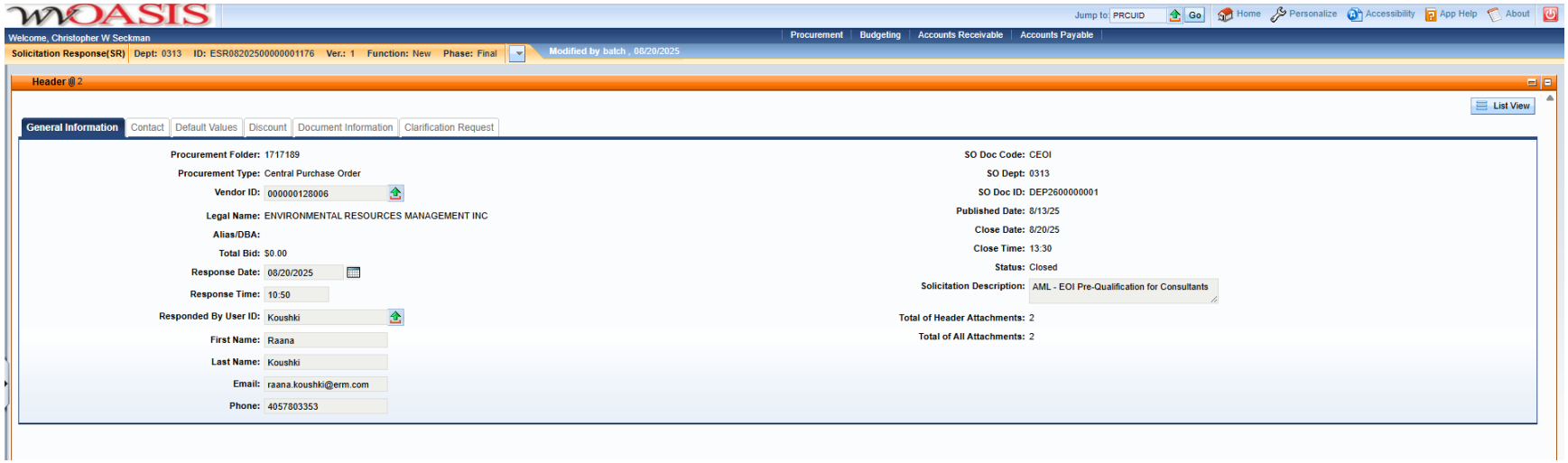
The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at ***wvOASIS.gov***. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at ***WVPurchasing.gov*** with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.


wvOASIS
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Welcome, Christopher W Seckman
Procurement | Budgeting | Accounts Receivable | Accounts Payable
Solicitation Response(SR) Dept: 0313 ID: ESR08202500000001176 Ver.: 1 Function: New Phase: Final
Modified by batch , 08/20/2025
Header @ 2
List View
General Information
Contact
Default Values
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Document Information
Clarification Request
Procurement Folder: 1717189
Procurement Type: Central Purchase Order
Vendor ID: 000000128006
Legal Name: ENVIRONMENTAL RESOURCES MANAGEMENT INC
Alias/DBA:
Total Bid: $0.00
Response Date: 08/20/2025
Response Time: 10:50
Responded By User ID: Koushki
First Name: Raana
Last Name: Koushki
Email: raana.koushki@erm.com
Phone: 4057803353
SO Doc Code: CEOI
SO Dept: 0313
SO Doc ID: DEP2600000001
Published Date: 8/13/25
Close Date: 8/20/25
Close Time: 13:30
Status: Closed
Solicitation Description: AML - EOI Pre-Qualification for Consultants
Total of Header Attachments: 2
Total of All Attachments: 2

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

State of West Virginia
Solicitation Response

Proc Folder:	1717189
Solicitation Description:	AML - EOI Pre-Qualification for Consultants
Proc Type:	Central Purchase Order

Solicitation Closes	Solicitation Response	Version
2025-08-20 13:30	SR 0313 ESR08202500000001176	1

VENDOR

000000128006
ENVIRONMENTAL RESOURCES MANAGEMENT INC

Solicitation Number: CEOI 0313 DEP2600000001

Total Bid: 0 **Response Date:** 2025-08-20 **Response Time:** 10:50:32

Comments:

FOR INFORMATION CONTACT THE BUYER
Joseph (Josh) E Hager III
(304) 558-2306
joseph.e.hageriii@wv.gov

Vendor
Signature X **FEIN#** **DATE**

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	EOI Engineering Design Services				0.00

Comm Code	Manufacturer	Specification	Model #
81100000			

Commodity Line Comments: Please see attached express of interest for Environmental Resources Management Inc. (ERM) and associated CVs and required CQQ forms.

Extended Description:

EOI Engineering Design Services

ADDITIONAL TERMS AND CONDITIONS
(Architectural and Engineering Contracts Only)

1. PLAN AND DRAWING DISTRIBUTION: All plans and drawings must be completed and available for distribution at least five business days prior to a scheduled pre-bid meeting for the construction or other work related to the plans and drawings.

2. PROJECT ADDENDA REQUIREMENTS: The Architect/Engineer and/or Agency shall be required to abide by the following schedule in issuing construction project addenda. The Architect/Engineer shall prepare any addendum materials for which it is responsible, and a list of all vendors that have obtained drawings and specifications for the project. The Architect/Engineer shall then send a copy of the addendum materials and the list of vendors to the State Agency for which the contract is issued to allow the Agency to make any necessary modifications. The addendum and list shall then be forwarded to the Purchasing Division buyer by the Agency. The Purchasing Division buyer shall send the addendum to all interested vendors and, if necessary, extend the bid opening date. Any addendum should be received by the Purchasing Division at least fourteen (14) days prior to the bid opening date.

3. PRE-BID MEETING RESPONSIBILITIES: The Architect/Engineer shall be available to attend any pre-bid meeting for the construction or other work resulting from the plans, drawings, or specifications prepared by the Architect/Engineer.

4. AIA DOCUMENTS: All construction contracts that will be completed in conjunction with architectural services procured under Chapter 5G of the West Virginia Code will be governed by the attached AIA documents, as amended by the Supplementary Conditions for the State of West Virginia, in addition to the terms and conditions contained herein. The terms and conditions of this document shall prevail over anything contained in the AIA Documents or the Supplementary Conditions.

5. GREEN BUILDINGS MINIMUM ENERGY STANDARDS: In accordance with West Virginia Code § 22-29-4, all new building construction projects of public agencies that have not entered the schematic design phase prior to July 1, 2012, or any building construction project receiving state grant funds and appropriations, including public schools, that have not entered the schematic design phase prior to July1, 2012, shall be designed and constructed complying with the ICC International Energy Conservation Code, adopted by the State Fire Commission, and the ANSI/ASHRAE/IESNA Standard 90.1-2007: Provided, That if any construction project has a commitment of federal funds to pay for a portion of such project, this provision shall only apply to the extent such standards are consistent with the federal standards.

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

(Printed Name and Title) David Carpenter, LRS, P.E.- Partner

(Address) 1038 Quarrier Street, Suite 100, Charleston WV 25301

(Phone Number) / (Fax Number) Phone- (304) 546-1783/ Fax- (304) 757-4799

(email address) David.Carpenter@erm.com

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through *wv*OASIS, I certify that: I have reviewed this Solicitation/Contract in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation/Contract for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that this bid or offer was made without prior understanding, agreement, or connection with any entity submitting a bid or offer for the same material, supplies, equipment or services; that this bid or offer is in all respects fair and without collusion or fraud; that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; that I am authorized by the Vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on Vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

By signing below, I further certify that I understand this Contract is subject to the provisions of West Virginia Code § 5A-3-62, which automatically voids certain contract clauses that violate State law; and that pursuant to W. Va. Code 5A-3-63, the entity entering into this contract is prohibited from engaging in a boycott against Israel.

ERM, Inc.

(Company)

(Signature of Authorized Representative)

David Carpenter, LRS, P.E.- Partner

(Printed Name and Title of Authorized Representative) (Date)

Phone- (304) 546-1783/ Fax- (304) 757-4799

(Phone Number) (Fax Number)

David.Carpenter@erm.com

(Email Address)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CEOI 0313 DEP2600000001

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

☑ Addendum No. 1	☐ Addendum No. 6
☐ Addendum No. 2	☐ Addendum No. 7
☐ Addendum No. 3	☐ Addendum No. 8
☐ Addendum No. 4	☐ Addendum No. 9
☐ Addendum No. 5	☐ Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

ERM, Inc.
Company

Authorized Signature

8/20/2025
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

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

PROJECT NAME	DATE (DAY, MONTH, YEAR)	FEIN
AML- EOI Pre-Qualification for Consultants	20 August 2025	232-05-3856

1. FIRM NAME	2. HOME OFFICE BUSINESS ADDRESS	3. FORMER FIRM NAME
ERM, Inc.	2nd Floor Exchequer Court, 33 St Mary Axe London, United Kingdom, EC3A 8AA	

4. HOME OFFICE TELEPHONE	5. ESTABLISHED (YEAR)	6. TYPE OWNERSHIP	6a. WV REGISTERED DBE (Disadvantaged Business Enterprise)
+44 20 3206 5200	1971	Individual [Corporation] Partnership Joint-Venture	YES [NO]

7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE

1038 Quarrier St., Suite 100, Charleston, WV 25301

8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS
David Carpenter, LRS, P.E.- Partner	Grant Morgan, P.E.- Partner; (304) 590-6160

9. PERSONNEL BY DISCIPLINE

>35	ADMINISTRATIVE	>200	ECOLOGISTS	5	LANDSCAPE ARCHITECTS	4	STRUCTURAL ENGINEERS
0	ARCHITECTS	>75	ECONOMISTS	6	MECHANICAL ENGINEERS	0	**SURVEYORS**
>100	**BIOLOGIST**	5	ELECTRICAL ENGINEERS	>125	**MINING ENGINEERS**	2	TRAFFIC ENGINEERS
>100	**CADD OPERATORS**	>250	ENVIRONMENTALISTS	8	PHOTOGRAMMETRISTS	—	OTHER
>75	CHEMICAL ENGINEERS	>40	ESTIMATORS	>30	PLANNERS: URBAN/REGIONAL		
>75	**CIVIL ENGINEERS**	>250	**GEOLOGISTS**	>10	SANITARY ENGINEERS		
>50	CONSTRUCTION INSPECTORS	0	HISTORIANS	>20	SOILS ENGINEERS		
>150	DESIGNERS	>125	HYDROLOGISTS	>10	SPECIFICATION WRITERS	8,180	TOTAL PERSONNELL
>100	DRAFTSMEN						

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 5

***RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.**

10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE? [X] YES [ ] NO

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

NAME AND ADDRESS	SPECIALTY	WORKED WITH BEFORE
Chapman Technical Group (GRW) 200 Sixth Avenue St. Albans, WV 25177	Surveyor, Electrical Engineer, Structural Engineer	X Yes _____ No
Delta Oaks Group 2724 Discovery Drive, Suite 110-120 Raleigh, NC 27616	Geotechnical Engineer	X Yes _____ No
		_____ Yes _____ No
		_____ Yes _____ No
		_____ Yes _____ No
		_____ Yes _____ No
		_____ Yes _____ No
		_____ Yes _____ No
		_____ Yes _____ No

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

(YES) Description and Number of Projects: ERM has supported many AML/MRE projects with scopes including site investigations, handling of cultural and biological surveys, designing various remediation plans and overseeing construction. (Hundreds of previous projects)

NO

B. Is your firm experienced in Soil Analysis?

(YES) Description and Number of Projects: ERM is very experienced in soil analysis routinely conducting Phase 1 and II ESAs, geotechnical investigations, contaminated land and remediation projects, mining and industrial projects, and land use assessments. (Hundreds of previous projects)

NO

C. Is your firm experienced in hydrology and hydraulics?

(YES) Description and Number of Projects: ERM hydrologists and engineers routinely model surface water runoff, groundwater flow and hydrodynamics to support mine reclamation and closure planning, acid mine drainage projects, flood modeling, wetland restoration, and stormwater management design and construction for various types of land development projects. (Hundreds of previous projects)

NO

D. Does your firm produce its own Aerial Photography and Develop Contour Mapping?

YES Description and Number of Projects: ERM subcontracts survey work. (Hundreds of previous projects)

(NO)

E. Is your firm experienced in domestic waterline design? (Include any experience your firm has in evaluation of aquifer degradation as a result of mining.)

(YES) Description and Number of Projects: ERM performs waterline and pipeline design as part of mine closure and reclamation projects, remediation projects, and design of waterlines for indutrial facilities. ERM has deep expertise in hydrogeology and groundwater systems, especially in the mining sector, which includes aquifer characterization, mine-induced aquifer impacts, contamination and degradation studies, and aquifer restoration. (Hundreds of previous projects)

NO

F. Is your firm experienced in Acid Mine Drainage Evaluation and Abatement Design?

(YES) Description and Number of Projects: ERM provides evaluation and characterization, including source identification, hydrologic/hydrogeologic studies, and risk assessment. ERM provides abatement and treatment design, including active treatment, passive treatment, hydraulic controls, and reclamation earthwork analysis. ERM provides mine closure and post-closure monitoring. (Hundreds of previous projects)

NO

G. Is your firm experienced in construction oversight?

(YES) Description and Number of Projects: ERM provides construction oversight making sure construction follows the design drawings and specifications. ERM has provided oversight on projects, including waterline and pipeline installation, treatment system construction, massive earthwork projects, AML remediation projects, mine closure projects, and industrial and brownfield remediation. (Hundreds of previous projects)

NO

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Carpenter, David, LRS, PE Partner, Engineer	5	30+	5

Brief Explanation of Responsibilities

My responsibilities include overall responsibility for the delivery of project work scopes on schedule, ensuring quality assurance, final review of project deliverables, overall responsibility for the project delivery team, project compliance and contractual obligations to the client. My responsibilities also include assembling a design team for each project assignment that can meet or exceed the client's expectations, conducting project progress meetings with the client and ensuring overall client satisfaction.

EDUCATION (Degree, Year, Specialization)

B.S. Geology & Physics 1992 B.S. Civil Engineering 1993 M.S. Environmental Engineering 2000

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
American Society of Civil Engineers, National Society of Professional Engineers, WV Chemical Alliance Zone, WV Chapter of Air & Waste Management Association	P.E. 1998 WV, P.E. KY 2012, P.E. OH 2013, P.E. PA 2013, Licensed Remediation Specialist WV 1998

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
James Hemme, LRS, MBA, PE (WV, OH, MD) Consulting Director, Engineer	10	35	12

Brief Explanation of Responsibilities

Mr. Hemme is a senior civil/environmental engineer with 35+ years of experience, including significant work in mining reclamation and post-mining restoration. He has managed multiple AML and AMD projects across WV and OH involving landslide stabilization, highwall regrading, soil balance planning, treatment pond design, and reclamation of former mine impoundments.He has also led stream and wetland restoration associated with legacy mine impacts and coordinated with regulatory agencies to obtain permits and implement long-term stabilization and drainage improvements on reclaimed mining sites.

EDUCATION (Degree, Year, Specialization)

- M.B.A., Point Park University, Pittsburgh PA, 2013
- B.S., Civil Engineering, West Virginia Institute of Technology, Montgomery WV, 1989

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
•WVUIT Civil Engineering Advisory Committee multiple terms •Member of WVDEP Stormwater Manual Development Advisory Subcommittee •Adjunct Professor at Marshall University 2015-2025	•Professional Engineer (PE), 2010, West Virginia, Ohio and Maryland

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Eisen, Michael, L.; PE, MBA Associate Partner, Engineer	3	18	10

Brief Explanation of Responsibilities

Civil engineering project manager with 18 years of experience in traditional land development and various types of energy projects. Mike's diverse background includes work with energy producers, oil and gas production, linear utilities, architects, mechanical/electrical/plumbing subconsultants, fire marshals, municipalities, and state government agencies. Mike's focus is developing projects from conceptual design through construction and includes management of site layouts, grading and drainage designs, utility designs, and erosion and sediment control designs. Mike has extensive experience with local land use and statewide stormwater and erosion and sediment control permitting.

EDUCATION (Degree, Year, Specialization)

BS, Civil and Environmental Engineeering with Mathematics Minor, Lafayette College, 2007
MBA, Master of Business Administration with Management focus, Point Park University, 2019

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
American Society of Civil Engineers	Licensed Professional Engineer in West Virginia, Pennsylvania, Illinois, Missouri, New Jersey and Ohio- Original License for First State Obtained in 2012

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Born, Nathaniel J	6	6	0

Brief Explanation of Responsibilities

Worked on a number of tailings pond projects for a large taconite (iron ore) mine in northern Minnesota. The tailings ponds were approximately 60 square miles in area, with over 100 miles of internal and external dams throughout the ponds. Projects included the yearly development of dam safety drawings showing updated ground elevations, water elevations, and instrumentation throughout the site. Also designed stormwater ponds for a soda ash mine in Wyoming, working on project from design through post-construction.

EDUCATION (Degree, Year, Specialization)

Louisiana State University, Bachelor's of Science, Civil Engineering, 2014

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
None	Professional Engineer, 2024, Minnesota

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Danielle Foss, PE Principal Technical Consultant, Engineering	3	10	

Brief Explanation of Responsibilities

Danielle Foss is a civil and environmental engineer with 11 years of experience focused on mine closure, reclamation design, and remediation. She has supported closure strategies for active and legacy mining sites, including development of soil cover systems, grading plans, and stormwater management designs for heap leach facilities and coal mining waste areas. Her work includes preparation of contract documents, construction drawings, technical specifications, and cost estimates for mine reclamation alternatives and long-term stabilization measures.

~~In addition to mining projects, Danielle has broad experience in soil and groundwater remediation, landfill capping, and water resources management, all of which~~ translate directly to effective reclamation design and post-closure monitoring of mining sites.

EDUCATION (Degree, Year, Specialization)

- B.S., Civil Engineering, University of Maryland College Park, 2013

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Professional Engineer, 2024, State of Washington

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Lindsay, Stephen, C, PE Technical Consulting Director	2 years	10 years	1 year

Brief Explanation of Responsibilities

Oversee, perform and/or review the investigation, design, permitting and construction of civil works projects in the mining, power, diversified energy, technology, manufacturing and chemical sectors. With respect to AML projects, responsibilities include conducting stability evaluations and subsurface explorations; civil site design, including earthwork, grading, stormwater management and road design; and preparation of land use and land disturbance applications.

EDUCATION (Degree, Year, Specialization)	BS (2003) in civil engineering MS (2008) in civil engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
ASCE (inactive)	Professional Engineer in HI, MD, NC, PA, VA, DC

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Boyce, Steven, R	5	24 mine site closure	0

Brief Explanation of Responsibilities

Developed closure evaluations and techniques for numerous western US minesites. Worked on several abandoned mine closures, all in Nevada. First mine closure in 1996. Participated in USACE Reclamation of Abandoned Mine Sites, Elder Creek Demonstration Project. Helped formulate Nevada's Standardized Reclamation Cost Estimator. Design garnered NV award for excellence in reclamation for the Big Ledge Barite Mine weste WRSF closure design (2021). Numerous heap leach, tailings storage facility, and waste rock dump closures 1996-2025.

EDUCATION (Degree, Year, Specialization)

BS Civil Engineering, 1991, Environmental; MS Civil Engineering, 1992, Environmental; MBA, 1999, general MBA.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State) Both current (2025).
SME Registered Member 04160390; AEMA; GSN	Civil PE, 1995, CA 53964; Civil PE, 1998, NV 13501

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
David, Abranovic, J. Partner	20	25	0

Brief Explanation of Responsibilities

- Technical leadership for Abandoned Mine Land (AML) focusing on mine closure, repository design, soil, ground water remediation, and surface water investigation and treatment.
- Leads multidisciplinary technical teams through all phases of CERCLA projects including RIFS, design and build.
- Oversees the construction projects the Qualified Party on several ERM's General Contractors licenses.
- Serves as the technical authority for mine closure design and reclamation, hydrodynamic and sediment transport modeling, acid rock drainage treatment design and groundwater monitoring system design.

EDUCATION (Degree, Year, Specialization)

- M.S., Environmental Engineering, 1998
- B.S., Geology, 1986

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
Society of Mining Metallurgy and Exploration (SME) American Exploration Metalurgy & Mining Association (AEMA)	PE, 2001, Arizona PE, 2015, Utah

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Jacob Hook Partner	7	17	

Brief Explanation of Responsibilities

Jacob “Jake” Hook is a Partner with over 17 years of experience leading large-scale demolition and decommissioning projects in the power, mining, oil & gas, chemical, and manufacturing sectors. He has extensive expertise in demolition planning, scope development, and project execution oversight, including site assessments for hazardous materials (ACM, lead, PCBs), developing technical specifications, reviewing bids, and managing contractors. Jake has overseen both mechanical and explosive demolitions of boilers, stacks, intake structures, and other industrial infrastructure, ensuring safe and compliant project delivery.

He has managed demolition programs for multiple fossil power plants across Arkansas, Louisiana, and Mississippi, representing over $65 million in project spend, as well as turnkey demolition of coal handling facilities and multi-unit power plants. His work includes coordinating field abatement, hazardous materials management, permitting, and structural assessments for decommissioning within active plants. Jake combines strategic planning with hands-on field oversight to execute complex demolition projects efficiently and safely.

EDUCATION (Degree, Year, Specialization)

- B.S. Civil Engineering, University of Illinois (2008)

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Luis Velasquez Engineering Consultant		6 years	

Brief Explanation of Responsibilities

- Worked as designer on coal combustion residual remediation plans for new development of power generation stations.
- Worked as access road designer for inter-state pipeline alignment projects including environmental impact assessment.
- Worked as designer of erosion & sediment control plans for multiple gas line new construction and maintenance projects.
- Worked as field monitor of site restoration efforts at multiple sites as part of abandoned oil/gas production remediation projects.

EDUCATION (Degree, Year, Specialization)

B.S. Geological Engineering, University of Alaska, USA, 2017

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
Association of Environmental and Engineering Geologists (AEG)	Professional Engineer (PE), 2025, WV#27535

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Rudowski, Monica R. Principal Consultant	0	0	0

Brief Explanation of Responsibilities

Monica Rudowski has extensive experience in wetland and waterbody delineations, Section 404/401 permitting, and NPDES stormwater permitting across West Virginia. She is proficient in floodplain permitting and has contributed to FERC 7c Environmental Impact Statements (EIS). Her expertise includes Federal, State, and local permitting, construction monitoring, and project management. She has years of experience in agency and client coordination, ensuring regulatory compliance and successful project delivery in complex environmental landscapes.

EDUCATION (Degree, Year, Specialization) B.S., 2013, Biological Science

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
N/A	

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Raana Koushki, Ph.D. Managing Technical Consultant, Engineering	4	17+	5

Brief Explanation of Responsibilities

Dr. Koushki, Ph.D., is a Managing Consultant Engineer and approved Project Manager at ERM with 17+ years of experience in civil and environmental engineering. She specializes in water resources management, sustainable engineering, environmental permitting, and life cycle assessments, leading complex projects across mining, energy, urban water, and agriculture sectors.

Her work spans hydrology and hydraulic modeling, water transfers, watershed management, and restoration projects like Lake Urmia. Known for her expertise in stakeholder coordination, risk management, and sustainable solutions, Ms. Koushki integrates technical precision and strategic planning to deliver high-quality, environmentally responsible results worldwide.

EDUCATION (Degree, Year, Specialization)

- Ph.D., Civil & Environmental Engineering, 2022
- M.S., Water Resources Engineering, 2006
- B.S., Irrigation and Drainage Engineering, 2000

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Spencer Reynolds A Senior Specialist, CAD	2	2	1

Brief Explanation of Responsibilities

Create/Update CAD drawings to the PM's specifications.

EDUCATION (Degree, Year, Specialization)

Associated in Applied Science with a specialty in CAD, 2

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
NA	NA

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Laura Lewis Managing Technical Consultant	0	4	0

Brief Explanation of Responsibilities

Engineer with 5 years of experience in the design, permitting, and construction of civil projects in the power, oil & gas, chemical, and manufacturing sectors. Experience includes permitting and civil design for natural gas and renewable energy facilities; stormwater permitting and design; surface water hydrology and hydraulics; construction management and inspection services; environmental regulatory compliance; and land development.

EDUCATION (Degree, Year, Specialization)

B.S. Environmental Engineering, University of Pittsburgh, 2020

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Hood, Alexandra	2 yrs (AML)	20 yrs	2 yrs

Brief Explanation of Responsibilities

AML Specific : focused on remediation of AML coal sites along the CKPC rail line, predominantly in OK. Focus on remediation of former pads, capping of historic ponds, seepage sampling and management, demolition of infrastructure, post closure monitoring program design and implementation. Experience working with federal office of surface mining.

NOAMI experience leading closure planning and development for a perpetual care plan for the Giant Mine; Mine Closure experience for hardrock and mineral mines

includes hazard id and risk mgmt, remediation and land form design, post closure water management and treatment, demolition, post closure monitoring and disposal

EDUCATION (Degree, Year, Specialization)

BSc (2008) Biology, Ecological Restoration & Rehabilitation, MSc (2018) Environmental Practice, Treatment Wetlands, Restoring Degraded Habitats; MBA (2024) Executive Management, Green Concrete and Best Methods for calculating Asset Retirement Obligations

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
International Network of Acid Prevention (INAP), Society of Mining, Metallurgy and Exploration, UN Decade of Restoration Global Facilitator, ACG Mine Closure	

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Johnson, Carlie S.	0	5	1

Brief Explanation of Responsibilities

Civil plans related to land development activities. Please refer to CV for additional detail.

EDUCATION (Degree, Year, Specialization)

Bachelor of Science, 2020, Environmental Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Ian Wilson, EP, PAg Partner	20	20	

Brief Explanation of Responsibilities

Ian is a Partner at ERM specializing in closure design, remediation, and stakeholder engagement for large, complex legacy sites. Before joining ERM, he led the Government of Saskatchewan's program to assess and remediate 37 former Cold War uranium mine and mill sites.

With over 20 years of operational and management experience in legacy mines, nuclear, oil and gas, marine, industrial, and spill sites, Ian has overseen large-scale mine closure activities, including earthworks, deconstruction of hundreds of structures, hazardous and nuclear waste management, ice road logistics, and ~~geostability improvements. He has managed projects exceeding $1 billion and completed over $300 million in mine closure cost estimating across western and~~ northern Canada.

EDUCATION (Degree, Year, Specialization)

- Masters of Business Administration (MBA). Oil, Gas and Energy Management, UK, 2017
- Graduate Certificate. Executive Leadership, Cornell University, USA, 2015
- Bachelor of Science (B.Sc.). Environmental Science, Royal Roads University, Canada, 2001

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	•Professional Agrologist, Saskatchewan, Canada •Environmental Professional, Canada

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Michael Tincher, PWS, CESSWI, QHP Associate Partner	10	13	

Brief Explanation of Responsibilities

Michael is an environmental project manager with 13 years of experience specializing in permitting, wetland and stream delineations, stormwater management, and environmental compliance for energy and infrastructure projects. He has led permitting and restoration efforts for pipelines, compressor stations, solar and wind facilities across the eastern U.S., including development of SWPPPs and oversight of erosion and sediment control in challenging terrain.

Much of Michael's experience is directly applicable to mining reclamation, particularly through his management of stormwater and erosion control on linear projects ~~in steep, slip-prone terrain and coordination of wetland and stream restoration activities. He routinely leads interdisciplinary teams to assess environmental impacts~~, develop mitigation strategies, and support long-term restoration and compliance efforts relevant to post-mining land use.

EDUCATION (Degree, Year, Specialization)

- M.B.A. Business and Economics, West Virginia University, USA, 2023
- M.S. Wildlife and Fisheries Resources, West Virginia University, USA, 2013
- B.S. Wildlife and Fisheries Resources, West Virginia University, USA, 2010

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	PWS, CESSWI, QHP

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Tanner McCallister, PE Senior Consultant, Engineering	2	6	1

Brief Explanation of Responsibilities

Tanner McCallister is a civil engineer and senior consultant with 6 years of experience focused on earthwork, stormwater management, and environmental compliance on large construction and remediation projects. He has supported reclamation-related activities including mass grading, slip repair, and erosion and sediment control design and inspections across West Virginia and the Mid-Atlantic region. His work includes CCR disposal facility inspections, stormwater investigations, ES&C plan preparation, constructability reviews in steep terrain, and environmental oversight for interim remedial actions—all of which contribute directly to successful mine reclamation and stabilization efforts.

EDUCATION (Degree, Year, Specialization)

- MS. Business Administration, West Virginia University, USA, 2019
- BS. Civil Engineering, West Virginia University, USA, 2018

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Registered Professional Engineer - Civil, 2025, WV

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Blat, Jessica, R.	0	5	0

Brief Explanation of Responsibilities

Supporting Civil Plans related to land development activities. See CV for additional details.

EDUCATION (Degree, Year, Specialization)

Bachelor of Science, 2020, Environmental Systems Engineering

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Engineer in Training, 2021, Pennsylvania

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Erbe, Matthew	0	0	0

Brief Explanation of Responsibilities

Matt is a Consulting Director based in Washington, D.C. He provides technical consulting for the characterization of environmental impacts to soil and waters as well as the evaluation of remedial measures, including mine reclamation, coal combustion product beneficial use and leachate impact analysis, and groundwater resource and supply analysis.

EDUCATION (Degree, Year, Specialization)

M.S., 1997, Hydrogeology

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Professional Geologist, 2004, Tennessee

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Omar Itani Principal Technical Consultant, PE		12 years	

Brief Explanation of Responsibilities

Perform geotechnical related activities such as: evaluation of subsurface conditions using boreholes, geophysics, and historical mining data. Identifying risks like subsidence, mine voids, unstable slopes. Develop stabilization strategies such as backfilling, grouting, and re-grading.

Develop monitoring startegies such as instrumentation to track ground movement and structural integrity.

Interdisciplinary coordination with hydrogeologists and environmental scientists to restore safe topography and hydrology.

EDUCATION (Degree, Year, Specialization)

BSc Civil Eng. 1996 | MSc Geotechnical Engineering 2000 | MEng Underground Tunneling 2015

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State)
	Licensed Professional Engineer: Ohio, Florida, Georgia

14. PROVIDE A LIST OF SOFTWARE AND EQUIPMENT AVAILABLE IN THE PRIMARY OFFICE WHICH WILL BE USED TO COMPLETE AML DESIGN SERVICES
AutoCAD Civil 3D, ArcGIS, GEO5, HydroCAD, Hydraflow Hydrographs, Hydraflow Express, Hydraflow Storm Sewers, HEC-RAS, HEC-HMS, RUSLE2, PLAXIS, Bluebeam Revu, Microsoft Project, Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Adobe Acrobat, PDF XChange Editor.

15. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS THE DESIGNATED ENGINEER OF RECORD

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	NATURE OF YOUR FIRM'S RESPONSIBILITY	ESTIMATED CONSTRUCTION COST	PERCENT COMPLETE
Battery Energy Storage System Projects (3 Projects in Michigan)	Confidential	Civil Design Engineers- Site Plan, Grading and Drainage, Erosion and Sediment Control (ESC) Designs`	Approximately $180 million per project	30%
UCC Filmont Landfill, South Charleston, WV	UCC 7501 State Highway 185 North Seadrift, TX 77983	Site wide contaminant investigation, interim remedial design, full scale remedial design, expert witness, NPDEs permitting with GPP and SWPPP	Approximately $36 million	25%
Various Gas Pipeline Projects in West Virginia, Ohio and Kentucky	Confidential	Civil Design Engineers- Site Plan, Grading and Drainage, ESC Designs	Varies	Varies- Most constructed
Supporting Construction Permitting Application for a Mine in North Carolina	Confidential	SWMP & Design, ESC Plan, Hydrologic and Hydraulic modeling and Engineering Design (construction, operational and reclamation Phases)	Unknown	30%
Procter and Gamble Several Permitting Support Projects, in West Virginia	Procter and Gamble	West Virginia Multi-Sector General Permit Renewal, SPCC	Varies	100%
Salton Sea Solar Plant in Imperial County, California	Indio Solar Partners II, LLC Santa Barbara, CA	Environmental Clearance and Permitting	Approximately $1.2 Billion	100%
Amazon, Several Sites across the world	Amazon	SWMP, HNONA, etc.	Varies	Varies

TOTAL NUMBER OF PROJECTS: Hundreds of previous projects

TOTAL ESTIMATED CONSTRUCTION COSTS: $ Hundreds of millions of $

16. CURRENT ACTIVITIES ON WHICH YOUR FIRM IS SERVING AS A SUB-CONSULTANT TO OTHERS

PROJECT NAME, TYPE AND LOCATION	NATURE OF FIRMS RESPONSIBILITY	NAME AND ADDRESS OF OWNER	ESTIMATED COMPLETION DATE	ESTIMATED CONSTRUCTION COST	
				ENTIRE PROJECT	YOUR FIRMS RESPONSIBILITY
Compressor Stations in North Carolina (Four Projects)	Responsible for the permitting, drainage and erosion and sediment control designs	Gulf Companies- 1080 Eldridge Parkway, Suite 500 Houston TX 77077	March 2027	Approximately $50 million	Approximately $0.5 million per project
Honor Rancho Storage Field Compressor Modernization (HRCM) in California	Stormwater Management Plan (SWMP), ESC Plan, Hydrologic study, Hydrologic and Hydraulic	Gulf Companies- 1080 Eldridge Parkway, Suite 500 Houston TX 77077	September 2025	Approximately $250 million	Approximately $0.5 million

17. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
7 DG Solar Projects in Ohio and Illinois	Confidential	Approximately $10 million per project	2023-2024	No
3 DG Solar Projects in Pennsylvania	Confidential	Approximately $10 million per project	2022-2024	No
Utility Scale Solar Project in Indiana	Confidential	Approximately $60 million	2023-2024	No
Compressor Station in Williamson County, Texas	Confidential	Approximately $1.5 million	2022-2023	Yes
Compressor Station in Austin County, Texas	Confidential	Approximately $1.5 million	2024	Yes
4 Solar Plant in California	Stellar Renewable Power 14643 Dallas Parkway, Suite 250 , Dallas, Texas 75254	Approximately $70 million each	2023-2024	Yes
Bear Valley Solar Energy Project, Santa Ana, CA 92705	ENGIE 4151 Burton Drive Santa Clara, CA 95054	Approximately $15 million	2024	Yes
Greenbark 30 Battery Energy Storage Project, Terminus Of Via Jero, Goleta, California	Greenbark 30 BESS, LLC., California	Approximately $15 million	2024	Yes

18. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM HAS CONSTRUCTION OVERSIGHT ON PROJECTS				
PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
DG Solar Project in Columbus, Ohio	Confidential	Approximately $10 million per project	2024-2025	Yes
Braskem America, Kenova, WV	Kenova, WV	Approximately $200k	2024	Yes
Pipeline Stream Crossings and Reporting	Confidential	Approximately $7 billion	2023-2024	Yes

19. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM HAS BEEN A SUB-CONSULTANT TO OTHER FIRMS (INDICATE PHASE OF WORK FOR WHICH YOUR FIRM WAS RESPONSIBLE)

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST OF YOUR FIRM'S PORTION	YEAR	CONSTRUCTED (YES OR NO)	FIRM ASSOCIATED WITH
Edgecombe Compressor Station, North Carolina	TC Energy	Approximately $0.5 million per project	2022-2025	Yes	Gulf Companies- 1080 Eldridge Parkway, Suite 500 Houston TX 77077
Ahoskie Compressor Station, North Carolina	TC Energy	Approximately $0.5 million per project	2022-2025	Yes	Gulf Companies- 1080 Eldridge Parkway, Suite 500 Houston TX 77077
Roanoke Rapids Compressor Station, North Carolina	TC Energy	Approximately $0.5 million per project	2022-2025	Yes	Gulf Companies- 1080 Eldridge Parkway, Suite 500 Houston TX 77077
Pitt County Compressor Station, North Carolina	TC Energy	Approximately $0.5 million per project	2022-2025	Yes	Gulf Companies- 1080 Eldridge Parkway, Suite 500 Houston TX 77077
Multiple others in Illinois, Michigan, Iowa, Wisconsin, and Pennsylvania					

20. Use this space to provide any additional information or description of resources supporting your firm's qualifications to perform work for the West Virginia Abandoned Mine Lands Program.

21. The foregoing is a statement of facts.

Signature: _____ Title: Partner Date: 8/20/2025

Printed Name: David Carpenter, LRS, P.E.

AML and RELATED PROJECT EXPERIENCE MATRIX

PROJECT	Exp. Basis C=Corp. P=Personnel *	Additional Info Provided in Section (s) **	PROJECT EXPERIENCE REQUIREMENTS															PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional					
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/Nitigation/ Replacement	Construction Inspection/Management	Water Treatment	Active/Passive Water Treatment Systems	Equipment/Structure Removal	Stream Restoration	Geotechnical/Stability						
McCracken Mine	ERM		X			X				X	X	X	X				X	X						
Red Dog Mine	ERM					X					X	X	X	X	X	X		X						
Battery Energy Storage System Projects	ERM					X					X	X	X					X						
UCC Filmont Landfill	ERM					X				X	X	X	X					X						
Various Gas Pipeline Projects	ERM					X					X	X	X					X						
Support of Construction Permitting for Mine in North Carolina	ERM		X			X					X	X	X					X						
Procter and Gamble Several Permitting Projects in WV	ERM					X					X	X	X					X						
Salton Sea Solar Plant	ERM					X					X	X	X					X						
Amazon, Several Sites	ERM					X					X	X	X					X						
Duck Creek Landslide WV AML Reclamation	ERM		X			X					X	X	X					X						
Miscellaneous West Virginia AML Projects	ERM		X			X				X	X	X	X					X						
Miscellaneous Ohio AML Projects	ERM		X			X				X	X	X	X					X						

*** List whether project experience is corporate or personnel based or both.**

**** Use this area to provide specific sections or pages if needed for reference.**

***** List Primary Design personnel and their functional capacity for the projects listed.**

Attachment "B"

AML - EOI Pre-Qualification for Consultants

STATE OF WEST VIRGINIA

DEPARTMENT OF ADMINISTRATION

CEOR 0313 DEP2600000001

AND

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

OFFICE OF ABANDONED MINE LANDS

Sustainability is our business

Table of Contents

Cover Letter

SUMBIT TO: BID CLERK
Department of Administration
Purchasing Division
2019 Washington St E
Charleston WV 25305

CC: ENVIRONMENTAL PROTECTION
Office of AML&R
601 57th St SE
Charleston WV 25304

Subject: Expression of Interest for AML Design Services

Environmental Resources Management, Inc. (ERM) is excited to submit our qualifications to perform abandoned mine land (AML) reclamation design services. ERM is a global environmental consultancy with an office and dedicated staff in Charleston WV, ready to support the West Virginia Department of Environmental Protection (WVDEP).

In response to the request for qualifications (RFQ) by the WVDEP, we have assembled a statement of Qualifications (SOQ) explaining our deep understanding of mining's challenges with environmental compliance, engineering design and project execution. ERM is highly experienced with the terrain, geologic setting, hydrology and permitting requirements and has a local core team of engineers and scientists with a very deep bench of similarly talented personnel within the surrounding region. This includes mining subject matter experts (SME's) with national and global mining experience to bring to the table.

ERM is uniquely positioned to deliver precision-engineered plans, property acquisition/negotiation and proactive environmental permitting from our extensive company and personnel's experience. Our global portfolio spans 24 countries, with site-specific investigations, reclamation design, regulatory navigation, and community engagement expertise.

We bring together land acquisition specialists, geologists, scientists, engineers and public outreach experts to develop designs tailored to each site's geological, hydrological and environmental context.

ERM
1038 Quarrier St.
Suite 100
Charleston
WV 25301
ERM.com

There are three key areas of value ERM brings to this important project.

1. **Safety-First Approach**
   ERM embeds safety into every phase of project planning, design, and execution. Our staff are empowered to stop work when safety concerns arise, protecting our clients and workers during high-risk and field activities such as geotechnical explorations, wetland delineation, construction monitoring and demolition. We specifically use our in-house safety expertise during design and construction as a core consideration for safe execution of the project. This is evidenced by our world class Experience Safety Modification (EMR) Rating of <1 for the past 5 years.

2. **Environmental Excellence**
   ERM sets our team members apart through integrating environmental assessment, environmental compliance and environmental clearance training into the mentoring of our design engineers and field staff. We do not "silo" our staff but rather encourage them to expand their experience through varied and highly challenging work in multiple groups on a variety of projects. During these efforts our engineers and geologist interact with permitting specialists, environmental scientists, biologists and subject matter experts (SME's) giving them an appreciation for how compliance must be achieved early in a project. Our team includes bat, avian and mussel specialists, cultural resource experts and archeologists and similar specialists. As a result our design teams are proactive with incorporating US Army Corp of Engineers (USACE), West Virginia Department of Natural Resources (WVDNR) and Fish and Wildlife Service (FWS) requirements into our designs and scheduling for their potential impacts.

3. **Strategic Project Delivery and Proven Technical Execution**
   We understand the critical nature of the projects that will be issued through this process. ERM is an expert working with some of the most aggressive leading national and global clients. We are sensitive to the importance of setting an accurate schedule and budget and maintaining and tracking those projections throughout the project. With technical specialties in health and safety, subsurface exploration, demolition, and engineering design we seamlessly combine environmental compliance into our projects early to avoid delays later in the project. Our designs prioritize constructability and low long-term operations & maintenance costs, helping eliminate surprises and execute with precision to meet regulatory and stakeholder expectations.

Our project team is committed to bringing insights and knowledge, acting as a true business partner, and helping make your projects successful. We welcome the opportunity to discuss our proposal with you in person or over the phone. Please contact David at (304) 546-1783 david.carpenter@erm.com to discuss further.

Sincerely,

David Carpenter, LRS, PE
Partner in Charge
Email: david.carpenter@erm.com
Phone: (304) 546-1783

James Hemme, LRS, PE
Project Manager
Email: james.hemme@erm.com
Phone: (612) 347-7135

Our Unique Value Proposition

	Safety-First Approach	Environmental Excellence	Strategic Project Delivery
WVDEP Needs	Embedded safety in design, protective of property owners and the public. Zero safety incidents	Confidence in timely environmental compliance regarding stream, wetland, RT&E species and NEPA. Design addresses regulatory concerns while minimizing future maintenance.	On-time and on budget delivery. Regulatory acceptance of design approach. Minimize operational and maintenance costs.
ERM's Value	**ERM's Six-Stage Decommissioning/Reclamation, Decontamination, and Demolition process** has been deployed on thousands of projects, saving clients millions and enabling safe execution and protection of stakeholders for work in complex environments. **ERM staff** are fully authorized to stop work and enforce safety protocols when risk thresholds are exceeded. **ERM stresses health and safety in everything we do. This is evidenced with our "Best in Class" Experience Modification Rate (EMR) < 1 for the past five years (following slide) – ERM NA Safety Statistics**	**ERM's World Class Approach to Environmental Sustainability** is integrated into every project we perform. Our unparalleled subject matter experts in RT&E (bats, mussels, avians, Running Buffalo Clover, etc.) are proactive in their approach in obtaining timely clearances from USFWS, WVDNR and NFS and in negotiating unique cost-effective mitigation where necessary. **Full In-House Comprehensive Environmental Permitting and Compliance Expertise** is provided to minimize any subconsultant needs and allow for thorough and timely incorporation of regulatory requirements into our engineering designs	**ERM's Focus on Sustainable Post Construction Operations** is incorporated at project startup. ERM's design team reflects on how designs blend with the environment, how the project will avoid or minimize resource impacts and how stabilization measures can be employed that minimize supplementary maintenance. **Cross Trained Engineering Design Staff** have a deep understanding of the environmental clearance process and readily incorporate targeted design aspects into our engineering plans to clearly address regulatory concerns. **Trusted by governments and global mining leaders,** ERM is a preferred partner for closure planning, environmental impact assessments, and remediation design at legacy mining sites worldwide.

Executive Summary

ERM will bring unmatched technical depth, regulatory fluency, and stakeholder credibility to the WVDEP in the execution of the desired scope of work.

Our team understands the strategic importance of keeping the design and construction of the reclamation projects on task with both schedule and budget.

ERM's approach is engineered for precision and resilience. We combine environmental clearance rigor, demolition expertise, health and safety protocols and constructability planning to support our engineering design development. Utilizing this approach ERM is prepared to deliver defensible, cost-effective, and execution-ready designs that WVDEP will have full confidence in that will support consistent bidding efforts by contractors.

Our proposed core team of engineers, scientists and designers are West Virginia residents and available for assignment under this contract immediately. Their experience is highlighted in the organizational section of this EOI. Detailed CVs for the proposed team and subject matter experts (SME's) are attached at the end of this document.

The local leaders for this effort will consist of

Mr. David Carpenter LRS, PE with over 30 years experience will be the WV based Partner In Charge (PIC) of the overall effort and responsible for quality of the project delivery to the WVDEP satisfaction. David is a highly experienced engineer in assessment, remediation and reclamation of brownfields, Voluntary Remediation Program sites and Landfill Closures.

Mr. James Hemme LRS, PE with over 35 years experience including AML/AMD and all aspects of Civil and Environmental Engineering, James will be the WV based Project Manager. James will be responsible for schedule tracking, communication with the WVDEP and be the overall Engineer of Record for the produced designs. James has a solid understanding of AML processes through his work history and will develop and manage the environmental/engineering team to deliver projects on time and on budget.

We are prepared at your convenience to discuss our capabilities in more detail.

Services We Provide

Expertise in mine reclamation is more fully explained in the EOI. ERM is experienced in all aspects of planning, investigations and report/permit application preparation related to all of the following services that ERM provides In-House:

- National Environmental Policy Act (NEPA) consultation
- West Virginia Division of Natural Resources (WVDNR) consultation
- West Virginia Historic Preservation Office (SHPO) consultation
- WV Regional Planning consultation
- US Forest Service consultations
- US Fish and Wildlife Service (USFWS) consultations
- Rare, Threatened and Endangered Species (RT&E) investigations
- Water Quality Sampling and Analysis
- Groundwater Sampling and Analysis

Engineering Design services ERM provides include:

- Site Assessment/Critical Issues Analysis
- Civil Engineering - Site Layout/Grading/Drainage/etc.
- Geological and Geotechnical Exploration for slope stability and highwall reclamation
- Hydrologic Analysis
- Structural Engineering (Subconsultant)
- Electrical Engineering (Subconsultant)
- Process Engineering
- Surveying (Subconsultant)
- Developing construction plans and technical specifications for reclaiming mine portals, drainage controls, highwall and auger hole reclamation
- Slope stabilization, coal refuse and mine spoil reclamation
- Stream and channel restoration
- Subsidence repair
- Temporary and permanent access or accesses for construction
- Stormwater and erosion and sediment control
- Water treatment systems
- Specialty remediation for unanticipated conditions on the project sites.

All engineering/surveying deliverables will be stamped by a Registered Professional Engineer in the State of West Virginia and Registered Professional Surveyor in the State of West Virginia for surveying.

ERM provides the following permit deliverables and construction services in parallel with our designs, including:

- National Pollutant Discharge Elimination System (NPDES) construction stormwater General Permit registration
- West Virginia Department of Highways (WVDOH) MM-109 encroachment permits
- Army Corps of Engineers (USACE) consultations
- Department of Health Permits (for water lines)
- County land development and floodplain permits
- Provide Construction Oversight
- Obtain, maintain and release all required permits

Answers to Key Questions from Request for EOI

Description of Project Management Approach

ERM will provide robust project management throughout the project, from coordinating an initial kick off meeting to final closure reporting and permit release. Project Management will consist of but not be limited to regular communications, standing meetings and agendas, documentation of decisions with meeting minutes, weekly schedule tracking and updates, budget tracking on a monthly schedule, maintaining a "management of change" log and recurring internal meetings that the PM will conduct with the project team. The PIC will check in with the PM weekly and communicate with the WVDEP regarding their perception of project delivery on a routine basis.

ERM will schedule an initial kick off meeting and schedule a recurring meeting with the WVDEP assigned contacts on a mutually agreeable schedule to continually hold ourselves to account for continuous progress. Routine internal meetings with environmental and engineering staff will maximize utilization of resources and promote solid communication. Within ERM, PM's have access to expenditures against budgets on a weekly basis. During each meeting with the WVDEP tracking against the project schedule will be updated and once a month or more frequently if requested by WVDEP the progress budget will be presented against the estimated percent complete.

Documenting mutually agreeable design directions/revisions with the WVDEP will be paramount to success and maintaining a record of decision. ERM will document decisions through distributed meeting minutes, maintaining the change log and proving a summary response to comments by the WVDEP on draft deliverables. Redundancy and backup have been built into the proposed staffing to minimize impacts of personnel changes. This is discussed more fully in our Proposed Summary of Personnel Availability below.

During bidding and construction, ERM will follow best practices for pre-bid documentation, summary of bid reviews, submittal reviews, pay request tracking, working with the WVDEP should field changes be necessary and in obtaining "As-Built" documentation for final reporting.

Examples of Past AML or Similar Projects Successfully Completed On Time

ERM has engaged in hundreds if not thousands of mining locations worldwide. We have an extensive reach within the United States with personnel having experience with both coal mining and hard rock mining and ERM services covering initial mine siting to final closure and reuse. Services span from simple grading reclamations to internment and closure of uranium ore tailings. These services have also included extensive environmental and NEPA clearances, groundwater and AMD treatment, surface mine highwall and deep mine portal closure. Special considerations such as bat gate design, confined space entry, demolition safety and planning for post closure alternative land use. Representative example projects and services we provide related to mine reclamation are included in the body of this EOI.

Proposed Summary Of Personnel Availability and Resource Planning to Meet Overlapping or Expedited Deadlines

ERM's project delivery framework is centered on a core team of West Virginia–based professionals, supported as needed by technical staff and subject matter experts from other offices. While additional resources may be geographically distributed, all personnel report through David Carpenter, LRS, PE, engineering and geology partner and James Hemme, LRS, MBA, PE, engineering director, who are both located in Charleston, West Virginia. This structure provides clear lines of accountability, provides consistency in project execution, and leverages both local knowledge and the broader expertise of our organization.

The larger engineering team has a demonstrated history of working together interchangeably on multiple assignments, which allows us to effectively balance resources across projects with overlapping schedules or accelerated deadlines. This collaborative approach provides flexibility to mobilize the appropriate staff to meet client needs while maintaining quality and schedule commitments. In addition, two senior engineers, Mike Eisen, PE, MBA and Nate Born, PE, are available to serve either as support project managers across concurrent efforts or as task managers for complex project elements, thereby adding leadership capacity when required.

Our design resources are further strengthened by a team of engineers experienced in the civil, geotechnical, and environmental disciplines. All engineers are proficient in AutoCAD Civil 3D, which is consistently employed to produce grading models, design plans, and detailed construction drawings. This standardized use of design software enhances efficiency, accuracy, and interoperability across all project deliverables.

Proposed Summary of Personnel Availability and Resource Planning to Meet Overlapping or Expedited Deadlines – Cont.

Key Personnel Roles Supporting this Project Include:

- **Partner (David Carpenter, LRS, PE) and Project Manager (James Hemme, LRS, MBA, PE) (West Virginia–based):** Provides overall direction, maintains client communication, and upholds accountability.
- **Support Project Managers / Task Managers (Mike Eisen, PE, MBA and Nate Born, PE and Danielle Foss PE):** Three senior engineers available to lead complex tasks or support multiple projects concurrently.
- **Design Engineers and CAD Support (Raana Koushki PhD, Omar Itani PE, Tanner McCallister PE, Luis Velasquez PE, Spencer Reynolds, Laura Fritz, Carlie Johnson, Jessica Blat, Caitlyn Cano, and others):** Experienced in civil, geotechnical, and environmental engineering; interchangeable across assignments to meet workload demands. All engineers are proficient in AutoCAD Civil 3D, ensuring consistency in design and documentation.
- **Technical Specialists and Scientists (Clayton Calmindon, Monica Rudowski, Elyse Johnston and others)** to provide environmental assessment, biological surveys, wetland delineations, consultations and permitting.
- **Subject Matter Experts (Steven Boyce PE, David Abranovic PE, Alex Hood, Jacob Hook, Jim Boykin, and others)** to provide expertise for challenging aspects of projects as encountered under West Virginia–based leadership.

This integrated resource structure anchored in West Virginia with the ability to draw on additional expertise, positions our team to provide timely, high-quality support under both standard and expedited project schedules.

A Plan for Communication, Progress Tracking, and Prompt Issue Resolution

A plan for communication, progress tracking, and prompt issue resolution.

Consistent with our Project Management approach described above, frequent and routine communication with the WVDEP will be integral to all projects assigned to ERM. As a starting point we would propose weekly emails from the PM on project questions/status and bi-weekly check in calls to discuss progress against the established schedule, monthly budget tracking and environmental clearance and/or design progress/challenges.

ERM will meet internally weekly to keep progress moving and to provide for efficient utilization of our staffing resources.

The PIC will establish a routine schedule to communicate with our WVDEP contact(s) to check on satisfaction with services being provided and to receive overall feedback on team performance. At all times the WVDEP has email and telephone access to the PIC and PM should concerns arise for quick resolution.

To promote documentation of changes in direction from addressing issues, the management of change log will be updated for future reference on the identified issue and its resolution.

About ERM

Sustainability is our business

Sustainability is our business

We are the world’s largest specialist sustainability consultancy

Founded in 1971, we are the largest advisory firm in the world incorporating sustainability into the environmental and engineering services we provide, offering unparalleled depth and breadth of expertise.

We shape a sustainable future with the world’s leading organizations

Our purpose guides everything we do. We create a better future by helping the world’s biggest brands address today’s sustainability imperatives.

We are the recognized market leader in sustainability services

Numerous industry benchmarks attest to our market leadership and the majority of our work is sole-sourced, reflecting trusted partnerships we build with our clients.

ERM OVERVIEW

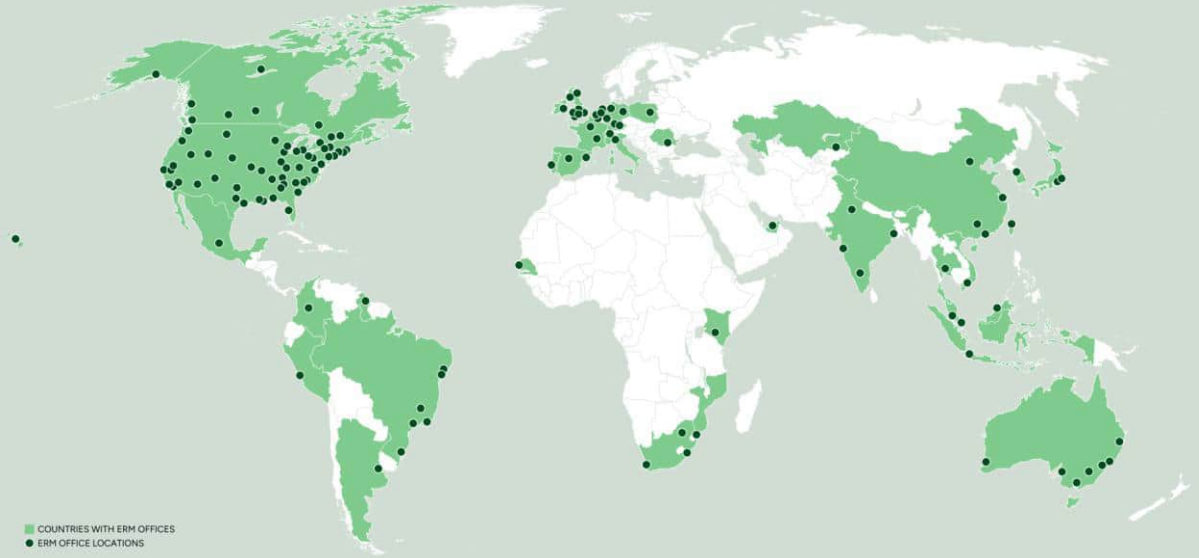
8000+
Professionals

40
Countries & territories

Market leader in sustainability services
HFS Horizons: Sustainability Services, 2024

150+
Offices

50+
Years of experience



We partner with…

70%
of Fortune 100

55%
of Fortune 500

Engineering Services

Site-Civil

- Facility Siting and Alignment Studies
- Earthwork, Grading and Utilities
- Access Roadway/Pavement Design
- Minor Structural Analysis

Geotechnical

- Landslide Evaluations and Abatement Design
- Slope Stability Analyses and Bank Stabilization
- Foundation Analysis
- Dam Levee and Embankment Forensic Analysis and Remediation

Construction Management Services

- Procurement Support
- Construction Management, Field Oversight, and Owner Representation
- QA/QC and Documentation

Stormwater Management

- Erosion & Sedimentation Control Design
- Retention Systems Design
- Pre and Post Development Modelling
- Storm Water Drainage Analysis and Design
- Culvert & Conveyance Design

Water Supply

- Piping Systems
- Bid and Construction Packages
- Horizontal Directional Drilling (HDD)

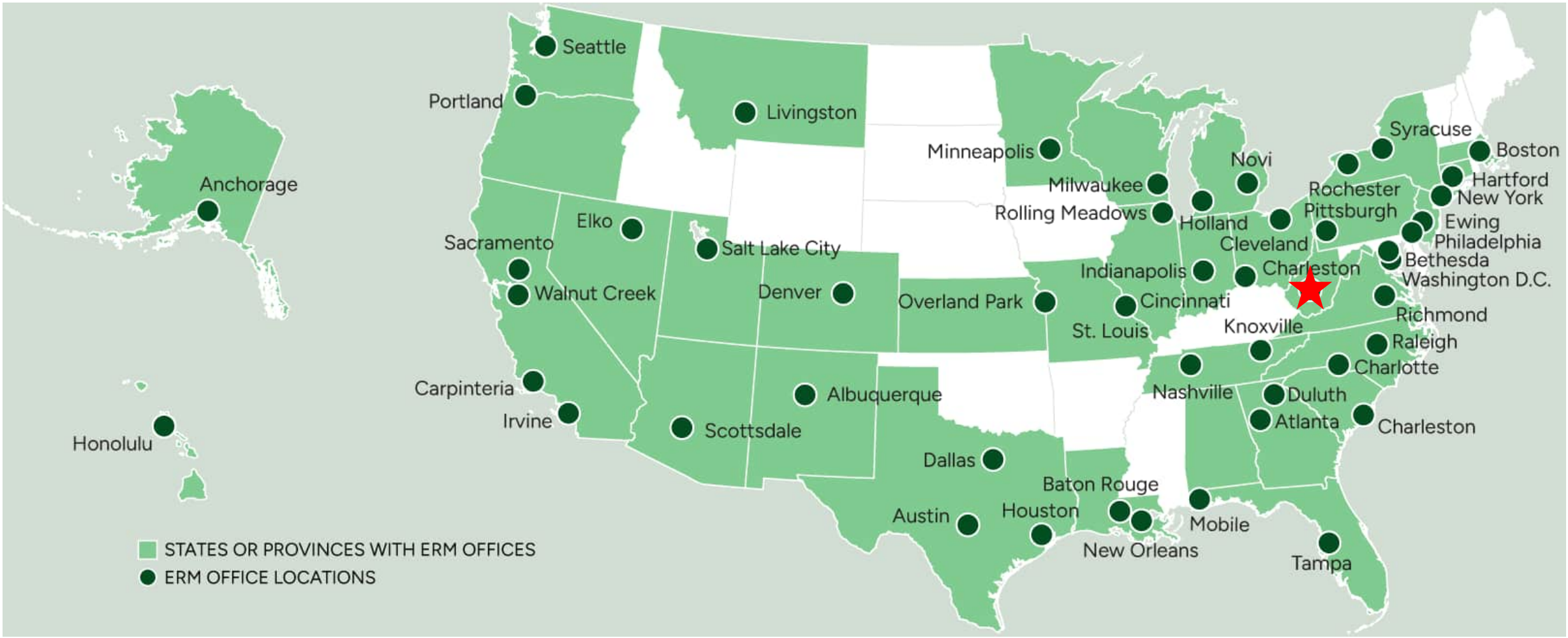
Remediation

- Hazardous/C&D/CCR Pits, Ponds, Lagoons and Landfills
- Remediation Containment and Treatment Barriers
- Biological, Chemical, Thermal Processes
- In-Situ Injection and Passive Barrier Delivery Systems
- Ex-Situ Extraction and Treatment
- Air/Vapor Handling and Treatment, Sub-Slab Depressurization Systems

Design Services

- Erosion and Sediment Control Design
- Access Roadway Design
- Mass Earthwork Cut/Fill Design
- Stormwater Management Design
- Slope Stability Analysis
- Geotechnical Design
- Landslide Investigation & Abatement Design
- Flood and Drainage Studies
- Stream Restoration Design
- Dam Inspections & Certifications
- Solid Waste/Landfill Design
- Solid Waste Closure Plans
- Soil and Groundwater Remediation
- Tank Farm and Containment Design
- Pits, Ponds and Lagoons Design
- Process and Piping Design
- Relief Valve & Flare Calculations
- P&IDs & PFDs
- Integrity Management Programs
- Facilities Engineering
- Process Modeling (ProMax)
- Equipment Design & Specification
- Equipment Design Reviews
- Bid Document Preparation
- Bid Review and Evaluation
- Construction Management

ERM US Offices



West Virginia-Based Team

ERM US Safety Statistics – 2020 to 2024

	2020	2021	2022	2023	2024
Experience Modification Rate (EMR)	0.69	0.84	0.83	0.79	0.88
Employees @ Year End	2267	2245	2570	2859	2722
Hours Worked ±	3,949,361	3,964,189	4,665,932	4,900,674	4,702,536
Lost Workday Cases	3	0	0	2	1
Lost Workdays	93	0	0	50	2
Restricted Duty Workday Cases	0	1	0	0	2
Restricted Workdays	118	2	0	174	36
First Aids	14	6	51	60	65
Medical Attention Cases	2	5	9	13	9
Fatalities	0	0	0	0	0
Total Recordable Cases	5	6	9	15	12
Total Recordable Incident Rate [1]	0.25	0.30	0.39	0.61	0.51
Lost Workday Incident Rate [2]	0.15	0.00	0.00	0.08	0.04
Lost Workday Case Severity Rate [3]	4.71	0.00	0.00	2.04	0.09

Notes:

1 [Cases] * 200,000 / [Hours Worked]
2 [LW Cases] * 200,000 / [Hours Worked]
3 LWSR: Lost Workday Severity Rate = [Days] * 200,000 / [Hours Worked]

± Includes manhours reported for all US-based employees for NA, Group and Global Businesses

CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY)
04/22/2025

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Aon Risk Services Central, Inc.
Philadelphia PA Office
100 North 18th Street
16th Floor
Philadelphia PA 19103 USA

CONTACT NAME:
PHONE (A/C. No. Ext): (866) 283-7122 **FAX (A/C. No.):** 800-363-0105
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A:	Allied World National Assurance Company	10690
INSURER B:	Travelers Property Cas Co of America	25674
INSURER C:		
INSURER D:		
INSURER E:		
INSURER F:		

INSURED
Environmental Resources Management, Inc.
75 Valley Stream Parkway, Suite 200
Malvern PA 19355 USA

COVERAGES **CERTIFICATE NUMBER:** 570112214173 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

Limits shown are as requested

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC OTHER:			03093102	11/30/2024	11/30/2025	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $1,000,000 $10,000 $1,000,000 $1,000,000 $1,000,000
B	**AUTOMOBILE LIABILITY** X ANY AUTO OWNED AUTOS ONLY X HIRED AUTOS ONLY SCHEDULED AUTOS X NON-OWNED AUTOS ONLY			TC2JCAP-8045X386-TIL-24 AOS	11/30/2024	11/30/2025	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000
	UMBRELLA LIAB OCCUR **EXCESS LIAB** CLAIMS-MADE DED RETENTION						EACH OCCURRENCE AGGREGATE	
B B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		UB0R5146432451K AOS UB0R5146432451R AZ, MA, OR, WI	11/30/2024 11/30/2024	11/30/2025 11/30/2025	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE-EA EMPLOYEE E.L. DISEASE-POLICY LIMIT	 $1,000,000 $1,000,000 $1,000,000
A	Contractors Pollution Liability			03093085 SIR applies per policy terms & conditions	11/30/2024	11/30/2025	Per Occurrence Aggregate	$1,000,000 $1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

This certificate is for evidence of ERM NA Holdings Corp.'s insurance coverages. The policies listed above are extended to ERM NA Holdings Corp. subsidiaries: ERM Consulting & Engineering, Inc., Environmental Resources Management Inc., Environmental Resources Management Southwest, Inc., ERM NC, Inc., ERM Alaska, Inc., ERM Certification and Verification Services Incorporated, Environmental Resources Management Michigan, Inc, SustainAbility, Inc., Coho Climate Advisors LLC, NewFields Princeton, LLC, NewFields Environmental Forensics Practice, LLC, NewFields Sediment Management & Marine Sciences, LLC , NewFields Atlanta, LLC, NewFields Environmental & Engineering, LLC and NewFields E&E, LLP. Additional Insured status is provided only as required by written contract, but limited to the operations of the Insured with respect to the General Liability policy.

CERTIFICATE HOLDER

ERM NA Holdings Corp.
75 Valley Stream Parkway, Suite 200
Malvern PA 19355 USA

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Aon Risk Services Central, Inc.

