



ABANDONED MINE PROGRAM SERVICES, EXPERIENCE, AND KEY PERSONNEL



Our Stake in Your Success Goes Beyond the Project

Multidisciplinary Experience

Kleinfelder is a leading engineering, construction management, design, and environmental professional services firm. Kleinfelder operates from over 100 office locations in the United States, Canada, and Australia. Established in 1961, we draw from a solid foundation of experience and thorough understanding of environmental, regulatory, economic, and civic conditions, to identify and address challenges with innovation and common sense. Using our multidisciplinary services, we collaborate with clients throughout the entire project lifecycle. Our understanding of each project phase allows us to develop innovative, cost-effective, and practical solutions that offer our clients increased flexibility, continuity, and coordination across all aspects of a project.



QUALITY
— A Company Culture —

Kleinfelder adheres to the highest standards of professional practice, maintaining a QA/QC Program identifying the procedures and controls to be used in project execution.

This Program includes processes for data collection, data verification, data mapping accuracy (i.e. for GIS uses), copy editing, document readability, legality, technical review, and quality of service. The QA/QC Program assigns responsibilities and accountability to each level of analysis and review, encompassing the informal needs for professional research and analysis as well as the stringent requirements of formal QA/QC demanded by data collection and environmental analysis, record keeping, and auditing.

Abandoned Mine Program Services

Kleinfelder's scientists, engineers, designers, and construction managers work together as a multidisciplinary team solving legacy mining issues. Our services include:

- Investigating watersheds and determining what abandoned mine lands and abandoned mine discharges to focus on first
- Designing abandoned mine land reclamation projects that remove hazards to improve land and water
- Designing abandoned mine drainage passive treatment systems and large-scale active treatment plants for the restoration of receiving waters
- Surveying, permitting, and construction management of reclamation and treatment projects
- Stream restoration survey, design, permitting, and construction management services to improve ecological habitat and recreational usage of waterways

Abandoned Mine Program Leadership



Sami Stahle, PE

Alabama, Illinois, Indiana, Kentucky, Maryland, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia

Senior Program Manager - Water, Facilities, and Abandoned Mines

Sami has 21 years of experience in mining and civil engineering, site assessment, and design for energy-related projects (mining and power), environmental permitting for infrastructure projects, feasibility studies, contract compliance and project management.

Sami is a licensed Professional Engineer, having current registration for multiple states, including Pennsylvania, New York, and Maryland. Sami has experience with project scopes ranging from initial development to construction management, in the realms of industrial and water treatment applications, mine site reclamation and refuse disposal, and transportation, as well as power- and energy-related with linear projects and facilities.

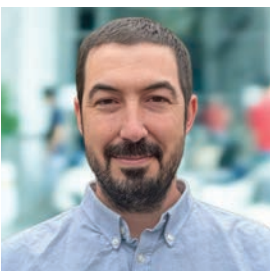


Thomas Clark

Project Development Manager and Lead Scientist

Tom has 28 years of experience specializing in the development of abandoned mine land reclamation and mine drainage treatment projects. Prior to joining Kleinfelder in March 2023, he served as the Mine Drainage Program Coordinator for the Susquehanna River Basin Commission for 16 years. Tom is experienced in the assessment of and restoration planning for mine drainage impacted watersheds. Tom is also an accomplished grant

proposal writer and is adept at finding the path of funding that your project needs to cross the restoration finish line. Tom is a biologist by trade and also has experience in aquatic ecological sampling procedures and macroinvertebrate and fish identification.



David "Ben" Gardner, PE

Engineering Manager and Mining Engineer

Ben has 19 years of experience in mining, environmental permitting, and acid mine drainage water treatment. His career started in the underground coal mines of West Virginia, where he obtained mine foreman certification before transitioning to engineering and design work. For the last 13 years, Ben has been centered in Pennsylvania, where he is a licensed Professional Engineer, and has been involved in a wide range of projects

from active underground mines to reclamation of abandoned mines to managing acid mine drainage water treatment sites that have treated more than one billion gallons of drainage a year.

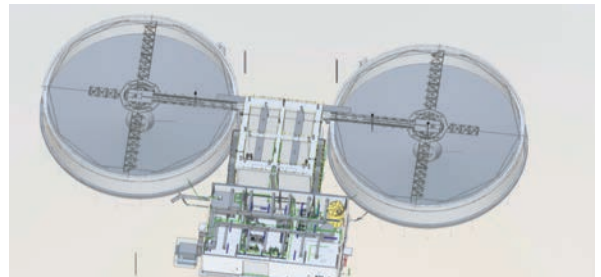


TECHNICAL CAPABILITIES

Abandoned Mine Program Services

Practice Areas

- AMD Treatment Process Evaluation and Design
- AML Reclamation Design
- Coal-to-Solar Energy Development
- Community Engagement and Public Relations
- Construction Administration and Inspection
- Ecological Assessment, Planning, and Permitting
- Field Data Collection
- Funding and Development Source Acquisition
- Independent Technical Peer Review
- Land Owner Engagement
- Mine Pool Control and Analysis
- Potable Water System Design
- Project Development and Feasibility Studies
- Retrofit/Rehabilitation Design
- Right-of-Way
- Risk Mitigation
- Slope/Slide Assessment and Stabilization Design
- Stream Channel Restoration and Sealing
- Subsidence Investigation and Mitigation Planning
- Survey Services
- Water Quality Improvements
- Watershed Assessment and Management



