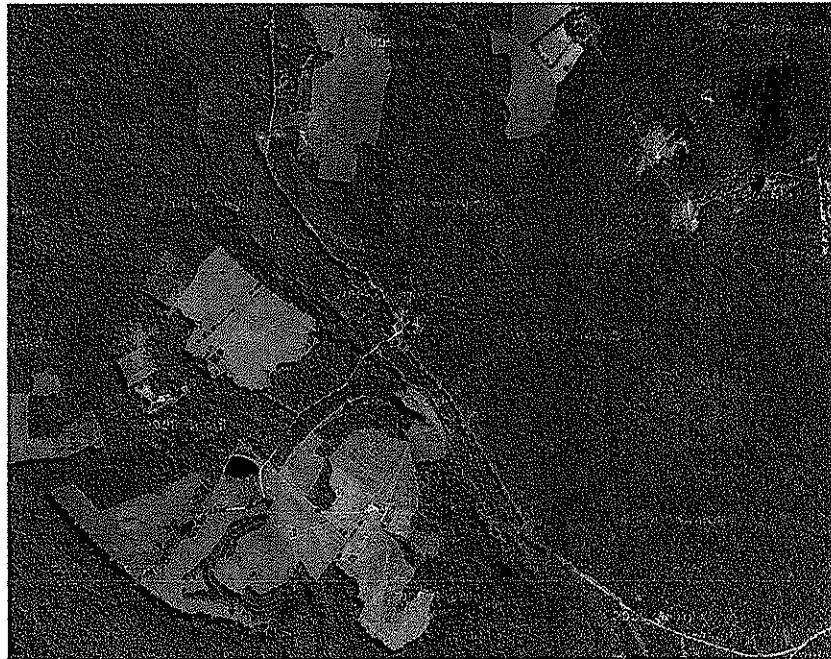


RFQ: DEP14783

October 1, 2009

Expression of Interest (EOI)
Little Laurel Run Highwall Design Project



Prepared by:

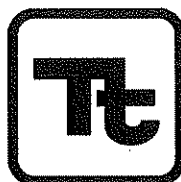
Tetra Tech
Foster Plaza 7
661 Andersen Drive
Pittsburgh, PA 15220

Point of Contact & Telephone Number:

Mr. Mark Speranza, PE
T: 412.921.8916
F: 412.921.4040
email: mark.speranza@tetrattech.com

Prepared for:

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





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

**Request for
 Quotation**

RFO NUMBER
 DEP14783

PAGE
 1

ADDRESS CORRESPONDENCE TO ATTENTION OF
 CHUCK BOWMAN
 304-558-2157

VENDOR

Tetra Tech NUS, Inc.
 661 Andersen Drive, Pittsburgh, PA 15220
 Tel 412.921.7090 Fax 412.921.4040 www.ttnus.com

SHIP TO

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

| DATE PRINTED | TERMS OF SALE | SHIP VIA | F.O.B. | FREIGHT TERMS |
|--------------|---------------|----------|--------|---------------|
| 09/10/2009 | | | | |

| | | |
|------------------------------|------------|---------------------------|
| BID OPENING DATE: 09/10/2009 | 10/01/2009 | BID OPENING TIME: 01:30PM |
|------------------------------|------------|---------------------------|

| LINE | QUANTITY | UOP | CAT NO | ITEM NUMBER | UNIT PRICE | AMOUNT |
|--|----------|-----|--------|-------------|------------|--------|
| 0001 | 1 | JB | | 906-29 | | |
| LITTLE LAUREL RUN HIGHWALL 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 LITTLE LAUREL RUN HIGHWALL PROJECT IN PRESTON COUNTY, WEST VIRGINIA, PER THE FOLLOWING BID REQUIREMENTS AND ATTACHED SPECIFICATIONS. | | | | | | |
| BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THE STATE MAY DEEM THIS CONTRACT NULL AND VOID AND TERMINATE SUCH CONTRACT WITHOUT FURTHER ORDER. | | | | | | |

RECEIVED

2009 OCT -1 P 12:14

PURCHASING DIVISION
 STATE OF WV

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE: *Mark [Signature]* TELEPHONE: 412-921-8916 DATE: 9/29/09

TITLE: PITTSBURGH OFFICE MANAGER FEIN: 95-4660169 ADDRESS CHANGES TO BE NOTED ABOVE

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



TETRA TECH

October 1, 2009

Mr. Chuck Bowman
State of West Virginia
Purchasing Division
P.O. Box 50130
Charleston, WV 25305-0130

Subject: RFQ #DEP14783 – Little Laurel Run Highwall Design

Dear Mr. Bowman:

Tetra Tech is pleased to submit our Expression of Interest to perform design services prepared in reply to RFQ #DEP14783 for the State of West Virginia. As outlined in our Expression of Interest, Tetra Tech, our project team, and its personnel have completed work on **hundreds of mining projects**. These projects have included services that will be needed for this project such as highwall closure design, the installation of mine seals, and construction monitoring and management.

This project will be managed out of Tetra Tech's Pittsburgh office and this location has two available abandoned mine land teams to work on projects. Our firm also has an office location in Charleston, West Virginia, which can provide support if needed. That office's largest client is the West Virginia Department of Environmental Protection. Tetra Tech welcomes the opportunity to perform work in West Virginia as we continue to develop our Charleston location. Tetra Tech is joined on this project by:

TRIAD Engineering (TRIAD), which will provide surveying and drilling services. Our firms have previously worked together. The Triad office for this project is located in Morgantown, West Virginia.

Richard Gray, PG of DiGioia, Gray and Associates, LLC, who will provide expert review of the project. He has worked as a consultant to Tetra Tech on similar projects in the past.

Our experienced team is led by Mr. Thomas Gray, PE. Mr. Gray is a licensed Professional Engineer in five states including West Virginia and has extensive mining experience, having worked on over **100 mining projects** throughout his career. Our team includes two Professional Engineers registered in the State of West Virginia and our proposed key personnel have over **200 years** of combined experience relevant to this project.

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 feel free to contact us at (412) 921-7090.

Very truly yours,

Mr. Mark Speranza, PE
Pittsburgh Office Manager

Mr. Thomas Gray, PE
Energy and Natural Resources Department Manager

Enclosures

Attachment B

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

| | | |
|--|---|---|
| PROJECT NAME Little Laurel Run Highwall Design | DATE (DAY, MONTH, YEAR) 1, October, 2009 | FEIN 95-4660169 |
| 1. FIRM NAME Tetra Tech NUS, Inc. | 2. HOME OFFICE BUSINESS ADDRESS Foster Plaza 7, 661 Andersen Drive Pittsburgh, Pennsylvania | 3. FORMER FIRM NAME NUS Corporation NUS Environmental Corporation Brown & Root Environmental |
| 4. HOME OFFICE TELEPHONE (412) 921-7090 | 5. ESTABLISHED (YEAR) 1960 | 6. TYPE OWNERSHIP Corporation |
| 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 / Mark Speranza, PE / 5 AML Personnel in this office

8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM
 Mr. Ronald Chu, PE - President
 Mr. Mark Perry, PE - Regional Manager
 Mr. John Trepanowski, PE - Regional Manager
 Mr. Steven Giannino, PE - Regional Manager

9. PERSONNEL BY DISCIPLINE

| | | | | |
|---------------------------|---|--------------------------|---|----------------------|
| 39 ADMINISTRATIVE | — | LANDSCAPE ARCHITECTS | — | STRUCTURAL ENGINEERS |
| — ARCHITECTS | 3 | MECHANICAL ENGINEERS | — | SURVEYORS |
| 4 BIOLOGIST | 5 | MINING ENGINEERS | — | TRAFFIC ENGINEERS |
| 7 CADD OPERATORS | — | PHOTOGRAMMETRISTS | — | 45 OTHER |
| 13 CHEMICAL ENGINEERS | — | PLANNERS: URBAN/REGIONAL | — | |
| 23 CIVIL ENGINEERS | 2 | SANITARY ENGINEERS | — | |
| 2 CONSTRUCTION INSPECTORS | — | SOILS ENGINEERS | — | |
| — DESIGNERS | — | SPECIFICATION WRITERS | — | 193 TOTAL PERSONNEL |
| — DRAFTSMEN | — | | | |

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 4
 *RPES other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.

10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE? YES NO N/A

11. OUT 3 KEY CONSULTANTS/SUB-CONSULTANTS ANTICIPATED TO BE USED. Attach "AML Consultant Qualification Questionnaire".

| | | |
|---|---|---|
| <p>NAME AND ADDRESS: TRIAD Engineering 219 Hartman Run Rd Morgantown, West Virginia 26505</p> | <p>SPECIALTY: Surveying and Drilling</p> | <p>WORKED WITH BEFORE <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>NAME AND ADDRESS: Digioia, Gray and Associates, LLC 570 Beauty Road Monroeville, Pennsylvania 15146</p> | <p>SPECIALTY: Expert Support</p> | <p>WORKED WITH BEFORE <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>NAME AND ADDRESS:</p> | <p>SPECIALTY:</p> | <p>WORKED WITH BEFORE <input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>NAME AND ADDRESS:</p> | <p>SPECIALTY:</p> | <p>WORKED WITH BEFORE <input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>NAME AND ADDRESS:</p> | <p>SPECIALTY:</p> | <p>WORKED WITH BEFORE <input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>NAME AND ADDRESS:</p> | <p>SPECIALTY:</p> | <p>WORKED WITH BEFORE <input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>NAME AND ADDRESS:</p> | <p>SPECIALTY:</p> | <p>WORKED WITH BEFORE <input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>NAME AND ADDRESS:</p> | <p>SPECIALTY:</p> | <p>WORKED WITH BEFORE <input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>NAME AND ADDRESS:</p> | <p>SPECIALTY:</p> | <p>WORKED WITH BEFORE <input type="checkbox"/> Yes <input type="checkbox"/> No</p> |

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

YES Description and Number of Projects: Tetra Tech staff and consultants have completed over 100 abandoned mine land projects - Attachment C is only a partial listing. Our Project Manager, Thomas Gray, PE, has been working on abandoned mine reclamation projects for the past 21 years, with many in West Virginia. Our advisor, Richard Gray, PG, has been involved with mine reclamation since the early 1980s. He has completed over 100 projects in West Virginia for the WVDEP. They have worked together on many of these projects. Tetra Tech has been involved with mine reclamation for many years throughout the western U.S. and is providing similar services in the Appalachian coal fields. Our Charleston, WV office will provide local support as needed.

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. 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/CADD personnel in its Pittsburgh office 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: 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 domestic water line design projects nationwide for hundreds of 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 5 acid mine drainage evaluation/abatement design projects and our proposed Project Manager, Thomas Gray, PE, has completed dozens of acid mine drainage and abatement projects. He 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 DOMESTIC WATERLINE DESIGN EXPERIENCE | |
|--|--|---------------------------------------|---|---|--|
| Gray, Thomas, A., PE Project Manager | | YEARS OF AML DESIGN EXPERIENCE: 22 | YEARS OF AML RELATED DESIGN EXPERIENCE: 34 | YEARS OF AML DESIGN EXPERIENCE: 22 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 16 |
| Brief Explanation of Responsibilities | | | | | |
| <p>Mr. Gray is an experienced mining engineer who has been involved with abandoned mine reclamation for the past 22 years. He is currently working on the reclamation design of the Gladden mine discharge in PA. Other projects include the treatment of an acidic discharge for PennDOT, subsidence evaluation for a mine in CO, and a pump station and pipeline design for a mine in PA. He previously worked at GAI, managing their Charleston, WV office in the 1990s. Since 2000, Mr. Gray has managed or was a senior consultant on 53 projects involving reclamation of abandoned mines, including managing 30 projects for the Office of Surface Mining. He also managed an open-end design for PADEP and the Maryland Bureau of Mines and has consulted to the WVDOH on mining issues, most recently on a project site in Harrison County in 2007. His WVDEP projects include Omega mine grouting, Owings mine reclamation, Majesty mine reclamation, Godby branch water supply extension, and Left Hand Fork Refuse fire control. He has published over 30 articles related to mining and reclamation, including the chapter entitled, "Mine Closure, Sealing, and Abandonment" in SME's Mining Engineering Handbook.</p> | | | | | |
| EDUCATION (Degree, Year, Specialization) | | | | | |
| BS, 1973, Mining Engineering | | | | | |
| MBA, 1977, Business Administration | | | | | |
| MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS | | | | | |
| Society of Mining Engineers - Distinguished Member | | | | | |
| Society of American Military Engineers | | | | | |
| Engineering Society of Western Pennsylvania | | | | | |
| REGISTRATION (Type, Year, State) | | | | | |
| Professional Engineer, 1988, West Virginia | | | | | |
| Professional Engineer, 1978, Pennsylvania | | | | | |
| Professional Engineer, 1980, Virginia | | | | | |
| Professional Engineer, 2009, Ohio | | | | | |
| Professional Engineer, 1989, Maryland | | | | | |
| 13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials) | | | | | |
| NAME & TITLE (Last, First, Middle Int.) | | YEARS OF EXPERIENCE | | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE | |
| Cummings, Biff, D., PE Deputy Project Manager | | YEARS OF AML DESIGN EXPERIENCE: 15 | YEARS OF AML RELATED DESIGN EXPERIENCE: 29 | YEARS OF AML DESIGN EXPERIENCE: 15 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 |
| Brief Explanation of Responsibilities | | | | | |
| <p>Mr. Cummings' expertise includes mine reclamation, water/soil consolidation, slope stability, settlement analysis, mine subsidence, and fill placement and the full range of civil site designs for developments and abandoned mine reclamation (mine drainage and seals, regarding and vegetation of spoil piles, landslide investigation and abatement, subsidence abatement, mine and spoil fires and stream channel restoration). He performed AML related activities under contracts in WV, OH, MD, and VA, and subsidence evaluations for private firms and OSM in WV, PA, OH, and MD. His experience also includes design, mine permitting and closure of waste disposal areas such as lagoons, landfills, and coal refuse dams and he has expertise with remedial design/actions including closure plans, synthetic, clay caps, leachate collection, slurry and sheet pile walls, groundwater collections systems, waste removal and in-situ stabilization.</p> | | | | | |
| EDUCATION (Degree, Year, Specialization) | | | | | |
| BS, 1978, Civil Engineering | | | | | |
| MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS | | | | | |
| American Society of Civil Engineers | | | | | |
| REGISTRATION (Type, Year, State) | | | | | |
| Professional Engineer, 2004, WV | | | | | |
| Professional Engineer, 1984, PA | | | | | |
| Professional Engineer, 1994, OH | | | | | |
| Professional Engineer, 2006, IL | | | | | |
| Professional Engineer, 2005, AL | | | | | |
| Professional Engineer, 2004, IN | | | | | |

| | |
|--|--|
| 13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials) | |
| NAME & TITLE (Last, First, Middle Int.) Giovannitti, Ernest, PE Project Advisor | YEARS OF AML DESIGN EXPERIENCE: 14 |
| YEARS OF AML RELATED DESIGN EXPERIENCE: 14 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 |
| <p>Brief Explanation of Responsibilities</p> <p>Mr. Giovannitti has over 39 years of mining experience and will serve as a Project Advisor on our team. He was the former Director of the Bureau of Mining and Reclamation and the Director of Abandoned Mine Reclamation for PADEP for 17 years. He also previously served as the Chief of the Division of Permits and Compliance in the Bureau of Water Quality Management. Mr. Giovannitti's experience has included managing a multi-disciplinary staff in reclaiming hazardous conditions and water pollution problems caused by coal mining activity. Mr. Giovannitti managed corrective actions and designed solutions to solve these problems.</p> | |
| <p>EDUCATION (Degree, Year, Specialization)</p> <p>MS, 1976, Sanitary Engineering BS, 1964, Civil Engineering</p> | |
| <p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <p>National Association of Abandoned Mine Land Programs</p> | |
| <p>13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials)</p> | |
| NAME & TITLE (Last, First, Middle Int.) Berenbrok, Allan, R., PE Project Engineer | YEARS OF AML DESIGN EXPERIENCE: 2 |
| YEARS OF AML RELATED DESIGN EXPERIENCE: 29 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 |
| <p>Brief Explanation of Responsibilities</p> <p>Mr. Berenbrok has over 29 years of professional design experience. His project experience includes serving as the Lead Design Engineer for the WVDEP Office of AML and Reclamation's Weston and Tunnelton Abandoned Mine Portals Closure Project, the Bear Run Phase II Acid Mine Drainage Passive Treatment System Design, and the Gladden Mine Reclamation Acid Mine Drainage Treatment System Design.</p> | |
| <p>EDUCATION (Degree, Year, Specialization)</p> <p>MS, 1984, Systems Management BS, 1980, Civil Engineering</p> | |
| <p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <p>NAIOP ICSC</p> | |
| <p>REGISTRATION (Type, Year, State)</p> <p>Professional Engineer, Pennsylvania Professional Engineer, Maryland</p> | |
| <p>REGISTRATION (Type, Year, State)</p> <p>Professional Engineer, 1988, Pennsylvania</p> | |

