Imagine the results

Mining Air Quality Services

INNOVATIVE, SUSTAINABLE AND GROUNDED SOLUTIONS
Mining Air Quality Services

The mining industry’s air quality programs are often challenged by scarce resources, budget constraints and compliance issues. The ARCADIS Air Quality Services group helps overcome these hurdles by providing our clients with expert support in a cost-effective and efficient manner.

Our team of professionals builds a technical partnership with our mining clients and works to understand which facility operational and production objectives have air quality implications. Using this approach, we then develop the most appropriate permitting, monitoring or pollution control program to achieve each client’s goals and objectives.

Emission Models
- BASTE
- WATER 8/9
- TOXCHEM+
- MOBILES
- LANDFILL
- TANKS
- PIRNIE-AIR
- EMFAC

Mobile Source
- CALINE3
- CALQHCR
- MOBILE-2
- STAMINA/OPTIMA

Other
- BNP
- WINDROSE
- UTMCON
- CAEEED
- VISCREEN
- HARP
- TSCREEN

Stationary Sources
- AERSCREEN
- AERMOD
- CALPUFF
- VALLEY
- CTSSCREEN
- CTDPLUS
- PAL
- INPUF

Accidental Release
- SLAB
- DEGADIS
- AFTOX
- ALOHA
- LINGFIRE3

Regulatory Programs/Standards
- Construction and Operating Permits
- Title V and Prevention of Significant Deterioration (PSD) Permitting
- Nonattainment New Source Review (NNSR)
- State Minor New Source Review, Synthetic Minor Permits and Permit Exemptions
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- New Source Performance Standards (NSPS)
- Regional Cap and Trade Agreements
- State Programs
- Greenhouse Gas (GHG) Regulations and Legislation

Emissions Control Services
- RACT, BACT, LAER and TBACT analyses
- Conceptual and Detailed Design
- Bid Package and Specification Preparation
- Bid Review and Recommendations
- Construction Management
- Startup, Certification and Shakedown Troubleshooting
- Operation and Maintenance Plan Development

Source Testing and Ambient Air Services
- Industrial Stack Sampling and Other Emissions Source Testing
- Emission Factor Development
- Continuous Emissions Monitoring Systems (CEMS)
- Parametric/Predictive Emissions Monitoring Systems Industrial Process Emissions Monitoring
- Air Pollution Control Equipment Efficiency Testing
- Pilot-scale Testing
- Ambient Air Sampling
- Industrial Hygiene Monitoring
- Meteorological Monitoring
- Hazardous Waste Incineration Trial Burns
- Remedial Action Air Monitoring
- Fugitive Emissions Testing and Monitoring

Climate Change and GHG Services
- Carbon Management Strategy
- On-site Development of Sustainable Energy Supply
- Emission Compensation
- Economic Modeling
- GHG Inventory and Energy Assessment
- Carbon Footprint Analysis
- Energy Cost Assessment
- Energy Management
- Engineered GHG Mitigation Solutions
- Carbon Capture and Storage
Air Dispersion Modeling

ARCADIS is able to assess the impact of new, existing or modified sources of air contaminants on ambient air quality through the use of customized, numerically based air quality dispersion models. By predicting a source’s compliance with applicable standards, ARCADIS scientists can evaluate the relative impact of alternative design options to provide the most prompt and reliable results possible.

ARCADIS is particularly sensitive to the new short-term standards mandated by National Ambient Air Quality Standards (NAAQS). In the past, modeling in support of permitting new or modified mining sources often did not pose significant problems. However, the short-term standards have led to a number of new complications, including regulatory agency requests, at their discretion, that modeling be performed to demonstrate compliance with the new short-term NAAQS.

Accordingly, it is even more important to provide accurate and timely results when performing modeling services to predict the potential impact of model outputs on mine planning and expedite planning and permitting to keep mine operations on line. Our staff works hand in hand with our clients to develop the appropriate strategy to achieve their goals.

Our staff include specialists in air quality meteorology, emissions characterization, and data analysis. Our experience includes PSD analyses, air toxics modeling and exposure assessment, odor modeling, and consequence analyses required for the evaluation of accidental releases.

