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

Solicitation

NUMBER	PAGE
DEP16434	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
FRANK WHITTAKER
304-558-2316

VENDOR
RFQ COPY
TYPE NAME/ADDRESS HERE
TETRA TECH, INC.
661 ANDERSEN DR.
PITTSBURGH, PA 15220

SHIP TO
ENVIRONMENTAL PROTECTION
DEPARTMENT OF
OFFICE OF AML&R
601 57TH STREET SE
CHARLESTON, WV
25304 304-926-0499

DATE PRINTED
12/10/2013

BID OPENING DATE: 01/14/2014 BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	JB		906-29		

CANYON REFUSE & DUMP 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 CANYON REFUSE AND DUMP, MONONGALIA COUNTY, WEST VIRGINIA PER THE FOLLOWING BID REQUIREMENTS AND ATTACHED SPECIFICATIONS.

****** THIS IS THE END OF RFQ DEP16434 ****** TOTAL:

01/06/14 10:13:03AM
West Virginia Purchasing Division

SIGNATURE Thomas A Long TELEPHONE (412) 921-8794 DATE 1/2/14

TITLE AML MANAGER FEIN 95-4148574

ADDRESS CHANGES TO BE NOTED ABOVE

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

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January 2, 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 #DEP16434 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 work for mine portals and refuse reclamation.

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) and **seven West Virginia registered Professional Engineers** in these offices. 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 experience with refuse projects. All three (Mr. Lane, Mr. Gray, and Mr. Hynes) are registered Professional Engineers in the State of West Virginia.

Tetra Tech as a firm also has significant experience managing these types of projects 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	DATE (DAY, MONTH, YEAR)		FEIN
Canyon Refuse & Dump	2, January, 2014		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 (412) 921-7090	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	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS
Mr. Ronald Lane, PE – Fairmont AML Manager Mr. Thomas Gray, PE – Pittsburgh AML Manager	

9. PERSONNEL BY DISCIPLINE

2012 ADMINISTRATIVE
130 ARCHITECTS
300 BIOLOGIST
170 CADD OPERATORS
304 CHEMICAL ENGINEERS
588 CIVIL ENGINEERS
61 CONSTRUCTION INSPECTORS
_ DESIGNERS (counted in CADD)
_ DRAFTSMEN (counted in CADD)
152 ECOLOGISTS
138 ECONOMISTS
60 ELECTRICAL ENGINEERS
746 ENVIRONMENTALISTS
271 ESTIMATORS
367 GEOLOGISTS
3 HISTORIANS
115 HYDROLOGISTS
19 LANDSCAPE ARCHITECTS
54 MECHANICAL ENGINEERS
70 MINING ENGINEERS
12 PHOTOGRAMMETRISTS
96 PLANNERS: URBAN/REGIONAL
70 SANITARY ENGINEERS
34 SOILS ENGINEERS
140 SPECIFICATION WRITERS
98 STRUCTURAL ENGINEERS
60 SURVEYORS
75 TRAFFIC ENGINEERS
7855 OTHER

239 TOTAL PERSONNEL (IN PRIMARY OFFICE)

14,000+ Personnel company-wide

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 7
***RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.**

10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE? ☐ YES ☐ NO 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 __X__Yes (with individual staff) _____No
NAME AND ADDRESS: Sturm Environmental Services P.O. Box 650 Bridgeport, WV 26330	SPECIALTY: Laboratory analysis (coal, soil, water)	WORKED WITH BEFORE __X__Yes (with individual staff) _____No
NAME AND ADDRESS: Double J Drilling 1207 Williamstown Pike Williamstown, WV 26187	SPECIALTY: Drilling	WORKED WITH BEFORE __X__Yes _____No
NAME AND ADDRESS: Blue Mountain Aerial Mapping 11023 Mason-Dixon Highway Burton, WV 26562	SPECIALTY: Aerial mapping	WORKED WITH BEFORE __X__ Yes ____No
NAME AND ADDRESS: Industrial Lab Analysis 65 36th Street Wheeling, WV 26003	SPECIALTY: Laboratory Analysis (water)	WORKED WITH BEFORE __X__ Yes (with individual staff) _____No
NAME AND ADDRESS: Test Boring Services, Inc. 140 Mong Road Scenery Hill, PA 15360	SPECIALTY: Drilling	WORKED WITH BEFORE __X__ Yes (with individual staff) ____No
NAME AND ADDRESS: Terra Testing, Inc. 260 Meadowlands Blvd. Washington, PA 15301	SPECIALTY: Geotechnical drilling	WORKED WITH BEFORE __X__Yes _____No
NAME AND ADDRESS: TRIAD Engineering 219 Hartman Run Road Morgantown, WV 26505	SPECIALTY: Surveying, Drilling	WORKED WITH BEFORE __X__Yes ____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. Our Technical Advisor, Mr. Thomas Gray, PE, has managed and supported AML projects for 26 years and has previously managed WVDEP projects, including several refuse and drainage projects. Our Senior Engineer, Gregory Hynes, PE, has been working on abandoned mine reclamation projects for the past 20 years, with many portal and refuse projects in West Virginia for the WVDEP.

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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Lane, Ronald, PE Project Manager	8	16	0

Brief Explanation of Responsibilities

Mr. Lane has more than 16 years of mining experience and is a technical expert in refuse, 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 numerous recent WVDEP projects involving refuse **including the WVDEP Roger Camp Hill Refuse project, Haywood Refuse #2 project, and the Ridenour Highwall project.** 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	REGISTRATION (Type, Year, State)
N/A	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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Gray, Thomas, A., PE Technical Advisor	27	39	21

Brief Explanation of Responsibilities

Mr. Gray has more than 39 years of mining engineering experience and has managed and supported numerous AML projects including the WVDEP's Tunnelton Mine Portal Closure Design project, Fisher Run Mine Portal Closure Design project, and the Paint Branch Mine Portal Closure Design project. He 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	REGISTRATION (Type, Year, State)
Society of Mining Engineers - Distinguished Member	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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Hynes, Gregory, P., PE Senior Engineer	22	22	26

Brief Explanation of Responsibilities

Mr. Hynes has more than 22 years of experience in abandoned mine land reclamation, refuse reclamation, land restoration, mining permits, and environmental and water resources engineering. He has managed or supported more than 30 AML projects for the WVDEP. His projects for the agency have include the Simpson Creek Highwall/Portals project, the Wymer Portals project, the Kempton Refuse project, the Borgman Refuse and Portals project, the Elkins Coal Refuse Reclamation project, the Tibbs Run Portals project, the Beech Bottom Refuse Reclamation project, the Twilight Burning Refuse Reclamation project, the Piney Swamp Run refuse project, the Pageton Mine Refuse project, the Watson Portal and Refuse project, the Flemington Portals and Drainage project, and the Jed-Havaco Refuse project. He has also managed several projects for other state agencies including PADEP.

