

# DEEPER RESERVES

mining solutions ahead of change



Civil & Environmental Consultants, Inc.

# THE CEC ADVANTAGE

*What sets CEC apart is that we put ourselves in our clients' shoes and make recommendations from their strategic vantage point. These are the real differentiators:*

## INDUSTRY EXPERIENCE

CEC understands the mining business from the inside and can complement an existing staff. Our industry experts have utilized their experience and strong regulatory and technical backgrounds to tailor CEC's internal resources to best serve mining companies.

## REGULATORY INSIGHT

CEC relies on thorough knowledge of environmental regulations to determine applicable requirements. CEC is able to leverage established relationships and help clients negotiate with regulatory agencies, as well as lend valuable insights to help streamline the permitting process.

## ENVIRONMENTAL COMPLIANCE

CEC provides robust environmental services to tackle everything from preventing and containing spills to managing disposal. Client-customized data management systems along with high-quality monitoring help clients efficiently track their environmental compliance and reporting obligations.

## ECOLOGICAL EXPERTISE

CEC evaluates the possible effects of mining on streams and wetlands and designs plans to mitigate impacts. Biological monitoring services can be implemented to develop cost-effective variances to permit requirements, reducing facility operation or construction costs.



**1:** As part of the air permit requirements, stack testing is performed at this lime plant in Ste. Genevieve, MO.

**2:** A secondary screening operation at a lime and stone facility in Delaware County, OH.

**3:** An air quality expert inspects this dust collector as part of required particulate matter emissions testing at an aggregate facility in AZ.

# MINE OPERATIONS

CEC has direct experience with the issues and requirements mining companies are facing, allowing operators to focus on achieving maximum output and return on investment.

## COMPLIANCE

Whether the goal is to establish or maintain compliance, CEC environmental compliance audits help address or correct issues. CEC's innovative tools help clients manage vast amounts of environmental data, monitor compliance performance, and track requirements for reporting.

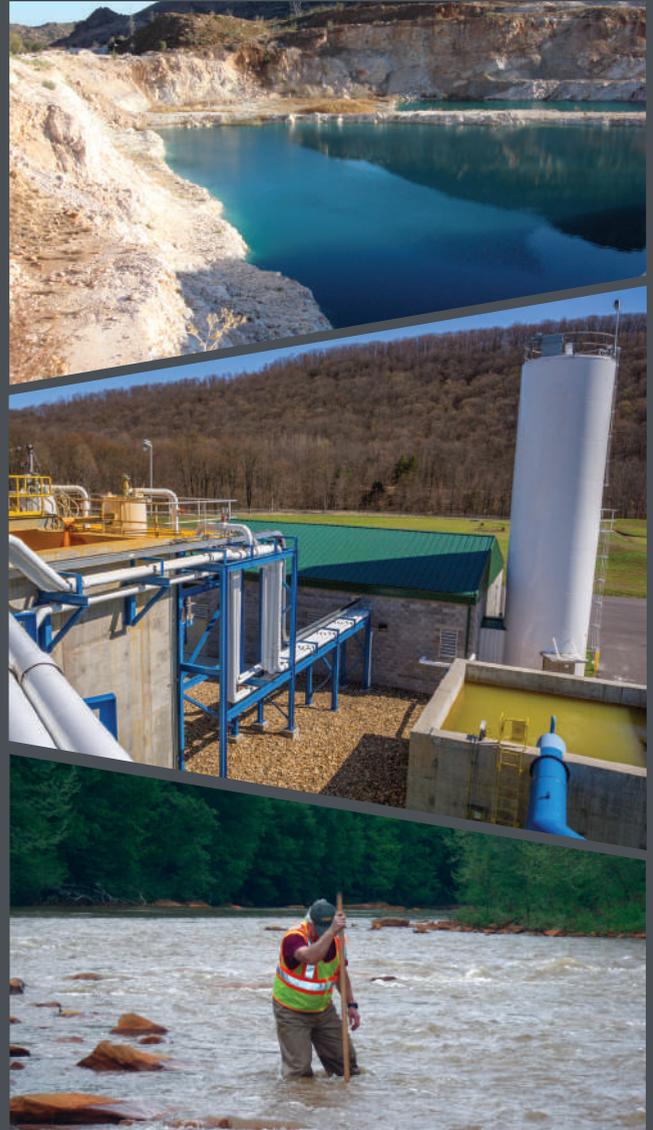
Hydrologic modeling, water quality impact assessments, and collection and treatment systems design help clients manage their discharges. To characterize the type and magnitude of stack and fugitive emissions, certified testing personnel perform source emissions testing using a state-of-the-art mobile laboratory.