Holder Identifier : Malvern

Certificate No : 570112214173

AGENCY CUSTOMER ID: 570000026033
LOC #:

ADDITIONAL REMARKS SCHEDULE

AGENCY	NAMED INSURED
Aon Risk Services Central, Inc.	Environmental Resources Management, Inc.
POLICY NUMBER See Certificate Number: 570112214173	
CARRIER See Certificate Number: 570112214173 / NAIC CODE	EFFECTIVE DATE:

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,
FORM NUMBER: ACORD 25 **FORM TITLE:** Certificate of Liability Insurance

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER	
INSURER	
INSURER	
INSURER	

ADDITIONAL POLICIES If a policy below does not include limit information, refer to the corresponding policy on the ACORD certificate form for policy limits.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS	
	OTHER							
A	Environmental Professional (E&O) Liab			03093085 Claims Made SIR applies per policy terms & conditions	11/30/2024	11/30/2025	Per Claim	$1,000,000
							Aggregate	$1,000,000

CERTIFICATE OF Authorization

STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

The West Virginia State Board of Registration for Professional Engineers having verified the person in responsible charge is registered in West Virginia as a professional engineer for the noted firm, hereby certifies

ENVIRONMENTAL RESOURCES MANAGEMENT, INC. (ERM)
C01031-00

Engineer in Responsible Charge: DAVID L. CARPENTER - WV PE 013741

has complied with section §30-13-17 of the West Virginia Code governing the issuance of a Certificate of Authorization. The Board hereby notifies you of its certification with issuance of this Certification of Authorization for the period of:

January 1, 2024 - December 31, 2025

providing for the practice of engineering services in the State of West Virginia.

IF YOU ARE REQUIRED TO REGISTER WITH THE SECRETARY OF STATE'S OFFICE, PLEASE SUBMIT THIS CERTIFICATE WITH YOUR APPLICATION.

IN TESTIMONY WHEREOF, THE WEST VIRGINIA STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS HAS ISSUED THIS COA UNDER ITS SEAL, AND SIGNED BY THE PRESIDENT OF SAID BOARD.

Scott E. Thomas Jr.

BOARD PRESIDENT

Mine Closure Services

Mine Lands Closure Services

ERM's has over 30 years' experience in the mining industry, ranging from regulatory negotiation to site closure.

Our technical and regulatory expertise, combined with our risk assessment, strategic communication and social impact services, enable us to implement efficient common-sense reclamations and/or cleanups that are readily accepted by local communities.

ERM understands that formulating comprehensive responses to complex environmental problems can be difficult and confusing and that implementing the right strategy can save a lot of money. It is essential to fully understand the technical issues as well as the regulatory framework and processes that may adversely affect the project. Our professionals differentiate from our competitors by integrating a wide range of technical capabilities and regulatory knowledge with a good sense of business acumen.

Our team has extensive understanding of the regulations that govern closure of inactive mine lands sites as well as specific experience with EPA's modus operandi, and are able to gain approval of cost-effective, technically sound solutions to the environmental challenges at these sites.

Sector Experience

- Strategic Regulatory Advice and PRP Due Diligence
- Site Inventories and Site Evaluations
- Preliminary Assessment/Site Investigation (PA/SI)
- Site/Grading/Stormwater/ESC Engineering
- Engineering Evaluation Cost Assessments (EE/CA)
- Remedial Investigations/Feasibility Study (RI/FS)
- Ecological and Human Health Risk Assessment (RAD and Heavy Metals)
- Remedial Design/Remedial Action (RD/RA)
- Acid Rock/Acid Mine Drainage (ARD/AMD)
- Stakeholder Engagement and Community Involvement
- Environmental Assessment and Impact Statement
- Natural Resource Damage Assessment (NRDA)
- Groundwater and Surface Water Evaluations
- Closure of Abandoned Mine Features and Reclamation

Strategic Regulatory Advice and PRP Due Diligence

Our in-depth knowledge of environmental regulations allows ERM to develop regulatory strategies that ensure projects proceed smoothly and efficiently.

ERM understands the importance of sound strategy in dealing with Regulatory Agencies. The ERM team has implemented numerous projects for both the private and government business sectors to ensure compliance with federal regulations such as CERCLA, RCRA, NEPA, the Clean Water Act, Safe Drinking Water Act, Toxic Substances Control Act, NPDES, and EPA, DOE, and DoD requirements. Our regulatory experts have a proven track record of assisting clients in negotiating a successful regulatory path to site closure, or in many cases compiling information necessary to avoid being named as a potential responsible party. We often perform the regulatory negotiations on our client's behalf to ensure that a most favorable outcome is realized. We also routinely present technical aspects of projects to the regulatory communities and stakeholders, or support our clients in negotiations or litigation with visualization of data, analysis, engineering reports, or other aspects of the project as necessary.

Areas of Expertise

- Regulatory Strategy Development
- Hazardous Waste Management
- Consent Order Negotiation
- Risk Ranking and Hazard Assessments
- Litigation Support
- Expert Witness Depositions
- Dispute Resolution Support
- Potential Responsible Party Assessment & Due Diligence
- Liability Allocation

Site Investigations and Hazard Assessments

A comprehensive field inventory survey and physical hazard assessment provides the critical information to make risk management decisions at inactive mine sites.

Site Inventory surveys employ a detailed and systematic approach to field-verify the existence of mines and mine features identified during a preliminary literature review, as well to identify other abandoned and inactive mine features. A physical hazards assessment provides GPS coordinates and descriptions of surface features that may pose a safety risk to the general public, which include abandoned explosives or chemicals, unstable structures, abandoned mechanical/electrical equipment and scrap materials, cribbing, impoundments, underground workings, mine portals, tram cables, open pits, highwalls, waste rock piles, tailing piles, and dumping. Potential environmental impacts at inactive mine sites include subsidence areas, underground workings, dust or chemical hazards, mine gases, impacted environmental media (e.g., ARD/AMD, sediment runoff, windborne transmission, and dumping.

ERM collects inventory data with a field tablet computer to allow for rapid uploading of data into an inventory database, which not only eliminates transcription errors, but is much more economical than manual data entry. This also creates uniformity in the data management and collection process.

Areas of Expertise

- Health and Safety Compliance
- GIS Mapping and Database Management
- Waste Characterization and Determination
- Historical Land Ownership Evaluation
- Geophysical Surveys
- Site Survey and Meta Data Collection

Preliminary Assessment and Site Investigations

Conducting a thorough PA/SI is key to developing a sound understanding of a site, which is essential when coordinating with the EPA and other regulatory bodies that make environmental decisions necessary to manage public lands.

ERM uses a combination of innovative techniques to generate data on a site's environmental condition. ERM's PA/SI teams include geologists, hydrogeologists, risk scientists, engineers, and remediation specialists in a mix of project roles. This approach provides essential information and avoids redundant data gathering. Our philosophy is to collect only essential information needed to evaluate potential risks and select reasonable / realistic approaches to resolve environmental issues. The ERM staff focus on how to collect high-quality data while reducing time and costs. On-site sample analysis and data interpretation, for example, enable real-time decision-making and eliminate additional or redundant tasks (e.g., the Triad SI methodology).

ERM understands that the preliminary assessment (PA) and site inspection (SI) are key components of the EPA's decision-making process. ERM's approach for accomplishing this at PRP-led sites is to identify features and mine related materials that may be sources of contamination and conduct targeted sampling to compare to ambient concentrations. ERM also routinely collects the data necessary to develop a conceptual site model and risk characterization of all relevant human and ecological exposure pathways and receptors. The ERM philosophy of conducting a PA/SI is to ensure that sufficient data collection is done such that there is no ambiguity regarding the scope of the next step in the CERCLA process (i.e., No Further Remedial Action Planed, EE/CA or RI/FS).

Areas of Expertise

- Historical document review and database research
- GIS Analyses of public and provided data
- Location demographics and geologic settings
- Real-time measurements of metals and radionuclides
- Screening level risk assessments
- Ambient concentration evaluations for metals and radionuclides
- Hazard Ranking System score estimates
- Conceptual site models
- Exposure Pathways Analysis

Remedial Investigation and Feasibility Studies

Characterization and remediation of radionuclide sites can be an expensive and time-consuming process. ERM's closure team applies real-time measurement technologies that complete characterization of radionuclide contamination in a timely and cost-effective manner. The result is often shorter RI timelines and realistic cleanup levels that are protective of human health and the environment.

ERM understands that the RI/FS process is generally reserved by EPA for complex mine site closures that require more detailed risk characterization than is generally performed in an SI or EECA. Our experience is that the EPA reserves this process for sites with the potential to have extensive impacts to groundwater, complex acid rock drainage (ARD), surface water issues, or have complex exposures that need to be evaluated in a baseline risk assessment. After risks have been thoroughly characterized and the need for an RA established, the next step in the CERCLA process is to assemble potential RA alternatives to be evaluated in an FS. ERM has extensive experience conducting FSs for a wide array of RAs applicable to mine sites, such as large-scale, store-and-release tailing impoundment vegetative cap design; chemical and biological treatment of acid mine drainage impacted with dissolved heavy metals; wetland and hytoremediation technologies; and in situ groundwater treatment technologies. The ERM closure team has conducted many RI/FSs for federal and private clients, including mine sites throughout the U.S.

Areas of Expertise

- TRIAD Sample Design
- Multi Incremental Sampling
- High resolution site characterization
- Conceptual Site Model (CSM) Development
- Data Quality Objective (DQO) Process
- Determination of Background Concentrations
- Development of Risk-based Cleanup Standards
- ARD Treatability Design/Testing
- Remediation Technology Screening

Engineering Evaluation and Cost Analysis

ERM recognizes that characterization and remedy evaluations for radionuclide sites must address a multitude of unique technical and regulatory issues that require highly specialized skills, and that many tasks that are normally routine become involved and require adherence to a complex array of federal and state regulations and policies.

ERM's closure has the specialty technical skills and regulatory knowledge to address all aspects of investigating including evaluating remedial actions (RAs) for sites impacted with metals. The EECA process is a common tool used by EPA to evaluate and select RAs at closed mine sites. Although each site is unique with regard to site constraints and conditions, the RAs can be somewhat formulaic. The typical EE/CA for mine sites involves the evaluation of the most efficient method for recovering mine related materials that have been dispersed by natural processes as well as human activities. The preferred RA for these sites is based on eliminating physical exposures by consolidation and capping, preferably in on-site impoundments.

The ERM closure team has used the EE/CA process at mine sites to develop and obtain regulatory approval for common sense RAs for private sector conducting PRP lead RAs. This experience allows our team to recommend practical and implementable Ras for consideration by the EPA. We believe that this experience along with a thorough understanding of the EPA's approach to evaluating AML sites is key to conducting a successful EE/CA and ultimately implementing a cost-effective RA.

Areas of Expertise

- EECA Investigations
- Risk-based Cleanup Levels
- Engineered On-site Repository Designs
- Rock-armored, Low-permeability Covers
- Vegetative Evapotranspiration Covers
- Zero Discharge Retention Ponds

Ecological and Human Health Risk Assessment

ERM understands that the risks perceived by local stakeholders often influence the decision-making process of state regulatory agencies. We have conducted human and ecological risk assessments that meet both state and federal requirements for mine sites throughout the U.S.

ERM has conducted human and ecological risk assessments for many sites under CERCLA and the Resource Conservation and Recovery Act (RCRA) to meet both state and federal requirements throughout the U.S. We have worked in nearly every state and region and understand the local guidance and preferences that often influence the decision-making process of regulatory agencies. Our expertise spans all major categories of hazardous pollutants, including metals commonly found at mine sites, as well as organics such as polychlorinated biphenyls, dioxin/furans, and petroleum hydrocarbons. We have sampled and evaluated data from surface water, sediment, soil, and air, as well as tissues of organisms ranging from plants, benthic macroinvertebrates, and fish, to mammalian and avian wildlife. The ERM risk assessment team members have negotiated with private and public stakeholders on a variety of sensitive technical issues, provided strategic support on data quality objectives (DQOs) and study design, and supported risk-based remediation of major cleanup sites.

Our environmental risk projects have ranged from screening level assessments to baseline studies at some of the largest Superfund and other contaminated sites in the U.S. and internationally.

Areas of Expertise

- Environmental Assessment under the
- Environmental Liability Directive
- Human Health and Ecological Risk Assessment
- Probabilistic Risk Assessment
- Financial Risk Analysis and Management
- Litigation Support and Expert Witness Testimony
- Sediment Management
- Water Quality and Watershed Management
- Habitat Restoration and Wetland Services
- Modeling for Surface Water, Windblown Soil, and Groundwater
- Site-specific Cleanup Levels
- Air Quality

Groundwater and Surface Water Monitoring

ERM's integrated surface water and groundwater assessment and modeling capabilities are essential to inform risk assessment and remedial actions in complex regulatory environments.

Our closure team members have experience with the application of multi-dimensional hydrodynamic, fate-and-transport models for groundwater, rivers, lakes, reservoirs, estuaries, and coastal waterbodies. Model applications are often essential to support baseline risk assessments and remedy evaluations for inactive mine sites with legacy sediment contamination litigation, regional water quality investigations, and nutrient load allocation studies.

ERM's groundwater and watershed modeling services are led by experts who have developed hundreds of groundwater flow, fate-and-transport, unsaturated flow, saltwater intrusion, and watershed models for our clients, particularly in the extractive industries. We routinely provide litigation support for ERM's modeling work, including developing expert reports; expert testimony; and depositions. Our mine closure team consists of professionals that specialize in geochemical and hydrochemical modeling to support mining and natural resources projects worldwide. This expertise ranges from permitting to abandoned mine characterization and closure, and includes all types of mine related contaminants such as sulfate, metals, cyanide, arsenic, selenium, mercury, radionuclides, and organics.

Areas of Expertise

- Prediction methods for acid rock drainage and modeling of leachate chemistry
- Monitoring of groundwater and surface water: levels and flow analysis
- Hydro (geo) chemistry: sampling of groundwater and surface water
- Modeling of radionuclide transport in the vadose zone using steady state or transient computer codes
- Numerical modelling of groundwater flow and transport processes (2D, 3D and multiplayer, steady state or transient, density dependent)
- Geochemical modeling using PHREEQC, MINTEQ and others to predict acid rock drainage potential
- Pit lake characterization and modeling using chemical mass balance and probabilistic/ stochastic computer codes

Physical Closure Design Installation, Maintenance, and Repair

ERM has significant experience with physical closure of mine features and post-construction activities including operation, maintenance (O&M), and monitoring.

The objective of reclamation is to return impacted land and watercourses to productive use, ensuring that landforms and structures are stable, and any watercourses are of acceptable water quality. The ERM closure team has experience with a multitude of reclamation activities such as hazardous material removal, recontouring disturbed land, restoring topsoil, and revegetating native grasses, trees, or ground cover. Activities include assessing the effectiveness of the RA in terms of meeting and maintaining the RA objectives, and preparation of Long-Term Monitoring Plans, Long-Term Maintenance Plans, and O&M Plans.

ERM's closure team can implement any and all RAs in accordance with the approved design and construction specifications. We provide the full range of technical engineering services and construction management services, including: preparing construction management, health and safety, and other site-specific plans; maintaining field logs and daily diaries; monitoring, updating, and reporting on construction progress; conducting and attending progress meetings; checking construction drawings submitted by subcontractors for compliance with design and construction plans and specifications; performing field testing; recommending action on health and safety considerations; developing site safety plans and monitoring quality control (QC) procedures; and preparing the construction certification and after action reports.

Areas of Expertise

- Contaminated soil and debris handling and disposal
- Engineering design of site grading and stormwater management features
- Stability analysis of existing and engineered fill slopes
- Backfill design of highwall and horizontal auger mining locations
- Decontamination, decommissioning and demolition of radiologically contaminated facilities
- Groundwater treatment system design, construction and operation
- Turn-key design and construction of reclamation projects including on-site impoundments
- Long-term monitoring and operation minimization
- Remote sensing and operation system design
- Physical closure design for historical shafts and adits to prevent human entry
- Bat gate closure designs to preserve bat use and habitat at inactive mine sites
- Specific RT&E design to minimize impact for identified species

Stakeholder Engagement

Public participation services provided by ERM have been instrumental in securing the necessary approvals for many hotly contested and politically contentious projects. Technically trained and highly experienced in conflict avoidance, conflict resolution and mediation services, ERM is recognized for providing these types of services in the regulatory -negotiated rule - making arena.

Our experts have designed and coordinated public information processes, public involvement programs, public participation training programs, and organized public interest groups in a variety of settings throughout the U.S. and internationally. ERM has been at the forefront of developing innovative approaches to public involvement, such as the collaborative processes we have been involved with on the St. Lawrence International Power Project in New York, the Clackamas River system in Oregon, and the interest based negotiation of water resource disputes in the Lake Champlain Basin. We provided full public participation services to the Federal Energy Regulatory Commission on a highly contentious Columbia River Basin proceeding that involved Native American rights, national public interest groups, and a well-educated and informed general public.

We have also provided tribal consultation services involving project impacts to tribal lands and project impacts to tribal economic livelihood, social and cultural issues, and natural resources.

Environmental Assessment and Impact Statement

NEPA helps officials make informed decisions about public land development while protecting and enhancing the environment.

ERM helps streamline NEPA reviews early in the public land approval process by reducing study requirements, agency review time, and analysis depth—benefiting both applicants and lead agencies.

Our team of ecologists and scientists has extensive experience assessing energy-related projects, from minor wetland impacts to large-scale developments. We've prepared EAs for endangered salmon in the Columbia River Basin and implemented bat habitat mitigation for a historic mine closure in Arizona. Our NEPA documents consistently support approvals with effective mitigation strategies.

We work closely with NMFS, USFWS, BLM, and USFS to assess impacts on species, habitats, wilderness areas, floodplains, and migratory birds. Our services include biological assessments, mitigation plans, and habitat evaluations using IFIM, Stream Rapid Bioassessment, and WHAM.

ERM's wetlands team has completed over 500 inventories, delineations, and assessments across diverse regions, supporting permitting through Nationwide and Individual Permits. We also evaluate ecological receptors and pollutant pathways using scientific and regulatory methods.

We conduct wildlife studies for mining and renewable energy projects—including wind, solar, and geothermal—offering strategic, cost-effective support for NEPA and state-level planning.

Areas of Expertise

- Endangered Species, Wetland, and Ecological Studies
- Habitat and Species Surveys and Protocol Development
- Habitat Mapping
- Section 7 Endangered Species Act (ESA) Consultation
- Essential Fish Habitat Assessments
- Protocol Development and Protocol-level Threatened and Endangered Species Surveys
- Aquatic and Terrestrial Ecology
- Wetland Delineation
- Wetland Mitigation Strategies, Planning, and Restoration
- Habitat Conservation and Restoration
- Constructed Wetlands and Treatment Systems
- ERA and HHRA
- Natural Resource Damage Assessments
- Natural Stream Restoration

Environmental Permitting and Assessment

Natural Resource Services

ERM has expertise and experience in a wide array of natural resource services. The different types of services ERM offers are shown below.

Natural Resources Service	Description
Bat Surveys	Conducting a series of bat surveys in support of the natural resources assessment for the facilities FERC relicensing effort.
Bat Habitat Management Plans	Developing a programmatic management plan to facilitate routine vegetation management activities that are in compliance with required USFWS guidance and regulations relative to listed bat species.
Botanical Surveys	Field surveys for rare, threatened and endangered plants along eight miles of transmission line corridor.
Cultural Resource Field Surveys	Historical background search and site investigation identifying possible additional grave markers, rectangular depressions suspected to be graves, ornamental plantings, and other visible indications defining the presence and memorialization of human burials.
Cultural Resource Construction Oversight	Unmarked Human Burial and Skeletal Remains Protection Act; NC GS chapter 70, Article 3.
Avian Surveys	Conducted nesting bird surveys (songbirds and raptors) in suitable habitat following a desktop review that showed potential presence of a protected species. Conducted nest monitoring during solar panel installation.
Vegetation Planning and Mitigation	Interacted with a county land managing agency in the Charlotte metropolitan area to develop a detailed right-of-way restoration plan. The work includes the installation and monitoring of over 3,000 trees.
Clean Water Act Regulatory Strategy Support	Provided CWA Section 404 permitting strategy review for the closure of coal ash basins and siting of new or expanded coal ash landfills. Support also focused on the re-instatement of pre-existing stream and wetland features.
Wetland Delineation	Potential wetland areas were identified through the analysis of various maps, aerial photographs and historic aerial photos, soils information, and on-site reconnaissance.

Natural Resource Services – Cont.

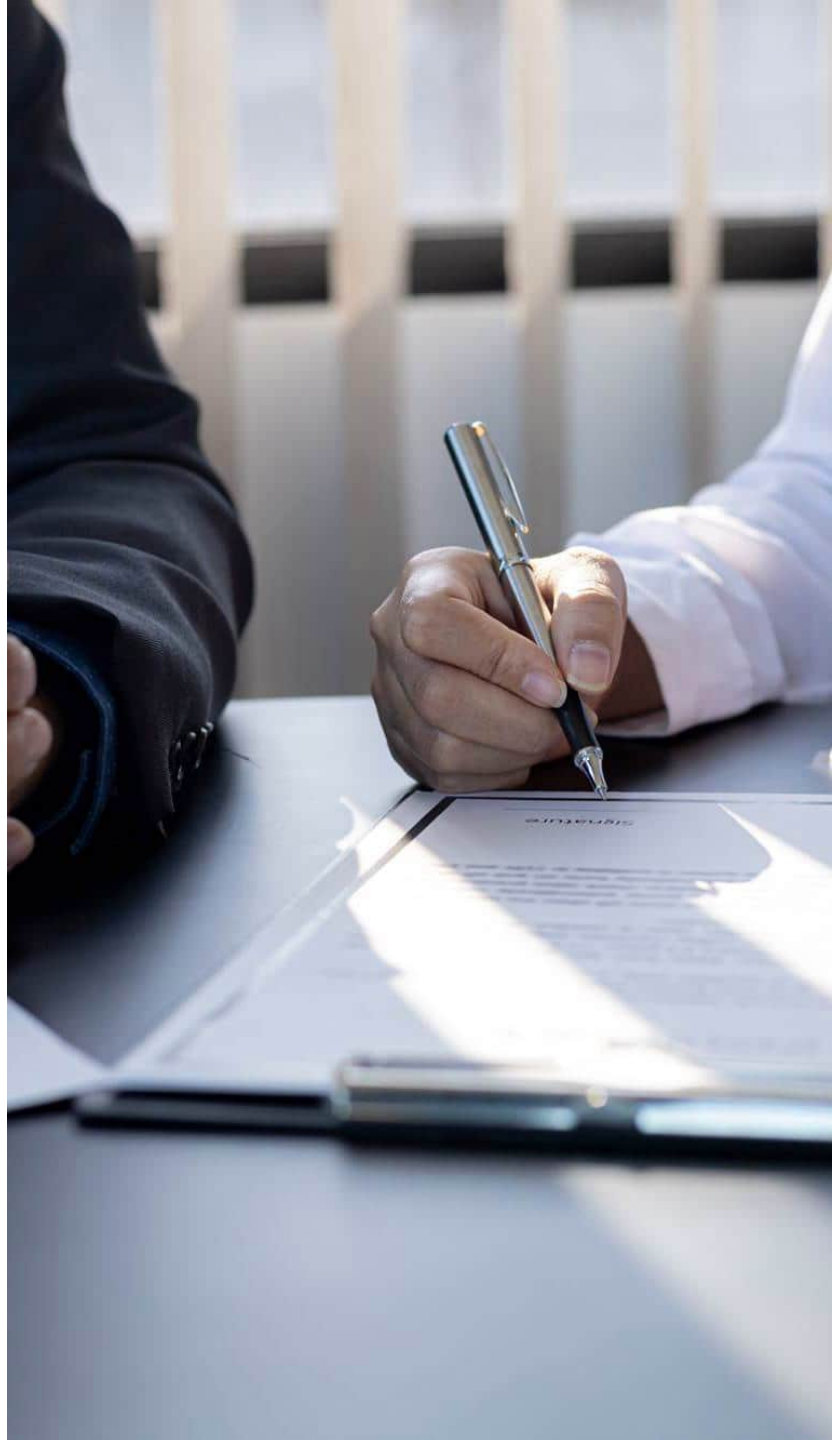
Natural Resources Service	Description
Phase I Environmental Site Assessments (ESAs)	Completed Phase I ESAs in accordance with ASTM standard E1527-13 with focus for solar sites to delineate and report on regulated water resources throughout the proposed site, evaluate the site for habitat that would be suitable for protected state or federally listed species, and perform a desktop cultural resource assessment.
National Environmental Policy Act	Environmental Assessment and Environmental Impact Studies for a wide range of energy facility development.
Monarch Butterfly CCAA	Support providing desktop habitat screening, field surveys, Management Plans of Right-of-Way for habitat, etc.
Erosion control and stormwater management	Stormwater management planning, grading plans, erosion & sediment control planning, construction inspection services, etc.
Fish Entrainment/Impingement Studies	Collect and describe (e.g., size, life stage) the fish and shellfish taxa composition in impingement and entrainment samples collected under normal operations; characterize species mixes and assess implications relative to intake operations.
Public Affairs Support	Public outreach support, stakeholder identification, resource use studies, community advisors studies and support, open house planning & support including Virtual Open House websites, etc.
Visual Simulations and Visual Impact Reporting	Viewshed analysis (desktop analysis and GIS followed up by field verification); visual simulations (photomontages, 3D computer animation and video montages); and visual impact assessments and reporting analyzing the visual compatibility of the project with the existing landscape identifying the potential impacts of a proposed project on views and on the general aesthetic amenity experienced by people in the vicinity.

Natural Resource Services – Cont.

Natural Resources Service	Description
Environmental Justice Services	Corporate advisory (policy review and policy development); Assessment & Analysis (identification of communities of concern, geospatial analysis, impact analysis, and human health risk assessment); Regulatory (outreach and permitting support); and Meaningful Involvement (strategic communications, stakeholder engagement and mitigation measures).
Herpetological surveys	Field surveys and implementation of mitigation plans for protected herpetological species.
Aquatic vegetation surveys and aquatic invasives management	Lake surveys for rare and/or invasive species, with boundary/extent approximations; implementation of triploid grass carp management of hydrilla.
Aquatic species baseline surveys	Sampling of fish and aquatic macroinvertebrates to characterize health of streams within a watershed; trapping/capturing fish and crabs in lakes and rivers for tissue sampling and toxicological analyses.
Sediment impact studies	Sediment sampling in streams and lake bottoms to assess BMP failures and general watershed impacts.
Stream restoration	Evaluation of stream morphological conditions; prescribing, engineering, implementing, and monitoring of restoration designs.
Mussel surveys	Surveys in streams and rivers for protected mussels.

National Enforcement Policy Act (NEPA)

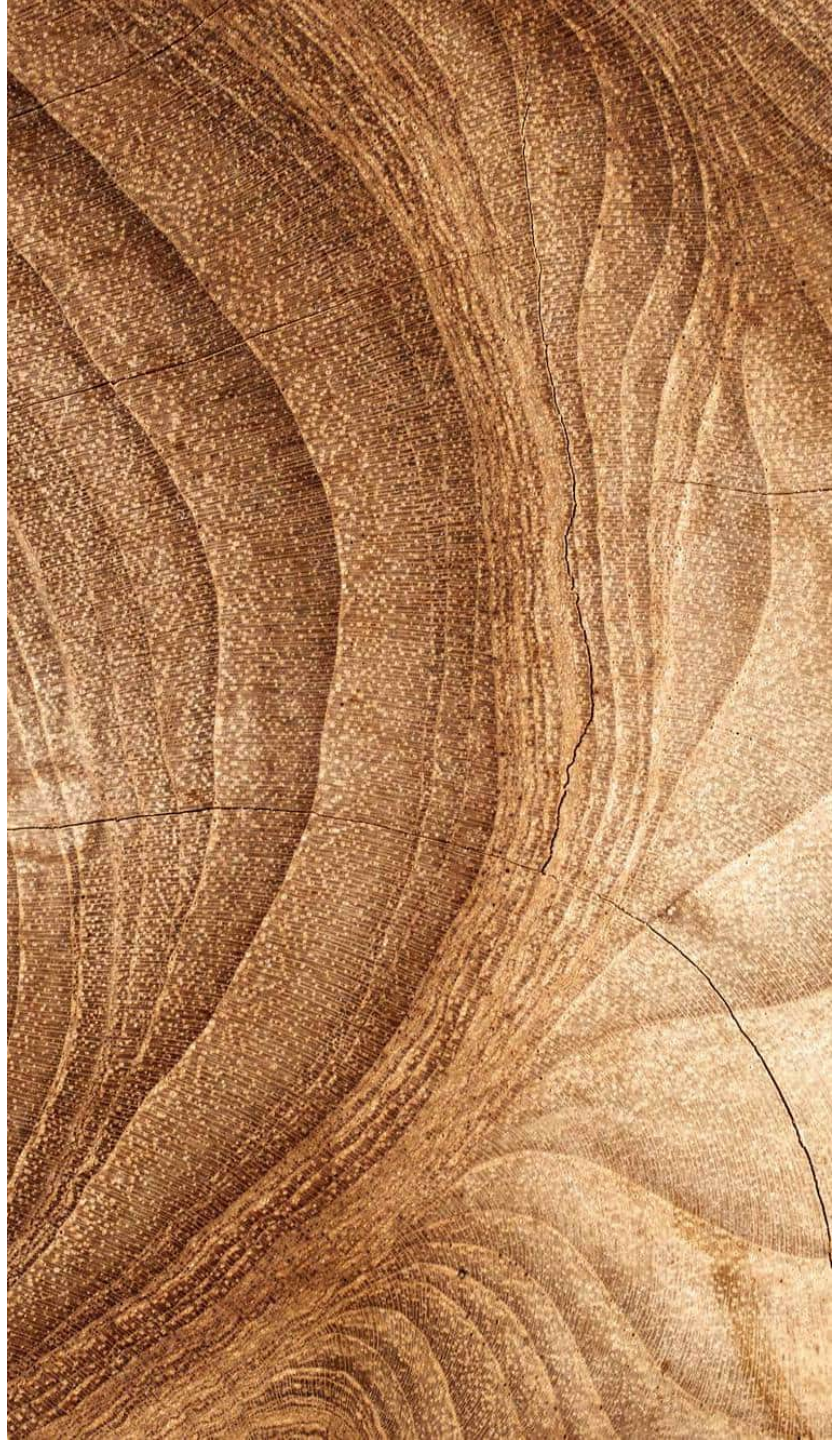
ERM has unparalleled diversity, depth, and breadth of NEPA experience and has been at the forefront of developing innovative approaches that have been instrumental in securing the necessary approvals for many high profile, complex and contentious projects. Throughout the U.S., ERM provides full-service NEPA support to private sector clients, federal agencies (including the USFS), and state agencies with NEPA-equivalent programs. This work includes preparation of third party Environmental Impact Statements and Environmental Assessments under the direction of federal agencies such as the USFS, Federal Energy Regulatory Commission (FERC), Maritime Administration/U.S. Coast Guard (USCG), Bureau of Ocean Energy Management (BOEM), and U.S. State Department. A substantial portion of ERM's NEPA experience has been in support of mining and energy-related projects. Based on our experience, we have found that successful management of the NEPA process includes the following critical elements: early planning and negotiations, consideration of alternatives proportionate to the complexity of the proposed project, comprehensive cumulative impact assessment, careful design and coordination of public information and involvement, and development of effective mitigation and management measures to address impacts.



Timber Clearing and Restoration Plans

ERM has experience preparing timber management and removal plans for forest clearing operations on NFS lands. On other projects, the USFS has required us to evaluate 'beneficial reuse" of cut merchantable timber (typically defined as any tree six inches diameter at breast height or greater). This was addressed by evaluating where the timber could be reasonable extracted and hauled away and where on-site disposal (leaving the cut timber along right-of-way) was a better option. This evaluation was incorporated into a plan that also identified sensitive resources in the timber clearing area and applied time of year restrictions as appropriate to protect these resources. These guiding principles were then integrated into the site planning. In our experience, the cutting of tress on NFS lands is governed by a timber contracts that determine the appropriate financial compensation for the clearing of merchantable timber. ERM has marked, cruised, designated, and developed timber cost equations (fair market value) to assist in the development of these contracts."

ERM also has experience developing revegetation, invasive species control, and tree replanting plans where additional mitigation beyond financial considerations is required by the USFS or our clients. In the Monongahela National Forest, ERM managed the transplanting of saplings and shrubs following the removal of mature trees from the right-of-way and also sourced and planted numerous red spruce seedlings in areas adjacent to the right-of-way. ERM has also developed successful revegetation plans for bare soils that incorporate USFS-approved seed mixes and outline measures to identify and control invasive species and promote desirable species.



