TETRA TECH

Statement of Qualifications

Pennsylvania Act 2 and Brownfield Redevelopment Services

November 2017

TETRA TECH OVERVIEW

Tetra Tech is a global leader in providing engineering and technical services. The company is acknowledged for its cutting-edge expertise in sophisticated environmental analysis, modeling, and design and for delivering this expertise effectively across an entire project life cycle. Tetra Tech is consistently recognized by Environmental Business Journal and Engineering News-Record as one of the top large businesses working in the environmental industry today. Our experience includes site characterization, remediation, environmental/civil engineering, regulatory compliance/ permitting, geochemical analysis, water resource management, geotechnical services, and renewable energy development.

From front-end science and planning to design, construction management and operations, Tetra Tech's global service network, facilitated by our Initiatives program, coordinates resources for specific markets and provides best-in-class experts with worldwide project experience. They deliver a high level of integrated services for the full project life-cycle in six service areas: water, environment, infrastructure, resource management, energy, and international development.

Company Facts

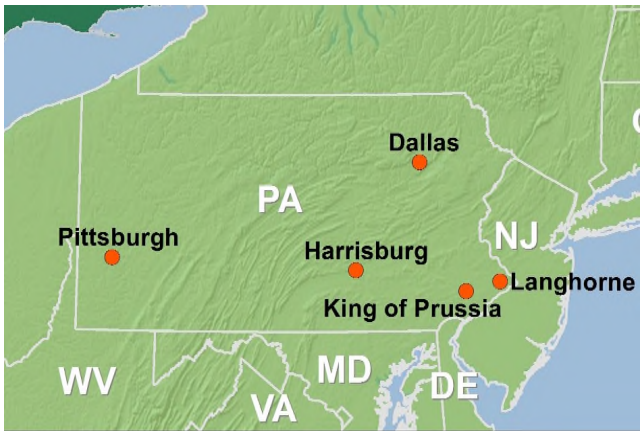
- Annual revenue: $2.5 billion (FY16)
- NASDAQ symbol: TTEK
- www.tetratech.com
- 16,000 employees

Tetra Tech's innovative, sustainable solutions help our clients address their water, environment, infrastructure, resource management, energy, and international development challenges. We are proud to be home to leading technical experts in every sector and to use that expertise throughout the project life cycle. Tetra Tech provides our clients comprehensive environmental, engineering, and construction management services. With a strong commitment to safety and environmental stewardship, Tetra Tech works closely with clients to identify and implement cost-effective engineering and environmental solutions. We combine the resources of a global, multi-billion dollar company with local, client-focused delivery.

ENR magazine ranks Tetra Tech a national and international leader in several markets.

TETRA TECH ACT 2 AND BROWNFIELD REDEVELOPMENT RESOURCES

Tetra Tech has more than 300 personnel in offices located in Pennsylvania (Pittsburgh, King of Prussia, Langhorne, Harrisburg, and Dallas) to meet Act 2 and brownfield redevelopment project staffing demands. An additional 2,000 personnel are located in nearby offices in adjacent states to ensure continuity of service and the ability to surge to meet unexpected contract demands if needed. Tetra Tech also has the ability to call upon our technical experts from any of our 206 nationwide offices to support Act 2 projects.



Tetra Tech has over 300 Staff in Pennsylvania offices

ACT 2 AND BROWNFIELD REDEVELOPMENT EXPERIENCE OVERVIEW

Tetra Tech has performed work under all major federal and Pennsylvania environmental statutes and regulatory programs. We have experience nationwide with CERCLA/SARA and RCRA projects as well as various state voluntary cleanup programs (VCP). Tetra Tech provides a full range of environmental services to support Pennsylvania's Hazardous Site Cleanup Act (Act 108 of 1988), Land Recycling and Environmental Remediation Standards Act (Act 2 of 1995), Storage Tank and Spill Prevention Act (Act 32 of 1989), and the RCRA Corrective Action Program. Most importantly, Tetra Tech understands the inter-relationship of these statutes, associated regulatory programs, and regulatory initiatives.

Tetra Tech staff have been actively engaged with Act 2 since its inception, leading some of the first and largest Act 2 projects in some of the most critical areas of the state. Tetra Tech staff have brought to bear unique technological approaches coupled with thorough knowledge of the intent and letter of Act 2 regulations and technical guidance. Outcomes have been favorable for all stakeholders, with Tetra Tech staff being engaged at all levels of regulatory negotiations – local, state and Federal, along with public involvement including required notices up through large public meetings. Project experience includes sites ranging in size from over 2,000 acres to local service stations – all conducted with the client's ultimate objectives in mind. Tetra Tech staff have dealt with almost every contaminant that there is to be encountered and resolved the issues with economically feasible scientific and engineering technical solutions as well understanding how to best employ institutional controls afforded under Act 2. Tetra Tech understands and appreciates that each project is unique from its setting site, its history and most importantly the client's business objective.

Act 2 typically offers communities and land owners viable economic opportunities when environmental aspects are addressed and navigated well. Tetra Tech staff have a track record of doing just that for the benefit of our clients and other stakeholders.

TETRA TECH ACT 2 AND BROWNFIELD REDEVELOPMENT SERVICES AND CAPABILITIES

Tetra Tech has decades of experience providing environmental solutions that are both feasible for our clients and sustainable for our future. Our fully integrated range of environmental, engineering, and construction services allows us to quickly and cost-effectively address our public and private clients' environmental issues:

- Supporting Environmental, Engineering & Regulatory Services
- Property and Facility Assessments
- Site Characterization and Remediation
- Funding and Economic Development
- Emerging Contaminants
- Groundwater Modeling & 3-D Visualization
- Surface Water Modeling & Permitting
- Risk Assessment & Toxicology
- Waste Management
- Multi-media compliance & Permitting
- Data Management & Statistical Analysis
- Forensic & Isotopic Chemistry
- Remedial Engineering
- Decommissioning & Demolition
- Plan, Specification Development and Contracting Support
- Industrial Hygiene & Safety Program Development & Implementation
- Site Redevelopment Planning
- Site Civil Engineering Support
- Structural Engineering
- Geotechnical Engineering & Foundation
- Permitting – Federal, State & Local
- Landfill, Lagoon & Pond Closure
- Landfill Design & Permitting
- Wastewater Treatment & Permitting
- Construction Management & Contractor Oversight
- Sediment Assessment, Dredging & Remediation
- Natural Resources Damage Assessment & Rehabilitation
- Ecological and Endangered Species and Habitat Restoration
- Ports, Harbors and Waterfront Services
- Infrastructure Engineering & Construction
- Regulatory Negotiations
- Engineering & Institutional Control Development
- Decision Analysis & Data Analytics
- Litigation Support and Expert Witness

REPRESENTATIVE ACT 2 AND BROWNFIELD REDEVELOPMENT PROJECTS

Following are representative projects that demonstrate Tetra Tech staff's experience in the many facets of brownfield redevelopment and the Act 2 program, demonstrating technical and regulatory leadership that facilitate turning impaired sites into valuable properties.

City of Johnstown, Pennsylvania US EPA Brownfield Assessment Program.

Tetra Tech has been retained by the City of Johnstown (City) to implement their Brownfield Assessment Program being funded by US EPA Assessment Grants awarded in 2016. The scope of the project includes:

1) Creating an inventory of brownfield sites in the City.
2) Prioritizing the inventoried Sites based on economic development potential.
3) Completing Phase I and Phase II environmental Site assessment activities at sites identified as having the greatest economic development potential.
4) Complete remediation and revitalization plans at select sites.
5) Community outreach.

In addition to environmental professionals, Tetra Tech's project team includes economic development/funding specialists; planners/landscape architects; market analysts, and; a local construction contractor and land surveyors. Because this is an economic development program it is important to have input from broad base of experts involved in the redevelopment of a site – not simply environmental.

Currently, the City has assembled a Brownfield Assessment Steering Council comprised of local business leaders, redevelopment agencies and environmental organizations to provide guidance and ensure that the specific projects are developed that have long lasting positive economic impact.

Johnstown Dollar General, Act 2 Site Characterization and ISRP Grant Support, The Mainland Companies, Johnstown, Pennsylvania

Tetra Tech completed the work associated with attainment of the Act 2 Site-Specific Standards (SSS) at this 1 acre site in downtown Johnstown. The site was formerly used as a gasoline station, machine shop and flour mill, among other things. The site is being redeveloped as a retail shopping store.

By the time the client retained Tetra Tech, the property was already acquired, site development plans were approved and some initial Phase I and Phase II ESA work had been completed by others. The owner's business model includes buying and developing the site and then "flipping" it to investors. Therefore, they were seeking the liability protections afforded by Act 2 to maximize the value of the site to future purchasers. The Tetra Tech team guided them through the Act 2 SSS process that included completing needed groundwater studies and a risk assessment, and obtaining PADEP approval of the combined Remedial Investigation Report/Risk Assessment (RIR/RA) and Cleanup Plan.

The owner faced challenges during development because proper due diligence was not performed by earlier environmental and geotechnical contractors prior to securing Tetra Tech's services. Those challenges included having to perform extensive over-excavation because of inadequate geotechnical data that resulted in large volumes of soil that did not meet PADEP Clean Fill standards, and discovering 8 USTs that had to be removed to accommodate construction and PADEP requirements. All of this was completed within the context of a very compressed completion schedule. Tetra Tech helped the owner overcome these challenges and save costs by:

- Working with the City of Johnstown to secure a PA Department of Community & Economic Development (DCED) Industrial Sites Reuse Program (ISRP) characterization grant to reimburse 75% of the environmental characterization costs. The private development had the strong support of the City as the Site is in a blighted neighborhood.
- Coordinating with PADEP to obtain approval for the placement of the over-excavated soil at another local Act 2 Site instead of disposal as residual waste at a landfill, thus saving the owner approximately $200,000.
- Coordinating with PADEP to allow the USTs to be closed as "unregistered" tanks and addressing impacted soil within our approved Act 2 plan instead of the storage tank regulations. This saved the client tens of thousands of dollars in terms of remediation and long term monitoring and reporting.