Project Highlights

Particulate Matter Emissions Modeling for a Portable Source Cut Costs
Confidential Mining Client, Colorado

ARCADIS assisted a mining client who had been trying to relocate a portable crushing and screening plant this site but could not do so because modeling results projected non-compliance with NAAQS. The inability to relocate the plant on-site resulted in high costs of transporting crushed rock to the facility. The ARCADIS team was successful in producing modeling results that allowed placement of the plant on-site. After working with this client on confirming proper permitting, emission rates and control efficiencies for the plant, alternative locations for the plant were determined, and operating scenarios were adjusted to maintain compliance. Our modeling team produced operating guidelines for the mine personnel that allow them to operate with confidence that emissions will be well within NAAQS.

Particulate Matter Emissions Modeling Provides Flexible Solutions
Confidential Mining Client, New Mexico

ARCADIS is currently assisting a mine in meeting compliance with the standard for the short-term particulate matter with an aerodynamic diameter equal to or less than 2.5 microns in accordance with NAAQS. Changes in New Mexico modeling guidelines, the air dispersion model and stack parameters of the existing equipment at the facility, as well as the addition of new sources at the facility, created a situation of non-compliance with NAAQS. Emissions reduction measures and stack parameter alterations were vetted with the client to assess which changes would have the greatest impact on the modeling results without interfering with operations and ongoing compliance measures (e.g., stack test results). ARCADIS worked with the facility’s environmental managers and operations personnel to develop a solution that would have minimal impact on current operations while allowing room for future growth.

Permitting and Operating Scenarios below Modeling Thresholds
Confidential Mined Products Manufacturer, Colorado

ARCADIS worked with this global manufacturer of mined products to expedite permitting for a new operation, in part by assessing operating throughputs and scenarios that avoid short-term modeling thresholds. Our team produced several alternative scenarios that were thoroughly examined with the client. We were successful in demonstrating to the state permitting authority that modeling would not be required for this new source. We estimate that the client has avoided up to two years of delay as a result of this permitting approach.

Coal Combustion Residue Research Supports Prediction of Metals Leachability
United States Environmental Protection Agency (USEPA)

ARCADIS collaborated with researchers at Vanderbilt University to develop, test and verify the suitability of a leaching procedure to assess health risks posed by toxic metals in coal combustion residues (CCRs). The project findings will support the Office of Air Quality Planning and Standards, Office of Solid Waste, and the USEPA’s Air Pollution Prevention and Control Division (APPCD) by determining the amounts of leachable mercury, arsenic, selenium, and cadmium in CCR collected from combustors with mercury controls. Vanderbilt University developed the comprehensive leaching method, and ARCADIS developed the corresponding quality assurance/quality control procedures. Vanderbilt will use the test results to verify the mathematical model’s ability to predict CCR metals leachability.

Mining Air Quality Services
Regulatory Analysis, Permitting, and Auditing and Compliance Support Services

Our clients benefit from more than 20 years of diligent effort to stay abreast of changes in air quality regulations and policy. No matter what changes occur, ARCADIS remains current and analyzes these changes on behalf of our clients. Our analyses provide strategic insight on the ways in which regulatory changes will affect mining operations so that our clients can develop responses that minimize negative impacts.

ARCADIS has established practices and procedures so that our clients can maintain compliance with the wide variety of requirements that must be met every day. For example, an emissions inventory is one of the principal elements of an air quality regulatory program that affects a facility. Air quality regulations rely on the proper identification of each emission unit and the correct quantification of the emissions contained in a facility’s emissions inventory. Our team of professionals is highly trained to work with mining facilities to provide accurate emissions calculations, emission factors and inventory development.

The number and complexity of regulatory requirements continues to increase. However, ARCADIS experts are skilled at streamlining the compliance burden and minimizing the likelihood of non-compliance. Our depth of experience in environmental auditing and testing for the mining industry also enables us to support client operations by developing new process changes that result in a safer and cleaner work environment.