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

| | | | |
|--|--------------------------------------|--|---|
| NAME & TITLE (Last, First, Middle Int.) Furniss, Matthew, D., EIT Project Engineer | YEARS OF AML DESIGN EXPERIENCE: 1 | YEARS OF AML RELATED DESIGN EXPERIENCE: 1 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 |
| Brief Explanation of Responsibilities | | | |
| Mr. Furniss has six years of mining engineering experience, which includes design, construction, research and development, and CAD/Drafting. His project experience includes serving as a Project Engineer for the WVDEP Office of AML and Reclamation's Weston and Tunnelton Abandoned Mine Portals Closure Project, the Bear Run Phase II Acid Mine Drainage Passive Treatment System Design, and the Gladden Mine Reclamation Acid Mine Drainage Treatment System Design. | | | |
| EDUCATION (Degree, Year, Specialization) | | | |
| MS, 2009, Mining and Minerals Engineering BS, 2007, Mining and Minerals Engineering | | | |
| MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS | | | |
| Society for Mining, Metallurgy, and Exploration | | | |
| REGISTRATION (Type, Year, State) | | | |
| EIT, 2007, 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.) Ludwig, John Project Scientist | YEARS OF AML DESIGN EXPERIENCE: 1 | YEARS OF AML RELATED DESIGN EXPERIENCE: 10 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 |
| Brief Explanation of Responsibilities | | | |
| Mr. Ludwig is the director of Tetra Tech's Charleston, WV office of TMDL and Water Resources Center. He is a senior environmental scientist with over ten years of experience providing technical and management support for clients in the areas of water resources, watershed and water quality assessment, watershed modeling and Total Maximum Daily Load (TMDL) development. In support of EPA and the WVDEP Division of Water and Waste Management (DWWM), he has served as the Project Manager in the development of over 1,900 EPA-approved TMDLs in West Virginia. He currently serves as the Project Manager for the existing TMDL contract with the WVDEP DWWM that includes the development of TMDLs for total iron, total manganese, dissolved aluminum, pH, selenium, fecal coliform bacteria, and biological impairments throughout the State of West Virginia. | | | |
| EDUCATION (Degree, Year, Specialization) | | | |
| MS, 1997, Environmental Pollution Control BS, 1995, Environmental Science | | | |
| MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS | | | |
| American Water Resources Association Water Environment Federation | | | |
| REGISTRATION (Type, Year, State) | | | |

| | | | | | | | |
|--|--|-----------------------------------|--|--|--|--|--|
| 13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials) | | YEARS OF AML DESIGN EXPERIENCE: 3 | | YEARS OF AML RELATED DESIGN EXPERIENCE: 16 | | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 | |
| NAME & TITLE (Last, First, Middle Int.) Drane, III, PG, Lawrence, A. Project Geologist | | YEARS OF AML DESIGN EXPERIENCE: 3 | | YEARS OF AML RELATED DESIGN EXPERIENCE: 16 | | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 | |
| Brief Explanation of Responsibilities | | | | | | | |
| <p>Mr. Drane has over 17 years experience in the environmental field and has spent three years in the surface mining industry completing mining permits and performing mapping and surveying. His experience includes long-term remedial investigations/remedial actions, Phase I and Phase II investigations, long-term environmental risk-based analysis, brownfield site investigations and closures, soil and groundwater remediation for VOCs, SVOCs, petroleum hydrocarbons, PCBs, and metals, underground storage tank investigations and closures, supervision of excavations and slurry wall construction, RCRA tank and facility closures, and design and construction of groundwater stripping systems.</p> <p>EDUCATION (Degree, Year, Specialization)</p> <p>MS, 1993, Hydrogeology and Geophysics BS, 1989, Geology (Minor in Civil Engineering)</p> <p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <p>REGISTRATION (Type, Year, State) Professional Geologist, 1995, Pennsylvania</p> | | | | | | | |
| 13. PERSONAL HISTORY STATEMENT OF PRINCIPALS AND ASSOCIATES RESPONSIBLE FOR AML PROJECT DESIGN (Furnish complete data but keep to essentials) | | | | | | | |
| NAME & TITLE (Last, First, Middle Int.) Wilkes, PWS, Samuel, P. Project Scientist | | YEARS OF AML DESIGN EXPERIENCE: 0 | | YEARS OF AML RELATED DESIGN EXPERIENCE: 5 | | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 | |
| Brief Explanation of Responsibilities | | | | | | | |
| <p>Mr. Wilkes is an environmental scientist providing technical support to clients, such as the WVDEP and the WVDHHR, US Forest Service, Bureau of Land Management, and the EPA. He also provides technical support to clients pertaining to abandoned mine site investigations, abandoned mine land inventories, contaminant transport in surface waters, environmental contamination, and potentially responsible party searches. Mr. Wilkes has experience in investigating hard rock mines and mill sites for contaminants such as arsenic, copper, cyanide, lead, mercury, uranium, zinc, and organic compounds. He is proficient in contaminant source identification and characterization, site assessments, site assessment migration pathways, and customized surface water modeling for abandoned mine sites.</p> <p>EDUCATION (Degree, Year, Specialization)</p> <p>MS, 2003, Environmental Science and Policy BS, 1996, Earth and Environmental Science</p> <p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <p>Society of Wetland Scientists Trout Unlimited</p> <p>REGISTRATION (Type, Year, State) Professional Wetland Scientist, 2003 Certified Forest Stand Delineator and Conservation Planner, 2003, Maryland</p> | | | | | | | |

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

| | | | |
|--|---------------------------------------|---|---|
| NAME & TITLE (Last, First, Middle Int.) Abshire, PE, Mark, S. Project Engineer | YEARS OF AML DESIGN EXPERIENCE: 16 | YEARS OF AML RELATED DESIGN EXPERIENCE: 16 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 |
|--|---------------------------------------|---|---|

Brief Explanation of Responsibilities

Mr. Abshire is a senior-level geotechnical engineer with 15 years of experience in geotechnical engineering for public and private sector clients in the western US, Central and South America, and Southeast Asia. Project management and project engineering experience include mine operation and closure, public works and civil infrastructure, community development, and forensic investigations. Specific mining experience for design, operation, closure, and reclamation includes permitting assistance, siting and geotechnical investigation, design of tailings storage facilities, LDS/LCS systems design, cover design, development of tailings management, operations and closure plans, uranium mill decommissioning, borrow source evaluation, preparation of construction plans and specifications, radiological health and safety plan development, construction oversight, and compliance monitoring.

EDUCATION (Degree, Year, Specialization)
MS, 2002, Civil Engineering (Geotechnical Engineering)
BS, 1992, Engineering Science (Aerospace Engineering)

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Society of Civil Engineers

REGISTRATION (Type, Year, State)

Professional Engineer, 1999, Colorado
Professional Engineer, 2004, Arizona
Professional Engineer, 2005, New Mexico

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.) Hallman, PE, PG, Dave Project Engineer and Geologist | YEARS OF AML DESIGN EXPERIENCE: 20 | YEARS OF AML RELATED DESIGN EXPERIENCE: 20 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 |
|--|---------------------------------------|---|---|

Brief Explanation of Responsibilities

Mr. Hallman has over 20 years of experience specializing in geotechnical engineering and construction on a variety of mining and civil engineering projects throughout the world. His technical expertise includes static and dynamic stability of embankments and natural slopes, landslide evaluation, rock slope stability, seismic risk assessments, liquefaction evaluations, dynamic deformation analyses, liner and seepage cutoff system design and evaluation, tailings and water dam design and construction, and design and construction of heap leach and landfill facilities.

EDUCATION (Degree, Year, Specialization)
BS, 1983, Geological Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

REGISTRATION (Type, Year, State)
Professional Engineer, 1994, Missouri
Professional Engineer, 2002, Texas
Professional Engineer, 1990, Alaska
Professional Engineer, 1989, Colorado
Professional Engineer, 2002, Wyoming
Professional Engineer, 1996, Idaho
Professional Geologist, 2004, Wyoming

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.) Henderson, PE, Michael Project Engineer | YEARS OF AML DESIGN EXPERIENCE: 25 | YEARS OF EXPERIENCE YEARS OF AML RELATED DESIGN EXPERIENCE: 25 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 0 |
|---|---------------------------------------|--|---|

Brief Explanation of Responsibilities

Mr. Henderson has more than 25 years of experience providing civil and geotechnical engineering design services to the mining industry. He is responsible for leadership on a wide range of engineering projects, including tailings impoundments, water storage reservoirs, heap leach facilities, and mine planning. Mr. Henderson's technical background relating to designing mining facilities includes design-engineering experience on a wide range of projects in the US and overseas, operations experience at several large mines, mine research for the US Bureau of Mines and Department of Energy (DOE), and expert witness testimony related to mine waste management issues.

EDUCATION (Degree, Year, Specialization)
MS, 1984, Civil Engineering/Water Resources
BS, 1979, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

Society for Mining, Metallurgy, and Exploration
American Society of Professional Engineers
National Society of Professional Engineers

REGISTRATION (Type, Year, State)

Professional Engineer, 1986, Pennsylvania
Professional Engineer, 2000, Tennessee
Professional Engineer, 2003, Nebraska
Professional Engineer in 15 additional states

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

| | | | |
|---|---------------------------------------|--|--|
| NAME & TITLE (Last, First, Middle Int.) Gray, PG, Richard, E. Project Advisor | YEARS OF AML DESIGN EXPERIENCE: 26 | YEARS OF EXPERIENCE YEARS OF AML RELATED DESIGN EXPERIENCE: 26 | YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE: 11 |
|---|---------------------------------------|--|--|

Brief Explanation of Responsibilities

Mr. Gray will consult with Tetra Tech and assist in selecting the design approach for the team. He will also be used to conduct a peer review of the design plans and specifications before they are finalized. He is highly regarded in the AML design field. He was the project manager on all of GAI's AML projects for the WVDEP from 1983 to 1995 and served as a technical consultant for all of the GAI projects with WVDEP from 1995 until 2005.

EDUCATION (Degree, Year, Specialization)
BS, Civil Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Society of Civil Engineers
American Association for the Advancement of Science
Society of American Military Engineers

REGISTRATION (Type, Year, State)

Professional Geologist, Pennsylvania
Professional Geologist, Virginia
Professional Geologist, Delaware
Professional Geologist, North Carolina
Professional Geologist, South Carolina
Professional Geologist, Florida
Professional Geologist, Indiana
Professional Geologist, Kentucky
Professional Geologist, Illinois
Professional Geologist, Alabama
Professional Geologist, California
Professional Geologist, Wyoming

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

Adobe Acrobat Version 8.0

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, 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 |
|--|---|---|---|--|
| Fisher Run (Posey) Mine Reclamation, AML Reclamation, West Virginia | WVDEP Office of Abandoned Mine Lands and Reclamation 105 S. Railroad Street Philippi, WV 26416 | Design of closure of mine portals allowing AMD flow into a stream, drilling, surveying | \$292,000 | Design complete, construction scheduled to be completed in 2010 |
| Bear Run Acid Mine Drainage Passive Treatment System, Passive Treatment, Pennsylvania | Indiana County Conservation District in conjunction w/PADEP 1432 Route 286 Hwy. E Indiana, PA 15701 | Design of a passive acid mine drainage treatment system, site grading, hydraulic analysis, E&S control permitting | Not yet determined | 95% |
| Gladden Mine Site Grading Plan and Acid Mine Drainage Treatment System, Treatment System, Pennsylvania | South Fayette Conservation Group in conjunction w/PADEP 515 Millers Run Road Morgan, PA 15064 | Site grading plan, design of acid mine drainage treatment system to treat a max. flow rate of 1,500 gpm of AMD flow | \$3,600,000 | Design of this project is complete, but construction has not yet begun |
| Tunnelton Mine Portal Closure Design, West Virginia | WVDEP Office of Abandoned Mine Lands and Reclamation 105 S. Railroad Street Philippi, WV 26416 | Mine portal closure design, development of regrading plans that balance cut and fill, Construction monitoring | \$62,000 | Design of this project is complete, but construction has not yet begun |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| TOTAL NUMBER OF PROJECTS: 4 | | | TOTAL ESTIMATED CONSTRUCTION COSTS: \$3,954,000 | |

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 |
|---------------------------------|---------------------------|--|------|-------------------------|----------------------|
| N/A | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |

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.

Please see our accompanying information for additional qualifications.

20. The foregoing is a statement of facts.

Signature: Mark P. Speranza

Printed Name: Mark Speranza, PE

Title: Pittsburgh Office Manager

Date: October 1, 2009



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. | Remaining Evaluation Mine/Refuse Fire | Subsidence Investigation | Mitigation Hazardous Waste Disposal | Project Specifications | Water Quality Evaluation/Mitigation/ Replacement | Construction Inspection/Manage- ment | Water Treatment Equipment/Structure Removal | Stream Restoration | Geotechnical/Stability | Thomas Gray, PE | Biff Cummings, PE | Ernest Giovannitti, PE | Allan Berenbrok, PE | Matthew Furniss, EIT | Jon Ludwig | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--|---|--|--|--|---|---|--|--|---|---|---|---|--|--|--|--|---|--|-----|--|--|--|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| OSM Clyde Mine Drainage Project | P | | | | | | | X | | | | | | X | | | | | | | M/P | | | | | | | | | | | | | | | | | | | | | |
| Ruberto Residence Subsidence | P | | | | | | | X | | | | | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | |
| Chartiers Creek Mine Opening and Discharge | P | | X | | | | X | | | | | X | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | |
| OSM Argenas Residential Mine Drainage | P | | | | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OSM Rabusseau Mine Drainage Evaluation/Design | P | | X | | | | X | | | | | X | | | | | | | | | | | | | | X | | | | | | | | | | | | | | | | |
| Abandoned Mine Storage of Sewer Overflow | P | | | | | | X | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mather Coal Refuse Pile Reclamation | P | | | | | | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OSM Francis Street Subsidence | P | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PADEP Ninevah Mine ABD Abatement Project | P | | | | | | X | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Turtle Creek Interbasin Transfer of Mine Drainage | P | | | | | | X | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OSM Villas on the Greens Subsidence | P | | | | | | X | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PennDOT Acid Rock Mitigation Evaluation | P | | | | | | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OSM Hazardous Mine Entries Shaft Inventory | P | | | | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* 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.



Project Approach



PROJECT APPROACH – LITTLE LAUREL RUN HIGHWALL DESIGN

Preliminary Site Meeting

Tetra Tech key team members will meet with WVDEP at the site to review site conditions and to agree on a plan of action and reclamation expectations. This information will be used by Tetra Tech to prepare a cost estimate for proposed services.