Protected Species Surveys

ERM is recognized within the energy, mining and other industries for our experience with the broad range of biological resource issues on energy projects. In particular, ERM's experience with protected species coordination with USFS staff includes two recent large capital improvement right-of-way projects in West Virginia traversing two National Forests in USFS Regions 8 and 9. One of these projects involved development of a new right-of-way while the other involved the permanent widening of an existing right-of-way. ERM partnered with its clients to work cooperatively with USFS, USFWS, and state wildlife/natural heritage agencies; developed study plans to inventory natural community types and conduct presence/absence surveys for a multitude of federally listed, state listed, and Regional Forester's Sensitive Species (RFSS); identified and monitored non-native invasive species; advised on strategies to avoid impacts to protected species; and assisted with mitigation efforts for loss of habitat. Surveys managed or executed by ERM included visual habitat surveys for West Virginia northern flying squirrel, timber rattlesnake, and Myotid bat species. Presence/absence surveys were also designed, conducted, and/or managed by ERM.

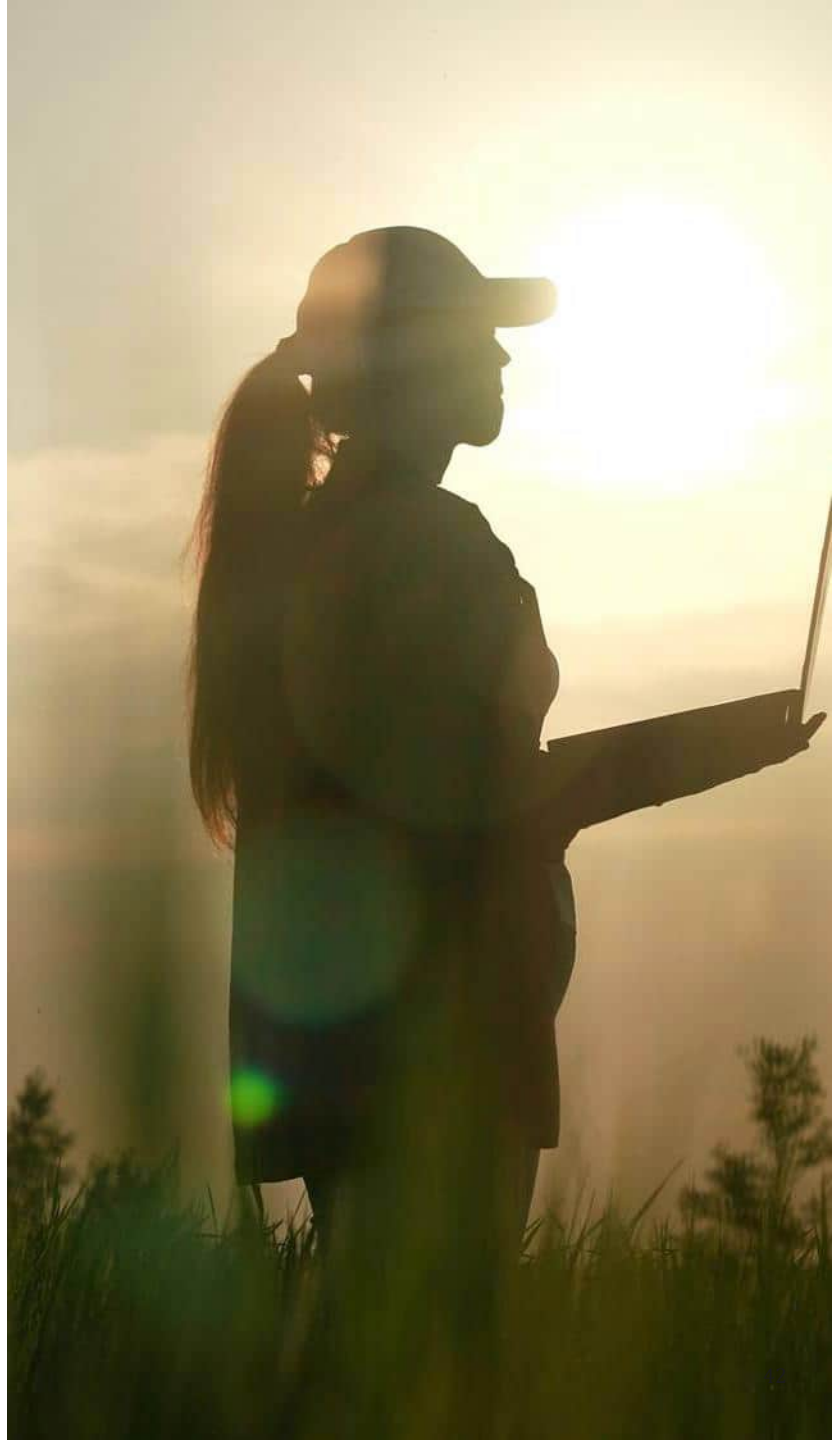
ERM has also partnered with its clients to conduct and manage ambient light, soil moisture, soil temperature, and population monitoring of identified small whorled pogonia populations adjacent to workspace on USFS land. Additional species-specific surveys employed a variety of techniques including visual assessment, mist-net and acoustic analysis, radio-telemetry tracking, live-traps, and camera traps.

Efforts to avoid, minimize, and mitigate included the assessment of reroutes for total avoidance, development of species-specific conservation plans including invasive species management plans and migratory bird management plans, surveys to protect USFS specimen trees, relocation of select plant species (i.e. American ginseng, red spruce, Allegheny onion, white alumroot, and silvery nailwort), construction monitoring to avoid animal entrapment and worker interactions, and developing and implementing mitigation for unavoidable impacts such as bat boxes and tree girdling to create roosting habitat for bats, timber rattlesnake basking habitat, West Virginia northern flying squirrel nest boxes, and planting of red spruce and shrub species to restore degraded habitat for spruce-forest dependent species.

Cultural Resources Surveys in WV

ERM's local presence, combined with our national reach, internal integration, and centralized management means our experts are well placed to speak with credibly to local stakeholders. ERM has done extensive work inWest Virginia and across the United States and consults regularly with the West Virginia State Historic Preservation Office..

ERM conducts Section 106 consultations with the State Historic Preservation Offices (SHPO) and Tribal Historic Preservation Offices on behalf of its clients. ERM has a large number of archaeological and architectural consultants that are Secretary of interior qualified and who have regional work experience, as well as success in obtaining Archaeological Resources Protection Act permits for work on Federal lands. ERM's Cultural Resources Field Services team is experienced and skilled in the successful completion of Phases I, II, and III levels of field efforts beginning with planning and ending with reporting and agency concurrence. ERM can conduct a historic resources survey covering Project areas and properties within the proposed Project viewshed, in accordance with state and federal guidelines. The viewshed is generally defined as an area where the Project may have a line of site from a historic property, taking into account intervening topography, vegetation, and any built environment. ERM architectural historians are well versed in defining appropriate Area of Potential Effects that meet project needs for scope, and scale. Field survey and reporting can be performed in accordance with state and federal guidelines for identifying archaeological resources. This includes SHPO Standards and Guidelines for Archaeological Resource Management Surveys and Reporting and as well as federal regulation requirements pertaining to, and complying with, Section 106 of the National Historic Preservation Act (NHPA). Moreover, ERM has experience writing treatment plans and overseeing mitigation efforts for cultural resources that may be adversely affected by Projects. Possible mitigation efforts can include, but are not limited to, data recovery, the preparation of a NRHP nomination package, pre- and post-construction photo documentation, compilation of oral histories, exhibition development, and visual buffers. ERM works closely with SHPOs, stakeholders, and the federal agency to define appropriate treatment options. Finally, ERM can work with existing cultural resource preservation planning to align survey and treatment strategy that adhere to long-term preservation and development planning.

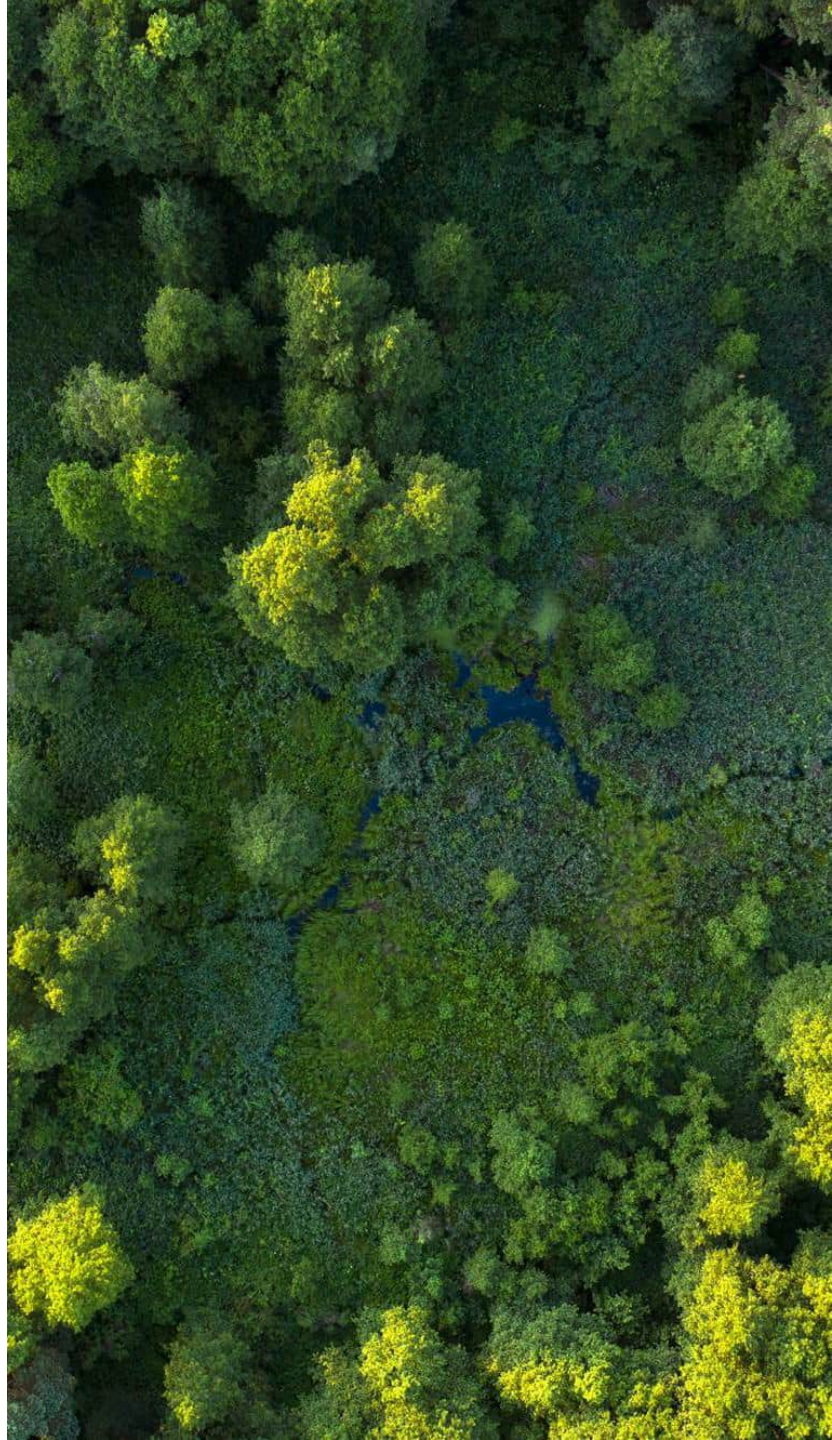


Visual Impact Analysis and Simulations

ERM offers comprehensive visual analysis services to help clients identify, describe, and mitigate potential visual impacts associated with linear and non-linear energy facilities. ERM's Graphic Information System (GIS) specialists can conduct bare-earth digital viewshed analysis based on topographic and/or vegetative screening, to model zones of visibility associated with different types of facilities. Viewshed models can be developed for any distance around a project, and the visual zone of influence would be defined based on the surrounding landscape conditions and recommendations by permitting jurisdictions. Using desktop GIS data and/or field studies, we conduct scenic resource inventories to identify potentially sensitive resources within the visual zone of influence. After conducting viewshed analyses and scenic resource inventories, ERM prepare technical visual resources reports. These reports are developed in compliance with appropriate legal or regulatory guidance or frameworks provided by governing jurisdictions, such as the USFS Scenery Management System (SMS) protocols. RM staff have worked directly with the Monongahela National Forest and the George Washington National Forest staff to implement the SMS system and analyze visual impacts of linear projects to eastern USFS lands and National Park Service assets. In addition, ERM staff have direct experience producing photorealistic visual simulations of potential impacts of forest clearing associated with linear facilities in national forests, and visual impacts at different construction stages, including post-tree removal, and revegetation at different time periods. Our visualization experts can create handouts, web-based presentations, or displays for public meetings to demonstrate existing and simulated conditions, as well as simulated conditions with mitigation strategies implemented. If photorealistic simulations are not required, ERM can produce "wireframe" simulations from field photos that show the extent (size and scale only) and location of facilities from selected viewpoints. ERM's visual team are also experienced NEPA practitioners and produce defensible and accurate visual impact sections for all levels of NEPA reporting.

Herbicides/Herbicide Use

ERM has experience providing herbicide treatment plans to control vegetation within stream restoration corridors, on mining reclamation areas and along utility corridors. Herbicide treatment plans are often part of larger vegetation management plans, but can be a stand-alone plan where appropriate. These plans typically include the types of vegetation to be controlled (e.g., invasive species, trees) and appropriate control methods or options. Herbicide treatment is typically targeted to particular vegetation types and may include tree cutting followed by herbicide treatment of stumps to prevent regrowth. Basal bark treatment is another option that may be identified as the preferred option for small trees, which targets only the specific tree and prevents killing of non-targeted vegetation. Suitable herbicides for the type of vegetation to be controlled are identified in the plan. Safety data sheets are reviewed to ensure appropriate use of any herbicide, including safety in aquatic environments where appropriate. We have experience identifying and selecting contactors with the appropriate credentials, including the appropriate licenses for herbicide application, and a good safety record. ERM also has experience developing and implementing multi-year treatment plans in accordance with project requirements.



Digital Technology (GIS, survey tools, etc.)

Prior to conducting field surveys, ERM works with its client to determine the survey corridor and footprint. ERM then reviews the survey corridor from an environmental perspective using computer-based GIS software and a combination of publicly available and in-house data layers to identify potential features within the survey footprint. These layers include recent aerial photography and U.S. Geologic Survey topographic maps as well as other GIS data sets. This desktop analysis is used to organize the subsequent field efforts.

ERM uses electronic data collection methods (such as ESRI's Survey 1-2-3 and Collector software) to improve data capture, increase quality and efficiency, accelerate accessibility, and reduce paperwork. Crews operate sub-meter accuracy global positioning system (GPS) equipment and manage the data that they collect. Ideally, shapefiles of the survey corridor and other facilities are provided to the crews prior to the field effort, so each crew has the ability to use the data to navigate to their survey area. The GPS units also have background files that show the locations of previously recorded sites and resources that occur in, or near, the project area. For most projects, crew chiefs/leads submit daily reports to a survey coordinator in the form of a Daily Progress Report. These reports include a description of the areas surveyed; survey progress tracked by milepost, parcel number, and/or some other method requested by the client; resources or sites that were encountered; landowner contacts; and project related issues that need to be resolved. Throughout the survey, our crew leads work closely with our GIS staff to record and update the footprint of the surveyed areas and corridors. This up-to-date footprint information is extremely valuable for tracking survey gaps and needs, and facilitated desktop analyses of survey coverage for route shifts or workspace additions.

Pollinators/Vegetation Management

The recent industry and regulatory focus on the value of sustaining pollinator habitat illustrates another way that ERM can work with clients in need of vegetation management services. Using Integrated Vegetation Management (IVM), ERM helps clients to implement cost-effective native species planting plans that create pollinator habitat on utility-scale solar projects and transmission line right-of-ways. When properly applied, IVM techniques can establish robust native plant communities that can be managed with reduced herbicide application and maintenance over time, lowering long-term operation and maintenance costs.

ERM Team

Team Overview

Our Mine Closure team is assembled from professionals with extensive experience working with radionuclides for a wide variety of clients.

Our team has the expertise to develop innovative regulatory strategies, negotiate consent orders, and implement efficient site investigation and remedial actions.

What we do

ERM is a full-service consultancy that is capable of furnishing a wide array of subject matter experts and support staff across all disciplines necessary to address mining related projects as well as relevant and complementary skills developed in other industrial settings. The ERM closure team has expertise with environmental impacts associated with a wide variety of mine sites, including coal, gold, silver, copper, nickel, and uranium and salt, potash. ERM's closure project team members have experience, working at active and inactive mine sites throughout the United States and multiple continents, as well as extensive experience working with EPA BLM and state regulatory agencies.

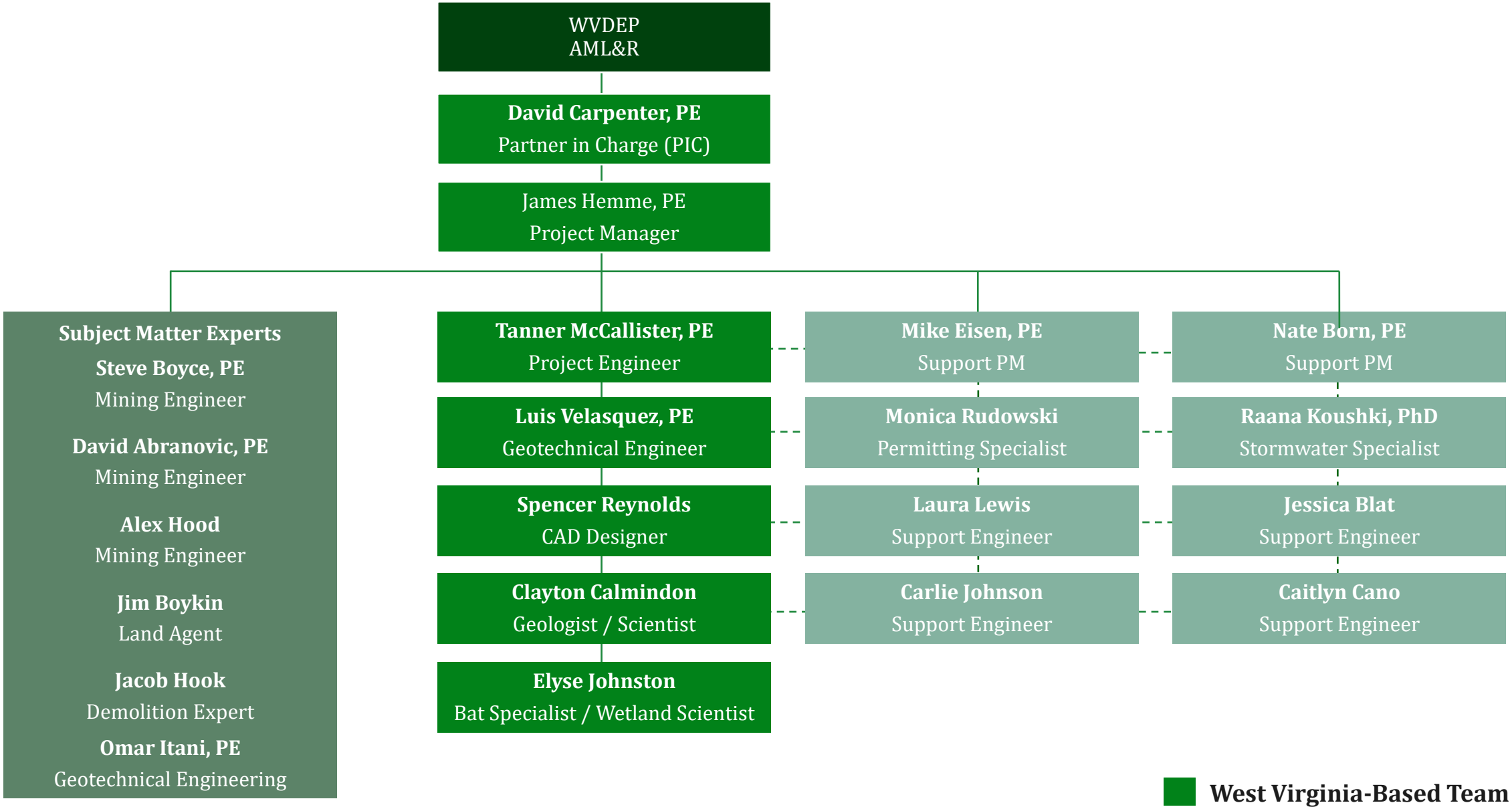
This unique team of professionals has the in-depth understanding of the federal and state agency processes to develop and execute all technical and regulatory aspects of a successful closure.

Our expertise

Our services apply to the closure project lifecycle, including the following areas:

- Environmental Data Collection and Presentation
- Engineering Design to Manage Stormwater and Balance Soil Grading
- Design of Bat Gates and Similar RT&E Controls
- Design of Engineered Covers or Remedial Systems
- Risk Assessment to Develop Site-Specific Human Health and Ecological Cleanup Levels
- Remedial Actions for Impacted Soil and Water
- Waste Characterization and Waste Treatment and Disposal
- Long-Term Monitoring, O&M and Risk Management Strategies
- Consent Order Negotiation

Team Organization



ERM Project Experience

Assessment of Corporate Mining Reclamation Liabilities (WV)

For a confidential client, ERM assessed an extensive portolio of bituminous coal mining properties including active permit operations and sections undergoing permit release. ERM reviewed existing permits , performed personnel interviews and visited locations to estimate length of unreclaimed highwall, surface area requiring reclamation, soil balance/deficiency, valley fill construction compliance and constructed portal and ventilation shaft liability. An assessment of other operational regulatory upgrades needed for compliance was also made.. ERM prepared an order of magnitude estimate for compliance for disclosure to a potential purchaser of potential risk.

Lithium Mine Engineering and Environmental Services

ERM is currently providing for a confidential client, environmental and engineering services for permitting a lithium mine in the eastern US. Services include regulatory consultations, engineering design of stormwater management, spoil pile placement for screening and staged reclmation. This has included extensive GiS land analysis , visual simulations and public outreach.

Evaluation, Closure Design, and Closure of Abandoned Mine Openings, Teck McCracken Mine, Mohave County, Arizona (US)

ERM was contracted by Teck to evaluate site conditions and design closures for below ground openings at the McCracken Mine in Mohave County, Arizona. The site represented a significant potential liability for TAI due to its accessibility and numerous open mine features. Initial site work consisted of a wildlife survey focusing on bats, a cultural resources survey, and an environmental survey. The cultural survey identified historic and cultural assets that might be present at the site to ensure that potentially historic structures and artifacts are not damaged or destroyed during closure. ERM also conducted an environmental survey to determine if there was potential for environmental concerns related to mine waste material at the site, and then used the survey results to develop feature-specific closure designs that would prevent access into the mine openings by site trespassers, while ensuring compliance with all State and Federal laws.

ERM identified 47 mine features during the bat habitat investigation, including stopes, adits, shafts and many declining adits that connected the shafts and stopes. Many areas of the site were very unstable and rock bridges between the features had to be collapsed due to safety concerns. Two large shafts required extensive work to close, one required the construction of an engineered bat ingress/egress structure with a cupola for the bats to fly in and out of, and the other deep shaft required the construction of a false bottom, the application of 20 feet of PUF, and a concrete re-enforced platform extending over the shaft. ERM provided contractor management and oversight activities during the closure-related construction activities.

Abandoned Mine Site Investigation Confidential Mining Client, Washington (US)

ERM conducted numerous site investigation tasks over a period of eight years on behalf of a confidential client at a large abandoned mine site in Washington State. These tasks included surface water, soil, sediment, plant, and soil invertebrate sampling; sediment bioassays; fish toxicity testing; groundwater monitoring well installation and sampling; underground mine investigations; and the geochemical characterization of tailings and waste rock piles. ERM also prepared a CERCLA/Model Toxics Control Act feasibility study (FS) for the site. The FS included an extensive probabilistic surface water loading analysis model to evaluate post-remediation metals concentrations in a receiving stream and the geochemical modeling of future metals loadings from abandoned mine tailings and waste rock piles over time. Post-remedial investigation/FS evaluations conducted at the site included the preparation of a Natural Resource Damage Assessment preliminary habitat equivalency analysis, a cost and constructability evaluation of two remedial alternatives, a terrestrial ecological risk assessment of the site, and multiple regulatory evaluations related to remedy selection.

ERM also managed construction activities related to re-establishing underground mine access and development and implementation of emergency remedial actions to minimize hazardous substance releases from mine tailings following severe weather conditions at the site, including large debris removal, surface water drainage improvements, bridge replacement, and tailings pile slope regrading and stabilization

Blackhawk Mine Reclamation Tailings Cap Design and Build, Grant County, State of New Mexico (US)

In the mid-1990s, Asarco completed reclamation activities at three tailings impoundments at the Blackhawk mill and concentrator site. Portions of the cap and drainage network have since failed, resulting in significant erosion of the cap and exposure of mill tailings. Remedial investigation and feasibility studies determined that cap and drainage network repairs should be completed to isolate the waste.

The State of New Mexico assumed responsibility for restoration of the Blackhawk Mine Tailings Impoundment Site in 2010 as part of a bankruptcy settlement with the ASARCO Trust. The State retained ERM to develop an innovative project approach, designed to meet budgetary constraints and to complete reclamation design/build for one of the impoundments.

ERM prepared the conceptual design, completed federal and state permits, performed a cultural resources survey of the BLM portion of the site, and performed hydrologic modeling of the area. ERM also completed data gap investigations to determine the volume of suitable cover material available, and conducted a failure analysis of the current tailings cap and surface water diversion system. This analysis was used to refine the conceptual reclamation design.

In addition, ERM developed the Preliminary Impoundment Reclamation Plan, BLM Borrow Area Restoration Plan, and Erosion Control Plan.

NEPA Environmental Assessment, Coal Mine Leases, BHP, Tribal Land in Arizona and New Mexico (US)

ERM provided air quality specialist services for a NEPA Environmental Assessment (EA), and EIS review for two large coal mine lease revisions and renewals on tribal lands in Arizona and New Mexico. These projects, led by the Office of Surface Mining, involved assessment of direct and indirect impacts of mine operations, evaluation of mitigation measures, and dispersion modeling to evaluate the extent and duration of off-site particulate impacts.

Unpermitting Homestake Mine, Barrick Gold Corporation, South Dakota (US)

“Unpermitting” a mine involves demonstrating successful completion of mining and reclamation permit obligations, managing long-term liabilities outside of the permit, and obtaining agency sign-off and mining permit cancellation or revision. Barrick retained ERM for the following independent support:

- Strategy development;
- Inventory of site obligations;
- Inspection/documentation of reclamation;
- Preparation of a residual reclamation plan;
- Preparation of post closure plan; and.
- Written reports and state-contested case hearing.

Reclamation and Closure of Tailings Impoundment, Impact Assessments, EMS, Construction Management, Homestake Mining Company (Barrick Gold), McLaughlin Mine, Lake County, California (US)

ERM has provided a wide range of services to this Barrick Gold subsidiary, including California Environmental Quality Act (CEQA) consultation, impact assessment, compliance assurance, environmental management system design and implementation, and Site Assessment/Remediation Construction Management. Specific projects include:

- Reclamation Plan Amendment and Closure Plan for Tailings Impoundment Facility – Review and Strategic Advice;
- CEQA – Support;
- Environmental Management System;
- EHS Compliance Assurance;
- Waste Discharge Requirements and General Permit Reporting;
- Wildlife Impacts Assessment – Tailings Impoundment;
- Reclamation/Construction Management – Waste Rock Pile; and.
- Reclamation and Closure Plan/Financial Assurance Update.

Preparation of Closure Petition, Reclamation Plan, and Postclosure Plan for Richmond Hill Mine Lead, Lac Minerals (Barrick Gold), South Dakota (US)

ERM was contracted to prepare the Closure Petition, Reclamation Plan, and Postclosure Plan for the Richmond Hill Mine, five miles northwest of Lead in the Black Hills of South Dakota. Mining operations were conducted at the site through 1994. The mine has been in reclamation and closure since 1994.

ERM performed a detailed review of the reclamation release criteria and reclamation status, including site visits to observe conditions within the permitted mine boundary, reviewing documents provided by LAC Minerals regarding its permit, permit amendment and technical revision requirements, and conducting a non-invasive hydrogeologic investigation of the mine pit impoundment area. Following this review, ERM prepared the Draft Petition for Release of Reclamation Obligations, Reclamation Plan, and Postclosure Plan for the mine with oversight and review by Lac Minerals. The final closure documents were submitted to the regulatory agencies, resulting in successful closure.

PA/Focused SI at the Brunckow Mine Site, Bureau of Land Management (BLM), Cochise County, Arizona (US)

The BLM contracted with ERM to conduct a Preliminary Assessment/Focused Site Inspection at the Brunckow Mine Site in Cochise County, Arizona. ERM prepared this PA/Focused SI in accordance with criteria established under CERCLA, SARA, and sections of the National Oil and Hazardous Substances Pollution Contingency Plan, commonly known as the NCP. The purpose of this investigation was to assess the threat posed to human health and the environment by extracted mining material (i.e., ore, tailings, waste rock, and/or concentrate) related to the Mine Site, and to determine the need for additional investigations under CERCLA/SARA or other appropriate action. The scope of work for this PA/Focused SI included:

- Assessment of Site-specific health and safety requirements for completing field activities;
- Research of readily-available information about the Mine Site and its surrounding area;
- A focused field investigation of surface soils and water to define the aerial extent of contamination from the ore, tailings, and/or waste rock within the Mine Site boundary and adjacent waterways under the direction of BLM;
- Sample locations and other significant site features measured with a Global Positioning System (GPS);
- Select field screening for individual and total metals of 50-75 samples with a portable x-ray fluorescence (XRF) analyzer from background locations, ore and tailings piles, adjacent areas, roadways, and drainage areas;
- TCLP analysis for select target metals of the samples exhibiting the highest select target metals concentrations; and.
- Preparation of draft and final versions of the PA/Focused SI Report.

PA/Focused SI at the Octave Mill Site, Bureau of Land Management (BLM), Yavapai County, Arizona (US)

The BLM contracted with ERM to conduct a PA/Focused SI at the Octave Mill Site in Yavapai County, Arizona. ERM performed a focused field investigation to define the near surface extent of contamination within the study area. The focused field investigation included select field screening for individual metals with an XRF, and recording coordinates with a hand-held GPS unit. Based on field screening results and decision criteria developed with input from BLM, ERM submitted samples from 20 locations for laboratory analysis of target metals and/or cyanide. The results of the PA/Focused SI indicated the milling material had the potential to represent a threat to public health, welfare, and/or the environment, and therefore an additional evaluation was warranted. ERM recommended a site inspection and human health risk assessment (HHRA), utilizing a risk-based approach to decision-making for the southern tailings pile area. Ultimately, ERM completed the project statement of work within schedule and budget.

PA/Focused SI at the Wickenburg Mill Site, Bureau of Land Management (BLM), Yavapai County, Arizona (US)

The BLM contracted with ERM to conduct a PA/Focused SI at the Wickenburg Mill Site in Yavapai County, Arizona. ERM prepared this PA/Focused SI in accordance with criteria established under CERCLA, SARA, and sections of the NCP, with the purpose to assess the threat posed to human health and the environment by milling material (i.e., manganese ore, tailings, waste rock, and/or concentrate) related to the Mill Site, and to determine the need for additional investigations under CERCLA/SARA or other appropriate action. Objectives of the PA/Focused SI were:

- Identification of potential environmental issues associated with milling material at the Mill Site;
- Preliminary quantification (area extent) of impact from the milling material;
- Characterization of the worst case conditions at the Mill Site for comparison to screening levels; and.
- Evaluation of results to determine whether removal action was warranted.

ERM field screened select milling material and soil sample locations for individual metals using an XRF analyzer. Based on the field screening results and decision-making protocol developed with input from BLM, analysis of soil samples confirmed several impacted areas that exceeded ADEQ residential soil cleanup levels (rSRLs).

Based in part on the results of the PA/Focused SI, BLM divided the Wickenburg Mill Site into two separate subsections for further study of remedial and/or removal alternatives. ERM completed the project statement of work within schedule and budget.

Wickenburg Mill Site EE/CA, Bureau of Land Management (BLM), Yavapai County, Arizona (US)

The BLM contracted with ERM to perform a CERCLA EE/CA for a subsection (35 acres) of the approximate 85-acre Wickenburg Mill Site. The purpose of project was development of an EE/CA to evaluate cleanup alternatives for treatment of soil at the Wickenburg Mill Site impacted with manganese, arsenic antimony, and lead exceeding rSRLs. The EE/CA identified objectives of the removal action, evaluated several alternative solutions, and recommended the best alternative according to effectiveness, implementability, and cost. The selected remedy included removal, consolidation, and capping of impacted soil into an on-site repository, with potential for expansion to incorporate additional soil from the RI remedy if required, as well as engineered controls to prevent run-on of impacted soil from the RI study area after the remedy was in place. The Statement of Work included development of an EE/CA Work Plan, a Site Characterization Sampling and Analysis plan (SAP), additional Site Characterization field work in support of the EE/CA, evaluation and completion of the EE/CA, development of an action memorandum, completion of the public notice process, organization/scheduling a public meeting, and supporting BLM in providing display materials and technical support for the public meeting. ERM completed the project statement of work within schedule and budget.