The Act 2 Final Report has been approved by PADEP and the owner is currently preparing the Environmental Covenant.

Former Talon Plant 5 Site, Meadville, PA, Crawford County Planning Department & Private Developer

Tetra Tech was retained by the County of Crawford (County) to complete Act 2 Site investigation and remediation activities at the form manufacturing facility in the City of Meadville. The Site is owned by the County and a private developer is interested in developing the majority of the site for multi-unit senior housing, with the balance of the site being retained by the County. The project included reviewing earlier environmental site investigation and remediation documentation completed by others; performing supplemental site investigation activities; preparing the Act 2 Remedial Investigation/Risk Assessment/Final Report, and coordinating with PADEP. During this process, Tetra Tech also advised the County on various potential funding strategies for supporting potential future site characterization and development.

Following meetings with PADEP, the County and prospective purchaser agreed that the environmental risk to future end users was sufficiently low that demonstrating attainment with an Act 2 standard was not necessary. Currently, the redevelopment plans/permits are being finalized. The private developer secured Tetra Tech's services to prepare the construction Soil Management Plan to be incorporated into the required NPDES stormwater permits.

USEPA Community-Wide Brownfields Assessment Grants, River Towns Coalition (RTC), Pittsburgh, Pennsylvania

Over three grant rounds, the RTC has grown to over 20 municipalities and/or members located in Allegheny (including the Urban Redevelopment Authority of Pittsburgh), Westmoreland, and Beaver Counties along the Allegheny and Ohio Rivers. Various former industrial operations are located in the area including those associated with steel, railroads, lumber, glass manufacturing and petroleum distribution. The North Side Industrial Development Company (NSIDC), on behalf of the RTC, was awarded three USEPA Coalition Brownfields Assessment Grants for hazardous substances and petroleum sites in 2009 (funded by the American Reinvestment and Recovery Act (ARRA)), 2011, and 2012. Tetra Tech was contracted to NSIDC as one of the environmental consultants for the grants.

The owner of the Henry Miller Spring site has invested close to $1 million in the redevelopment of that site, and plans four more buildings.

Tetra Tech staff was actively involved with identifying and prioritizing sites; participating in routine meetings with municipal leaders, state political representatives, business representatives, EPA staff, PADEP staff, non-profit industrial development company staff and the real estate / legal consultant; and in developing an overall strategy for community economic development incorporating Brownfields redevelopment.

Tetra Tech implemented the grant program by generating the program-wide Quality Assurance Project Plan (QAPP) approved by USEPA Region 3, conducting Phase I and II ESAs, generating USEPA-approved Sampling and Analysis Plans (SAPs), completing sites through PADEP Act 2 program as warranted by the owner's/buyer's needs, and assisting the grant recipient with routine USEPA-required status reporting. Several key properties have been assessed including: 1) asbestos survey and abatement costs provided for redevelopment of a former theater by the local community college; 2) vacant parcels bought by Allegheny County for expansion of the neighboring park, providing additional greenspace; 3) attaining relief of liability for a 30-acre parcel part of the former P&LE Railroad site in McKees Rocks, where the buyer/developer obtained $2M Pennsylvania site reuse grants for commercial and light industrial redevelopment, with the potential to provide 1,000 jobs; and 4) assessment of a former industrial slag pile area for residential redevelopment plans in Homestead (Summerset at Frick Park).

Former Henry Miller Spring and Manufacturing Co. Site, Sharpsburg, Pennsylvania

Historically, this property was used as an iron works facility (1884 to 1927) until the Henry Miller Spring and Manufacturing Company used the property to manufacture industrial springs (1947 to 2000). The property was acquired in 2004 for multiple manufacturing and warehousing operations. Tetra Tech performed the Phase I and Phase II ESAs. Tetrachloroethene (PCE) was detected in groundwater above the PADEP Act 2 statewide health standards as well as heavy metals in the soils. The site is within a quarter mile of two public water supply well fields for Sharpsburg and Etna/Shaler municipalities. Tetra Tech, NSIDC, and NSIDC's real estate consultant worked with local and state officials for concurrence of supplemental work as well as agreement on an off-site source. The site has attained relief of liability through the PADEP Act 2 program. A deed covenant will be in place restricting land use to non-residential, requiring proper management of soils, and restricting the use of groundwater.

Former P&LE Railroad Property, McKees Rocks, Pennsylvania

The North Side Industrial Development Company (NSIDC) on behalf the Ohio River Towns Enterprise Zone (ORTEZ) consisting of a four-municipality area located the Ohio River west of Pittsburgh was awarded two $200,000 USEPA Community-Wide Brownfields Assessment Grants for hazardous substances and petroleum in 2008. The key site for these grants was the parcels formerly owned by the former Pittsburgh and Lake Erie (P&LE) Railroad.

The former Pittsburgh and Lake Erie (P&LE) Railroad owned approximately 90 acres near the Ohio River in McKees Rocks and Stowe Township. The railroad was operational from approximately 1875 through 1996. Various Phase I and II ESAs have been performed at the Site over the past twenty years by other consulting firms but to date none of the properties which comprise the Site have achieved relief of liability under PA Act 2.

Tetra Tech obtained USEPA approval to proceed with the assessment and received petroleum eligibility from PADEP for portions of the project site. To date, Tetra Tech has performed Phase I ESAs on four properties comprising approximately 50 acres of the former railroad property and submitted a combined assessment report to satisfy both EPA and PADEP requirements. Phase II activities included advancing 75 soil borings, collecting over 140 soil samples, redeveloping 12 wells, installing 10 new wells, laboratory analysis of soil and groundwater samples. The MBE subcontractor performed asbestos surveys at Tetra Tech worked closely with the buyers and owners to determine a cost-effective remedial action for the redevelopment plans. Based on the owners/ buyers need, separate Phase II ESA reports were prepared for each property. Relief of liability for the Site is being pursued under the Site Specific Standard incorporating Special Industrialized Area (SIA) provisions of PA Act 2 for metals in the surface soils and trace of chlorinated solvents in the groundwater. The remedial approach includes institutional and engineering controls. This site has been acknowledged as a showcase site for the PADEP Southwest Region. The developer buying a 30-acre parcel of the site has been awarded $2M Pennsylvania site reuse grants for commercial and light industrial redevelopment, which has potential for creating up to 1,000 jobs.

Former Yeager Texaco Gas Station Site, Etna, Pennsylvania

The North Side Industrial Development Company (NSIDC) was awarded a $200,000 USEPA Community-Wide Brownfields Assessment Grant for Petroleum sites on behalf of the Allegheny River Towns Enterprise Zone (ARTEZ) in 2007. ARTEZ consists of a seven-municipality area located on the north shore of the Allegheny River east of Pittsburgh. One key site assessed under this grant was the former Yeager Texaco gas station site, located in Etna, Pennsylvania along Pine Creek and the busy Route 8 corridor.

The former Yeager Texaco property had been utilized as a gas station from 1950 until underground storage tanks (USTs) were removed in 2004. Since the removal of the USTs in 2004, the Site had been used as an automobile repair and maintenance business. PADEP had issued a consent order to the owner requiring remediation of soil and groundwater but the owner was bankrupt and unable to meet these obligations.

Through discussions with PADEP, Tetra Tech was able to obtain petroleum eligibility for the property. Tetra Tech performed the Phase I and Phase II Environmental Site Assessments (ESAs). Metals were found in soils and methyl tertiary butyl ether (MtBE) was detected in groundwater exceeding the non-residential standards. Using the PENTOx model, Tetra Tech was able to determine that the contaminants in groundwater would not reach the bordering creek. Tetra Tech was able to attain the PA Act 2 standards for the site via pathway elimination. PADEP approved the combined Phase ii ESA/Site Characterization Report/Remedial Action Plan document and granted relief of liability. An Environmental Deed Covenant is in place restricting use of groundwater and requiring proper management of soils for excavation in deed restricted areas. The property was acquired by the neighboring chiropractor in 2010 who expanded his business by constructing a medical business building. A grand opening was celebrated in March 2012.

Nine Mile Run Slag Site; Pittsburgh, Pennsylvania.

Conducted a risk assessment in accordance with Act 2 regulations to demonstrate that the slag site could be developed into a residential community. Air transport modeling associated with known future construction activities was conducted to demonstrate air concentrations of metals and PAHs would not impact construction workers and adjacent offsite residents. Partnered with DEP to facilitate development of this "brownfield."

Brownfield Site Remediation and Closure under Pennsylvania Act 2, Confidential Home Improvement Retailer, Monroeville, Pennsylvania

Tetra Tech performed site characterization activities at a 16-acre former automotive dealership that was being redeveloped into a retail store. Leaks from a 4000 gallon UST resulted in exceedances of state groundwater standards. Tetra Tech performed a site characterization in accordance with the Pennsylvania storage tank and spill prevention program requirements.