Banning Mine drainage treatment plan rendering



Kleinfelder team with community at public meeting



Abandoned mine land highwall investigation



TECHNICAL CAPABILITIES

Water Testing Laboratory Capabilities

Drinking Water Laboratory

Kleinfelder's drinking water laboratory in McClure, Ohio, is OEPA certified to perform MMO-MUG Analysis for Total Coliform by Colilert. The laboratory is certified every three years and participates in an annual proficiency test to maintain certification. "Proficiency Testing (PT) samples are used to measure a laboratory's proficiency in performing a particular drinking water approved method for specified parameters/analytes. In accordance with rules 3745-89-03, 3745-89-05 and 3745-89-06 of the *Ohio Administrative Code* (OAC), *Ohio EPA Laboratory Manual for Chemical Analyses of Public Drinking Water* (2020), *Ohio EPA Laboratory Manual for Microbiological Analyses of Public Drinking Water* (2020), and the United States Environmental Protection Agency's *Manual for Certification of Laboratories Analyzing Drinking Water* (5th ed.), each certified laboratory must participate and receive acceptable results for a PT study obtained from an approved PT provider."



Kleinfelder's McClure, Ohio, Laboratory

Wastewater - Mine Drainage Laboratory

Bench-scale testing required to correctly select and size treatment components for large-scale mine drainage treatment plants can be completed by Kleinfelder at our McClure, Ohio, laboratory about 40 minutes Southwest of Toledo. Kleinfelder's Process Engineers utilize this large laboratory space and testing equipment to develop and hone strategies for treating and mitigating the stream impact consequences of mine drainage treatment projects.



Morris Run Treatment Plant Rendering



TECHNICAL CAPABILITIES

Water and Environmental Resources Services

Comprehensive Solutions

The water and environmental resources team provides comprehensive water resources engineering, stream restoration, natural resources assessment, environmental permitting, and environmental compliance design services. Success has been the result of a strong client focus, providing innovative and practical solutions, while delivering quality products on schedule.

Practice Areas

- Construction Inspection and Post-Construction Monitoring
- Environmental Assessments, NEPA, and Permitting
- Environmental Compliance (SWPPP, SPCC, Industrial NPDES)
- GIS, Asset Management, and Resiliency Planning
- Hydrologic, Hydraulic, and Floodplain (1D/2D) Modeling and Analysis
- MS4, NPDES, and TMDL Services
- Stormwater and Drainage Design
- Stream and Ecological Restoration Design
- Water Quality Monitoring and IDDE Services
- Watershed Planning and Pollutant Load Reduction Modeling
- Wetland Mitigation, Creation, and Enhancement



Restoration and stormwater planning



Stream bank restoration and mitigation



Interceptor remediation

Shamokin Creek Abandoned Mine Drainage Treatment Plant Development

Shamokin Creek, located in central Pennsylvania's Northumberland County, is heavily impacted by abandoned mine drainage (AMD) from historical anthracite coal mining activity. Even though the mining occurred approximately 30 miles upstream of Shamokin Creek's confluence with the Susquehanna River near the City of Sunbury, Shamokin Creek still causes iron hydroxide staining at that confluence.

PROJECT RESULTS

This project aims to provide informed, comprehensive designs for active AMD treatment plants that can treat multiple outfalls conveyed to them for the ultimate goal of improving the quality of Shamokin Creek through the City of Shamokin and the 32 miles of mainstem currently listed as impaired to its confluence with the Susquehanna River.



MINE POOL OUTFALLS AND WATER QUALITY

The heavy volume of flow from four mine pool outfalls — Excelsior, Scott, Henry Clay Sterling, and Cameron — around the Shamokin area combine to contribute approximately 28 million gallons per day (MGD) on average to Shamokin Creek, and up to 76 MGD after high precipitation events. Ferrous oxide and sulphuric acid from the AMD and subsequent chemical reactions not only affect water quality and pH levels, but also settle on the creek beds, smothering out plant and animal life. The Shamokin Creek Restoration Alliance (SCRA) was founded 30 years ago to help advance and coordinate remediation of AMD across the Shamokin Creek Watershed. Kleinfelder partnered with SCRA to investigate and propose remediation plans for Shamokin Creek along its 32-mile mainstem.

