Environmental Quality Abandoned Mine Lands Division. This project is comprised of 17 abandoned coal mine sites falling under NEPA status in Sheridan, Campbell, Johnson, and Hot Springs counties in Wyoming. Jim oversees all aspects of project phases from eligibility, inventory, site investigations, monitoring, remediation/reclamation design, surveying, planning, project estimating, budgeting, construction, construction management, and documentation/reporting of project completion.

Construction Management. Jim has extensive construction management experience related to mine closure and mine reclamation projects, including daily documentation, reporting, and quality assurance/ quality control (QA/QC) monitoring for government regulatory agencies and the private sector. He combines written and oral communications skills with the ability to interpret construction plans and specifications. Jim has extensive experience in providing both project cost tracking and progress tracking. He also prepares bid estimates for construction and mine reclamation projects.

Mine Land Reclamation and Planning. Jim has completed numerous types of physical hazard mitigations and small mine closures involving earthwork, PUF, concrete, block, stone, and bat grates/ gates. As a contractor, Jim has designed, submitted cost estimates, scheduled, managed, and constructed closures. Jim has designed and installed stormwater pollution prevention measures and best management practices. Jim's experience in mine site reclamation includes final drainage and sediment-control feature construction, slope-stability measures and construction, historic mine cleanup, streambed and stream bank restoration, passive water treatment design and construction, bioreactor design/construction and maintenance, reservoir and stormwater pond construction. Jim was involved on an operational and management level of reclaiming a 4-million-yard mine waste dump and associated open pit.

PROJECT EXPERIENCE.

Montana Department of Environmental Quality (DEQ) Contract No. 43018, Montana DEQ, Helena, Montana. Jim was the contractor for this project and provided site-operation services at the Basin Creek

Mine Site. The project included constructing, maintaining, and using water quality infrastructure for water treatment of two leach pads, eight stormwater containment systems, and land-application discharge system. Jim constructed, maintained, serviced, and used a bioreactor water treatment facility and provided technical construction and expertise to the Environmental Protection Agency (EPA) when constructing the nearby Upper Ten Mile National Priorities Listed (NPL) site.

Victor Brown Mine Closures, CDM Engineering, California. Jim was the contractor for this project, which consisted of mitigating 16 hazardous mine openings in a historic gypsum mine located in southern California. The closure techniques consisted of bulk PUF closures that use a foam pump as well as bat-grate construction and placement. Final earth grading was performed at each site.

Basin Creek Mine, Southwest Montana. Jim was the construction manager for this project. The project involved the final reclamation of 300 acres of open pit mine disturbance, including two leach pads. Jim removed the waste dump and backfilled two open pits in a high-elevation area in Montana on the continental divide with harsh operating conditions. The project included organizing and managing manpower and performing site investigations and site stormwater control, processing water treatment and discharge, performing historic mine reclamation, and conducting mine site disturbance reclamation and revegetation. Jim also cooperated with multiple federal and state agencies to construct and manage the development of the EPA's superfund Regional Mine Waste Repository located in the Luttrell Pit.

Vindicator, Morning, and North Ada Mine Mitigation Project, Beaverhead National Forest, Montana. Jim was the construction manager for this project, which included removing 12,000 cubic yards of mine waste from three separate historical mines in southwestern Montana under the US Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program. Jim performed project cost estimating and construction management for the new road-construction, mine waste loading and hauling, erosion control, asbestos mitigation, stream-channel restoration, and revegetation activities.

Wyoming AML 17J, Wyoming DEQ, Wyoming. As the construction manager for the project, Jim conducted investigations, consents, clearances, eligibility design, and construction management on abandoned coal mine reclamation projects. The sites for this project include Custer Armstrong, Hidden Waters Phase 2, Ash Creek, Record Eveland Mine, Carney Mine, Acme 3 Mine, Apache Mine, Waegle Mine, Arvada Townsite, Kooi Mine, Old Monarch Mine, Mitchell Mine, Rock Creek Mine, McNeese Draw, Mike Thomas Residence, Storm King Mine, Tibbits Mine Dietz Mine, Hotchkiss Mine, and Plachek Pit. The mitigation efforts range from conducting multimillion cubic yard, mass-grading projects to mitigating hazardous sinkholes and portals that require PUF, rock/concrete, rock bulkhead, and compacted backfill closures.

Wyoming AML 17F, Wyoming DEQ, Cheyenne, Wyoming. As the construction manager for the project, Jim conducted investigations, consents, clearances, eligibility design, and construction management on abandoned coal mine reclamation projects. The sites for this project include Custer Armstrong, Hidden Waters Phase 2, Ash Creek, Record Eveland Mine, Carney Mine, Acme 3 Mine, Apache Mine, Waegle Mine, Arvada Townsite, Kooi Mine, Old Monarch Mine, Mitchell Mine, Rock Creek Mine, McNeese Draw, Mike Thomas Residence, Storm King Mine, Tibbits Mine Dietz Mine, Hotchkiss Mine, and Plachek Pit. The mitigation efforts range from conducting multimillion cubic yard, mass-grading projects to mitigating hazardous sinkholes and portals that require PUF, rock/concrete, rock bulkhead, and compacted backfill closures.