EDUCATION (Degree, Year, Specialization)
MS, 1997, Civil Engineering
BE, 1987, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
N/A	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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Yanero, David, L. Project Designer	20	20	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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Coffman, James, D. Geophysicist	2	16	0

Brief Explanation of Responsibilities

Mr. Coffman has more than 16 years of experience leading, performing, and interpreting results for hundreds of surface and borehole geophysical surveys. His experience in environmental geophysics is comprehensive and he has also performed this work for abandoned mine land projects. He currently serves as the primary geophysicist on two statewide abandoned mine land reclamation contracts with PADEP. His concentration has been in surveys using electromagnetics (EM), ground penetrating radar (GPR), magnetics, seismic refraction, electrical resistivity, borehole geophysics, and utility location equipment.

EDUCATION (Degree, Year, Specialization)

MS, Geophysics, 1997
BS, Geology, 1995

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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Trexler, Heather, PG Project Geologist	0	9	0

Brief Explanation of Responsibilities

Ms. Trexler has more than nine years of hydrologic, geologic, and mining-related experience. Throughout her career, she has supported numerous abandoned mine land reclamation projects including those to remediate drainage and refuse issues. In addition, she has supported mine site investigation work in West Virginia for a private client, American Bituminous Power Partners. She currently serves as a lead on two statewide abandoned mine land reclamation contracts with PADEP, focusing on mine drainage studies and other AML problems throughout the state of Pennsylvania.

EDUCATION (Degree, Year, Specialization)

MS, 2003, Geology
BS, 2001, Geology

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
Society for Mining, Metallurgy & Exploration Pennsylvania Coal Mining Institute of America Marcellus Shale Coalition	Professional Geologist, 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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE EXPERIENCE:
Hoppe, Ben CAD Designer	6	8	0

Brief Explanation of Responsibilities

Mr. Hoppe has more than eight years of professional CAD experience. He has conducted work for several abandoned mine land reclamation projects throughout his career. Recently, he has supported Tetra Tech's work for the WVDEP including the Fisher Run Portal Closure Design project, the Tunnelton Mine Portal Closure Design project, and the Paint Branch Mine Portal project. Mr. Hoppe serves as Tetra Tech's local CAD manager.

EDUCATION (Degree, Year, Specialization)

AS, 2007, Drafting

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.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0
Kramer, Carly, N. CAD Designer	5	7	

Brief Explanation of Responsibilities

Ms. Kramer has more than seven years of experience in Computer Aided Drafting and Design. She has supported numerous mining-related and abandoned mine land projects throughout her career including Tetra Tech's Paint Branch Mine Portals project for the WVDEP. Her responsibilities have included creating and modifying elevations, level drawings, base levels, and site plans for wireless infrastructure; performing quality assurance tasks; maintaining cycle times for normal course of business during integration; communicating with area representatives and field technicians to resolve conflicting data; reviewing site data for accuracy; and preparing cross sections, site location maps, surface soil and groundwater sampling maps, and conceptual site model figures.

EDUCATION (Degree, Year, Specialization)

AS, 2007, Drafting

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
N/A	N/A

14. PROVIDE A LIST OF SOFTWARE AND EQUIPMENT AVAILABLE IN THE PRIMARY OFFICE WHICH WILL BE USED TO COMPLETE AML DESIGN SERVICES
TR-55, STABL5, HEC-HMS, GeoHMS, HECFFA, HEC-SSP, HEC-DSSVue, HEC-ResSim, CWMS and legacy software such as HEC-1, HEC-5, HEC-DSS and COED
Microsoft Office Professional and Microsoft Project
Adobe Photoshop and Acrobat Version 9.0
Carlson
AutoCAD Map 3D 2008 / AutoCAD 2008
AutoDesk Civil 3D 2007
ESRI ArcGIS 9.2
ESRI ArcView 3.3
Bentley PondPack (Haestad Methods) Version 9.0
Bentley Flow Master (Haestad Methods)
Bentley HEC-Pack
STABL5M
Hydrologic Evaluation of Landfill Performance (HELP)
Groundwater Vistas Version 3.5 (MODFLOW based 3D finite difference model, including MT3D, RT3D, MODPATH, MODFLOWT, and SWIFT Components
GMS (MODFLOW based 3D finite difference model, including MT3D, RT3D, MODPATH, and 3-D spatial analysis components)
Visual MODFLOW (MODFLOW based 3D finite difference model, including MODPATH)
SWANFLOW (3D finite difference model specializing in 3-phase fluid flow in porous media – water, NAPL, air)
Several analytical-based software packages including BIOCHLOR, BIOSCREEN, and SESOIL

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 57th Street Charleston, WV 25304	Prime Contractor – Design	Not yet known	20%
WVDEP OSR Energy Marketing Impoundment Design, West Virginia	WVDEP OSR 601 57th Street Charleston, WV 25304	Prime Contractor – Design	Not yet known	50%
WVDEP TMDL Development for WV Group E2 Watershed (West Fork River Watershed)	WVDEP DWWM 601-57th Street Charleston, WV 25304-2345	Prime Contractor - TMDL Development Lead	N/A	40%
WVDEP TMDL Development for WV Group D2 Watersheds (Monongahela River Watershed)	WVDEP DWWM 601-57th Street Charleston, WV 25304-2345	Prime Contractor - TMDL Development Lead	N/A	70%
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	20%
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	20%
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	80%
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	80%
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	0% (awarded in December 2013)
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	75%
Wyoming Abandoned Mine Lands Statewide Subsidence Hazards Mitigation Contract, Wyoming	Wyoming Department of Environmental Quality, AML Division 122 W. 25th Street Cheyenne, WY 82002	Statewide program management of subsidence mitigation	Not yet known	30%
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	0% (awarded in December 2013)

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

PROJECT NAME, TYPE AND LOCATION	NATURE OF FIRMS RESPONSIBILITY	NAME AND ADDRESS OF OWNER	ESTIMATED COMPLETION DATE	ESTIMATED CONSTRUCTION COST	
				ENTIRE PROJECT	YOUR FIRMS RESPONSIBILITY
PADEP Cresson Mine Pool Project, Pennsylvania	AML remediation	PADEP – Bureau of Abandoned Mine Reclamation 286 Industrial Park Road Ebensburg, PA 15931	2014	Not yet known	Not yet known

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)
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
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 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
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

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)
WVDOH Corridor H Davis to Bismark Specialty Coal Appraisal, West Virginia	West Virginia Division of Highways 1900 Kanawha Blvd. East Charleston, WV 25305	N/A	2013	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
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
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
Quecreek Deep Mine Expansion Permitting, Pennsylvania	PBS Coals, Inc. 1576 Stoystown Road Friedens, PA 15541	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)
ODNR Harrison and Jefferson County Reviews of Coal Mining and Reclamation Permits, Harrison and Jefferson Counties, Ohio	Ohio Dept. of Natural Resources 2045 Morse Road Columbus, OH 43229	N/A	2013	N/A
Brookville Coal Seam 27A Highwall Mining Analysis, Somerset County, Pennsylvania	PBS Coals 1576 Stoystown Road Friedens, PA 15541	N/A	2013	N/A
Majorsville Pipeline Mine Subsidence Investigation	MarkWest Energy 601 Technology Drive, Suite 130 Canonsburg, PA 15317	N/A	2011	N/A
Bandy and King Home Mine Subsidence Investigation	Commonwealth of Virginia Department of Mines, Minerals, & Energy 3405 Mountain Empire Road Big Stone Gap, VA 24219	N/A	2011	N/A
Central PA Mine Reserves Investigation and Due Diligence Study	PBS Coals 1576 Stoystown Road Friedens, PA 15541	N/A	2011	N/A
South Fayette Mine Water Sourcing Study, Pennsylvania	Confidential oil and gas client	N/A	2011	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

