



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

Solicitation

NUMBER

DEP16436

PAGE

1

ADDRESS CORRESPONDENCE TO ATTENTION OF

FRANK WHITTAKER
304-558-2316

RFQ COPY

TYPE NAME/ADDRESS HERE

Tetra Tech, Inc.
661 Andersen Drive
Pittsburgh, PA 15220

V
E
N
D
O
R

ENVIRONMENTAL PROTECTION

DEPARTMENT OF
OFFICE OF AML&R
601 57TH STREET SE
CHARLESTON, WV
25304

S
H
I
P
T
O

304-926-0499

DATE PRINTED

03/20/2014

BID OPENING DATE:

04/10/2014

BID OPENING TIME

1:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	JB		906-29		
				MAURIN MINE FIRE & PORTALS DESIGN		
				EXPRESSION OF INTEREST		
				THE WEST VIRGINIA PURCHASING DIVISION, FOR THE AGENCY, THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, IS SOLICITING EXPRESSIONS OF INTEREST FOR PROFESSIONAL ENGINEERING DESIGN SERVICES AND CONSTRUCTION MONITORING SERVICES AT THE MAURIN MINE FIRE AND PORTALS, MONONGALIA COUNTY, WEST VIRGINIA PER THE FOLLOWING BID REQUIREMENTS AND ATTACHED SPECIFICATIONS.		
				***** THIS IS THE END OF RFQ DEP16436 ***** TOTAL:		
				04/09/14 09:43:21AM West Virginia Purchasing Division		

SIGNATURE

Thomas A. Gray

TELEPHONE

(412) 921-8794

DATE

April 8, 2014

TITLE

Energy/Nat. Resources Mgr

FEIN

95-4148514

ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



CERTIFICATION AND SIGNATURE PAGE

By signing below, I certify that I have reviewed this Solicitation in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid or proposal for review and consideration; that I am authorized by the bidder to execute this bid or any documents related thereto on bidder's behalf; that I am authorized to bind the bidder in a contractual relationship; and that to the best of my knowledge, the bidder has properly registered with any State agency that may require registration.

Tetra Tech, Inc.
(Company)

Mark P. Speranza
(Authorized Signature)

Mark P. Speranza, Operations Manager
(Representative Name, Title)

412-921-8916 412-921-4040
(Phone Number) (Fax Number)

4/8/2014
(Date)



TABLE OF CONTENTS

TAB A.....	Cover Letter
TAB B.....	Attachment B
TAB C.....	Attachment C
TAB D.....	Personnel
TAB E.....	Project Experience



April 8, 2014

Mr. Frank Whittaker
Department of Administration, Purchasing Division
2019 Washington Street East, Charleston, West Virginia 25305-0130

Dear Mr. Whittaker:

Tetra Tech is pleased to submit our qualifications to perform design services in reply to RFQ #DEP16436 for the State of West Virginia. As outlined in our proposal, Tetra Tech and its personnel have completed work on **thousands of mine reclamation projects**. These projects have included mine fires, the installation of mine seals (including those with bat gates), drainage conveyance design, and the demolition of abandoned mine related structures.

This project will be managed out of Tetra Tech's Pittsburgh, Pennsylvania area offices, led by our Fairmont, WV office. Tetra Tech has a total of **six AML design teams** (a team consisting of one West Virginia registered engineer and one CAD professional) in these offices as well as a West Virginia registered surveyor. Tetra Tech also has more than 650 mining and civil engineers, and 170 CAD professionals companywide that are available to support this work if needed.

Our experienced team is led by Mr. Ronald Lane, PE. Mr. Lane has more than 16 years of mining and AML experience and was previously the manager of WVDEP's AML&R Emergency Response program. He will be joined by our technical advisor, Mr. Thomas Gray, PE, and our senior engineer, Mr. Gregory Hynes, PE, as well as the rest of our project team. Mr. Gray and Mr. Hynes have managed or supported more than 40 AML projects for the WVDEP and both have managed several similar projects involving mine seals and drainage design. All three (Mr. Lane, Mr. Gray, and Mr. Hynes) are registered Professional Engineers in the State of West Virginia.

As a firm, Tetra Tech also has significant experience working for the WVDEP. Mr. Gray recently managed three AML projects for the WVDEP – the Fisher Run, Tunnelton, and the Paint Branch Mine Portal Closure Design projects. Tetra Tech is also currently managing the AML&R's Parker Run Design Project and the OSR's Energy Marketing Slurry Impoundment Project. In addition, our Charleston office is currently managing TMDL projects for the WVDEP.

As requested by the RFP we have provided one original submittal, one copy, and one copy on CD-ROM. We appreciate this opportunity to provide this proposal, and look forward to answering any questions you may have. If you should require any additional information, please contact Mr. Lane at (304) 534-4021.

Sincerely,

Mr. Ronald Lane, PE
Project Manager

Mr. Thomas Gray, PE
Energy and Natural Resources Manager



Section B: Consultant Questionnaire

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

AML CONSULTANT QUALIFICATION QUESTIONNAIRE

Attachment "B"

PROJECT NAME Maurin Mine Fire & Portals	DATE (DAY, MONTH, YEAR) 8, April, 2014	FEIN 95-4148514	
1. FIRM NAME Tetra Tech, Inc.	2. HOME OFFICE BUSINESS ADDRESS 661 Andersen Drive Pittsburgh, PA 15220	3. FORMER FIRM NAME Tetra Tech NUS, Inc. NUS Corporation NUS Environmental Corporation	
4. HOME OFFICE TELEPHONE (304) 534-4021	5. ESTABLISHED (YEAR) 1966	6. TYPE OWNERSHIP Corporation	6a. WV REGISTERED DBE (Disadvantaged Business Enterprise) No
7. PRIMARY AML DESIGN OFFICE: ADDRESS/TELEPHONE/PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE Foster Plaza 7, 661 Andersen Drive, Pittsburgh, PA 15220 / (412) 921-7090 / Thomas Gray, PE / (16 AML design personnel - 10 Design Engineers and 6 CADD Professionals)			
8. PRINCIPAL OFFICERS OR MEMBERS OF FIRM Mr. Ronald Lane, PE – Fairmont AML Manager Mr. Thomas Gray, PE – Pittsburgh AML Manager		8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS	
9. PERSONNEL BY DISCIPLINE			
2012 ADMINISTRATIVE	152 ECOLOGISTS	19 LANDSCAPE ARCHITECTS	98 STRUCTURAL ENGINEERS
130 ARCHITECTS	138 ECONOMISTS	54 MECHANICAL ENGINEERS	60 SURVEYORS
300 BIOLOGIST	60 ELECTRICAL ENGINEERS	70 MINING ENGINEERS	75 TRAFFIC ENGINEERS
170 CADD OPERATORS	746 ENVIRONMENTALISTS	12 PHOTOGRAMMETRISTS	7855 OTHER
304 CHEMICAL ENGINEERS	271 ESTIMATORS	96 PLANNERS: URBAN/REGIONAL	
588 CIVIL ENGINEERS	367 GEOLOGISTS	70 SANITARY ENGINEERS	
61 CONSTRUCTION INSPECTORS	3 HISTORIANS	34 SOILS ENGINEERS	239 TOTAL PERSONNEL (IN PRIMARY OFFICE)
DESIGNERS (counted in CADD)	115 HYDROLOGISTS	140 SPECIFICATION WRITERS	
DRAFTSMEN (counted in CADD)			14,000+ Personnel company-wide
TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 6			
*RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.			
10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE? <input type="checkbox"/> YES <input type="checkbox"/> NO N/A			

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

NAME AND ADDRESS: Test Boring Services, Inc. 140 Mong Road Scenery Hill, PA 15360	SPECIALTY: Drilling	WORKED WITH BEFORE <u> X </u> Yes (with individual staff) <u> </u> No
NAME AND ADDRESS: Sturm Environmental Services P.O. Box 650 Bridgeport, WV 26330	SPECIALTY: Laboratory analysis (coal, soil, water)	WORKED WITH BEFORE <u> X </u> Yes (with individual staff) <u> </u> No
NAME AND ADDRESS: Double J Drilling 1207 Williamstown Pike Williamstown, WV 26187	SPECIALTY: Drilling	WORKED WITH BEFORE <u> </u> No <u> X </u> Yes
NAME AND ADDRESS: Blue Mountain Aerial Mapping 11023 Mason-Dixon Highway Burton, WV 26562	SPECIALTY: Aerial mapping	WORKED WITH BEFORE <u> </u> No <u> X </u> Yes
NAME AND ADDRESS: Industrial Lab Analysis 65 36 th Street Wheeling, WV 26003	SPECIALTY: Laboratory Analysis (water)	WORKED WITH BEFORE <u> </u> No <u> X </u> Yes (with individual staff)
NAME AND ADDRESS: Test Boring Services, Inc. 140 Mong Road Scenery Hill, PA 15360	SPECIALTY: Drilling	WORKED WITH BEFORE <u> X </u> Yes (with individual staff) <u> </u> No
NAME AND ADDRESS: Terra Testing, Inc. 260 Meadowlands Blvd. Washington, PA 15301	SPECIALTY: Geotechnical drilling	WORKED WITH BEFORE <u> </u> No <u> X </u> Yes
NAME AND ADDRESS: TRIAD Engineering 219 Hartman Run Road Morgantown, WV 26505	SPECIALTY: Surveying, Drilling	WORKED WITH BEFORE <u> </u> No <u> X </u> Yes
		<u> </u> No

12. A. Are your firm's personnel experienced in Abandoned Mine Lands Remediation/Mine Reclamation Engineering?

YES Description and Number of Projects: Tetra Tech and its consultants have completed **over 300 abandoned mine land projects** - Attachment C is only a partial listing. Our Project Manager, Ronald Lane, PE, previously managed the AML program for the WVDEP. He has done preliminary data gathering on the Morgantown Airport site and is extremely familiar with the project area. Our Technical Advisor, Mr. Thomas Gray, PE, has managed and supported AML projects for 26 years and has previously managed WVDEP projects. Our Senior Engineer, Gregory Hynes, PE, has been working on abandoned mine reclamation projects for the past 20 years, with many in West Virginia for the WVDEP. Tetra Tech has been involved with mine reclamation for many years throughout the western U.S. and is providing similar services in the Appalachian coal fields.

B. Are your firm's personnel experienced in Soil Analysis?

YES Description and Number of Projects: Tetra Tech has conducted **thousands of soil investigations** worldwide that included sampling and analysis. Along with this site work, we have provided thousands of reports presenting the results of the investigations. We have extensive specialized experience and technical competence in providing soil sampling and analysis services, including **more than 6,000 environmental site characterizations (including at mining sites) and more than 1,000 geotechnical investigations**. We have trained and experienced field sampling crews available to support this project.

C. Are your firm's personnel experienced in hydrology and hydraulics?

YES Description and Number of Projects: Tetra Tech has over **three decades of experience** in hydrology and hydraulics having completed **hundreds of projects**. Our expertise and knowledge in evaluating hydrologic systems is applied to specific water resource project types including water resource and flood damage assessment, flood control designs (including channels, levees, detention basins and bank protection, hydraulic structure design, erosion and sedimentation studies, stream restoration and wetland design, dam and levee safety evaluations, reservoir operation/optimization studies, flood-control and flood management studies and mapping, development of flood warning systems, dam break flood studies and contingency planning, stormwater drainage design, surface and groundwater supply analysis. The basis of these hydrologic studies is the application of HEC software such as HEC-HMS, GeoHMS, HECFFA, HEC-SSP, HEC-DSSVue, HEC-ResSim, CWMS and legacy software such as HEC-1, HEC-5, HEC-DSS, and COED.

D. Does your firm produce its own Aerial Photography and Develop Contour Mapping?

YES Description and Number of Projects: Tetra Tech employs 15 GIS and CADD personnel in its Pittsburgh and Fairmont offices and has all necessary software for map development. Our firm hires subcontractors when necessary for aerial photography to develop contour maps. Tetra Tech has completed aerial photography and/or contour mapping for **over 100 projects**.

E. Are your firm's personnel experienced in domestic waterline design? (Include any experience in evaluation of aquifer degradation as a result of mining.)

YES Description and Number of Projects: Our senior engineer, Gregory Hynes, PE, has completed **more than ten water line projects for the WVDEP**. Tetra Tech has extensive expertise in modeling, designing, and building reliable, save and cost-effective water transmission and distribution systems. Our experience encompasses all aspects of transmission and distribution systems, including large diameter water mains, distribution piping, booster pumping stations, storage tanks and metering facilities. We have performed **hundreds of domestic water line design projects** nationwide for many municipalities and water authorities.

F. Are your firm's personnel experienced in Acid Mine Drainage Evaluation and Abatement Design?

YES Description and Number of Projects: Tetra Tech and its personnel have extensive acid mine drainage evaluation and abatement design experience. Our firm has **recently completed more than ten acid mine drainage evaluation/abatement design projects** and our personnel have completed **more than 30 acid mine drainage and abatement projects** at other firms. Our technical advisor, Mr. Thomas Gray, PE, also managed an open-end contract for the Maryland Bureau of Mines, which included over 16 projects relating to mining, acid mine drainage treatment, and mine reclamation.