INVESTIGATION AND REMEDIATION PLANS

Kleinfelder's remediation plans began with a comprehensive investigation of current conditions, including outfall data collection and mine pool mapping. A major goal of this project is to determine where to capture and convey mine pools to centralized plants that could treat multiple discharges. Data collection, including pressure transducers in the mine pools, are being used to monitor the changing water depths over a hydrologic year, informing the placement of treatment plants and pump stations, siting of conveyance lines, injection sites of treatment plant iron residuals, and if water storage can be created within the mine pool to lessen the max flows allowing for easier and more effective treatment plant operations. With this data in hand, Kleinfelder's professionals are forming a discharge conveyance plan and sludge disposal plan. Along with designing the treatment process and active treatment plant (ATP) to remediate AMD, Kleinfelder also is performing a real estate analysis for the ATP siting and pipe conveyance. These ongoing efforts will lead to providing estimated costs for design and construction of the APT, as well as a development report to inform decision-making.

Location:

City of Shamokin
and Coal Township,
Pennsylvania

Owner:

Shamokin Creek
Restoration Alliance

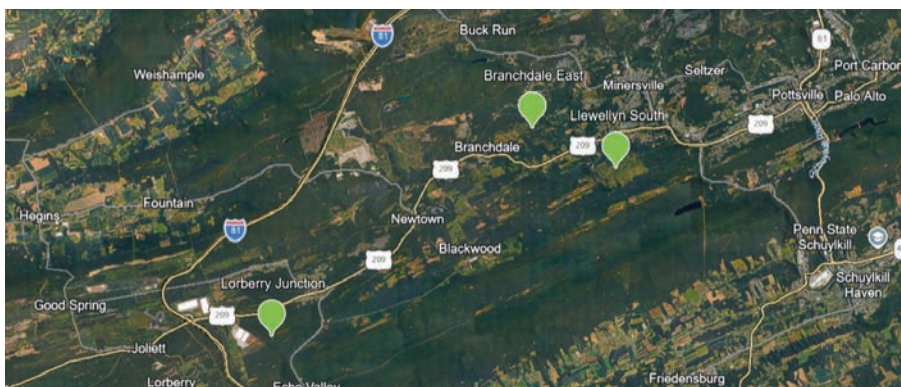


Schuylkill County Mining Impacts Remediation Program

Schuylkill County, Pennsylvania, is heavily impacted by legacy anthracite mining, with abandoned mine lands creating safety hazards and degraded habitat. Through reclamation at the Llewellyn South, Branchdale East, and Lorberry Junction sites, Woodlands for Wildlife (W4W) is restoring these landscapes to improve public safety, enhance environmental quality, and expand recreational opportunities.

PROJECT RESULTS

The reclamation program will transform large AML-impacted landscapes into safer, more accessible wildlife and recreation areas while expanding opportunities for hunting, fishing, and passive outdoor use. By eliminating hazardous features and reducing pathways for sediment and abandoned mine drainage impacts, the projects will also contribute to improved watershed conditions and enhanced ecological value.



COMPREHENSIVE RECLAMATION STRATEGY

W4W required a comprehensive reclamation strategy to address hazardous AML features, including stripping pits, spoil piles, highwalls, and abandoned mine shafts that pose risks to public safety and watershed health. The program also sought to preserve valuable aquatic and wildlife habitats while enhancing land accessibility for hunting, fishing, and other passive recreational uses. The three sites contain a complex mix of AML hazards that require site-specific remediation while supporting broader watershed restoration objectives. Existing flooded pits provide quality aquatic habitat and therefore must be preserved even as surrounding hazards are eliminated. Sensitive ecological considerations, including potential bat use of abandoned mine shafts and coordination with regional restoration partners, added complexity to project planning and design.

IMPROVING SAFETY AND ENVIRONMENTAL QUALITY

A coordinated reclamation program was developed to address hazards across the Llewellyn South, Branchdale East, and Lorberry Junction AML sites while maximizing environmental and community benefits. Engineering measures include regrading unstable spoil piles and highwalls, eliminating hazardous mine openings, and revegetating disturbed areas to establish long-term site stability. Biological assessments are being conducted to evaluate bat habitat within mine shafts, with bat-compatible gates and culverts incorporated where appropriate to maintain ecological function while improving public safety. At Lorberry Junction, beneficial reuse of dredged sediments from Sweet Arrow Lake County Park will support mine pit backfilling and site restoration, creating an innovative, multi-benefit solution through partnership with the Schuylkill County Conservation District.

Location:

Schuylkill County,
Pennsylvania

Owner:

Woodlands for Wildlife



Hawk Run Active Treatment Plant Development

The Moshannon Creek Watershed, one of the largest and the most mine-drainage-impacted tributaries to the West Branch Susquehanna River, was historically regarded as impossible to remediate. That perception changed with the passing of the Infrastructure Investment and Jobs Act and the \$250 million allocated to Pennsylvania annually for mine land reclamation and mine drainage treatment projects.