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
ALCOSAN Grand View Golf Course Mine Drainage Treatment System, Pennsylvania	ALCOSAN 3300 Preble Avenue Pittsburgh, PA 15233	N/A	2011	N/A
Coal Mine Air Shaft Closure Design, Ohio	Ohio Valley Coal Company 34 Kelley Way, Suite 100 Brilliant, OH 43913	N/A	2009	Yes
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.

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

Date: January 2, 2014

Printed Name: Thomas Gray, PE

Section C: 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	Gregory Hynes, PE	Heather Trexler, PG	Ben Hoppe	Other Tetra Tech Personnel
TETRA TECH FEATURED PROJECTS																								
WVDEP Parker Run Design	C & P	E	X								X		X				X		P	P	M			P
WVDEP Tunnelton Mine Portal Closure Design	C & P	E	X	X							X				X					M			P	P
WVDEP Fisher Run (Posey) Mine Portal Closure Design	C & P	E		X	X	X					X		X							M			P	P
WVDEP Paint Branch Mine Portals Design	C & P	E		X	X						X									P			P	M
Bird Mine and Strayer Refuse Permitting & Design	C & P	E				X		X				X		X						M		P		P
PADEP Blacklick Creek Refuse Study/AMD Design	C & P	E				X		X	X		X	X		X						M		P		P
Marion County Reclaimed Mine Site Investigation	C & P	E				X		X				X										M		P
Dirtcon West Virginia Remining Consulting	C & P	E					X					X					X					P		M
WVDEP TMDL Development	C & P	E	X	X		X	X					X		X		X							P	M
PADEP AML Statewide Reclamation Contracts	C & P	E	X	X	X	X		X	X		X	X	X	X			X		P	M	P	P	P	P
Lower Indian Creek Stream Channel Reclamation	C & P	E	X			X						X	X			X								M

* List whether project experience is corporate or personnel based or both.

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

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

AML and RELATED PROJECT EXPERIENCE MATRIX

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					
PROJECT MANAGER'S (RONALD LANE, PE) ADDITIONAL WVDEP EXPERIENCE AS AGENCY ADMINISTRATOR																								
WVDEP Multiple Ground Stabilization Projects	P	D							X		X						X		M					
WVDEP Jackson Addition Subsidence Abatement	P	D							X		X								M					
WVDEP Barbour County Highwall Elimination	P	D	X									X					X		M					
WVDEP Morgan Mine Road (Burkey) Mine Fire	P	D	X	X	X			X									X		M					
WVDEP Ridenour Highwall Project	P	D	X		X				X										M					
WVDEP Roger Camp Hill Refuse Project	P	D	X											X					M					
WVDEP Peninsula Highwall #1 and #2	P	D	X		X								X						M					
WVDEP Pendleton Creek Strip	P	D	X										X						M					
WVDEP Three Fork Stream Watershed Restoration	P	D										X	X			X			M					
WVDEP Laurel Valley (Daniels) Landslide	P	D	X										X				X		M					
WVDEP Quick (Morris) Coal Seam Fire	P	D						X			X		X						M					
WVDEP Haywood Refuse #2 Project	P	D						X			X		X						M					

* List whether project experience is corporate or personnel based or both.

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

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

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		Gregory Hynes, PE					
SENIOR ENGINEER'S (GREGORY HYNES, PE) ADDITIONAL WVDEP EXPERIENCE																								
WVDEP Masontown No. 4 Reclamation	P	D	X	X	X	X					X	X		X	X	X	X		P					
WVDEP Odd-Moore Mine Reclamation	P	D									X			X			X		P					
WVDEP Watson Portal and Refuse Reclamation	P	D	X	X	X	X					X	X		X	X	X	X		P					
WVDEP Point Marion Maintenance	P	D				X					X	X		X					P					
WVDEP Kempton Refuse and AMD	P	D	X		X						X	X		X		X	X		P					
WVDEP Borgman Refuse & Portals	P	D	X	X	X	X					X	X		X					P					
WVDEP Flemington Portals & Drainage No. 2	P	D	X	X	X	X					X			X			X		P					
WVDEP Maple Run Portals & AMD	P	D	X	X	X	X					X	X		X		X			P					
WVDEP Emoryville Mine Complex AML/AMD	P	D	X	X	X	X					X	X		X			X		P					
WVDEP County Route 9 Waterline Extension	P	D				X					X	X					X		P					
WVDEP 9 Conty Roads Water Supply Study	P	D				X						X							P					
WVDEP Cheat Lake Highwall	P	D			X	X					X								P					
WVDEP Recommendations to Ameliorate Subsidence	P	D							X								X		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.

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		Gregory Hynes, PE					
SENIOR ENGINEER'S (GREGORY HYNES, PE) ADDITIONAL WVDEP EXPERIENCE																								
WVDEP Masontown No. 4 Reclamation	P	D	X	X	X	X					X	X		X	X	X	X		P					
WVDEP Odd-Moore Mine Reclamation	P	D									X			X			X		P					
WVDEP Watson Portal and Refuse Reclamation	P	D	X	X	X	X					X	X		X	X	X	X		P					
WVDEP Point Marion Maintenance	P	D				X					X	X		X					P					
WVDEP Kempton Refuse and AMD	P	D	X		X						X	X		X		X	X		P					
WVDEP Borgman Refuse & Portals	P	D	X	X	X	X					X	X		X					P					
WVDEP Flemington Portals & Drainage No. 2	P	D	X	X	X	X					X			X			X		P					
WVDEP Maple Run Portals & AMD	P	D	X	X	X	X					X	X		X		X			P					
WVDEP Emoryville Mine Complex AML/AMD	P	D	X	X	X	X					X	X		X			X		P					
WVDEP County Route 9 Waterline Extension	P	D				X					X	X					X		P					
WVDEP 9 Conty Roads Water Supply Study	P	D				X						X							P					
WVDEP Cheat Lake Highwall	P	D			X	X					X								P					
WVDEP Recommendations to Ameliorate Subsidence	P	D							X								X		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.