Design Task 2 - Field Survey

TRIAD Engineering, Inc. of Morgantown, West Virginia will be retained to prepare site topography for the Little Laurel Run Highwall Site. The topography will include two foot contours and the associated physical surface features of the affected area such as the locations and dimensions of the tipple structure, mine portals, spoil areas, and property lines based on county tax maps. Miss Utility of West Virginia will be contacted prior to the start of field survey operations to locate public utilities on the site. These will be shown on the topographic mapping.

Task 3 - Geotechnical Evaluation

TRIAD Engineering, Inc. of Morgantown, West Virginia will be retained to investigate sub-surface conditions, identify whether any open voids exist, locate the existing coal bed elevations, determine if there is any standing water in the mine portals, and to determine the general thickness of the coal refuse onsite, if necessary. The necessity and extents of this evaluation will be determined jointly by Tetra Tech and the WVDEP during the initial site visit. If deemed appropriate piezometers will be installed to monitor the water elevation in the mine voids. Tetra Tech will provide full time monitoring of the geotechnical investigation and will prepare boring logs of any drilling.

Task 4 - Design, Construction Drawings and Specifications

Tetra Tech will prepare site design drawings and construction specifications to install mine seals at the two collapsed mine portal locations, reclaim two highwall sections to approximate original contour while utilizing and encapsulating onsite spoil and coal refuse into the backfill material, demolish the remains of the old tipple, remove accumulated junk on the site, and to construct a drainage conveyance channel.

The results of the geotechnical evaluation will be used to facilitate the mine seal designs. If standing water is discovered within the mine voids wet seal(s) will be proposed. If water is not present dry mine seal(s) will be designed.



LITTLE LAUREL RUN HIGHWALL DESIGN WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Subsurface conditions, location(s) of the mine voids, location of the coal seam, and the estimated quantity of the coal refuse (as determined by the geotechnical evaluation) will be used to determine where the required fill quantity of the backfill will be obtained to reclaim the highwalls. Depending on the available on-site spoil the highwall closure will be designed at a slope of approximately 3:1. If wet mine seals are implemented the regrading will provide for subsurface conveyance of the mine water to the constructed drainage conveyance channel. Water samples of the mine water will be obtained and tested to determine if on-site treatment will be required. The constructed drainage conveyance channel will be designed to properly capture the on-site surface run-off and to route it off site.

Tetra Tech will review the tippie and can inventory, if appropriate, the associated equipment with an experienced mining engineer to determine if anything can be reused or resold. Tetra Tech proposes to specify that the contractor prepare an approach and health and safety plan for approval.

Tetra Tech proposes to handle the onsite scrap material using the one of the following three options:

- Scrap becomes property of contractor and shall be removed from the site.
- An estimation of the quantity of scrap will be made by Tetra Tech and a separate bid credit item will be added for the salvage value of the scrap per ton removed.
- Contractor could stock pile all scrap material on-site and, if desired, WVDEP could recover its salvage value through a separate contract.

Tetra Tech will make a recommendation to WVDEP following the site visit on which option to apply.

Task 5 - Attend Pre-Bid Construction Meeting

Tetra Tech shall attend the pre-bid construction meeting to guide the attending contractors through the design and to answer any questions.

Task 6 - Provide Construction Support and Oversight

Tetra Tech shall provide WVDEP with construction support and oversight. This will include answering questions and helping during the construction bid process as well as providing a final inspection of the post construction site conditions.



Personnel



ABOUT OUR PROJECT MANAGER THOMAS A. GRAY, PE

Thomas Gray, PE is the Energy and Natural Resources Manager at Tetra Tech. He has a large amount of project experience in West Virginia, having previously managed an engineering office in Charleston. He is a technical expert in mining engineering, mine reclamation, coal ash disposal and utilization, watershed and ecosystem restoration, mine subsidence, acid mine drainage remediation, mine stabilization via grouting and abandoned mine fire mitigation. His long career has included **over 100 mining-related projects**.

Mr. Gray has over 36 years of professional mining experience and is a registered Professional Engineer in West Virginia, Pennsylvania, Virginia, Maryland, and Ohio. He specializes in abandoned mine land reclamation and his project management responsibility has included construction, engineering, regulatory compliance, and research and development. He has also completed mining projects for the West Virginia Department of Environmental Protection including the Owings Mine Complex Acid Mine Drainage Passive Treatment System, which won the **James E. Pitsenbarger Abandoned Mine Land Award**.

He is a member of many industry organizations and is recognized as a Distinguished Member in the Society for Mining, Metallurgy, and Exploration. In addition to authoring over 25 mining-related publications, Mr. Gray has also made presentations at mining conferences around the U.S.

Mr. Gray received a BS degree in Mining Engineering from The Pennsylvania State University and an MBA degree from The University of Pittsburgh.

Mr. Gray has provided the WVDEP with the highest quality of services and I recommend him to all agencies that are considering using the services of Tetra Tech.

Mr. David Broschart, PE
West Virginia Department of
Environmental Protection

I would recommend both Tom and Tetra Tech to anyone considering undertaking an AMD project. The project won the South Fayette Conservation Group a 2008 Western Pennsylvania Environmental Award. The project has also won a 2008 Office of Surface Mining Reclamation Award for the Bureau of Abandoned Mine Reclamation.

Ms. Amy Smith
So. Fayette Conservation Group

Mr. Gray's work was always of the highest quality and completed within the assigned time frame. I attribute his success to his experience and ability to understand a wide range of issues.

Mr. Michael Garner – Maryland
Bureau of Mines



Thomas A. Gray, PE
Project Manager

EDUCATION: MBA, Business Administration, University of Pittsburgh, 1977
BS, Mining Engineering, The Pennsylvania State University, 1973

**CERTIFICATIONS/
REGISTRATIONS:** Professional Engineer, West Virginia, 10523, 1988
Professional Engineer, Pennsylvania, 26978-E, 1978
Professional Engineer, Maryland, 17048, 1989
Professional Engineer, Virginia, 11628, 1980
Professional Engineer, Ohio, 73686, 2009

PRIOR PROJECT EXPERIENCE:

Project Manager; West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation; Lewis and Preston Counties, WV. Project Manager for the preparation of construction drawings to install wet mine seals and drainage improvements for the closure of abandoned mine portals on private property in Weston and Tunnelton West Virginia. Prepared construction specifications and construction cost estimate for the closure of nine mine portals.

Project Consultant; West Virginia Division of Environmental Protection Abandoned Mine Reclamation, Charleston, WV. Reclamation design of an abandoned mine site comprising old mine structures, open mine portals, refuse piles and numerous acid mine drainage (AMD) producing discharges. Evaluated water quality and designed a passive AMD treatment system design at the Owings Mine Complex site. Awarded: James E. "Pete" Pitsenbarger Abandoned Mine Land Award North, 1999 West Virginia Reclamation Awards.

Project Manager; West Virginia Division of Environmental Protection Abandoned Mine Workings Injection Project; Monongalia County, WV. This research and demonstration project injected coal combustion byproduct based grout into 25 acres of abandoned mine workings to reduce the generation of acid mine drainage and to reduce subsidence potential. Responsible for R&D investigation, construction plans and specifications, monitoring construction, and preparing a research report. Sponsors included Allegheny Energy, the DOE, Consol Inc. and the Electric Power Research Institute.

Project Advisor; West Virginia Division of Environmental Protection Water Line Extension; Nicholas County, WV. Evaluated construction documents for the Gauley River and Heizer/Manila Creek water line extension projects.

Project Advisor; West Virginia Division of Environmental Protection Water Supply System; Chapmanville, Logan Count, and WV. Designed a water supply system to service approximately 800 residents of the Mill Creek-Isom Community along Godby Branch watershed.

Project Advisor; West Virginia Division of Environmental Protection Water Supply Extension; Logan County, WV. Prepared construction documents for a water supply extension project.

Project Engineer; Capels Resources, Inc. (Subsidiary to Berwind Corporation) Subsidence Assessment; McDowell County, WV. Preliminary subsidence assessment project for underground coal mining property being proposed as a sanitary landfill.

Project Manager; Island Creek Corporation Hydrologic Impact Assessment; Grant County WV. Prepared a cumulative hydrologic impact assessment of the Alpine Number 2 refuse disposal area.

Project Manager; Island Creek Coal Corporation (subsidiary to Occidental Petroleum) Mine Development Services; Bayard, WV. Completed mine development plans, cost estimating, and permitting services for the mining of coal waste and the disposal of AFBC ash at the North Branch Mine, including exploration and geotechnical evaluation.

Project Manager; Indiana County Conservation District Bear Run Phase II, AMD Passive Treatment System; 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



Thomas A. Gray, PE Project Manager

preparation of a PADEP Government Financed Construction Contract for a third party contractor to remove coal refuse from the site. Prepared construction grading plans, permits and hydraulic analysis of the Bear Run stream for a stream culvert crossing.

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

Project Engineer; Mitchell Power Plant Site Selection Evaluation, Moundsville, WV. Completed a site selection evaluation of a new solid waste landfill at a coal-fired electric generating facility. The site was underlain by coal that had been deep mined using room and pillar mining.

Project Manager; Cannelton Industries Surface Mining Equipment Time and Motion Studies; Charleston, WV. Conducted time and motion studies for surface mining equipment at a mountain top removal operation, including draglines, off road trucks and hydraulic excavators.

Project Manager; West Virginia Division of Highways, PennDOT, and Pennsylvania Turnpike Commission Mineral Reserves Appraisal Reports; WV and PA. Provided appraisal reports of mineral reserves related to highway right of way acquisition, including expert witness testimony.

Project Manager; Mettiki Coal Corporation Construction Management; Mt. Storm, WV. Provided construction management support for the construction of a new coal handling and storage facility at the Mt. Storm power plant and a three mile coal haul road.

Project Manager; Cannelton Industries Mine Permitting and Environmental Compliance Evaluation; Charleston, WV. Evaluated permit and environmental compliance of a subcontracted surface mine operator and preparation of an expert witness legal report.

Project Manager; Island Creek Coal Corporation (subsidiary to Occidental Petroleum) Structural Integrity Evaluation; Grant and Tucker Counties, WV. Structural integrity investigation project for a 125-foot-high, 500 kV steel lattice transmission tower immediately above chain pillars separating two longwall panels of a 300 feet deep mine. Responsible for evaluations, including structural analysis and prediction of the impacts of active longwall mining on the electrical transmission tower.

Project Engineer; BethEnergy Mines Feasibility Study; Nicholas County, WV. Conducted a feasibility study of a four million ton per year mountain-top removal project. The mine was permitted and operated successfully.

Project Engineer; ANR Coal Company Mine Complex Evaluation; Webster County, WV. Completed a feasibility study and economic evaluation for a one million ton per year West Virginia mine complex. Provided permitting services, prepared construction plans and specifications and provided onsite construction management.

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



Thomas A. Gray, PE Project Manager

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

Project Manager; Consol Energy Mining Evaluation; Greene County, PA. Evaluated longwall mining subsidence and impacts to surface structures.

Project Manager; South Fayette Conservation Group in association with PADEP Deep Mine Discharge Investigation; South Fayette Township, PA. During an investigation of the deep mine discharges in Chartiers Creek it was found that Fishing Run was being diverted into a deep mine entrance and after becoming polluted coming out at the Gladden discharge, the largest pollution source in the watershed. Through a grant from PADEP, a reclamation design was prepared and permitted. The design included sealing the mine entrance, reclaiming abandoned highwalls, removing dangerous mine structures and restoring 2000 feet of stream channel. Construction monitoring was performed.

Project Manager; Maryland Department of the Environment Bureau of Mines Open-End Mining Contract; Frostburg, MD. Managed an open end contract to provide technical assistance in mining 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; Paint Creek Watershed Association in association with PADEP Jandy Coal Refuse Disposal Site AMD Investigation; 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.

Project Manager; Maryland Department of the Environment, Bureau of Mines Open-End Hydrogeology Contract; Frostburg, MD. Managed an open end contract that provided hydrogeology services to the state agency. Investigated and provided expert opinions of the impacts on two domestic water supply sources from surface mining in Raynor and Kinsinger, MD. Reported on the impacts of surface coal mining activities on the quality and quantity of local groundwater supplies in the vicinity of Mill Run, MD. Reviewed the groundwater hydrology section of a surface coal mine permit application.

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

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

Project Manager; BethEnergy Mines Acid Mine Drainage Treatment Design; Ebensburg, PA. Completed a preliminary design of a large passive treatment system to treat acidic mine water from a permitted closed coal mine. Responsible for a conceptual design of the passive treatment system and for the final design and construction oversight of a pilot test treatment system.

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



PUBLICATIONS:

- 2009 Gray, T. A., Bruhn, R.W., Mack, J.F. (OSM) "Dolph Abandoned Mine Fire Control Project" presented at the 2009 annual SME meeting in Denver, Colorado, February 22-25, 2009.
- 2007 Gray, T.A., "Surface Mining" article for inclusion in McGraw-Hill Encyclopedia of Science and Technology, 10th edition
- 2005 Gray, T.A., and Horrell, S. (PADEP). "Ninevah Acid Mine Pollution Abatement Project" presented at the 2005 World of Coal Ash, Lexington, KY, April 15, 2005.
- 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.
- 2003 Gray, T.A., and Broush, J.C. "Use of GIS in Mining Applications" presented at the Seminar on the Use of GIS in Mining Application at California University, Canonsburg, PA, May 8, 2003.
- 2003 Gray, T.A., and Smith, Ed, USACE, "Ecosystem Restoration - South Branch Blacklick Creek" published in the March-April 2003 issue of The Military Engineer, SAME's monthly magazine.
- 2002 Gray, T.A., Gray, R.E. "Coal Combustion Products Can be Used to Construct Tailing Dams" presented at the 19th Annual International Pittsburgh Coal Conference, Pittsburgh, PA, September 25, 2002.
- 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.
- 2002 Gray, T.A., Gray, R.E., and Newman, F.B. "Utilization of Coal Combustion By-Products in Tailing Dams" presented at the Tailing Dams 2002 meeting in Las Vegas, NV, May 1, 2002.
- 2000 Gray, T. A., Kyper, T.N., Smith, E., and Hedin, R. "Feasibility Study for Ecosystem Restoration by Remediation of the Webster Mine Discharge at Nanty Glo, Pennsylvania." Presented at the U.S.D.O.E., NETL Facility, Morgantown, WV, October 4, 2000.
- 2000 Gray, T. A., Michalski, S.R., and Parkinson, J.W. "Re-Mining Coal Preparation Plant Slurry Ponds" presented at the Tailing Dams 2000, Association of State Dam Safety Officials Annual Conference, Las Vegas, NV, March 28-30, 2000.
- 1998 Gray, R. E., and Gray, T. A. "Coal Mine Reclamation by Ash Haulback." Presented at the 8th Congress of International Association of Engineering Geology, Vancouver, B.C., September 1998.
- 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.
- 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 1998 Annual National Meeting of the American Society for Surface Mining and Reclamation (ASSMR), Saint Louis, MO, May 16-21, 1998.
- 1998 Gray, R.E., and Gray, Thomas A. "Coal Combustion Ash Haulback." Presented at the 1998 Annual National Meeting of the American Society for Surface Mining and Reclamation (ASSMR), Saint Louis, MO, May 16-21, 1998.