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.) Lane, Ronald, PE Project Manager	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
	8	17	

Brief Explanation of Responsibilities

Mr. Lane has more than 17 years of mining experience and is a technical expert in mine subsidence, mining engineering, mine reclamation, and other mining-related issues. He previously served as the program manager for the WVDEP's AML&R emergency response program and is Tetra Tech's AML manager in their Fairmont, West Virginia office. Mr. Lane specializes in the reclamation of abandoned mine sites and currently is supporting Tetra Tech's Parker Run Design project for the WDEP AML&R. His project management responsibility has included construction, engineering, and regulatory compliance development. He has been responsible for the successful completion of a wide variety of abandoned mine reclamation projects and has provided oversight of design documents as project manager to mitigate mine subsidence potential over an extensive area which included 120 residential structures. His experience has also included the preparation of construction plans and specifications in addition to construction oversight as program manager for AML&R's emergency program.

EDUCATION (Degree, Year, Specialization)

BS, 1983, Mining Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

N/A

REGISTRATION (Type, Year, State)

Professional Engineer, 2009, West Virginia

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.) Gray, Thomas, A., PE Technical Advisor	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 22
	28	40	

Brief Explanation of Responsibilities

Mr. Gray has more than 39 years of mining engineering experience and has managed and supported numerous subsidence projects including the Virginia DMME's Bandy and King subsidence investigations, the Bureau of Mines' Streyer Run Subsidence Assessment, and subsidence projects for private clients in West Virginia, Maryland, and Pennsylvania. In addition, he also has managed and supported seven AML projects for the WVDEP and is currently working on two projects for the agency – the Parker Run Design project for the AML&R division and the Energy Marketing Company Slurry Impoundment Permit Project for the OSR. Since 2000, Mr. Gray has participated in more than 50 AMR projects and has managed 30 projects for the OSM. Currently, Mr. Gray oversees two statewide open-end contracts with the Pennsylvania Department of Environmental Protection. He also currently manages projects involving mineral rights for the West Virginia Division of Highways. Mr. Gray co-authored the chapter entitled, 'Mine Closure, Sealing, and Abandonment' in SME's Mining Engineering Handbook.

EDUCATION (Degree, Year, Specialization)

BS, 1973, Mining Engineering

MBA, 1977, Business Administration

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

Society of Mining Engineers - Distinguished Member

REGISTRATION (Type, Year, State)

Professional Engineer, 1988, West Virginia
Professional Engineer, 1978, Pennsylvania
Professional Engineer, 1980, Virginia
Professional Engineer, 2009, Ohio
Professional Engineer, 1989, Maryland

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.) Hynes, Gregory, P., PE Senior Engineer	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 23	YEARS OF AML RELATED DESIGN EXPERIENCE: 23	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 27
Brief Explanation of Responsibilities			
Mr. Hynes has more than 22 years of experience in abandoned mine land reclamation, land restoration, mining permits, and environmental and water resources engineering. He has managed or supported more than 30 AML projects for the WVDEP. Most recently, Mr. Hynes managed three AML projects for the agency in 2012 – the Waitman-Barbe Highwall, the Colliers Sportsman's Club Highwall, and the Simpson Creek Highwall. He has also managed several projects for other state agencies including PADEP and the Ohio Department of Natural Resources, preparing design calculations, cost estimates, plans, and technical specifications for abandoned mine land reclamation. Mr. Hynes has also prepared permit applications and construction level drawings and specifications for proposed surface mine facilities in West Virginia and Pennsylvania. Projects included permitting and reclamation of various mining related surface facilities.			
EDUCATION (Degree, Year, Specialization) MS, 1997, Civil Engineering BE, 1987, Civil Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS N/A		REGISTRATION (Type, Year, State) Professional Engineer, 1998, West Virginia Professional Engineer, 1993, Pennsylvania Professional Engineer, 1998, Ohio	

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.) Smith, Terry, PE Mining Engineer	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 6	YEARS OF AML RELATED DESIGN EXPERIENCE: 6	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 10
Brief Explanation of Responsibilities			
Mr. Smith has more than 36 years of experience in mining engineering and management, and water and wastewater design engineering and project management. Recently, he has supported Tetra Tech's project for mine seal and bulkhead design for a project at a mine in Ohio. Mr. Smith's other experience includes longwall mining, coal preparation plant and coal refuse disposal supervision, surface mine permitting, mine operations evaluations, compliance evaluations, economic feasibility analysis, cost estimating and project management in the coal mining industry.			
EDUCATION (Degree, Year, Specialization) BS, 1978, Mining Engineering			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State) Professional Engineer, 1992, Pennsylvania	

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.) Yanero, David, L. CAD Designer	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 20	YEARS OF AML RELATED DESIGN EXPERIENCE: 20	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities			
Mr. Yanero has more than 20 years of abandoned mine land and engineering experience. He has supported numerous abandoned mine land design projects in West Virginia and other nearby states including Maryland, Pennsylvania, and Ohio. His work has included subsidence investigations, the design of drainage structures, regrading and stabilization plans, pre-blast investigations, permitting, mapping, and computer drafting using AutoCAD. Currently, he is supporting Tetra Tech's work with the WVDEP for the Parker Run Design Project.			
EDUCATION (Degree, Year, Specialization)			
AS, Architectural Design			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State)	
N/A		N/A	
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.) Kimmel, Thomas, PS/PLS Surveyor	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: N/A (Surveyor)	YEARS OF AML RELATED DESIGN EXPERIENCE: 41	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: N/A (Surveyor)
Brief Explanation of Responsibilities			
Mr. Kimmel has more than 41 years of surveying experience in various sectors for private and public government. He is a registered surveyor in nine states, including West Virginia. Mr. Kimmel has supported numerous projects involving boundary and topographic surveying, borehole stakeouts, cross sections, mapping using aerial photogrammetric methods, and ALTA land title surveys. He also has experience teaching community college surveying courses.			
EDUCATION (Degree, Year, Specialization)			
BS, 1995, Applied Science and Technology with Surveying Specialization AS, 1973, Engineering and Surveying			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS		REGISTRATION (Type, Year, State)	
		Professional Surveyor, 1994, WV Professional Land Surveyor, 1975, PA Professional Land Surveyor, 1990, MD Professional Surveyor, 2003, OH Licensed Surveyor, 1993, VA Also a registered surveyor in DE, NC, NJ, and NY	

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.) Hoppe, Ben CAD Designer	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: 5	YEARS OF AML RELATED DESIGN EXPERIENCE: 9	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Mr. Hoppe has more than nine years of professional CADD experience. He has conducted work for several abandoned mine land reclamation projects, including those for the West Virginia Department of Environmental Protection's Office of AML, and erosion and sediment control plans. He is a CAD manager for Tetra Tech. His projects for the WVDEP have included the Fisher Run Mine Portal Closure Design, the Tunnelton Mine Portal Closure Design, and the Paint Branch Mine Portal Closure Design.			
EDUCATION (Degree, Year, Specialization) AS, 2004, drafting			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS N/A		REGISTRATION (Type, Year, State) N/A	
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.) Trexler, Heather, PG Project Geologist	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE: N/A (Geologist)	YEARS OF AML RELATED DESIGN EXPERIENCE: 10	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Brief Explanation of Responsibilities Ms. Trexler has more than ten years of hydrologic, geologic, and mining-related experience. In addition to studying impacts created by subsidence, her project activities for mining development include the preparation of geologic and hydrologic sections of permits to state agencies for longwall expansions, new room and pillar mines, refuse expansions, and associated surface activities. She also currently serves as a lead on two statewide abandoned mine land reclamation contracts with PADEP.			
EDUCATION (Degree, Year, Specialization) MS, 2003, Geology BS, 2001, Geology			
MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS Society for Mining, Metallurgy & Exploration Pennsylvania Coal Mining Institute of America Marcellus Shale Coalition		REGISTRATION (Type, Year, State) Professional Geologist, 2007, Pennsylvania	

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
WVDEP Parker Run Design Project, West Virginia	WVDEP AML&R 601 57 th Street Charleston, WV 25304	Prime Contractor – Design	Not yet known	50%
WVDEP OSR Energy Marketing Impoundment Design, West Virginia	WVDEP OSR 601 57 th Street Charleston, WV 25304	Prime Contractor – Design	Not yet known	80%
WVDEP TMDL Development for WV Group E2 Watershed (West Fork River Watershed)	WVDEP DWWMM 601-57th Street Charleston, WV 25304-2345	Prime Contractor - TMDL Development Lead	N/A	60%
WVDEP TMDL Development for WV Group D2 Watersheds (Monongahela River Watershed)	WVDEP DWWMM 601-57th Street Charleston, WV 25304-2345	Prime Contractor - TMDL Development Lead	N/A	90%
PADEP Statewide Mining Engineering Design Services Contract, Pennsylvania	PADEP Bureau of Mining Programs 400 Market Street Harrisburg, PA 17105	Program management of five-year statewide mining engineering design contract	Not yet known	40%
PADEP Statewide Mining Engineering Design Services Contract, Pennsylvania	PADEP Bureau of Abandoned Mine Reclamation 400 Market Street Harrisburg, PA 17105	Program management of five-year statewide mining engineering design contract	Not yet known	40%
PADEP East Avoca-Grove Street Mine Drainage Study, Pennsylvania	PADEP Bureau of Abandoned Mine Reclamation 400 Market Street Harrisburg, PA 17105	Management of mine drainage control project	Not yet known	95%
TOTAL NUMBER OF PROJECTS: 10 (Tetra Tech is currently conducting thousands of projects nationwide – for the purpose of this EOI, only a sample of our most recent mining projects for state entities are shown)			TOTAL ESTIMATED CONSTRUCTION COSTS: Not yet known – currently in design phases	

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
PADEP Palo Alto Mine Drainage Design, Pennsylvania	PADEP Bureau of Abandoned Mine Reclamation 400 Market Street Harrisburg, PA 17105	Management of mine drainage control project	Not yet known	95%
PADEP Blacklick Creek Treatment Facility Design, Pennsylvania	PADEP Bureau of Abandoned Mine Reclamation 400 Market Street Harrisburg, PA 17105	Management of mine pool treatment design project	Not yet known	< 5% (recently started)
ODNR Statewide Coal Mining Permit Review Contract, Ohio	Ohio Dept. of Natural Resources 2045 Morse Road Columbus, OH 43229	Program management of two-year statewide coal mining permit reviews	N/A	90%
Wyoming Abandoned Mine Lands Statewide Subsidence Hazards Mitigation Contract, Wyoming	Wyoming Department of Environmental Quality, AML Division 122 W. 25 th Street Cheyenne, WY 82002	Statewide program management of subsidence mitigation	Not yet known	50%
Colorado Division of Reclamation, Mining, and Safety Mine Fire Abatement Management, Colorado	Colorado DRMS 1313 Sherman Street #423 Denver, CO 80203	Statewide mine fire abatement management	Not yet known	5%
TOTAL NUMBER OF PROJECTS: 12 (Tetra Tech is currently conducting thousands of projects nationwide – for the purpose of this EOI, only a sample of our most recent mining projects for state entities are shown)			TOTAL ESTIMATED CONSTRUCTION COSTS: \$0 Not yet known – currently in design phases	

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

[illegible]

17. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD				
PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
Coal Mine Air Shaft Closure Design, Ohio	Ohio Valley Coal Company 34 Kelley Way, Suite 100 Brilliant, OH 43913	Confidential	2010	Yes
Coal Mine Seal and Bulkhead Design, Ohio	Ohio Valley Coal Company 34 Kelley Way, Suite 100 Brilliant, OH 43913	Confidential	2010	Yes
WVDEP Paint Branch Abandoned Mine Land Project, West Virginia	WVDEP Office of Abandoned Mine Lands and Reclamation 105 S. Railroad Street Philippi, WV 26416	\$35,000	2010	Yes
WVDEP Tunnelton Mine Portal Closure Design, West Virginia	WVDEP Office of Abandoned Mine Lands and Reclamation 105 S. Railroad Street Philippi, WV 26416	\$62,300	2010	Yes
WVDEP Fisher Run (Posey) Mine Reclamation, West Virginia	WVDEP Office of Abandoned Mine Lands and Reclamation 105 S. Railroad Street Philippi, WV 26416	\$292,600	2010	Yes
Bird Mine and Strayer Mine Refuse Permitting and Water Treatment Design, Pennsylvania	AMD Industries, Inc. P.O. Box 501 California, PA 15419	N/A	2012	N/A
ALCOSAN Grand View Golf Course Mine Drainage Treatment System, Pennsylvania	ALCOSAN 3300 Preble Avenue Pittsburgh, PA 15233	N/A	2011	N/A
WVDEP TMDL Development for WV Group B2 Watersheds (Upper Kanawha, Elk River, and North Branch Potomac Watersheds)	WVDEP DWWM 601-57th Street Charleston, WV 25304-2346	N/A	2012	N/A

Tetra Tech has completed thousands of projects in the past five years. This is only a representative sample of that work.

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)
Consulting Services for Remining Operations, West Virginia	Dirtcon Excavating RR1 Box 30A Enterprise, WV 26568	N/A	2012	N/A
Marion County Reclaimed Mine Site Investigation, West Virginia	American Bituminous Power Partners, LP RR17 Grant Town, WV 26574	N/A	2012	N/A
WVDEP TMDL Development for WV Group C2 Watersheds (Middle Ohio North & South Watersheds)	WVDEP DWWM 601-57th Street Charleston, WV 25304-2345	N/A	2012	N/A
WVDEP TMDL Development for Cheat River Watershed, West Virginia	USEPA Region 3, 1650 Arch Street, Philadelphia, PA 19103; WVDEP DWWM, 601-57th Street, Charleston, WV 25304-2346	N/A	2011	N/A
WVDOH Rita to Dabney Specialty Coal Appraisal, West Virginia	West Virginia Division of Highways 1900 Kanawha Blvd. East Charleston, WV 25305	N/A	2011	N/A
WVDHHR Drinking Water Treatment Revolving Fund, West Virginia	WVDHHR, Environmental Engineering Division, Infrastructure and Capacity Development 350 Capitol Street, Room 313 Charleston, WV 25301-3713	N/A	2012	N/A
Water Balance Study, Water Study, Ohio	Confidential Client	N/A	2010	N/A
Casselman Mine AMD Prevention and Response Plan, Maryland	Maryland Energy Resources, LLC 6015 Ferguson Road Indiana, PA 15701	N/A	2010	N/A

Tetra Tech has completed thousands of projects in the past five years. This is only a representative sample of that work.