PROJECT RESULTS

This Phase I project is intended to complete investigations and needed data compilations, including design documents, permitting plans, and construction cost estimates, to treat the discharges impacting Hawk Run. These items will allow the Moshannon Creek Watershed Association to submit a future grant application for project completion.



NEW SOLUTIONS FOR 'IMPOSSIBLE' REMEDIATION

A 2020 watershed-wide assessment determined three prime areas of the Moshannon Creek Watershed were contributing 70% of the mine drainage loading. Hawk Run and its mine drainage discharges are one of those three locations, and offer the most iron loading to the Moshannon Creek mainstem. Due to the influx of Infrastructure Investment and Jobs Act funding, three large-scale active treatment plant projects are now in the early process of becoming a reality. The most upstream project is centered around discharges in the vicinity of Osceola Mills Borough; the second is located near the town of Hawk Run in Morris Township, Clearfield County, being advanced by Kleinfelder; and the most downstream plant being planned to treat discharges impacting the Sulfur Run tributary in Cooper Township, Clearfield County. The combined remediation impacts of these three planned plants have the potential of improving the Moshannon Creek mainstem water quality to an extent that allows fish species to re-populate.

MINE POOL COMBINATION POTENTIAL

While Hawk Run is impacted greatly from two shaft discharges from underground workings in the Lower Kittanning Coal Seam, another pool in the Ghem Mine which impacts Munson Run to the North, has the potential of being combined with the two pools that impact Hawk Run leading to a single plant treating three separate mine pools that could return water quality to two tributaries of Moshannon Creek. This project also will utilize thermal drone capabilities to help Kleinfelder and its client investigate and confirm that all mine discharge water impacting this area are accounted for and being collected. Mine water exits the underground at about 50 degrees Fahrenheit year round. This temperature is significant because it can be sensed by a thermal drone within surface waters, which have temperatures greater than 70 degrees during the summer months.

Location:

Morris Township,
Pennsylvania

Client:

Moshannon Creek
Watershed Association



Big Five Shade Creek Abandoned Mine Discharges Treatment Plant Development

The Shade Creek Watershed, the second largest tributary to the Stonycreek River in Somerset County, is heavily impacted by five large-flow mine discharges in close proximity. Being within a close radius allows for the combined treatment of those discharges in one centralized treatment plant. The plant will restore 3.5 miles of Dark Shade Creek, 10 miles of Shade Creek, and four miles of the Stonycreek River.

PROJECT RESULTS

The goal of this Phase I project is to complete investigations and data compilations that will inform the 10 percent conceptual design, as well as final design, construction, and permitting cost estimate of the centralized plant to treat the 'Big 5' discharges. This information and design will allow the Shade Creek Watershed Association to submit a grant application to gain funding for project completion.



A TALE OF TWO WATERSHEDS

Shade Creek is formed at the confluence of the aptly named Clear Shade Creek and Dark Shade Creek. Clear Shade Creek drains much of the Gallitzin State Forest and contains stretches of Exceptional Value, High-Quality, Wild Trout, and Class A Fisheries. Dark Shade, on the other hand, was mined for coal significantly, still has operational mines, and suffers the consequences of that industry, particularly the mining that occurred before the 1977 Surface Mining Control and Reclamation Act. Upon their confluence, Shade Creek is a paddler's dream containing sections of Class IV/V rapids. The aquatic habitat through this section is also of a quality that will allow Shade Creek to be a cold-water fishing destination and economic driver for Somerset County.

THE 'BIG 5'

While most of Dark Shade Creek is mined by both underground and surface means, the most significant impacts originate as drainage from five legacy underground mine entries: Reitz #4, Loyalhanna #6, Reitz #2 Upper, Reitz #2 Lower, and Reitz #1. Of those five, Reitz #4 and Loyalhanna #6 are the most impactful to Shade Creek, contributing 96 percent of the iron loading, 86 percent of the acidity loading, and 34 percent of the aluminum loading. Reitz #2 Upper is a major aluminum contributor at 22 percent. Reitz #2 Lower and Reitz #1 are smaller contributors, but can be easily captured and conveyed for added stream buffering for smaller downstream discharges.

STONYCREEK RIVER REVIVAL

Water quality of the Stonycreek River has improved significantly over the last few decades. It has changed from a river running orange down to its confluence with the Little Conemaugh River in Johnstown, Pennsylvania, to a river prized by paddlers with more sections holding sport fishing opportunities every year – even in downtown Johnstown. Shade Creek's abandoned mine discharge loading is one of the final issues for a successful environmental revival, which will be a contributing factor to a regional economic renaissance.

Location:

Somerset County,
Pennsylvania

Owner:

Shade Creek
Watershed Association
shadecreekwatershed.org



Morris Run Active Treatment Plant Facility Design

The Morris Run Active Treatment Plant will collect abandoned mine drainage water and provide treatment using a high-density sludge process. Treated water will be returned to local tributaries of the Tioga River and mitigate existing water quality impairments.