Wyoming AML 17L, Wyoming DEQ, Cheyenne, Wyoming. Jim was the construction manager for this project, which included investigations, consents, clearances, eligibility, surveying, design, and construction management on abandoned coal mine reclamation projects. The sites included Layland Canyon Mine, Leefe Mine, and Raymond Canyon. The mitigation efforts range from performing multimillion cubic yard mass-grading projects to mitigating hazardous sinkholes and portals that require PUF, rock/concrete, rock bulkhead, and compacted backfill closures. The Leefe Mine required a bank-scour assessment and stream-channel investigation.

Wyoming AML 64-NC, Wyoming DEQ, Cheyenne, Wyoming. Jim was the project designer and construction manager for the Layland Canyon Phosphate Mine Slope Failure Mitigation project. This project involved an initial slope-stability investigation and report, topographic survey, construction design, construction management, as-built survey, and final drawings. The project addressed the failure of a steep 2:1 previously reclaimed slope, which involved reducing a 1,300-foot main bench and constructing compacted engineered slope benches using geogrid and various compaction methods.

BRADLEY S. PETRI, PE

PROJECT ENGINEER

OVERVIEW

Bradley Petri has more than 13 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 FLAC3D. 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

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 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)

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.

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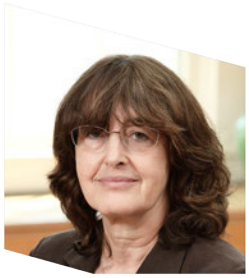
Trivedi, R., T. N. Singh, and N. Gupta, 2015. "Prediction of Blast-Induced Flyrock in Opencast Mines Using ANN and ANFIS," *Geotechnical and Geological Engineering*, Vol. 33, No. 4, pp. 875–891.

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.



HONORE D. ROWE, PG, CPG

GEOLOGIST

OVERVIEW

Honore Rowe has exceptional scientific and research skills in conducting geologic analyses for clients. She excels in due diligence work, geologic modeling and reserve estimation, and geologic characterization of ore deposits. She has led many exploration drilling programs and performed the geological interpretation and logging of core.

PROJECT EXPERIENCE

Topliff Project, Tooele, Utah. Honore performed on-site field mapping and evaluation; developed the exploration drilling and seismic survey programs; logged, sampled, and defined the core-sample testing and analysis; and built a geologic model delineating the mineable zones of the deposit based on structure, faulting, lithology, and geochemical grade parameters and constraints for resource and reserve calculations for developing a new surface mine of a structurally and geochemically complex deposit.

Cemex, Battletown-Cole Project, Kentucky. Honore performed an on-site geologic site evaluation; developed the exploration drilling plan; provided drilling oversight; logged and sampled core in a core laboratory for geochemical analysis; built a geologic model to delineate the mineable zones of the deposit based on structure, lithology, and geochemical grade parameters or constraints, for use in resource and reserve calculations; and calculated a resource estimate of limestone feed for cement production.

Pete Branch II, Gilbert, West Virginia. Honore reviewed and interpreted drillcore logs and e-logs for coal seam correlation and geologic modeling of coal deposits using the Carlson software. She also compiled overburden analyses to model and identify toxic materials (including selenium) for special handling during coal extraction.

Cemex, Victorville Project, California. Honore performed an on-site geologic site evaluation; reviewed and evaluated previous drill core and blast data; built a geologic model to delineate the mineable zones of the deposit based on structure, lithology, and geochemical grade parameters or constraints for resource and reserve calculations; and classified and calculated a resource estimate of limestone feed for cement production.

Huff Creek Surface Mine, Wyoming County, West Virginia. Honore compiled overburden analyses and used three-dimensional (3D) block modeling to identify potentially toxic material. With this information, a volume estimate of material that should be specially handled during coal extraction was generated and a resulting Materials Handling Plan was developed according to West Virginia's Surface Mining Rules.

Sydney Ohio, Sydney Sand and Gravel Project, Ohio. Honore performed an on-site geologic site evaluation; reviewed and compiled drilling data from previous drill core; built a geologic model of the deposit based on structure and grading of aggregate material; and calculated a resource estimate of the sand and gravel deposit.

Continental Cement, Hannibal, Missouri. Honore developed the exploration drilling program and defined the testing and analysis work that should be conducted in consideration for developing a new underground mine. All of the structural geology and geologic modeling of the deposit was performed using Carlson software. Three-dimensional block modeling was performed on quality assays to determine the optimum mining horizon and highest recovery of limestone.