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)
Western Pennsylvania Abandoned Mine Fire, Pennsylvania	Confidential Client	N/A	2011	N/A
Bear Run Acid Mine Drainage Passive Treatment System, Pennsylvania	Indiana County Conservation District in conjunction w/PADEP 1432 Route 286 Hwy. E Indiana, PA 15701	\$250,000	2010	Yes
Gladden Mine Site Grading Plan and Acid Mine Drainage Treatment System, Pennsylvania	South Fayette Conservation Group in conjunction w/PADEP 515 Millers Run Road Morgan, PA 15064	3,600,000	2009	Yes
Majorsville Mine Subsidence Investigation, Pennsylvania	MarkWest Energy 601 Technology Drive, Suite 130 Canonsburg, PA 15317	N/A	2011	N/A
Bandy and King Subsidence Project, Virginia	Department of Mines, Minerals & Energy 3405 Mountain Empire Road Big Stone Gap, VA 24219	N/A	2011	N/A
Coal Property Due Diligence Evaluation, Pennsylvania	Confidential client	N/A	2011	N/A
Forest City Mine Water Sourcing Study, Pennsylvania	Confidential oil and gas client	N/A	2011	N/A
South Fayette Mine Water Sourcing Study, Pennsylvania	Confidential oil and gas client	N/A	2011	N/A

Tetra Tech has completed thousands of projects in the past five years. This is only a representative sample of that work.

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)
Marjol Battery Plant RFI Oversight and Mine Subsidence Investigation, Pennsylvania	EPA Region III 1650 Arch Street Philadelphia, PA 19103	N/A	2009	N/A
Quecreek Deep Mine Expansion Permitting, Pennsylvania	PBS Coals, Inc. 1576 Stoystown Road Friedens, PA 15541	N/A	2012	N/A
Mine Pool Water Evaluation Management Plan, Pennsylvania	Confidential oil and gas client	N/A	2011	N/A
Inspections for Settling Ponds under Mining Activity Permits, Pennsylvania	AMD Industries, Inc. P.O. Box 501 California, PA 15419	N/A	2010	N/A
Mine Reserves Investigation and Due Diligence Study, Pennsylvania	PBS Coals, Inc. 1576 Stoystown Road Friedens, PA 15541	N/A	2011	N/A

Tetra Tech has completed thousands of projects in the past five years. This is only a representative sample of that work.

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
IHI Mine Fire Investigation, Colorado	Colorado Division of Mining Reclamation and Safety 101 South Third, Suite 301 Grand Junction, CO 81501	N/A	2010	N/A	Zapata Engineering, Inc.
Tetra Tech has been a subcontractor on numerous projects over the past five years. These are our most recent AML projects for State agencies					

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.

Due to the large number of mining projects recently completed by Tetra Tech, only a sample of some recent projects are shown in this attachment. Additional experience can be identified upon request.

20. The foregoing is a statement of facts.

Signature: Thomas A Gray Title: Energy and Natural Resources Manager

Printed Name: Thomas Gray, PE

Date: April 8, 2014



Section C: Attachment C



ATTACHMENT C

Over the next several pages, we have included our Attachment C form that lists recent mining projects. The form has been broken down to include several parts including:

- Featured Projects (longer descriptions of each project has been provided in Section E)
- Project Manager's WVDEP projects
- Project Advisor's WVDEP projects
- Senior Engineer's WVDEP projects
- Additional WVDEP and WVDOT projects completed by our firm
- Additional local projects completed by our firm (West Virginia and neighboring states)

Tetra Tech has additional local mining projects, but for the sake of brevity, we have included only a sampling of recent work. Our firm has completed thousands of mining-related projects nationwide.

AML and RELATED PROJECT EXPERIENCE MATRIX

[illegible]

AML and RELATED PROJECT EXPERIENCE MATRIX

[illegible]

AML and RELATED PROJECT EXPERIENCE MATRIX

[illegible]

AML and RELATED PROJECT EXPERIENCE MATRIX

[illegible]

AML and RELATED PROJECT EXPERIENCE MATRIX

*** List primary design personnel and their functional capacity for the projects listed.

AML and RELATED PROJECT EXPERIENCE MATRIX

[illegible]

AML and RELATED PROJECT EXPERIENCE MATRIX

[illegible]

AML and RELATED PROJECT EXPERIENCE MATRIX

[illegible]

Attachment "C"
AML and RELATED PROJECT EXPERIENCE MATRIX

PROJECT	Exp. Basis C-Corp. P-Personal *	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/ Eval.	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		Ronald Lane, PE	Thomas Gray, PE	Ben Hoppe	Heather Trexler, PG	Other Project Team Personnel	Other Tetra Tech Personnel
TETRA TECH'S ADDITIONAL RECENT LOCAL EXPERIENCE (WEST VIRGINIA AND BORDERING STATES)																								
South Fayette Mine Water Sourcing Study	C & P		X			X			X			X		X					M				P	
PA Abandoned Mine Fire Remediation/Investigation	C & P		X		X	X		X	X			X	X	X					M	P		P	P	
Beaver County YMCA Subsurface Investigation	C					X						X				X							M	
Kiskiminetas TMDL/AML GIS Support	C & P					X						X		X		X							M	
Settling Pond Inspections under Mining Activity Permits	C & P					X										X			M				P	
PBS Coals Mine Reserves Investigation	C & P									X									M			P	P	
MEPCO Mine Discharge Water Treatment Evaluation	C & P					X					X	X		X					M				P	
Casselman Mine Biomonitoring Plan	C & P					X						X							M			P	P	
Century Mine Water Balance Studies	C & P					X						X							M	P			P	
PA Coal Property Due Diligence Evaluation	C & P																		M				P	
Boone County Rural Water Line Expansion	C & P					X					X		X										M	
Canterbury Coal Floating Pump Station Design	C & P					X								X					M	P		P	P	
NEPCO CoGen Plant Fuel Supply and Ash Disposal	C & P									X		X							M	P			P	
* List whether project experience is corporate or personnel based or both.																								
** Use this area to provide specific sections or pages if needed for reference.																								
*** List primary design personnel and their functional capacity for the projects listed.																								
Attachment "C"																								

AML and RELATED PROJECT EXPERIENCE MATRIX

PROJECT	Exp. Basis C-Corp. P-Personal *	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/ Eval.	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		Ronald Lane, PE	Thomas Gray, PE	Ben Hoppe	Heather Trexler, PG	Other Project Team Personnel	Other Tetra Tech Personnel
TETRA TECH'S ADDITIONAL RECENT LOCAL EXPERIENCE (WEST VIRGINIA AND BORDERING STATES)																								
EPA Citizens Guide to Addressing AMD	C & P										X		X										M	
Nelsonville Bypass Mine Subsidence Mitigation	C & P								X												M	P		
Majorsville Pipeline & Mine Subsidence Investigation	C & P							X										P		P	P	M		
Marjol Battery Plant Mine Fire & Subsidence Evalaution	C & P					X		X	X									P				M		
Dirtcon Remining Consulting Services	C & P						X				X					X		M		M		P		
AMD Industries Lancashire Treatment Facility O&M	C & P										X		X					M			P	P		
Mettiki Coal Refuse Disposal Support/Planning	C & P							X										M	P		P	P		
PA DCNR CCS Report/Study for Coal-Based Power	C & P										X							M			P	P		
CRA Riverside No. 3 Mine Seal	C & P				X													M				P		
PBS Coals Corsa Capital Document Review	C & P																	M				P		
Dirtcon Philippi Quarry Permitting	C & P																	M				P		
Dirtcon Hoglick Hollow Permitting	C & P																	M			P	P		
Dirtcon Mining Reserve Estimates	C & P																	M		M	P	P		
* List whether project experience is corporate or personnel based or both.																								
** Use this area to provide specific sections or pages if needed for reference.																								
*** List primary design personnel and their functional capacity for the projects listed.																								
Attachment "C"																								



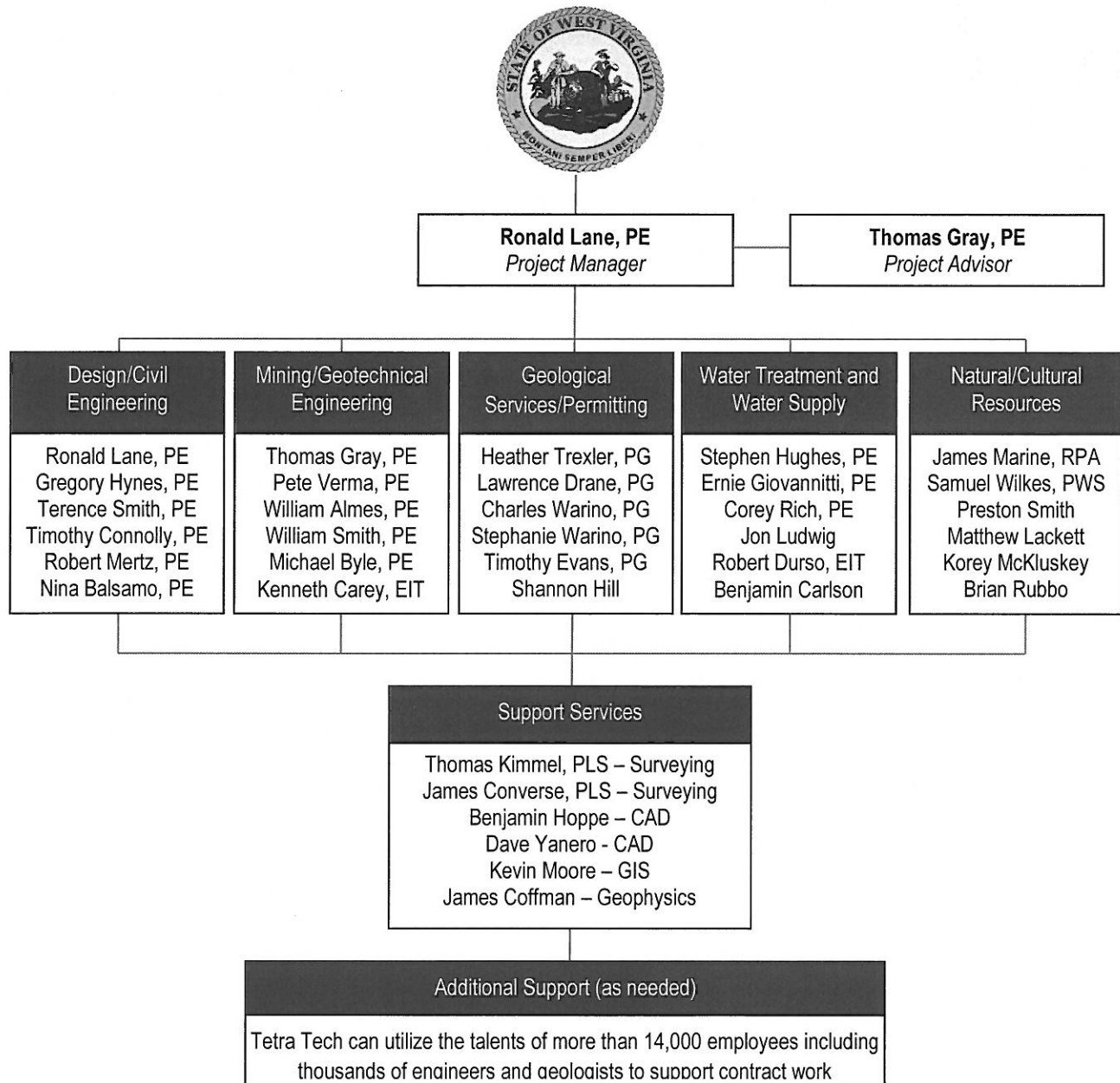
Section D: Resumes



Project Team Resumes

Over the next several pages, we have included full-page resumes of our project team's key personnel to supplement our proposal. Our project team is led by Mr. Ronald Lane, PE and Mr. Thomas Gray, PE. Both are West Virginia-registered Professional Engineers. Mr. Lane is the former AML Emergency Manager for the WVDEP and will serve as our project manager. Mr. Gray has more than 40 years of mining experience and has supported more than 100 mining projects, including many for the WVDEP.

In addition, an organization chart of our mining team professionals has been provided below. All staff are located in local West Virginia, Pennsylvania, and Ohio offices.





RONALD LANE, PE
PROJECT MANAGER/MINING ENGINEER

EXPERIENCE SUMMARY

Mr. Ronald D. Lane, P.E., has 17 years of professional experience. He is a technical expert in mining engineering, mine reclamation, mine stabilization via injection grouting, abandoned underground mine fire mitigation, coal refuse fire mitigation, mine subsidence and acid mine drainage remediation. Prior to joining Tetra Tech, he was the program manager for W.V. Department of Environmental Protection Agency's Abandoned Mine Lands and Reclamation (AML&R) emergency response program. Mr. Lane specializes in the reclamation of abandoned mine sites. His project management responsibility has included construction, engineering, and regulatory compliance development.