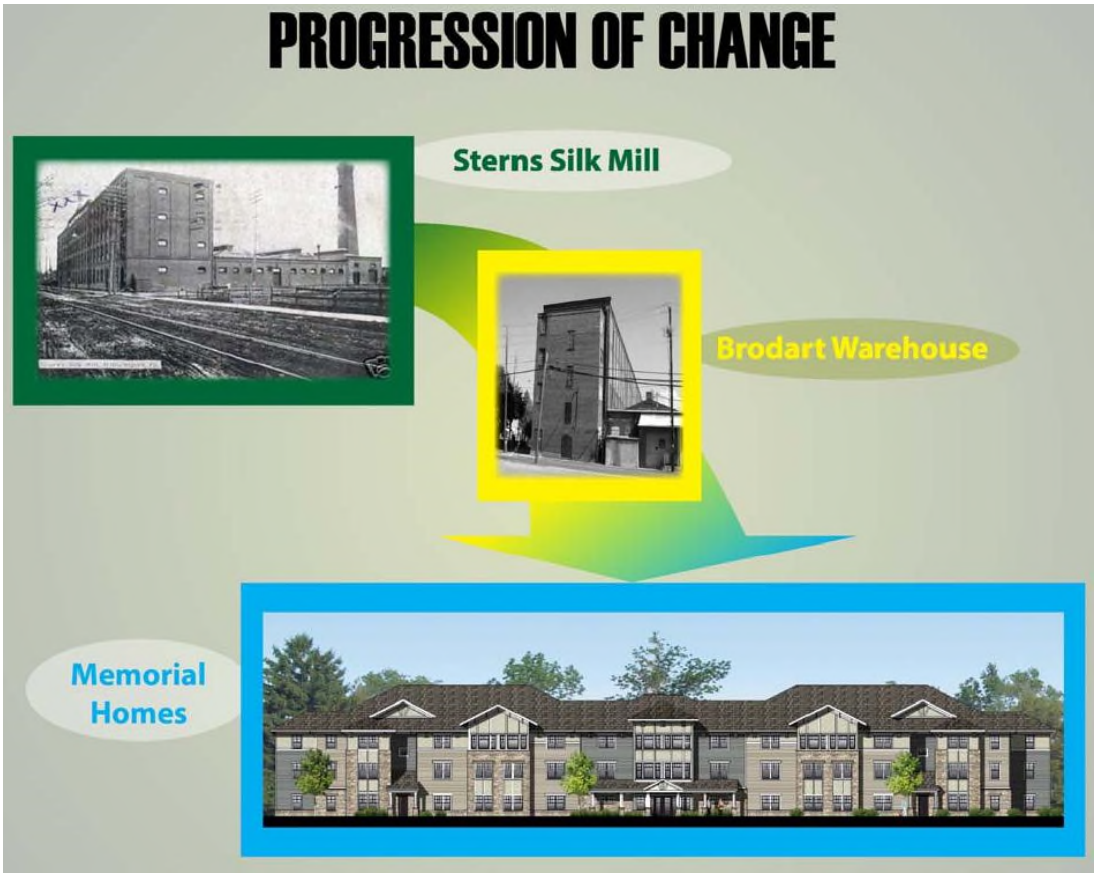
A site characterization report was prepared and submitted to PADEP with the ultimate goal of obtaining liability indemnification under the Pennsylvania Land Recycling Program (Act 2). Perimeter compliance well sampling demonstrated that there was no off-site migration. A Remedial Action Completion Report was prepared and liability indemnification in accordance with Act 2 was granted by PADEP.

Tetra Tech also performed remediation activities to support the existing facility demolition activities including removal of:

- 13,000 fluorescent lights
- 3800 pounds of PCB-containing ballasts
- 4 transformers
- 2 capacitors
- Refrigerants
- Oil / water separator
- Elevator hydraulic oil
- 5 hydraulic lifts and associated tanks

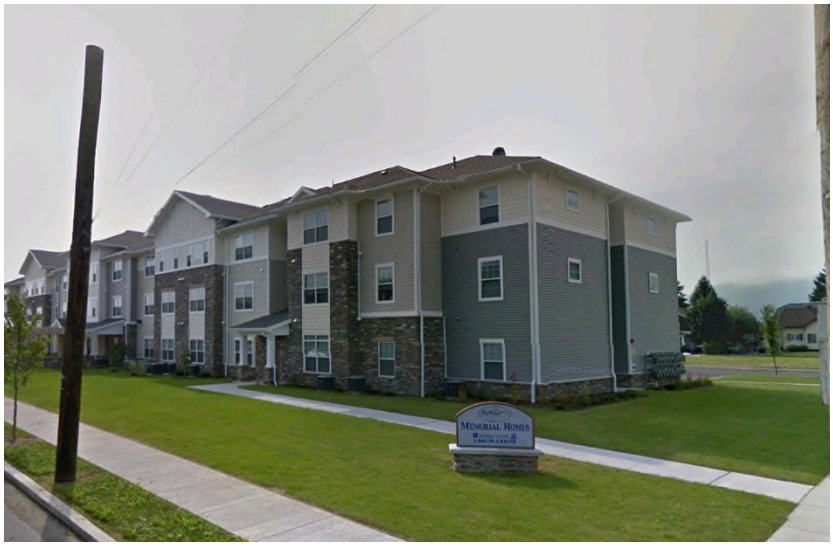
Lycoming County Planning and Community Development

While engaged with other firms, Tetra Tech's Joe Senita and John Mizerak starting working with the County of Lycoming in the early 2000s. In 2007, work began on the County's $200,000 US EPA assessment grant during which over 100 sites were identified and 20 Phase I ESAs were completed. This led to other area wide and site specific assessments completed through 2012. As a result of that work, the Brodart Warehouse was identified as a Site that, if redeveloped, could serve as a catalyst to revitalize and entire blighted neighborhood in Williamsport as discussed below. The total cost of the projects completed for Lycoming between 2007 and 2014 is in the range of $2 million. During that time, the County leveraged our "environmental" efforts to secure public and private investment in the neighborhood in the range of $30 million.



Between 2008 and 2014, work at the Brodart Site included supporting the County in identifying an end user for the former Brodart Warehouse Site; securing funding from PADEP/DCED's Industrial Site Reuse Program (ISRP) to complete the Act 2 Site Characterization and Cleanup plan that integrated Site remediation into market rate housing development plans; coordinated with PADEP and; prepared all of the Act 2 final reports and environmental covenants. In early 2015, a ribbon cutting ceremony was held for new market rate, multi-unit housing complex at the former brownfield that is serving as a cornerstone for the revitalization of an entire blighted neighborhood within the City.

Concurrent with addressing the "environmental" aspects of the Brodart redevelopment program, our team supported the County in assembling funding sources for remediation, private development and neighborhood improvement portions of the project. We worked with County to develop and implement a funding strategy that included funding from the Department of Community and Economic Development's Industrial Site Reuse Program, PHARE funds administered through the Pennsylvania Housing Finance Agency and the County's Act 13 Shale Impact Fee. These efforts were leveraged to develop a companion part of the project - the Brodart Neighborhood Improvement Project.



This project complemented the Brodart Brownfield Redevelopment Project and included the partnerships and funding from STEP's Homes-in-Need Program and Housing Counseling, Habitat for Humanity's *A Brush With Kindness* Program, City CDBG funds, additional County Act 13 funds, PA DCED's Keystone Communities program, the City's Rental Rehab Program to focus on the redevelopment activities in this neighborhood. The result was that by 2014 remediation was complete and the Site is redeveloped with market rate housing. In March 2015, the partners held the first ribbon cutting ceremony and opened the 40 unit residential housing portion of the project, (news article- http://www.lyco.org/Portals/1/PlanningCommunityDevelopment/Documents/WilliamsportHousingStrategy/54.pdf).

Erie County Convention Center Authority - Former GAF Land Use Planning and Remediation, Erie, Pennsylvania

While engaged with another firm, Tetra Tech's Joe Senita served as Project Manager for this remediation project at a 13 acre former roofing manufacturing Site on Presque Isle Bay (Lake Erie) which was considered a Great Lakes Treaty Area of Concern. This project is in the public eye, as this is that last large tract of undeveloped land on the Bay and it is adjacent to the Erie Bayfront Convention Center. The majority of the Site is comprised of "made land" consisting of off-spec shingles and "tar paper" with tar and viscous non-aqueous phase liquids (NAPL). The constituents of concern are semi-volatile organic compounds, VOCs and metals in soil and groundwater along with asbestos containing materials.

Mr. Senita managed a wide variety of professionals including planners, engineers, landscape architects, commercial market analysts, as well as earth work, waste disposal, slurry wall and sea wall installation subcontractors. He has been responsible for completing environmental investigations necessary to demonstrate attainment with the PADEP Act 2 Site Specific remediation standard to allow for residential reuse. Concurrently, he managed the completion of land use planning activities necessary for the owner and the community to determine the best end use for the Site.

The key activities completed on this project include:

1) Completion of a "Conceptual Land Use Plan" that included local market analyses and extensive outreach to direct stake holders and the general public to determine the appropriate end use for the Site. Remediation plans were then prepared to accommodate the desired mixed residential/commercial end use.

2) PADEP approval of the Act 2 Remedial Investigation Report, Human Health and Ecological Risk Assessment, Act 2 Cleanup Plan, Final Report and Environmental Covenant. The work included extensive assessment of potential on-going impacts to the Bay, a sensitive ecosystem.

3) NPDES construction and post construction storm water management permits for remediation and the final development along with a joint PADEP/USACE 105 encroachment permit for piping an open storm water drainage feature and construction of a sea wall. The permitting approach has allowed the owner to quickly move into redevelopment.

4) Remediation and risk mitigation through the: Removal and crushing of 10 acres of concrete floors/foundations for reuse on-site as sub base for future construction; closing a 2,500 foot gas well; construction of a 500 foot slurry wall to prohibit off-site NAPL migration; placement a 12 acre cover system to eliminate the direct soil contact exposure pathway; construction of the on-site storm water management system to accommodate future development, and; construction of a 1,000 foot long steel sheet pile seawall. Because of effective management, sufficient funds remained to incorporate a 1,000 foot long public park along the Bay into the Site cover system.

Following PADEP approval of the Act 2 Final Report, Mr. Senita has managed the on-site treatment of contaminated groundwater and waste that are generated during Site development.

Pennsylvania Hazardous Site Cleanup Act/ACT 2 Site, Limerick, Pennsylvania

Ms. Khalil handled all site investigation and evaluation of remedial alternatives (on and off-site) associated with chlorinated volatile organic compounds in soil and groundwater. Coordinated all phases of complex $1.5M waterline construction project associated with long-term remedial alternative, involving interfacing with variety of state agencies (PADEP & PennDOT), local officials, Montgomery County Conservation, public utilities (water and nuclear) and affected residences. Prepared and filed Uniform Environmental Covenants associated with limitation on groundwater use for off-site affected land parcels.

Oversaw soil remediation initiative, which involved relocation of utility lines (sanitary, electrical & fire waterline), coordination of all off-site disposal of remediated soil (hazardous and non-hazardous), utilization of slide/rail system and trench boxes, and underground storage tank closure at an active manufacturing facility. Evaluated post-remedial groundwater monitoring activities and Fate and Transport Modeling associated with groundwater and vapor intrusion receptor evaluations.