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		Gregory Hynes, PE					
SENIOR ENGINEER'S (GREGORY HYNES, PE) ADDITIONAL WVDEP EXPERIENCE																								
WVDEP Jed-Havaco Refuse Reclamation	P	D			X						X						X		P					
WVDEP Denver Street Drainage Abatement	P	D			X	X					X								P					
WVDEP Stonewood Reclamation	P	D			X	X					X						X		P					
WVDEP Stark Drainage Abatement	P	D				X					X								P					
WVDEP Beatty Church-Whetsell Road Highwall	P	D			X	X					X						X		P					
WVDEP National Church Hollow Road Waterline	P	D				X						X							P					
WVDEP McDowell County Water Supply System	P	D				X					X			X					P					
WVDEP Kanes Creek Water Line	P	D				X					X								P					
WVDEP Moundsville Water Line	P	D				X					X								P					
WVDEP Page-Kincaid Water Line	P	D				X					X								P					
WVDEP Dogtown Road Water Line	P	D				X					X								P					
WVDEP Turkey Run Water Line	P	D				X					X								P					
WVDEP Berwind, Canebrake, Vallscreek Study	P	D									X	X							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		Thomas Gray, PE					
TECHNICAL ADVISOR'S (THOMAS GRAY, PE) ADDITIONAL WVDEP EXPERIENCE																								
WVDEP Grout Injection Research Project	P	D							X		X		X						M					
WVDEP Water Supply Extension Project	P	D											X						P					
WVDEP Godby Branch Water Supply Extension	P	D	X								X	X					X		M					
WVDEP Gauley River Heizer/Manila Water Line	P	D											X						P					
WVDEP Lefthand Fork Burning Refuse	P	D	X				X	X			X	X					X		M					
WVDEP Owings Mine Grouting Design	P	D		X	X	X	X				X	X	X	X	X	X	X		M					
WVDEP Majesty Mine Complex Restoration	P	D	X	X	X	X	X				X	X		X	X	X	X		M					
WVDEP Refuse Pile and Mine Portal Reclamation Design	P	D	X								X						X		P					
WVDEP OSR Energy Marketing Impoundment	P	D				X											X		P					

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

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

AML and RELATED PROJECT EXPERIENCE MATRIX

PROJECT	Exp. Basis C-Corp. P-Personal *	Additional info provided in Section (s) **	PROJECT EXPERIENCE REQUIREMENTS																*** 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	Gregory Hynes, PE	Heather Trexler, PG	Ben Hoppe	Other Tetra Tech Personnel
TETRA TECH'S ADDITIONAL WVDEP AND WEST VIRGINIA MINING-RELATED STATE AGENCY EXPERIENCE																								
WVDEP OSR Energy Marketing Impoundment	C & P					X											X		P	P	M			M
WVDOH Rita to Dabney Specialty Coal Appraisal	C & P																			M				P
WVDEP TMDL Development Group B2 Watersheds	C & P					X						X												M
WVDEP TMDL Development Cheat River Watershed	C & P					X						X												M
WVDEP TMDL Development Group C2 Watersheds	C & P					X						X												M
WVDEP DWWM TMDL Development E2 Watersheds	C & P					X						X												M
WVDEP DWWM TMDL Development D2 Watersheds	C & P					X						X												M
WVDOT Specialty Coal Valuations	C & P																			M		P		P

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

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	Gregory Hynes, PE	Heather Trexler, PG	Ben Hoppe	Other Tetra Tech Personnel
TETRA TECH'S ADDITIONAL RECENT LOCAL EXPERIENCE																								
ODNR Coal Permit Review Services	C & P		X								X									P	P			M
PADEP Cresson Mine Water Treatment	C & P					X					X	X		X					P	M		P	P	P
Bear Run Alkaline Mine Drainage Passive Treatment	C & P		X			X					X	X	X	X	X	X				M			P	P
Quecreek Deep Mine Expansion Permitting	C & P			X		X											X			M		P	P	P
PADEP Palo Alto Mine Drainage Control Design	C & P		X			X					X									M		P		P
Gladden AMD Mitigation/Stream Sealing	C & P		X	X	X	X					X	X	X		X	X	X			M			P	P
PADEP East Avoca Grove Street Drainage Project	C & P		X			X														P		M		P
PBS Coals Mine Reserves Investigation/Due Diligence	C & P																			M		P		P
Eastern Ohio Coal Mine Air Shaft Closure Design	C & P				X	X														M				P
PADEP Jonathan Run AMD Treatment Design	C & P					X					X			X						M				P
Powderly Creek Mine Drainage Feasibility Study	C					X					X	X		X		X	X							M
ALCOSAN AMD Treatment System and Pipeline	C & P					X						X		X						M				P
Casselman AMD Prevention and Response Plan	C & P						X					X		X						M				P

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

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	Gregory Hynes, PE	Heather Trexler, PG	Ben Hoppe	Other Tetra Tech Personnel
TETRA TECH'S ADDITIONAL RECENT LOCAL EXPERIENCE																								
PA Abandoned Mine Fire Remediation/Investigation	C & P		X		X	X		X	X			X	X	X						M				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
Forest City Mine Water Sourcing Study	C & P		X			X						X		X						M				P
South Fayette Mine Water Sourcing Study	C & P		X			X			X			X		X						M				P
Mine Pool Water Evaluation Management Plan	C & P		X			X						X		X			X			M				P
PBS Coals Mine Reserves Investigation	C & P										X									M				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
Belmont Mine Water Balance Studies	C & P					X						X								M				P
PA Coal Property Due Diligence Evaluation	C & P																			M				P
Boone County Rural Water Line Expansion	C & P					X					X		X											M

* List whether project experience is corporate or personnel based or both.

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

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

Section D: Resumes

RONALD LANE, PE

Engineer

Mr. Lane has more than 16 years of professional experience. He is a technical expert in mining engineering, refuse reclamation, mine reclamation, mine stabilization, and acid mine drainage remediation. Mr. Lane specializes in the reclamation of abandoned mine sites and is the former manager of WVDEP ALM&R's emergency response program. 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 oversight of design documents as project manager to mitigate mine subsidence potential over an extensive area which included 120 residential structures.

EDUCATION
BS, Mining Engineering
REGISTRATIONS
Professional Engineer: WV
YEARS EXPERIENCE
16

Project Manager; West Virginia Department of Environmental Protection Agency (WVDEP), Abandoned Mine Lands and Reclamation (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.

Emergency Engineer; West Virginia Department of Environmental Protection Agency (WVDEP), Abandoned Mine Lands and Reclamation (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.

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 and Emergency Program Administrator; Multiple Subsidence and Ground Stabilization Projects; WVDEP; Various Counties, WV. Work consisted of injection grouting to provide ground stabilization to mitigate the impact of subsidence on residential and commercial structures. As the AML Emergency Engineer, Mr. Lane administered the projects from the initial site investigation through completion of construction. Conducted exploratory drilling to determine the extent and depth of the underground mine workings, the integrity and characteristics of the overburden and immediate mine roof, and targets for the vertical and angled injection holes. The surveying involved the creation of an existing conditions map which included existing utilities, contours, borehole locations, and to obtain further detail near the structures for rig access during the grouting phase of the various projects. The quantity and type of grout required for ground stabilization for each structure was estimated based on the results of the

exploratory drilling. Prepared the plans, specifications, and biding documents in addition to conducting all meetings for over ten ground stabilization projects.