He has been responsible for the successful completion of a wide variety of abandoned mine reclamation projects, including the mitigation and stabilization of landslides; dewatering of underground mine workings to eliminate potential uncontrolled releases of mine water; reclamation of abandoned surface mine sites, design and construction of passive and active acid mine water treatment systems; mitigation of refuse and underground mine fires; oversight of design documents as project manager to mitigate mine subsidence potential over an extensive area which included 120 residential structures; preparation of construction plans and specifications in addition to construction oversight as program manager for AML&R's emergency program.

RELEVANT EXPERIENCE

Project Engineer; Parker Run Mine Drainage Design; West Virginia Department of Environmental Protection Office of AML&R; Marion County, WV. Supporting this contract, which includes design of drainage conveyances, design installation of mine seals, highwall reclamation, design of refuse reclamation, design of stream bank stabilization, design of structural and trash removal/disposal, and re-vegetation of disturbed areas.

Emergency Engineer; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Quick (Morris) Coal Seam Fire; Kanawha County, WV. Mr. Lane was responsible for project management, engineering design, development of construction plans and specifications, construction oversight, and development of cost estimates. The primary objective of the project was to extinguish a coal seam fire that had originated at the augered outcrop and had progressed in by via the auger holes.

Project Engineer; Blacklick Creek Vinton/Wehrum Mine Drainage Treatment Facility Design; PADEP Bureau of Abandoned Mine Reclamation; Indiana County, PA. Tetra Tech was retained by PADEP for the design of a mine drainage treatment facility. Supporting this large, multifaceted project included the design of a mine water conveyance system, design of relief boreholes, assessment of local mines for

EDUCATION

BS, Mining Engineering, West Virginia University, 1983

AREA OF EXPERTISE

Mining Engineering

**REGISTRATIONS/
AFFILIATIONS**

Professional Engineer, WV,
2009, 017963

TRAINING/CERTIFICATIONS

N/A

YEARS OF EXPERIENCE

17



sludge disposal, coal refuse pile analysis, mine shaft and subsidence assessment, historical and museum commission documentation/clearance, conceptual treatment facility layout, public involvement through the development of a website, and the development of bid documents.

Project Manager; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Highwall Elimination Project; Barbour County, WV. Scope of work consisted of the elimination approximately 5,000 lf of hazardous highwalls at four different sites, wetland delineation, installation of surface and subsurface drainage control structures, reclamation of coal refuse piles, mapping of the site, determination of borehole locations to gather geotechnical information for refuse and highwall reclamation, water sampling and testing, relocation of gas lines, E&S controls and permitting. Due to the close proximity of occupied dwellings at the toe of one highwall, the method proposed for stabilization was the utilization of soil nails and rock anchors. The remaining highwalls were to be eliminated by utilizing the available on-site spoil to backfill the highwall to a stable configuration. Conceptual design documents had been prepared as of February 2013.

Project Manager; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Morgan Mine Road (Burkey) Mine Fire; Preston County, WV. Coordinated and supervised exploratory drilling to determine the extent and properties of an underground mine fire located in abandoned workings. The project has since been eliminated for abatement due to geotechnical information gathered from the exploratory drilling.

Project Manager; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Hilderbrand Highwall Project; Monongalia County, WV. Project design involved reducing the highwall to a stable configuration by backfilling with on-site spoil, installation of wet/modified mine seals, drilling to locate the underground mine workings and determine the head and water chemistry, installation of open limestone channels (OLCs) to treat the acid mine drainage (AMD), testing of impounded water to determine PH and water chemistry, installation of subsurface drains, soil testing to determine nutrient requirements to establish vegetation, stream bank stabilization, E&S controls and permitting.

Project Manager; West Virginia Department of Environmental Protection Agency WVDEP AML&R; Ridenour Highwall Project; Monongalia County, WV. Project design involved elimination of linear subsidence features located above the crown of the highwall, reducing the highwall to a stable configuration by backfilling with available on-site spoil, entombment of refuse, drainage control structures, E&S controls and permitting.

Project Manager; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Roger Camp Hill Refuse Project; Tucker County, WV. Project design involved the construction of approximately 3,000 lf of access road, dewatering and treatment of ½ acre impoundment located in the center of refuse prior to discharging into the wetland, elimination of the highwall by backfilling to the approximate original contour, entombment of refuse, drainage control structures, revegetation of all disturbed areas, E&S controls and permitting.

Construction Engineer; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Peninsula Highwall #1 and #2; Monongalia County, WV. Mr. Lane served as the Construction Engineer and supervised and coordinated the work of the Construction Inspectors during the construction phase of the project. The construction of the project consisted of the reclamation of two highwalls,



installation of one dry mine seal and one batgate type wet mine seal, installation of surface and subsurface drainage control structures, dewatering and treatment of impounded mine drainage, access roads and pavement repair, soil cover and placement, erosion and sediment controls, and revegetation.

Construction Engineer; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Pendleton Creek Strip; Tucker County, WV. Mr. Lane served as the Construction Engineer and supervised and coordinated the work of the Construction Inspectors during the construction phase of the project. The construction of the project involved; highwall elimination, dewatering of impoundments and regrading to eliminate impounded areas, sealing of mine openings, construction of a stream through the area by means of natural stream design, surface and subsurface drainage control structures, erosion and sediment controls, placement of suitable soil cover and revegetation. Revegetation of the area included reforestation and riparian zones.

Construction Engineer; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Three Fork Stream Watershed Restoration; Preston County, WV. Served as the Construction Engineer and supervised and coordinated the work of the Construction Inspectors during the construction phase of the project. The Three Fork Watershed Restoration project was initiated to provide full stream restoration to fishery quality utilizing in-stream active treatment. The construction of the project included, but was not limited to; site preparation, installation of support areas and access roads, installation of drainage structures, construction and installation of four dosers, intake and feed lines, erosion and sediment controls, and revegetation. Quality control involved testing for compressive strengths for concrete and grout, soil nutrients and lime requirements for soil, and field density tests for soil compaction.

Emergency Engineer and Administrator; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Laurel Valley (Daniels) Landslide; Harrison County, WV. Mr. Lane managed the design and construction of the project from inception to completion. The project was comprised of two phases. The first phase involved the removal of approximately 0.5 acres of loose, unconsolidated spoil that had slipped and toed out against the basement wall of a residential structure. The lateral stresses induced by the slip material had caused significant lateral movement of the wall. Acid mine drainage was observed emanating at several locations within the slip material. Drainage controls were constructed to convey the acid mine drainage that had contributed to the slope instability away from the slip area. The slip area was stabilized by removing the slip material and regrading the site to a stable configuration. The second phase of the project involved the reclamation of approximately 460 lf of highwall utilizing the material excavated from the slip area. The project also included the design and construction of open limestone channels, vegetated channels, installation of pipes and associated appurtenances, site preparation, slope stability calculations, soils and grout testing, concrete road repair, development of quantity estimate and construction cost estimate, initial site investigation to determine eligibility, erosion and sediment controls, and revegetation of disturbed areas.

Emergency Engineer; West Virginia Department of Environmental Protection Agency (WVDEP) AML&R; Haywood Refuse #2; Harrison County, WV. Mr. Lane was responsible for project management, engineering design, development of construction plans and specifications, construction oversight, and development of cost estimates. The primary objective of the project was to mitigate a refuse fire located between the West Fork River and the CSX railroad.



THOMAS GRAY, PE PROJECT ADVISOR

EXPERIENCE SUMMARY

Mr. Gray has more than 40 years of professional experience. He is a technical expert in mining engineering, mine reclamation, coal ash disposal and utilization, watershed and ecosystem restoration, mine subsidence, acid mine drainage remediation, mine stabilization via grouting and abandoned mine fire mitigation. Mr. Gray specializes in active and abandoned mining projects and with infrastructure projects that have mining related concerns. His project management responsibility has included construction, engineering, regulatory compliance, and research and development. He has been responsible for the successful completion of many unique projects.

RELEVANT EXPERIENCE

Project/Contract Manager; 2012 Professional Design Services Contract; Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation and Bureau of Mining Programs; PA. Currently managing these open-end contracts to provide professional design services to remediate problems such as acid mine drainage, contamination of water supplies, degraded stream quality, subsidence, and abandoned refuse and waste piles, strip mines, highwalls, and landslide-prone areas.

Project Engineer; Parker Run Mine Drainage Design; West Virginia Department of Environmental Protection Office of AML&R; Marion County, WV. Supporting this contract, which includes design of drainage conveyances, design installation of mine seals, highwall reclamation, design of refuse reclamation, design of stream bank stabilization, design of structural and trash removal/disposal, and re-vegetation of disturbed areas.

Project Manager; Mine Seal Designs; Ohio Valley Coal Company; Aledonia, OH. Prepared mine seal designs for three shafts for use at an active coal mine during mine closure. The mine seals were designed to withstand the expected water pressure after the maximum mine pool has developed.

Project Manager; Fisher Run and Tunnelton Mine Portal Closures; WVDEP Office of AML and Reclamation; Lewis and Preston Counties, WV. Project Manager for the preparation of construction drawings to install wet mine seals and drainage improvements for the closure of abandoned mine portals

EDUCATION

BS, Mining Engineering,
Pennsylvania State University,
1973

MBA, University of Pittsburgh,
1977

AREA OF EXPERTISE

Mining Engineering

REGISTRATIONS/ AFFILIATIONS

Professional Engineer, WV,
1988, 10523

Professional Engineer, PA,
1978, 26978-E

Professional Engineer, MD,
1989, 17048

Professional Engineer, VA,
1980, 11628

Professional Engineer, OH,
2009, 73686

TRAINING/CERTIFICATIONS

N/A

YEARS OF EXPERIENCE

40



on private property in Weston and Tunnelton, WV. Prepared construction specifications and construction cost estimate for the closure of nine mine portals.

Senior Project Consultant; Mine Seal Research; NIOSH; Fayette County, PA. Research project to evaluate a potentially significant improvement to current state-of-the-art practice of constructing mine seals through vertical boreholes when direct access is prohibited. The new technology was tested and proved to be effective in providing barriers to airflow and to impound water and other inert materials.

Project Manager; Mine Seal Evaluation; Duquesne Light Company; Greensboro, PA. Evaluated suitability of a mine seal at the Gray's Landing Lock and Dam being constructed on the Monongahela River by the USACE.

Project Manager; OSM Little River Mining Reclamation Project; Cloudland, GA. This project near Cloudland, Georgia, required regrading an abandoned coal mine strip pit to eliminate a highwall, construction of drainage channels, and revegetation of disturbed areas. The survey was conducted to prepare site topography and cross sections at 50-foot intervals for reclamation and restoration of approximately 2,500 feet of abandoned highwall (as high as 100 feet) from surface mining. A grading plan was prepared that included site drainage features for two drainage channels.

Senior Project Manager; Chartiers Creek/Fishing Run Mine Discharge Investigation; South Fayette Conservation Group in Association with PADEP; South Fayette Township, PA. During an investigation of the deep mine discharges in Chartiers Creek it was found that Fishing Run was being diverted into a deep mine entrance and after becoming polluted coming out at the Gladden discharge, was the largest pollution source in the watershed. Through a grant from PADEP, a reclamation design was prepared and permitted. The design included sealing the mine entrance, reclaiming abandoned highwalls, removing dangerous mine structures and restoring 2,000 feet of stream channel.

Senior Project Manager; Chartiers Creek Mine Discharge Assessment; Chartiers Nature Conservancy in Association with PADEP; Crafton, PA. Assessed the characteristics of the large deep mine discharges in the Chartiers Creek main stem. Flow and chemical data was collected for nine mine discharges over a 12 month period. Mine maps were obtained and scanned into a GIS database. The conceptual hydrology of the mines was evaluated, including underground drainage basins and pooled conditions. This information was used to develop a restoration plan for the watershed.

Senior Engineer; Colorado Statewide Mine Fire Abatement Contract; Colorado Division of Reclamation, Mining and Safety; CO. The Colorado Inactive Mine Reclamation Program (CIMRP) is charged with abating, to the extent possible, hazards associated with mining activities resulting from mining which occurred prior to August, 1977. Six underground coal mine fires were identified for funding for reclamation design for their abatement and Tetra Tech was retained for this work. Mr. Gray is serving as a lead engineer supporting this work, which includes project development, design, procurement documents, and field management of fire abatement activities. Projects begin with the development of a mine fire abatement strategy and then the development of an abatement design. An Invitation for Bid is then created to find a suitable contractor and Tetra Tech provides construction management and inspection services.

Project Manager; Abandoned Coal Mine Fire Remediation Plan; Confidential Client; PA. During the development of a well pad, a natural gas drilling client operating in the Marcellus Shale experienced



elevated temperatures in excavated materials due to a burning abandoned coal mine. Tetra Tech investigated the subsurface conditions and Mr. Gray managed a Mine Fire Remediation Plan for the client.

Senior Project Manager; Dolph Mine Fire; Office of Surface Mining; Lackawanna County, PA. The Dolph mine fire was burning in coal refuse and two underground abandoned anthracite coal mines. A site investigation was completed to define the limits of fire and to recommend fire control methods. A cut-off trench was selected, plans and specifications were prepared and a contractor was selected. Construction was successfully completed and the fire is under control.

Project Consultant; Percy Mine Fire Control Project; PADER; Fayette County, PA. Provided consultation for this mine fire control project that involved mine grouting to contain an underground mine fire. The fire was successfully controlled.