Project Highlights

Comprehensive Air Permitting and Compliance Support
Mosaic Potash Carlsbad Inc., Carlsbad, New Mexico

ARCADIS is providing Mosaic Potash with air permitting and support services that include preparation of the following: permit applications; emissions calculations; compliance assurance monitoring plan; a best engineering practices plan; a good housekeeping plan; a startup, shutdown and malfunction plan; standard operating procedures; quarterly, semiannual, and annual compliance reports as required by its Title V permit; and stack test protocols and reports. Work has also consisted of PSD table preparation for a recent NNSR application that compares stack test protocols and reports. Work has also consisted of PSD table preparation for a recent NNSR application that compares stack test protocols and reports. Development of site-specific emission factors for complex volatile organic compound (VOC)-emitting sources, such as crushers and conveyors and natural gas-fired equipment. Development of site-specific emission factors for complex volatile organic compound (VOC)-emitting sources, such as crushers and conveyors and natural gas-fired equipment. Development of site-specific emission factors for complex volatile organic compound (VOC)-emitting sources, such as crushers and conveyors and natural gas-fired equipment.

Process Changes and Permitting Modifications Adaptable for Operations
Confidential Client, Colorado

ARCADIS is performing modifications of the synthetic minor air permits for mining and milling operations in Colorado. This work includes verification of emission factors for emission sources, such as crushers and conveyors and natural gas-fired equipment; development of site-specific emission factors for complex volatile organic compound (VOC)-emitting sources, such as coke concentrate dryers and reagent mixing activities; regulatory analysis to assess applicable federal and state requirements; and on-site support for agency inspections, draft permitting strategies and conformance to the company’s environmental management system. Our focus is to maintain mine and mill operating flexibility while meeting applicable regulatory requirements.

Successful Process Improvements without Permit Revisions
Confidential Mining Client, New Mexico

ARCADIS analyzed milling process chemicals to evaluate the effects of process changes and enhancements on air quality. Working with facility metallurgists and mill operators, ARCADIS was able to find a solution that facilitated process improvements without triggering a permit modification. As a result, a testing methodology for reagents was recommended as part of this project.

Facility Proven not Major Source of Air Emissions
Confidential Client, Arizona

ARCADIS obtained a minor source air permit from the Pima County Department of Environmental Quality for a new metal powder production facility by demonstrating that the facility was not a major source of air emissions. The scope of work included the evaluation of emissions from complex chemical reactions and combustion processes, evaluation of applicable regulatory requirements, air emissions modeling, and final permit negotiations with Pima County.

Identifying Compliance Issues Beyond the Typical
Confidential Mining Clients, Utah, Arizona, New Mexico, Texas, and Colorado

ARCADIS has provided in-depth auditing services for mining, milling, smelting and refining operations across the Western U.S. In each case, we have sent our senior air quality engineers and scientists to identify compliance issues that go beyond these typically cited in audit reports. Our teams have not only identified findings but also have provided observations and recommendations for areas where an existing permit condition or limit is too restrictive for the operation and could be modified within the state or local regulatory framework. We have also worked with our mining clients to help close out audit findings and document responses in a timely manner and within the context of attorney-client privilege.

Mining Air Quality Services
Emissions Control Services and Technology

ARCADIS combines both “hands on” and engineering capabilities to identify, evaluate and design technologically feasible and cost-effective control systems for our clients. Our experts get involved in the early stages of a pollution control project and coordinate closely with our in-house regulatory experts, permitting engineers and client to identify the options most appropriate for the need – whether practical or innovative. Our engineers can perform or assist with the design, construction management, start-up and performance evaluation of new or modified systems. In addition to the projects highlighted below, our engineers have also performed engineering studies for mining clients to troubleshoot problems with existing control devices and specify solutions to these problems. We have also worked with clients as they design new or expanded operations to ensure that the controls will be designed, located and configured to perform as required within the constraints of the operation.

We think strategically. For example, when conducting a reasonably available control technologies (RACT) evaluation, we consider not only whether the solution will address the pollutant of concern for RACT, but also whether the emissions of other pollutants that carry a higher level of regulatory burden, such as hazardous air pollutants, could be effectively controlled by the device.