Chemical Plant, Monaca, Pennsylvania

Tetra Tech personnel performed the Act 2 Risk assessments and closure of a chemical plant located in Monaca, Pennsylvania. The project required using existing data from the site to complete the site characterization reports, performing modeling to evaluate the potential for site-related constituents to migrate to exposure points and performing risk assessments to evaluate the potential for adverse effects to human health and the environment based on realistic exposure pathways at the site. The site included six distinct areas, which were closed based on a combination of the Statewide Health Standard and the Site-Specific Standard.

Phase I/II ESA - Alcoa Research Laboratory, New Kensington, Pennsylvania

Tetra Tech performed a Phase I and Phase II Environmental, Site Assessment (ESA) at this former research laboratory facility in New Kensington, PA. The facility was formerly used to perform pilot tests of new processes and products in the smelting and manufacture of aluminum products. Tetra Tech performed the Phase I ESA in accordance with the American Society for Testing Materials (ASTM) Standard Method E-1527-00 as well as performing asbestos and lead paint screening in the site buildings. Upon completion of the Phase I, Tetra Tech prepared an inventory of asbestos containing materials, lead paint and other potentially hazardous materials that were present at the site. Tetra Tech then performed a Phase II of certain areas of the site in order to obtain a release from environmental liability under Pennsylvania's Act 2 program.

Former Manufacturing Facility, Wyomissing, Pennsylvania

Ms. Khalil oversaw Phase II investigation activities associated with attainment of the ACT 2 Site-Specific Standards for volatile organic compounds. Negotiated with PADEP officials on the extent of remedial investigation required to obtain approval under ACT 2. Completed and filed Uniform Environmental Covenant associated with restrictive use of groundwater. Property was later transferred to a new owner for redevelopment.

Natural Attenuation of Petroleum Hydrocarbons in Groundwater, Willow Grove Air Force Reserve Station, Pennsylvania.

Tetra Tech completed a study to evaluate the natural attenuation of jet fuel (jP-4) contamination in the shallow groundwater beneath the Willow Grove Air Reserve Station (WGARS).At the time of the investigation, benzene and naphthalene were the only constituents of concern that were present in groundwater at concentrations exceeding Act 2 clean-up standards established by the Pennsylvania Department of Environmental Protection (PADEP).

Tetra Tech performed analyses to determine whether reductions in jP-4 constituents were attributable to natural biodegradation processes. The distribution of natural attenuation parameters in the groundwater was assessed to screen for evidence of intrinsic biodegradation. Tetra Tech conducted mass balance analyses as a means of back-calculating the quantity of contaminant mass that had biodegraded. The natural rate of biodegradation was estimated by the Buscheck and Alcantar method and by the exponential regression of contaminant mass-in-place versus time. Analytical modeling with the code BiOSCREEN was performed to predict the time-frame required to achieve compliance with PADEP Act 2 clean-up standards in the absence of engineered remedial measures.

The investigation found that while natural biodegradation was actively removing several hundred pounds of JP-4 constituents from the groundwater, residual soil contamination and free-product continued to

serve as a contaminant source. Results of the project were used by the Air Force to focus future remediation on areas where residual contamination and free-product were present rather than implementing less effective site wide measures with limited effectiveness in mitigating impacts to groundwater.

Active Confidential Client Industrial Chemical Manufacturing

Mr. Polmann managed the development of a dense-phase non-aqueous phase liquids (DNAPL) treatment program designed to achieve the RCRA 2020 goals in accordance with PADEP Act 2. This facility is located in Philadelphia, PA; the primary contaminants of concern included coal tar and associated oily materials. The project consisted of completing the following major tasks: pre-design investigations using the TarGOST® probe to define, characterize and present a 3D model of the horizontal and vertical extent of the DNAPL areas; development of a focused in-situ DNAPL treatment feasibility study evaluating active, passive, and innovative treatment technologies to cost-effectively address the DNAPL source area materials; detailed cost analyses for potential treatment technologies; bench-scale treatability testing, and pilot study implementation of a promising DNAPL treatment approaches.

Based on the results of the feasibility study, two treatment technologies were initially selected for treatability testing: 1) a new and innovative method of In Situ Geochemical Stabilization (ISGS) via catalyzed sodium permanganate solution for DNAPL mass encapsulation and mass flux reduction; and 2) a conventional approach of In Situ Chemical Oxidation (ISCO) via Catalyzed Hydrogen Peroxide (modified Fenton's Reagent) to chemically destroy the LNAPL. Bench-scale testing indicated that ISCO was cost prohibitive due to the extensive treatment area. An ISGS pilot study was conducted. The data were inconclusive as to the overall success of the ISGS ability to encapsulate the DNAPL materials.

A successful bench scale test was then conducted on a new and innovative treatment technology (Gas Thermal Remediation (GTR)). The system consists of closed loop hot air conduction injection wells to heat the impacted formation to 100°C. The co-located soil vapor extraction wells will remove the generated effluent contaminant vapors. Previously completed remedial actions at other sites indicate that GTR is an efficient and **Green** technology compared with other thermal (electric resistive heating and stream injection) approaches as natural/propane gas is used to power the burners and up to 90% of the generated effluent gas vapors can be recycled into the burner as a supplemental fuel, reducing off gas treatment costs. Upon successful completion of DNAPL mass removal, the heated aquifer will be allowed to equilibrate to a pre-determined, optimal, chemical activation temperature. A final ISCO polishing step will be implemented (if necessary) to treat the residual dissolved-phase groundwater VOC and SVOC contaminants. This GTR - ISCO technology combination approach has the potential to achieve a rapid and cost-effective site closure for any remaining residual groundwater contamination at this site.

The bench-scale data indicate that DNAPL mass removal rates up to 95% were rapidly achieved. The project is currently in the pilot-scale design phase.

RESUMES OF KEY TETRA TECH PERSONNEL

The following are representative Tetra Tech staff available to support Act 2 and brownfield redevelopment projects including project managers, advisors and subject matter experts. These staff are supported by other field and support staff across Pennsylvania to provide Tetra Tech clients the ideal teams to complete Act 2 and brownfield redevelopment projects with a high degree of expertise and cost effectiveness.

- Mona Khalil – Project Manager
- Joseph (Joe) Senita, P.G. – Project Manager
- Mary M. Mang, CHMM, PMP – Project Manager
- Dan Forlastro, PE – Civil Engineer
- John Mizerak, MPA – Economic Development Specialist
- Katherine Super, DABT – Risk Assessor

TETRA TECH

Mona Khalil

Program Manager - Commercial

EXPERIENCE SUMMARY

Extensive background in conducting safety and environmental audits at industrial facilities in North America / Europe and assisting facilities in implementing comprehensive safety, environmental, and transportation programs. Successful record of expertly managing compliance operations and leading comprehensive remediation lifecycle activities. Well-versed in risk management, hazard analysis, and oversight associated with regulatory matters, including numerous states and federal bodies.

RELEVANT EXPERIENCE

Project Manager; Pennsylvania Hazardous Site Cleanup Act/ACT 2; Confidential Medical Device Manufacturer. Project value over $4 Million. Managed all site investigation and evaluation of remedial alternatives (on and off-site). Coordinated all phases of complex $1.5M waterline construction project associated with long-term remedial alternative, involving interfacing with variety of state agencies (PADEP & PennDOT), local officials, Montgomery County Conservation, public utilities (water and nuclear) and affected residences. Oversaw soil remediation initiative, which involved relocation of utility lines (sanitary, electrical & fire waterline), coordination of all off-site disposal of remediated soil (hazardous and non-hazardous), utilization of slide/rail system and trench boxes, and underground storage tank closure at an active manufacturing facility. Project management also involved scheduling, communication, asset management and budgeting issues. Evaluated post-remedial groundwater monitoring activities and Fate and Transport Modeling associated with groundwater and vapor intrusion receptor evaluations.

Project Manager; Environmental Remediation Manager; Confidential Medical Device Manufacturer. Managed multiple hazardous site investigation and remediation projects for major manufacturing company. Major projects included:

Project Manager; Region III Superfund Remedial Site. Project value over $1 Million. Oversaw remedial site investigation activities, groundwater evaluation, vapor intrusion evaluation, soils feasibility study and oversight charges by USEPA. In addition, managed oversight of USEPA Bioremediation pilot study and worked with property owner and other entities relating to site activities.

EDUCATION

B.S., Chemical Engineering, Drexel University, 1989

AREA OF EXPERTISE

Environmental, Health & Safety Project Management

REGISTRATIONS/ AFFILIATIONS

American Institute of Chemical Engineers

Air & Waste Management Association

Chem Pharma Professional Association

TRAINING/CERTIFICATIONS

US DOT: Hazardous Materials Regulations

International Air Transportation Association

ISO 14001: Environmental Management System Internal Auditor & Developing & Implementing an Environmental Management System

OFFICE

King of Prussia, PA

YEARS OF EXPERIENCE

27

YEARS WITH TETRA TECH

1

Project Manager; Texas Voluntary Cleanup Program; Confidential Medical Device Manufacturer. Project value over $1 Million. Oversaw site investigation activities, Soil Remedial Cleanup Plan and groundwater monitoring program for a chlorinated volatile organic plume. Completed Municipal Settings Evaluation as a potential long-term groundwater remedy. Project oversight also included communication with all interested parties (TCEQ, local officials and residents), asset management, scheduling and budgeting.

Project Manager; Connecticut Property Transfer Act & Solid Waste Management Confidential Medical Device Manufacturer. Project value range $190,000 to $1 Million. Managed several Property Transfer Act filings related to groundwater and soil impacts associated with varies contaminants of concern (chlorinated volatile organics, metals and petroleum related compounds). Project management included groundwater delineation and monitoring, and soil investigation activities to delineate extent of contamination. Successfully negotiated with CT Department of Energy and Environmental Protection groundwater monitoring frequency and completion of investigative activities at three subject properties. Managed successful transfer and closure of construction debris landfill discovered on one industrial property during site investigation activities. Post-closure and financial assurance activities were completed and will remain in-place for the life of the permit.