Senior Project Manager; Cohen Mine Fire; Office of Surface Mining; OSM; Baldwin Borough, PA. Provided surveying and consultation for this small underground abandoned coal mine fire.

Senior Project Manager; Maiolie Mine Fire; Office of Surface Mining; Washington Township, PA. Provided surveying and consultation for this small underground abandoned coal mine fire.

Senior Project Manager; Coal Mine Fire Abatement; Office of Surface Mining; Elk County, PA. Managed the surveying during the abatement of a 1.5 acre coal mine fire. Quantity surveys were initiated within 24 hours of request by OSM.

Project Advisor; World Bank Mine Fire Appraisal; Dhanbad, State of Bihar, India. Assisted in the mine fire appraisal project to assess the fires in 17 coal seams of the 450 sq. km. coalfield for the world's largest complex of above-ground and underground mine fires.

Project Manager; Coal Refuse Pile Reclamation; Maple Coal Company; Colver, PA. Prepared technical specifications for reducing the potential for spontaneous heating at the Colver coal refuse pile.

Project Manager; Blacklick Creek Vinton/Wehrum Mine Drainage Treatment Facility Design; PADEP Bureau of Abandoned Mine Reclamation; Indiana County, PA. Tetra Tech was retained by PADEP for the design of a mine drainage treatment facility. Managing this large, multifaceted project included the design of a mine water conveyance system, design of relief boreholes, assessment of local mines for sludge disposal, coal refuse pile analysis, mine shaft and subsidence assessment, historical and museum commission documentation/clearance, conceptual treatment facility layout, public involvement through the development of a website, and the development of bid documents.

Project Manager; Palo Alto Mine Drainage Study and Design; PADEP Bureau of Abandoned Mine Reclamation; Borough of Palo Alto, PA. Managing this mine drainage study. Mine drainage is appearing at a residence in the Borough of Palo Alto during heavy precipitation events. Previous attempts at remediation by PADEP and the Office of Surface Mining were unsuccessful. Tetra Tech is studying the site and providing preliminary and final designs. The project also includes drilling, water testing, and surveying.

Project Advisor; East Avoca Mine Drainage Study; PADEP Bureau of Abandoned Mine Reclamation; Avoca Borough, PA. Providing oversight for this mine drainage study in Avoca, PA. Several residents



along Grove Street in Avoca have reported incidents of mine water in basements and in their yards during heavy precipitation events. Tetra Tech's investigation will determine the location and depth of abandoned mine workings that may be the source of mine water occasionally noted along Grove Street. Tetra Tech will then propose alternative solutions to abate the drainage problem.

Senior Project Manager; Alkaline Coal Ash Injection to Mitigate Acid Mine Drainage; CTC Foundation in conjunction with PADEP BAMR and Others; Washington, DC. Evaluated the injection of alkaline coal ash into the 537-acre Valley No. 2 mine to mitigate an AMD (500 gpm) pollution to the Conemaugh River and nearby Big Spring Run. Provided technical consultation for the investigation and authored a technical report. The project team included PADEP, Bureau of Abandoned Mine Reclamation, the Kiski-Conemaugh Coalition, Blacklick Creek Watershed Association, Reliant Energy, the Western PA Watershed Protection Project, St. Clair Township, and PA DCNR.

Senior Project Manager; Passive Treatment Techniques for Acid Mine Discharges; MAX Environmental Services; Yukon, PA. Developed plans to use passive treatment techniques to treat most of the effluent from a hazardous waste disposal facility. Water sources included near neutral surface water runoff, acidic mine discharges and alkaline underflows from disposal cells.

Senior Project Manager; South Branch Blacklick Creek Acid Mine Drainage Feasibility Study; USACE Pittsburgh District; Nanty Glo, PA. Completed a feasibility study to determine the most effective passive abatement method for treating acid mine drainage at the abandoned mine and restoring the aquatic environment of the South Branch Blacklick Creek. Project manager for the conceptual design and cost estimate. A general evaluation report for the restoration of the aquatic ecosystem was completed.

Senior Project Manager; Mine Pool Acid Discharge Investigation; LTV Corporation; Greene County, PA. Conducted an investigation of the potential to utilize biological remediation for a large mine pool acid discharge. Responsible for evaluating and developing a field test to utilize sulfate reduction bacteria to mitigate the large Clyde Mine Pool discharge.

Senior Project Manager; Thompson Run Watershed Acid Mine Drainage Assessment and Restoration; Municipality of Monroeville; Monroeville, PA. Prepared a watershed restoration project for Thompson Run, a tributary of Turtle Creek. Responsible for assessing the adverse impacts of acid mine drainage on the 16-square-mile watershed and developing a realistic restoration plan.

Project Manager; Acid Mine Drainage Identification / Mine Pool Water Sourcing Study; Confidential Client; Forest City, PA. Identified large acid mine drainage sources around Forest City to be used as potential sources of water for a Marcellus Shale client's fracing operations in northeast PA. Mr. Gray gathered the historic flow and chemistry data for the discharges. Two discharges were singled out for further consideration, Vandling and Grey Slope. The mine pools were georeferenced onto a map with these discharges. A conceptual passive treatment system was designed for the Vandling Discharge with an associated pipeline to transport the water to a truck loading area.

Project Manager; Casselman Mine Acid Mine Drainage Prevention and Response Plan; Maryland Energy Resources; Garrett County, MD. Prepared a plan for submittal to the state of Maryland which outlined the measures to be taken to prevent impacts to the Casselman River by mine water when an underground coal mine was closed. The plan needed to include provisions that explained the interaction of



the final mine pool with the Casselman River, what measures would be taken to avoid seeps, outflows, and other discharges resulting from the mine pool, how the mine pool would be controlled post-mining, a monitoring and detection plan for acid mine drainage seeps, and a response/mitigation plan should a seep or discharge occur.

Project Manager; Kempton Mine Acid Mine Drainage Study; Mettiki Coal Company; Western MD. Completed a mine drainage study to determine the feasibility of eliminating AMD flowing from the abandoned Kempton mine into the headwaters of the Potomac River by siphoning water from the pool into an adjacent active underground mine. The study evaluated the potential for lowering the mine pool to below the level of the discharge by siphoning water from the pool into Mettiki's active underground mine.

Project Engineer; AMD Treatment; PADEP; Cresson, PA. Supporting this preliminary design evaluation associated with the proposed Cresson AMD Treatment Plant. BAMR has entered into an agreement with the Susquehanna River Basin Commission to provide treated AMD to supplement flow during low flow periods. Project is currently in the field investigation phase to identify the location of the proposed facility and mine water extraction wells.

Project Manager: Bear Run Acid Mine Drainage Passive Treatment System; Indiana County Conservation District in Conjunction with PADEP; Indiana County, PA. Project Manager for the design of a passive AMD mine treatment system, site grading and PADEP / Indiana County Erosion and Sediment Control permit, stream restoration and preparation of a PADEP Government Financed Construction Contract for a third party contractor to remove coal refuse from the site. Prepared construction grading plans, permits and hydraulic analysis of the Bear Run stream for a stream culvert crossing.

Project Manager: Group Gladden Mine Acid Mine Drainage Treatment System; South Fayette Conservation; South Fayette Township, PA. Preparation of a site grading plan and passive AMD treatment system to treat a maximum flow rate of 1,500 gpm of AMD flow from the abandoned Gladden Mine into Millers Run and Chartiers Creek. Preparation of a grading plan, specifications and design calculations to create 3 acres of passive treatment ponds and design of a spray pumping system to deliver 1,000 gpm of AMD through a nozzle system for aeration and evaluation of stream flow losses in areas affected by past mining.

Senior Project Manager; Jandy Coal Refuse Acid Mine Drainage Investigation and Design; Paint Creek Watershed Association in Association with PADEP; Windber, PA. Investigated acid mine drainage on the Jandy coal refuse disposal site. It was determined that the source of the contamination was a reclaimed surface mine spoil and adjacent abandoned deep coal mine. The selected mitigation approach was to reduce the surface infiltration through drainage controls and to reduce the level of the mine pool so that the groundwater levels would be reduced and thus eliminate the discharge. Design plans were prepared as part of this project.

Project Consultant; Owings Mine Complex Site Reclamation Acid Mine Drainage Treatment System Design; WVDEP; Charleston, WV. Reclamation design of an abandoned mine site comprising old mine structures, open mine portals, refuse piles and numerous acid mine drainage producing discharges. Evaluated water quality and designed a passive AMD treatment system design at the Owings Mine Complex site. **Awarded: James E. "Pete" Pitsenbarger AML Award North, West Virginia Reclamation Awards.**



GREGORY HYNES, PE MINING ENGINEER

EXPERIENCE SUMMARY

Mr. Hynes has more than 27 years of experience in abandoned mine land reclamation, land restoration, mining permits, and environmental and water resources engineering. He has managed or supported more than 25 AML projects for the WVDEP. Most recently, Mr. Hynes managed three highwall projects for the agency in 2012 – the Waitman-Barbe Highwall, the Colliers Sportsman's Club Highwall, and the Simpson Creek Highwall. He has also managed several projects for other state agencies including PADEP and the Ohio Department of Natural Resources, preparing design calculations, cost estimates, plans, and technical specifications for abandoned mine land reclamation. Mr. Hynes has also prepared permit applications and construction level drawings and specifications for proposed surface mine facilities in West Virginia and Pennsylvania. Projects included permitting and reclamation of various mining related surface facilities.

RELEVANT EXPERIENCE

Project Manager; Parker Run Mine Drainage Design; West Virginia Department of Environmental Protection Office of AML&R; Marion County, WV. Managing this contract, which includes design of drainage conveyances, design installation of mine seals, highwall reclamation, design of refuse reclamation, design of stream bank stabilization, design of structural and trash removal/disposal, and re-vegetation of disturbed areas.

Project Manager; Energy Marketing Slurry Impoundment; West Virginia Department of Environmental Protection OSR; Barbour County, WV. Managing this project that involves the certification of a coal slurry impoundment for a company (Energy Marketing Company) that had its mine permit revoked. Services included safety certification of the impoundment with MSHA 30 CFR 77.216-4, mapping of the permit area, a dewatering plan to minimize seepage through the existing embankment, and the development of an RFQ for the construction contract to clean the existing sediment control pond and replace the pond outlet drainage structure to control dewatering from the impoundment. The safety assessment includes a review of data and location of piezometers, underdrains, decant pipes, and discharges; a bathymetric survey to document depths, volumes and elevations of the impounded water, sediment, and slurry; and the identification of any deficiencies that may affect the short-term stability of the structure until dewatering and final reclamation are initiated.

Project Engineer; Vienna Mine Seals – Abandoned Mine Lands; ODNR; Vienna, OH. Provided plans, specifications, and cost estimates for sealing two 100-foot-deep mine shafts located at two different sites

EDUCATION

MS, Civil Engineering,
Youngstown State University,
1997

BE, Civil Engineering,
Youngstown State University,
1987

AREA OF EXPERTISE

Mining Engineering

REGISTRATIONS/ AFFILIATIONS

Professional Engineer, WV,
1998, 013850

Professional Engineer, PA,
1993, PE044310E

Professional Engineer, OH,
1998, 62948

TRAINING/CERTIFICATIONS

N/A

YEARS OF EXPERIENCE

27



and determine the best design for sealing the shafts. Both sites are on wooded lots adjacent to occupied residences.

Project Manager; Simpson Creek Highwall, Tipple, and Portals; WVDEP; Barbour County, WV. Responsible for project management, engineering design, and development of construction plans, specifications, and cost estimates. The project included exploratory drilling, and preparation of reclamation plans and specifications for five sites containing numerous suspected mine entries to a large underground mine complex. Design measures included elimination of impounded mine water, installation of wet mine seals, access roads, collection channels, tipple demolition, minor site grading to provide positive drainage, and final revegetation.

Project Manager; Wymer Portals and Acid Mine Drainage; WVDEP; Monongalia County, WV. Responsible for project management, engineering design, and development of construction plans, specifications, and cost estimates. The project included development of site mapping, exploratory drilling, and preparation of reclamation plans and specifications for a large abandoned mine complex. Design measures included elimination of impounded mine water, installation of wet mine seals, bat gates, and access roads, elimination of highwalls by proposed earthwork and site grading with available on site refuse and spoil materials, and final revegetation. Numerous surface water and mine drainage structures including ditches, pipes, and underdrains were also required.

Project Manager; Davidson Highwall; WVDEP; Monongalia County, WV. Responsible for project management, engineering design, and development of construction plans, specifications, and cost estimates. The project included development of site mapping, exploratory drilling, and preparation of reclamation plans and specifications for a large abandoned mine complex. Design measures included elimination of impounded mine water, installation of wet mine seals, stream channel restoration, elimination of highwalls by proposed earthwork and site grading with available on site refuse and spoil materials, and final revegetation. Numerous surface water and mine drainage structures including ditches, pipes, and underdrains were also required.

Project Engineer; Elkins Coal Refuse Reclamation; WVDEP; Preston County, WV. Performed research of geological data and mining maps, designing reclamation measures, and preparing construction plans and specifications for the project which included erosion and sedimentation control measures, site earthwork and grading, slope stability analysis, mine seals, collection and diversion ditches, soil cover placement, and revegetation.

Project Engineer; Tibbs Run Portals & Tipple Reclamation; WVDEP; Monongalia County, WV. Performed design of reclamation measures, including mine seals, underdrains, and mine water collection channels. Prepared construction plans, specifications, and cost estimates for the project, which included erosion and sedimentation control measures, site regrading, collection and diversion ditches, soil cover placement, and revegetation.