TECHNICAL EXPERTISE

- Geologic Modeling of Limestone, Coal Seams, Selenium Toxicity, Sand, and Gravel Deposits
- Geochemical Analyses
- Isotopic Determinations, Geochemical Interpretation, and Petrography
- Resource and Reserve Estimation
- GIS
- AutoCAD/Carlson
- Surpac
- Rockware
- EVS

EDUCATION

- MA in Geology and Geophysics, Rice University, Houston, TX (1998)
- BS in Earth and Planetary Sciences, University of New Mexico, Albuquerque, NM (1995)

REGISTRATIONS & LICENSES

- Professional Geologist in Kentucky
- Certified Professional Geologist
- Registered Member of Society for Mining, Metallurgy & Exploration

PROFESSIONAL MEMBERSHIPS

- Society for Mining, Metallurgy, & Exploration
- American Institute of Professional Geologists (AIPG)

WORK HISTORY

- RESPEC (2014–Present)
- Morgan Worldwide Consultants, Inc. (2007–2013)
- University of Kentucky (2006–2007)
- United States Geological Survey (1998–2001)
- Rice University (1996–1998)

Muirfield Holdings, Florence, Alabama. Honore developed the drilling program for consideration of reopening an abandoned marble quarry near Florence, Alabama. She assisted field personnel with interpreting the geology, constructed the geologic model, and generating the detailed geologists' logs in Rockware. With the on-site core samples, Honore completed the core analyses with splitting and polishing sections to determine suitability for marketable marble tile.

Tennessee Unsuitable Lands, Tennessee. Honore used compiled databases to construct a geologic model of coal seams within the North Cumberland Wildlife Management Area and Emory River Conservation Easement area, using Carlson software, that encompassed approximately 172,000 acres. The model was then used to estimate coal resources within the combined areas.

CRH Lafarge/Holcim Integration, Multiple Locations. Honore was the lead modeler for eight project/quarry areas, assisting modeler for six project areas, and consulting modeler for five project areas. As a modeler, she evaluated and interpreted existing geologic data, developed exploration drilling programs, defined the testing and analysis work to be conducted, and created geologic models at existing, structurally and geochemically complex limestone and clay quarries. All of the structural geology and geologic block modeling of the deposits was performed using Surpac software. Three-dimensional block modeling was performed on quality assays with structural constraints to determine the optimum mining horizons and highest recovery of limestone and clay, classify and calculate a resource estimate of limestone feed for cement production, and calculate the reserve classifications.

PUBLICATIONS & PRESENTATIONS

Amato, J. M., H. D. Rowe, J. Wright, and E. Miller, 1998. "Cretaceous Granitoids and Crustal Extension in the Bering Strait Region," *Proceedings, EOS Transactions of the American Geophysical Union Spring Meeting*, *Supplemental*, Boston, MA, May 26–29.

Rowe, H. D., D. Harold, A. M. Kudo, and J. W. Geissman, 1995. "Geochemistry and Petrogenetic Modeling of Cerro de Los Lunas Andesites," *Proceedings, EOS Transactions of the American Geophysical Union Fall Meeting*, *Supplemental*, Vol. 76, No. 46.

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 35 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

MANAGER

OVERVIEW

Brett Drake has 10 years of 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 a 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 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.

PROJECT EXPERIENCE

AML 17.7, Wyoming Department of Environmental Quality (DEQ) Abandoned Mine Land 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 (QA/QC) of the dataset.

AML 10C, Wyoming DEQ, Abandoned Mine Land Division, Wyoming. Brett, as the Assistant Project Manager, performs a variety of roles within the AML 10C project including field investigation, design oversight, and management. Brett performed investigations for surface and sub-surface features at a historic Limestone Mine which required locating and inventorying dozens of mine openings. Brett also assisted with design for mitigation of a bench highwall by utilizing Carlson Natural Regrade and AutoCAD Civil 3D.

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.

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)

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. 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. Projects, including 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 pre-design report. 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 pre-design report; 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

MINING ENGINEER

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 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

- Engineer in Training (EIT) 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)

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," I*nternational 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 35 years of road and highway experience, Keith guides his team in all types of transportation projects. He uses lessons learned from projects spanning175 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.

JOSEPH (JOE) NAUGHTON

SENIOR BIOLOGIST

OVERVIEW

Joe Naughton is the monitoring group manager for the environment division of the Water & Natural Resources business unit at RESPEC. He has 16 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 lewisi*). 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,

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)

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 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.

PATRICK WIECK, PE

MANAGER, DENVER MINING DIVISION

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.

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)

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

Rector

Registrar

Vest Virginia State Board of Registration for Professional

fee has been received and your pocket card showing that you
ice engineering in West Virginia until June 30, 2003 may be detac
that date.

State of West Virginia

State Board of Registration for Professional Engineers

This is to certify that Professional Engineer

MICHAEL A RICCI License No: [redacted]

has met the requirements of the law, is duly registered and is entitled to practice engineering in the State of West Virginia.

EXPIRES JUNE 30, 2003

Search: Details

Name:	MICHAEL A. RICCI
WV Professional Engineer:	**PE License Number:** [redacted]
	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:	[redacted]
Primary Employer of Record:	RESPEC PO BOX 888 LEXINGTON, KY 40588
	* 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.