Site Investigation, Compliance, and Remediation, Confidential Mining Company, Southeast Missouri (US)

ERM was retained to manage investigation, compliance, and remediation activities at a former lead and cobalt mine in the Old Lead Belt of southeastern Missouri. Management responsibilities included: site characterization; identification and implementation of Best Management Practices (BMPs) for storm water pollution prevention; management of engineered caps over tailings including maintenance of cap integrity, reseeding, erosion control and fencing; monitoring of metallurgical pond dam and plugged mine decline; tailings dam management and permitting; storm water permitting, including sampling and reporting; baseline risk assessments including toxicity identification/reduction evaluations; stream and sediment sampling; and implementation of CERCLA Work Plan following United States Environmental Protection Agency (EPA) approval.

ERM tasks included:

- Stabilization program management;
- Maintenance of caps, tailings dam, and storm water retention dam;
- Implementation and management of CERCLA investigation;
- Investigation of properties along a stream downgradient of the tailings dam and areas upgradient of the mine outfalls;
- Management of all NPDES permit compliance activities;
- Maintenance of sedimentation structure;
- Completion of a Toxicity Identification Evaluation (TIE);
- Implementation of a Toxicity Reduction Evaluation (TRE) to eliminate/remediate the source of metals in the mine discharge;
- Evaluation of options to address ARD;
- Completion of a bench-scale test of sulfate-reducing bacteria (SRB) cells to address the seeps; and.
- Design and Operation of an SRB pilot to be incorporated into a full-scale system.

Environmental/Engineering Consulting and ARD Control, Confidential Mining Client, Arizona (US)

ERM was retained through a three-party agreement including a legal firm and copper mining company to provide technical support for securing an Aquifer Protection Permit at an inactive copper mine. ERM's technical support included review of previous site characterization studies, engineering design of acid rick draining (ARD) and un-impacted storm water management facilities that had not yet been designed, project cost estimating and scheduling, and interaction with regulatory agencies.

Remedial Investigation and Feasibility Study, Eagle Mine, Eagle County, Colorado (US)

ERM conducted comprehensive environmental studies under CERCLA for the remediation and subsequent redevelopment of the Eagle Mine Superfund site. These studies included conducting a Remedial Investigation, feasibility Study, Risk Assessment, and Wetlands Delineation. Additionally, ERM evaluated the impacts of the proposed site reuse upon the water quality in the adjacent Eagle River and Cross Creek, and performed a groundwater model to determine the impacts of constructing an on-site reservoir upon the migration of contaminations from a tailings pile upon the nearby surface streams.

Final Reclamation Design, Bruce Mine Voluntary Remediation Program, Freeport McMoRan Copper & Gold, Arizona (US)

The Bruce Mine, a former copper and zinc mine located in Bagdad, Arizona, was accepted into Arizona's Voluntary Remediation Program (VRP). As part of the VRP, it was necessary to develop a Reclamation Plan to bring the Bruce Mine site to closure. The results of site characterization efforts were used to develop an initial reclamation design concept. ERM was retained to complete the Final Reclamation Plan for the client. The reclamation design concept included:

- A vegetated Evapotranspiration (ET) soil cover;
- Diversion channels to manage and control the storm water runoff away from the tailing impoundments;
- Either a passive sulfate-reducing bioreactor (SRBR) to treat or a collection pond to manage/control residual toe seepage from the South and East Tailings Impoundments; and.
- Mitigation measures for acid rock drainage (ARD) materials.

ERM's work included:

- Review and evaluation of previous investigations to define the geochemical properties of the tailings, tailings impoundment thickness, and ARD materials;
- Geotechnical investigation to further define the geochemical properties of the tailings, tailings impoundment thickness, and ARD materials;
- Study of the surface water hydrology;
- Clean Water Act 404 permitting and 401 certification necessary to complete reclamation activities;
- Pilot testing to determine the effectiveness of the SRBR in treating residual toe seepage from the tailings impoundment;
- Development of the draft reclamation design; and.
- Development of the final reclamation design.

Golden Reward Mine Post Closure Plan, GoldCorp, Black Hills, South Dakota (US)

The Golden Reward Mining Company operated the Golden Reward gold mine in the Black Hills of South Dakota from 1989 until 1996, and then reclaimed the majority of the affected acreage from 2002 until 2007. Over 400 acres have been reclaimed and re-established as a viable wildlife habitat, thus meeting the permitted post mining land use. Upon release of reclamation obligations for these areas by the South Dakota Board of Minerals and Environment, these areas will be managed under the Post closure Plan prepared by ERM.

ERM was retained by Golden Reward to prepare the Post closure Plan and Financial Assurance cost estimate for the Golden Reward Mine. For those areas that met the reclamation criteria, ERM prepared a Draft Petition for Release from Reclamation complete with a description of the permitted areas, activities completed to meet reclamation requirements, documentation supporting that the release criteria had been met (i.e., revegetation and stability survey results, etc.). For those areas that did not meet the reclamation criteria, ERM prepared a Reclamation Plan that described the areas of interest, the proposed reclamation activities, schedule for reclamation, and cost estimate to complete the reclamation. For the estimate, ERM began with the State's estimate, using their format and modifying it accordingly, based on the initial assessment findings. The South Dakota Board of Minerals and Environment granted the release of reclamation obligations for the acres meeting reclamation criteria as defined in the petition and accepted the Reclamation Plan for those areas requiring additional monitoring prior to release.

Conceptual Site Model and Data Gaps Analysis, Sulphur Creek Mining District, Colosa County, California (US)

ERM completed a Conceptual Site Model (CSM) and data gaps analysis for the Sulphur Creek Mining District (SCMD) to support cleanup and abatement of mine wastes. SCMD consisted of 6 former mercury/gold mines where mining wastes were contributing to the mercury load to Sulphur Creek. The CSM captured and summarized the current understanding of (a) sources and their contribution, (b) mercury cycling [transport, transformation, bioaccumulation, key factors affecting cycling], and (c) human and ecological exposure scenarios and mercury toxicity. The CSM and data gaps analysis facilitated a consensus with respect to the scope of waste characterization and cleanup of the SCMD. During field reconnaissance activities, mine openings were identified and assessed for closure alternatives, including bat gates, cupolas, grates, and polyurethane foam.

Social Impact Assessment for Closure and Opening of Gold Mines and a Power Plant, Newmont Mining Corporation, Battle Mountain, Nevada (US)

ERM undertook a Social Impact Assessment (SIA) to evaluate the net socioeconomic impacts of the closure of a large, open-pit gold mine; the construction of a new open-pit gold, copper, and silver mine; and the construction of a coal-fired power plant. Each of the phases of the SIA involved extensive stakeholder consultation including meetings with personnel from across multiple functions in Newmont and key external stakeholders, including county and city government officials; federal and state regulations; ranchers and farmers; Newmont contractors; local businesses; health, education, public safety, and public utilities providers; religious organizations; NGOs; ethnic community groups; Native Americans; and other mining companies. ERM's independent third-party assessment provided Newmont with a systematic analysis of impacts that allowed Newmont to prioritize risks and activities.

Northumberland FPCP, Newmont USA Limited, Nevada

ERM was retained by Newmont to prepare a Final Permanent Closure Plan (FPCP) for the historical Northumberland Mine Site in northern Nevada. ERM's scope of work included the following tasks:

- Data Review
- Data Gap Analysis
- Review Status of Reclaimed Leach Pads
- Develop Draft Closure Alternatives
- Draft and Final Closure Plan Preparation
- Site Visits and Meetings with Newmont
- Presentations and Meetings with NDEP
- Monthly Progress Reports

Successful completion of this work consisted of developing a credible and defensible FPCP, with low-cost remedies, and submitting it to the NDEP prior to the agency deadline. ERM developed a fit-for-purpose approach to the FPCP by identifying simple, cost-effective closure technologies using existing data and reclamation plan remedies (where available). ERM understood that Newmont was required to close the site as mandated by NDEP, even though Newmont never operated nor benefitted from its resources.

The Closure Plan was prepared in accordance with the BLM Surface Management Regulations 43 CFR 3809 and Nevada Administrative Code 445A. The Closure Plan incorporated previously-approved reclamation strategies, results of recent baseline studies, and refined closure approaches to help limit long-term maintenance and water treatment costs. ERM addressed the most significant challenge of heap leach drain down management at high elevation by presenting to NDEP a thorough review and evaluation of available precipitation and existing heap leach drainage data to support phased management of drain down during a reasonable (6 year) closure period. The NDEP is currently reviewing the FPCP that was submitted to the agency on time and within ERM's proposed budget. ERM is currently developing for Newmont an engineer's estimate for implementation of the FPCP.

Heap Leach Facility Final Plan for Permanent Closure (FPPC)

ERM developed the FPPC for a heap leach facility in the western U.S., aligning closure design with the client's risk management and regulatory compliance objectives. The scope included engineering design of a store-and-release soil cover system, slope regrading to meet stability criteria, and stormwater management modeling using HydroCAD. ERM conducted material characterization, numerical modeling, and sensitivity analyses to evaluate cover system performance and erosion potential. Final deliverables included stamped construction drawings, technical specifications, and a comprehensive engineering design report in accordance with applicable state mining regulations.

Site-Wide Closure Strategy – Arctic Mining Operation

ERM developed a site-wide closure strategy for a remote Arctic mining operation, addressing infrastructure such as access roads, laydown areas, airstrip, landform design, and revegetation. The strategy included defining closure objectives and principles, conducting geochemical and soil quality studies, and evaluating cover material availability. ERM led the development of conceptual designs and closure configurations, identified key risks and data gaps, and aligned the strategy with corporate biodiversity goals and applicable regulatory frameworks. The deliverable supports long-term planning, progressive reclamation, and cost estimation for final closure.

ERM References

Reference Contact Information

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Project: McCracken project

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Project: Red Dog Mine, Alaska

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Project: Multiple Natural Gas Compression Facility Site Developments. Environmental Clearance, Stormwater and ESC Engineering.

Appendix 1 – ERM Team CV's

David L. Carpenter, P.E., LRS

Partner

David is a Sr. Partner in ERM's Charleston, West Virginia office. He is a registered professional engineer in multiple jurisdictions and licensed remediation specialist in the state of West Virginia. He has over 30 years of experience in environmental consulting, engineering design and project leadership. David has experience in management of large, multi-scope programs and large, complex projects with aspects in civil design packages, engineering estimates, permit and construction level drawings, engineering design surveying, bid specifications, complex permit applications, bid evaluations, engineering design reports, geotechnical drilling and rock coring, landslide studies, erosion and sedimentation control design, slope stability analysis, engineered fills, revegetation plans, culvert design, hydrology/hydraulic modeling and impact studies, construction quality assurance, project closeout reports.

Experience: over 30 years' experience in mining, oil & gas, chemical, government, legal, manufacturing, and power sectors

Email: david.carpenter@erm.com

LinkedIn: https://www.linkedin.com/in/david-carpenter-74b4b92a/

Education

- M.S. Environmental Engineering, Marshall University, WV, USA, 2000
- B.S. Civil & Environmental Engineering, Clarkson University, NY, USA 1993
- B.S. Physics & Geology, SUNY at Fredonia, NY, USA,1991

Professional Affiliations and Registrations

- Professional Engineer, WV, PA, OH, KY
- Licensed Remediation Specialist, WV
- Certified Monitoring Well Driller, WV
- Member American Society of Civil Engineers
- Member WV Chemical Alliance Zone
- 40 Hr HAZWOPER Training, 1993
- 8 Hr Refresher - Annually, ERM
- Past Board President WV Air and Waste Mgt. Association 2018-2022

Languages

- English, native speaker

Fields of Competence

- Project leadership
- Civil site design
- Stormwater design
- Solid waste design
- Capital project delivery
- Risk assessment & management
- Environmental Due Diligence
- Environmental permitting & compliance
- Litigation support
- Contaminated site management
- WV Voluntary Remediation Program
- Remedial investigations & design

Key Industry Sectors

- Mining
- Oil & Gas
- Power
- Renewable Energy
- Chemical
- Manufacturing
- Legal

ERM

Key Projects

Pre-Law Coal Mining Hydrogeologic Impact Study – Barbour County, WV
Project Engineer/Geologist for a comprehensive hydrogeologic investigation of a watershed. The overall project approach involved the performance of a hydrogeologic study to determine if residential source water supplies had been affected by pre-law (pre-Surface Mining Control and Reclamation Act (SMCRA)) coal mining and then subsequently prepare a feasibility study and engineers estimate of the cost to extend the public water supply to the study area. The study included a desk top study and research, a week long field reconnaissance that included tap water sampling, data analysis, interpretation, preparation of piper trilinear diagrams to support data analysis, hydrogeologic cross-sections of the watershed and preparation of a comprehensive report.

Abandoned Coal Mine Environmental Due Diligence & Risk Review – Mt. Hope, WV
Project Director for Phase I/II ESA of a 12,000 acre + tract of former mine land near Mt. Hope, West Virginia in support of development of a $300M non-profit high adventure camp and Jamboree Center for a boys club. The property included both pre-SMCRA and post-SMCRA coal mining activities. The property was heavily underground, surface and area mined that included former tipples, rail spurs and coal handling areas. Detailed research was conducted of the past mining operations at the property that included database searches such as: coal impoundments, EPA's ECHO database, Office of Surface Mining, WV Geological Survey, U.S. Geological Survey, WV Department of Miner's Health & Safety, Google Earth and others. This data was used to identify and map potential problem areas prior to conducting a week long field reconnaissance. Several recognized environmental concerns (RECs) were identified from the site reconnaissance which included numerous underground mine portals, mine drainage areas, refuse piles, and unreclaimed surface mine areas. The Phase I ESA was followed up with a Phase II ESA to estimate the extent and magnitude of the RECs. Subsequently environmental and mine reclamation liability estimates were prepared for use to secure millions of dollars in State and Federal funds for mine reclamation that allowed for the successful fast tracked development of the property.

Coal Mine Environmental Due Diligence & Risk Review – Neal, WV
Project Engineer for a modified Phase I/II environmental liability assessment for a coal handling, processing and load-out facility on the Big Sandy River. The assessment included a site reconnaissance, facility file review, air, water, waste and mine permit review, historical records review, interviews with personnel familiar with the facility, collection of soil, sediment and surface water samples. Potential contaminant sources were USTs, ASTs, heavy equipment maintenance facility, mine motor storage building, sludge drying lagoons, and drain pipe discharge points. Potential contaminants of concern included petroleum hydrocarbons, heavy metals, PCBs and various VOCs and SVOCs. A detailed report was prepared which included assessment findings and recommendations.

Coal Handling Facility Permitting and Compliance – Kenova, WV
Project Director for complete rebuild one of coal handling facility and expansion permitting of a second facility. Project tasks included air permitting for coal crushing and handling operations, method 9 visual emissions testing, annual emission inventory, facility compliance storm water inspection, wetland survey and reporting, army corp permitting for coal dock expansion, management and curation of 26 boxes of artifacts, development of preliminary site grading plans, construction storm water permitting, baseline groundwater investigation, updated environmental compliance plans.

Abandoned Coal Mine Environmental & Reclamation Liability Assessment – Beckley, WV
Project Engineer/Geologist for reclamation and environmental liability assessment of a 3,000-acre tract of property for a commercial property transaction. Assessment included a review of mine permits and associated reclamation requirements,

environmental compliance record review, site reconnaissance including environmental sampling and documentation. Results along with cost estimate of liabilities presented in a report.

Coal Impoundment Dam Breach Analysis - Marmet, WV
Project Engineer for a monitoring and emergency warning plan preparation which included a coal refuse dam breach analysis for flood routing and evacuation control. Also conducted routine refuse impoundment inspections and certifications.

Landfill Closure Design
Project Manager for the landfill cap design at a Preston County landfill completed under the West Virginia Division Environmental Protection Landfill Closure Assistance Program (LCAP). Project activities included aerial boundary survey, location of edge of waste, borrow area analysis, cap and storm water control system design, slope stability analysis, sediment control system design, gas management/vent system design, leachate management plan, leachate tank and pumping station design, revegetation plan, engineering cost estimate, and preparation of construction plans and specifications, preparation of a groundwater monitoring plan, installation, sampling, slug testing of groundwater monitoring wells, statistical variance modeling of groundwater analytical data, leachate study and modeling. The project also included construction quality assurance (CQA) which involved the assurance that all components were installed according to engineering design and specifications.

Municipal Landfill Design
Project Engineer for a Subtitle D landfill expansion and partial closure that included; storm sewer sizing, design of leachate collection and detection lines, grading plans, borrow area suitability analysis, leachate force main design and other engineering work for a permit application/modification.

Landfill Expansion
Performed on-site engineering and construction quality assurance (CQA) for a landfill expansion. The landfill expansion included steep slope (2:1) and overfill composite liner system installation, Subtitle D cap for a closed cell, design and installation of passive gas vents, construction of a sediment control pond and relining of a leachate collection pond. CQA activities included construction monitoring and documentation, verification of construction and assisting with the completion of a certification report.

Landfill Due Diligence
Project Engineer for buy-side due diligence of a municipal solid waste landfill that included review of permits, permit conditions and regulatory compliance status, agency files, interviews with knowledgeable staff and operators, site reconnaissance and evaluation of landfill gas management system, review of historical operational non-compliance issues and corrective actions and documentation and preparation of a comprehensive summary report for decision making.

Landfill Investigation and Remediation
Performed as Project Engineer, Project Director and Expert Witness for the investigation, remediation and environmental closure of numerous industrial landfills. Conducted investigations to determine limits of waste, source of specific wastes, removal and relocation of wastes, including buried drums in a residential setting, confirmation sampling, evaluation and remedy of soil and groundwater impacts, landfill gas migration studies, public liaison, public land restoration, redevelopment of closed landfills and long-term care and management. Landfills included wide range of legacy landfills across multiple industry sectors including coal ash facilities.

Renewables
Project Director for site civil design and land development for multiple utility scale solar power facilities. Engineering design aspects have included surveying, local planning, permitting and zoning, critical flaw analysis, site plan development, slope suitability analysis, stormwater construction permits, stormwater pollution prevention plans, land use permitting, flood plain analysis, hydrology modeling, retention and detention structure sizing, BMPs, access road, preliminary geotechnical studies, record drawings, easement plats and agreements.

Erosion and Sedimentation Control Design
Preliminary erosion & sedimentation control design for permitting. Design was for new manufacturing

facility on 130-acre parcel and included pre and post development hydraulic modeling, design of retention and detention structures, site grading design, culvert design, E&S controls and best management practices in accordance with state approved controls and guidance manual.

Erosion and Sedimentation Control Plans
Project manager for the preparation of several erosion and sedimentation control plans in accordance with State design requirements and guidance manuals for a major retail chain expansion across multiple states. The plans included use of general and alternative best management practices (BMPs) to minimize erosion and control runoff. Project included preparing and delivering a contractor training program across multiple venues and quality assurance site visits to verify proper implementation.

HDD River Crossing
Project Director for engineering support and erosion and sediment control permitting, Section 10 and Section 404 permitting of a high-pressure gas line crossing of a jurisdictional river. Due to frack-out during HDD the project included consultation with US Fish and Wildlife Service, WV Department of Natural Resources, and West Virginia Department of Environmental Protection regarding protection of water resources and flora and fauna species. Consulting and design services related to the interim stabilization of residential property and steep river embankment. Property, structural and infrastructure engineering assessments and mitigation design. Design included removal of failed soil, replacement with geotextile and rock fill and compaction grouting subsurface to stabilize soils and sewer trunk line.

Pipeline Slope Stability
Project Director/Civil Engineer for 3rd party engineering evaluation of failed slope along a multi-party natural gas transmission right-of-way. Performed as civil design engineer for expert opinions of a major landslide in steep slope terrain. Slope failed and extended beyond the permitted limits-of-disturbance and impacted residential property and water bodies. Reviewed site-civil landslide abatement and repair plans, consulted with the lead design engineer and completed comprehensive site reconnaissance. Identified fatal flaws in implementation of site grading, run-on and run-off design from current and past grading from other pipeline operators, inadequate installation and maintenance of E&S controls and undersized BMPs. Presented the preliminary findings to the client verbally and followed up with a report of engineer's opinion at the request of the client.

Capital Project Development
Project Director for delivery of environmental and outer battery limit civil design services for large scale capital projects in West Virginia. Projects have included multiple chemical and petrochemical manufacturing facilities, a large ethane fractionator complex, natural gas transmission pipelines, compressor stations and ancillary facilities, a coal-to-liquids facility, coal handling facilities, consumer goods, insulation manufacturing, gas-fired power generation and numerous utility-scale solar facilities across the U.S. Services have included critical issues analysis, permitting matrices, permitting road maps and legal registers, environmental due diligence, site investigation/voluntary remediation program, NSR and PSD level air modelling and permitting, earthwork grading design, storm water management design, construction and multi-sector storm water permitting, complex industrial NPDES permitting, cultural/archeological studies, wetlands, Army Corp of Engineers permitting for stream, wetland and barge cells, aboveground storage tank registration/inspection/certification, community outreach and stakeholder engagement, local, state and federal agency liaisons, and general engineering and environmental support. Post operations services have included environmental compliance plans, various annual environmental reporting, permit modifications and source testing.

Aboveground Storage Tanks
Project Director and certifying engineer for registration, inspection and certification for over 3,000 aboveground storage tanks (ASTs) associated with the oil & gas, chemical and manufacturing industries. Project tasks included on-site inspection of AST systems, including secondary containments, inspection of API and other testing records, review of leak detection and corrosion protection systems, inspection and training records and other ancillary

components. Data was collected in custom database and reported through the agency electronic submission system (ESS). Preparation of Spill Prevention Response Plans (SPRPs) in accordance with WV code 22-30-9.

SPCC, Facility Response and ODC Plans
Project Manager and Certifying Engineer for over 250 SPCC Plans and dozens of Facility Response Plans (FRPs) prepared in accordance with 40 CFR 112 and numerous Oil Discharge Contingency (ODC) Plans prepared in accordance with 40 CFR 109. These plans were prepared for various types of facilities including bulk oil storage facilities, river terminals, hydrocarbon manufacturing plants, oil & gas production, gathering, midstream and transmission facilities, wind farms, chemical manufacturing facilities, power generation, manufacturing facilities, railroad yards stations, construction sites, scrap yards, heavy equipment storage yards and a wide range of commercial facilities.

Integrated Contingency Plans (ICP)
Project Manager and certifying engineer for the preparation of four Integrated Contingency Plans (ICP). Two of the facilities consist of large bulk oil storage facilities that transfer oil over water. The ICPs included SPCC Plans, Storm Water Pollution Prevention Plans (SWPPP), Groundwater Protection Plans (GPP), Oil Pollution Act of 1990 (OPA 90) Facility Response Plan, and an emergency response action plan.

West Virginia Voluntary Remediation Program/Brownfield Experience
Licensed Remediation Specialist/Project Manager (LRS/PM) for completion of Voluntary Remediation Applications and Agreements associated with the West Virginia Voluntary Remediation & Redevelopment Act (VRRA) also known as the WV Voluntary Remediation Program (VRP). Performed as the LRS/PM for over twenty-five (25) VRP sites. Project tasks have included; Phase I & Phase II investigations, comprehensive search of historical site activities, site visit with regulatory agency, development of detailed list of source areas and potential contaminates of concern, evaluating data gaps, preparing sampling & analysis plans, remediation work plans, bench scale and pilot scale design studies, full-scale remedial design and implementation, remedial construction management, management of human health and ecological risk assessment, groundwater modelling, preparing information for public notice and presentations and regular liaison with regulatory agency, preparation of final reports and land use covenants.

Chemical Manufacturing Plant Assessment and Clean-up Project
Project Manager and Licensed Remediation Specialist (LRS) for a former chemical manufacturing plant assessment and clean up performed under the WV Voluntary Remediation Program (VRP). The project involved extensive environmental assessment including the use of CPT and MIP technologies for lithology and contaminant characterization. The primary contaminant of concern (COC) was carbon tetrachloride; however, other COCs include various other VOCs as well as SVOCs and pesticides. Bench and/or pilot scale testing of innovative remedial technologies, which included High Vacuum Soil Vapor Extraction, in-situ chemical oxidation (ISCO) using caustic activated sodium persulfate and chelated iron activated sodium persulfate, and bio-augmentation and bio-stimulation. Coordinated quarterly regulatory progress updates and developed annual project summary and milestone schedule. Gave periodic project update presentations to Public Advisory Group (PAG).

Environmental Due Diligence & Risk Review
Project Engineer for a modified Phase I/II environmental liability assessment for a river coal handling, processing and load-out facility. The assessment included a site reconnaissance, facility file review, air, water, waste and mine permit review, historical records review, interviews with personnel familiar with the facility, collection of soil, sediment and surface water samples. Potential contaminant sources were USTs, ASTs, heavy equipment maintenance facility, mine motor storage building, sludge drying lagoons, and drain pipe discharge points. Potential contaminants of concern included

petroleum hydrocarbons, heavy metals, PCBs and various VOCs and SVOCs. A detailed report was prepared which included assessment findings and recommendations.

ACOE 404 Wetland Delineation Studies
Project Manager for several ACOE 404 wetland delineation studies to support land development projects. Certified wetland delineators conducted these studies. The studies included delineation, mapping and professional surveying of the wetlands. Some of these wetland projects included a wetland mitigation evaluation and feasibility study, wetland bank alternative study, and associated regulatory liaisons.

NPDES Permit Modification Project
Project Manager for NPDES permit modification involving a dye study & ecological impact study along the Kanawha River. The study was performed to demonstrate adequate mixing was taking place in the near field & far field mixing zones. The dye study and aquatic habitat study demonstrated sufficient mixing was occurring and additional treatment of effluent was not required. A revised permit was issued saving the client hundreds of thousands of dollars in plant upgrades or potential remote POTW connection.

Industrial User Permit Application and Baseline Water Quality Study
Project Director for successful discharge permitting for a new major industrial manufacturing facility in West Virginia. Prepared and implemented a baseline water quality and metal translator study for a high quality receiving stream. The results of this study were used to evaluate the assimilative capacity of the receiving stream and to model effluent loading for pre-treatment design. This work was completed by the permittee on behalf of the local POTW and in direct consultation, engagement and working sessions with the WVDEP.

NPDES Permitted Outfall Re-routing Design
Project Manager for an NPDES permitted outfall re-routing design study and evaluation. Due to closure of part of the chemical manufacturing facility and impending sale of the outfall via duct, there was a rapid need to re-route the permitted outfall. The design study included evaluation of several storm water management, containment, and routing options. The study also included regulatory interaction, meetings, and other liaisons to develop the most viable approach. The final design utilized much of the existing, unutilized, facility infrastructure to re-route storm water through two new internal outfalls thus saving the client over $250,000 in WWTP upgrades and storm water piping infrastructure.

Due Diligence/Phase I Environmental Assessments
Partner/Project Manager for over 100 Phase I Environmental Assessments for oil & gas, commercial, industrial, and mining real estate property transactions in accordance with the American Society of Testing Materials standards and EPA AAI. Many of these Phase I's included review of large complex assets spread across large regions of geography using a systematic approach for risk evaluation with liability threshold limits.

Real Estate Transaction Audit
Coordinated and led a field team to perform several modified Phase I ESA audits in preparation for a real estate transaction of over 30 natural gas facilities within West Virginia. The audits included facility compliance with RCRA, CERCLA, TSCA, Clean Water Act and the Air Pollution Control Act. Samples were collected from potential sources and obvious areas of concern. Contaminants of concern included PCBs, mercury, petroleum hydrocarbons and various volatile and semi-volatile compounds. Subject sites were remote natural gas compressor facilities and well sites.

Toxic Release Inventory (TRI) Reporting Project
Project Manager/Engineer for preparation and completion of toxic release inventory (TRI) reporting for Form R's for several mining facilities. The TRI Form R's were prepared in response to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act and Section 6607 of the Pollution Prevention Act.

Emission Source Testing

Project Director for West Virginia based emissions compliance testing team. Source testing for multiple criteria pollutants and RATA requirements to demonstrate permit compliance for boilers, furnaces and industrial process emission points for numerous chemical, power, oil & gas and manufacturing facilities. Review and approval of testing protocol and emission testing reports.

Integrated Contingency Plans (ICP) Project
Project Manager and certifying engineer for the preparation of four Integrated Contingency Plans (ICP). Two of the facilities consist of large bulk oil storage facilities that transfer oil over water. The ICPs included SPCC Plans, Storm Water Pollution Prevention Plans (SWPPP), Groundwater Protection Plans (GPP), Oil Pollution Act of 1990 (OPA 90) Facility Response Plan, and an emergency response action plan.

Publications

- William Cutler, James Bodamer, Philip Block, Stewart Abrams, David Carpenter, Michael Hayes, Tarek Ladaa, George Robertson and Duane Root, Use of CPT/MIPS to Determine Optimal ISCO Injection Zones, AEHS Conference, San Diego, CA, 2005
- Tarek Ladaa, David Carpenter, Stew Abrams, Philip Block and Bill Cutler, In Situ Chemical Oxidation Pilot Test Using Activated Persulfate, Partnering-Clients, and Remediation Technologies, Orlando, FL, 2005
- Philip Block, James Bodamer, David Carpenter, Tarek Ladaa and Duane Root, Pilot Scale Application of Activated Persulfate to Treat Chlorinated Methanes, University of Massachusetts, Boston, MA, 2005

Technical Presentations

- WV Brownfield Conference 2015, presentation "Successful Redevelopment of Brownfield Sites for Mixed Use," David Carpenter
- WV Brownfield Conference 2010, presentation "Design and Installation of Vapor Barriers, a Case Study," David Carpenter
- WV Brownfield Conference 2010, presentation "Brownfield to Greenfield, Huntington, WV," David Carpenter
- WV Chamber of Commerce 2004, presentation "How to Prepare a Regulatory Compliant SPCC Plan," David Carpenter

Expert and Fact Witness

- The Courtland Company v. Union Carbide Corporation, civil action number 2:19-cv-00894, 2:21-cv-00487. Served as expert witness in the U.S. District Court, Southern District of West Virginia for industrial landfill case involving the federal Clean Water Act, RCRA/CERCLA liability, and multiple state laws and codes including the WV Hazardous Waste Management Act, WV Solid Waste Management Act, WV Voluntary Remediation and Redevelopment Act and others. Case involved a TRO hearing followed by two phases of trials 18 months apart. Judgement for the defendant 27 September 2024.

- Statkiewicz v. Jay-Bee Oil & Gas, civil action number: 2008-C-50, Circuit Court of Ritchie County, West Virginia, Edward Hinchey, expert witness; David Carpenter, supporting expert and technical lead, 2012. Case involving alleged thermogenic methane impacts to residential drinking water well. Law firm, Baily & Wyant PLLC. Judgement for the defendant 2012.

- Edgil Roberts v. EQT, civil action, Circuit Court, Pike County Kentucky, Edward Hinchey, expert witness; David Carpenter, supporting expert and technical lead, 2013. Case involving alleged thermogenic methane impacts to residential drinking water well. Law firm Porter, Schmitt, Banks & Baldwin. Defendant represented they were not the source of alleged allegations, as such this defendant was dismissed from the case and the plaintiff settled with separate party.

- Hagey v. Equitable Production Co., et al., Civil Action No. 2:10-cv-1372 (Federal District Court for the Southern District of West Virginia), Legal matter in Jackson County, West Virginia, Edward Hinchey, expert witness; David Carpenter, supporting expert and technical lead, law firm Robinson & McElwee PLLC. Case involving alleged thermogenic methane impacts to residential drinking water well. Judgement for the defendant 2012.

- U.S. GSA v. Dick Corporation, civil action, Raleigh County, West Virginia. Served as expert witness for alleged improperly installed underground storage tank resulting in a release of off-road diesel fuel. I reviewed documents relating to the tank installation, witnessed removal of the newly installed underground storage tank, made observations that demonstrated multiple improper installation procedures that resulted in the tank failure, and prepared an expert witness report. Case settled out of court based on my findings, 1999.

James Hemme LRS, MBA, PE (WV, OH, MD)

Consulting Director, Engineer

Mr. Hemme is a Consultant Director and Professional Engineer with ERM. Mr. Hemme brings 35 years of planning engineering, permitting, and construction related services in civil and environmental engineering to the table. He has provided these services extensively throughout the United States. Mr. Hemme's background includes work with land development, mining, energy producers, linear utilities, manufacturing, chemical, oil and gas, architects, municipalities and government agencies. He is a highly experienced design engineer and brings a multi-disciplinary background to projects enabling him to provide critical issue analyses early in a project and see the "big picture" of what is needed for project completion.