Project Manager; Fairmont (Jackson Addition) Subsidence Abatement Project; WVDEP; Marion County, WV. Work consisted of exploratory drilling to determine the extent and depth of the underground mine workings, the integrity and characteristics of the overburden and immediate mine roof, targets for the vertical and angled injection holes in addition to the batch plant locations. Mr. Lane coordinated the drilling and surveying of the site. The surveying involved the creation of an existing conditions map which included existing utilities, contours, borehole locations, and to obtain further detail near the structures for rig access during the grouting phase. Mr. Lane completed the drilling investigation plan by selecting locations for exploratory drilling based on physical observations and the thickness of the overburden above the suspected underground mine workings that are located in the Pittsburgh Seam. The quantity and type of grout required for ground stabilization for each structure was estimated based on the results of the exploratory drilling. The project will involve the drilling of 620 vertical and angled injection holes to provide ground stabilization via injection grouting for 123 residential structures.

Project Manager; Ridenour Highwall/Subsidence Project; WVDEP; 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; Highwall Elimination Project; WVDEP; 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.

Project Manager; Hilderbrand Highwall Project; WVDEP; 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 to treat the acid mine drainage, 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.

Construction Engineer; Peninsula Highwall #1 and #2; WVDEP; 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 off 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.

THOMAS GRAY, PE

Project Advisor / Quality Control

EDUCATION
BS, Mining Engineering
MBA
REGISTRATIONS
Professional Engineer: WV, PA, OH, MD, VA
YEARS EXPERIENCE
39

Mr. Gray has more than 39 years of professional experience. He is a technical expert in subsidence, 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.

Project Manager; Fisher Run and Tunnelton Mine Portal Closures; WVDEP Office of AML and Reclamation; Lewis and Preston Counties, WV. Managed the preparation of construction drawings to install wet mine seals and drainage improvements for the closure of abandoned mine portals on private property in Weston and Tunnelton, WV. Prepared construction specifications and construction cost estimate for the closure of nine mine portals.

Project Engineer; Paint Branch Mine Portals; WVDEP; Paint Branch, WV. Supported this 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.

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; Bird Mine and Strayer Refuse Project; AMD Industries; Tire Hill, PA. Managed this project 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.

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.

Professional Design Services Contract; Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation; PA. Managing 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.

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 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; 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; 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 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 site. ***Awarded: James E. "Pete" Pitsenbarger AML Award North, West Virginia Reclamation Awards.***

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 will conduct study the site then provide preliminary and final designs. The project will also include 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; Open-End Contract; Maryland Department of the Environment Bureau of Mines; Frostburg, MD. Managed an open-end contract to provide technical assistance in mine engineering, acid mine drainage treatment and mine reclamation. Completed 16 projects, including evaluating the use of solar or wind power to operate a mine water treatment plant.

Project Manager; Mine Permitting Open-End Contract; MD Department of the Environment, BOM; Frostburg, MD. Managed an open end contract to assist small operators with permit applications. The emphasis was on geological exploration and hydrogeology and hydraulics pertaining to impacts from surface mining.

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.

PUBLICATIONS

2004 Gray, T.A., Crayne, L.M., Trevits, M.A., Glogowski, P.E. "Demonstration of Remote Mine Seal Construction" presented at the Annual SME Meeting, Denver, Colorado, February 23-25, 2004.

2002 Gray, T.A. and Gray, R.E. "Omega Mine Injection Projects" presented at the PA Conference on Abandoned Mine Reclamation, June 15, 2002, State College, PA.

1998 Gray, T. A., Moran, T. C., Broschart, D., and Smith, G. "Injection of Coal Combustion By-Products into the Omega Mine for the Reduction of Acid Mine Drainage." Presented at the Pittsburgh Coal Conference in Pittsburgh, PA, September 15, 1998.

1997 Kyper, T. N., Snodgrass, J., and Gray, T. A. "Disposal of Coal Combustion By-Products in Underground Coal Mines." Published in the University of Kentucky Center for Applied Energy Research bimonthly newsletter, Energeia.

1991 Gray, T. A., Bruhn, R. W., Luxbacher, G. W., and Ferrell, J. R. "The Structural Response of a Steel Lattice Transmission Tower to Mining-Related Ground Movements." Presented at the 10th International Conference on Ground Control in Mining, Morgantown, WV, June 10-12, 1991.

1992 Gray, T. A., and Gray, R. E. "Mine Closure, Sealing, and Abandonment." In SME Mining Engineering Handbook, 2nd ed., edited by H. L. Hartman. Society for Mining, Metallurgy, & Exploration, 1992.

GREGORY HYNES, PE

Senior Engineer

Mr. Hynes has more than 26 years of experience in abandoned mine land reclamation, refuse 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.

EDUCATION
MS, Civil Engineering
BE, Civil Engineering
REGISTRATIONS
Professional Engineer: WV, PA, OH
YEARS EXPERIENCE
26

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 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 research of geological data and mining maps, review of water quality data, and 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; 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 developed by Baker 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.

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 Project; WVDEP; Keyser, WV. Researched geological data/mining maps, review of water quality data, and design of acid mine drainage abatement measures, including anaerobic/compost 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; 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; 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 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 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. The overall 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.

DAVID YANERO

Project Designer

EDUCATION
AS, Architectural Design
REGISTRATIONS
N/A
YEARS EXPERIENCE
20

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.

Project Designer; Parker Run Design Project; WVDEP; Marion County, WV. Mr. Yanero is currently supporting Tetra Tech's abandoned mine land design work for the Parker Run 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; 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; Abandoned Mine Land Design; 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; 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.

HEATHER TREXLER, PG

Geologist

EDUCATION
MS, Geology
BS, Geology
REGISTRATIONS
Professional Geologist: PA
YEARS EXPERIENCE
9

Ms. Trexler has more than nine years of experience as a project manager and geologist. Projects 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. Additional technical projects include the evaluation of current and potential mine pools, reviewing current and potential impacts to water resources, managing mining compliance sampling programs and evaluating large-volume water quality analysis.

Project Manager; Bailey Mine Refuse Expansion; CONSOL Energy; Greene County, PA. Prepared geology and hydrology sections of permit application for expansion of refuse impoundments to support of underground mining activities. Developed work plan for collection of necessary hydrologic and geologic data for permit application and a detailed evaluation of potential ground water and surface water impacts due to proposed activity. Completion of this project included weekly communication with client for progress updates and communication with PADEP to address concerns or questions.

Project Geologist; 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 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 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 Office of Surface Mining 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 Geologist; 2012 Professional Design Services Contract; Pennsylvania Department of Environmental Protection, Bureau Mining Programs; PA. Serving as a project 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 with a second PADEP mining agency.