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. Singletary
President of the University

Chairman, Board of Trustees

UNIVERSITY OF KENTUCKY
LEXINGTON, KENTUCKY

Dean of the College

Elberon W. Ockerman
Dean of Admissions and Registrar

COMMONWEALTH OF KENTUCKY

Be it known that

Reinhold Daykin John Schnell

having qualified, as authorized 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 19th day of April, 2021

_____ *Chair*

D. Clay Kelly

_____ *Secretary*

License No. [redacted]

Issued by the

Kentucky State Board of Licensure for Professional Engineers and Land Surveyors

Kentucky Board of Engineers & Land Surveyors

ABOUT | GETTING LICENSED | CONSUMER INFORMATION | ALREADY LICENSED? | CONTACT US | CALENDAR OF EVENTS

Name: Reinhold Schnell

Professional Engineer: Number: [redacted]
Status: Current
Issue Date: 04/19/2021
Expiration Date: 06/30/2024

Professional Land Surveyor:

Address of Record: [redacted]

Responsible Charge For:

Disciplinary Action?:

DEPARTMENT OF TRANSPORTATION — FEDERAL AVIATION ADMINISTRATION

I NAME
REINHOLD DAYKIN SCHNELL

V ADDRESS [redacted]

U

VI NATIONALITY USA SEX HEIGHT WEIGHT HAIR EYES

IVa D.O.B. [redacted]

IX HAS BEEN FOUND TO BE PROPERLY QUALIFIED TO EXERCISE THE PRIVILEGES OF

A

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III CERTIFICATE NUMBER [redacted]

X DATE OF ISSUE 31 JAN 2019

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XIV OK Elwell

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

Provost

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

Chair, Board of Regents

President


I UNITED STATES OF AMERICA XI
DEPARTMENT OF TRANSPORTATION • FEDERAL AVIATION ADMINISTRATION
IV NAME
JAMES MICHAEL BROWN
V ADDRESS
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VIII ACTING ADMINISTRATOR

Cincinnati State
WORKFORCE DEVELOPMENT

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

Instructor or Program Manager

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 25, 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.

SEAL

Board Chair

[redacted]

Board Secretary

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

[redacted]
Number

11/01/2021
Issue Date

Active
Credential Status

10/31/2023
Expire Date

Verify this credential at: dpo.colorado.gov

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

[redacted]
Number

11/01/2021
Issue Date

Active
Credential Status

10/31/2023
Expire Date

Verify this credential at: dpo.colorado.gov

Division Director: Ronne Hines

Credential Holder Signature

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.

Dave Penrose

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

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 D. Carson
Chairman of the Board of Governors

C. D. Spangler Jr.
President of the University of North Carolina

J. A. Bennett
Chairman of the Board of Trustees

Richard R. Eakin
Chancellor of East Carolina University

License #: [redacted]
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 #: [redacted]
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 IV
President of The Regents of Education

Richard J. Lamer
President of The School
of Mines and Technology

Board of Technical Professions

State of Kansas

Certifies That

Alicia D. Gilley

PROFESSIONAL ENGINEER, LICENSE NO. [redacted]

is licensed to practice in the State of Kansas

Thomas E. Mulinazzi
Chairperson

Secretary

Dated December 29, 2005

Kansas Board of Technical Professions Licensee Details

Demographic Information

Licensee Name: Alicia D. Gilley

Location Information

City: [redacted]

State:

Zip:

License Information

License Number:	[redacted]	**License Type:**	Professional Engineer	**License Status:**	Active
Originally Issued:	12/29/2005	**Last Renewed:**	4/29/2022	**Expiration:**	4/30/2024
Obtained By:	Examination				

Digital Documents

No Related Licensing Documents

The Oklahoma State Regents for Higher Education acting through

Oklahoma State University

have admitted

Alicia Dawn Gilley

to the degree of

Master of Science

Biosystems Engineering

and all the honors, privileges and obligations belonging thereto,
and in witness thereof have authorized the issuance of
this Diploma duly signed and sealed.
Issued at the Oklahoma State University at Stillwater, Oklahoma on the
third day of August, two thousand one.

OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION
VITA ABUNDANTIOR
1941

For the Regents

Chairman

Secretary

Chancellor

For the University

Chairman, Board of Regents

President of the University

Dean of the Division

OKLAHOMA STATE UNIVERSITY
INSTRUCTION RESEARCH EXTENSION
1890

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

[redacted]

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

[redacted]

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.