Thomas A. Gray, PE
Project Manager

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- 1998 Moran, T. C., Gray, T. A., Smith, G. A., and Broschart, D.W. "Injection of Coal Combustion By-Products into the Omega Mine for the Reduction of Acid Mine Drainage." Presented at the West Virginia Surface Mine Drainage Task Force in Morgantown, WV, April 7-8, 1998.
- 1997 Gray, T. A., Moran, T. C., Broschart, D. W., and Smith, G. A. "The Omega Mine Grout Injection Project." Presented at the International Ash Utilization Symposium, Lexington, KY, October 20-22, 1997.
- 1997 Gray, T. A., Moran, T. C., Broschart, D. W., and Smith, G. A. "Using Coal Combustion By-Products to Reduce Acid Mine Drainage at the Omega Mine." Presented at the 19th Annual National Abandoned Mine Lands Conference at Canaan Valley, WV, August 18-19, 1997.
- 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, *Energieia*.
- 1997 Gray, T. A., Moran, T. C., Broschart, D., and Smith, G. "Plan for Injection of Coal Combustion Byproducts into the Omega Mine for the Reduction of Acid Mine Drainage." Presented at the 1997 Annual Meeting of the American Society for Surface Mining and Reclamation, Austin, TX, May 10-16, 1997.
- 1997 Ward, Patrick E., and Gray, T. A. "Environmental Standardization ISO 14000." Presented at the Central Appalachian Section of the Society for Mining, Metallurgy and Exploration, Inc.'s 1997 Annual Spring Meeting, Lexington, KY, April 4, 1997.
- 1997 Gray, T. A. "Coal Ash Utilization at Coal Mines." Presented at the West Virginia Mining and Reclamation Association Meeting, February 14, 1997.
- 1994 Gray, T. A., Perry, M. T., and Conrad, P. W. "Management of Coal Waste Disposal for Reduced Environmental Impacts and for Increased Profits." Presented at the annual meeting of the Society for Mining, Metallurgy, and Exploration, Albuquerque, NM, February 14-17, 1994.
- 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.
- 1991 Gray, T. A., Perry, M. T., and Gray, R. E. "Ash Haulback Alternatives for Coal Mine Operators." Presented at the American Mining Congress Coal Convention, Pittsburgh, PA, June 5, 1991.
- 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.
- 1990 Gray, T. A., and Perry, M. T. "Overview of AFBC Ash Disposal Options for Coal or Coal Waste Burning Power Plants." Presented at the Seventh Annual International Pittsburgh Coal Conference, Pittsburgh, PA, September 10-14, 1990.
- 1986 Gray, T. A. and Sethi, S. "Computer Modeling of Underground Ventilation at WIPP." Presented at the fall meeting of the Society of Mining Engineers of the AIME, St. Louis, MO, September 7, 1986.



Biff D. Cummings, PE
Deputy Project Manager

EDUCATION: BS, Civil Engineering, The Pennsylvania State University, 1978

**CERTIFICATIONS/
REGISTRATIONS:**

Professional Engineer, West Virginia, 015871, 2004
Professional Engineer, Pennsylvania, PE 033238 E, 1984
Professional Engineer, Ohio, E-57675, 1994
Professional Engineer, Indiana, PE 10403586, 2004
Professional Engineer, Illinois, 062.059306, 2006
Professional Engineer, Alabama, 21197-E, 2005
National Council of Examiners for Engineers and Surveyors, 11655, 1993

TRAINING:

OSHA 1910.120 40-Hour HAZWOPER Training
OSHA 1910.120 8-Hour Annual Refresher Training
OSHA 1910.120 8-Hour Supervisory Training

PRIOR PROJECT EXPERIENCE:

Project Manager; West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation Tunnelton and Weston Projects; Lewis and Preston Counties, WV. Project Manager for the preparation of construction drawings to install wet mine seals and drainage improvements for the closure of abandoned mine portals on private property in Weston and Tunnelton West Virginia. Prepared construction specifications and construction cost estimate for the closure of nine mine portals.

Project Engineer; Barnabus Refuse Piles Mine Sealing; WV. Provide sealing of approximately five (5) deep mine openings and development of reclamation plans. Site contained unstable, eroding refuse piles and open abandoned portals with attendant drainage. Provide detailed field reconnaissance, collection and laboratory analysis of refuse and soil samples, ground control survey, reclamation designs, hydrologic and hydraulic analyses, designs for wet and dry mine seals, evaluation of areas as direct-seeded growth medium because of limited borrow areas.

Project Engineer; Bradshaw Coal Refuse Pile Reclamation; WV. Performed reclamation of four (4) abandoned refuse piles. Provided Aerial photography, topographic mapping, surficial and subsurface investigations, laboratory testing, design engineering, construction drawings, technical specifications, construction cost estimates and construction monitoring.

Project Engineer; Mark Mine Acid Mine Drainage Abatement Project; Kermit, WV. Mr. Cummings served as a Project Engineer on this acid mine drainage project. He performed mine seal and design services.

Project Manager; Bayer Corporation Remedial Action Work Plan for the South Landfill; New Martinsville, WV. Prepared the design and Remedial Action Work Plan (RAWP) for the closure of the South Landfill (SWMU Group A) at Bayer Corporation's New Martinsville, West Virginia Facility. Prepared a landfill cap design to mitigation filtration; designed a stormwater management and sedimentation and erosion control facilities, and; prepared the RAWP for submission to U.S. EPA and the West Virginia Division of Environmental Protection. The approximately 5-acre landfill contained wastes from past disposal operations at the plant system that, based on previous investigation, were impacting groundwater. Provided a cap design consisting of a multi-layer system utilizing a geomembrane, and geocomposite drainage materials.

Project Engineer; West Virginia Department of Energy Mahan Reclamation Project; WV. Mr. Cummings served as a Project Engineer for this reclamation project. He performed gob pile reclamation, geotechnical, and design services.



Biff D. Cummings, PE
Deputy Project Manager

Project Manager; AEP Southern Ohio Coal Company Barnes Mine/Landslide Litigation; Fairmont, WV. Managed this landslide/mine subsidence litigation case. It was contended by a homeowner that mine subsidence led to a landslide that was damaging his home and the coal company hired ICF Kaiser to support its defense. Mr. Cummings developed plans for the installation of slope monitors, supervised long-term data collection, analyzed data, evaluated seasonal hydrogeologic conditions, and provided documentation for use in court to defend the coal company.

Project Engineer; Virginia Department of Mine Lands and Reclamation Projects; VA. Mr. Cummings served as a Project Engineer on a variety of reclamation projects for the Commonwealth of Virginia, providing gob pile reclamation, geotechnical, mine seal, and design services. His projects for the Virginia DMLR included the:

- Clifton Reclamation project
- Little Short Creek Reclamation project
- Robin Coal Reclamation project.

Senior Project Manager; Hobet Mining Company Pine Creek Upstream Coal Tailings Impoundment Expansion. Mr. Cummings evaluated and designed a 165-foot-high expansion of an upstream constructed coal tailings impoundment to store an additional 18 million tons of waste material. Provided subsurface investigation and piezometer installation, physical testing including, static and cyclic triaxial shear tests, hydrologic and hydraulic evaluations of drainage facilities, a seismic evaluation and liquefaction analysis, consolidation pressure analysis, stability analysis, and development of plans and specifications.

Senior Project Manager; Barton Mine Fire; Barton, MD. Design of the abatement plan for a fire within an existing deep mine using a cutoff trench. The site is located approximately 2.5 miles east of Barton, Maryland. The area was initially strip mined approximately 6,000 feet along the outcrop with the deep mine entries developed in the coal seam at the base of the highwall. The mine fire has extended about 200 feet into the deep mine at various locations along the strip mine highwall. Present preliminary designs and associated quantities and cost estimates for comment by Maryland Bureau of Mines personnel. Develop final construction design drawings and technical specifications. Prepare final construction cost estimates.

Project Manager/Senior Engineer; Parkway Center Mall Foundation Rehabilitation; Pittsburgh, PA. Managed the investigation, design, and construction program for the rehabilitation of the foundation system of this \$30 million shopping mall including deep mine grouting. The mall was settling leading to severe structural damage due to differential settlement and subsidence. For this project, Mr. Cummings developed subsurface exploration plans, analyzed the data obtained, designed methods to support the mall without restricting business operations, and managed construction oversight of the foundation correction methods.

Project Engineer; Sequatchie Valley Coal Acid Mine Drainage Project; Chattanooga, TN. Mr. Cummings served as a Project Engineer on this acid mine drainage project. He performed a drainage evaluation and redesign services.

Project Engineer; Office of Surface Mining Home Subsidence Projects; Various Locations in PA and MD. Mr. Cummings served as a Project Engineer on several home subsidence projects in Pennsylvania and Maryland for the Office of Surface Mining. These projects were located in Penn Hills and Bridgeville, Pennsylvania and Frostburg, Maryland.



Ernest F. Giovannitti, PE
Project Advisor

EDUCATION: MS, Sanitary Engineering, The Pennsylvania State University, 1976
BS, Civil Engineering, The University of Pittsburgh, 1964

**CERTIFICATIONS/
REGISTRATIONS:** Professional Engineer, Pennsylvania, PE014032E
Professional Engineer, Maryland, 31658

PRIOR PROJECT EXPERIENCE:

Project Engineer; Stoller Chemical Site Evaluation; Charleston, SC. Mr. Giovannitti performed the engineering evaluation for a contaminated restoration plan on the Stoller Chemical site located in Charleston, South Carolina.

Project Engineer/Independent Subcontractor; Various Mine Restoration Projects; Various Locations. Mr. Giovannitti served as a subcontractor to perform work on a variety of mine restoration projects.

Project Engineer; Clean Ocean and Shore Trust Evaluation for Mine Reclamation. Mr. Giovannitti performed an engineering evaluation of the use of dredged material and coal ash for a mine reclamation for the Clean Ocean and Shore Trust.

Project Engineer; Mine Discharge Feasibility Study. Mr. Giovannitti performed an engineering evaluation of the feasibility of using mine discharges to generate electrical energy.

Project Engineer; Upper Little Conemaugh River Evaluation; PA. Mr. Giovannitti performed an engineering evaluation and watershed restoration plan for this river located in Pennsylvania.

Project Engineer; McDonald Mine Discharge Evaluation; Frostburg, MD. Mr. Giovannitti performed an engineering evaluation of discharge from the McDonald mine located in Frostburg, Maryland.

PADEP Director of Abandoned Mine Reclamation; Pennsylvania Comprehensive Plan for Abandoned Mine Reclamation; PA. While employed at the Pennsylvania Department of Environmental Protection, Mr. Giovannitti created this comprehensive plan, which provides a framework for organization reclamation in the state. It provides for coordinating among those involved in reclamation activities, for prioritizing expenditures and for decision-making. It also includes a process for developing restoration plans on a watershed basis, method for selecting projects based on costs and benefits and recognizes that partnering is the only means for achieving comprehensive solutions to abandoned mine land problems.

Project Engineer; Clearfield County Mine Restoration Research and Demonstration "Laboratory." Several important and innovative mine restoration techniques resulted from this effort including: The beneficial use of high alkalinity coal ash as a fill material for reclaiming abandoned surface mines; The development of an artificial soil using waste products from a paper mill and leather tannery; and the beneficial use of dredged material combined with coal ash and waste lime products to produce a fill material for reclaiming abandoned surface and underground mines.

PADEP Director of Abandoned Mine Reclamation; Abandoned Mine Reclamation Program Business Plan; PA. While at the Pennsylvania Department of Environmental Protection, Mr. Giovannitti developed this plan to identify the Bureau of Mining and Reclamation's business practices, solicited customer needs, and established strategic goals and objectives.

PADEP Director of Abandoned Mine Reclamation; Investigation of use of Beneficial Materials for Mine Reclamation; PA. While at the Pennsylvania Department of Environmental Protection, Mr. Giovannitti developed this initiative to seek companies and contractors to determine that abandoned mine



Ernest F. Giovannitti, PE Project Advisor

lands can be reclaimed at no cost or reduced costs using materials (i.e. fly ash, river dredge, biosolids, air pollution control by-products) discarded by others.

PADEP Director of Abandoned Mine Reclamation; Research of Alternative Means for Treating Acid Mine Drainage; PA. While at the Pennsylvania Department of Environmental Protection, Mr. Giovannitti researched new means to treat acid water including the pyrolucite process and enhanced limestone dissolution with carbon dioxide.

PADEP Chief of the Division of Permits and Compliance in the Bureau of Water Quality Management; Program Guidance Manual Development; PA. While at the Pennsylvania Department of Environmental Resources, Mr. Giovannitti established a formal, written mechanism for communicating program policies and procedures to the staff responsible for implementation.

PADEP Chief of the Division of Permits and Compliance in the Bureau of Water Quality Management; Comprehensive Management Information System; PA. While at the Pennsylvania Department of Environmental Resources, Mr. Giovannitti developed this system used by supervisors to manage their workload, by management to conduct program evaluations, and by raters to measure individual performance. The system also produces reports to support federal grant requirements.

PADEP Chief of the Division of Permits and Compliance in the Bureau of Water Quality Management; Program Planning Process and Development of Annual Program Plans; PA. While at the Pennsylvania Department of Environmental Resources, Mr. Giovannitti initiated a program planning process and developed annual program plans. This important program element included a compilation of mandated work, an analysis of workload, the prioritization of work, reconciliation between the mandated workload, and the available resources and listing of work that cannot be done.

PADEP Chief of the Division of Permits and Compliance in the Bureau of Water Quality Management; Surface Mining Permit Policy; PA. While at the Pennsylvania Department of Environmental Resources, Mr. Giovannitti established a formal policy to issue surface mining permits within 180 days.

PADEP Chief of the Division of Permits and Compliance in the Bureau of Water Quality Management; Development of a Complete Approach to Mine Permitting; PA. While at the Pennsylvania Department of Environmental Resources, Mr. Giovannitti developed a complete approach to mine permitting. Mining permits include a water quality evaluation consistent with the water quality requirements; a stream encroachment and wetlands evaluation consistent with the requirements of those programs; and a residual waste evaluation where fly ash is disposed into surface mines.

PADEP Chief of the Division of Permits and Compliance in the Bureau of Water Quality Management; Erosion and Sedimentation Control Program; PA. While at the Pennsylvania Department of Environmental Resources, Mr. Giovannitti developed this program including regulations and implementation mechanisms to control the water pollution problems caused by accelerated erosion and sedimentation.

PADEP Chief of the Division of Permits and Compliance in the Bureau of Water Quality Management; NPDES Program; PA. While at the Pennsylvania Department of Environmental Resources, Mr. Giovannitti developed the necessary regulations, procedures, budgets, grant application, and program description to obtain delegation of the NPDES program for the state of Pennsylvania. The Memorandum of Agreement with the Environmental Protection Agency was also negotiated.



Allan R. Berenbrok, PE
Project Engineer

EDUCATION: MS, Systems Management, University of Southern California, 1984
BS, Civil Engineering, The Virginia Military Institute, 1980

**CERTIFICATIONS/
REGISTRATIONS:** Professional Engineer, Pennsylvania, 037262-E, 1988

TRAINING: OSHA 1910.120 40-Hour HAZWOPER Training
OSHA 1910.120 8-Hour Annual Refresher Training

PRIOR PROJECT EXPERIENCE:

Lead Design Engineer; West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation Weston and Tunnelton Projects; Lewis and Preston Counties, WV. Lead Design Engineer for 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 West Virginia. Prepared construction specifications and construction cost estimate for the closure of nine mine portals.

Lead Design Engineer; Indiana County Conservation District Bear Run Phase II Acid Mine Drainage Passive Treatment System; Indiana County, PA. Lead Design Engineer for the design of a passive acid mine drainage 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.

Lead Design Engineer; Gladden Mine Reclamation; South Fayette, PA. Preparation of a site grading plan and passive acid mine drainage treatment system to treat a maximum flow rate of 1,500 gpm of AMD flow from the abandoned Gladden Mine into Millers Run and Chartiers Creek. Preparation of a grading plan, specifications and design calculations to create 3 acres of passive treatment ponds and design of a spray pumping system to deliver 1,000 gpm of AMD through a nozzle system for aeration and performance of an HEC – RAS study to determine the effect of the construction of the treatment ponds to the floodway of Millers Run.