Project Manager; Marion County Reclaimed Mine Site Investigation; American Bituminous Power Partners, LP; Marion County, WV. Managed this project, which included a site assessment and general recommendations as to the possible sources of elevated levels of aluminum at the Barrackville Refuse and Mining Operations site in Marion County. The site was reclaimed from previous contour surface mining and auger mining. Tetra Tech conducted water and soil sampling and reviewed the history of the site and historical water quality data. Following the field work, Tetra Tech met with the client and recommended options to improve the soil condition and to achieve better run-off while reducing erosion so that discharges can meet state effluent limits.

Senior Geologist; Bailey Mine Expansion; CONSOL Energy; Greene County, PA. Managed permit expansion of longwall coal mine. Developed work plan for collection of necessary hydrologic and geologic data for permit application which included the door-to-door survey of over 200 properties for water supplies, installation of over 30 monitoring wells and monitoring of over 50 stream stations. Additionally, directed and managed field crews for collection of data, reviewed and performed quality control of field data, and evaluated potential ground water and surface water impacts due to proposed mining activity. Completion of this project included weekly communication with client for progress updates and communication with PADEP to address concerns or questions.

Senior Geologist; Cumberland and Emerald Mines Pre-Mine Surveys; Alpha Natural Resources; Greene County, PA. Managed field crews to conduct residential well pump tests and sampling program ahead of underground mining development. Reviewed mining projection maps and used ArcGIS to track progress and schedule field crews.

Project Manager; Enlow Fork Mine Expansion; CONSOL Energy; Greene/Washington Counties, PA. Managed permit expansion of longwall coal mine. Developed work plan for collection of necessary hydrologic and geologic data for permit application which included the door-to-door survey of over 500 properties for water supplies, installation of over 40 monitoring wells and monitoring of over 60 stream stations. Additionally, directed and managed field crews for collection of data, reviewed and performed quality control of field data, and evaluated potential ground water and surface water impacts due to proposed mining activity. Completion of this project included weekly communication with client for progress updates and communication with PADEP to address concerns or questions.

JAMES COFFMAN

Geophysicist

EDUCATION
MS, Geophysics
BS, Geology
REGISTRATIONS
N/A
YEARS EXPERIENCE
15

Mr. Coffman has more than 15 years of experience leading, performing, and interpreting results for hundreds of surface and borehole geophysical surveys. His experience in environmental geophysics is comprehensive and he has also performed this work for abandoned mine land projects, targeting mine voids. His concentration has been in surveys using electromagnetics (EM), ground penetrating radar (GPR), magnetics, seismic refraction, electrical resistivity, borehole geophysics, and utility location equipment.

Project Geophysicist; Geophysical Survey for Mining Investigation at Two Sites; South Fayette Township; South Fayette, PA. Performed a geophysical survey using a multi-frequency EM instrument to help locate possible fractures related to stream loss. Processed and interpreted all data, and summarized the geophysical results on figures and in a brief narrative.

Geophysicist; Mine Subsidence Geophysical Investigation at Two Sites; Virginia Department of Mines, Minerals, and Energy; Wise County, VA. Mr. Coffman participated in an investigation to characterize suspected mine voids on two residential properties which exhibited evidence consistent with mine subsidence. He performed GPR survey to search for potential mine openings (spaces). Processed and interpreted all data, and summarized results for inclusion in a report.

Project Geophysicist; Geophysical Survey for UST Investigation; Confidential Commercial Client; Clearfield, PA. Mr. Coffman performed a geophysical survey using EM61 and magnetic locator instruments to search for possible underground storage tanks. Processed and interpreted all data, and summarized the geophysical results for inclusion in a report.

Project Geophysicist; Geophysical Survey for Disposal Area Investigation; USDA; Beltsville, MD. Performed a geophysical survey using EM31 and electrical resistivity to locate possible disposal areas. Processed and interpreted all data, and summarized the geophysical results in a report for submittal to the Client.

Project Geophysicist; Geophysical Surveys for Utility Locating Investigation at Four Sites; U.S. Navy; Indian Head, MD. Performed geophysical surveys using EM31, GPR, and pipe locator instruments at four sites to locate utilities for proposed borings. Processed and interpreted all data, and summarized the geophysical results on figures and in a brief narrative.

Project Geophysicist; Geophysical Surveys for Utility Locating Investigation; U.S. Coast Guard; Indian River, DE. Performed geophysical surveys using GPR and a pipe locator instrument around five proposed boring locations to locate possible utilities. Processed and interpreted all data, and summarized the geophysical results on figures.

BEN HOPPE

CADD Professional

EDUCATION
AAS, Drafting
REGISTRATIONS
N/A
YEARS EXPERIENCE
8

Mr. Hoppe has more than eight years of professional CADD experience and 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 the CAD manager of Tetra Tech's Pittsburgh office, managing all CAD personnel.

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. 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; 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.

CAD Designer; 2012 Professional Design Services Contract; Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation; PA. Serving as a CAD designer 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.

CARLY KRAMER

CAD Designer

EDUCATION
AS, Drafting
REGISTRATIONS
N/A
YEARS EXPERIENCE
6

Ms. Kramer has more than six years of experience and has supported numerous mining-related and abandoned mine land projects. Her responsibilities have included creating and modifying elevations, level drawings, base levels, and site plans for wireless infrastructure; performing quality assurance tasks; maintaining cycle times for normal course of business during integration; communicating with area representatives and field technicians to resolve conflicting data; reviewing site data for accuracy; and preparing cross sections, site location maps, surface soil and groundwater sampling maps, and conceptual site model figures.

CAD Designer; Paint Branch Mine Portals; WVDEP; Paint Branch, WV. 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. Ms. Cramer support this project with CAD services.

CAD Designer; Fishing Run Stream Sealing; South Fayette Conservation Group (SFCG) in Association with PADEP; South Fayette Township, PA. Project involved the installation of five (5) weirs and continuous flow meters to monitor the stream flow conditions, analysis of flow data, stream corridor land surveying, geophysical surveying to identify subsurface cracks and flow patterns, stream base study to identify stream sections which flow directly over fractured bedrock, stream sealing design alternatives analysis, and the stream encroachment permit pre-application meeting. Ms. Cramer supported this project with CAD services.

CAD Designer; Mine Subsidence Investigation; Virginia Department of Mines, Minerals, and Energy; Wise County, VA. Participated in 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. Ms. Cramer assisted on this project with CAD support.

CAD Designer; 2012 Professional Design Services Contract; Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation; PA. Serving as a CAD designer 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.

CAD Designer; 2012 Professional Design Services Contract; Pennsylvania Department of Environmental Protection, Bureau Mining Programs; PA. Serving as a CAD designer 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 with a second PADEP mining agency.

Section E: Project Descriptions

WVDEP Parker Run Design

Marion County West Virginia

CLIENT/CONTACT:

West Virginia Department of Environmental Protection

PROJECT HIGHLIGHTS:

- Engineering design
- Construction monitoring

In 2013, Tetra Tech was retained by the West Virginia Department of Environmental Protection's AML&R Division to provide design services at the Parker Run sites in Marion County. The project is is expected to include:

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

The project involves four sites that include highwalls, refuse piles, and portals and is currently ongoing. Aspects of the project design work include civil engineering, structural engineering, and geological and hydrogeological support.