Project Engineer; National Mine Complex Reclamation, WVDEP; Monongalia County, WV. Performed research of geological data and mining maps, designing reclamation measures, and preparing construction plans and specifications for the project which included erosion and sedimentation control measures, site earthwork and regrading, slope stability analysis, mine seals, collection and diversion ditches, soil cover placement, and revegetation.



Project Engineer; MacArthur Mine Subsidence; WVDEP; Raleigh County, WV. Performed drilling inspection, mine map research and interpretation, and parking lot and roadway restoration, and developing specifications, plans, and cost estimates. The project required test drilling in a residential neighborhood in order to estimate grouting requirements to abate its underground mine subsidence problems.

Project Engineer; Beech Bottom Refuse Reclamation Project; WVDEP; Ohio and Brooke Counties, Beech Bottom, WV. Responsibilities included site design and preparation of the project construction plans and specifications. The project included three sites located along the Ohio River containing barren refuse piles ranging in size from 15 to 60 acres. The reclamation plan that was developed provided for the refuse piles to be graded to stable slopes, covered, and vegetated to reduce AMD generation. Refuse piles encroaching on the Ohio River were graded and covered with a mat liner and vegetated for erosion control. Site drainage with collection ditches and storm water piping was also designed to provide positive drainage. A phase I archaeological investigation of a proposed borrow area located in the Ohio River Floodplain was performed as required by the WV SHPO.

Project Engineer; Big Hollow Mine Dump Reclamation; WVDEP; Mullins, WV. Performed research of geological data and mining maps. Prepared construction plans and specifications for the project which included erosion and sedimentation control measures, site regrading, collection and diversion ditches, soil cover placement, and revegetation.

Project Engineer; Twilight Burning Refuse Reclamation; WVDEP; Twilight, WV. Performed research of geological data and mining maps, designing reclamation measures, and preparing construction plans, specifications, and cost estimates for the project which included erosion and sedimentation control measures, site earthwork and grading, mine seals, methods of extinguishing/quenching actively burning refuse, collection and diversion ditches, soil cover placement, and revegetation.

Project Engineer; Piney Swamp Run Refuse No. 1 Reclamation; WVDEP; Keyser, WV. Performed research of geological data and mining maps, review of water quality data, and design of acid mine drainage abatement measures, including wetlands, successive alkalinity producing systems, anoxic limestone drains, metals settling ponds, and open limestone channels. Prepared construction plans, specifications, and cost estimates for the project, which included erosion and sedimentation control measures, site regrading, collection and diversion ditches, soil cover placement, and revegetation.

Project Engineer; Turnhole Branch Reclamation Project; WVDEP; McDowell County, WV. Performed research of geological data and mining maps, designing reclamation measures, and preparing construction plans, specifications, and cost estimates for the project which included erosion and sedimentation control measures, site earthwork and regrading, underdrain, slope stability analysis, mine seals, collection and diversion ditches, soil cover placement, and revegetation.

Project Engineer; Pageton Mine Refuse Reclamation; WVDEP; Pageton, WV. Performed research of geological data and mining maps, designing reclamation measures, and preparing construction plans and specifications for the project which included erosion and sedimentation control measures, site earthwork and regrading, slope stability analysis, mine seals, collection and diversion ditches, soil cover placement, and revegetation.



Project Engineer; Masontown No. 4 Reclamation, AMD Abatement; WVDEP; Masontown, WV. Performed research of geological data and mining maps, review of water quality data, and preparation of construction plans, specifications, and cost estimates for the project which included erosion and sedimentation control measures, site earthwork and grading, mine seals (wet and dry), collection and diversion ditches, stream crossings, soil cover placement, and revegetation. The Masontown No. 4 project required the design of measures for the abatement of acid mine drainage (AMD) emanating from abandoned mine entries and refuse piles at four specific sites along two tributaries to the Cheat River.

Project Engineer; Odd-Moore Mine Reclamation; WVDEP; Raleigh County, Odd, WV. Performed research of geological data and mining maps, designing reclamation measures, and preparing construction plans, specifications, and cost estimates for the project which included erosion and sedimentation control measures, site earthwork and regrading, underdrains, limestone ditches, abandoned mining structure removal, soil cover placement, and revegetation. The Odd Moore Refuse Pile abandoned mine land site consisted of two refuse piles covering approximately 12 acres with steep unstable slopes, four abandoned mining impoundments, a concrete foundation and remains of an old tipple, and acid mine drainage (AMD) seepage, all in close proximity to an existing residence.

Project Engineer; Watson Portal and Refuse Reclamation; WVDEP; Fairmont, WV. Performed research of geological data and mining maps, review of water quality data, and design of acid mine drainage abatement measures, including anoxic limestone drains, metals settling ponds, and open limestone channels. Prepared construction plans and specifications for the project, which included erosion and sedimentation control measures, site regrading, mine seals, collection and diversion ditches, abandoned barge and coal refuse removal from the North Branch of the Monongahela River, soil cover placement, and revegetation.

Project Engineer; Cheat Lake Highwall; WVDEP; Monongalia County, WV. Performed research of geological data and mining maps and review of water quality data. Prepared construction plans, specifications, and cost estimates for the project which included erosion and sedimentation control measures, site earthwork and regrading, mine seals (wet and dry), collection and diversion ditches, stream crossings, soil cover placement, and revegetation. The Cheat Lake Highwall abandoned mine land site consisted of a 19-acre refuse pile, numerous abandoned mine openings discharging acid mine drainage (AMD), and a dangerous highwall in close proximity to a residential area.

Project Engineer; Emoryville Mine Complex Reclamation and AMD Remediation; WVDEP; Emoryville, WV. Performed research of geological data and mining maps, review of water quality data, and design of acid mine drainage abatement measures, including open limestone channels, Successive Alkalinity Producing Systems, and aerobic wetlands. Prepared construction plans and specifications for the project which included erosion and sedimentation control measures, site regrading, mine seals, collection and diversion ditches, abandoned barge and coal refuse removal from the North Branch of the Monongahela River, soil cover placement, and revegetation. The Emoryville Mine Complex project required the design of measures for the abatement of acid mine drainage (AMD) emanating from abandoned mine entries and piles at three sites. AMD discharges and coal refuse piles are located along both sides of Emory Creek, a tributary to the North Branch Potomac River.

Project Engineer; Flemington Portals and Drainage; WVDEP; Taylor County, WV. Provided review and oversight of all hydraulic and hydrologic calculating performed on the project, and developing



conceptual plans for review with the client prior to finalization of the design. The design portion of the project included the following: design of reclamation measures for an abandoned highwall area, construction of diversion and collection ditches, replacement of an existing culvert, repair to existing mine seals and ditches, erosion and sedimentation control measures, and site grading to eliminate the existing ponded areas, and revegetation. The work also included preparation of construction plans and specifications including the cost estimate.

Project Engineer; Mine Reclamation for Borgman Refuse and Portals; WVDEP; Preston County, WV. Performed research of geological data and mining maps, designing reclamation measures, and preparing construction plans and specifications for the project which included erosion and sedimentation control measures, site earthwork and regrading, slope stability analysis, mine seals, collection and diversion ditches, soil cover placement, and revegetation. Project responsibilities included site reconnaissance, survey and mapping, subsurface investigation, designing grading, drainage control structures, ditches, passive treatment for AMD, earthwork, and preparation of plans, specifications and costs.

Project Engineer; Kempton Refuse and Acid Mine Drainage; WVDEP; Tucker County, WV. Performed research of geological data and mining maps, review of water quality data, and design of acid mine drainage abatement measures, including open limestone channels, SAPS cells, and aerobic wetlands. Prepared construction plans and specifications for the project, which included site grading, mine seals, collection and diversion ditches, soil cover placement, and revegetation. Work included performance of site reconnaissance and office research, field surveying, test drilling, analysis and design of reclamation measures, preparation of construction plans and specifications, and development of a quantity estimate and construction cost estimate.

Project Engineer; Jed-Havaco Refuse Reclamation; WVDEP; WV. Performed research of geological data and mining maps, designed reclamation measures, and prepared construction plans, specifications, and cost estimates for the project which included erosion and sedimentation control measures, site earthwork and regrading, slope stability analysis, mine seals, collection and diversion ditches, soil cover placement, and revegetation.

Project Engineer; Denver Street Drainage Abatement; WVDEP; WV. Performed research of geological data and mining maps, designed reclamation measures, and prepared construction plans, specifications, and cost estimates for the project which included erosion and sedimentation control measures, mine seals, pond for active treatment of mine water during dewatering of mine pool, water conveyance pipe, collection ditches, and diversion ditches.

Project Engineer; Stonewood Reclamation; WVDEP; WV. Performed research of geological data and mining maps, designed reclamation measures, and prepared construction plans, specifications, and cost estimates for the project.

Project Engineer; Stark Drainage Abatement; WVDEP; WV. Performed research of geological data and mining maps, designed reclamation measures, and prepared construction plans, specifications, and cost estimates. The project included erosion and sedimentation control measures, mine water conveyance pipe in underdrains and horizontally bored into mine workings, a manhole and inlet with West Virginia Department of Transportation, Division of Highways' roadway crossing, placement and piping collection and diversion ditches, and underdrains.



TERRY SMITH, PE MINING ENGINEER

EXPERIENCE SUMMARY

Mr. Smith has more than 36 years of experience in mining engineering and management, and water and wastewater design engineering and project management. Recently, he has supported Tetra Tech's project for mine seal and bulkhead design for a project at a mine in Ohio. Mr. Smith's other experience includes longwall mining, coal preparation plant and coal refuse disposal supervision, surface mine permitting, mine operations evaluations, compliance evaluations, economic feasibility analysis, cost estimating and project management in the coal mining industry.

RELEVANT EXPERIENCE

Project Manager; 2012 Professional Design Services Contract; Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation and Bureau of Mining Programs; PA. Serving as a project manager for these two five-year \$5M mining engineering contracts to provide professional design services to remediate problems such as open mine portals, acid mine drainage, mine fires, highwalls, and subsidence projects.

Project Engineer; Mine Seal and Bulkhead Design; Ohio Valley

Coal Company; Alledonia, OH. Tetra Tech designed four hydraulic mine seals at the Ohio Valley #6 Mine near Alledonia, OH and Mr. Smith supported this project with design services. Tetra Tech also performed a detailed study of mine seal and bulkhead successes and failures to assist in the design. The research included an analysis of reasons for failures of mine bulkheads as well as an analysis of the number of approved versus unapproved designs. Individuals at both MSHA and NIOSH were contacted to provide insight into mine bulkhead design. A review of available literature on mine bulkhead design was also performed and summarized as part of the project.

Project Engineer; AMD Treatment; PADEP; Cresson, PA. Preliminary design evaluation associated with the proposed Cresson AMD Treatment Plant. BAMR has entered into an agreement with the Susquehanna River Basin Commission to provide treated AMD to supplement flow during low flow periods. Project is currently in the field investigation phase to identify the location of the proposed facility and mine water extraction wells.

Project Engineer; Mine Discharge Reclamation; South Fayette Conservation Group; PA. Design engineering, permitting and project management for a watershed conservation group. The project objective is to seal a stream bottom in order to prevent water from entering an abandoned underground coal mine.

EDUCATION

BS, Mining Engineering,
University of Pittsburgh, 1978

AREA OF EXPERTISE

Mining Engineering

REGISTRATIONS/ AFFILIATIONS

Professional Engineer, PA,
1992, PE070977

TRAINING/CERTIFICATIONS

N/A

YEARS OF EXPERIENCE

36



THOMAS KIMMEL, PS/PLS SURVEYOR

EXPERIENCE SUMMARY

Mr. Kimmel has more than 41 years of surveying experience in various sectors for private and public government. He is a registered surveyor in nine states, including West Virginia. Mr. Kimmel has supported numerous projects involving boundary and topographic surveying, borehole stakeouts, cross sections, mapping using aerial photogrammetric methods, and ALTA land title surveys. He also has experience teaching community college surveying courses.

RELEVANT EXPERIENCE

Surveyor; ALTA Land Title Surveys; WV and PA. Conducted ALTA land title survey for a horse racetrack located in Charlestown, West Virginia. The West Virginia site was nearly 300 acres, consisting of 31 separate parcels located in three municipalities with over 80 title exceptions. The base mapping for the planimetrics of the area was done using aerial photogrammetric mapping techniques. The control (horizontal & vertical) for the photo-identities was established using GPS from a number of NGS and USGS monuments surrounding the site, having moved the control onto the site first and utilizing those bases for subsequent work. After all the deeds and easements were plotted, a survey crew was sent to search for ground evidence.

Surveyor; Mapping using Aerial Photogrammetric Methods; Pennsylvania Turnpike Commission; PA. Managed mapping projects utilizing aerial photogrammetric methods for three ten-mile sections of the PA turnpike, two along the mainline and one in the northeast extension. Control monument pairs were set approximately every two miles with panel points for both low level helicopter and upper level airplane flights. A full report was written and submitted to NGS such that the data was to be accepted and included into NGS' national data base for horizontal and vertical control.

Surveyor; Various PennDOT Surveying Projects; PennDOT; PA. Responsible for the creation of a transportation survey section at a previous employer to better meet the client's needs and PennDOT's requirements on surveying projects.

Surveyor; Boundary and Topographic Surveys; Various Clients.

Performed numerous individual property, topographic, aerial, hydrographic, and engineering surveys. Conducted area supervision of multi-crewed projects.