Project Manager; Stream Hydrologic and Hydraulic Analysis for a Private Developer; Charleston, WV. Responsible for hydraulic analysis of box culverts meeting the state of West Virginia Flood Plain Criteria for private land development. Project included the analysis of the stream using the HEC 1 and HEC 2 computer model to determine upstream and downstream water surface elevations, and HY-8 in order to size the box culverts. Duties included client contact and with the U.S. Army Corps of Engineers, Huntington District.

Project Engineer; ACT 537 Plan Revision; Monroe Township, Clarion County, PA. Preparation of a revision to the ACT 537 plan for Monroe Township in response to a Consent Order issued by PADEP. The regional sewage treatment plant was issued a Consent Order in December 2008 to revise operations to bring the plant into compliance with current discharge limits. Monroe Township contributes approximately 10% of the total flow to the plant. An ACT 537 revision defining the current Monroe Township contributory area and future contributory areas was prepared and submitted to PADEP for review and approval to address the Consent Order.



Matthew D. Furniss, EIT Project Engineer

EDUCATION: MS, Mining and Minerals Engineering, Virginia Tech, 2009
BS, Mining and Minerals Engineering, Virginia Tech, 2007

**CERTIFICATIONS/
REGISTRATIONS:** Engineer-In-Training, 2007

PRIOR PROJECT EXPERIENCE:

Project Engineer; South Fayette Conservation Group Gladden Mine Discharge Passive Treatment System (in association with PADEP); South Fayette Township, PA. Assisted with final report on the background, new conceptual design, and final design of the passive treatment system design for the Gladden Mine Discharge. Cost estimate and final construction specifications were prepared.

Project Engineer; South Fayette Conservation Group Fishing Run Stream Sealing (in association with PADEP); South Fayette Township, PA. Investigation of potential stream flows into the Gladden Mine. Identification of four stream channels losing flow through seep and apparent sinkhole subsidence events. Preparation of surface/mine map overlays to determine depth of cover and potential impacted stream areas.

Project Engineer; West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation Weston and Tunnelton Projects; Lewis and Preston Counties, WV. Final preparation of construction drawings and specifications to install wet mine seals and drainage improvements for the closure of (9) abandoned mine portals on private property in Weston and Tunnelton.

Project Engineer; West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation Paint Branch Mine Project; Kanawha, WV. Final preparation of construction drawings and specifications to install splash pads and metal bat gates on three abandoned mine portals and to remove approximately 48 abandoned bridge piers in Paint Branch.

Project Engineer; Indiana County Conservation District Bear Run Phase II Acid Mine Drainage (AMD) Passive Treatment System. Design of a passive AMD treatment system (launder weir channel, two wetlands, and a pond). Preparation of construction drawings, specifications, and cost estimate.

Project Engineer; BHP Billiton New Mexico Coal Mine Reserve Calculations. Prepared mine reserve calculations using Vulcan for remainder of active pit (nine separate seams).

Project Engineer; BHP Billiton New Mexico Coal Reclamation Projects. Prepared cut/fill regrade calculations and diagrams for reclamation.

Project Engineer; BHP Billiton New Mexico Coal Feasibility and Cost Analyses. Prepared feasibility and cost analyses for mine expansion road relocation and construction.

Project Engineer; BHP Billiton New Mexico Coal New Sewer Lagoon. Designed and prepared location of new sewer lagoon including permitting.

Project Engineer; BHP Billiton New Mexico Coal Fines Deposit Removal. Analyzed the most economical way to remove excessive coal fines deposit in lined contaminant ponds at on-site power plant.

Project Engineer; Martin Marietta Aggregates Ten-Year Mine Plan. Mr. Furniss helped develop a ten-year mine plan for the Nova Scotia mountaintop mine by blending different materials.

Project Engineer; Martin Marietta Aggregates Overburden Storage Locations. Mr. Furniss designed and drafted multiple overburden storage locations using AutoCAD.



Samuel P. Wilkes, PWS Project Scientist

EDUCATION: MS, Environmental Science and Policy, Johns Hopkins University, 2003
BS, Earth and Environmental Science, Wilkes University, 1996

**CERTIFICATIONS/
REGISTRATIONS:** Professional Wetland Scientist, 00001395, 2003
Certified Forest Stand Delineator and Conservation Planner, Maryland, 2003

PRIOR PROJECT EXPERIENCE:

Field Coordination Manager; United States Forest Services Abandoned Mine Land Surveys; Gila and Lincoln National Forests in NM. Mr. Wilkes served as the field coordination manager and assisted with the inventory of over 700 abandoned mine sites throughout the Gila and Lincoln National Forests in New Mexico. He was responsible for the preliminary review of the abandoned mine land database, plotting abandoned mine land sites on topographic maps, and assisting in the three months of site field verification. Once site locations were verified, GPS coordinates; photographs, and an abandoned mine land inventory worksheet (which included information about open adits, shafts, tailings piles, overburden piles, acid mine drainage, subsidence, and any other human or environmental hazards) were completed for each site.

The hard copy data was entered into an electronic database and delivered to the U.S. Forest Service for remediation prioritization and management purposes. Problems such as open adits, shafts and pits; exposed tailings and waste rock piles typically result in acidic runoff; and acid mine drainage directly from flooded adits or shafts typically exist at abandoned mine sites. Elevated heavy metals concentrations found in soils, tailings, waste rock and acidic waters draining from these sites can adversely affect human health or the environment.

Project Scientist; United States Forest Service Abandoned Mine and Mill Sites Removal Preliminary Assessments; AZ and NM. Mr. Wilkes conducted several removal preliminary assessments for the USFS at various abandoned mine and mill sites throughout Arizona and New Mexico. Many of the mines used cyanide leaching techniques to recover gold and silver along with other metals, such as copper, lead, and zinc as by products. Other hard rock mines investigated produced uranium and mercury ores for milling.

Project Scientist; United States Forest Service Promontory Butte Mine Site Research and Removal Preliminary Assessment; Payson, AZ. Mr. Wilkes conducted research for a limited potentially responsible party (PRP) search and a removal preliminary assessment for the Promontory Butte Mine Site near Payson Arizona. The goals of the investigation were to:

- Quantify the contamination at the site (in the pit, piles, and other features) resulting from the mining activities
- Evaluate the potential for offsite impacts to human health and the environment; and
- Collect information necessary to make generalized initial conclusions regarding site reclamation options.

Project Scientist; United States Forest Service Old Payson Landfill Removal Preliminary Assessment, AZ. Mr. Wilkes managed the Removal Preliminary Assessment for the Old Payson Landfill. The lateral and depth of landfill materials was determined by using a backhoe to dig trenches and test pits throughout the landfill. Various samples were collected and analyzed for contaminants such as volatile organic compounds, semi-volatile compounds, pesticides, PCBs and metals.



John Ludwig
Project Scientist

EDUCATION: MS, Environmental Pollution Control, The Pennsylvania State University, 1997
BS, Environmental Science, Widener University, 1995

**CERTIFICATIONS/
REGISTRATIONS:** Professional Wetland Scientist, 00001395, 2003
Certified Forest Stand Delineator and Conservation Planner, Maryland, 2003

PRIOR PROJECT EXPERIENCE:

Project Scientist; Mining NPDES Permit Support for WVDEP; WV. Over the past few years, Tetra Tech has supported WVDEP in the development of metals TMDL development for the Coal River watershed. During the course of TMDL development, EPA approved a revision to the West Virginia Water Quality Standards that altered the zone of applicability of the manganese water quality criterion for the public water supply designated use. The criterion is now applicable only in the five-mile zone upstream of known public or private water supply intakes used for human consumption. The revision resulted many request letters from coal companies to "back-slide" their current manganese effluent limits to technology-based limits. At the request of WVDEP, Tetra Tech conducted a comprehensive analysis to determine the cumulative effect of this backsliding at various downstream locations in the Coal River watershed where the revised manganese criterion is applicable. Mr. Ludwig served as the project manager and technical lead for this project that utilized the calibrated watershed model that was constructed for TMDL development (MDAS) to provide solutions and guidance as to which areas of the Coal River watershed could sustain manganese technology-based effluent limits while maintaining compliance with water quality criteria in the effective zones. Results were summarized into graphical displays in an easy to use format so that WVDEP DMR permit writers can address the above mentioned request letters and issue/re-issue permits quickly and efficiently.

Project Manager; West Virginia TMDL Development for Hydrologic Groups A, B, C, and D; WV. Under contract with WV DWWM, currently serving as project manager for more than 950 metals (iron, dissolved aluminum, manganese, and selenium), pH, fecal coliform bacteria, and biological TMDL in the Upper Kanawha River, Upper Ohio North, Lower Kanawha River, North Branch/Potomac River, Coal River, Gauley River, Potomac River Direct Drains, Greenbrier River, New River, Little Kanawha River, and James River watersheds. These impairments were modeled using various EPA approved models and methodologies such as, MDAS and DESC-R for metals and fecal coliform bacteria. A strength-of-evidence stressor identification methodology was used to identify the likely stressors to the biological community and TMDLs were developed for these stressors. To further define biological impairments, macroinvertebrate tolerance values and a new modeling approach ("dirty reference modeling") were developed using observed data collected throughout the state. The "dirty reference modeling" is a new approach that uses a known impaired site as a "reference" for each type of impairment to which all other sites are compared. A similarity matrix is calculated for each impairment and sites that group together may be impaired for that particular parameter.

Project Manager; WV TMDL Development Support for EPA Region 3; WV. For EPA Region 3, served as project manager for the development of over 1,000 pH and metals TMDLs in West Virginia including the Monongahela River, West Fork River, Tug Fork River, and Guyandotte watersheds. Provided lead role both technically and administratively in the evaluation of data and pollutant sources to assess and determine relationships between acid mine drainage and in-stream metals concentrations. Developed various technical approaches related to mining impacts (nonpoint and point sources) on metals loading and applied the Mining Data Analysis System (MDAS), a dynamic watershed modeling tool, to develop TMDLs throughout West Virginia. TMDL development addressed a variety of case-specific requirements related to water quality criteria, water use designations, source pollution conveyance methods, and permitting in large-scale watersheds. Applied the Environmental Fluid Dynamics Code (EFDC), a 3 dimensional hydrodynamic model, to develop TMDLs for the Monongahela River mainstream. Applied DESC-R to dynamically simulate the fate and transport of dissolved aluminum in the Guyandotte watershed. Documented the technical approaches and compiled TMDL results in a final report.



Lawrence A. Drane, III, PG Project Geologist

EDUCATION: MS, Hydrogeology and Geophysics, University of Toledo, 1993
BS, Geology (Minor in Civil Engineering), Youngstown State University, 1989

**CERTIFICATIONS/
REGISTRATIONS:** Professional Geologist, Pennsylvania, PG002762G, 1995

TRAINING: OSHA 1910.120 40-Hour HAZWOPER Training
OSHA 1910.120 8-Hour Annual Refresher Training

PRIOR PROJECT EXPERIENCE:

Project Manager; Ohio River Clean Fuels Services; Wellsville, OH. Managed portion of proposed \$5.5 Billion Coal-to-Liquid Fuel facility. Overall Management of Deep Mine Exploration and Analysis, Environmental, Air Permitting, Water Permitting, Ohio Power Siting Board Application, Geological Exploration, Archeological Studies, Noise Analysis, Geotechnical Studies, Preliminary Site Civil, Wetland and Stream Assessments, Indiana Bat Survey, 401/404 Permitting and Mitigation, Alternative Site Analysis, and several other smaller subtasks.

Assistant Project Manager; Due Diligent Services and Mining Operations Review for a Confidential Client; WV, OH, and PA. Managed the Due Diligent services for a company acquisition of several sand and gravel operations in West Virginia, Ohio, and Pennsylvania. Conducted Phase I Environmental Assessments, Wetland Determinations, and review of mining operations.

Technical Manager; Ohio Sand and Gravel Operations Surface Mining Permitting; OH. Coordinated and conducted field activities for surface mining permits at several sand and gravel operations throughout the state of Ohio. Field activities included mapping and surveying, surface and groundwater sampling, and evaluation of existing conditions. Prepared the mining applications, prepared annual reports, surface water engineering and permits, reclamation plans, and bonding evaluations.

Technical Manager; Zimnox Coal Company Surface Mining Activities; Brilliant, OH. Coordinated and conducted the field activities for a surface mining area in Brilliant, Ohio. Activities included mapping and surveying, surface and groundwater sampling, and evaluation of existing conditions. Prepared the mining application, surface water engineering and permits, and the reclamation plan. The reclamation plan included reclamation of contour mining that was previously conducted in the area.

Project Manager; Buckeye Industrial Mining Permitting; Wellsville, OH. Prepared air and water permits for a coal unloading facility. Also conducted wetland and ecological studies of the property.

Technical Manager; Blume Coal Company Surface Mining Activities; Malvern, OH. Coordinated and conducted the field activities for a surface mining area in Malvern, Ohio. Activities included mapping and surveying, surface and groundwater sampling, and evaluation of existing conditions. Prepared the mining application including the reclamation plan. Worked closely with local residents in application preparation.

Technical Manager; Southwest Portland Cement Company Mining Services; Fairborn, OH. Conducted field mapping and surveying for Annual Reports. Calculated affected area for bonding and prepared addendums and permit applications for mining expansion areas.

Assistant Project Manager; CONSOL Energy Acid Mining Drainage Assessments; Pittsburgh, PA. Conducted acid mining drainage assessments and remedial option analysis for two areas in Pennsylvania.

Project Geologist; Weirton Construction Surface Mining Activities; OH. Conducted field activities for a surface mining area at mining facilities in eastern Ohio. Activities included mapping and surveying, surface and groundwater sampling, and evaluation of existing conditions. Prepared the mining application including the reclamation plan. Worked closely with the local residents in application preparation.



Mark S. Abshire, PE
Project Engineer

EDUCATION: MS, Civil Engineering (Geotechnical), Colorado State University, 2002
BS, Environmental Science (Aerospace), Colorado State University, 1992

**CERTIFICATIONS/
REGISTRATIONS:** Professional Engineer, Colorado, 33319, 1999
Professional Engineer, Arizona, 42023, 2004
Professional Engineer, New Mexico, 16950, 2005

PRIOR PROJECT EXPERIENCE:

Project Engineer; Dunes Pit Temporary Highwalls and Slope Stability Analyses; Denver, CO. As Project Engineer, performed slope stability analyses for aggregate mining operations, including temporary highwalls and long-term reclaimed slopes.

Project Engineer; Mine Closure Compliance Monitoring; Minahasa, Indonesia. Project Engineer responsible for compliance monitoring at a gold mining facility that closed after eight years of mining. Processing included both milling and heap leach extraction. Tailings from the mill process were managed using submarine disposal techniques. Administered environmental library and managed transfer of environmental monitoring data to headquarters in Jakarta for preparation of closure submittals. Consulted with the mine closure superintendent to ensure compliance with the closure plan. Closure activities included regrading and covering of heap leach pad, construction of passive treatment system for heap leach drainage, and management of surplus ore.

Resident Engineer; Uranium Mill Demolition and Closure Compliance; Ford, WA. Resident Engineer for demolition of a 13,000 square-foot, three-story mill building and appurtenant structures. Managed full-time engineering observation of demolition, transport, and disposal activities to ensure permit compliance.

Project Engineer; Heap Leach Pad Reclamation; Elko, NV. Project Engineer responsible for field engineering supervision for reclamation of a gold heap leach pad and construction of the water collection system, including preparation of an as-built construction report.