EXPERIENCE: 35 years of planning, engineering, permitting, and construction related services in most aspects of civil and environmental engineering

EMAIL: james.hemme@erm.com

EDUCATION

- M.B.A., Point Park University, Pittsburgh PA, 2013
- B.S., Civil Engineering, West Virginia Institute of Technology, Montgomery WV, 1989

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Professional Engineer (PE) in West Virginia, Ohio and Maryland
- Licensed Remediation Specialist (LRS), WV
- Adjunct Professor, Marshall University 2015-2025;Solid Waste Management; Environmental Engineering; Hydrology; Groundwater; Environmental Site Assessment; Brownfields; and Environmental Regulations and Permitting.
- WVUIT Civil Engineering Advisory Committee multiple terms
- Member of WVDEP Stormwater Manual Development Advisory Subcommittee

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Site/Civil engineering design and specifications
- Impoundment/Pond design and modeling
- Stream and wetland restoration and monitoring
- Oil and Gas Pipeline and Infrastructure assessment, design and ESC permitting.
- CCR and Solid waste management planning, design and permitting.
- Mining reclamation and stabilization

KEY INDUSTRY SECTORS

- Real Estate & Land Development
- Infrastructure Development
- Mining
- Oil & Gas
- Industrial and Municipal Solid Waste Management
- Power Generation and Distribution

REPRESENTATIVE EXPERIENCE

Duck Creek Landslide WV AML Reclamation

Project manager and lead engineer for the assessment and reclamation of a slow moving landslide threatening a rural private residence and associated structures. The soil mass had progressed to less than 20 feet of the landowners propane tank and corner of the home. The source of the moving material was unconsolidated and heavily wooded spoil from a former strip bench located upgradient of the site and on adjacent property. The affected landowner had limited property for placement of excavated spoils and the cost of hauling on-road to a disposal area was cost prohibitive. James assisted AML in obtaining right-of-entry for assessment of a small surface mine less than 2 miles from the landslide that could be reached on existing haul roads. This active surface mine was undergoing reclamation at the same time. A modified grading plan was prepared for this area to show how the additional material from the landslide would assist this active ridgetop reclamation which had a soil deficit. James prepared a grading plan and associated slope stability assessment for the landslide area and for the disposal area creating a soil balance for the two locations and successfully remediating conditions at both locations.

Richard Mine Acid Mine Drainage Investigation and Treatment Alternatives Report – Morgantown, WV; for the NRCS and West Virginia Conservation Agency

Senior engineer and task manager for various components of this project. Richard Mine covers several square miles and was a pre-law mine closing in the 1950's. Water coming out of the downgradient portal results in significantly lowered pH levels below the discharge making the receiving stream void of benthic life for several miles. Services

included literature review of former mining activities, sampling of the discharge, recommendations of remedial approaches, bench scale treatment study and conducting a year long full time flow measurement program resulting in a much better understanding of the challenges and costs associated with addressing this historical legacy. Engineers Estimate of Probable Cost for construction of treatment alternatives were prepared in support of the each assessed treatment scenario.

Multiple WV Abandoned Mine Land Projects – Design and Estimating

Senior engineer for design, estimating and bidding of multiple abandoned mine land (AML) and acid mine drainage (AMD) projects in WV. Projects included pre-law mines in numerous West Virginia counties ranging from Putnam in the west to Logan in the south and Preston in the north. Projects involved extensive grading/soil balance, high wall reclamation, stormwater management, slope stabilization, stream restoration, utility relocation, revegetation plans and various other tasks. Prepared detailed Engineers estimates of probable costs for use in correlating available budget to the prepared design and for comparison of received bids.

Multiple OH AML and AMD Mine Land Projects – Design and Estimating

Project Manager and Senior engineer for layout, design and estimating of multiple abandoned mine land (AML) locations in eastern Ohio with acid mine drainage (AMD) impacts. Projects involved sizing and grading of treatment ponds with adequate retention time to drop target pollutants of concern out prior to final discharge. Services included grading of exposed highwalls and spoil mounds was performed to return to approximate original contour and direct stormwater through the proposed pond systems. When the design was complete, prepared detailed Engineers estimates of probable costs for use in correlating available budget to the prepared design.

Construction Monitoring and Management

Mr. Hemme has been Engineer of Record for dozens of engineering designs and responsible for part time or full time construction monitoring. This has included public bid advertisements, pre-bid organization, bid review and award, daily or periodic observations, quality control testing, processing requests for information, pay request review, change order negotiation, substantial completion inspections and as-built drawing preparation.

Dam Removal Alternatives Analysis and Detailed Design for CA Gold Mine

Project Manager and lead engineer for the assessment of reclamation alternatives for a large impoundment associated with gold mining activities. Alternatives were developed ranging from upgrade to meeting current dam regulations, reduction in height to non-jurisdictional status and complete removal. For each case grading scenarios and soil balance were prepared and overall access was planned. Prepared estimates of probable cost for the these alternatives and prepared a report comparing a variety of social and environmental impacts associated with each alternative to provide a summary for presentation to corporate decision makers.

CCR and Solid Waste Management Design and Permitting

Design and permitting experience for 60+ CCR, municipal and industrial solid waste facilities. Experience has included landfills, transfer stations, recycling facilities, material

recovery facilities and waste to energy facilities. Services have included all aspects of solid waste management including: programming; initial siting; conceptual design/design development; earthwork design, cut/fill balance, geotechnical investigation; slope stability; permitting; detailed design; and construction documents**.**

Dam Removal and Reclamation
Project Manager and lead engineer for the assessment and removal of two dams constructed for fresh water supply in mountainous terrain. Projects involved development of a dewatering plan, embankment lowering and restoration of the location to approximate original contours. A natural stream and wetland restoration was designed and installed on one of the locations where a jurisdictional stream was present prior to damming. Projects involved extensive earthwork and cut/fill balancing, location and design of an excess soil disposal area and overall reclamation of the former impoundments using native vegetation and woody plantings.

West Virginia Forensic Wetland and Stream Delineations, Stream Restoration/Mitigation and USEPA Region III Regulatory Consent Decree Negotiation
Mr. Hemme is Project Manager and Engineer of Record for a statewide facility review and multi-year process to support negotiations for a consent decree with USEPA regarding alleged 404 impacts under the CWA. This included internal review of several hundred facilities, management of pre-construction/forensic stream and wetland delineations, development of stream and wetland restoration plans, preparation of construction documents and construction monitoring of numerous sites. Mr. Hemme assisted legal counsel in presenting information to regulatory agencies and responding to requests for information. Services resulted in the successful negotiation of a consent decree. Engineering design and construction monitoring services continue and have resulted to date in the successful completion of restorations for almost all of the locations. The remaining sites slated for restoration were completed in 2017 and annual monitoring successfully finished in 2022 with all sites being released.

Landslide Stabilization and Stream Restoration with Emergency USACE Permit
Mr. Hemme coordinated the response team associated with the emergency investigative response and engineering design for repair of a substantial landslide that occurred in the vicinity of the Clients access road and natural gas well. The landslide affected previously mined areas and former access to those locations also. The landslide resulted in a rock and mud flow that affected numerous homes, businesses and public streets within an incorporated area in West Virginia. The project first assessed immediate response items and guidance on avoiding impact to water resources. Mr. Hemme assisted with contacting regulatory authorities having jurisdiction and in developing a step by step approach to alleviate the situation through interim measures and begin the process of reclamation and long term stabilization. Mr. Hemme assembled an engineering team to assess the cause of the landslide and design the long term repairs. A findings document was prepared for the Client relaying this finding. The repair design included stabilization measures for the mountainside so that the clients facilities could be safely reached and maintained. This work also involved the reopening of a plugged stream coming off the mountain, removal of material from other water resources and stabilizing the stream with native rock. Mr. Hemme was successfully able to negotiate this work being done under

the stream restoration nationwide permit with the USACE. The project resulted in no regulatory penalties being assessed against the Client.

Stream and Wetland Restoration Design
Mr. Hemme is Project Manager for field assessment, development of construction drawings and implementation of the design with associated construction monitoring for impacted sections of first, second and third order streams and a variety of wetlands associated with industrial and commercial activities at 26 different locations.

Stream/Wetland Delineations and RT&E Assessment

25+ Years experience in assembling and managing teams for dozens of projects for the purposes of delineating water resources recognized as waters of the United States and in investigating for the presence of Rare, Threatened and Endangered Species. As both Project Manager and Team Leader coordinated continuity between environmental and engineering teams to provide for inclusion and proper interpretation of results to promote avoidance, or when unavoidable, designing to minimize impact in the final project.

Roadway Design to National Forest Service (NFS) Standards
Project manager and provided technical direction for the development of detailed access road designs within National Forest land. Approximately 20 miles of roadway were designed to stringent NFS standards and Federal Highway Administration Rural Road standards. Road ranged from very flat to very steep terrain with dozens of stream and wetland crossings. Services also included design of mitigative measures to avoid Environmentally Sensitive Areas including waterbodies and rare, threatened and endangered (RT&E) species habitat. Roads were upgraded to allow for the safe passage of industrial construction equipment and for servicing a new industrial/commercial right of way.

Multiple Landslide Repairs and Estimating
Mr. Hemme managed and engineered the stabilization and repair of multiple landslides within steep slope and slip prone soil areas ranging in size from 20 to over 100 feet in vertical height associated with development of oil and gas facilities in mountainous rural areas. These facilities included pipelines, well pads, access roads and impoundments. Services included preparation of bid quantities and estimation of potential cost for comparison to bids received. Mr Hemme also was involved in an advisory capacity on numerous additional landslides. Landslides were assessed through visual and geotechnical investigative techniques and repairs were designed utilizing a variety of approaches.

Programmatic SPCC and GPP Audit for Mining Locations
Mr. Hemme was Project Manager leading a multi-team field exploration for a comprehensive review of spill containment and contamination assessment for petroleum related tanks at dozens of mining facilities. He was responsible for updating or

generating new SPCCs bases on the results of the field reviews and making recommendations for improvements and clean up priorities for excursions observed.

CCR Surface Impoundment Closure Plan
Project manager for a closure plan at a large power station with three large CCR surface impoundments designated for closure in place. Worked with team to develop scope of work for extensive geotechnical exploration and findings.

CCR Facility Design and Construction Monitoring
Project manager for an expansion of the CCR landfill for metal alloy plant. The facility took fly ash and bottom ash from an on-site supplemental power generating facility. Involved closure of the former unlined portions of the facility and expansion of the disposal area over a regulatory liner system. Further included a challenging process of slip lining the historic steel leachate collection line with a high HDPE pipeline and sealing off potential exfiltration points from the unlined area.

Site Development, Storm Water and Utilities
Mr. Hemme has been involved in 100+ land development projects over 30+ years. This includes large commercial development, manufacturing facilities, power sub-stations, compressor stations, distribution centers, courthouses, highways/roadways, solar arrays/BESS, maintenance buildings, corporate headquarters, subdivisions, streetscapes and business parks. This routinely involves the detailed design of trunk line water and utility extensions, new stormwater management systems, erosion and sediment controls wastewater lift stations and force main, water lines and gravity sewers. He has worked closely with Architects, Landscape Architects, Planners, Mechanical/Electrical/Plumbing Consultants, Geotechnical Consultants, Structural Engineers and Contractors. Projects also involved preparation of opinions of probable cost, technical specifications and proposed construction schedules

Linear Infrastructure Design
Mr. Hemme has performed engineering design and review of numerous linear utility mainline and service extensions. This has included potable water, irrigation water, sanitary sewers, industrial sewers, natural gas lines and overhead electric. He is an expert at stormwater management and erosion and sediment control design within narrow corridors and in the preparation of associated stormwater pollution prevention plans.

Hydrologic Assessment
Mr. Hemme has been involved in dozens of projects involving the hydrologic analysis of watersheds and associated design storms including 100 year peak flow rates and associated flood plain analysis. This work has involved the use of multiple hydrologic models and methods (TR-20, TR-55, Unit Hydrograph Method,w etc.) and stream flood plain modeling using HEC-RAS. His experience has included the design of extensive culvert systems from small pipes to large box culverts and associated hydraulic modeling using multiple methodologies.

Wastewater Treatment Plant Design and Upgrades

Engineer of record or supporting engineer for numerous wastewater treatment facilities including package plants, traditional aeration and clarification, facultative ponds and a multitude of package plants. Provided engineering, permitting and construction monitoring.

HDD River Crossing with Landowner Impacts and RT&E

Mr. Hemme provided consulting services for erosion and sediment control permitting and Section 10 and Section 404 permitting of a high-pressure gas line crossing of a jurisdictional river. During drilling, a portion of the riverbank near the boring had a localized failure and Mr. Hemme was contacted to correspond with the US Fish and Wildlife Service, WV Department of Natural Resources, and West Virginia Department of Environmental Protection regarding protection of water resources and flora and fauna species. In addition, he provided consulting and design services related to the interim stabilization of a steep bank allegedly failing as the result of the contractor's horizontal river bore crossing process for the new gas line. Mr. Hemme assembled a team to assess interim measures to stabilize the affected residential property, which was potentially threatening the house structure and main sewer line for the community. Mr. Hemme coordinated with the Client to contact regulatory authorities and obtain permission to proceed with a removal of failed soil and replacement with geotextile and rock fill. Repairs had to follow certain best management practices as known RT&E species were identified downstream of the activity. The engineering scope of services was expanded when a sink hole developed on the property. Mr. Hemme's team performed geotechnical drilling and testing and worked with a specialty geotechnical contractor to specify a Compaction Grouting technique to stabilize the soil behind the rock repair and allow the sink hole to be backfilled and stabilized. Project resulted in the successful completion of the pipeline under the river for the Client, the private residence was stabilized and affected ground has shown no further significant movement.

Numerous Landslide Repairs

Mr. Hemme managed and engineered the design of repairs for numerous landslides throughout West Virginia associated with pipelines and conventional well pad access roads. Services have included initial consultation, surveying, geotechnical exploration, engineering design, and construction meetings with contractors, preparation of bid documents, construction monitoring and documentation of repairs.

Transmission Line 24 Mile Upgrade ES&C, Access Road Improvement and Stormwater Culvert Sizing and Replacement Crossing Mining Locations

Mr. Hemme was the Engineering Manager for the preparation of permitting and design of the E&SC plans for an electric transmission line upgrade. The project included crossing active mine permits in the process of final reclamation and a formerly reclaimed AML site. Mr. Hemme assisted in the coordination with active permit holders and the AML section to establish protocols for the temporary impacts to access the location. The project involved partial reuse of existing right-of-way and partial new right-of way traversing heavily wooded and remote hillsides and ridge lines. Existing roadways were assessed by the engineering team and proposed improvements designed for compliance with ESC requirements and to allow access of the largest anticipated construction vehicles. Individual culvert analysis was performed given the large watershed areas involved and number of jurisdictional features being crossed. The Project included development of comprehensive SWPPP and Groundwater Protection Plan (GPP). The project was successfully permitted and constructed under the NPDES Construction General Permit (CGP).

Pipeline Routing, Erosion and Sediment Control Design, Construction Stormwater Permitting – Multiple States

Mr. Hemme is Engineer of Record or Senior Consultant for multiple pipeline projects in several mid-Atlantic states. Mr. Hemme worked with his team in the design and specification of ESC's through steep topography, karst terrain, slip prone soils, urban areas, interstate crossings and innumerable jurisdictional stream and wetland crossings.

Global Manufacturing Company Facility Phase 2, Soil Management Plan and Voluntary Remediation Program

Mr. Hemme managed and assisted in the preparation of a comprehensive Phase 2 Environmental Assessment for a 400+/- acre parcel in WV. The property was put into the state Voluntary Remediation Program and Mr. Hemme managed the environmental and construction monitors on location responsible for air quality monitoring, removal of soil and proper interment of the identified contaminated soils. The project involved almost 1 million cubic yards of remediated soil management and has successfully completed the VRP process. The site was formerly an apple orchard impacted by anthropogenic arsenic from former pesticide use. Services included a Sampling and Analysis plan (SAP), Remedial Action Work Plan (RAWP) and Soil Management Plan (SMP).

Stream Restoration Annual Monitoring

Responsible for assembling monitoring teams and managing annual stream/wetland monitoring for projects where construction is complete. Monitoring is required for 5 years after completion of construction and maintenance issues must be identified and addressed in the first three years of monitoring to keep projects on track to meet metrics at the end of year five. Mr. Hemme has successfully brought multiple locations to completion through this process through either meeting all metrics or negotiating variances based upon field data obtained during monitoring.

Chemical Facility – Permitting Matrix and Schedule Summary Report

Project manager for a complex CAPX project involving multimedia permitting for both environmental and non-environmental aspects of the project. Municipal solid waste, residual waste and hazardous waste regulatory compliance requirements were specifically researched for the proposed facility and recommendations for timing of applications, contents and liabilities presented to the client. An estimated schedule for receipt of required permits was then developed for tracking project development.

Horizontal Well and Freshwater Impoundment Design

Mr. Hemme has managed and been involved in the engineering and/or environmental assessment and delineations for over 200 facilities related to both new and existing horizontal multiple well pads and associated freshwater impoundments, midstream pipelines and access roads. This has included new construction, site modifications, slide repairs, road widening and state/local permitting. By coordination of environmental reviews with design staff, water resources avoidance was promoted typically resulting in minimal or no USACE and state water resource permitting being required improving construction schedules.

Tanner McCallister, MBA, P.E.

Senior Consultant

Tanner is a civil engineer with experience in daily production tracking, financial forecasting, and creating new construction processes. He has worked on a variety of construction projects in the Mid-Atlantic area. His experience includes executing purchase orders and change orders, performing equipment utilization analyses, job costing review, and submittal review. He has worked on large scale earthwork projects, waterline installation projects, sewer line installation projects, remediation projects, stormwater management projects, and various environmental compliance projects. These projects have helped create a baseline of understanding some construction tools like surveying, installing BMPs, critical path method schedules, JSAs, constructability calculations, and overall regulatory compliance. Since joining ERM, Tanner's main focus has consisted of earthwork grading, stormwater design, constructability field reviews, environmental compliance reviews, environmental inspections, construction oversight, and various field work opportunities.

EXPERIENCE: 6 years' experience in construction industry

LINKEDIN: https://www.linkedin.com/in/tanner-mccallister-917230a1/

EMAIL: tanner.mccallister@erm.com

EDUCATION

- MS. Business Administration
  West Virginia University, USA, 2019
- BS. Civil Engineering,
- West Virginia University, USA, 2018

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Registered Professional Engineer – Civil, WV
- 40 Hour HAZWOPER

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Earthwork Grading and Stormwater Management Design
- Construction oversight
- Material submittal review
- Confined spaces
- Private utility locate
- ES&C Plans
- AutoCAD drafting
- WV and KY Environmental inspections

KEY INDUSTRY SECTORS

KEY PROJECTS

Earthwork project for manufacturing facility

Managed daily activity reports on a large scale earthwork project that involved installing utilities, blasting operations, and crushing operations in West Virginia. Provided oversight on contract agreements and reviewed material submittal correspondence. Assisted in job cost review processes as well as performed time and material billing. Reviewed monthly safety submittals, completed daily JSAs, and finalized SDS book for onsite materials.

Environmental Inspections

Performed environmental inspections based on stormwater pollution prevention plan (SWPPP) design for linear utility projects. Projects have included linear right-of-way and station work. Understanding off-road driving and maneuvering through active construction have been critical to performing safe inspections. Active construction monitored consisted of culvert installation, road installation, concrete work, transmission pole or pipeline installation, drilling activities, mass grading activities, erosion and sediment control bmp installation, temporary and permanent seeding, slip repair, chain link fence installation, and retaining wall installation.

Contractor Compliance

Assisted on reviewing contractor submittals, daily field reports, and project correspondence to ensure compliance with ERM and regulatory requirements stated on project plan sheets.

Stormwater Investigation for Chemical Manufacturers

Project involved multiple phases of work including preliminary survey, camera scoping work, and stormwater design. Worked as ERM representative in the field overseeing ERM and client subcontracted work. Provided multiple reports and updated plan sheets to ensure client had most up to date information. Participated in the health and safety procedures necessary for confined space entry. Completed stormwater calculations using Win TR-55 and ArcMap. Used AutoCAD to draft stormwater plan set.

ES&C Plans and Construction Conformance

Reviewed contractor submittal information to ensure on site construction activities adhered to site plans provided by ERM. Items that were reviewed to ensure regulatory and design compliance included material submittal information, construction design documentation, laboratory testing reports, gradation reports, as-built reports, and daily field reports.

Access Road Constructability Review

Reviewed proposed access roads through forested terrain to determine feasibility. Documented existing drainage conditions, existing utility lines, and stormwater structures to be used to create an erosion and sediment control plan.

Safety Oversight for Interim Remedial Action Work Plan

Provided daily safety oversight for construction activities including tree felling, clearing, chipping, subsurface clearance, erosion and sediment control installation, earthwork operations, chain link fence installation, and concrete pouring.

Coal Combustion Residual (CCR) Disposal Facility Inspections

Conducted multiple federal regulatory CCR annual inspections including visual constructability observations, documentation review, calculations, and overall compliance. Completed for power generation landfill, impoundments and ancillary facilities.

Client AST Review

Performed multiple desktop reviews for documentation associated with AST certifications and recertifications to be compliant with West Virginia Department of Environmental Protection regulations.

Groundwater Sampling

Surveyed piezometer locations using rover and base station equipment to obtain accurate GPS locations. Monitored site conditions and obtained water level data from piezometers.

ES&C Plans

Completed erosion and sediment control plans for a variety of clients, but mainly TC Energy, in West Virginia, Virginia, Ohio, and Kentucky. Worked in AGOL on the design and AutoCAD for drafting sheets depending on what was needed for each project. Coordinated with GIS personnel, drafters, professional engineers, and project managers to meet deadlines. Performed initial review on projects prior to professional engineer review.

Hydrologic Reports

Completed hydrologic analyses used in reports for various clients such as TC Energy and AEP. Reports are created using various software to determine different aspects of the client's final report. Previously utilized Win TR-55, AutoCAD, ArcGIS, Microsoft Word, and Microsoft Excel to provide the final deliverable.

Luis Velasquez

Consultant – Engineering

Luis Velasquez started his career with ERM in 2018 in the Charleston, West Virginia office where he currently serves as an Engineering Consultant. Luis has over eight years of experience in civil, environmental, and geotechnical engineering projects across the US. Luis has experience in civil and environmental design, geotechnical exploration, environmental remediation, industrial permitting, and construction monitoring.

EXPERIENCE: Over eight years of experience as Engineer, Consultant, and Field Technician in large-scale civil, environmental, and geotechnical engineering projects.

EMAIL: Luis.Velasquez@erm.com

EDUCATION

- B.S. Geological Engineering
  University of Alaska, USA, 2017.

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Professional Engineer (PE) - WV#27535
- Member of Association of Environmental and Engineering Geologists (AEG)
- OSHA 40-Hr HAZWOPER
- First Aid/CPR/AED

LANGUAGES

- English & Spanish

FIELDS OF COMPETENCE

- Civil & environmental design
- Geotechnical exploration
- Environmental remediation
- Industrial permitting
- Construction monitoring

KEY INDUSTRY SECTORS

- Civil
- Environmental
- Geotechnical
- Manufacturing
- Mining
- Oil & Gas

KEY PROJECTS

Environmental Inspections for Power Transmission Construction Project Sites in KY.
Worked as environmental inspector for multiple power transmission construction projects. Conducted weekly inspections of site construction and environmental controls. Collaborated with client and contractors in assessment of environmental controls and implementation of alternative measures to protect local waters and comply with state permitting requirements.

Erosion & Sediment Control Plan Design for Gas Line Construction Project Sites in OH.
Worked as designer of Erosion & Sediment Control (ESC) Plans for multiple gas line maintenance and new construction projects. Designed ESC Plans by evaluating site setting, proposed construction scope, and state regulations.

Oversight of Environmental Remediation Operations at Rural Project Sites in WV.
Monitored site restoration efforts at multiple remote project sites as part of remediation plan for former oil/gas production project. Conducted site inspections and assessed environmental impacts. Oversaw completion of restoration activities and installation of proper controls.

Access Road Design for Interstate Pipeline Project in WV, VA, and NC.
Worked as designer for pipeline access roads. Conducted water quality and quantity analysis as part of road impact assessment on environmentally sensitive region. Conducted hydrologic data analysis for design of drainage structures and erosion and sediment controls.

Site Civil Design for Power Generation Stations in NC.
Worked as designer on Coal Combustion Residuals (CCR) remediation development plans for power generation stations. Conducted stormwater management hydrologic analysis associated with proposed site improvements. Developed construction plan drafts and details associated with proposed remediation developments and site construction access.

Environmental Health & Safety Plan Drafting for Multiple Manufacturing Facilities in WV.
Worked as drafter of Emergency Response Plans, including Stormwater Pollution Prevention Plan (SWPPP), Spill Prevention, Control & Countermeasures Plan (SPCC), and Groundwater Protection Plan (GPP), for various clients in the manufacturing industry. Conducted facility inspections and drafted updates to Emergency Response Plans encompassing applicable state and federal regulations.

Geotechnical Explorations for Solar Development in PA & NJ.
Worked as field engineer and project lead in multiple geotechnical explorations for solar site development. Oversaw geotechnical drilling and excavation activities in the field. Prepared geotechnical reports based on review and analysis of site conditions, site history, geotechnical exploration logs, and geotechnical laboratory testing.

Geotechnical Exploration & Slope Stability Analysis for Impoundment in CA.
Worked as project geotechnical engineer in geotechnical exploration and stability assessment of earthen impoundment. Oversaw exploration plan and geotechnical drilling procedures conducted by field team. Prepared geotechnical report including slope stability analysis based on site conditions, history, exploration findings, laboratory testing, and engineering analysis.

CPT/SPT Survey at Bottom-Ash Pond for Power Plant Client in OH.
Worked as field engineer for depositional profile investigation of bottom-ash pond. Documented Cone Penetration Test (CPT) and Standard Penetration Test (SPT) surveys across bottom-ash pond. Collaborated with drilling crew on real-time interpretation of geotechnical survey results. Conducted soil/ash logging/sampling for geotechnical and chemical analysis. Coordinated multiple contractors for safe drilling operations on land and water.

Monitoring Well Installations for Power Plant Client in OH.
Worked as field engineer documenting monitoring well abandonment and new installations as part of groundwater quality monitoring program. Oversaw drilling operations and performed rock core analysis for identification of target formations and understanding of local hydrogeologic conditions.

Monitoring Well Installations for Developing Mining Site in MN.
Worked as field engineer documenting winter drilling operations for open-pit mine project development. Oversaw drilling operations and conducted field logging/sampling of rock core and drilled cuttings. Served as on-site coordinator and safety officer for overall site development operations.

Vapor Intrusion Mitigation System Installation Oversight in DE.
Worked as construction inspector for installation of a Vapor Intrusion Mitigation System (VIMS) as part of a foundation construction for a large-scale commercial facility. Oversaw daily installation of VIMS components including underground venting system and multi-layer vapor barrier. Performed QA/QC testing of vapor barrier and oversaw performance during concrete foundation pour.

Secondary Containment Construction Monitoring in VA.
Worked as construction monitor for secondary containment structure construction at manufacturing facility. Monitored construction operations, subsurface clearance procedures, excavation, material testing, and decontamination procedures. Served as field safety officer, ensuring safe working practices by all contractors involved.

Spencer Reynolds,

Senior Specialist, CAD/Graphic Design

Mr. Reynolds has more than 8 years of experience at ERM providing drafting and technical drawing services. I follow the appropriate/applicable design/drafting standards. Produce maps from topographic data and survey field notes. Develop and maintain base files for information used to complete environmental and facility designs. I ensure technical quality of developed designs. Research and compile publicly available data (imagery, topography, parcel, existing utilities, etc.) and convert into Civil 3D CAD compatible files. Review survey data to identify missing information or inconsistent data. Format survey data in accordance with provided design/drafting standards. Evaluate and recommend hardware/software as well as procedures to enable the team to work more efficiently. I provide quality and timely design drafting support for projects as well as engineering and design standards. I provide support, guidance, and quality control for 3rd party survey and design. I have over five years of experience associated with mine land sites, various National Pollution Discharge Elimination System (NPDES) permits, remediation and environmental site assessment projects. Abandoned Mine Land (AML) environmental and feasibility studies, Surface Mining Control and Reclamation Act (SMCRA) permitting support, Incidental Boundary Revision (IBRs) support, coal refuse impoundment drafting & design. Prepared various drawings for permit

applications, including site location maps, site boundary maps, haul road maps, drainage control maps, grading plans, environmental database findings overlay, landuse plans, geologic and hydrogeologic plans, incidental boundary revisions (IBRs) plans, and blasting maps.

EXPERIENCE: 7 years' experience in Drafting/Design - Pipeline Designer in the Oil and Gas industry. 8 years' experience in drafting and technical drawing services for but not limited to remediation and environmental site assessment projects.

LINKEDIN: https://www.linkedin.com/in/spencer-reynolds-78793a65/

EMAIL: spencer.reynolds@erm.com

EDUCATION

- Associate's degree. Applied Science, West Virginia State University, 2008
- Computer-Aided Drafting (CAD) and Design Skill Set Certificate

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Autodesk AutoCAD & Autodesk Software
- ESRI ArcGIS Desktop, ArcGIS Pro, ArcGIS Online
- MicroStation & Microsoft Suite
- Civil and Structural Design (Civil 3D, Map 3D, AEC)
- Contractor Oversight
- Construction Quality Assurance
- Various Permit Application Support

KEY INDUSTRY SECTORS

- Mining
- Chemical Manufacturing
- Oil & Gas
- Commercial and Industrial

HONORS AND AWARDS

- Graduated with honors
- Dean's List

- Multiple ERM Spot Bonus Awards

KEY PROJECTS

Channel Grading Plans

Utilize several surfaces to create Channel Grading Plan for a large client. Compile and/or Model 3D surfaces repressing various engineering features such as graded terrain, waterways, wetlands, roads, railroads, etc. Prepare conceptual plans and figures for proposals, reports and/or presentations. I work closely with various engineering and environmental staff to meet the engineering design and drafting needs for our clients. I demonstrate Health, Safety, Security and Environmental (HSSE) excellence, including complying with the various guidelines,

Solar Farm Creation

Utilized PVCADMega. Utilized several surfaces to create a Solar Array Farm for a large client. Prepare engineering plans, profiles, sections and details for design, tender, construction drawing sets for environmental compliance and associated infrastructure as directed by the PE.

Landfill Designs

Utilize several surfaces to create Channel Grading Plan for a large client. He has prepared various drawings for permit applications, including site location maps, site boundary maps, haul road maps, drainage control maps, grading plans, environmental database findings overlay, land use plans, geologic and hydrogeological plans, incidental boundary revisions (IBRs) plans, and blasting maps.

Watermain Maintenance Designs

Utilize Survey, Client provided information and imagery to create watermain replacement. Prepare engineering plans, profiles, sections and details for design, tender, construction drawing sets for environmental compliance and associated infrastructure as directed by the PE. I provide support, guidance, and quality control for 3rd party survey and design.

Phase I and Phase II ESA Support, Boy Scouts of America, Mount Hope, WV

Used and manipulated several different software programs to place and find mine portals, ponds, open dumps, gas wells, refuse pile areas, and mine drainage areas. Overlayed historical mine maps to find mine portals.

Produced multiple drawings to support a Phase I and Phase II ESA of a 12,000 acre + tract of former mine land in West Virginia. The property included both pre-SMCRA and post-SMCRA coal mining activities. The property was widely underground, surface, and area mined. Outlined pre-SMCRA and post-SMCRA mining activities and site features on a series of drawings. Site features included former tipples, rail spurs, and coal handling areas. Multiple image source files were researched such as U.S. Geological Survey, Google Earth, and state and federal government databases in order to develop historical operations drawings. Further these image files and data were used to identify and map potential problem areas prior to conducting a week long field reconnaissance.

Hydrogeological Plans, New Jersey, Confidential Client

Developed hydrogeological cross-section maps, site plans, site location maps, and other associated drawings.

Technical Drawing Support, New Jersey, Rockwell

Developed several technical drawings and prepared analytical results maps for both groundwater and soil.

Sampling and Analysis Plan Support, South Charleston, West Virginia, FMC

Prepared various drawings in support of Sampling and Analysis Plans (SAP), Site Characterization Reports (SCR), Remedial Action Work Plans (RAWP), Final Reports, and Semi-Annual Long-Term Monitoring (LTM) reports. Groundwater analytical results and potentiometric flow maps for the former FMC Peroxide Plant and Former FMC East Plant in South Charleston

Soil Boring Sample Reports and Tables, New Jersey, Consolidated Containers

Prepared soil boring sampling reports and analytical tables. Developed an engineering controls detail map, and detailed hydrogeological cross-section map.

Site Investigation and Remediation (SIR)

Assisted with supervision and coordination of SIR activities for waste sites involving retail and bulk petroleum, chemical manufacturing and industrial facilities, underground storage tank sites, oil/fuel spill sites, VRP sites, LUST, CERCLA, and RCRA. Also assisted in coordinating field investigation activities, soil and ground water sampling, monitoring well instillations, and Free Product Recovery.