Project Manager; New Jersey Industrial Site Recovery Act (ISRA); Confidential Medical Device Manufacturer. Managed four different ISRA filings associated with divestment of business and plant closures. One filing was related to groundwater and soil contamination, where property owner ultimately retained environmental responsibility for investigation and potential clean-up remedy. Other filings where NJDEP approval was received related to De minimis status and Site Assessment evaluation were no environmental impacts were documented.

Project Manager; Ohio Voluntary Action Program (VCP); Confidential Medical Device Manufacturer. Managed two industrial properties through the OH VCP. Predominant contaminant of concern was chromium; however, other metals were also evaluated, both in soils and groundwater. Covenant Not to Sue for both properties was ultimately granted by Ohio EPA in 2004. Properties were later sold to other parties as a result of the issuance of the covenants.

Corporate EHS Manager; North America; Confidential Medical Device Manufacturer. Conducted multi-media environmental, occupational health and safety compliance audits at industrial facilities in North America and Europe. Evaluated safety, environmental and transportation regulations for varies states and federal bodies. Supervised and trained compliance team auditors. Monitored operational compliance practices, investigated incidents, and conducted risk assessments. Performed complex compliance research and regulatory analysis, monitoring regulations and support business operations according to project plans.

Project Manager; Perfluorinated Compounds (PFCs); Confidential Medical Device Manufacturer. Completed facility evaluation in the State of New Hampshire associated with statewide Air Division Information Request relating to the documented use of PFCs (2016). Evaluation covered historical and current PFC usage and resulted in the state issuing a no further action determination.

Project Manager; Department of Transportation/Hazardous Materials Safety; Confidential Medical Device Manufacturer. Completed detailed incident report, corrective action plan and training program associated with an alleged hazardous material incident. Negotiated a reduced penalty and settlement agreement relating to incident with the Federal Aviation Administration (FAA). Transportation Advisor for company associated with shipment of lithium battery devices, lithium battery accessories, hazardous materials, and compressed gases within the United States and International countries.

TETRA TECH

JOSEPH (JOE) SENITA, PG

Senior Scientist/Project Manager

EXPERIENCE SUMMARY

Mr. Senita has 32 years of experience in the field of hydrogeology and environmental consulting throughout the US. His clients include private industry, government, and quasi-governmental economic development bodies. His experience includes assembling teams and effectively managing quality, schedule and budgets for projects and programs such as individual and multi-site/multi-national programmatic environmental assessments relating to business acquisition, divestiture and expansion with a focus on quantifying environmental liabilities and ongoing regulatory obligations/constraints. He has managed large, complex, and multi-disciplinary site remediation and redevelopment projects at former industrial sites. A key practice area is integrating brownfield site remediation into site reuse plans thereby providing value to the client as the "bridge" between the technical/regulatory aspects of remediation and site development stakeholders (owners, government and public). He has performed environmental site investigations pursuant to federal and state cleanup programs, particularly PA Act 2. Investigations include soil, groundwater and vapor modeling; ecological and human health risk assessment, remedial alternatives evaluation and remediation planning; wastewater treatment plant and process optimization, waste minimization, energy/facility life cycle analyses and environmental compliance/permitting for private industry. He has strong positive relationships with PADEP, OEPA and US EPA, among others.

RELEVANT EXPERIENCE

Project Manager; Dollar General Act 2 Site Remediation; Mainland LLC; Johnstown, PA. Project Manager for attainment of the Act 2 Site-Specific Standards (SSS) at this 1 acre site in downtown Johnstown on behalf of a private developer. The site was formerly used as a gasoline station, machine shop and flour mill, among other things. The site is being redeveloped as a retail shopping store. The project included integrating earlier environmental and geotechnical work completed by others with groundwater data collected by others to prepare a combined Remedial Investigation/Risk Assessment and Cleanup Plan to support a potential future residential land use pursuant to the Act 2 Site Specific Standard regulations that was approved by PADEP. The work included evaluation of vapor intrusion (VI) and fate and transport modeling for benzene and trichloroethene. Originally the only constituent of concern was benzene and attainment of the Act 2 Residential Non-Use Aquifer State Wide Health Standard (SHS) be pursued. TCE was identified during the pursuit of the PADEP Non-Use Aquifer Determination and the focus changed to attainment of the SSS. The Cleanup Plan included pathway elimination by constructing the development. Coordinated extensively with PADEP and the City of Johnstown to secure PA DCED Industrial Site Reuse Program (ISRP) characterization grants; securing approval to place Site soils at another local Act 2 Site and; addressing eight USTs discovered during excavation

EDUCATION

BS Geology, 1984, West Virginia University

AREA OF EXPERTISE

Hydrogeology; Environmental Site Investigation/Remediation

REGISTRATIONS/ AFFILIATIONS

Professional Geologist, Pennsylvania, PG00990G, 1993

TRAINING/CERTIFICATIONS

OSHA (29CFR 1910.120) 40 hour HAZWOPER

OSHA (29 CFR 1910.120) 8 hour Site Supervisor

OFFICE

Pittsburgh, PA

YEARS OF EXPERIENCE

32

YEARS WITH TETRA TECH

2

under Act 2 instead of the UST regulations. These efforts saved the client over $200,000 and saved the development project. The retail store opened in late summer 2016 and the Final Act 2 Report is being submitted in February 2017.

Project Manager; Confidential Industrial Site Act 2 Remediation; Meadville, PA. The six acre former industrial and R&D facility is currently owned by Crawford County who is negotiating the sale of the Site to a developer of senior housing. Initially the County desire to receive the liability protections afforded by Act 2 by attaining the Site Specific Standard for arsenic in soil. Upon collection of the data, completion of the risk assessment and discussion with PADEP, the County and the prospective purchaser, a decision was made not to pursue Act 2. The decision was based on the fact that the proposed development would eliminate the viable exposure pathways for to arsenic in soil to levels that meet the PADEP benchmarks. Therefore, the County and prospective purchaser were satisfied that the potential business risk was acceptable and the sale is proceeding.

Project Manager; Former GAF Building Materials Act 2 Environmental Site Characterization, Land Use Planning and Remediation; Erie County Convention Center Authority; Erie, PA. Project Manager for this $7.5M remediation project at a 13 acre former roofing manufacturing Site on Presque Isle Bay (Lake Erie) which was considered a Great Lakes Treaty Area of Concern. This project is in the public eye, as this is that last large tract of undeveloped land on the Bay. The majority of the Site is comprised of "made land" consisting of off-spec shingles and "tar paper" with tar and viscous non-aqueous phase liquids (NAPL). The constituents of concern are semi-volatile organic compounds, VOCs and metals in soil and groundwater along with asbestos containing materials. Managed a wide variety of professionals including engineers, landscape architects, commercial market analysts, as well as earth work, waste disposal, slurry wall and sea wall installation subcontractors. Responsible for completing environmental investigations necessary to demonstrate attainment with the PADEP Act 2 Site Specific remediation standard to allow for residential reuse. Concurrently managed the completion of land use planning activities necessary for the owner and the community to determine the best end use for the Site. Completed a "Conceptual Land Use Plan" that included local market analyses and extensive outreach to direct stake holders and the general public to determine the appropriate end use for the Site. Remediation plans were then prepared to accommodate the desired mixed residential/commercial end use. Obtained PADEP approval of the Act 2 Remedial Investigation Report, Human Health and Ecological Risk Assessment, Act 2 Cleanup Plan, Final Report and Environmental Covenant. The work included extensive assessment of potential on-going impacts to the Bay, a sensitive ecosystem. Prepared NPDES construction and post construction storm water management permits for remediation and the final development along with a joint PADEP/USACE 105 encroachment permit for piping an open storm water drainage feature and construction of a sea wall. The permitting approach has allowed the owner to quickly move into redevelopment. Oversaw remediation and risk mitigation through the removal and crushing of 10 acres of concrete floors/foundations for reuse on-site as sub base for future construction; closing a 2,500 foot gas well; construction of a 500 foot slurry wall to prohibit off-site NAPL migration; placement of a 12 acre cover system to eliminate the direct soil contact exposure pathway; construction of the on-site storm water management system to accommodate future development, and; construction of a 1,000 foot long steel sheet pile seawall. Because of effective management, sufficient funds remained to incorporate a 1,000 foot long public park along the Bay into the Site cover system. Following PADEP approval of the Act 2 Final Report, Mr. Senita managed the on-site treatment of contaminated groundwater and waste that are generated during Site development.

Program Manager; US EPA, PADEP and PA DCED Funded Brownfield Assessment Programs; Lycoming County and Lawrence County, PA. Supported both counties in developing their Brownfield revitalization programs using USEPA Brownfield Assessment Grant Funding along with funding from PADEP and PA DCED. Developed site ranking strategies to identify those sites which have the most economic development potential for the community. Based on those results, over 50 environmental assessments were completed. Worked with clients and site owners to implement strategies for addressing environmental issues and making the sites shovel ready for reuse. Worked closely with the public and various local and state agencies to ensure that regulatory concerns were addressed and that public perceptions were accurate. Was instrumental in "connecting" prospective end users with the economic development

agencies to the benefit of both. Because of the quality of the work, he has been able to support clients in creating a positive public image and obtaining follow on funding.

Project Manager; Act 2 Site Characterization and Solid Waste Landfill Closure; Confidential Former Chemical Manufacturing Facility, Washington County, PA. Project Manager for this 87 acre site that had been historically used as the surface works for deep bituminous coal mining as well as a chemical manufacturing facility. The Site was impacted with VOCs and metal contamination in soil and groundwater and contained a 3 acre permitted landfill used to dispose of chemical manufacturing waste. Provided public water to nearby residents whose well water contained similar constituents as those found on the Site. Following that, obtained PADEP "non-use aquifer" determination. Assessed the BTU content and physical properties of approximately 100,000 cy of coal refuse for potential reuse in electrical power generation. Prepared and implemented Landfill Closure Plans and permits to remove 40,000 cy of solid waste from the landfill and dispose off-site in accordance with EPA and PADEP solid waste regulations. Developed waste segregation and disposal strategies that resulted in over $1.5M in savings. This project required close coordination with the PADEP Act 2, Solid Waste and Surface Water Quality personnel in the PADEP Southwest Regional Office.