Project Engineer; Detention Pond Liner Geotechnical Investigation; Denver, CO. Performed geotechnical investigation at a beverage bottling facility constructed adjacent to a river on the former site of a metal processing plant. The facility was constructed on thick deposits of blast furnace ash and slag. Performed a field investigation and design of a synthetic liner for a surface water detention facility. The liner was to prevent percolating surface water from leaching heavy metal contamination into the groundwater. Liner materials evaluated included compacted clay, high density polyethylene, and PVC.

Project Engineer; Settling Pond Geotechnical Investigation at Mining Facility; Meeker, CO. Project Engineer responsible for a geotechnical investigation for a settling pond dam at a coal mining facility.

Project Engineer; Tailings Pond Engineering Services; Raton, NM. Designed a downstream lift for a large coal mining facility.

Project Engineer; Howe Pit Slope Stability; Denver, CO. As a Project Engineer, performed slope stability analyses for aggregate mining operations, including temporary highwalls and long-term reclaimed slopes. Challenges included boundary disputes and negotiations with adjacent landowners.

Project Engineer; Hazeltine Pit/Cooley Reservoir Geotechnical Investigation; Adams County, CO. Responsible for a geotechnical investigation prior to final reclamation of an aggregate mining pit. Reclamation plans included lining of the pit for water storage. Analyses included stability analyses for reclaimed slopes and for numerous existing high-voltage power transmission towers, and foundation investigation for conveyor bridges and processing equipment.



Dave Hallman, PE, PG
Project Engineer and Geologist

EDUCATION: BS, Geological Engineering, Colorado School of Mines, 1983

**CERTIFICATIONS/
REGISTRATIONS:**

Professional Engineer, Missouri, E-26685, 1994
Professional Engineer, Texas, 90421, 2002
Professional Engineer, Colorado, 26076, 1989
Professional Engineer, Wyoming, PE-9495, 2002
Professional Engineer, Idaho, 8350, 1996
Professional Engineer, Alaska, CE-8086, 1990
Professional Geologist, Wyoming, PG-3536, 2004

TRAINING: OSHA 1910.120 40-Hour HAZWOPER Training
OSHA Confined Space Entry

PRIOR PROJECT EXPERIENCE:

Principal Engineer; Coal Mine Subsidence Evaluation and Mitigation; Rock Springs, WY. Evaluating and mitigating subsidence risk over extensive historic underground room and pillar coal mines in developed and undeveloped areas within the City of Rock Springs. Project required extensive use of GIS systems to process and assimilate large volumes of existing data, monitoring of active ground movements and participation in public information meetings.

Project Manager; Brisas Del Cuyuni Proposed Mine Pit Slope Design Review; Las Brisas, Venezuela. Pit slope design at this proposed gold mine in Venezuela. The proposed mine pit is roughly 2.4 kilometers long, 1.4 kilometers wide and 570 meters deep, extending nearly 400 meters below sea level, with more than 100 meters of saprolite in the upper portions of the pit wall.

Technical Specialist; Sunrise Mine Subsidence Potential/Reclamation Measure; Guernsey, WY. Evaluation of subsidence potential and reclamation measures of large subsidence features associated with block caving practices at historic iron mine. Assessed landslide-induced wave action associated with potential failure of a large open pit filled with water. Developed automated slope monitoring system to provide warning of impending failure(s) to protect potential downstream inundation zones.

Project Manager; Gravel Quarry Silt Pond Embankment Failure; Henderson, CO. Evaluation of cause and design of remedial measures for failure of the embankment for a wash fines containment pond at a gravel quarry operation. Temporary remedial measures included design and installation of dewatering wells and horizontal drains to alleviate groundwater pressures acting on the slope. Long-term remedial design included cost-benefit analyses for comparison of various alternatives. Final design provides for partial relief of excess pore water pressures under rapid drawdown conditions to ensure adequate stability.

Project Engineer; Ten-Mile Pass Limestone Quarry Rock Slope Stability Assessment for Mine Plan Evaluation, Soda Springs, ID. As the Project Geotechnical Engineer, performed a preliminary assessment of rock slope stability for this proposed limestone quarry as part of an overall mine plan evaluation. Subsequent access road development included rock slope excavations, which exceeded recommended slope angles and triggered slope failures necessitating remedial design.

Project Manager; Trans Alaska Gas System Foundation/Rock Slope Stability Evaluation, Valdez, AK. Field Manager for geotechnical evaluation of the foundation and rock slope stability for the marine terminal and natural gas liquefaction facilities at Port Valdez and rock slope evaluation for the Keystone Canyon segment of the pipeline route. Involved helicopter-supported, oriented core drilling, instrumentation, and detailed outcrop mapping. Duties included landslide hazard mapping and preparation of site conditions and engineering recommendations reports.



Dave Hallman, PE, PG
Project Engineer and Geologist

Project Engineer; Florida Canyon Mine Rock Slope Stability Evaluation, Winnemucca, NV. Responsible for evaluating rock slope stability at this large operating open pit gold mine to determine safe slope angles for continued pit expansion. Analyses included assessment of weak, shattered rock masses.

Project Engineer; Dresden Cooling Tower Project Rock Wall Stability Evaluation, Dresden, IL. Senior Geotechnical Engineer responsible for evaluation of rock wall stability during excavation for twin 25-foot deep vertical cooling tower intake sumps in layered sandstone, shale, and limestone strata.

Project Manager; Engineering Design, Lucky Friday Pond 4; Northern ID. Responsible for engineering design for a proposed 16M ton tailings disposal facility for this lead-silver mine in the historic Wallace Mining District of Idaho. Facility designs include staged construction maximizing use of available on-site materials and the mine waste rock production schedule, an innovative low permeability core comprised of a geosynthetic clay liner and emergency spillway incorporating geotextile fabric formed revetments to control erosion on spillway slopes of 35 percent.

Engineer of Record; St. Joe State Park Seismic Stability Remediation; Park Hills, MO. Engineer of Record for a \$5M construction project for seismic stability remediation measures for two large historic tailings dams currently utilized as part of a state park. Coordinated engineering design and permitting services and report preparation, and provided liaison between the owner and numerous regulatory agencies. Prepared technical specifications and bid documents for seismic stability and spillway retrofitting. Responsible for supervision of construction management and quality control activities, and construction certification with regulatory agency. Project was awarded the 1997 Association of State Dam Safety Officials National Rehabilitation Project of the Year Award for innovative use of onsite materials.

Principal Engineer; Design and Evaluation for New Viburnum, Old Viburnum, Fletcher, Buick and Brushy Creek Tailings Disposal Facilities; New Lead Belt, MO. Principal Engineer responsible for evaluation of liquefaction potential, seismically induced settlement and associated dynamic stability for upstream raises of the tailings dams to increase tailings storage at these lead mines. Conducted dam safety inspections, audits, ongoing performance monitoring, and stability evaluations. Performed assessments of means to increase disposal capacity and coordinated engineering designs and permit submittals for expansion of the tailings dams and updated closure plans.

Design Engineer; Ridgeway Mine Tailings Dam Evaluation; Ridgeway, SC. As Design Engineer, performed detailed evaluation for a proposed upstream tailings dam raise construction. Included assessments of tailings liquefaction potential and consolidation of the tailings beneath the proposed dam raise. Cone penetration testing (CPT) of the tailings indicated relatively loose, under-consolidated tailings conditions, which required extensive analysis. Assessed geotechnical issues associated with final closure cap for the facility. Included detailed CPT/standard penetration testing of the tailings and finite difference modeling of post-closure tailings consolidation.

Project Manager; San Luis Project Upstream Tailings Dam Design; San Luis, CO. Responsible for design of upstream tailings dam raises founded on tailings, which included assessment of tailings liquefaction and dynamic stability evaluations under high levels of seismic loading. Prepared engineering design and construction documentation, performed professional engineer duties during tailings disposal facility expansion and provided liaison between client and regulatory agencies, which became substantial over the course of the construction. Installed monitor wells and conducted in-situ permeability testing, evaluated embankment stability and estimated seepage quantities and fate for the fully lined and drained tailings impoundment for this 12M ton gold mine. Designed the tailings slurry pipeline. Finalized closure design components as part of reclamation activities. Prepared construction drawings and specifications.

Technical Specialist; Greens Creek Project Tailings Disposal Facilities Evaluations and Design, AK. Technical Specialist responsible for review of seismic hazard evaluations, liquefaction and dynamic stability analyses, and design for expansion of a dewatered tailings disposal facility and waste rock disposal facilities.



Michael Henderson, PE
Project Engineer

EDUCATION: MS, Civil Engineering/Water Resources, University of Pittsburgh, 1984
BS, Civil Engineering, Colorado State University, 1979

CERTIFICATIONS/

REGISTRATIONS: Professional Engineer, Pennsylvania, 035232-E, 1986
Professional Engineer, Tennessee, 105992, 2000
Professional Engineer, South Carolina, 13652, 1990
Professional Engineer in 15 additional states

PRIOR PROJECT EXPERIENCE:

Project Manager; Office of Surface Mining Dam Safety Project; Pittsburgh, PA. As Project Manager, supervised the design, testing, and analysis required to assess the stability and Office of Surface Mining regulations of large waste disposal embankments. This project included full-scale simulation of 500-foot embankments consisting of minus-24-inch material.

Project Manager; Bureau of Mines Analytical Laboratory Supervision; Pittsburgh, PA. Project Manager responsible for supervising the US Bureau of Mines Analytical Laboratory, specifically including chemical analyses of acid rock drainage (ARD) treatment options and biologic treatment columns.

Senior Reviewer; San Manuel Mine Closure; AZ. Senior Reviewer on closure planning for this large underground and open pit copper mining facility.

Project Manager; Climax Molybdenum Mine Tailings Management Plan; Climax, CO. Project Manager on an overall plan to provide interim closure and reclamation of portions of the overall tailings disposal facilities, to redesign the tailings management practices to optimize beach construction and minimize mill water return pumping costs, and to evaluate the effects of reclamation plans on the stability of the embankments. The project also included design of a haul road constructed on submerged tailings, redesign of a large mill water pumping station, and design of long-term diversion canals and spillways from the tailings impoundment surfaces.

Project Engineer; Climax Molybdenum Company Mine Reclamation Plan; Climax, CO. Professional Engineer responsible for updating the site reclamation plan, as administered by Colorado Mine Land Reclamation Board. Prepared and submitted notifications of disturbance for mining and construction activities to the US Army Corps of Engineers, under Section 404 of the Clean Water Act.

Technical Reviewer; Mine Facility Closure, Darwin Project; Darwin, CA. Technical Reviewer on closure of a large mining facility in southern California. Issues included geochemical stability and stabilization, surface and underground environmental audits, and regulatory requirements.

Project Manager; Walker Mine Closure; Portola, CA. Project Manager on an abandoned copper mine closure and remediation project, under contract to the State of California. Project included three major aspects: (1) rehabilitation of an existing mine tunnel, (2) assessment/treatment of acid mine drainage, and (3) surface and groundwater assessment and control. The major portion of the project was the acid mine drainage issue, wherein the underground and surface mine zones were assessed for contributions to the overall problem, and remediation measures proposed. Specific remediation measures included chemical and biologic treatment of the mine discharge, waste disposal alternatives, and groundwater flow controls.

Project Manager; Nickel Laterite Mine Development; New Caledonia. Principal Engineer/Project Manager on overall development of a large nickel laterite mine in the South Pacific. Areas of responsibility include resource evaluation; mine planning; equipment selection; materials handling; and design of tailings disposal facilities, water storage reservoirs, and waste disposal facilities.

Project Manager; Atlas Moab Uranium Closure Project; Moab, UT. Project Manager on geotechnical, geochemical and hydrologic issues supporting closure and reclamation of a 10-million ton uranium mill tailings impoundment located adjacent to the Colorado River.



Michael Henderson, PE Project Engineer

Principal Engineer; BHP Navaho Mine Seepage Interception Design, NM. Principal Engineer for design of a seepage interception system for the Doby Pit project.

Project Manager; Walker Mine Tunnel Safety Inspections; Portola, CA. Project Manager, providing annual safety inspections of an abandoned, underground mine tunnel. Design work included mapping and designing a passive underground roof control system, which can provide for long life, high reliability, and low maintenance. Although pressure-treated timber was ultimately selected, steel sets, steel arches, rock bolts, and slip lining were fully evaluated.

Project Engineer; Printer Boy Mine Development Services; Leadville, CO. Developed plan of operations and state permit applications necessary for a gold mine development project.

Senior Geotechnical Engineer; Independence Mine Environmental Impact Statement (EIS); Elko, NV. Senior Geotechnical Engineer for preparation of the groundwater hydrology, waste dump stability, and closure and reclamation portions of the EIS.

Project Manager; Lone Tree Mine Sampling Program; Winnemucca, NV. Assisted with scoping a sampling program to adequately characterize various geologic units in a large open pit mine. Representative samples were identified via comparison with the Kriged mine model and were evaluated with static and kinetic geochemical tests to provide data for a geochemical model of the open pit.

Project Manager; Goldstrike Mine Tailings Management Plan for Barrick Goldstrike Mines Inc.; Elko, NV. Project Manager responsible for performing tailings management studies aimed at improving the efficiency of the tailings facility, with an emphasis on sub-aerial deposition. The study included a probabilistic assessment of the long-term precipitation events in addition to normal and upset operating conditions and influences from the design storm.

Project Manager; Hayden Hill Tailings Dam Design; Susanville, CA. Project Manager on the siting and design on a large tailings dam and heap leach facilities at this gold mine in northern California.

Senior Reviewer; Centralia Mine Tailings Impoundment Design; WA. This unique project involved inducing liquefaction in a coal tailings impoundment followed by physical displacement to a final waste filtering/storage area. The project involved rheological testing of the tailings material, cone penetrometer testing of the relatively weak foundation material, and design of a passive filtering system.

Senior Reviewer; Cyprus Tonopah Mine Tailings Impoundment Design; Tonopah, NV. Reviewer on a significant upstream raise to this cyclone tailings impoundment. Addressed stability of the embankment under earthquake loading conditions and operational considerations associated with cyclone operations.

Senior Reviewer; Tintaya Tailings Impoundment Design; Peru. Senior Reviewer on the expansion of an existing facility and design of a new tailings impoundment at the Tintaya Copper Mine.

Project Manager; Erdenet Mine Tailings Facility Stability Assessment; Mongolia. Project Manager and Principal on stability assessment of the existing tailings facility at the Erdenet Mine. Included assessment of static and dynamic stability, and installation of inclinometers and additional piezometers.

Project Manager; Coeur Rochester Mine Stability Assessment; Lovelock, NV. Project Manager on stability issues for the mine waste dumps at the Rochester Mine. Stability assessment included static, pseudo-static, and dynamic assessment, along with a drilling program to assess the actual rock strength.

Technical Expert; Mining Application Technical Reviews; NV, CA, MT, and ID. As Technical Expert, performed technical review as to the suitability of various mining applications as related to environmental impacts. The technical reviews have primarily involved the adequacy of the proposed containment of mining wastes, acid mine drainage issues, and geotechnical considerations. Involved in Nevada and California in the development on State regulations dealing with the control of mining wastes.

Senior Technical Reviewer; Thompson Creek Molybdenum Mine Plan of Operations Review; Challis, ID. Reviewer under contract to the USDA Forest Service, evaluating the applicant's submitted plan of operations. Areas of concern evaluated included ARD potential from the tailings impoundment, waste rock dumps, and the open pit, and geotechnical stability of the tailings impoundment.



Richard E. Gray, PG
Project Advisor

EDUCATION: MS, Environmental Pollution Control, The Pennsylvania State University, 1997
BS, Environmental Science, Widener University, 1995

**CERTIFICATIONS/
REGISTRATIONS:** Professional Wetland Scientist, 00001395, 2003
Certified Forest Stand Delineator and Conservation Planner, Maryland, 2003

PRIOR PROJECT EXPERIENCE:

Geologist; WVDEP Omega Mine Injection Program; WV. Twenty-six acres of the mine were filled with coal combustion products to control the formation of acid mine drainage and prevent subsidence – West Virginia Division of Environmental Protection.