Drawing Support, Princeton University, New Jersey

Prepared detailed drawings to support the preparation of a Spill Prevention Control and Countermeasure (SPCC) plan for Princeton University.

FMC – South Charleston, West Virginia

Prepared various drawings in support of Sampling and Analysis Plans (SAP), Site Characterization Reports (SCR), Remedial Action Work Plans (RAWP), Final Reports and Semi-Annual Long-Term Monitoring (LTM) reports. groundwater analytical results and potentiometric flow maps for the former FMC Peroxide Plant and Former FMC East Plant in South Charleston.

FMC – Avtex, Front Royal, Virginia

Supported a large-scale low flow ground water sampling event. Tasks included gauging monitoring wells, set-up of low flow groundwater sampling equipment, water quality meter calibration, collection of water quality readings, sample collection and documentation, sample preparation, equipment decontamination, quality control sample collection and preparation of a daily field log.

Channel Grading Plans

Utilize several surfaces to create Cahnnel Grading Plan for a large client.

Solar Farm Creation

Utilized PVCADMega. Utilized several surfaces to create a Solar Array Farm for a large client.

Landfill Designs
Utilize several surfaces to create Cahnnel Grading Plan for a large client.

Watermain Maintenance Designs
Utilize Survey, Client provided information and imagery to create watermain replacement.

Australian landfill project
Worked with the PM to get the grading correct.

Geothermal Grading Project out west
Utilize several surfaces to create roads and geothermal plumes plan for a large client.

Clayton Calmindon
Environmental Consultant, Geology

Clayton has over 10 years' experience as a geologist and environmental scientist. Clayton has experience in environmental, geotechnical, civil engineering, transportation, federal/state projects, and construction management projects. Clayton has over 8 years of relevant experience in Wetland and Stream Delineations, Monitoring, Reporting and Permitting (Section 404 Nationwide permitting & WVDEP Water Quality Certifications); NEPA Environmental Assessments; WVVRP & UECA QAPP, HASP, Site Assessment Work Plans, Site Characterizations, Site Remediation; Phase I and Phase II Environmental Site Assessments; Groundwater Monitoring, Sampling, & Modeling; Contamination Site Management; GIS Analyst; Geotechnical Foundation Investigations, Slope Investigations, Highway Bench Recommendations, Geotechnical management for key transportation projects; and Construction Management for NPS.

EXPERIENCE: 10 years of providing Environmental Clearance, Remediation, Wetland Delineation, Geotechnical, and Construction Management consulting services.

EMAIL: clayton.calmindon@erm.com

EDUCATION

- M.S. Physical and Applied Science with Emphasis in Geology and Geo-biophysical Modeling, Marshall University, USA, 2017
- Graduate Certification Geospatial Information Systems, Marshall University, USA, 2016
- B.S. Geology, Marshall University, USA, 2013

CERTIFICATIONS

- *OSHA 40-Hr HAZWOPER Training*
- *OSHA 30-Hr Construction*
- *OSHA 10-Hr Construction*
- *Safeland Training*, Petroleum Education Council, 2016
- *CPR/First Aid/AED Training,* American Red Cross, 2021
- West Virginia Department of Transportation (WVDOT) Transportation Engineering Technician (TRET) Level 4
- ERM High Risk Field Safety Officer (HRFSO)
- ERM Subsurface Clearance Experienced Person (SSCEP)
- APNGA Portable Nuclear Gauge Safety & U.S.D.O.T Hazmat Certification

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Environmental Technical Reporting, Permitting and Compliance
- Wetland and Stream Delineation, Monitoring, Reporting and Permitting
- Environmental Characterizations
- NEPA Environmental Assessments
- ArcMap GIS Drafting and Data Analysis
- Geotechnical Investigations
- Construction Management
- Environmental, Geotechnical, and Construction Inspections

KEY INDUSTRY SECTORS

- Energy – Oil & Gas, Solar
- Design and Development
- Chemical
- Environmental
- Federal
- Manufacturing
- Construction
- Geotechnical

KEY PROJECTS

Wetland, Waters of the US Delineation, Endangered Species, Permitting, Compensatory Mitigation

Provided and conducted Wetland-Aquatic Resource Reports/Waters of the US delineations with associated field investigations and reporting per USACE and WVDEP specifications. The latter was conducted for numerous federal, state, and private development clients. Prepared Nationwide Permits, Individual 404 Permits to Army Corps of Engineers, WV 401 Water Quality Certification, WV 401 permitting - Compensatory Mitigation Plans and Alternative Analysis Plans.

Writing and Conducting full NEPA Environmental Assessments

Acted as lead and head writer for full NEPA EAs and various categorical exclusions. Performed site environmental assessment, research, and reporting to determine environmental impacts associated with biodiversity-endangered and threatened species, wetlands and aquatic resources, history and cultural/archeological resources, air and water quality, traffic, public health and safety, hazardous materials, land use, floodplain encroachment, socioeconomic impacts, noise pollution, public services and utilities, and held public meetings/comments. NEPA Assessments conducted for various Federal Agencies.

West Virginia Voluntary Remediation Program (WVVRP)

Conducted Quality Assurance Project Plans, Health and Safety Plans, Site Assessment Work Plans, Site Characterizations, Continued Monitoring, and Remedial Action Plans in coordination with WVDEP. Site Characterizations including but not limited to: well installation, surface and subsurface soil sampling, groundwater sampling and monitoring, aquifer testing, Vapor Intrusion Assessments/Sampling, report writing/data analysis, and GIS mapping/modeling.

Phase I (60+), Phase II, and Phase III Environmental Site Assessments (ESA)

Performed site visits, historic research, and prepared technical reports for over 60 Phase I ESAs and over 30 Limited Environmental Due Diligence Transaction Screen Questionnaires. Performed various Phase II site assessments in order to characterize the extent, if any, of contamination

for groundwater and subsurface /surface soils. Performed various remediation activities typically associated with US Brownfields, UST, and/or Oil & Gas sites.

Groundwater Monitoring, Sampling, & Modeling, Monitoring Well Installation, Soil Sampling, and Vapor Intrusion Installation/Sampling

Performed groundwater activities for various sites as part of Phase II, Brownfields, NPDES, WVVRP, and UECA investigations. Aquifer Testing, GIS Groundwater and Soil Modeling Groundwater Sampling, Soil Sampling, oversight of various drilling methods, Monitoring Well Installation, Vapor Pin Installation, Sampling, and technical reporting.

Construction Management Representative NPS

Construction Management Representative for National Park Services at various locations. Responsibilities include direct oversight of construction activities, inspection, conducting weekly meetings, oversight of RFIs and RFPs, and direct coordination with Denver Service Center.

Environmental and Geotechnical Inspection

Provide oversight and QA/QC inspection of various facets of construction activities and procedures that include but are not limited to: compaction testing and reporting, daily inspection reports, conformance to design specifications, provide environmental erosional inspections, recommendations for construction grading activities, and Construction Management of key geotechnical engineering slope remediation projects for Oil and Gas Clients.

GIS Analysis

Extensive experience utilizing ArcGIS for various applications in the consulting industry and lead GIS analysis for Terradon Corporation. Mapping streams, points, tanks, etc., modeling environmental soil and groundwater contamination using 3D methods, creating cross sections, mapping contaminated groundwater migration, mapping and storage for public water municipalities, Indiana Bat Habitat Analyses and Conservation Plans, GIS for SPCC and SWPP. GIS use for private, state, and federal developmental clients to determine potential developable areas by various key aspects. Created aesthetically pleasing trail maps for various trail systems in West Virginia for differing municipalities.

Geotechnical Investigations

Project lead for various geotechnical drilling projects for both state and private clients. Responsibilities include: proposal writing, management, and associated coordination. In field oversight of soil and core drilling activities while noting soil and rock classification, Standard Penetration Test, Percolation Testing, and other properties per engineering guidelines. Experience with geotechnical QA/QC during construction phase for earthwork compaction utilizing a Nuclear Gauge to determine density and moisture parameters of material being used. Direct oversight of Failed Slope Repair for Oil and Gas clients as per geotechnical guidelines.

Provide Cut Slope Design Classification recommendations based off of lithology/ core sampling and compressive strength testing for various transportation projects.

West Virginia Department of Transportation (WVDOT) Transportation Engineering Technician (TRET) Level 4

Acted as a Level 4 TRET inspector for the 2019-2021 US Interstate I70 bridge rehabilitation project. Responsibilities for the project included acting as Quality Control for the WVDOH with coordination of WVDOH Quality Assurance representatives, inspecting contractor's work per WVDOH Specifications, coordinating with foreman each day, daily report writing and documentation, drawings-calculations-estimates, record contractor time and equipment, and report billable tasks completed for sixteen bridges at various stages.

SPCC and SWPP Plans

Conduct report writing, coordination with municipalities, state and federal agencies, and GIS analysis.

Elyse Johnston

Consulting Senior Associate, Scientist, Biologist - Impact Assessment

Elyse Johnston is a soil, biological, and environmental scientist with over five years of experience who is actively pursuing additional wildlife biological experience, namely with bat biology. Since 2020, Elyse has been an Environmental Consultant for data centers in Virginia, with a focus on site due diligence, permitting, construction, and compliance. She has extensive experience in executing wetlands delineations and wetlands Section 404 permitting. Elyse has conducted numerous wildlife-related surveys, including bat presence/absence, habitat assessment, soil stability, vegetation communities, invertebrate host plants, and herpetology.

EXPERIENCE: 6+ years' experience in analytical soil science, 3+ years' experience in environmental due diligence, delineating, permitting, and compliance, 2+ year of experience with wildlife surveys

LINKEDIN: https://www.linkedin.com/in/elyse-johnston-5a26a119b/

EMAIL: elyse.johnston@erm.com

EDUCATION

- BS. Crop and Soil Environmental Science, Virginia Polytechnic Institute and State University, USA, 2019

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- ESIN2091
- SWIN2248
- OSHA 40-Hr HAZWOPER Training
- MSHA 24-Hr Surface Miner Training

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Wetlands delineations and reporting
- Environmental permitting and compliance
- Site due diligence and feasibility
- Soil science & sampling
- Bat biology (mist netting, acoustics, habitat)
- Wildlife surveying & assessments
- Ecological surveying & assessments
- Biological baseline surveys
- Phase I & II environmental site assessments
- Erosion & sediment control
- Storm-water management
- Technical writing & editing
- Analytical data screening
- GIS (ArcMap)
- Autodesk AutoCAD (Civil)
- Trimble GPS devices

KEY INDUSTRY SECTORS

- Data centers
- Government
- Oil & gas
- Power & transmission
- Renewables (solar, wind)
- Mining

KEY PROJECTS

Renewable Energy Development, VA, WV, OH, NY, PA, KY, MD

Field technician as a wetland and waterbody delineator for both solar and wind energy clients, per the Regional Supplements (including Atlantic & Gulf Coast Supplement and Eastern Mountains & Piedmont Supplement) to the US Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual. Developed permits (JPA, NWP, IP), complete jurisdictional determination reports as well as critical issues analyses. Also acted as a wetland "re-flagger," to assist in initiating construction on both wind farm itself and its transmission line in upstate New York.

Natural Gas Pipeline Development, VA, WV

Field technician as a wetland and waterbody delineator in the Coastal Plain of VA and in WV for replacement efforts of linear pipeline projects and their associated transmission/utility lines and access roads, per the Regional Supplements (including Atlantic & Gulf Coast Supplement and

Eastern Mountains & Piedmont Supplement) to the US Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual. Developed permits (JPA, NWP, IP, VMRC), complete jurisdictional determination reports as well as critical issues analyses.

Environmental Auditor (Stream Biological Conditions), Natural Gas Pipeline Development for Confidential Client, WV

Environmental auditor/monitor for active construction of a 42" diameter natural gas pipeline, maintaining client's 'in-compliance' status when working within/adjacent to biological resources (i.e., streams, wetlands, and their associated resources) as per the Restoration Work Plan of the Confidential Client's Comprehensive Stream and Wetland Monitoring, Restoration and Mitigation Framework.

Data Center Development, VA

Lead team member (in-field consultant, wetlands delineator and permitter, ESIN/SWIN) for evaluating existing environmental programs with identification of tasks, risks, and mitigation. Wetland monitor and ESIN/SWIN for assisting client with maintaining due diligence and compliance throughout active construction. Team member for developing a regional wetlands mitigation solution, with synergized community and sustainability aspects.

Wetlands Monitoring & Compliance, VA

Lead consultant for monitoring impacts to wetlands onsite at an active construction site (data centers) in central Virginia. Inspects numerous sites once a month for compliance and advises and facilitates remediation. Performs regulatory reports, correspondence and coordination throughout entire project planning, design, and implementation process with the proper regulatory agencies.

Soil Management Plan, MD

Formulated a soil management plan to document management procedures to be followed by the client for potentially contaminated soil and rock matter (i.e., potentially containing acid sulfate/acid mine drainage) which may remain onsite.

Terrasond Guyana Shore-to-Coast Pipeline Development, GUY

Soil and groundwater data analyst, screening analytical data's nutrient, pesticide, herbicide, polychlorinated biphenyl, heavy metals, volatile organic compound and semi-volatile organic compound contents, as well as productivity, pH, total organic carbon, and specific conductivity, where applicable.

Confidential Mine Project, NV

Lead field biologist (managing a crew of 6 people) for conducting long-term baseline biological field surveys for an existing mine in NV in the remote Mojave Desert, including, but not limited to, vegetation community, soil stability, special status plants, invertebrate host plants, desert tortoise, herpetology, and noxious plants/weeds.

Confidential Project

Field biologist for conducting long-term baseline biological field surveys in the remote Mojave Desert, including, but not limited to, vegetation community, soil stability, special status plants,

invertebrate host plants, desert tortoise, and habitat mapping. Enlisted to help with drafting Biological Baseline Report, specifically the soil stability and vegetation community sections.

Mist Netting Bat Surveys, WV, NC, TN, VA

As a biological technician, conducted presence/probable absence pre-construction mist-net surveys for proposed linear pipeline clients in West Virginia, a power station site in VA, and for a proposed non-linear, renewable client in NC. Handled adult and juvenile Tri-colored (*Perimyotis subflavus*), Evening (*Nycticeius humeralis*), Silver-haired (*Lasionycteris noctivagans*), Eastern red (*Lasirius borealis*), and Big brown (*Eptesicus fuscus*) bats; collected data; set up and broke down triple-high net sets; designed, engineered, and manufactured single-high net sets. Performed end-of-year reporting.

Acoustic Bat Surveys, VA

Lead biologist for a proposed solar development for a transmission/utility line in VA. Additionally deployed acoustic detectors and collected data for a linear transmission project and a non-linear renewable project. Maintained acoustic units (SM4 detectors), monitored battery levels, organized data, and conducted maintenance as needed.

Bat PRT Habitat Assessment Surveys, WV

As a lead field biologist, assessed potential roost tree (PRT) suitability, specifically for the federally endangered Indiana bat (*Myotis sodalis*) and Northern Long-eared bat (*Myotis septentrionalis*) on proposed solar sites. Managed collected data, including QAQC and data analysis. Produced the deliverable survey report.

Wildlife Resource Surveys, ID

Lead field biologist for conducting biological amphibian surveys on a historic underground and open-pit mining/timbering site in compliance with the Visual Encounter Survey (VES) for Amphibians Standards. Aided in the development of an open-pit gold and silver mining operation in the Owyhee Mountains, ID. Performed wildlife resource surveys to determine species presence and spearheaded data collection to aid in further mine design & National Environmental Policy Act (NEPA) analysis.

Phase I Environmental Site Assessments, VA, PA, KY, WV

Phase I Environmental Site Assessor, namely to assist with continued data center, pipeline, and renewable energy developments; has also performed site assessments on landfill-adjacent sites. Performed soil sampling to analyze for the following: RCRA 8 Metals (US EPA 6010), VOCs (USEPA 8260B), total petroleum hydrocarbons (TPH)-diesel range organics (DRO) and TPH-gas range organics (GRO) compounds (US EPA 8015B).

Red Spruce Vegetation Monitoring, WV

Conducted post-construction monitoring of planted red spruce (*Picea rubens*) to aid in mitigation efforts for a linear pipeline in the Allegheny Mountains.

Threatened & Endangered Species, Habitat Assessments, VA, NV, WV, PA, KY, NC

Performed desktop suitable habitat assessments for Rafinesque's big-eared bat (*Corynorhinus rafinesquii)* & Timber rattlesnake (*Crotalus horridus*) for a linear pipeline project in VA. Performed numerous surveys across the country assessing and classifying generic habitat conditions, as well as suitable habitat for other threatened & endangered species.

KEY PROJECTS PRIOR TO JOINING ERM

Mountain Valley Pipeline Soil Analyses at Virginia Tech, VA

Lab and field assistant in Dr. W. Lee Daniels' soil rehabilitation analytical lab (focusing on soil genesis, soil fertility and water quality) at Virginia Tech's School of Plant and Environmental Sciences. Focused on land reclamation and wetlands restoration, with a particular emphasis on offering guidance on reclamation of acid sulfate soils and subsequent acidic, metal-laden surface runoff. Subcontracted by MVP to perform soil testing. Prepared (sieved and ground), maintained, and tested numerous soil/water samples at a time. Performed basic soil characterizations, including but not limited to: carbon to nitrogen (combustion) analysis, sulfur analysis, particle size analysis (PSA), cation exchange capacity (CEC) analysis, pH analysis, electrical conductivity analysis, water holding capacity, bulk density analysis, nutrient and lime amendment recommendations, as well as peroxide potential analysis, calcium carbonate equivalency, total metals (microwave digestion), and extractable nitrogen. Performed total dissolved solids (TDS), nitrate, ammonium, ortho-phosphate (cations and oxyanions) and dissolved organic carbon (DOC) analyses of water samples. Regulated health and safety procedures within the lab as well as cleanliness of lab itself.

Data Center Development, VA

Team member of AE site due diligence teams in region on 5 sites, which included wetlands delineation, threatened and endangered species review, cultural resources Phase IA, compensatory mitigation, site planning, and project management. As sites gained signal, developed section 404 wetlands permit applications with submission and approval, which included delivering a Permitee Responsible Mitigation (PRM) solution. Following permit issuance, worked with General Contractor and site teams to conduct weekly SWPPP inspections and reporting as well as monthly wetlands monitoring and compliance inspections. Performed regulatory correspondence and coordination throughout entire project planning, design, and implementation process.

Mecklenburg County Public School Campus Development, VA

Conducted wetlands delineation and section 404 wetlands permitting for a multi-school consolidated campus for Mecklenburg County. Worked directly under project manager for cultural resource study efforts, which included the extraction of resources within proposed building footprint. Conducted wetlands compliance inspection and reporting, which included team collaboration and coordination amongst contractors and teams.

Michael Eisen, PE, MBA

Associate Partner, Engineer

Mike is an Associate Partner at ERM located in Pittsburgh, PA and based in the Civil Engineering Sector. Mike is a focused, business-driven civil engineering project manager with 18 years of experience in traditional land development and various types of energy projects. Mike's diverse background includes work with energy producers, oil and gas production, linear utilities, architects, mechanical/electrical/plumbing subconsultants, fire marshals, municipalities, and state government agencies. A Registered Professional Engineer in six states, Mike's professional experience has entailed a diverse set of project management and control tools, as well as a wide variety of software – focusing on client satisfaction and project success.

EXPERIENCE: 18 years' experience in civil engineering design, permitting, and project management for land development projects.

EMAIL: Mike.Eisen@erm.com

EDUCATION

- MBA, Master of Business Administration (Management), Point Park University, 2019
- BS, Civil and Environmental Engineering (Mathematics Minor), Lafayette College, 2007

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Professional Engineer State of West Virginia – License No. 022092
- Professional Engineer State of Pennsylvania – License No. PE081465
- Professional Engineer State of Illinois – License No. 062068930
- Professional Engineer State of Missouri – License No. 2017006934
- Professional Engineer State of New Jersey – License No. 24GE05000500
- Professional Engineer State of Ohio – License No. PE.81556

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Civil Engineering Land Development, Building Permits, and Construction Administration Services
- Oil and Gas and Infrastructure Assessment, Design, and ESC Permitting
- Electric and Solar Utility Permitting and ESC Design

KEY INDUSTRY SECTORS

- NPDES Permitting
- Stormwater Management
- Erosion and Sediment Control Design

HONORS AND AWARDS

- Harvard Business Leadership Program Graduate, 2019
- Dale Carnegie Leadership Skills for Success Graduate, 2015

KEY PROJECTS

Land Development Site/Civil/Utility Design

Mike has been involved with many different types of land development projects for 18 years. Services have included Conditional Land Use Permitting, Zoning Amendments and obtaining full Land Development approvals. Regarding building permits, Mike's experience includes coordination of permitting efforts with Architects, Landscape Architects, MEP Consultants, Geotechnical Consultants and Structural Engineers to obtain necessary Fire Marshall, Municipal, County and State permits for land development and building construction. This has included vast focus on compliance with ADA requirements, fire department access, utility access, maintenance, and overall protection of the public.

Various Oil and Gas Pipeline and Well Pad Projects, Ohio and West Virginia

Mike is the project manager responsible for civil engineering designs and reviews for various oil and gas projects in Ohio and West Virginia.

Confidential Compressor Station Site, Northampton County, North Carolina

Mike is the project manager responsible for stormwater management and erosion and sediment control design for an approximately three-acre compressor station pad. Mike was also involved with obtaining a Construction Stormwater General Permit through Northampton County.

Confidential Overhead Power Line Replacement Project, City of Fort Wayne, Indiana

Mike is the project manager responsible for erosion and sediment control design and utility design review for a large overhead power line replacement project. Mike was involved with addressing

City of Fort Wayne comments and assisting with reviewing the Stormwater Pollution and Prevention Plan (SWPPP).

Confidential Solar Development, Hopewell Township, Pennsylvania

Mike is the project manager responsible for site design and permitting associated with a solar array farm and substation on a 136-acre site. Mike was involved with the site layout, grading and drainage design, erosion and sediment (E&S) control design, and details. Mike was also involved with permitting through Hopewell Township and the York County Conservation District.

Confidential Solar Development, City of Columbus, Ohio

Mike is the project manager responsible for stormwater management and erosion and sediment control review for the solar array farm on a 63-acre site. Mike reviewed the Stormwater Pollution and Prevention Plan (SWP3) for compliance with the City of Columbus and the Ohio Environmental Protection Agency (OEPA) regulations.

Confidential Solar Development, Village of Lockbourne, Ohio

Mike is the project manager responsible for stormwater management and erosion and sediment control review for the solar array farm on a 155-acre site. Mike reviewed the Stormwater Pollution and Prevention Plan (SWP3) for compliance with the City of Columbus and the Ohio Environmental Protection Agency (OEPA) regulations.

Confidential Power Plant, Village of Cheshire, Ohio

Mike is the project manager responsible for the annual inspection of a Power Plant for compliance with the Federal Coal Combustion Residuals (CCR) Rule. Mike performed an inspection and report for the Residual Waste Landfill and the Bottom Ash Pond at the power plant.

KEY PROJECTS PRIOR TO JOINING ERM

Warehouse Expansion Project, Cranberry Township, Pennsylvania

Mike was the project manager responsible for site design and permitting associated with a design/build of an approximate 32,500 sf warehouse expansion, 2,600 sf truck dock expansion, parking expansion, stormwater management facilities, landscaping, associated infrastructure, and other site amenities on a 10-acre site. Mike was involved with site layout, grading and drainage design, utility design, sewage facilities planning module (SFPM), E&S control design, lot consolidation, and details. The proposed expansion included disturbing wetlands, and as a result, a Joint Permit was needed. Mike managed permitting through Cranberry Township, Butler County Planning Commission, Butler County Conservation District, and the PADEP.

Residential and Commercial Development, South Park Township, Pennsylvania

Mike was the project manager responsible for site design and permitting associated with a three-phase residential and commercial development on a 90-acre site. Site development included townhouses, single-family homes, multi-family homes, retail, and assisted living. Mike was involved with site layout, grading and drainage design, utility design, correspondence with utility companies, sewage facilities planning module (SFPM), E&S control design, subdivision plans, and

details. Mike was also involved with permitting through South Park Township, Allegheny County Conservation District, and Bethel Park Municipal Authority.

Gas Station Project, Town of McCandless, Pennsylvania

Mike was the engineer responsible for site design and permitting associated with a new gas station project. Mike was involved with the site layout, grading and drainage design, utility design, correspondence with utility companies, sewage facilities planning module (SFPM), E&S control design, and details. Mike was involved with permitting through McCandless Township, Allegheny County Conservation District, Lowries Run Operating Committee, West View Water Authority, and McCandless Township Sanitary Authority.

Park Improvement Project, City of Pittsburgh, Pennsylvania

Mike was the engineer responsible for stormwater and erosion and sediment (E&S) pollution control design, utility design, and permitting associated with park improvements, including sidewalks, trees, lighting, and gazebos. This project involved obtaining a National Pollutant Discharge Elimination System (NPDES) permit with the Allegheny County Conservation District and a Water and Sewer Use Permit with the Pittsburgh Sewer and Water Authority (PWSA).

Arena Plaza Renovation Project, City of Huntington, West Virginia

Mike was the engineer and project manager responsible for site design and permitting associated with the development of an arena plaza renovation project. The redeveloped plaza included new and redeveloped concrete areas, decking, a fountain, landscaped areas, and lighting. Mike was involved with site layout, grading and drainage design, E&S control design, and details. This project involved obtaining approval from the City of Huntington.

Park Improvement Project, Cross Creek Township, Pennsylvania

Mike was the engineer and project manager responsible for site design and permitting associated with the development of fishing piers, a boardwalk along the lakeshore with an extension into the lake, lawn terrace area, trails, and parking facilities at the Cross Creek County Park. Mike was involved with site layout, grading and drainage design, E&S control design, and details. This project involved obtaining a National Pollutant Discharge Elimination System (NPDES) permit with the Washington County Conservation District, a Joint Permit with the PADEP, and Site Plan Approval with Cross Creek Township.

Parking Lot Improvement Project, City of Pittsburgh, Pennsylvania

Mike was the project manager responsible for site design, stormwater and erosion and sediment (E&S) pollution control design and permitting associated with a parking lot optimization site for shuttle bus and car parking. This project involved a Lot Consolidation Plan, obtaining City of Pittsburgh Planning approval, Pittsburgh Water and Sewer Authority approval, and E&S approval with the Allegheny County Conservation District.

Monica Rudowski

Principal Consultant

Monica has over 11 years of experience working in the industry, including multi-scope and complex projects, compliance with federal, state, and local permitting and agency coordination. Monica has worked in the energy sector assisting as a FERC third-party consultant to prepare sections of EAs and Environmental Impact Statements. She has also worked for energy sector clients to prepare Environmental Resource Reports to support section 7(c) applications, Section 401 water quality certifications and Section 404 permits in addition to other federal, state, and local permitting applications throughout the northeast, southeast, and the Midwest regions.

EXPERIENCE: 11 years' experience in oil & gas, chemical, manufacturing, transportation, solar, and electric transmission sectors.

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EDUCATION

- B.S., Biological Science, University of Pittsburgh, USA, 2013.

FIELDS OF COMPETENCE

- Clean Water Act (CWA) 404/401 jurisdictional stream and wetland delineations
- §404 Individual and Nationwide permits
- Federal, state, and local regulatory planning, permitting, and compliance (Kentucky, Maine, Massachusetts, New Hampshire, New Jersey, Ohio, Pennsylvania, Virginia, and West Virginia)
- National Pollutant Discharge Elimination System (NPDES) permitting
- Stormwater Pollution Prevention Plan (SWPPP) and Groundwater Protection Plan (GPP) development
- Environmental Assessment (EA) and Environmental Impact Statement (EIS) documents
- Tier II and Toxics Release Inventory (TRI) Form R Reporting

KEY INDUSTRY SECTORS

- Oil and Gas
- Manufacturing
- Chemical
- Electric Power
- Solar

KEY PROJECTS

Natural Resources Permitting – Oil and Gas Maintenance Projects – Kentucky, Maine, New Hampshire, Ohio, Virginia, West Virginia, USA – 2019-2025

Project manager and permit lead for oil and gas operations and maintenance projects along multiple existing pipelines and associated facilities, including preparation of applications for nationwide permits, state and local stormwater permits and water quality certifications.

Confidential Solar Development Project – Pennsylvania, USA – 2024-2025

Project manager and permitting support for a solar development project in Pennsylvania permitted under a PADEP Joint Permit Application, including permitting of GP-5 and GP-7 crossings.

Natural Gas Pipeline Replacement Project – Virginia, USA – 2022-2025

Permit lead and project manager for an approximate 50-mile FERC 7(c) pipeline replacement project and associated facilities including agency coordination and application preparation at the federal, state, and county level.

Water Resources Technical Lead – Well Pad Restoration – West Virginia, USA – 2016-2022

Conducted wetland and waterbody restoration assessments and collected macroinvertebrate samples at multiple restored oil and gas well pad and impoundment sites. Prepared annual monitoring reports in accordance with the U.S. Environmental Protection requirements in compliance with the Consent Decree. Prepared NPDES and Stream Activity permit applications and provided construction oversight.

Lead Wetland Delineator and Permit Lead – Transmission Line – West Virginia, Michigan, Indiana, USA – 2020-2021

Conducted wetland and waterbody delineations and associated reports along transmission lines. Prepared stormwater permit applications and associated reports.

Permit Support – Pipeline Replacement Project – Virginia and West Virginia, USA – 2017-2019

Preparation of federal, state, and local permits for a proposed natural gas pipeline in West Virginia and Virginia, a portion of which would cross the Monongahela National Forest. Project permitting included federal and state wetland and waterbody permits, construction stormwater permits, as well as local building and floodplain permits and site plans.

Laura Lewis, EIT

Managing Technical Consultant, Engineering

Laura is an engineer with 5 years of experience in the design, permitting, and construction of civil projects in the power, oil & gas, chemical, and manufacturing sectors. Her experience includes investigation, design, permitting, construction, and operation. Her project experience includes permitting and civil design for natural gas and renewable energy facilities; stormwater permitting and design; surface water hydrology and hydraulics; construction management and inspection services; environmental regulatory compliance; and land development.

EXPERIENCE: 5 years' experience in civil/environmental engineering, permitting, and environmental compliance

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EDUCATION

- B.S. Environmental Engineering, University of Pittsburgh, USA, 2020

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Engineer-in-Training
- American Society of Civil Engineers
- American Academy of Environmental Engineers and Scientists

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Civil & environmental engineering
- Environmental compliance
- Land development
- Erosion and sediment control
- Stormwater design and compliance
- Water/wastewater permitting

- Toxic Release Inventory Reporting
- Tier II Reporting

KEY INDUSTRY SECTORS

- Power
- Renewable Energy
- Oil & Gas
- Manufacturing

KEY PROJECTS

Michigan Battery Energy Storage System Site Developments

Laura supported land development for several battery energy storage sites in Michigan. This included supporting engineering design efforts, including post construction stormwater management, erosion and sediment control, and site grading. This also involved development of 30% design civil plan sets for local permitting requirements. Laura conducted calculations to determine decommissioning costs for the facilities. Laura supported hydrologic calculations for post-construction stormwater best management practices for each site. Laura assisted with coordination with project stakeholders such as local regulatory agencies.

Natural Gas Pipeline Projects

Developed over 100 erosion and sediment control plans as part of Stormwater Pollution Prevention Plans by designing controls in applicable areas of work sites for operation and maintenance work on company's pipelines. Ensured plans complied with stormwater regulations and permit requirements in Ohio, West Virginia, and Virginia.

Electric Transmission Line Projects

Developed erosion and sediment control plans as part of Stormwater Pollution Prevention Plans by designing controls in applicable areas of work sites for operation and maintenance work on company's transmission lines. Ensured plans complied with stormwater regulations and permit requirements in West Virginia.

Natural Gas Pipeline Replacement Stormwater Management

Laura prepared detailed design of erosion and sediment control plan for approximately 50 miles of pipeline replacement. Conducted QA/QC of stormwater plans and ensured compliance with both federal and state requirements.

Stormwater Design for Renewable Natural Gas Point of Receipt Facility

Laura assisted with stormwater management design and permitting for a new renewable natural gas point of receipt facility in North Carolina. This effort included coordinating with the North Carolina Department of Environmental Quality to ensure compliance with all relevant regulations and permit requirements. Laura developed a detailed erosion and sediment control plan for the site and conducted hydrologic calculations for pre- and post-construction conditions.

Post-Construction Stormwater Management Construction Oversight and As-built Development

Supported construction of post-construction stormwater management features including detention features and riparian buffer establishment as part of a natural gas compressor station modification. Served as on-site representative to document construction progress, respond to information requests, and ensure system was installed according to issued-for-construction drawings. Developed as-built documentation for post-construction stormwater management features and coordinated termination of construction stormwater permit.