EDUCATION

BS, Applied Science and Technology with Surveying Specialization, Thomas Edison State College, 1995

AS, Engineering and Surveying, Pennsylvania State University, 1973

AREA OF EXPERTISE

Surveying

REGISTRATIONS/ AFFILIATIONS

Professional Surveyor, WV, PS #974, 1994

Professional Land Surveyor, PA, PLS #22855-E, 1975

Professional Land Surveyor, MD, PLS #10911, 1990

Professional Land Surveyor, DE, PLS #572, 1993

Licensed Surveyor, VA, LS #1961, 1993

Professional Land Surveyor, NC, PLS #L3674, 1994

Professional Land Surveyor, NJ, PLS #GS39650, 1996

Licensed Surveyor, NY, LS #50239, 1996

Professional Surveyor, OH, #8260, 2003

TRAINING/CERTIFICATIONS

N/A

YEARS OF EXPERIENCE

41



HEATHER TREXLER, PG LEAD GEOLOGIST

EXPERIENCE SUMMARY

Ms. Trexler has more than nine years of experience as a project manager and geologist. Her project activities for mining development include the preparation of geologic and hydrologic sections of permits to state agencies in West Virginia for longwall expansions, new room and pillar mines, refuse expansions and associated surface activities. She also reviews current and potential impacts to water resources, managing mining compliance sampling programs and evaluating large-volume water quality analysis.

RELEVANT EXPERIENCE

Project Geologist; Blacklick Creek Vinton/Wehrum Mine Drainage Treatment Facility Design; PADEP Bureau of Abandoned Mine Reclamation; Indiana County, PA. Supporting this large, multifaceted project included the design of a mine water conveyance system, design of relief boreholes, assessment of local mines for sludge disposal, coal refuse pile analysis, mine shaft and subsidence assessment, conceptual treatment facility layout, public involvement, and the development of bid documents.

Project Geologist; Palo Alto Mine Drainage Study and Design; PADEP Bureau of Abandoned Mine Reclamation; Borough of Palo Alto, PA. Providing geological support for this mine drainage study. Mine drainage is appearing at a residence in the Borough of Palo Alto during heavy precipitation events. Previous attempts at remediation by PADEP and the OSM were unsuccessful. Tetra Tech will conduct study the site then provide preliminary and final designs. The project will also include drilling, water testing, and surveying.

Project Geologist; East Avoca Mine Drainage Study; PADEP Bureau of Abandoned Mine Reclamation; Avoca Borough, PA. Serving as the lead geologist on this mine drainage study in Avoca, PA. Several residents along Grove Street in Avoca have reported incidents of mine water in basements and in their yards during heavy precipitation events. Tetra Tech's investigation will determine the location and depth of abandoned mine workings that may be the source of mine water occasionally noted along Grove Street. Tetra Tech will then propose alternative solutions to abate the drainage problem.

Project Geologist; 2012 Professional Design Services Contract; Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation; PA. Serving as a geologist for this five-year \$5M mining engineering contract to provide professional design services to remediate problems such as open mine portals, acid mine drainage, mine fires, highwalls, and subsidence projects.

Project Manager; Marion County Reclaimed Mine Site Investigation; American Bituminous Power Partners, LP; Marion County, WV. Managed this project, which included a site assessment, sampling, and general recommendations as to the possible sources of elevated levels of aluminum at the site.

EDUCATION

MS, Geology, West Virginia University, 2003

BS, Geology, University of Cincinnati, 2001

AREA OF EXPERTISE

Geology

REGISTRATIONS/ AFFILIATIONS

Professional Geologist, PA, 2007, PG-004787

TRAINING/CERTIFICATIONS

PADEP Environmental Permitting and Erosion and Sedimentation Control Training

YEARS OF EXPERIENCE

10



BEN HOPPE CAD DESIGNER

EXPERIENCE SUMMARY

Mr. Hoppe has more than eight years of professional CADD experience. He has conducted work for several abandoned mine land reclamation projects, including those for the West Virginia Department of Environmental Protection's Office of AML, and erosion and sediment control plans. He is a CAD manager for Tetra Tech and has supported more than 30 mining-related projects over the past several years.

RELEVANT EXPERIENCE

CAD Designer; Bandy/King Mine Subsidence Investigation; Virginia Department of Mines, Minerals, and Energy; Wise County, VA. Provided CAD support for an investigation to characterize suspected mine voids on two residential properties which exhibited evidence consistent with mine subsidence. Work consisted of a property survey, a GPR survey, and generation of mapping and a drilling investigation plan.

CAD Designer; Fisher Run Portal Closure; West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation; Weston WV. Mr. Hoppe's responsibilities included creating existing conditions plans and sections along with mine void information to adequately design structures to seal mine and convey mine water discharge. Also performed design of multiple piping and ditch conveyance systems to allow mine water to discharge to existing streams.

CAD Designer; Tunnelton Mine Portal Closure Design for Acid Mine Drainage; West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation; Tunnelton, WV. Responsibilities included creating existing conditions plans and sections along with mine void information to adequately design structures to seal mine and convey mine water discharge. Also performed design of multiple piping and ditch conveyance systems to allow mine water to discharge to existing streams.

CAD Designer; Paint Branch Mine Project; West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation; Kanawha, WV. Mr. Hoppe performed design services on this project, which included the installation splash pads and metal bat gates on three abandoned mine portals and removal approximately 48 abandoned bridge piers in Paint Branch.

CAD Designer; Gladden Mine Discharge Passive Treatment System (in association with PADEP); South Fayette Conservation Group; South Fayette Township, PA. Design required creation of existing conditions plans and sections along with design of 2 ½ acre pond separated into 3 chambers using earthen berms. Pond required berm with graded access road into pond area and along perimeter. Sections and profiles were created along pond and access road. Access road required horizontal and vertical geometry to be included on plan and profiles.

EDUCATION

AS, Drafting, Johnson College,
2004

REGISTRATIONS/ AFFILIATIONS

N/A

TRAINING/CERTIFICATIONS

N/A

YEARS OF EXPERIENCE

9



DAVID YANERO

CAD DESIGNER

EXPERIENCE SUMMARY

Mr. Yanero has more than 20 years of abandoned mine land and engineering experience. He has supported numerous abandoned mine land design projects in West Virginia, including those for the West Virginia Department of Environmental Protection. His work has included design/CAD support for various mine reclamation projects including those involving drainage structures, subsidence investigations, regarding and stabilization plans, pre-blast investigations, and permitting.

RELEVANT EXPERIENCE

Project Designer; Parker Run Design Project; WVDEP; Marion County, WV. Providing CAD support for this project involving four sites located in Marion County, West Virginia. The project is ongoing and includes the design of drainage conveyances, design installation of mine seals, highwall reclamation, design of refuse reclamation, design of stream bank stabilization, the design of structural demolition and trash removal/disposal, and the revegetation of disturbed areas.

Project Designer; Abandoned Mine Land Design including Subsidence Investigations; Various Clients; WV, MD, PA, and OH. Mr. Yanero has provided several design services for various AML projects in West Virginia, Maryland, Pennsylvania, and Ohio. His work has included subsidence investigations, regrading and stabilization plans, design of drainage structures, pre-blast investigations, erosion and sediment control plans, stormwater pans, permitting, and mapping.

Environmental Technician/Land Agent; Subsidence Investigation, Permitting, and Design; Consolidation Coal Company; Various Locations. Mr. Yanero assisted in the preparation of state and federal mine permits related to deep mine development. His work also included subsidence investigations, the design of surface facilities, shaft sites, roads, sediment and drainage structures, acid mine drainage treatment facilities, NPDES, and pre-blast surveys.

Project Designer; Acid Mine Drainage Treatment Design; Pennsylvania Department of Environmental Protection; Cresson, PA. Providing CAD design services for the design for the Cresson acid mine drainage treatment plant. Tetra Tech supported a preliminary design evaluation initially for the proposed treatment plant. The Bureau of Abandoned Mine Reclamation entered into an agreement with the Susquehanna River Basin Commission to provide treated acid mine drainage to supplement flow during low flow periods.

Project Designer; Design for Oil and Gas Projects; Various Clients; WV. Mr. Yanero has supported the design of various design projects for oil and gas clients in West Virginia, including the design of gas well pads, access roads, E&S plans, and mitigation and monitoring of streams. Design and mapping services were provided using Civil 3D software.

EDUCATION

AS, Architectural Design

REGISTRATIONS/ AFFILIATIONS

N/A

TRAINING/CERTIFICATIONS

N/A

YEARS OF EXPERIENCE

20



Section E: Project Descriptions



Relevant Project Experience

Over the next several pages, we have included full-page project descriptions to supplement our proposal. These project examples (all of which have been listed in Attachment C) provide detailed descriptions of some of our recent work performed.



WVDEP PARKER RUN RECLAMATION DESIGN



CLIENT

West Virginia Department of
Environmental Protection,
AML&R

LOCATION

Marion County, West Virginia

DURATION

2013 – Ongoing

FEATURES

- Drainage and mine seal design
- Refuse and highwall reclamation
- Stream bank stabilization design

PROJECT DESCRIPTION

Tetra Tech was awarded this contract with the West Virginia Department of Environmental Protection, Office of AML&R. Our firm is designing various reclamation features at Parker Run in Marion County.

Tetra Tech's services include:

- Design of drainage conveyances
- Design installation of mine seals
- Highwall reclamation
- Design refuse reclamation
- Design stream bank stabilization
- Design structural and trash removal/disposal
- Re-vegetation of disturbed areas



PAINT BRANCH MINE PORTAL CLOSURE DESIGN



CLIENT

WVDEP, AML Division

LOCATION

Kanawha County, West Virginia

DURATION

2010

FEATURES

- Design of three abandoned mine portal seals
- Simple, innovative bat gate design

PROJECT DESCRIPTION

The West Virginia Department of Environmental Protection (WVDEP) Office of Abandoned Mine Lands retained Tetra Tech to develop a reclamation design of an abandoned underground mining site in Paint Branch, WV in 2010. The site consisted of three open mine portals and approximately 42 abandoned bridge piers. Topographic mapping of the site was prepared and used by Tetra Tech to develop a design including construction drawings, specifications, and a construction cost estimate. An erosion and sedimentation control plan was also completed. Tetra Tech also provided ongoing construction support.

The design challenges of the site included steep terrain, which limited access to the site, and narrow openings which had to be fitted with seals that would allow bats access. The traditional bat gate mine portal seal design of installing a large oval pipe with metal bars into the mine opening was not suitable for use at this site due to access restrictions and the limited size of the opening. Tetra Tech developed a simple new design which consisted of a matrix of welded steel bars directly mounted to the rock face. The project has been constructed and the design has already been adopted by the WVDEP at other mine portal sites.



FISHER RUN MINE PORTAL CLOSURE DESIGN



CLIENT

WVDEP, AML Division

LOCATION

Weston, West Virginia

DURATION

2009

FEATURES

- Design of six wet mine seals and one bat gate
- Hydrologic and hydraulic analysis
- Coordination with property owners

PROJECT DESCRIPTION

In 2009, The West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands & Reclamation (AML&R) retained Tetra Tech for the investigation and design for the closure of seven mine portals on private property. The portals currently allow acid mine drainage to exit and flow into a small stream. The design included evaluating multiple closure alternatives and developing regrading plans that balance cut and fill. The project included the use of a drilling subcontractor to perform soil borings at the portals to determine the nature and properties of the overburden material and the elevation of the mine pool. Tetra Tech also used a local land surveyor to survey the portal and gather topographic information of the adjacent land area to support site grading and portal closure design.

Tetra Tech also performed a hydrologic and hydraulic analysis of the receiving stream to determine the effect on the stream due to site grading. Coordination with the private property owners was necessary to restore the property to an acceptable condition. A bat gate will be installed on one mine portal. Construction drawings, specifications, construction cost estimates and erosion and sediment control permits were prepared for public bidding of the project by the West Virginia Department of Environmental Protection/Office of AML&R.



TUNNELTON MINE PORTAL CLOSURE DESIGN



CLIENT

WVDEP, AML Division

LOCATION

Kanawha County, West Virginia

DURATION

2009

FEATURES

- Design of wet and dry seals for abandoned mine portals
- Construction administration
- Coordination with property owners

PROJECT DESCRIPTION

The West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands & Reclamation (AMLR) retained Tetra Tech in 2009 for the investigation and design for the closure of two mine portals on two separate private parcels. One portal currently allows acid mine drainage to exit and flow off-site. The design included evaluating multiple closure alternatives and developing regrading plans that balance cut and fill. The project included the use of a drilling subcontractor to perform soil borings at one portal to determine the nature and properties of overburden material and the elevation of the mine pool. The project plan also involved the demolition of an abandoned concrete mining structure.

Tetra Tech also used a local land surveyor to survey the portals and gather topographic information of the adjacent land area to support site grading and portal closure design. Coordination with the private property owners is necessary to restore the properties to acceptable conditions. Because one portal is located directly behind a private garage, it required a closure plan to minimize impacts to the garage. Tetra Tech prepared construction drawings, specifications, construction cost estimates and erosion and sediment control permits for public bidding of the project by the West Virginia Department of Environmental Protection/Office of AMLR.