Geologist; WVDEP Reclamation Projects; WV. Mr. Gray participated in four reclamation projects involving large, unstable coal refuse piles for the WVDEP in Omar, Kimball, Vivian, and Summerlee, West Virginia.

Director; Bureau of Mines and Appalachian Regional Commission Subsidence Engineering Investigations; PA, Washington D.C., and MN. Mr. Gray has conducted many investigations into the causes and methods of mitigating subsidence-related problems. Three significant studies directed by Mr. Gray include State of the Art Study on Subsidence Control, the Study of Surface Subsidence over the Mined Pittsburgh Coalbed, and the Survey of Ground Surface Conditions Affecting Structural Response to Subsidence.

Investigator; Hatfield's Perry Power Station Mine Stabilization; Greene County, PA. Investigation of abandoned mine in Pittsburgh Coal, design and construction monitoring of mine stabilization program for three 540,000 kw electric generating units – Allegheny Power System, New York, New York.

Manager; Indianapolis Power & Light Company and electric Power Research Institute Abandoned Deep Mine Demonstration Project. Manager of demonstration project on the injection of fixated scrubber sludge into abandoned deep mine to abate surface subsidence – Indianapolis Power & Light Co. and Electric Power Research Institute.

Geologist; Mine and Refuse Fires; Various Locations. Mr. Gray has worked on 13 mine and refuse fires including: the Centralia Fire, which forced Congress to appropriate \$42M to relocate residents; the Glen Burn Fire, the largest fire in Pennsylvania, where controls were designed to prevent the fire from moving under a city, and; the Jharia Coal Field Project, where the only source of coking coal in India was seriously impacted by 65 fires.

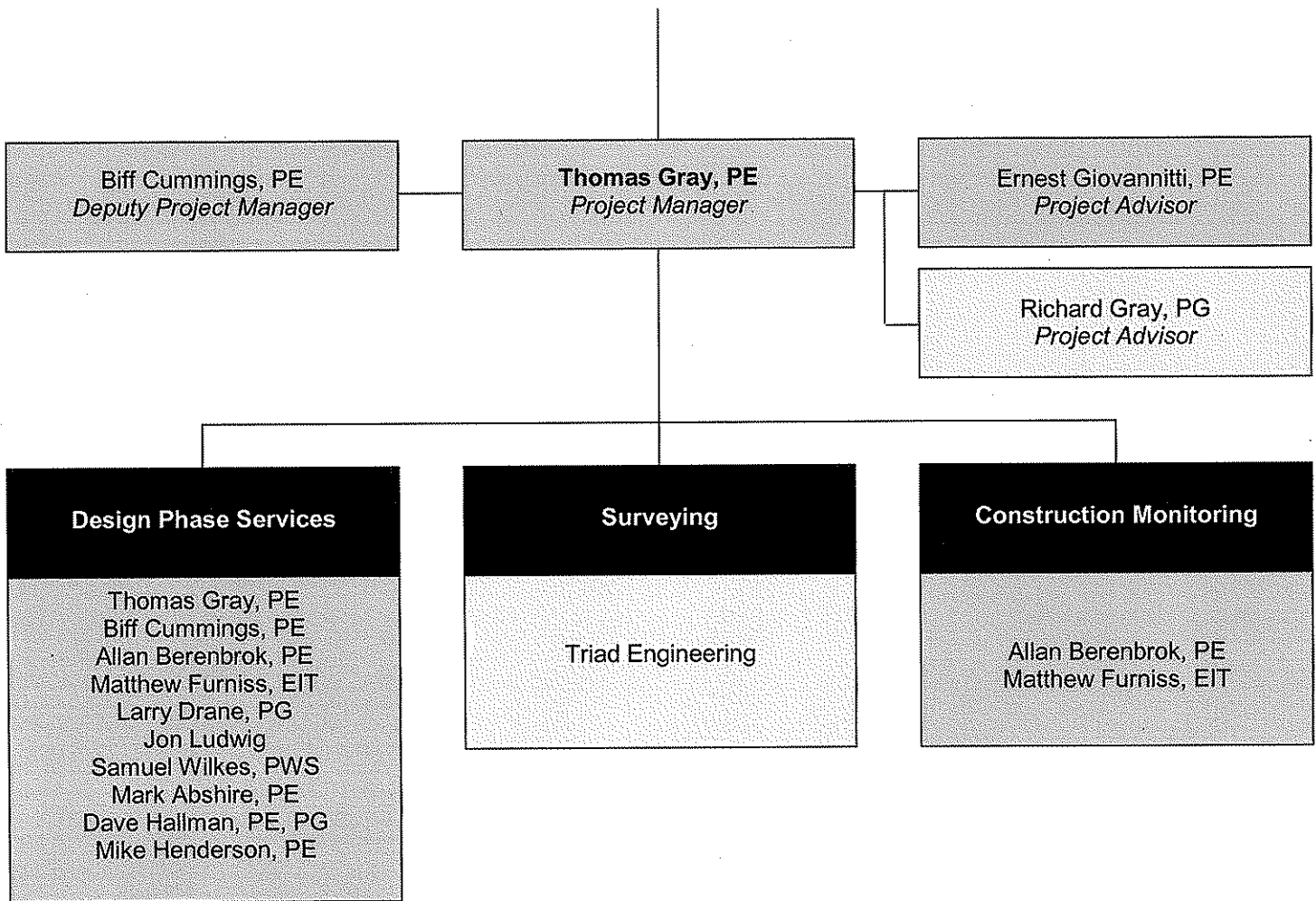
Author; Papers, Presentations and Reports. Mr. Gray has served as an author or co-author for a variety of mining-related publications and presentations including: "Highwall Elimination and Return to Approximate Original Contour as Required in the Surface Mining Control and Reclamation Act of 1977," "Subsidence Failure Modes Presentation for the NRC," "Mitigating Losses from Land Subsidence in the U.S.," "Fires in Abandoned Coal Mines," "Mine Closure, Sealing and Abandonment," "Slope Stability in the Appalachian Plateau of Pennsylvania and West Virginia," "Making the Grade in Coal Refuse Disposal," "Processes of Colluvial Slope Development," and "Indicators of Coal Refuse Embankment Stability."


Guest Lecturer; University of Missouri, Rolla Subsidence Engineering Courses. Mr. Gray has been a key guest lecturer in several short courses on subsidence engineering conducted by the University of Missouri, Rolla.

Geologist; Coal Mine Subsidence Projects; Canada and New Zealand. Mr. Gray has worked on coal mine subsidence at several locations in Canada and in New Zealand. The project in New Zealand and one on Vancouver Island involved subsidence studies with recommendations on land use zoning.



ORGANIZATION CHART



 = Tetra Tech

 = Subconsultant



Project Descriptions



Client Name

West Virginia DEP Office of Abandoned Mine Lands and Reclamation

Project Highlights

- *Design of six wet mine seals and one bat gate*

- *Hydrologic and hydraulic analysis*

- *Coordination with property owners*

Project Cost

\$292,000

Completion Date

Design completed in 2009, Construction not yet complete

The West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands & Reclamation (AMLR) contracted with Tetra Tech for the investigation and design for the closure of seven mine portals on private property. The portals currently allow acid mine drainage to exit and flow into a small stream.

The design included evaluating multiple closure alternatives and developing regrading plans that balance cut and fill. The project included the use of a drilling subcontractor to perform soil borings at the portals to determine the nature and properties of the overburden material and the elevation of the mine pool. Tetra Tech also used a local land surveyor to survey the portal and gather topographic information of the adjacent land area to support site grading and portal closure design.

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





TETRA TECH

Tunnelton Mine Portal Closure Design

Tunnelton, West Virginia

Client Name
West Virginia DEP Office of
Abandoned Mine Lands and
Reclamation

Project Highlights

- Design of one abandoned mine portal wet seal and one dry seal
- Hydrologic and hydraulic analysis
- Coordination with property owners

Project Cost
\$62,000

Completion Date
Ongoing

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

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





Client Name
West Virginia Department of
Environmental Protection – Office
of Abandoned Mine Lands

Project Highlights

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

Project Cost
\$74,000 (est.)

Completion Date
On-going

The WVDEP Office of Abandoned Mine Lands retained Tetra Tech to develop a reclamation design of an abandoned underground mining site in Paint Branch, WV. 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 was retained to provide on-going construction support to the project.

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 design has already been adopted by the WVDEP at other mine portal closure sites.





TETRA TECH

**West Virginia Department of Environmental Protection
Support**

West Virginia

Client Name
WVDEP

Project Highlights

- Hydrologic Modeling
- AML Source Tracking & Assessment
- AMD Water Quality Modeling

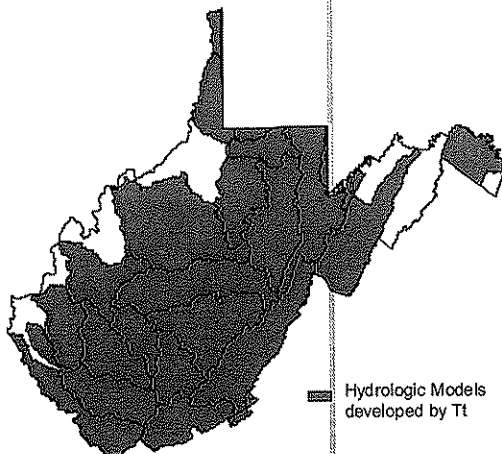
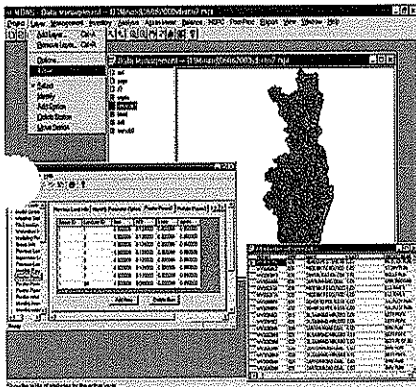
Project Cost
\$4,100,000

Completion Date
Ongoing

Tetra Tech is a nationwide leader in hydraulic and hydrological analyses for hydraulic features and other infrastructure planning, design, and construction. Tetra Tech offers specialized experience and technical competence in hydraulic, hydrodynamic, watershed, storm water, groundwater, and water quality modeling; data collection and analysis; environmental analysis and compliance; and stream and lake restoration. This expertise coupled with extensive experience gained through conducting the many TMDL studies provides Tetra Tech with a thorough understanding of the dynamic hydrologic, hydraulic, and water quality processes associated with AMD throughout West Virginia.

Over the past 8 years, Tetra Tech has supported the WVDEP and EPA Region 3 to develop and fine-tune a Total Maximum Daily Load (TMDL) methodology to address various water quality impairments due to acid mine drainage in West Virginia. Tetra Tech developed this innovative modeling approach, the Mining Data Analysis System (MDAS), to simulate hydrologic and water quality conditions 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. The watershed modeling process 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, portals, and disturbed land from abandoned mines).

Since 2003, Tetra Tech has been the exclusive TMDL contractor for WVDEP and Tetra Tech staff routinely work with WVDEP staff to identify hydrologic and water quality characteristics of abandoned mines throughout West Virginia. Furthermore, Tetra Tech has a great deal of experience querying WVDEP's AML databases, which we have access to through a virtual private network connection from our Charleston, WV, office. To date, Tetra Tech has constructed and calibrated hydrologic models that cover more than 82% of West Virginia. WVDEP and Tetra Tech have worked together to characterize the hydrologic and water quality impacts from mining sources. Sources such as acid mine drainage not only pose human health risks but environmental risk and violations to the water quality standards.



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Client Name
West Virginia Department of
Environmental Protection
(WVDEP)

Project Highlights

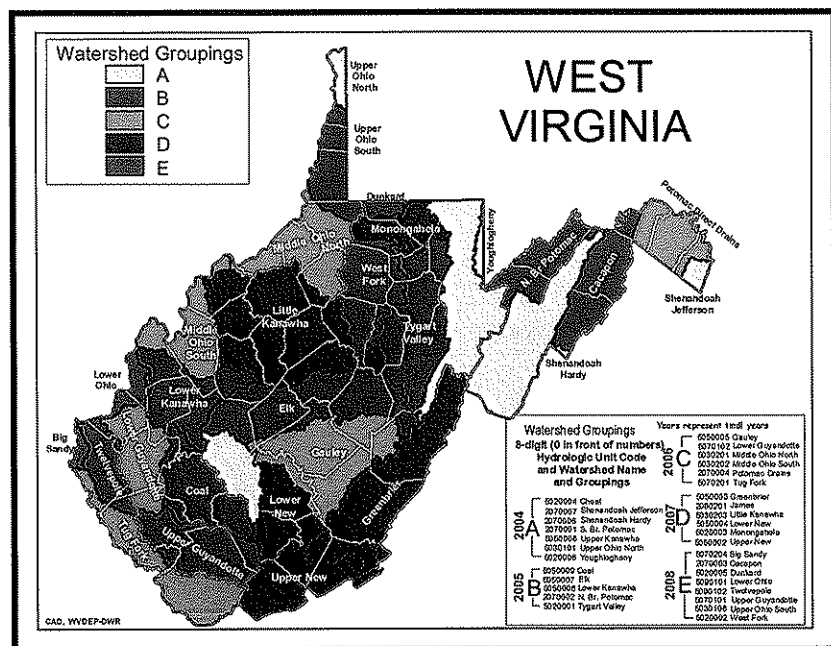
- Met EPA's rigorous schedule as defined in a consent decree
- 22 Member Stakeholder Committee
- WVDEP has created unique ways to integrate large-scale, watershed based TMDLs

Project Cost
\$500,000

Completion Date
On-going

From 1997 through September 2003, EPA Region 3 developed West Virginia TMDLs. A rigorous schedule was established for TMDL development and required TMDLs for the impaired waters on West Virginia's 1996 Section 303(d) list. While EPA was working on developing TMDLs, WVDEP concentrated on building its own TMDL program. With the help of a TMDL stakeholder committee, the agency secured funding from the state legislature and created the TMDL stakeholder committee consisted of 22 members with balanced interests among extractive and manufacturing industries, environmental advocates, agriculture, forestry, state and federal government, sportsmen associations, and municipalities. The committee made recommendations for WVDEP TMDL development and supported general revenue funding.

Since October 2003, West Virginia's TMDLs were and continue to be developed by Tetra Tech under contract to WVDEP. While accommodating the remaining TMDLs required by the consent decree, Tetra Tech generates numerous other TMDLs under a comprehensive watershed based approach. TMDLs are developed according to the Watershed Management Framework cycle. The framework divides the state into 32 major watersheds and operates on a five year rotation process. The watersheds are divided into five hydrologic groups. Prior to the existence of the TMDL Program, WVDEP stream monitoring and NPDES permit reissuance activities were organized in accordance with the Framework. The TMDL program was then designed to be synchronized with the monitoring and implementation schedule of the Framework creating a fully integrated watershed based program.





Client Name
South Fayette Conservation
Group

Project Highlights

- Restore 5+ miles of stream
- Passive treatment of AMD
- Hydrologic investigation of flood plain
- Prepared plans and specifications

Project Cost
\$3,600,000

Completion Date
Ongoing

The South Fayette Conservation Group, in conjunction with the Pennsylvania Department of Environmental Protection (DEP) Bureau of Abandoned Mine Reclamation, retained Tetra Tech for the design of a passive acid mine drainage treatment system. Millers Run, a warm water fishery, flows into Chartiers Creek, also a warm water fishery. The abandoned mine portal discharges approximately 1,000 gallons per minute of acid mine drainage into Millers Run. With the aeration and mixing of the flow the pH rises and the iron oxide is precipitated out of the flow, resulting in several miles of iron oxide precipitation and low oxygenated water.