WVDEP Tunnelton Mine Portal Closure Design

Tunnelton, West Virginia

CLIENT/CONTACT:

West Virginia Department of Environmental Protection

PROJECT HIGHLIGHTS:

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

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 allowed acid mine drainage to exit and flow off-site. The design included evaluating multiple closure alternatives and developing regrading plans that balanced 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 was necessary to restore the properties to acceptable conditions. Because one portal was 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.

"The strong leadership of Tetra Tech's management team and the exceptional performance of their technical staff have provided WVDEP with high-quality and cost-effective products under past and existing contracts."

David Montali

West Virginia Department of Environmental Protection

WVDEP Fisher Run Mine Portal Closure Design

Weston, West Virginia

CLIENT/CONTACT:

West Virginia Department of Environmental Protection

PROJECT HIGHLIGHTS:

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

In 2009, The West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands & Reclamation (AMLR) retained Tetra Tech for the investigation and design for the closure of seven mine portals on private property. The portals allowed 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 was 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 AMLR.

WVDEP Paint Branch Mine Portal Closure Design

Kanawha County, West Virginia

CLIENT/CONTACT:

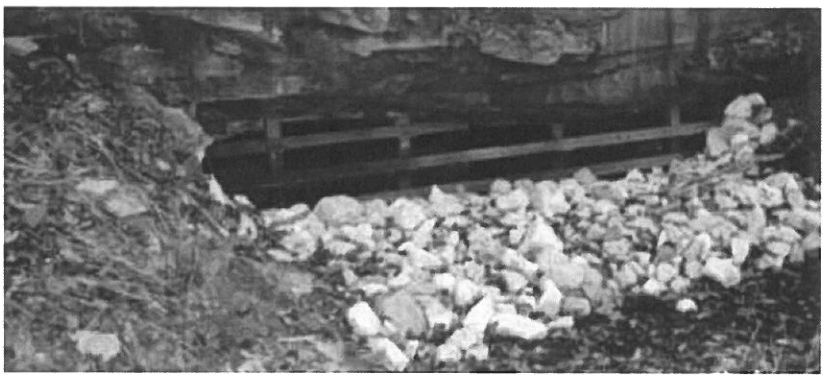
West Virginia Department of Environmental Protection

PROJECT HIGHLIGHTS:

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

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 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.



Bird Mine and Strayer Refuse Permitting and Water Treatment System Design

Tire Hill, Pennsylvania

CLIENT/CONTACT:

AMD Industries, Inc.

PROJECT HIGHLIGHTS:

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

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.

Blacklick Creek Treatment Facility Vinton/Wehrum Refuse Pile Analysis and Acid Mine Drainage Treatment

Indiana County, Pennsylvania

CLIENT/CONTACT:

PADEP, Bureau of Abandoned Mine Reclamation

PROJECT HIGHLIGHTS:

- Mine drainage treatment design
- Coal refuse pile analysis
- Mine shaft and subsidence assessment
- Historical clearance
- Public involvement
- Bid documents

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:

- Coal refuse pile analysis
- 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 and relief boreholes in Blacklick Creek
- Assessment of Diamond No. 2 and No. 3 Mines for sludge disposal
- 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

Marion County Reclaimed Mine Site/Refuse Investigation

Marion County, West Virginia

CLIENT/CONTACT:

American Bituminous Power Partners, LP

PROJECT HIGHLIGHTS:

- Reclaimed mine site investigation
- Review of mining history of the site
- Review of historical water quality data
- Soil/water sampling

In 2012, Tetra Tech was retained by American Bituminous Power Partners, L.P. (ABPP) to perform a site assessment and provide general recommendations as to the possible source and corrective actions for elevated levels of aluminum at the Barrackville Refuse and Mining Operations site in Marion County, West Virginia. The site has been reclaimed from previous contour surface mining and auger mining. Elevated levels of aluminum have been detected in the discharge of several of the retention ponds that control runoff from the site. The area draining to these structures has been reclaimed from the previous mining but was exhibiting poor vegetation reestablishment.

The purpose of this investigation was to determine the reason for poor vegetation establishment and the possible source of aluminum in the pond discharges. Tetra Tech reviewed the mining history of the site and historical water quality data, conducted a site review and collected soil and water samples.

The results of the water and soil sampling indicated that the topsoil used for reclamation had a naturally low pH that was releasing high levels of soluble aluminum. The review of the site also indicated that the reclamation was not protecting against erosion which was increasing run-off of the soil. Tetra Tech met with the client and recommended options to improve the soil condition, better control run-off and reduce erosion so that discharges from the site can meet state effluent limitations.

Consulting Services for Remining Operations

Marion and Tucker Counties, West Virginia

CLIENT/CONTACT:

Dirtcon Excavating

PROJECT HIGHLIGHTS:

- Miscellaneous permitting
- Mine planning
- Surveying/aerial photography
- Geotechnical investigations
- Soil/water sampling
- Pre-blast survey
- Reclamation plan

Tetra Tech was retained by Dirtcon Excavating to provide miscellaneous engineering and environmental consulting services for several state quarry operations located in Marion and Tucker Counties in West Virginia.

Tetra Tech's services included reconnaissance of property mapping and deeds, review of the mining history for each site, water and soil/rock sampling, permitting, aerial photography and surveying, pre-blast surveys, and other related services.

Both operations are scheduled to be expanded through the permit modification process as regulated by the WVDEP Division of Mining and Reclamation. The Marion County site is undergoing the permit process to be developed as an industrial business park to service the growing demand for commercial/industrial development that is occurring within the general area.

Both sites represent areas that have been previously mined using surface and deep mining methods. The Marion County quarry site is permitted for the extraction of coal in addition to the stone products being developed. The coal extraction involves areas which were previously subjected to underground mining activities. The 'remining' of these areas is allowing for further recovery of the coal resources and is also eliminating an environmental situation that could potentially result in the production of substandard water quality conditions.

Tetra Tech was instrumental in providing mapping and guidance in determining the remining potential for this site.