Project Manager; Former Brodart Site Act 2 Site Characterization, Remediation and Redevelopment Support; Williamsport, PA. Managed $1.5M redevelopment project at a 3.5 acre industrial site that contained a 4 story brick office building and wooden manufacturing building that occupied an entire city block in a blighted urban area adjacent to an active CERCLA NPL site. Work began with a Phase I ESA conducted as part of Lycoming County's US EPA Brownfield Assessment Program managed by Mr. Senita. The site entered the Act 2 program in 2010 and the Act 2 Remedial Investigation, Risk Assessment and Cleanup Plan were completed using funding from PADEP and PA DCED ISRP. Concurrent with managing that work, supported the County and City in forming a conceptual land use plan. A developer was identified in 2012 via the National Brownfield Conference and Mr. Senita supported the City in securing an ISRP Remediation Grant. Coordinated with the developer to ensure that development plans complied with the approved Cleanup Plan. Site remediation was completed in 2013 and market rate housing was constructed in 2014. This project is the corner stone for on-going neighborhood revitalization efforts and has been highlighted at PADEP and US EPA Brownfield conferences. Because of the thoroughness of the work and his strong collaborative relationship with PADEP and the developer, the Act 2 Final Report and Environmental Covenant were approved by PADEP in an expedited manner, thereby allowing the developer to claim several million dollars in tax credits. The tax credits were a crucial piece of financing for this $17MM development – without them the development may not have gone forward. Site characterization included soil sampling, groundwater monitoring well installation/sampling and soil vapor sampling. Contaminants include metals and SVOCs in soil as well as VOCs in groundwater and soil vapor. The risk assessment evaluated future potential residential and construction worker exposure via direct contact and vapor intrusion pathways. Remediation included asbestos abatement/demolition; recycling of masonry demolition debris for use on site as cover material; covering the impacted soils with clean fill, and; installing passive vapor mitigation in new structures.

SCIENTIFIC/TECHNICAL PUBLICATIONS

2015: Pennsylvania Department of Environmental Protection Annual Brownfield Conference "Planning, Collaboration & Performance; Remediation of the former GAF Building Materials Site, Erie, PA"

2012: Pennsylvania Chapter AICP Conference Presentation "Tar Water and Fish"

2008 and 2010: Pennsylvania State Association of Township Supervisors presentations on USEPA Brownfield Assessments and Economic Development.

TETRA TECH

MARY M. MANG, CHMM, PMP

Project Manager

EXPERIENCE SUMMARY

Ms. Mang is a project manager with 25 plus years of experience in the environmental consulting field. She has worked with a wide variety of clients including private industry, government agencies, municipalities, and legal and engineering firms. Ms. Mang has expertise in development of work plans and associated field investigation documents (field sampling plans, quality assurance project plans, health and safety plans, etc.); oversight of treatment systems operations, maintenance and monitoring; identification and screening of remedial alternatives for soil and groundwater media; development of feasibility studies and remedial action plans; and preparation of conceptual and final design plans, technical specifications, and construction quality control/quality assurance programs. Her project experience includes RCRA compliance and reporting, CERCLA and RCRA Corrective Action programs, Pennsylvania Act 2, New Jersey Site Remediation Reform Act (SRRA), and underground storage tank (UST) regulations. On behalf of her clients, Ms. Mang has actively participated in regulatory negotiations of Consent Orders, permit conditions, and scopes of work within EPA Regions 1, 2, and 3.

RELEVANT EXPERIENCE

Project Manager; Voluntary Investigation/Cleanup; Confidential Commercial Client; Pennsylvania. Managed $2.6M voluntary investigation project at an active manufacturing and research facility. Provided investigation support including vapor intrusion monitoring of two occupied buildings. Project objectives include delineation of chlorinated solvent plume in groundwater and assessment of vapor intrusion impacts. Field investigation included installation of monitoring wells, borehole coring and rock matrix sampling and analyses, geophysical testing and logging, aquifer pumping tests, soil sampling, and sub-slab vapor and indoor air sampling. Managed preparation of two EE/CAs to address sub-slab vapor impacts. Successfully met all project deliverable schedules and financial goals.

Project Manager; HHRA and Ecological Screening; Confidential Commercial Client; Pennsylvania. Project Value $50K. Managing a human health risk assessment and baseline ecological screening study at an active manufacturing and research facility. Identified human health receptor populations and exposure pathways as part of conceptual site model (CSM) development and risk evaluation. Baseline ecological screening conducted in accordance with PADEP and EPA guidance.

EDUCATION

M.S.E., Civil Engineering, 1983, University of Pennsylvania

B.S., Pomology, Cornell University, 1977

A.S., Liberal Arts-Math/Science, Niagara County Community College, 1975

AREA OF EXPERTISE

CERCLA; RCRA; UST/AST; TSCA

REGISTRATIONS/ AFFILIATIONS

CHMM, 1998, No. 9105

PMP, 2015, No. 1798394

TRAINING/CERTIFICATIONS

OSHA 1910.120, 40-Hour HAZWOPER

OSHA 1910.120, 8-Hour Refresher, Annually

OSHA 1910.1030, Bloodborne Pathogens Training

OSHA 1910.1200 Hazard Communications

OSHA 1910.120, 8-Hour Supervisor

OFFICE

King of Prussia, Pennsylvania

YEARS OF EXPERIENCE

25+ years

YEARS WITH TETRA TECH

17 years

Project Manager; Act 2 Remediation Project; Pennsylvania. Provided technical input and in-field oversight of environmental remediation activities conducted as part of an interstate highway construction project. Work included excavation and disposal of PCB-impacted soil; excavation and disposal of RCRA hazardous lead-contaminated soil and debris; sampling and analysis of asbestos-containing materials including roofing, siding, and flooring, abatement technology review and surveillance of abatement activities; closure of both aboveground and underground storage tanks; and monitoring well closeout. Reviewed and commented on numerous contractor submittals such as subcontractor qualifications, health and safety plans, sampling data quality assurance plans, Site Work Plan, and required PADEP and/or City of Philadelphia permit submittals. Coordinated between representatives of the PennDOT, the design engineer, the project construction manager, and the construction contractor/subcontractors.

Project Engineer; Groundwater Feasibility Study; Crossley Farm CERCLA Site; Hanover Township, Pennsylvania. Prepared FS for remediation of a site with volatile organic compound (VOC) contaminated groundwater. Media of potential concern included site groundwater, surface water, sediment, soil, and off-site residential drinking water supplies. The FS analysis included the identification of ARARs and preliminary remediation goals, the review of various groundwater treatment technologies, identification of conceptual remediation alternatives, a detailed comparison of the proposed alternatives to applicable criteria, and an estimate of capital and long-term operation and maintenance costs.

Project Manager/Engineer; Chemical Manufacturer; RCRA Corrective Action; Pennsylvania. Implemented RCRA Corrective Action activities at an 800-acre facility owned and operated by a major chemical manufacturer. Participated in negotiations with USEPA and the client on the RCRA work that was conducted per a 3008(h) consent order. Coordinated with the client, regulatory agencies, and the local community to plan for or implement RCRA Facility Investigations (RFIs) or Corrective Measures Implementation (CMI) activities of five USEPA-approved study areas involving 23 solid waste management units (SWMUs). RFI activities included monitoring well installation, groundwater sampling, soil and waste characterization, terrain conductivity surveys, specific conductance profiling, and seismic reflection surveys. Also involved with the preparation of a site-wide groundwater flow model and a fate and transport study integral to the preparation of risk assessments for two of the study areas.

Project Manager; Inactive Industrial Waste Landfill Closed Under the RCRA Corrective Action Program; Pennsylvania. Managed various RFI field investigations that included groundwater and surface water sampling, soil and waste characterization, and geophysical surveys of a 60-acre industrial waste landfill. Prepared two risk assessments, which involved selection of indicator chemicals, identification of exposure pathways and exposure point concentrations, and development of environmental models. The final USEPA-approved CMS considered excavation, groundwater recovery and treatment, cutoff walls, leachate collection systems, and capping, and included detailed cost estimates for a number of remedial alternatives. Participated in the negotiation of an EPA Consent Order outlining the CMI requirements. Final design of the approved corrective measures included coordination with federal (EPA, USACE, etc.) and state regulatory agencies. The selected measures included impermeable and permeable capping systems, soil-bentonite cutoff walls, and leachate collection and monitoring systems. During the construction phase, was involved in various sampling activities and design related issues.

Project Coordinator for Phase I Remediation Activities; Chemical Manufacturer; Pennsylvania. This project involved the excavation of approximately 85,000 cy of bulk and drummed materials waste, replacement within the existing landfill, and slope reestablishment. The waste was moved to allow for the future construction of a soil-bentonite slurry wall. Coordinated activities with the client, USEPA, and the USACE. Worked closely with the facility Public Affairs Manager in providing information to and coordinating the planned construction activities with Township representatives and community groups.

TETRA TECH

DANIEL FORLASTRO, P.E.

Senior Project Manager & Principal Engineer

EXPERIENCE SUMMARY

Mr. Forlastro has 31 years of civil and environmental engineering and remediation experience in hazardous, industrial, and solid waste management under RCRA, CERCLA, and state waste management programs. He has performed engineering investigations, remedial designs and feasibility studies. He is knowledgeable of the design and closure of solid and hazardous waste facilities and the implementation of waste treatment and recovery technologies. He has conducted hydrological and geotechnical investigations for site development and operation of municipal solid, industrial, and hazardous waste landfills. He has been construction manager for civil construction and environmental remediation projects. He has conducted slope stability analyses; designed and installed erosion and sedimentation control systems; provided geosynthetic design and construction services; developed closure plans for hazardous waste sites; and implemented corrective action plans at RCRA and CERCLA sites.

RELEVANT EXPERIENCE

Project Manager; Act 2 Remediation of Former Tar Manufacturing Facility; Presque Isle Bay, Erie, Pennsylvania. The project included removal of building foundations, tanks, pits, and waste materials, barrier wall installation, sheet pile sea wall installation, grading, and construction of a community park area. The project was conducted under the Pennsylvania Act 2 voluntary cleanup program.