**RACT Analysis Used as Effective Decision Tool**
National Gypsum Company, Phoenix, Arizona

ARCADIS completed a RACT determination analysis that examined the technological and economic feasibility of proposed modifications for the facility. This analysis, which was completed to support National Gypsum Company’s (NGC’s) air permit modification for this facility, evaluated the various types of add-on control technologies that could potentially be installed to abate emissions from the proposed modification, as well as the associated costs, to determine whether add-on controls were cost effective on a dollar-per-ton-of-pollutant-removed basis. This information was used to assist NGC in its decision regarding the viability of obtaining an air permit for this facility.

**Expertise Reduces Timeframe for Analyses**
Various Mining Clients, Western U.S.

ARCADIS air quality engineers and scientists have performed several RACT analyses for mining clients that run the spectrum from extremely detailed technology and cost analyses to straightforward reviews of the typical technologies considered RACT by the regulatory agency. We have prepared detailed reports as stand-alone documents at the request of the agency and developed simple tables to demonstrate the scope of our analyses and the alternatives evaluated for our clients. Our experienced team, which includes control technology design engineers, successfully reduced the time required for RACT analyses when regulatory thresholds are triggered.

**Effective Management of Operation and Maintenance of Pollution Control Equipment**
Confidential Client, Arizona

ARCADIS managed the operation and maintenance of pollution control equipment and instrumentation at this smelter facility; provided staff assistance to the meteorologists; was responsible for maintenance of ambient and continuous emissions monitors; conducted compliance testing; monitored the Federal Register for changes in air quality, water quality, hazardous waste, and Occupational Safety and Health Administration regulations; and assessed the applicability of the regulations to the facility.

**Comprehensive Site-wide Operation and Maintenance Plan**
Confidential Mining Client, Colorado

ARCADIS consolidated several existing specific-process operation and maintenance (O&M) plans that had been submitted to the state and created numerous new O&M plans for other identified processes, assimilating them into one site-wide O&M plan. Site visits identified one or more processes that required an O&M plan that were then included in the overall O&M plan.
Source Testing and Ambient Air Assessments

ARCADIS’ in-house source testing and ambient air monitoring capabilities enable us to help our clients meet compliance and monitoring obligations, as well as define emissions and process parameters for engineering design and operation. These programs have incorporated the full range of test methods, including USEPA and National Institute for Occupational Safety and Health reference test methodologies.

ARCADIS performs ambient air assessment programs for a wide range of volatile, semivolatile and solid organic constituents, as well as metals and other inorganics. We have developed sampling protocols, gained agency approval and performed assessments for complex air compound matrices using traditional sampling and analysis techniques and, more recently, optical remote sensing.

Project Highlights

Development and Implementation of Unique Emissions Testing Protocols
Confidential Client, Western U.S.

ARCADIS developed and implemented unique emissions testing protocols in consultation with the USEPA Emissions Measurement Center to accurately characterize and quantify emissions for milling processes at a mining mill. The protocols were designed to address specific air flow characteristics within the mill building from the concentrating and conveyance of slurry. The resulting data were used to develop site-specific emissions factors for several air pollutants. ARCADIS continues to pursue technological advancements for air emissions through energy efficiency or process changes to reduce both emissions and cost.

New Straightforward Testing Protocol for Fugitive VOCs
Confidential Mining Operation, Colorado

ARCADIS drew expertise from its Technical Knowledge and Innovation team as well as its mining air quality experts to develop and execute a challenging VOC emissions testing program at a large tailings storage facility. Health and safety and critical logistical issues were successfully managed and written into the protocol. Testing was performed under the scrutiny of the state regulatory agency, and a robust sample set was obtained for the development of a straightforward emission factor to estimate and permit emissions of VOCs and organic hazardous air pollutants.

General Air Quality Services at Mine-Smelter Complex
Confidential Client, Arizona

ARCADIS provided environmental engineering support for general air quality issues at a mine-smelter complex. ARCADIS supervised personnel who operated and maintained the CEMS and ambient sulfur dioxide (SO2) and particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM10) monitoring equipment; assisted with Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), and Superfund Amendments and Reauthorization Act (SARA) reporting; helped address water quality issues; tracked and commented on new regulations; and monitored compliance at the site.