PROJECT RESULTS

This project is currently still in the design phase. The goal of the project is to restore the ecological habitat and fish populations of the Tioga River and Tioga Lake. Among the services contributing to this goal, Kleinfelder provided wastewater treatment design, environmental permitting, geotechnical services, and public engagement.



AN IMPACTED WATERSHED

The Tioga River Watershed is significantly impacted by five abandoned mine discharges. The discharges have rendered sections of the streams they discharge to and 22 miles of the Tioga River and several tributaries fishless, and impact the operations and water quality of the U.S. Army Corps of Engineers' Tioga Reservoir. Improved water quality at Tioga Lake could allow for low-flow augmentation management during drought periods for Tioga River users in Pennsylvania and Southern New York.

TREATMENT FACILITY SOLUTION

Kleinfelder is in the process of designing more than eight miles of gravity sewer and force mains and five separate pump stations to convey water to the active treatment plant site. At the treatment plant site, four mixing tanks and two 112-foot diameter clarifiers are planned to provide acid neutralization and metals precipitation. Sludge generated from the process will be pumped to injection wells one mile north of the treatment facility and treated water will be returned to local streams.

Once completed, the Morris Run Active Treatment Plant will include five discharges with a maximum flow of 15 million gallons per day, potentially making it one of the largest abandoned mine discharge plants in the world.



Location:

Morris Run, Pennsylvania

Client:

Susquehanna River Basin Commission



Banning Mine No. 4 Treatment Plant Upgrade and Reclamation Concept Design

The Banning and Euclid Active Treatment Plants located in Westmoreland County, Pennsylvania, were selected for replacement. The Banning Mine No. 4 water treatment plant was constructed in 1966 and for mine water control and to meet compliance discharge, and was re-activated in 1984 to abate mine pool surface discharge and elevation management.

PROJECT RESULTS

While still in the design phase of the project, it is expected that construction of the new treatment plant and other upgrades will begin as early as July 2024, with full commissioning as early as November 2025. With expanded capacity and attention to modern standards, the new facility will protect the waters of the Youghiogheny River and continue to function for many years.



EXISTING CONDITIONS AND CHALLENGES

The Banning Mine water treatment plant serves an important purpose in collecting mine water from the underground pool for treatment to allow suspended solids and metals to be removed to meet effluent limits. To prevent a surface breakout, the mine pool must be maintained below a specified elevation, and the infrastructure must include redundancy of equipment to limit plant downtime.

RECOMMENDATIONS AND GOALS

Kleinfelder's team of professionals recommended replacing the existing infrastructure with a mine water pumping and treatment facility having a capacity of 6,500 gallons per minute. The conceptual design includes a new operations building and three vertical turbine pumps. This allows two of the mine dewatering pumps to operate during normal conditions while one pump remains on standby.

The flood plain of the Youghiogheny River constrained the new plant locations and required that additional fill was needed to raise the plant and pump operations pads to prevent flooding.

Goals of Kleinfelder's design included maintaining the level of the mine pool, preventing surface discharges from the underground mine pool, meeting or exceeding the required effluent limits, and ultimately preserving the water quality in the Youghiogheny River. Throughout the process, Kleinfelder will provide a variety of services, including engineering, operations, permitting, maintenance, and construction administration.

Location:

Westmoreland County,
Pennsylvania

Owner:

Clean Streams
Foundation, Inc.



Quakake Tunnel Abandoned Mine Discharge Treatment Facility

The Quakake Tunnel abandoned mine discharge (AMD) treatment facility will treat the large-flow discharge impacting Wetzel Creek, Quakake Creek, and Black Creek to its confluence with the Lehigh River in Carbon County, Pennsylvania. The treatment plant will include tunnel outfall collection, a hydrated lime mix tank, polymer addition, two conventional clarifiers, and aluminum sludge handling.

PROJECT RESULTS

The goal of the project is to design and construct a mine drainage treatment plant which will restore 10 miles of Wetzel, Quakake, and Black Creeks to a viable sport fishery to their confluence with the Lehigh River. Black Creek, popular with paddlers, enters the Lehigh River within the Lehigh Gorge State Park.



A TROUT STREAM IN WAITING

The Black Creek drainage, including Wetzel Creek and Quakake Creek, is significantly impacted by a large-flow abandoned mine tunnel-drainage discharge. That discharge, which can be in excess of 20,000 gallons per minute after precipitation events, has rendered 10 miles of those potential cold-water streams as fishless due to added acidity and aluminum loading. The AMD-polluted Black Creek then confluent with the Lehigh River within the Lehigh Gorge State Park which will also be improved through the project.