In support of the design, Tetra Tech surveyed the site and prepared a topographic map, installed monitoring wells to monitor the mine pool elevation, delineated wetlands, evaluated several alternative site configurations. One of the sites evaluated had an unstable highwall. Tetra Tech is currently conducting a geotechnical evaluation of the site, performing a hydrologic evaluation of the floodplain, and preparing the site layout and grading plan design. Tetra Tech is also preparing construction drawings, specifications, construction cost estimates and applicable Pennsylvania DEP permits.

The design consists of the excavation of a 3-acre basin on private property adjacent to a four-lane highway, railroad right-of-way, and an adjacent property owner. The treatment will consist of a directional bore into the mine to allow gravity flow of the mine drainage into a limestone bed and into the 3-acre holding basin. The basin area will be over-excavated to remove the underlying coal bed. The basin will be constructed at a horizontal distance far enough away from the existing mine to prevent a blowout. The existing discharge will remain behind a small check dam to eliminate the discharge but will be used as an outlet control if the mine pool would rise. The basin will consist of three cells with enhanced aeration to increase holding time and maximize iron precipitation. The layout allows for each cell to be isolated for the removal of iron oxide from the cell for commercial use.





Bear Run Phase II Mine Drainage Passive Treatment Systems Design

Indiana, Pennsylvania

Client Name
Indiana County
Conservation District

Project Highlights

- Will reclaim 20 acres of abandoned mining
- Will passively treat AMD
- Will restore 1,000 feet of stream

Project Cost
\$250,000 (est.)

Completion Date
Ongoing

Tetra Tech was retained for the preparation of a site grading plan to install a passive treatment system for mine drainage that is discharging onto private land and into Bear Run. The mine drainage is alkaline, therefore the passive treatment system is designed to aerate and hold the flow in two surface water ponds totaling three acres.

The flow discharges into an existing wetland for polishing and ultimately into Bear Run. The design was incorporated into a Government Financed Construction Contract through the Pennsylvania Department of Environmental Protection for the removal of coal refuse from the site. Stream hydraulics were computed to reshape an unnamed tributary to Bear Run and to reconstruct a private stream crossing.

Completion of construction is estimated for Spring 2010.





Powderly Creek Abandoned Mine Land Feasibility Study

Lackawanna County, Pennsylvania

Client Name
Baltimore District U.S. Army Corps
of Engineers

Project Highlights

- *Geomorphic modeling and sediment load analysis*
- *HEC-RAS hydraulic modeling*
 - *Passive AMD treatment alternatives evaluated*
- *MCACES cost estimate and preparation of construction documents*

Project Cost
\$335,000

Completion Date
2005

Tetra Tech conducted an engineering evaluation of alternatives to restore reaches of Powderly Creek impacted by acid mine drainage (AMD). The creek had been impounded, choked with fine sediments, and buried by mine tailings. Tetra Tech collected soil, water, and aquatic biology samples to assess the aquatic and riparian habitat, and prepared a detailed HEC-RAS hydraulic model to help evaluate stream restoration alternatives. Because impacts to stream flows, floodplains, bank and bed materials, and stream location had been severely impacted by coal mining activities, geomorphologic modeling was essential for the successful development of stable stream restoration designs. Overland and in-stream sediment loads, hydraulics, bed forms, stream profile, impoundment and wetland impacts, and potential management practices were evaluated to fully describe site geomorphology with and without the restoration projects. Geomorphic resources included USACE documents such as EM 1110-2-4000, EM 1110-2-1418, ERDC-CHL TR-01-28, and the "WES Stream Investigation and "Streambank Stabilization Handbook."

Tetra Tech prepared restoration options including wetland improvements, wetland creation, stream restoration, stream channel relocation, development of floodplains that appropriately link to the restored stream, low head floodwalls, potential breaching of other low head dams, and creation of stormwater BMPs. Passive systems for treating AMD were incorporated into the designs with treatment units located in the riparian corridor. The detailed designs of the selected alternative to restore the Powderly Creek watershed included a geomorphic evaluation, sediment load study, MCACES costs, construction documents, dam modifications, and passive AMD treatment systems.





Client Name
*Wyoming Department of
Environmental Quality Abandoned
Mine Lands Division*

Project Highlights

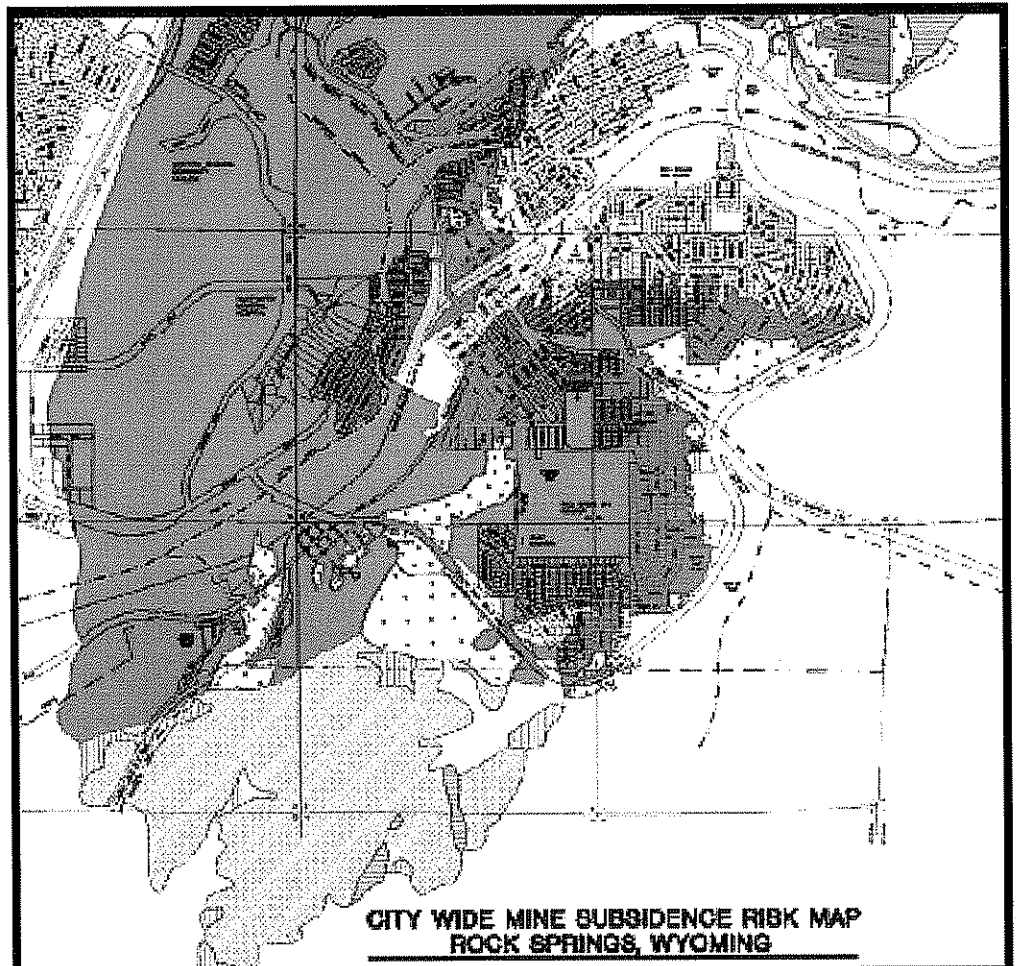
- Extensive use of GIS to assimilate data from thousands of existing borings
- State-of-the-art geophysical imaging
- Subsurface Investigations
- Air quality monitoring for mine gases
- Structural distress surveys and structural monitoring
 - Subsidence hazards assessment
- Public meeting participation

Project Cost
\$2,100,000

Completion Date
Ongoing

The Wyoming Abandoned Mine Lands (AML) Project 17.6A is a State-Wide ID/IQ contract for mitigating coal mine subsidence hazards awarded to Tetra Tech by the Wyoming Department of Environmental Quality Abandoned Mine Lands Division. Initial work under this contract includes assessment of subsidence hazards within the City of Rock Springs where historic underground coal mining from the 1860s to 1950s resulted in approximately 900 acres of the city being undermined and a history of moderate to severe subsidence as a result.

Although subsidence mitigation efforts have been implemented through a number of previous projects for AML and the Bureau of Mines by others, Tetra Tech was selected for the current work on the basis of the unparalleled qualifications of its multi-disciplinary project team including specialists in geological engineering, forensic geotechnics, geophysical investigations, underground mine design and grouting. Detailed geomechanical characterization of the subsurface conditions coupled with highly advanced state-of-the-art geophysical imaging and processing techniques to delineate mine voids are being used to allow subsidence risks to be accurately quantified and focused, cost-effective mitigation solutions to be developed.





TETRA TECH

**Sediment Control/Mine Waste Pile Remediation
Clear Creek/Central City Superfund Site**

Gilpin County, Colorado

Client Name
Colorado Department of Public
Health and Environment

Project Highlights

- Dam and Channel Design
 - Geotechnical Design
 - Construction Documents
- Construction Administration

Project Cost
\$1,400,000

Completion Date
2007

Tetra Tech performed professional engineering and surveying services for the planning and design of water quality improvements in the North Clear Creek watershed. The Clear Creek/Central City Superfund Site encompasses many mine waste rock piles dating back to the mid-19th century gold rush days. Abandoned waste rock piles contaminated the watershed with acid mine drainage and contaminated sediments. This project reduces runoff contact with the waste rock, collects sediments for future removal, and provides flood control to Central City and the Town of Black Hawk. Key project elements include:

- Hydraulic and geotechnical design of two rock fill dams with heights exceeding 25 feet
- A soil nail wall with a natural stone veneer to protect Gregory Gulch
- Design of runoff and runoff control ditches to minimize water contact with five waste rock piles
- Stone protection of waste rock pile toes adjacent to the creeks
- Construction observation and administration
- Interfacing with the Colorado Department of Public Health and Environment, the Environmental Protection Agency, and local municipalities
- Iron oxide recovery plan





Letters of Recommendation



Pennsylvania Department of Environmental Protection

286 Industrial Park Road
Ebensburg, PA 15931-4119
September 3, 2008

Bureau of Abandoned Mine Reclamation

814-472-1800

Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh, PA 15220-2745

Re: Consulting Work

To Whom It May Concern:

This letter is to verify that Thomas Gray, while with his former employer GAI, provided consulting work to PA-DEP, Bureau of Abandoned Mine Reclamation. Most recently, Mr. Gray was involved in a technical evaluation of the potential use of ten mine pools for water storage, with treatment and discharge during low-flow conditions. I was the DEP's project coordinator for this evaluation.

Mr. Gray and his staff were responsive, professional, and completed all work in a timely manner and under budget. All items in the scope of work were fully addressed.

Please contact me at the above phone number if you would like to further discuss this project and Mr. Gray's involvement.

Sincerely,

Pamela J. Milavec, Chief
Environmental Services Section
Cambria Office



west virginia department of environmental protection

Office of Abandoned Mine Lands
105 S. Railroad Street
Philippi, WV 26416
Phone 304-457-3219 Fax 304-457-5613

Joe Manchin III, Governor
Randy C. Huffman, Cabinet Secretary
www.wvdep.org

September 4, 2008

To Whom It May Concern:

This letter serves as a recommendation for utilization of Mr. Thomas Gray in future projects related to abandoned mine land reclamation. I have personally worked with Mr. Gray since 1986 for many of the projects that he was involved with through the West Virginia Department of Environmental Protection, Division of Land Restoration, Office of Abandoned Mine Lands. He has provided expertise in subsidence, geotechnical, mine drainage, mine sealing and mine reclamation projects.

Mr. Gray has provided the WVDEP with the highest quality of services and I recommend him to all agencies that are considering using the services of Tetra Tech.

Sincerely,

David W. Broschart, P.E.
Regional Engineer

DWB/dln



MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore MD 21230

410-537-3000 • 1-800-633-6101

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Water Management Administration
Mining Program – Bureau of Mines
160 South Water Street
Frostburg, Maryland 21532

Shari T. Wilson
Secretary

Bob Summers
Deputy Secretary

February 14, 2008

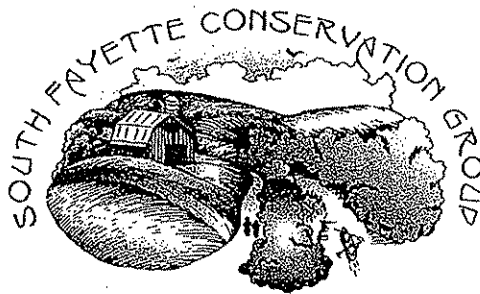
To Whom It May Concern:

I have worked with Mr. Tom Gray since 2002 as the contract monitor for the Maryland Bureau of Mine's technical service contract and the Chief of the Maryland Abandoned Mine Land Program. During that time, Mr. Gray was assigned tasks to perform technical services related to coal mining and coal mine reclamation. In general, the work consisted of geotechnical evaluations, acid mine drainage evaluations, water supply evaluations and acid mine drainage treatment system enhancements.

Mr. Gray's work was always of the highest quality and completed within the assigned time frame. I attribute his success to his experience and ability to understand a wide range of issues. He communicated effectively by providing work updates and was able to resolve a variety of technical and administrative issues before committing time and resources, maximizing the value of his services to the State. I would recommend him to any person or agency considering contracting for his services. If you have any questions, please feel free to contact me at (301)689-1460 or by email at mgarner@allconet.org.

Sincerely,

Michael P. Garner, Chief
Abandoned Mine Land Program
Maryland Bureau of Mines



September 5, 2008

To whom it may concern,

I want to express my appreciation to both Tom Gray and Tetra Tech NUS, Inc. for their ongoing efforts to design an abandoned mine discharge passive treatment system that the South Fayette Conservation Group will be able to submit for Growing Greener funding in 2009. The meeting of August 28th, held to discuss the design of the settlement ponds with Rich Beam of Pa. DEP BAMR, was insightful and informative. As the result of the meeting, a smart strategy has been decided upon for moving forward with this project.

I would recommend both Tom and Tetra Tech to anyone considering undertaking an AMD project. Tom was the designer of our recently completed Fishing Run Restoration/Maude Mine Reclamation Project. The project won the South Fayette Conservation Group a 2008 Western Pa. Environmental Award. The project has also won a 2008 Office of Surface Mining Reclamation Award for the Bureau of Abandoned Mine Reclamation.

Tom and everyone at Tetra Tech is always very responsive to our needs as we tackle permitting issues, adjacent landowner concerns, grant paperwork requests and the coordination of all project partners. Tetra Tech has also been willing to work with us financially in order to help us achieve our required 15% cost match for the grant funds.

As we continue to tackle the problems of abandoned mine drainage within our township, we look forward to maintaining a strong working relationship with Tom and all of the employees at Tetra Tech NUS, Inc.

Sincerely,

Amy Smith
President, South Fayette Conservation Group

Working to conserve, protect and enhance our natural and recreational resources.

515 Millers Run Road, Morgan, PA. 15064



United States Department of the Interior

OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT

Appalachian Regional Coordinating Center
Three Parkway Center
Pittsburgh, Pennsylvania 15220

May 9, 2003

GAI Consultants, Inc.
Attn: Mr. Thomas A. Gray
570 Beatty Road
Monroeville, PA 15146-1300

Subject: Contract Performance

Dear Mr. Gray:

This letter serves as a recommendation of your corporation for future work. GAI has performed numerous contracts in a highly acceptable manner. You have shown the ability to assign resources in order to concurrently complete multiple contracts without any lose in efficiency and continue to maintain highly professional standards. We appreciate and look forward to working with you in the future.

Sincerely,

Brian J. Luzik
Contracting Officer

RECEIVED

MAY 12 2003

GAI CONSULTANTS INC.
PROJ. NO. _____