C C Garrison Jr.
Rector

Edmund G Henneke
Dean

Paul E Torgersen
President

Dean

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 K. Richardson
Chair of the Board of Control

President of the University

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

State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors

Erik A Hemstad

Professional Engineer

[redacted]
N

11/01/2021
Issue Date

Active
Credential Status

10/31/2023
Expire Date

Verify this credential at: dpo.colorado.gov

Division Director: Ronne Hines Credential Holder Signature

Colorado Department of Regulatory Agencies
Division of Professions and Occupations

State Board of Licensure for Architects, Professional Engineers and Professional Land Surveyors

Erik A Hemstad

Professional Engineer

[redacted]
Number

11/01/2021
Issue Date

Active
Credential Status

10/31/2023
Expire Date

Verify this credential at: dpo.colorado.gov

Division Director: Ronne Hines Credential Holder Signature

The State of West Virginia

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 [redacted]

"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

West Virginia State Board of Registration for Professional Engineers

rch... SEARCH

- e
- eral Information
- alendar of Events
- oard Agendas / Minutes
- ublications / Reports
- djust Font Size / Zoom In
- ontact Us / Feedback
- isitor Survey
- t Virginia Board
- oard Members
- oard Staff
- gency Organization Chart
- ision / Mission Statement
- oard / Licensure History
- t Virginia Engineering Law
- est Virginia Engineering Law
- nforcement / Disciplinary ctions
- ortance of Licensure
- nge of Address-Individual
- nge of Address-Company
- nse / COA Verification
- lications / Forms
- ngineer Intern Certification
- nitial Licensure (PE Examinee)
- omity / Reciprocity
- E Reinstatement
- uthorized Company (COA)
- pecial Exam Accommodations
- tinuing Education
- ewal Services
- rofessional Engineer
- etired Engineer
- uthorized Company (COA)
- nactive / Lapsed Status
- rint PE Wallet Card/Receipt
- rint COA Wall Certificate
- al Media
- rnational Issues

A Century of Service!

1921 – 2021

Search: Details

Name:	WHITNEY ELAINE FAULKNER
WV Professional Engineer:	PE License Number: [redacted]
	PE License Status: Active
	PE Issue Date: 08/20/2019
	PE Expiration Date: 12/31/2022
Continuing Education Claim:	Qualifying Hours from Last Renewal or Reinstatement:
	Carryover Hours for Next Renewal:
	Last Renewal or Reinstatement Date*: 12/2/2020
WV Engineer Intern:	EI Certification Number:
	EI Issue Date:
Primary Address of Record:	[redacted]
Primary Employer of Record:	RESPEC 146 EAST THIRD STREET LEXINGTON, KY 40508

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 T. Todd, Jr.
President of the University

Billy Joe Miles
Chairman, Board of Trustees

UNIVERSITY OF KENTUCKY
1878 1916
1865
UNITED WE STAND - DIVIDED WE FALL

Thomas W. Lester
Dean of College

Donald E. Witt
University Registrar

BUREAU OF PROFESSIONAL AND OCCUPATIONAL AFFAIRS

P. O. Box 2649

Harrisburg, PA 17105-2649

06/20/2022

License Information

EDWARD F ZEGLEN JR

[redacted]

Board/Commission:	State Registration Board for Professional Engineers, Land Surveyors and Geologists	Status Effective Date:	05/12/2008
LicenseType:	Professional Engineer	Issue Date:	03/13/1997
Specialty Type:		Expiration Date:	09/30/2023
License Number:	[redacted]	Last Renewal:	08/04/2021
Status:	Active		

Disciplinary Action Details

No disciplinary actions were found for this license.

This site is considered a primary source for verification of license credentials provided by the Pennsylvania Department of State.

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.

Hans A. Bulig
PRESIDENT OF THE UNIVERSITY

PRESIDENT, WEST VIRGINIA BOARD OF REGENTS

DEAN OF THE COLLEGE

Ben G. Morton
CHANCELLOR, WEST VIRGINIA BOARD OF REGENTS

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: [redacted]

Expiration: 12/31/2020

Michael Albertson, Chairman

Steven O. Thingelstad, Secretary

Kathryn Patterson, Executive Director

SOUTH DAKOTA DEPT. OF LABOR & REGULATION

South Dakota Board of Technical Professions

Licensee Roster

Search By: Name * Hocking

Profession: All Professions

Status: All Statuses

PE Disc.: All

City:

State:

Search | Reset

* 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	[redacted]						MN	12/31/2022	Active

State of Louisiana
BOARD OF PROFESSIONAL GEOSCIENTISTS

Crystal M. Hocking

LICENSE NO. [redacted]

EXPIRING ON OCTOBER 14, 2022

[redacted], 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.