## OPTIMIZATION

CEC helps clients maximize returns by evaluating treatment processes to optimize systems or by determining ways to prevent system problems from occurring. CEC evaluates water or air quality pollution control systems to meet new or stricter effluent and emission guidelines.

## EXPANSION PROJECTS

Geologists evaluate in-situ reserve estimates, characterize lithology, and identify geologic structures. Ecologically sensitive areas are identified to streamline the permitting process and minimize long-term effects on local ecosystems. Environmental due diligence helps identify potential liabilities and characterize risk. Civil engineers and site designers provide permitting, construction management, and CQA services, while scientists develop baseline air quality and groundwater models to evaluate process water needs and potential development impacts.



**1:** A preliminary hydrogeologic assessment was performed for this open-pit limestone quarry in AZ for consideration of mine closure options.

**2:** Water from 20 mine discharges is conveyed to this centralized acid mine drainage treatment plant in north central PA.

**3:** Baseline condition assessment of benthic macroinvertebrate communities prior to start-up of a mine water treatment plant near Johnstown, PA.

## MINE CLOSURE

When reserves are exhausted or extraction becomes cost-prohibitive, CEC provides the expertise mining companies need to transition through the closure process.

### SITE RECLAMATION

CEC integrates design and engineering and also manages the permitting and approval process for successful reclamation projects. Soil scientists examine cover strategies, compare the effects of topography and surface soil cover on erosion, and evaluate revegetation alternatives for refuse or tailings sites. CEC designs functional stream and wetland systems and creates compensatory habitat through a variety of mitigation techniques.

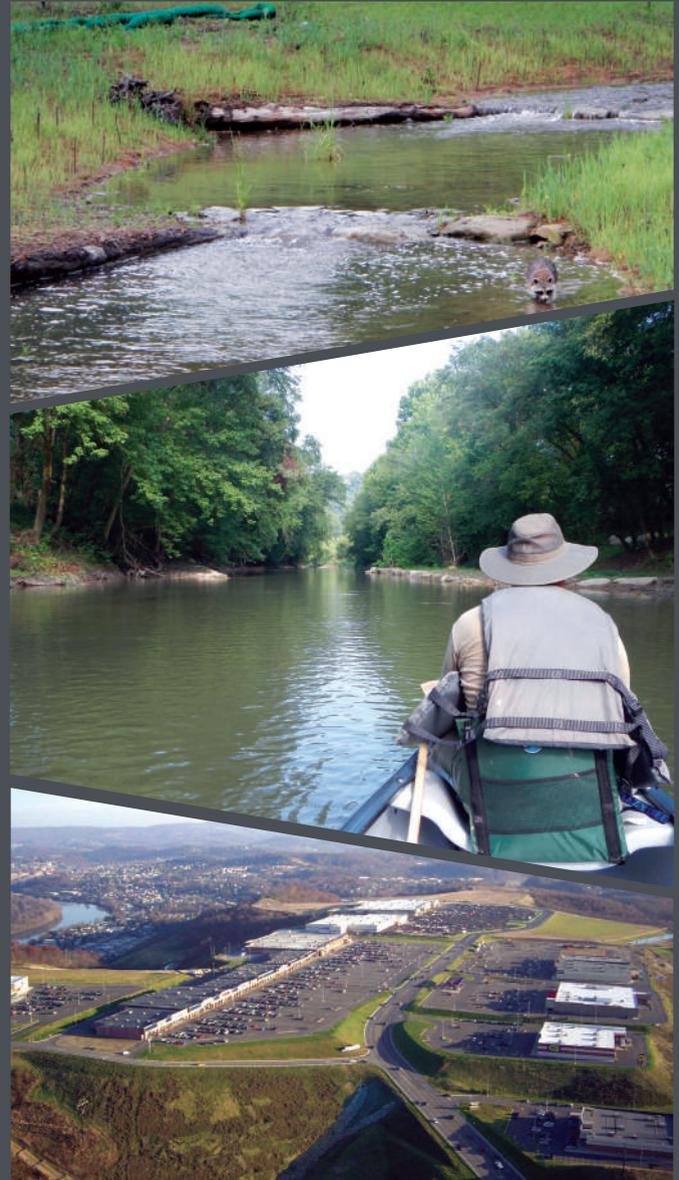
### AIR QUALITY AND WATER QUALITY ASSISTANCE