WVDEP TMDL Development

West Virginia (Statewide)

CLIENT/CONTACT:

West Virginia Department of Environmental Protection

PROJECT HIGHLIGHTS:

- Development of more than 3,500 TMDLs in West Virginia
- Collaboration between Tetra Tech and various state entities

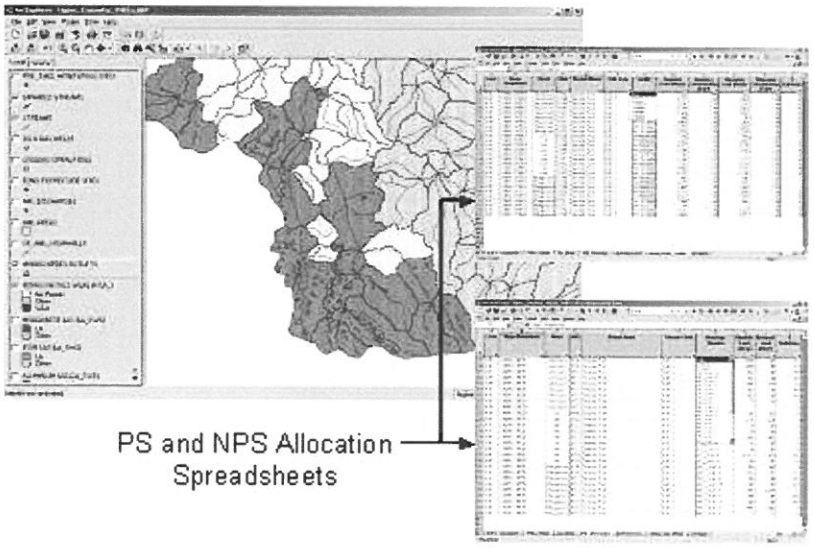
Over the past 13 years, Tetra Tech has supported West Virginia Department of Environmental Protection (WVDEP) and Environmental Protection Agency Region 3 (EPA), to develop and fine-tune a Total Maximum Daily Load (TMDL) methodology to address various water quality impairments in West Virginia, including biological, iron, manganese, dissolved aluminum, pH, fecal coliform bacteria, and sediment. Originally designed to meet aggressive consent decree deadlines, this innovative TMDL modeling approach was developed using the Mining Data Analysis System (MDAS) to simulate in-stream flow and water quality conditions (based on point and nonpoint contributions) throughout large watersheds. MDAS is a comprehensive GIS, dynamic modeling, and analysis package that provides the ability to overcome the difficult simulation of a large-scale watershed while maintaining a great level of detail (i.e., segmenting watersheds into hundreds of smaller hydrologic units to address impairments in small nested tributaries). The watershed modeling process also involved the compilation of meteorological, land use, stream and land use-specific hydrology and pollutant data; hydrologic calibration and water quality calibration; and generation of nonpoint source and in-stream flows and pollutant loadings. In order to account for the multiple mining related sources, additional land use categories that are specific to AMD were represented as nonpoint sources (e.g. high walls, disturbed land, and abandoned mines). In addition, several thousand permitted mining discharges in multiple phases of reclamation exhibiting various water quality conditions were represented as point sources that simulated characteristics of precipitation driven discharges.

Development of the methodology also involved close collaboration between Tetra Tech, various divisions within WVDEP, including Division of Water and Waste Management, Division of Mining and Reclamation, Division of Oil and Gas, Division of Natural Resources, and Division of Forestry, and EPA Region 3. Tetra Tech took the technical lead in most areas, including recommending targeted in-stream monitoring data; requesting, processing, and managing permit information for several thousand mining discharges; collecting and analyzing abandoned mine land data; model development and application; defining a consistent, acceptable allocation procedure; developing TMDL reports; and presenting the TMDL approaches and results to the public.

To further improve the "usability" of the TMDLs, Tetra Tech developed a series of interactive tools to provide TMDL implementation guidance. These tools were designed to simplify and assist "implementers" (nonpoint source staff and permit writers) utilize the TMDLs to develop watershed plans and issue/renew permits. An interactive ArcExplorer geographic information system (GIS) project allows the user to explore the spatial relationships of the source assessment data, as well as further details related to the data. Users are also able to "zoom in" on streams and other features of interest. In addition, spreadsheet tools (in Microsoft Excel format) were developed to provide the data used during the TMDL development process, and the detailed source allocations associated with successful TMDL scenarios. These tools provide guidance for selection of implementation projects as well as for permit issuance. Furthermore, Tetra Tech is currently developing a web enabled TMDL viewer tool that integrates a GIS interface with an online database, enhancing the user's ability to explore and utilize TMDL results quickly and efficiently. The TMDL viewer tool will be available for use upon public notice of the draft TMDLs in the near future.

To date, Tetra Tech has developed over 3,500 TMDLs in West Virginia using this methodology to meet strict consent decree deadlines, including 1,180 waterbodies and eight different pollutants (including pH, aluminum, iron, manganese, chloride, selenium, siltation, and biological impairments). TMDLs resulting from this approach are technically defensible, approved by EPA, and consistent with WV permitting processes (and are now part of an ongoing permit review process).

ArcExplorer GIS Viewer



PADEP Statewide Mining Engineering Reclamation Design Contracts

Statewide Pennsylvania

CLIENT/CONTACT:

PADEP Bureau of Mining Programs

PADEP Bureau of Abandoned Mine Reclamation

PROJECT HIGHLIGHTS:

- Statewide engineering contracts
- Mine subsidence mitigation
- AML reclamation plans
- Closure of mine openings
- Mine fire abatement
- Acid mine drainage treatment
- Water line extension and replacement

In 2012, Tetra Tech was selected for two 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 will begin in 2012. The scope of services under each covers a wide variety of issues including:

- Mine subsidence
- 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
- Water supply

Lower Indian Creek Stream Channel Reclamation

Townsend, Montana

CLIENT/CONTACT:

Montana Bureau of Land Management

PROJECT HIGHLIGHTS:

- Stream restoration
- Construction oversight
- Approximately 2,400 lineal feet of stream channel

Placer and hydraulic mining activities have impacted the lower portion of Indian Creek for over 100 years. Tetra Tech completed all necessary plans and permits and conducted reclamation construction oversight for the reclamation of approximately 2,400 lineal feet of stream channel. The objective of this project was to reclaim the worst section of the stream by constructing a hydraulically and geomorphologically stable channel for perennial surface flows capable of supporting a riparian plant community and habitat for brook trout.

Five plans and permits were prepared and four additional plans and permits were reviewed prior to submittal to the appropriate State and Local agencies. Tetra Tech completed full-time on-site construction oversight for the 90-day construction period. This work involved 100 percent oversight by the on-site representative to ensure the contractor completed work in compliance with the plans and specifications and approved workplans and completed the necessary inspections and tests. Specific tasks include documenting construction progress and weather and site conditions, and coordinating and communicating with other agencies and organizations involved in the project.

The second phase of the Lower Indian Creek Stream Restoration Project involved a reclamation characterization and screening-level engineering evaluation/cost analysis (EE/CA) for the lowest three miles of Indian Creek, from the end of the reconstructed section, to the creek's confluence with the Missouri River. Gold was discovered in Indian Creek in 1870 and was initially worked by hand, washing the deposits through sluice boxes. During the 1930's and 1940's, an electric-powered bucket line dredge and dry land dredge were used to strip overburden and wash nearly 670,000 yd3 of gravel per year. Placer dredge mining has extensively impacted nearly all of this section of Indian Creek. A project work plan was prepared as a guide for conducting the reclamation characterization activities.

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 Speranza, PE, Pittsburgh Operations Manager

(Representative Name, Title)

(412) 921-7090 (412) 921-4040

(Phone Number) (Fax Number)

January 2, 2014

(Date)