Air Sampling
USEPA, Research, Triangle Park, North Carolina

ARCADIS managed the design and construction of the Dilution Sampling System for the Emissions Characterization and Prevention Branch of the USEPA’s Air Pollution Prevention and Control Division (APPCD). This sampler added flow management and operational improvements, such as feedback control for the critical flows, data acquisition of parameters and multi-zone temperature control for the sampling probe.
Climate Change and Greenhouse Gas Emissions

Climate change has captured the world’s attention as one of the most important global issues of our time. It also presents a rapidly evolving challenge: new strategies appear daily for determining how, when and why to take action to address GHG emissions and climate change. GHG regulations at both the national and international level are a new challenge facing many industries.

The ARCADIS GHG staff stay on top of changing regulations and has played an innovative role in local, state and federal regulatory developments. We have stepped up to meet this new challenge in support of our clients. Working together with the rest of our air quality staff and strategically partnering with the economists in our Economic Modeling group, the GHG team provides our clients with insights and dimensions of service not available from most firms.

ARCADIS has completed several projects that included quantifying GHG emissions, assessing applicability under the USEPA’s Mandatory GHG reporting rule, developing GHG emissions spreadsheets, developing GHG compliance documents, and assessing applicability of the USEPA’s Tailoring Rule to projects involving new and modified sources.

Team Collaboration for an Efficient GHG Monitoring Plan
Confidential Client, Colorado

ARCADIS assisted a confidential mining client with the identification and quantification of GHG emissions sources for the purposes of determining reporting applicability under the USEPA’s Mandatory Reporting of GHGs. Following GHG emissions inventory development, ARCADIS worked with the client’s environmental and legal teams to develop a GHG monitoring plan.

Monitoring Burden Recommended, Removed from Permit Renewal
Confidential Clients, New Mexico

ARCADIS prepared Title V permit renewal applications for two copper mining and processing operations. Permit renewal activities included the evaluation of emissions from power plants, open-pit mining, solvent extraction, copper and molybdenum concentration, and tailings impoundments. The applications included our applicability determinations for state and federal requirements, including NSPS, the GHG Tailoring Rule, and NESHAP. At one facility’s power plant, we identified an existing permit requirement not mandated by the regulations. In the renewal application, we have proposed that this unnecessary monitoring burden be removed from the renewal permit.

Mining Air Quality Services
Our team takes the time to integrate ourselves into the operational process of each facility and site that we work. We understand the subtle nuances unique to each operation and align with our clients’ overarching goals to apply true consistency across facilities.

Health & Safety

A Real Commitment, A Daily Issue: Safety
Tracking to Zero: Integrating Health and Safety into Every Project.

Providing a healthy and safe work environment is an integral ARCADIS value and a key element of the solutions we provide. Our clients demand robust programs that involve continuous improvement, strong leadership, and employee engagement. We address these concerns through our risk- and behavior-based health and safety management program, proactively identifying and prioritizing risks, developing robust approaches to eliminate or minimize these risks, and keeping health and safety first in everything we do. As a result, ARCADIS work-related injury and illness rates are currently below industry benchmarks.
ARCADIS is an international company providing consultancy, design, engineering and management services in infrastructure, water, environment and buildings. We enhance mobility, sustainability and quality of life by creating balance in the built and natural environments. ARCADIS develops, designs, implements, maintains and operates projects for companies and governments. With 22,000 employees and more than $3.3 billion in revenues, the company has an extensive international network supported by strong local market positions. ARCADIS supports UN-HABITAT with knowledge and expertise to improve the quality of life in rapidly growing cities around the world.

While our expertise is built upon the heritage of great organizations, today ARCADIS is one firm, invested in our clients’ success, and committed to operate with integrity, agility, entrepreneurship, collaboration, and a focus on health and safety to improve the quality of life for all. Join with us to celebrate our bright future by embracing the ARCADIS name and the vision, mission and values.

Together we can do a world of good.