Meteorologists and air quality scientists perform modeling to predict impacts on human health and ambient air quality and can evaluate various methods of dust control to help obtain approval for closure plans.

Stormwater management and grading plans help divert runoff from open pits, while hydrogeologists analyze methods and time frames for pumping, treatment, and discharge of underground mine water. CEC develops comprehensive water quality and flow assessments to determine which discharges are best for treatment and provides environmental and engineering services for collection, transport, and treatment systems.

### POST-MINING LAND USE

Site planners and civil engineers evaluate post-mining land use options to achieve the highest and best use possible — even encouraging repurposing facilities. CEC's real estate experts are instrumental to the process. Many properties go on to generate revenue.



**1:** A mitigation plan restored 4,400 linear feet of highly degraded stream and created 1.25 acres of diverse wetland habitat in Greene County, PA.

**2:** Off-site stream mitigation for coal mining impacts in southwestern WV created spawning habitat for a fishery.

**3:** This 40-acre commercial development near Morgantown, WV, sits on the previous site of an inactive fine coal refuse impoundment.

## Mining companies must stay ahead of the curve to respond to regulatory changes as well as market changes.

With diversified expertise and deep bench strength, CEC is a valuable resource uniquely positioned to provide solutions that address the industry's changing needs.

CEC has successfully integrated civil and geotechnical engineering design with ecological and environmental expertise to offer a full suite of services that benefit the coal, aggregate, and hard rock sectors of the mining industry. This multi-disciplined approach to mining industry consulting has led to the successful completion of a wide range of projects—from design and permitting of refuse disposal areas, to water treatment studies, to assessing and mitigating ecological resource impacts.

The strategic hiring of mining professionals has enabled CEC to harness a wealth of direct industry experience. These seasoned experts are able to identify challenges and address needs from the vantage point of the owner.



### CEC OVERVIEW

*Civil & Environmental Consultants, Inc. (CEC) provides comprehensive market-oriented consulting services that advance the strategic business objectives of our clients. CEC is recognized for its innovative design solutions and integrated expertise in air quality, civil engineering, ecological sciences, environmental engineering and sciences, manufacturing infrastructure services, survey/geospatial, waste management, and water resources.*

*Our Mining Market Group is a diverse team of engineers, scientists, and professionals who serve as our conduit to the latest thinking and advancements in the mining industry, providing clients with concise, timely information and regulatory updates to facilitate informed decision-making.*

## ECOLOGICAL

Threatened and endangered species assistance  
Aquatic ecology studies (e.g., benthic macroinvertebrates, fish, and mussels)  
Stream impact evaluation and mitigation  
Wetland and stream delineation, impact assessment, and mitigation design  
Soil and revegetation studies

## ENGINEERING

Refuse/tailings disposal design and permitting  
Dam and impoundment design, permitting, and inspection  
Hydrologic and hydraulic modeling  
Design of stormwater handling structures  
Erosion and sedimentation controls  
Site layouts, including road networks  
Geologic studies for greenfields/expansions/reserves  
Geotechnical instrumentation and monitoring

## ENVIRONMENTAL

Air and water quality monitoring/studies  
Compliance audits and assessments  
Environmental management systems (ISO 14001)  
Client-specific GIS and data management interfaces  
Mine subsidence investigations and remediation  
Mine closure assistance and evaluations  
Preparation of SPCC and PPC plans  
Due diligence  
Permitting

## WATER RESOURCES

Water treatability studies  
AMD treatment plant design (passive and active)  
Total Maximum Daily Load (TMDL) studies  
Pre- and post-mining water quality studies  
Probable Hydrologic Consequences (PHC) studies  
Surface and ground water baseline and impact studies

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