TREATMENT FACILITY SOLUTION

Kleinfelder is in the process of value engineering an 85-percent active treatment plant design project for the Quakake Tunnel discharge. A part of the value engineering is the evaluation and consideration of other techniques in terms of discharge outfall capture and polymer usage that may allow higher flows to be treated within the clarifier-plant leading to more effective high flow treatment and better water quality within the Black Creek drainage. In addition, Kleinfelder will explore alternatives for management and handling of the primarily aluminum hydroxide treatment solid by-product that will need to be disposed.



Location:

Packer Township,
Pennsylvania

Client:

Pennsylvania Bureau
of Abandoned Mine
Reclamation



Kleinfelder is also evaluating methods to lessen costs and maintenance duties by reducing or eliminating stormwater impacts and detritus from entering the treatment plant.

Loyalsock Creek Passive Treatment Plant Redesign

The headwaters of Loyalsock Creek are a high-quality major sub-watershed to the West Branch Susquehanna River. The waters are impacted by two mine tunnel drainage discharges, which supply a significant level of acidity. Treatment systems designed and constructed in the 1990s resulted in some success in treating the discharge waters, but have been deteriorating in efficacy over time.

PROJECT RESULTS

The Loyalsock Creek Passive Treatment Plant is currently in the design phase, with plans to complete designs by early 2024 and begin construction by late 2024.

Treatment of large flows will decrease the aluminum concentration and, most notably, increase the pH and alkalinity concentrations in Loyalsock Creek, which will improve the mainstream fishery.



PLANS FOR NEW TREATMENT INFRASTRUCTURE

To correct the deteriorating infrastructure, Kleinfelder was selected to design two new passive treatment systems for the mine water discharges. The new treatment facilities will treat higher rates of discharge and will offer easier operations and maintenance for the plant operator.

CHALLENGES AND GOALS

Adequate design of a new treatment solution provided three significant challenges:

- The need to design a passive water treatment system that can treat higher volumes of influent than systems built in the 1990s
- Loyalsock Creek is a cold-water fishery, resulting in the need to discharge treated effluent that will not thermally impact the cold water fishery
- The need to improve and/or create a passive treatment system that is easier to operate and maintain for the operator

Kleinfelder's proposed design includes an improved flow distribution box at the B-vein tunnel discharge. This improvement will capture and treat higher flows, allow for high flow bypass, and will create an easier method for handling possible sediment issues during high-flow events. This will provide treatment of flows up to 1,000 gallons per minute, with piping that will allow for an increase up to 2,000 gallons per minute.

At the C-vein discharge, Kleinfelder has proposed a new discharge catchment system to minimize sediment from entering the system. Conversion of the current pond to an upflow oxic limestone drain will allow for inflow up to 1,500 gallons per minute (an increase from 300 gallons per minute, currently).

Additional proposed features include a flush pond to be used as a storage mechanism for high-flow sediment. Treated waters will also be kept within limestone and pipes as much as possible to help mitigate thermal pollution.

Location:

Sullivan County,
Pennsylvania

Owner:

Pennsylvania Department
of Environmental
Protection



Browns Run and Grassflat Run Abandoned Mine Land Reclamation Design

The Browns Run and Grassflat Run abandoned mine land (AML) reclamations in Cooper Township, Pennsylvania, will restore mine lands and improve waters within the Moshannon Creek watershed, which is the largest tributary source of mining pollution to the entire West Branch Susquehanna River sub-basin.

PROJECT RESULTS

The goal of the Browns Run and Grassflat Run remediation project is the reclamation design of four Priority 2 dangerous highwalls totaling 13,600 linear feet, one Priority 3 highwall totaling 1,000 linear feet, 138-acres of Priority 3 spoil piles, and six Priority 3 mine openings, with several requiring bat gate installations. These reclamations will improve the water quality of both streams.

Location:

Cooper Township,
Pennsylvania

Owner:

Pennsylvania Bureau
of Abandoned Mine
Reclamation



A SCARRED WATERSHED

Moshannon Creek is the largest source of mine drainage loading to the West Branch Susquehanna River. Major efforts are starting to focus on three areas where strategically placed active mine drainage plants could be catalysts for widespread environmental remediation. However, those three plants, while leading to significant water quality improvements, will not completely restore Moshannon Creek and its tributaries. Projects like the Browns Run and Grassflat Run AML reclamation design that focus additional attention on AML reclamation that will improve tributary water quality, are also necessary to move the restoration needle.

IMPROVING BAT HABITATS THROUGH RECLAMATION

Bat populations, drawn to mine openings to roost and hibernate, have been in recent decline. However, these historical mine openings are also hazardous to humans and other animals that could fall in, becoming trapped or even killed. As part of the remediation plan, Kleinfelder will design bat gates that will eliminate these on-site AML hazards, while also improving bat access to those preferred habitats.



West Fork River Watershed Drainage Abandoned Mine Reclamation Design

The West Fork River Watershed is located in the north central coalfields of West Virginia. Historically, coal mining played a significant economic role in the early 1900s through the 1970s. Waters in the West Fork mainstem and many of its tributaries are listed on West Virginia's 303 (d) list of impaired waters due to mining pollution. Reclamation activities seek to address the associated land hazards and water quality.