OHIO VALLEY COAL COMPANY MINE SEAL AND BULKHEAD DESIGN



CLIENT

Ohio Valley Coal Company

LOCATION

Alledonia, Ohio

DURATION

2010

FEATURES

- Design of two hydraulic mine seals
- Study of mine seal and bulkheads
- Coordination with MSHA and NIOSH officials

PROJECT DESCRIPTION

Tetra Tech designed four hydraulic mine seals at the Ohio Valley #6 Mine near Alledonia, OH. Tetra Tech also performed a detailed study of mine seal and bulkhead successes and failures to assist in the design. The research included an analysis of reasons for failures of mine bulkheads as well as an analysis of the number of approved versus unapproved designs. Individuals at both MSHA and NIOSH were contacted to provide insight into mine bulkhead design. A review of available literature on mine bulkhead design was also performed and summarized as part of the project. The internal bulkheads were designed for a minimum permanent static head of 90 feet of water and to have a safety factor of 2.0. The seal designs included removing undesirable roof and floor material and keying the seal into the coal ribs. Two boreholes were drilled and geotechnical testing performed to determine the characteristics of the strata above and below the coal seam.

The mine floor and roof that is considered to be incompetent or prone to weathering will be removed by continuous miners. In addition, rib spalling will be removed so that competent coal is exposed. Core drilling of the roofed floor at each seal location will be conducted just prior to seal installation to confirm the rock strata conditions and will be used to determine the excavation limits. An experienced geotechnical engineer or geologist will observe the excavations and will select the excavation limits. Registered professional geotechnical engineers will approve all seal openings prior to the forms being erected. Pressure grouting of the strata surrounding the seal location will follow a pattern of holes which will be drilled perpendicular to the mine roof, floor and ribs. Two water stops surround the perimeter of each entry will be placed for use to grout the interfaces between the cured concrete and the roof, ribs and floor. Forms will then be placed on each side of the concrete seals. While form work is placed, a one inch diameter gas sampling pipe will be placed in each entry. The seal length will be based upon the final width and height of the seal opening. These seals were designed to seal the McMahon Mains mining area after mining of the area is completed. At closure of the mine the seals will be converted to water impounding bulkheads.



OHIO VALLEY COAL COMPANY MINE AIR SHAFT CLOSURE DESIGN



CLIENT

Ohio Valley Coal Company

LOCATION

Eastern Ohio

DURATION

2010

FEATURES

- Design of seals for three coal mine air intake shafts
- Concrete cap assembly allows for easier installation and visual checks for performance during the seal's life

PROJECT DESCRIPTION

Three air intake shafts remain on the surface at a closed coal mine in eastern Ohio. To prepare for mine closure, the coal mining company retained Tetra Tech to design seals for the three intake structures.

Tetra Tech's design consisted of structural concrete mine opening seals to resist the uplift pressure of the hydraulic gradient. These structures consist of steel deck plating to span the opening and steel reinforcement to increase the weight of the seal and to tie the structures together. A commercial air release valve assembly was designed into this system to release escaping air and intake air as the mine water surface elevation fluctuates over time. This air release valve releases pressure on the concrete seal cap. The vent for the air release valve was set at 15 feet above the surface of the cap to eliminate the potential of concentrated methane gas at the surface. An initial investigation determined that an internal horizontal mine shaft plug would be more costly and less reliable for long term maintenance.

This concrete cap assembly will allow easier installation and visual checks of performance during the life of the seal.



BLACKLICK CREEK TREATMENT FACILITY VINTON/WEHRUM ACID MINE DRAINAGE TREATMENT



CLIENT

PADEP, Bureau of Abandoned
Mine Reclamation

LOCATION

Indiana County, Pennsylvania

DURATION

2014 – Ongoing

FEATURES

- Mine drainage treatment design
- Mine shaft and subsidence assessment
- Public coordination

PROJECT DESCRIPTION

Three of the largest discharges and greatest sources of AMD loading in the Blacklick Creek Watershed are the Vinton No. 6 boreholes, located in the North Branch Blacklick Creek, the Commercial No. 16 Mine discharge, also known as the Red Mill discharge to the North Branch Blacklick Creek, and the discharge from the Wehrum Shaft, located approximately three miles downstream on the east side of the main stem of Blacklick Creek.

It is planned by PADEP that all of the above mentioned discharges can be combined and treated at one location. Some of the planning and exploration has already been completed by PADEP. PADEP retained Tetra Tech to design the mine interconnections and pumping/piping systems to convey the mine water to a proposed treatment plant location in Buffington and East Wheatfield Townships, Indiana County. Tetra Tech's tasks under this project include:

- Property easements
- Obtaining mine maps and design of relief boreholes in Wehrum Mine
- Design of the mine water conveyance system
- Design of permanent abandonment of the artesian discharge/relief boreholes in Blacklick Creek
- Assessment of Diamond No. 2 and No. 3 Mines for sludge disposal
- Coal refuse pile analysis
- Mine shaft and subsidence assessment
- Historical and museum commission documentation and clearance
- Conceptual treatment facility layout
- Public involvement via development of a website
- Bid documents



PALO ALTO MINE DRAINAGE CONTROL PROJECT



CLIENT

PADEP, Bureau of Abandoned
Mine Reclamation

LOCATION

Palo Alto Borough,
Pennsylvania

FEATURES

- Mine drainage control design
- Drilling
- Surveying

DURATION

2013

PROJECT DESCRIPTION

Under its existing open-end contract for AML services with the Pennsylvania Department of Environmental Protection's Bureau of Abandoned Mine Reclamation, Tetra Tech was retained to complete plans and the design of a project to alleviate a mine drainage issue occurring at a residence in the Borough of Palo Alto. The project included drilling to capture and convey the mine drainage through proposed conduits to an existing combination storm and sanitary conduit. During heavy precipitation, the water table at a mine tunnel blockage beneath the residence rises and has caused mine drainage to surface. The majority of the time, the drainage that passes through the blockage is captured by culverts and an inlet near the residence. The inlet outlets to a culvert that runs beneath the street and a park before tying into the combined storm and sanitary system. The project was initially investigated by PADEP and the Office of Surface Mining in 2004. Despite efforts to remediate the problem, the issue remained. Tetra Tech was retained and reviewed various documents including mine maps of the area, topographic mapping, drawings and documents from previous remediation efforts, property information, field survey data, prior water level monitoring results, and prior boring logs and locations.

Upon review of the information, Tetra Tech provided the following services:

- Preliminary and final engineering design services
- Determine a drilling plan
- Consider alternate designs
- Determine Erosion and Sediment Controls
- Site restoration of sidewalks, curbs, fence, vegetation, etc.
- Technical specifications, plans, and drawings
- Staging of construction activities and bid documents
- Obtain necessary permits (environmental, HOP)
- Utility coordination



EAST AVOCA – GROVE STREET MINE DRAINAGE STUDY



CLIENT

PADEP Bureau of Abandoned
Mine Reclamation

LOCATION

Avoca, Pennsylvania

DURATION

2013 – Ongoing

FEATURES

- Mine drainage investigation
- Field studies and drilling

PROJECT DESCRIPTION

Tetra Tech was retained by the Pennsylvania Bureau of Abandoned Mine Reclamation to complete a mine drainage study in Avoca, PA. Several residents along Grove Street in Avoca have reported incidents of mine water in basements and in their yards during heavy precipitation events. PADEP, the Bureau of Abandoned Mine Reclamation, and the Office of Surface Mining (OSM) have previously conducted investigations at the site including the review of mine maps and exploratory drilling.

There are four mined coal seams beneath the general vicinity of Avoca Borough, known as the Marcy Bed, Clark Bed, Stark/Top Red Ash Bed, and Bottom Red Ash Bed. PADEP and the OSM have conducted the drilling in 1995, 2000, and 2005 with both rotary and core drilling to determine the depths to the voids, coal seam elevations, and water elevations, if found.

Tetra Tech's investigation will determine the location and depth of abandoned mine workings that may be the source of mine water occasionally noted along Grove Street. This investigation will also determine whether or not the source of surface water reaching the underground mine workings originates at the storm water basin that serves the Wilkes-Barre/Scranton International Airport or if it originates from another location. Tetra Tech will then propose alternative solutions to abate the drainage problem.

Tetra Tech's services include a review of past investigations, field investigations, drilling, mine mapping, Right of Entry agreements, monitoring during heavy rains, surface and mine flow diagrams, a study of mine pool interaction with surface/subsurface flows, and a final report and recommendations.



PADEP FIVE-YEAR STATEWIDE MINING ENGINEERING CONTRACTS



CLIENT

PADEP Bureau of Abandoned Mine Reclamation and Bureau of Mining Programs

LOCATION

Pennsylvania (Statewide)

DURATION

2012 – 2017

FEATURES

- Five-year statewide contracts with numerous projects
- Various types of AML issues
- \$10 million total contract value

PROJECT DESCRIPTION

In 2012, Tetra Tech was selected for two separate statewide mining engineering design contracts for the State of Pennsylvania. The contracts were awarded by the Pennsylvania Department of Environmental Protection's (PADEP) Bureau of Mining Programs (BMP) and Bureau of Abandoned Mine Reclamation (BAMR).

Each contract is for a period of five years and work under the contracts began in the fall of 2012. The scope of services under each will cover a wide variety of issues including:

- The development of plans for AML reclamation
- Closure of mine openings
- Control and extinguishment of mine fires
- Abatement or treatment of acid mine drainage water pollution
- Evaluation and rehabilitation of existing passive or active acid mine drainage treatment systems
- Water line extension and replacement
- Mine subsidence
- Water supply



COLORADO MINE FIRE ABATEMENT AND CONSTRUCTION



CLIENT

Colorado DNR Division of
Reclamation, Mining, Safety

LOCATION

Colorado (statewide)

DURATION

2014 – Ongoing

FEATURES

- Mine fire abatement strategies and reclamation design
- Construction management
- Statewide contract

PROJECT DESCRIPTION

The Colorado Inactive Mine Reclamation Program (CIMRP) is charged with abating, to the extent possible, hazards associated with mining activities resulting from mining which occurred prior to August, 1977. Primarily, CIMRP activities are directed at abating hazards presented by inactive coal mines. The CIMRP receives funding for abandoned mine reclamation activities from the United States Department of the Interior Office of Surface Mining Reclamation and Enforcement (OSM) under the authority of the Surface Mining Control and Reclamation Act of 1977.

Six underground coal mine fires were identified for funding for reclamation design for their abatement and Tetra Tech was retained for this work. Tetra Tech is responsible for all phases and aspects of the mine fire abatement at the specified sites. The work includes project development, design, procurement documents, and field management of fire abatement activities. Projects begin with the development of a mine fire abatement strategy and then the development of an abatement design. An Invitation for Bid is then created to find a suitable contractor and Tetra Tech then provides construction management and inspection services. The projects under this contract will continue until 2015 and include:

- Skull Creek Mine Fire Abatement
- Sunshine Design and Mine Fire Abatement
- West Slope Design and Abatement
- South Canyon Fire Abatement
- Marshall Mine Fire Abatement
- Pocahontas Mine Fire Abatement



BIRD MINE AND STRAYER REFUSE PERMITTING AND WATER TREATMENT SYSTEM DESIGN



CLIENT

AMD Industries, Inc.

LOCATION

Tire Hill, Pennsylvania

DURATION

2012 – Ongoing

FEATURES

- Water treatment design
- PADEP permitting
- Refuse pile quantification and quality analysis

PROJECT DESCRIPTION

Tetra Tech was retained by AMD Industries to complete Pennsylvania Department of Environmental Protection (PADEP) permitting, water treatment design, and refuse pile quantification and quality analysis at the Bird Mine located in Tire Hill, PA. Tetra Tech was tasked with completing two different PADEP mining activity permit renewals – one for the Strayer Refuse Site and one for the Bird Mine Treatment Facility.

In addition, Tetra Tech planned for and conducted exploratory testing of the Strayer Refuse Site to determine the volume and quality of the refuse for possible removal. Our firm continues to provide mining-related support to this site.





CRESSON MINE POOL PROJECT



CLIENT

PADEP, Bureau of Abandoned
Mine Reclamation

LOCATION

Cresson, Pennsylvania

DURATION

2011 – Ongoing

FEATURES

- Treatment of mine pool water discharge
- Modeling

PROJECT DESCRIPTION

Tetra Tech was subcontracted by GAI to perform Abandoned Mine Land remediation for PADEP's Bureau of Abandoned Mine Reclamation project located in Cresson, PA. The project involves the treatment of mine pool water and subsequent discharge into Clearfield Creek for use in agricultural purposes within the watershed. The facility will provide 5.7 million gallons per day of water to users in this river basin to mitigate for agricultural consumptive use during low-flow conditions and to restore water quality in Clearfield Creek.

Our evaluation determined that the combining and treating the water from the Cresson 9, Gallitzin Shaft, and Argyle/Stone Bridge mines could produce slightly less than the needed 5.7 mgd and that additional flow could be obtained by managing the pools. These pools can be treated at one location by collecting and routing discharges to a single treatment plant from the multiple mine pools. Several locations for sludge injection boreholes (expected to be successful and work for a long time period) were found by our engineers that had previous experience in in-mine sludge disposal. The necessary ingredients for successful sludge disposal include available property rights, open mining voids to accommodate the volume of sludge generated, and locating each borehole a sufficient distance from the withdrawal location to limit recycling. Tetra Tech reviewed mine maps and selected three boreholes for sludge disposal.

Tetra Tech is also developing a load duration curve approach coupled with geochemical simulation using the MINTEQA2 model to evaluate the existing and expected water quality conditions of Clearfield Creek and Sugar Run. The load duration curve approach is a simplified statistical approach for determining pollutant loading capacity by analyzing water quality concentrations and stream flow regimes. It will be used to establish the in-stream and end-of-pipe loading capacities of the water quality components under various pollutant loading conditions.