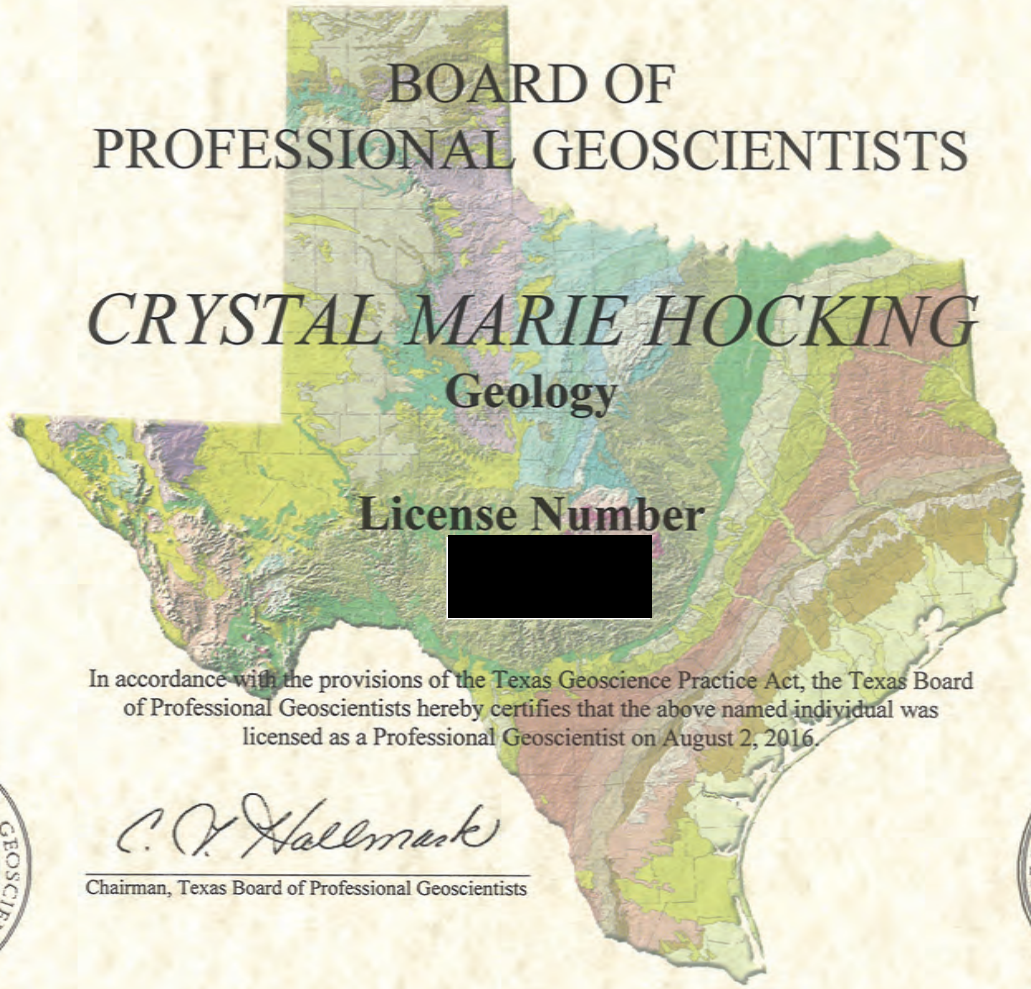
With best regards,
Brenda Macon, Executive Secretary

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 [redacted]

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 Rusch
President of The School
of Mines and Technology

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

_____ *Chair*

William A. Bowie, J.

_____ *Secretary*

License No. [redacted]

Issued by the

Kentucky State Board of Licensure for Professional Engineers and Land Surveyors

Kentucky Board of Engineers & Land Surveyors

Name: Michael Raffaldi

Professional Engineer: Number: [redacted]
Status: Current
Issue Date: 07/03/2018
Expiration Date: 06/30/2024

Professional Land Surveyor:

Address of Record: [redacted]

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 Capilouto
President of the University

Susan Carvalho
Interim Dean of College

Oliver Keith Gannon
Chair, Board of Trustees

Donald E. Witt
University Registrar

License #: [redacted]
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.

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	Effective	Expires
[redacted]	12/13/2021	12/31/2023

CODY JAMES KREITEL
[redacted]


I UNITED STATES OF AMERICA XI
DEPARTMENT OF TRANSPORTATION • FEDERAL AVIATION ADMINISTRATION
IV NAME
CODY JAMES KREITEL
V ADDRESS
[redacted]
U
VI NATIONALITY USA SEX HEIGHT WEIGHT HAIR EYES
IVa D.O.B. [redacted]
IX HAS BEEN FOUND PROPERLY QUALIFIED TO EXERCISE THE PRIVILEGES OF
II REMOTE PILOT
III CERTIFICATE NUMBER [redacted]
X DATE OF ISSUE 19 OCT 2020
A
XIV
VIII ADMINISTRATOR
S

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

UNIVERSITY OF ALASKA
AD SUMMUM
ANCHORAGE

Patricia A Jacobson
Chair of the Board of Regents

Tom Case
Chancellor

TK Gamble
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

Chair

Secretary

License No. [redacted]

Issued by the

Kentucky State Board of Licensure for Professional Engineers and Land Surveyors

Name: Petri, Bradley
Student SSN: *****[redacted]
Student Number: [redacted]
Print Date: 08/28/2014 **Page Number:** 1 of 1

Issued to:

Requested by: Bradley Petri

Graduate Academic Record

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

2010 Fall Semester

Program:
Graduate School
Master of Science in Mining Engineering
Major: Mining Engineering