PROJECT RESULTS

The goal of the N1 remediation projects is the reclamation design and construction management services for highwalls, existing facilities, open and collapsed mine portals, subsidence areas, coal mine spoil piles, dangerous slides, and AMD abatement. Cumulatively, these projects will contribute to a safer and cleaner environment for the public and improve the land and water quality of the West Fork River Watershed.

Location:

Harrison and Barbour Counties, West Virginia

Owner:

West Virginia Department of Environmental Protection, Abandoned Mine Land Program



IMPACTED WATERS AND PLANNED PROJECT SITES

Waters on the 303 (d) list do not meet state water quality standards impacting aquatic life. The impairments are typically a result of abandoned mine drainage and sedimentation generated from abandoned mine lands. To remediate these issues, the Kleinfelder team will address the following areas:

- Enterprise Portals
- Miller Mine Drainage
- Sheppard Mine Drainage
- Simpson Creek Highwall, Tipple, and Portals
- West Fork #9

In addition, this reclamation project will help to protect the local communities through decreasing abandoned mine land hazards, such as open mine portals and facilities associated with past coal mining.

ABANDONED MINE LAND RECLAMATION

Kleinfelder's team of professionals was selected to supply planning, realty, design, and construction oversight services as part of reclamation efforts in the West Fork River Watershed. The project is funded through the Infrastructure Investment and Jobs Act. Each year over the life of the legislation, West Virginia is forecasted to receive \$140 million for the reclamation of abandoned mine lands and the treatment of abandoned mine drainage.



During the design phase, a slide occurred when water backed up within an abandoned mine and broke through to the surface. Expedited rail-trail repair required coordination among Kleinfelder, WVDEP, local government officials, and property owners.



Meet the Team



Jose Infante Corona, PhD, PE Sr. Process Engineer

Jose has 20 years of experience in the planning, design, and construction management of site development/civil engineering projects and process engineering. His experience includes hydrological analysis and design/construction of water and wastewater infrastructure. He also has advanced knowledge in hydrological modeling focused on watershed management and planning, design of separate and combined storm sewer systems and sanitary sewer systems, water supply systems, and stormwater management.



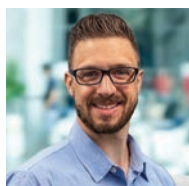
Dan Koury Principal Professional, Anthracite Region Liaison

With 36 years of career experience, Dan has advanced knowledge of the Anthracite coal region, mining history, mine reclamation, and AMD treatment. His experience includes establishing good working relationships with local community leaders, industry stakeholders, and regulatory authorities, along with environmental policy development and monitoring. Dan also has experience in grant management and mine reforestation projects.



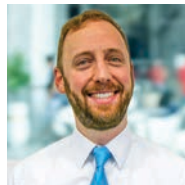
Aaron Pontzer, PE Sr. Engineer, AML Remediation

Aaron has 27 years of career experience, formerly serving as a Watershed Manager in the Pennsylvania DEP District Mining Program and Project Developer for the PA DEP BAMR program. His technical experience includes the design, review, inspection, rehabilitation, and management of active and passive AMD treatment systems, as well as the project management, inspection, and design of abandoned mine land reclamation projects.



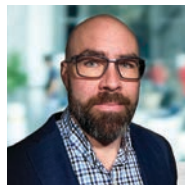
John Miller Project Manager

With more than 15 years of experience, John specializes in water and wastewater infrastructure, project management, and project delivery. His background includes engineering design support, permitting, capital planning, construction support, GIS, and stakeholder coordination. He has managed complex utility projects from planning through closeout, working with licensed engineers, clients, regulators, municipalities, contractors, and multidisciplinary teams.



Ed Asbury, PE, LEED AP® BD+C Facilities Engineering Lead

Ed has 22 years of experience spanning the design of heating, ventilation, and air-conditioning (HVAC) systems, along with plumbing, fire protection, and fueling infrastructure. His water market experience includes pump stations, raw water intake facilities, chemical storage facilities, high-service pump buildings, filter buildings, sludge dewatering facilities, and clearwells.



Clayton Lilly, MS Environmental Permitting Lead

Clayton has 14 years of experience with an emphasis on clean water, permitting, and planning, spanning all levels of environmental permitting and compliance, including stream and wetland delineation, environmental inspection, endangered species survey, permitting, and project/program management. He has served as the permitting technical lead and reviewer for projects ranging from natural gas distribution and transmission to mine remediation and reclamation projects.



Brad Shultz, PE Principal Engineer, AMD and AML

Previously in his 26-year career, Brad served as a mining engineer for the Federal Office of Surface Mining and as a hydrologist within the same OSM office. He has designed more than 50 treatment systems including passive systems, semi-active systems, and rehabilitations of existing systems.