Project Manager; Former Lagoon Closure; Chemical Manufacturing Facility; McDonald, Pennsylvania. The closure included regrading of the lagoons, installation of groundwater interceptor trenches around the lagoon perimeters, and placement of an asphalt cap over the regraded lagoons.

Project Manager; Former Lagoon Closure; Glass Manufacturing Facility; Creighton, Pennsylvania. The closure included construction of a clay soil cap, regrading and reinforcement of the lagoon walls to prevent potential failure, and construction of a surface water management system to handle storm water run-on and run-off.

Project Manager and Supervising Engineer; Former Chemical Facility Brownfield Site Remediation; Buffalo, New York. The facility was remediated through the New York State Brownfield Cleanup Program. The project location is separated into five sites. Responsibilities included remedial design preparation, oversight of remedy implementation, preparation of final engineering reports, and preparation of site management plans to

EDUCATION

B.S., Civil Engineering, University of Pittsburgh

AREA OF EXPERTISE

Civil Engineering and Construction – Design & Management, Investigations and Remedial Action Plans

REGISTRATIONS/ AFFILIATIONS

Professional Engineer – Illinois, New York, Pennsylvania, West Virginia

Licensed Remediation Specialist – West Virginia

Licensed Engineering Contractor – West Virginia

TRAINING/CERTIFICATIONS

40 Hour OHSA HAZWOPER, 8-Hour HAZWOPER Supervisor, First Aid & CPR

OFFICE

Pittsburgh PA

YEARS OF EXPERIENCE

31

implement operation, maintenance and monitoring activities. Remedies included groundwater extraction and treatment for VOCs, barrier wall installation, riverbank restoration, and cap installation.

Project Manager; Soil and Groundwater Remediation System Operation; Ohio VAP Site; Western Ohio. The dual phase remediation system used a high vacuum pump to recover soil vapor and groundwater impacted by chlorinated solvents. Oil recovery from the groundwater table using a pump and skimmer system was conducted as an ancillary activity to the soil and groundwater remediation for solvent impact. The project was conducted under the guidance of the Ohio Voluntary Action Program.

Project Manager; Engineering Design and Remediation; Active Tar and Chemical Plant; Chicago, Illinois. Soil and groundwater impacted by SVOCs and VOCs were encountered at the site. The project involved directing the site through the Illinois EPA's Site Remediation Program (voluntary action) to achieve no further action status. The project included all plan and submittal preparation for investigation, engineering design, and remediation activities in accordance with SRP requirements, implementation of the plans when approved by Illinois EPA, and preparation of reports documenting the work performed.

Project Manager; Sediment Remediation Projects; Vermont and South Carolina. The South Carolina project involved the dredging of sediment from a river and marsh areas at a former phosphate chemical facility. The project was located adjacent marina and the sensitive marsh ecosystem, which could not be adversely impacted by the work and required detailed restoration after remediation. The Vermont project involved the excavation and capping of former talc mine tailings ponds. The ponds were excavated, stabilized, and covered with a soil cap. Project difficulties included the consistency of the talc and the need for a dewatering system.

Project Manager; Engineering Design and Remediation Oversight; Missouri RBCA Site; St. Louis, Missouri. The project included remediation of soil impacted by PCBs, pesticides, and dioxins. The project included removal and replacement of a railroad spur, soil excavation and offsite disposal, excavation and replacement of an 18-inch concrete storm sewer, and site restoration. The project was conducted under the guidance of the Missouri Risk-Based Corrective Action Program.

Project Manager; Hazardous Soil Removal and Cap Construction; Former Manufacturing Facility; North Smithfield, Rhode Island. Approximately 20,000 cubic yards of hazardous soil were excavated and transported off-site for thermal destruction. The excavations were backfilled with imported soil. A low-permeability soil cap was constructed in an area adjacent to the excavations to prevent contact with waste materials.

Project Manager; PCB Remediation; Manufacturing Facility; Cincinnati, Ohio. The remediation consisted of removing 20,000 tons of PCB-contaminated soil from an existing drainage ditch, while diverting 25 active discharge lines from the manufacturing facility. A concrete ditch was constructed upon removal of the PCB soil. Additional site work included installation and operation of an on-site waste water treatment plant, installing 60-inch diameter pipes beneath an active railroad using boring and jacking techniques, and construction of a new storm water drainage ditch lined with a clay geocomposite and rip rap.

Civil Engineer; Buried Drum Removal; Chester County, Pennsylvania. Engineering design and implementation of buried drum removal. Developed drawings and specifications for performing the buried drum removal and acting as the on-site engineer and client representative during the drum removal effort.

Civil Engineer; Lagoon Closure; Ambridge, Pennsylvania. Design included regrading, a low-permeability cap system, and a perimeter soil-cement-bentonite slurry wall. Was site engineer during construction.

Civil Engineer; Hazardous Site Closure; Buffalo, New York. The design required isolating a contaminated peninsula from the Buffalo River for a site located adjacent to an active chemical facility. The design included slope stabilization of the riverbanks, perimeter slurry wall, low-permeability cap using a geomembrane liner, groundwater collection and conveyance system, and an on-site groundwater treatment system.

TETRA TECH

JOHN E. MIZERAK, MPA

Project Manager

EXPERIENCE SUMMARY

Mr. Mizerak has worked for more than 19 years in both the public and private sectors, providing a wide variety of services related to strategic community and economic planning. The focus of these services is to provide decision-makers the necessary information and data in order to define projects, set priorities and define steps necessary for project implementation.

Mr. Mizerak manages Tetra Tech's Economic Development Program Practice Area. In this position, he works with public- and private-sector clients to identify and implement their priority projects. These efforts include identifying and prioritizing a community's infrastructure improvements, economic development opportunities, disaster recovery and resiliency projects, and other initiatives that focus on the collective support necessary to complete a project. Once projects have been identified, Mr. Mizerak assists with the development of financing strategies to leverage local, state, federal, and private funding for project implementation.

He has first-hand experience working with elected officials, planning commission members, private developers, key stakeholders and the general public to develop and implement community and economic development projects.

RELEVANT PROJECT EXPERIENCE

Economic Development Program Manager with Tetra Tech. Utilizing experts and design professionals from Tetra Tech's comprehensive service areas, Mr. Mizerak manages the entire continuum of community and economic development projects. This continuum includes the development of strategic plans, preparation of public funding strategies, securing funding, and managing drawdown, developing economic impact analyses to identify and quantify the impacts of future development or redevelopment; and assisting clients with interfacing with the local, state, and federal agencies for the various reviews of any required approvals related to successful project development and implementation.

Lycoming County "Implementable" Comprehensive Plans and Project Implementation, Pennsylvania. During the past seven years, Mr. Mizerak has assisted the County with the development of annual strategic plans and implementation of public funding strategies to secure and leverage public funding. Currently, he is assisting the County with the development of six multi-municipal comprehensive plans and the county comprehensive plan under the guides of Pennsylvania's *"Creating an Implementable Comprehensive Plan"*. During the development of these plans, Mr. Mizerak has been involved in the development of the process for the steering committees, public and community

EDUCATION

MPA, Public Administration
Shippensburg University, 1993

BS, Public Administration
Shippensburg University, 1992

AREAS OF EXPERTISE

Community and Economic Development Strategies/Plans

Public Funding Strategies

Community Outreach and Public Participation

Community Recovery and Resiliency Plans

State Policy Development & Analysis

Program Management

Redevelopment Projects

CDBG-DR program

Policy Development

Training

OFFICE

Harrisburg, Pennsylvania

YEARS OF EXPERIENCE

19

outreach, engagement with key focus groups, development of the proposed projects and will include the development of public funding strategies; all focused on the implementation of priority projects. He has also worked with the county annually to identify their priority economic development projects and strategically plan for their implementation. The implementation included developing public funding strategies to access and leverage state, federal and private funding for the projects in excess of $50 million for infrastructure, housing, brownfield, emergency management, economic development projects.

Dauphin County Economic Development Corporation. Mr. Mizerak has been working with the Corporation on several significant community and economic development projects. He worked with the Corporation and Authority to develop the County's first Redevelopment Plan. With this project, his team worked with the county and its 40 municipalities to identify and prioritize properties that are in need of redevelopment. Once the prioritized list was complete, he led the development of site profiles for each property which provides critical information needed to market these sites for redevelopment. He led the development of the County's Regional Community Rating System Initiative. Mr. Mizerak led the development of the County's Community Rating System (CRS) Initiative. In an effort to assist the County with identify ways for its 40 municipalities to address the negative impacts of rising flood insurance premiums while making them more resilient to flooding, Mr. Mizerak led the team with educating the municipal leaders about CRS through a series of educational workshops, developed a baseline assessment tool to be used to assess the current status of each municipal governments floodplain management program and develop recommendations for improvements, and will assist the interested municipalities with applying to FEMA to enter the CRS program. Since the baseline assessments were completed, there are 10 municipalities that are initially interested in applying to the program and his team will be assisting them through the process. He is currently leading the development of the County's Consolidated Plan. This plan provides guidance to the County for the use of its annual allotment of Community Development Block Grant funding. The funding is used for community and economic development projects with a focus on projects in areas of low-to-moderate income.

Chalfont Borough, Pennsylvania. Mr. Mizerak worked with the Borough to implement their Redevelopment Plan. He has assisted them during meetings with interested developers. As these discussions further developed into a project, Mr. Mizerak worked with his team to lead the Borough with identifying public funding to leverage with the potential development. The Borough has received $1 million in competitive grant funding for redevelopment projects.

Borough of Lansdale, Pennsylvania. Mr. Mizerak was responsible for assisting the Borough of Lansdale through a major community and economic development project that once complete will transform the borough. The borough owned a surface parking lot directly adjacent to a local mass transit station. He led the borough through a process to build a public and private partnership and select a private developer to build a mixed use development including a parking structure on the site. He built the necessary relationships between the borough, the borough's Parking Authority, the private developer, the mass transit provider, the State's Departments of Transportation and Community and Economic Development and other key community stakeholders to plan for the project, identify, secure and leverage public funding for the project and ultimately implement the project.