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	QPTS	GPA
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 & ENVIRONMENTAL ISS	A	3.0 *	12.00
MNG 264	MINING METHODS	A	3.0 *	12.00

	AHRS	EHRS	QHRS	QPTS	GPA
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	QPTS	GPA
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				

2012 Spring Semester

CRS NUM	COURSE TITLE	GRADE	HOURS	QPTS
MNG 699	TOPIC IN MINING ENGR: TUNNELING FOR MNG	A	3.0	12.00
MNG 531	ADV BLAST DES AND TECH	B	3.0	9.00

	AHRS	EHRS	QHRS	QPTS	GPA
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 TRANSPORT	B	3.0	9.00

	AHRS	EHRS	QHRS	QPTS	GPA
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				

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

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 ANALYSIS	B	3.0	9.00

	AHRS	EHRS	QHRS	QPTS	GPA
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

Program:
Graduate School
Doctor of Philosophy
Major: Mining Engineering

CRS NUM	COURSE TITLE	GRADE	HOURS	QPTS
CE 508	DESIGN & OPTIMIZATION OF CONSTRUCTION	---	3.0	0.00

	AHRS	EHRS	QHRS	QPTS	GPA
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** ***

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

In the name and by the Authority of the

Commonwealth of Kentucky

Kentucky Board of Registration for Professional Geologists

Honore Deborah Rowe

having qualified as required by act of the General Assembly, is duly registered and is hereby authorized to practice in the Commonwealth of Kentucky as a

Professional Geologist

In Testimony Whereof we have affixed our hand and seal of the Kentucky Board of Registration for Professional Geologists.

/s Mark Sweet

Chair

Registration Number: [redacted]

Issue Date: April 20, 2009

Expire Date: December 30, 2023

RICE UNIVERSITY

AN AMERICAN INSTITUTION
DEDICATED TO THE ADVANCEMENT
OF LIBERAL AND TECHNICAL LEARNING
AND THE PROGRESS OF HUMANKIND
IN LETTERS SCIENCE AND ART
FOUNDED AND ENDOWED
AD MAIOREM DEI GLORIAM
BY WILLIAM MARSH RICE
IN FREEDOM FOR RESEARCH
TO SOBER FEARLESS PURSUIT
OF TRUTH BEAUTY RIGHTEOUSNESS
AND TO ALL HIGH EMPRISE CONSECRATED
WOULD HAVE ALL KNOW BY THESE PRESENTS
THAT IN THE PRESENCE OF THE TRUSTEES FACULTY
STUDENTS AND FRIENDS OF THIS UNIVERSITY
IN PUBLIC CONVOCATION ASSEMBLED
THE TRUSTEES HAVE CONFERRED UPON

HONORE DEBORAH ROWE

A STUDENT OF THE UNIVERSITY

THE DEGREE OF MASTER OF ARTS

WITH ALL THE RIGHTS DUTIES AND PRIVILEGES
APPERTAINING TO THAT DEGREE

HOUSTON, TEXAS
MAY NINTH
A. D. MCMXCVIII

Malcolm Gillis
PRESIDENT

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
[redacted]

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** [redacted] 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)).

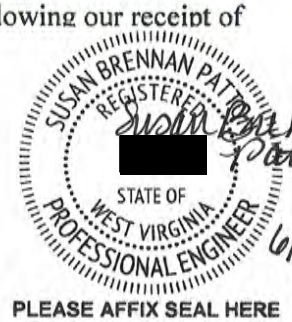
You are not licensed to practice or offer engineering in the State of West Virginia until we have a copy of your seal on file in our office and the final $25 registration certificate fee has been received. In order to complete the registration process, please remit a check in the amount of $25 and return 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



Susan Brennan Patton 6/20/22
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
[redacted]

STATE OF ALABAMA
BOARD OF LICENSURE FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS
2022|2023

SUSAN BRENNAN PATTON

Is duly licensed as a
PROFESSIONAL ENGINEER

License Number: [redacted]
Status: **Active**
Expire Date
12/31/2023

William R. Huett
Executive Director

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 Thereof, 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 Eaglen
Dean

Wyoming Board of Professional Engineers and Professional Land Surveyors

VERIFY LICENSE

Individual Search : ◉ Firm Search : ○

Last Name : Drake

First Name : Brett

License Number :

State Or Province :

City :

Zip Code :

Type : - Select -

Discipline : - Select -

Search Reset

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	[redacted]	Cheyenne	WY	United States	

Last Name : Drake
First Name : Brett
StreetLine 1 : [redacted]
StreetLine 2 :
City :
State : WY
Zip :
Branch : CE/CNE
License Date : 06/05/2019
Status : Active
Business :
Registration Number : [redacted]
Type : Professional Engineers
Expiration Date : 12/31/2022

← Close detail

First Previous 1 Next Last

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

President of the University

Secretary of the Trustees

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.