Nick Flanders, CPESC, CESSWI Project and Construction Manager

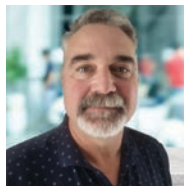
Nick has 14 years of engineering consulting experience, including extensive civil design experience completing projects for industry leaders. He provides consulting services in the water and wastewater industry, including treatment plant upgrades and conveyance installations. His background also includes geography, environmental planning, and business management.

Meet the Team



Ladd Williams
AMP Development
Project Manager

Ladd's 33 years of career experience includes serving as the former West Virginia Department of Environmental Protection Mine Drainage Remediation Specialist. He has experience in the development of watershed-based plans for the treatment and monitoring of acid mine drainage, along with conceptual designs of active and passive AMD treatment systems, and investigating and researching new technologies in mine water remediation.



Dan Skaggs, PE
Sr. Engineer,
Construction Management

Dan brings more than 27 years of experience in construction management and engineering design. He has served as project engineer and manager at various positions throughout his career within mining, construction, and consulting companies. His experience includes developing plans for mining and reclamation, water collection and treatment, and labor/materials/construction needs for bridge, road, and pipeline construction.



Joece Lynn
Environmental Technician

Bringing three years of experience in her career, Joece undergraduate studies included a double major in Environmental Studies and Geography, Biology minor, Geographic Information Systems Certificate, and Master of Science in Geography. She is an experienced GIS technician with knowledge in digitizing and attributing mine data using ArcMap and ArcGIS Pro. Joece is also experienced in water quality sampling and monitoring, particularly at abandoned mine sites.



Lee Yost
Project Professional,
AML Construction Lead

Lee has six years of career experiences as an environmental resources specialist, most recently working for the West Virginia Department of Environmental Protection Abandoned Mine Lands Program. Lee enjoys the complexity associated with reclaiming historic mine sites and water treatment facilities while seeing the direct benefit to all the surrounding communities.



Heather Sexton
Sr. Professional,
Wetland Scientist

Heather is a wetland scientist with more than 26 years of environmental consulting experience, focusing primarily on Clean Water Act Section 404/401 project planning and permit acquisition. Her environmental permitting and compliance experience includes stream and wetland delineation, endangered species surveys and relocations, federal/state/local environmental permitting, aquatic resource mitigation compliance, and project/program management.



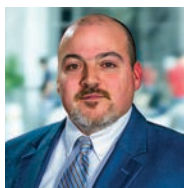
Paul Fletcher, PhD
Sr. Water Resources Engineer

Paul has more than thirty-one years of experience in the planning, process design, and construction of water and wastewater treatment facilities. His experience includes the hydraulic analysis of equipment, piping, and structures under gravity and pumped conditions. He also has experience in technical reviews of complete project drawing and specification packages.



Samine Tran, PE
Electrical, Instrumentation, and
Controls Lead

Samine has 32 years of electrical engineering experience in the consulting engineering industry. His experience includes governmental, commercial, industrial, educational, transportation, and water and wastewater facilities, focusing on electrical systems such as lighting, power, fire alarm, security access, and lightning protection as well as instrumentation and control systems.



Craig Lynch, PE
Principal Engineer,
Environmental Resources

Craig brings 33 years of experience with NPDES MS4 and TMDL policies, crediting protocols, IDDE screening/sampling/source tracking, and environmental permitting. His experience includes watershed and geomorphic assessments; natural channel design; stream, floodplain, and zero-order valley restoration; regenerative and step-pool stormwater conveyance; legacy sediment removal; and sediment transport analysis.



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Recognizing we live in a world of finite resources, Kleinfelder's environmental engineers and scientists ensure societal development and the use of natural resources are sustainable. From project permitting to construction, to operation and into decommissioning, our technical experts apply their understanding of local, state, and federal regulations to provide full lifecycle environmental solutions.

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Kleinfelder's multi-disciplinary staff of geotechnical, civil, and materials engineers, as well as earth scientists and computer specialists, provides a wide range of technical resources and a depth of professional experience to address our clients' project requirements. Our diverse geography provides an added benefit of local experience, which results in cost-effective and timely service.

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We recognize the positive impact that good design has on our clients and communities and strive to be good stewards of our environments. Our attention to detail and responsiveness to our clients are core tenets of our work philosophy. We work with project stakeholders to provide designs that meet our clients' schedules, budget constraints, and the needs of the affected communities.

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Our materials engineers, project managers, construction inspectors, and testing professionals successfully provide solutions to our clients and teaming partners in transportation, water, energy, and facilities to reduce uncertainties during construction, ensure construction quality, reduce costs for future maintenance, and ultimately keep the public safe.

CONSTRUCTION MANAGEMENT

Our experienced staff provides full scope construction management and inspection services for all types of projects. From design development through project closeout, we work as a part of an integrated team, providing cost-effective and functional solutions. We carefully plan and tailor the scope for each management assignment specifically for our clients and their project needs.



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