Land Use and Transportation for Economic Development, Pennsylvania Department of Community and Economic Development. While working for the Pennsylvania Department of Community and Economic Development, Mr. Mizerak managed the initiative with the Departments of Community and Economic Development, Environmental Protection, Conservation and Natural Resources, Transportation and Agriculture to develop policy and programs that promoted regional planning and project implementation. Coordinated meetings with the seven Local Development Districts, the Delaware Valley Regional Planning Commission to develop process to identify projects of regional significance and coordinate state agency funding support for project implementation.

Land Use and Growth Management Report. While working for the Pennsylvania Department of Community and Economic Development, Mr. Mizerak led the development and publication of the State's Inaugural Land Use and

Growth Management Report. Required by law to be published every five years beginning in 2005, the report was required to provide an assessment of statewide and regional growth and development patterns and offering a series of strategic policy recommendations to Commonwealth agencies for coordination of executive action, regulations and programs. Mr. Mizerak developed the process for the development of this report which included collecting and analyzing data and statistics related to the growth in the State, outreach to the 67 county planning departments/agencies, local governments officials, private companies and other key community and economic stakeholders.

Policy Manager, Pennsylvania Department of Community and Economic Development Governor's Center for Local Government Services. Mr. Mizerak managed the Department's Statewide Land Use Planning and Technical Assistance Program. He was responsible for establishing and implementing the programs' priorities for the utilization of the annual multi-million dollar budget for land use and community and economic development planning projects. He assisted counties and municipal governments with developing strategies to leverage local, state and federal funding. He also developed and coordinated the State's training program and technical assistance program for land use planning which was available to county and municipal officials.

He managed the State's Interagency Team on Land Use, which contained executive-level staff from 15 state agencies and 7 offices of the governor and was responsible for the development and coordination of state agency policy and funding for local planning, facility, infrastructure, and economic development projects. He also managed the State's initiative to Integrate Land Use, Transportation and Economic Development working with the seven Local Development Districts and the State's Planning Board which was responsible for studying the local governance structure in the State and making recommendations for improving the efficiency of delivering services.

Led the development of the State's newly created Transit Revitalization Investment District (TRID) program. After passage of the legislation creating this new and innovative economic revitalization tool, Mr. Mizerak led the effort to develop the program along with State Agency partners like the Department of Transportation, Environmental Protection and Conservation and Natural Resources. Once the program was created, he led the development and offering of training programs for municipal and county officials throughout the Commonwealth.

Loan Servicing Division - Single Family Loan Service Division, Pennsylvania Housing Finance Agency. In this position, Mr. Mizerak worked with PHFA's first-time homeowners with FHA and non-FHA mortgages. He had daily interaction with mortgage-delinquent homeowners to assist them with meeting their obligations under the mortgage agreements, and developed financial strategies to help them stay in their homes and prevent foreclosure. He also serviced homeowners in the State's Homeowners' Emergency Mortgage Assistance Program for any residents that were delinquent with their mortgages. The focus of this program was to prevent foreclosure by providing financial assistance to homeowners to bring them current on the mortgage payments.

TETRA TECH

KATHERINE S. SUPER, M.S., DABT

Senior Toxicologist

EXPERIENCE SUMMARY

Katherine Super, M.S., DABT is a toxicologist and risk assessment manager with 25+ years of experience in both human health and ecological risk assessment and toxicology. A board-certified toxicologist, she utilizes her toxicology training to evaluate the strengths and weaknesses of toxicology studies upon which USEPA-derived toxicity criteria are based. Ms. Super has conducted risk assessments under many state environmental programs, including Pennsylvania Act 2. She has conducted risk assessments and supported risk-based remediation efforts under UST as well as State Superfund regulatory programs. She has extensive risk assessment experience with metals including arsenic, lead, and chromium; PCBs and 2,3,7,8-TCDD regulatory, toxicity, and bio-accumulative considerations; methodologies for toxicity evaluation of complex mixtures, such as total petroleum hydrocarbons (TPH) and PAHs; and VOCs (including petroleum components and chlorinated solvents) and exposure pathways such as vapor intrusion.

RELEVANT EXPERIENCE

Mainland DG Brownfield Site, Johnstown, PA. Conducted a Site-Specific Pennsylvania Act 2 Risk Assessment to support commercial redevelopment and unrestricted future use. Chemicals of Potential Concern (COPCs) in groundwater reflected historical operations as a gas station. PADEP approved the Risk Assessment and Clean-up Plan that proposed likely Activity and Use Limitations (AULs) and compliance reporting requirements included in an Environmental Covenant (EC).

Cold Rolling Oil Release Area, Alumax Mill Products Facility, Lancaster, PA. Conducted a risk assessment to support Act 2 Site-Specific Standard for rolling oil release that included a risk evaluation of a proprietary-formulation rolling oil that was released to environment. Argued by lines of evidence that some of the components were likely of low toxicity based on MSDS and limited toxicity data, chemical class, and with toxicological information of similar (surrogate) chemicals, and USFDA approval for use of chemical as direct or indirect food additives. Reviewed and applied the Massachusetts DEP and TPH Working Group's Surrogate Toxicity approach to TPH fractions and key petroleum chemical analysis.

Aspinwall Waterworks Site, Aspinwall, PA. Prepared a site-specific Pennsylvania Act 2 risk assessment to support the risk-based closure of the Aspinwall Waterworks Site for redevelopment as a public park. COPCs were metals and carcinogenic PAHs in soil, and some metals and chlorinated solvents in groundwater.

Etna Riverfront Property, Pittsburgh, PA. Prepared a site-specific Pennsylvania Act 2 risk assessment for metals and PAHs in soil and chlorinated solvents in groundwater. PADEP approved risk-based closure under the Site-Specific Standard of Act 2 for this site based on the risk assessment.

EDUCATION

M.S.; Environmental Biology (emphasis Toxicology); Ohio State University; 1985

B.S.; Biology; Westminster College; 1981

AREA OF EXPERTISE

Toxicology and Risk Assessment

REGISTRATIONS/ AFFILIATIONS

NA

TRAINING/CERTIFICATIONS

Diplomate of the American Board of Toxicology (DABT; 1997)

OFFICE

Pittsburgh, PA

YEARS OF EXPERIENCE

25+

YEARS WITH TETRA TECH

18

Pennsylvania Chemical Plant. For one of the largest and most complex sites closed under Pennsylvania's Act 2, prepared human health and ecological risk assessments as part of an RI/FS for an active chemical plant along the Ohio River. The primary COPCs for this site were volatile organic chemicals in ground water (principally BTEX). Five of six investigation areas were closed according to the Site-specific standards, which are based on risk assessment. The sixth was closed under the State-wide Health Standard for mercury.

Risk Management During Brownfields Redevelopment, San Jose, CA. Conducted the redevelopment-specific risk assessment of the 18 acre Lenzen Yard, and incorporated this into the risk management plan for redevelopment of the property. The California Regional Water Quality Control Board (RWQCB) approved the risk-management plan for the Lenzen Yard, being redeveloped as an administrative and maintenance facility for Caltrain, a local commuter railroad. The primary constituents of interest at the site included TPH and arsenic.

Preliminary Endangerment Assessment (PEA) of Former Metal-Plating Facility, Southern California. Prepared a PEA risk assessment for a former metal-plating facility that was redeveloped as a storage facility. Developed a risk-based decision tree that guided soil remediation with the goal that post-remediation levels would be acceptable to DTSC. After redevelopment of the property, the PEA risk assessment was prepared according to published DTSC guidance and guidance provided in a phone conference with DTSC, and then submitted to DTSC. This included evaluation of vapor intrusion to indoor air using the DTSC's Johnson & Ettinger model.

Risk Assessment and Risk Management Plan for Redevelopment. Prepared a risk assessment following San Francisco RWQCB and USEPA Risk Assessment Guidance for Superfund (RAGS) guidance that supported risk management during redevelopment and the risk-based closure of a brownfields property in San Francisco for redevelopment as a storage facility. The San Francisco RWQCB approved the risk-based closure, which allowed PAHs to remain in soil at concentrations greater than industrial soil Environmental Screening Levels (ESLs).

RFI Risk Assessment of Dioxins in Groundwater and Miscellaneous Chemicals in Soil, Former Dye Production Facility, VA. Prepared a risk assessment that supported client's preferred remedy. First, the risk assessment evaluated hot spots separately from site-wide conditions resulting in acceptable risks for all areas besides hot spots. Second, the inclusion of site-specific data was successfully argued in negotiations with EPA Region III. Most significantly, site-specific lead solubility data were applied in the Integrated Exposure and Uptake Biokinetic (IEUBK) Model in the RFI Report in order to provide a more realistic risk evaluation for lead exposure.

RFI Chemical Plant, West Virginia. Involved in preparation of 30+ SWMU risk assessment for RFI Report submitted to EPA Region III. Used a screening risk assessment approach to eliminate consideration of large number of SWMUs to focus later phases of RFI on few potentially problem areas and environmental media.

RFI Coke By-Products Plant, Follansbee, West Virginia. Prepared a risk assessment and negotiated with USEPA Region III on behalf of the client. Constituents of concern included PAHs and benzene in soil, and dissolved phase from DNAPL in groundwater. Advocated the position that only realistic land use assumptions and complete exposure pathways should be addressed quantitatively in the risk assessment.

RI/FS, Multiple PRP Group Superfund Site, Nitro, West Virginia. Prepared a site-specific risk assessment for high profile Superfund site with many organic COPCs. Strategy for risk assessment included applying best science (in toxicology and fate and transport) and site-specific exposure assumptions to support no further action for soils.

No Action Decision, PCBs in Stream Sediments, Scippo Creek, Ohio. Prepared risk assessment that achieved a No Action Decision by Ohio EPA for PCBs in a small stream adjacent to a chemical plant. Site-specific fish ingestion pathway using fish tissue data for exposure assessment was a key element in the human health risk activity and use limitations (AULs)

Tetra Tech

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