E. Gordon Gee
President of the University

William A. Wilmoth
Chair, West Virginia University Board of Governors

Eugene V. Cilento
Dean of the College

Joyce McConnell
Provost and Vice President for Academic Affairs

Department of Commerce, Community, and Economic Development
CORPORATIONS, BUSINESS & PROFESSIONAL LICENSING

LICENSE DETAILS

License #: [redacted]
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: [redacted]

Owners

Owner Name	Entity Number
KEITH L. HANNEMAN	

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 #: [redacted]

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: [redacted]

Owners

Owner Name	Entity Number
KEITH LEROY HANNEMAN	

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

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	[redacted]

Credential Information

License Number	License Method	License Type	License Status	Original Issue Date	Effective Date	Expiration Date
[redacted]	Examination	Professional Engineer	Active	01/20/2011	11/01/2021	10/31/2023

Board/Program Actions

Discipline
There is no Discipline or Board Actions on file for this 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

President, Board of Trustees

Secretary, Board of Trustees

Head of the Department of
Mining Engineering

President

Executive Vice President for Academic Affairs
and Dean of Faculty

INDIANA DEPARTMENT OF HOMELAND SECURITY

This License is issued to

Paul B. Lewis

PSID: [redacted]

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: [redacted]

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: [redacted]

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.

UNIVERSITY OF LOUISVILLE 1798

Jessica S. Loving
Chair of the Board of Trustees

James L. Ramsey
President of the University

Kathleen L. Otto
Registrar of the University

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: 1047664			**Reason for Modification:**
Doc Description: EOI - 2022 AML Contract 9 Project North			
Proc Type: Central Purchase Order			
Date Issued	**Solicitation Closes**	**Solicitation No**	**Version**
2022-05-31	2022-06-28 13:30	CEOI 0313 DEP2200000018	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

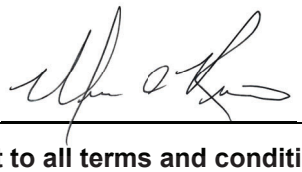
City : Lexington

State : Kentucky **Country :** USA **Zip :** 40508

Principal Contact : Michael Ricci, PE

Vendor Contact Phone: 859.259.0959 **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** June 28, 2022

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

ADDITIONAL INFORMATION
The Acquisitions and Contract Administration Section of the Purchasing Division is soliciting an Expression of Interest ("EOI" or "Bids") for the West Virginia Department of Environmental Protection, Division of Land Restoration, Office of Abandoned Mine Lands and Reclamation 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	Professional Svcs - Three Fork Creek Watershed Restoration		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Professional Svcs - Three Fork Creek Watershed Restoration

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	Professional Svcs - Abram Creek AMD Treatment Phase II		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Professional Svcs - Abram Creek AMD Treatment Phase II

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	Professional Svcs - Richard (Shaver) Drainage		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description:
Professional Svcs - Richard (Shaver) Drainage

SCHEDULE OF EVENTS

Line	Event	Event Date

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.

(Name, Title)  Principal Consultant

(Printed Name and Title) Michael Ricci, PE, Principal Consultant

(Address) 146 East Third Street, Lexington, Kentucky, 40508

(Phone Number) / (Fax Number) 859.259.0959

(email address) Michael.Ricci@respec.com

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through *wv*OASIS, 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 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)

 Principal Consultant

(Authorized Signature) (Representative Name, Title)

Michael Ricci, PE, Principal Consultant, June 28, 2022

(Printed Name and Title of Authorized Representative) (Date)

859.259.0959

(Phone Number) (Fax Number)

Michael.Ricci@respec.com

(Email Address)

APPENDIX F.

ADDENDUM ACKNOWLEDGEMENT FORM

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CEOI 0313 DEP2200000018

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.

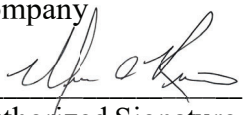
Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

[ ] Addendum No. 1	[ ] Addendum No. 6
[ ] Addendum No. 2	[ ] Addendum No. 7
[ ] Addendum No. 3	[ ] Addendum No. 8
[ ] Addendum No. 4	[ ] Addendum No. 9
[ ] Addendum No. 5	[ ] 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

6/28/2022
_____
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

APPENDIX G.

AML CONTRACTOR INFORMATION FORM (AVS)

OMB # 1029-0119
Expiration Date:
10/31/2024

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:	RESPEC, INC RESPEC Company, LLC
Tax ID #:	46-0315848 83-2898293
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/resources/forms/OMB1029-0119instructions.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.

June 01,2022	Robyn Beaird Digitally signed by Robyn Beaird Date: 2022.06.01 09:37:50 -06'00'	Corporate Accounting Manager
Date	Signature	Title

OMB # 1029-0119
Expiration Date:
10/31/2024

Part D: OFT Information

Contractor'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:	12/09/11
End Date:	06/30/21
% Ownership:	O%
Position/Title:	Director
Phone Number:	605.394.6517

Name:	Marv Truhe
Address:	3824 Jet Drive
City, State, Zip:	Rapid City, SD 57703
Begin Date:	01/01/11
End Date:	07/01/20
% 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