Solar Site Developments

Laura supported land development for several solar development sites in Illinois, Ohio, and Pennsylvania. This included supporting engineering design efforts, including post construction stormwater management, erosion and sediment control, and site grading. This also involved development of civil plan sets and assisting with required site permitting. Laura conducted hydrologic and hydraulic calculations to determine appropriate post-construction stormwater best management practices for each site. Laura assisted with coordination with project stakeholders such as utility companies and local regulatory agencies.

Coal-fired Power Station NPDES Modification

Laura assisted with modification of current NPDES permit at power station to modify flue gas desulfurization waste stream in order to comply with USEPA Amendment to Steam Electric Generating Effluent Guidelines for wastewater streams. This included conducting a mass balance model to calculate effluent discharge concentrations for alternative outfall locations. Discharge monitoring reports for the station were analyzed in order to model the impact of an additional waste stream. Submittal of the NPDES permit modification included development of current environmental compliance plans for the facility, consisting of the Stormwater Pollution Prevention Plan, Groundwater Protection Plan, Spill Prevention, Control, and Countermeasure Plan, and Spill Prevention and Response Plan. Laura assisted in analysis of final permit to ensure facility compliance with new and existing permit conditions.

Stormwater Design for Outfall Reroute

Assisted in development of conceptual design for rerouting stormwater discharge from NPDES outfalls to existing pond onsite. This included conducting hydrologic and hydraulic calculations for design alternatives and preparation of summary technical memorandum.

NPDES Permit Major Modification

Assisted in major modification of current NPDES wastewater permit to account for replacement of existing wastewater treatment plant.

Confidential Mineral Wool Manufacturing Facility Reporting

Laura supported preparation and submission of toxic inventory release reporting under Section 313 of EPCRA for a mineral wool manufacturing facility. This included a detailed review of material inventories and analysis of materials consumed. Calculations were performed to determine if chemicals at the facility meet TRI thresholds and then determine quantities of applicable chemicals released by the facility. Facility data was managed and consolidated into proper format to submit through EPA reporting portal.

Spill Prevention, Control, and Countermeasure (SPCC) Plan Updates

Completed revisions to multiple natural gas compressor station SPCC plans, including containment calculations. Ensured compliance with applicable regulations.

Environmental Plan Updates

Supported development of environmental plans for a manufacturing plant including updates to a Stormwater Pollution Prevention Plan, Groundwater Protection Plan, SPCC, and SPRP plans.

Carlie Johnson

Consultant, Engineering

Carlie is an environmental engineer based in ERM's Washington, DC office with 5 years of experience. She is an organized, resourceful, and accountable person with an aptitude to learn new skills. Carlie's current experience includes land development, stormwater management modeling and design, site grading, erosion and sediment control planning, and permitting. Carlie has worked in projects throughout the United States with most of her experience in Pennsylvania, West Virginia, Michigan and Ohio.

EXPERIENCE: 5 years' experience in civil/environmental engineering, permitting, and environmental compliance specifically related to land development and municipal engineering

EMAIL: carlie.johnson@erm.com

EDUCATION

- B.S. Environmental Engineering, University of Pittsburgh, USA, 2020

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Civil & environmental engineering
- Environmental compliance
- Erosion and sediment control
- Stormwater design and compliance
- Water/wastewater permitting
- Municipal Engineering

KEY INDUSTRY SECTORS

- Power and Energy
- Commercial Development

CERTIFICATIONS

- 40 Hour HAZWOPER
- Red Cross First Aid/CPR/AED
- ERM – Field Safety Officer
- ERM – Subsurface Clearance (GE)

KEY PROJECTS

Battery Energy Storage System (BESS) Sites - Michigan

Supported civil design for land development of multiple BESS sites in Michigan. This included post construction stormwater management design, erosion and sediment control planning, and site grading. In order to complete the design AutoCAD, Civil 3D, HydroCAD, and Hydraflow Express software was used. This also involved development of a civil plan set and assisting with required site permitting.

Solar Site Developments – Ohio and Illinois

Supported civil design for land development of multiple solar field sites in Ohio and Illinois. This included post construction stormwater management design, erosion and sediment control planning, and site grading. In order to complete the design AutoCAD, Civil 3D, HydroCAD, and Hydraflow Express software was used. This also involved development of a civil plan set and assisting with required site permitting.

Dam Remediation Study – California

Supported an alternatives assessment to evaluate a dam that was out of compliance with state and client standards. The project included analyzing three alternatives that involved complete dam removal, lowering the dam to a non jurisdictional height, or remediating the existing dam and maintaining capacity. Each design considered regulatory requirements, earthwork needs, costs, and associated risks. The deliverables included conceptual designs for each alternative using Civil 3D and a technical memorandum.

Cost Estimate – West Virginia

Assisted with the development of a cost estimate for a landfill remediation. The document was to be used as a part of a technical witness' statement. The development of the estimate included determining the cost of all necessary site work and materials necessary to remediate the site.

KEY PROJECTS PRIOR TO JOINING ERM

Division 1 University Sports Performance Center – Pittsburgh, Pennsylvania

Supported the civil engineering design for an athletic facility on a University's urban campus.

Tasks included but were not limited to:

- Acquiring an NPDES permit and multiple major modifications to the permit due to additional project scope that included building construction.

- Communicating with the water and sewer authority to design tap in plans and acquire a permit for the construction of additional sewer and water lines within the city.
- Responding to field issues and coordinating construction adjustments with all subconsultant engineering teams

Commercial Development – Selma, North Carolina

Supported the civil engineering design for a 400 acre retail development. The site was previously undisturbed and all aspects of civil design needed to be considered.

Tasks included but were not limited to:

- Leading a team to create an overall phasing plan for the site using AutoCAD and Civil 3D
- Coordinating directly with utility companies to get service lines installed.
- Designing pad ready sites to sell to retailers. Each pad design included laying out the site, coordinating with utility companies to service the site, and grading.

Sanitary Sewer Rehabilitation Program – Pittsburgh, Pennsylvania

Participated in and led the engineering team for three annual municipal contracts. The contract teams were for manhole rehabilitation, chemical root treatment of sewer lines, and backwater valve installation and maintenance. These projects largely focused on coordination between contractors, the municipality, and the engineering team to verify that contract specifications were followed and work was completed and paid out in a timely manner.

Combined Sewer Overflow Reduction – Pittsburgh, Pennsylvania

Worked with municipalities in Pittsburgh to analyze their combined sewer systems and designed engineering projects to minimize combined sewer overflow. The projects areas were determined through analyzing sensor data after storm events to target areas with high rainfall derived inflow and infiltration to maximize the reduction of combined sewer overflow.

Nate Born, PE (MN)

Principal Consultant, Engineer

Nate Born, PE has over eleven years of experience as a Civil Engineer. His experience spans the entire project lifecycle, from feasibility studies and preliminary permitting, to detailed design and cost estimates, to construction oversight, to post-construction monitoring. Nate specializes in construction plan development, utilizing his AutoCAD Civil3D experience to develop complex models and provide accurate construction quantities, and has a proven track record of being a liaison between owners and contractors during construction to ensure that projects are built according to the design, on time, and within budget.

EXPERIENCE: Over 11 years' experience in the oil and gas, mining, renewable energy, and public infrastructure sectors.

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EDUCATION

- Bachelor's of Science. Civil Engineering, Louisiana State University, 2014.
- Bachelor's of Science. Computer Science, University of Minnesota, 2009.

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Professional Engineer, State of Minnesota, license number 63227

LANGUAGES

- English, native speaker
- Spanish, conversational

FIELDS OF COMPETENCE

- Engineering permitting

- Feasibility studies
- Stormwater modeling
- Construction plan development
- AutoCAD Civil3D modeling
- HydroCAD modeling
- Microsoft Office
- Cost estimating
- Construction oversight, including schedule management and cost tracking
- Stormwater inspection
- Project management
- Environmental noise monitoring
- Environmental noise modeling using SoundPLAN and PredictOr software

KEY INDUSTRY SECTORS

- Oil and gas
- Mining
- Renewable energy
- Public infrastructure

KEY PROJECTS

1 Natural Gas Compressor Station Stormwater Design and Permitting

Task manager for the stormwater design and permitting for four natural gas compressor stations in North Carolina. Designed erosion and sediment control and stormwater management plans for the sites, in order to obtain state and local permits for construction. Coordinated with the owner, primary Engineer, and contractor throughout construction to maintain compliance with permits. Verified that the construction met the design criteria after construction.

2 Gold Mine Dam and Reservoir Elimination Study and Cost Estimate

Task manager for a study to evaluate various options for eliminating a dam and reservoir associated with a gold mine in California. Led a team to review existing historical documentation and develop three alternatives to either reduce the size of or eliminate the dam. Prepared a technical memorandum to outline the design criteria, conceptual design, regulatory considerations, cost estimate, and risks for each of the options.

3 National Pulp/Paper Producer Reservoir Expansion Study and Cost Estimate

Task manager for an expansion study for the reservoir of a national pulp/paper mill in Oregon. Oversaw the development of four different expansion alternative methods, including a conceptual design, permitting analysis, and cost estimate for each alternative. Developed a technical report to describe the findings and provide recommendations for future analysis.

4 Storm Tunnel Rehabilitation and Cost Estimating Projects

Projects associated with an underground six-mile storm tunnel that collects runoff from city streets in a major metropolitan area and diverts it to a major river. Conducted NASSCO inspections and wrote inspection reports for the tunnel system, in approximate 1-mile sections each year. Based on the inspections, designed the necessary repairs and developed the associated construction plans to rehabilitate deficient sections of the tunnel. Also calculated estimated repair quantities and provided estimates of the predicted costs for repairs. After assisting the client in soliciting bids for the repair work, provided oversight of the repair construction. This included being on site daily, answering the contractor's questions about the design, documenting the repairs, calculating pay quantities, and troubleshooting design issues as they came up. After construction completion, created record drawings of the projects.

5 Soda Ash Mine Stormwater Ponds Design Project

Project consisted of the design of two stormwater ponds totaling approximately 800 acre-feet, for a soda ash mine in Wyoming. Designed the ponds by modeling them in Civil3D, and then developed associated construction plans and quantity takeoffs. During construction, coordinated with the main field engineer to troubleshoot design issues, modifying the design accordingly.

6 Multiple Low-head Dam Replacement and Cost Estimate Projects

Developed 3D surface models in Civil3D of complex rock riffle structures in Minnesota and South Dakota, ranging from 100 to 250 feet long and 60-100 feet wide, containing 10-25 rock riffle drops of 6 to 8 inches each. Used these models to develop construction plans, quantity takeoffs, and a cost estimate. During construction, provided support to help troubleshoot and modify design issues that arose. After construction completion, created as-built drawings to document the construction.

7 Multiple Wind Turbine Foundation Grouting Projects

Projects consisted of the void filling and compaction grouting of underground karst formations for 150+ wind turbine sites in Texas, Arizona, and Oklahoma. Evaluated boring data to design compaction grouting plans for each of the sites. During construction, coordinated with field staff to track the grout-injection volumes and recommended additional grouting based on field results. After grouting was complete, developed record drawings to document the construction.

8 Levee Raise and Seepage Mitigation and Cost Estimate Project

Designed a series of 4-8" PVC seepage collection trenches totaling approximately two miles, along a major river in Iowa. Used the model to produce construction plans, quantity takeoffs, and a cost estimate. This work involved calculating the anticipated seepage that would be collected and selecting the location and elevation of the trench that would provide stability to the levee while avoiding utility conflicts.

9 Tailings Facilities Dam Safety and Seepage Mitigation Projects

Worked on a number of tailings pond projects for a large taconite (iron ore) mine in northern Minnesota. The tailings ponds were approximately 60 square miles in area, with over 100 miles of internal and external dams throughout the ponds. Projects included the yearly development of

dam safety drawings showing updated ground elevations, water elevations, and instrumentation throughout the site. Designed seepage mitigation systems throughout approximately 12 miles of the perimeter dams.

10 Dam Work Platform Design Project

Designed the layout of a concrete work platform associated with the construction of a secant cutoff wall to stabilize a dam in Tennessee. Calculated the live and dead loads that would be used during the construction of the cutoff wall. Worked with structural and geotechnical engineers to to produce construction plans in Civil3D. After construction of the work platform, incorporated the survey information into record drawings in Civil3D.

11 Natural Gas Pipeline Contractor Yard Design Project

Designed erosion and sediment control plans for approximately 20 semi-permanent contractor yards and other permanent facilities along a 600-mile natural gas pipeline project spanning the mid-Atlantic region. This included HydroCAD modeling and site plan design in Civil3D to develop construction plans of the sites.

12 Natural Gas Distribution Line Permitting Projects

Worked on approximately 80 natural gas distribution line projects throughout Minnesota and the Gulf region. Work included obtaining state and local permits, the development of stormwater pollution prevention plans (SWPPPs), erosion and sediment plan designs, and regular stormwater best management practice inspections to ensure compliance with the SWPPPs.

13 Natural Gas Distribution Line Permitting Projects

Worked on approximately 80 natural gas distribution line projects throughout Minnesota and the Gulf region. Work included obtaining state and local permits, the development of stormwater pollution prevention plans (SWPPPs), erosion and sediment plan designs, and regular stormwater best management practice inspections to ensure compliance with the SWPPPs.

14 Environmental Noise Monitoring Projects

Coordinated and conducted 15 environmental noise monitoring projects for proposed LNG pipelines and export terminals along the US Gulf Coast and Canadian Pacific Coast. Developed environmental noise monitoring plans, trained other field staff to use the noise monitoring equipment, and conducted the environmental noise surveys. Also processed the data and wrote reports to describe the results of the surveys. Wrote the environmental noise sections for multiple FERC regulatory filings.

Raana Koushki Ph.D.

Managing Consultant Engineering

Dr. Koushki is a Managing Consultant Engineer and an approved Project Manager with ERM, bringing over 17+ years of global expertise in planning engineering, water and environmental resources management, and sustainable engineering across various sectors of civil and environmental engineering. Her extensive experience enables her to work effectively with diverse technical communities, government agencies, industry leaders, and multiple stakeholders. Ms. Koushki's career spans academic, public, and private sectors, where she has gained a multi-disciplinary background and honed her ability to manage complex projects with a broad perspective. She is highly skilled in stakeholder coordination, team leadership, and directing water-related projects, ensuring smooth execution across multidisciplinary teams. With a strong foundation in risk assessment and mitigation, she proactively identifies and addresses potential risks, keeping projects on track and within budget, even in the face of tight deadlines and complex challenges. Ms. Koushki excels in monitoring project costs, swiftly recognizing financial impacts, and offering strategic recommendations to maintain budget integrity. She has a keen eye for reviewing technical reports, drawings, and documents, ensuring that all project specifications are met with precision. Committed to continuous improvement, Dr. Koushki strives to identify opportunities that drive project success, guaranteeing high-quality results and efficient processes that exceed client expectations.

Experience: 17+ years of sustainable planning engineering, design and management related services in different aspects of sustainable civil and environmental engineering, approved project manager at ERM

Email: Raana.Koushki@erm.com

Google Scholar: https://shorturl.at/leZG5

Education

- Ph.D., Civil & Environmental Engineering, Oklahoma State University, Stillwater OK, U.S., 2022
- M.S., Water Resources Engineering, Tehran University, Tehran, Iran, 2006
- B.S., Irrigation and Drainage Engineering, Tehran University, Tehran, Iran, 2000

Languages

- English
- Persian (Farsi), native speaker

Fields of Competence

- **Project Management & Stakeholder Coordination**: overseeing projects timelines and resources, tracking projects schedules and costs, collaborating with cross-functional teams and stakeholders, and developing communication plans to ensure compliance, monitor costs, and achieve project objectives.
- **Large Data Set Analysis**: managing, analyzing, and interpreting large and complex data sets, data-driven insights to optimize project outcomes, predict trends, and enhance work accuracy.
- **Environmental Impact Assessment (EIA) and Environmental Compliance and Permitting**: Industrial and Construction General Permits (IGP & CGP), Notice of Non-Applicability (NONA), Stormwater Management Plan (SWMP), Stormwater Pollution Prevention Plans (SWPPP), Spill Prevention, Control, and Countermeasure (SPCC), Federal Energy Regulatory Commission (FERC).
- **Water Resources Modeling and Studies**: Hydrologic and Hydraulic (H&H) modeling, Erosion & Sediment Control (ESC), stormwater management planning, hydrological, meteorological, groundwater, and water supply studies, including participation in site selection reviews and ensuring alignment with stakeholder requirements.
- **Water and Environmental Resources Sustainability, Resiliency Planning and Integrated Water and Environmental Resources Management (IWRM)**: integrating sustainable practices throughout the project lifecycle, ensuring long-term project viability and compliance and working with multiple sectors and stakeholders to optimize outcomes.
- **Watershed Management Plan**: identifying technical and regulatory requirements, assessing financial needs and ensuring alignment with environmental standards.
- **System Thinking, and System Dynamics Modeling**: applying a holistic approach to understand and address project risks, monitor impacts, and forecast long-term outcomes in a sustainable and integrated manner.
- **Life Cycle Inventory and Assessment (LCI & LCA)**: Water & Carbon Footprinting of Products (W & CFP), climate change impacts and Greenhouse Gas (GHG) emissions estimations.

Key Industry Sectors

- Urban Water Management
- Power and Energy
- Mining & Manufacturing
- Oil & Gas
- Agriculture

Honors and Awards

- 2016 Honor Professional Engineer, Water & Wastewater Macro Planning Bureau, Iran
- 2005 4th Position in 2004 National Entrance Exam for Graduate Studies (M.S. National Entrance Exam)

Representative Projects

Environmental compliance and permitting

Dr. Koushki has conducted and/or collaborated in several permitting projects within ERM (in several sites including but not limited to NC, GA, TX, CA, OR, VA, WE, IN, Canada, Africa, etc.), including:

- Led and collaborated on multiple permitting projects across various U.S. states within ERM, overseeing environmental compliance and permitting for Construction and Industrial General Permits (CGP & IGP) at numerous facilities.
- Provided technical consultation to facilities in the development of Stormwater Management Plan, and Storm Water Pollution Prevention Plans (SWPPPs) to manage construction and industrial discharges, ensuring compliance with IGP, CGP, and other regulatory requirements under the Clean Water Act, as well as applicable federal and local regulations.
- Developed Erosion and Sediment Control (ESC) plans for diverse facilities to mitigate environmental impacts from construction activities.
- Prepared and implemented Water Quality Management Plans (WQMP) and Urban Stormwater Mitigation Plans (USMP) for various sites to ensure stormwater management compliance.
- Drafted and submitted Notice of Non-Applicability (NONA) documents for several facilities in California, including Amazon sites, ensuring industrial discharges are contained in detention basins and fully disconnected from surface and groundwater resources.

Federal Energy Regulatory Commission (FERC)

Raana Koushki has conducted the hydrology and water quality section for a hydropower plant in California per FERC requirements.

Water Transfer & Pipelines

Ms. Koushki collaborated on several water transfer projects, including inter-basin water transfer projects. She was the project manager of some water transfer projects, leading technical preparations, including surveying and preparing technical reports and drawings during her work for consultant engineering companies. She also was the governmental coordinator of some inter-basin water transfer projects. Services included water resources planning, initial siting, conceptual design/design development, geotechnical investigation, water rights and water allocation, environmental permitting, budgeting, detailed design, and construction documents.

Open Channels Hydraulic Design

Dr. Koushki was the senior project engineer in charge of compliance with construction documents and all changes due to field conditions during the implementation of several projects, including thousands of kilometers of open channels in Khuzestan, Southern Iran. These included first-, second-, and third-degree irrigation and drainage networks as well as stormwater management channels for various projects such as a large mining project in NC. She accomplished the first and second phases of studies and designs for these projects, conducted the technical reports and drawings, cooperated with construction supervision, and performed as-built drawings.

Hydrologic and Hydraulic (H&H) Modeling, Water Supply Assessment, Hydrological, Meteorological, and Ground Water Studies

Dr. Koushki has recently conducted the HEC-RAS modeling for different projects including a solar plant in California, providing flood velocity and depth maps. She has developed hydrological models for several ERM projects, including projects in Mozambique (Africa), Canada, and different states within the U.S. (California, Virginia, Oregan, Georgia, North Carolina, etc.), spanning commercial, industrial and mining sectors.

She conducted comprehensive Water Supply Assessment (WSA) reports, including a detailed WSA for a solar plant in California, evaluating the water demands for both the construction and operational phases. The assessment involved analyzing local water resources, identifying available sources, and estimating water consumption throughout the project lifecycle. The report also included an evaluation of the environmental impact of water usage, assessing the sustainability of local water supply systems, and ensuring compliance with relevant state and local water regulations.

Ms. Koushki was the senior consultant engineer and project manager of artificial recharge projects and dam construction studies and, including first and second-phase studies of various small dams in northwest of Iran. In these projects, she conducted or supervised water sampling, initial siting, hydrological studies and modeling, meteorological studies, groundwater desktop studies, water resources planning, water allocation and environmental permitting, land surveying, conceptual design/design development, cost estimation, detailed design, and construction documents.

Integrated Water Resources Management (IWRM) and Modeling & Urban Water Management

Ms. Koushki collaborated in preparing a "Watershed Based Plan for Walnut Bayou Watershed" for the Oklahoma Conservation Commission.

Ms. Koushki developed an urban water management portfolio based on the measures implemented in 8 states (66 cities) in the southcentral and southwestern United States that could be applied to arid/semi-arid areas worldwide to satisfy their increasing urban water demands while facing water scarcity regarding climate change.

Ms. Koushki collaborated with or was the project manager of several integrated water resources management projects. These projects included water resources evaluation, water balancing, water allocation, structural construction, and social and economic aspects. She also collaborated in the surface water management of Tehran, Iran, as an outsourcing expert and developed a system dynamic model for the project. The model included stormwater collection, water and wastewater treatment plants, and surface and groundwater resources, including surface water provided by five large dams providing urban water for Tehran.

Stream and Wetland Restoration

Ms. Koushki was in charge of the national committee of restoration of the Urmia Lake in Iran, known for its Urmia Artemia and as the second saltiest lake in the world, for the first year of establishing the committee. The lake watershed is located within three states. So, some political issues were also involved in water resources management and allocation of the watershed among these three states. To tackle several political, social, and environmental issues, Ms. Koushki collaborated in establishing local, national, and technical committees regarding the technical evaluations, policymaking, and budgeting aspects required to restore the lake. She worked with several local and national stakeholders, including environmentalists, scientists, and academic, agricultural, industrial, and water resources stakeholders. She coordinated proposals, research, studies, and executive projects related to Lake Urmia. The committee's efforts provided a road map including nineteen short-term and long-term projects to rescue the lake. She also was a member of the national wetland conservation committee and collaborated with the UNDP wetland conservation project. Services included hydrological and meteorological studies, social studies, water resources planning, water allocation and environmental permitting, budgeting, detailed design, and construction documents.

Sustainable Environmental Management and Life Cycle Assessment (LCA)

Ms. Koushki conducted several Carbon Footprinting of Products (CFP) projects within U.S and Europe, including estimation of the carbon footprint of some oil products in the US and cradle-to-gate food production machineries in Iceland, Europe.

She has worked on sustainable design, life cycle assessment (LCA), greenhouse gas (GHG) emissions estimation, and life cycle water, carbon, and energy footprint. She collaborated on several sustainable environmental management projects, including LCA of food produce machineries, water and GHG emissions footprint of crop production, energy generation and consumption, and various management measurements. She coordinated

with Iran's national low-carbon economy committee that was established based on the Paris Agreement. She coordinated conducting the cradle-to-product LCA of the water and emissions footprint of various products in Iran. She has performed "Greenhouse gas emissions of agricultural groundwater (GW) pumping with energy demand and supply management analysis," considering natural gas and electric energy (current electricity mix, renewable energies (wind and solar)) and life cycle GHG emissions from producing a groundwater pump. This work examined the energy management practices that reduce life cycle GHG emissions from GW pumping energy consumptions.

Ms. Koushki performed a "comparison of life cycle greenhouse gas emissions of various pre-field (energy, crop seed, pesticide productions, and transportations to agricultural fields) and in-field (on-site energy combustion (from pumping energy and agricultural vehicles), and agricultural soils) factors were for diverse fields under different application rates of water and fertilizer. Results indicate that GHG emissions from agricultural soils are the primary source of GHG emissions from crop production. So, when planning to reduce the GHG emissions from crop production, this parameter could be targeted to achieve the optimum result.

Various methods and software that were used for these studies include SimaPro, GREET2021 (R&D), Ecoinvent database, ArcMap (GIS), Microsoft Excel, R Studio, the Intergovernmental Panel on Climate Change (IPCC), and the U.S. Environmental Protection Agency (EPA) Greenhouse Gas Inventory Guidance.

Environmental Impact Assessment (EIA)

Ms. Koushki collaborated with the Environmental and Social Impact Assessment (ESIA) working group at ERM for a project in Angola, Africa.

She collaborated with the Environmental National Committee of Iran. The committee issued environmental permits for various mining, construction, and industrial projects. She was responsible for assessing the impacts of the projects on water resources. The projects included highway constructions, oil pipelines, water transfer pipelines and tunnels, mining, factory constructions and operations, seawater desalination, etc.

She was also a national committee member of Confrontation and Prevention of the Adverse Consequences of Dust Storms in the Tigris and Euphrates Region and cooperated in producing the national and regional plans for this aim.

Publications and Presentations

- 2024 Assessing the Resilience of Stormwater Ponds Under Climate Change: Implications for Flood Control and Water Quality, USA. (*Nominee for the Best Researcher Award at the 2024 International Awards on Civil and Environmental Engineering*)
- (2024) Water Conservation in Urban Landscapes: Technological, Social, Economic, and Logistical Aspects, U.S.
- (2024) Urban Water Management Portfolio for Arid and Semi-Arid Areas, OSU, USA.
- 2023 Comparison of Life Cycle Greenhouse Gas Emissions of Various Pre-Field and In-field Factors through Irrigated Corn Production, USA.
- 2023 Greenhouse Gas Emissions of Agricultural Groundwater Pumping with Energy Demand and Supply Management Analysis, USA.
- 2019 Watershed Based Plan for Walnut Bayou Watershed , Oklahoma Conservation Commission, Natural Resources Conservation Service (OCC-NRCS) and Chickasaw Nation
- 2019 Urban Water Management Outlook in the Southwestern and South-Central United States, AGU, USA (Poster).
- 2019 A Review of the Lake Urmia Restoration Proposals, OCLWA Conference, USA.
- 2017 Proposal of Reducing Water Losses in Irrigation Canals using Solar Panels (Nexus of water and energy), Ministry of Energy, Iran.
- 2013 Assessing the Share of Several Parameter on the Decline of the Urmia Lake's Water Level Trough Different Years, Lake Urmia-International Conference, Freie Universität Berlin, Germany.
- 2012 An Analysis of Various Factors Leading to the Decrease in Water Level of Urmia Lake in Recent Years, Advanced International Training Program of Regional Development in Euphrates-Tigris Region, SIDA, Sweden.
- 2007 "Integrated Water Resources Management using System Dynamics" Accepted to the System Dynamics 50th Anniversary Conference, Boston, USA.

- 2006 Master Thesis, Integrated Water Resources Management Using System Dynamics in Garmsar Plain, University of Tehran, Iran.

Jessica Blat, EIT

Consultant, Engineering

Jessica is an environmental engineer based in ERM's Rolling Meadows, IL office with 5 years of consulting experience. She is very resourceful, a quick learner, and always looking to expand her skillset. Jessica's current experience includes land development, stormwater management modeling and design, erosion and sediment control planning, and permitting. Jessica has worked on projects throughout the United States with most of her experience in Pennsylvania.

EXPERIENCE: 5 years' experience in civil/environmental engineering and permitting specifically related to land development and stormwater design in the energy industry.

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EDUCATION

- B.S. Environmental Systems Engineering, Penn State University, USA, 2020

PROFESSIONAL REGISTRATIONS

- Engineer in Training (EIT), Pennsylvania, 2021

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Civil & environmental engineering
- Erosion and sediment control
- Stormwater design and compliance

KEY INDUSTRY SECTORS

- Power and Energy

CERTIFICATIONS

- 40 Hour HAZWOPER
- Red Cross First Aid/CPR/AED
- ERM – Field Safety Officer
- ERM – Subsurface Clearance (GE)

KEY PROJECTS

BESS Facility Developments

Supported land development for multiple BESS development sites in Michigan. This included supporting engineering design efforts, including stormwater management, erosion and sediment control planning, and grading. This also involved the development of civil site plans and coordination with local regulatory agencies. In order to complete the design Civil 3D and HydroCAD were used.

Solar Site Development

Supported land development of a solar site in New York. This included supporting engineering design efforts, including stormwater management, erosion and sediment control planning, and grading. This also involved the development of civil site plans and a SWPPP. In order to complete the design Civil 3D and HydroCAD were used.

SWPPP Audits

Supported a SWPPP audit program for multiple data center development sites in Illinois. Reviewed weekly SWPPP inspection reports for data center sites to confirm environmental compliance and provided weekly site progress updates to the environmental project manager. Performed a quarterly SWPPP inspection and prepared a SWPPP inspection report deliverable. Provided support for implementation and termination of NPDES permits.

Dam Removal Study

Supported an alternatives assessment to evaluate a dam that was out of compliance with state and client standards in California. The project included analyzing three alternatives that involved complete dam removal, lowering the dam to a non-jurisdictional height, or remediating the existing dam to maintain capacity. Each design considered regulatory requirements, earthwork needs, costs, and associated risks. The deliverables included conceptual designs for each alternative using Civil 3D and a technical memorandum.

KEY PROJECTS PRIOR TO JOINING ERM

Well Pad Developments

Supported civil design and permitting for land development of multiple well pad sites in Pennsylvania. This included post construction stormwater management design and erosion and

sediment control planning. In order to complete the design AutoCAD, Civil 3D, and HydroCAD were used. This also involved assisting with the development of a civil plan set and the required permitting. Required permits included Chapter 102 Erosion and Sediment Control General Permit and Chapter 105 General Permit.

Natural Gas Pipeline Development

Completed required permitting for natural gas pipelines in Pennsylvania. Required permits included Chapter 102 Erosion and Sediment Control General Permit and Chapter 105 General Permits. Chapter 105 permits included a utility line stream crossing permit and a temporary road crossing permit. This included erosion and sediment control planning and contributing to an erosion and sediment control plan set and a General Permit plan set. In order to complete the design AutoCAD software was used.

Water Impoundment Development

Completed required permitting for a 28.7-million-gallon water impoundment and temporary waterline tie-in to support well development activities in Pennsylvania. Required permits included Chapter 102 Erosion and Sediment Control General Permit and Chapter 105 General Permits. Chapter 105 permits included a utility line stream crossing permit and a minor road crossing permit. This included post construction stormwater management design and erosion and sediment control planning. In order to complete the design AutoCAD software was used. This also involved contributing to the development of a civil plan set.

Caitlyn Cano, EIT (TX)

Consulting Senior Associate, Engineering

Caitlyn is a Consulting Senior Associate in Engineering based out of the ERM office in Charlotte, NC. She is a passionate earth-first engineer with experience in infrastructure project planning and implementation, fieldwork, research methods, and communication in a variety of settings (including written, oral, and digital delivery).

EXPERIENCE: 2 years of experience in civil and environmental engineering (site development)

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EDUCATION

- B.S., Environmental Engineering, University of Notre Dame, Notre Dame, Indiana, USA 2023

PROFESSIONAL REGISTRATIONS

- Engineer-In-Training (EIT), Texas, 2023

CERTIFICATIONS

- Red Cross CPR/First Aid/AED
- 40-Hour OSHA HAZWOPER
- 24-Hour MSHA New Miner (Part 48b)
- 10-Hour OSHA Construction
- ERM FSO
- ERM SSC-GE
- ERM Aquatic-GE
- ERM Mine-GE

LANGUAGES

- English, native speaker
- Spanish, working knowledge

FIELDS OF COMPETENCE

- Civil and Environmental Engineering
- Communication
- Field Sampling and Assessment

KEY INDUSTRY SECTORS

- Energy
- Oil & Gas
- Remediation

PUBLICATIONS

- "Understanding Radioactive 40-Potassium at the Jackpile Mine and Surrounding Areas with Gamma Spectroscopy," Environmental Engineering and Geology Division Student Research Poster Competition, *Geological Society of America Connects* (October 2022)
- "Radiological Analyses of 226Ra and 238U in Surface Water and Sediments from the Jackpile Member of the Morrison Formation, Pueblo of Laguna, New Mexico," *Environmental Science and Technology,* Vol 58, Issue 34 (August 2024)

KEY PROJECTS

Erosion and Sediment Control Plan Development

Used ArcGIS and AutoCAD to create erosion and sediment control plans in accordance with local control standards for natural gas pipeline maintenance and electric utilities in the upper Midwest U.S.

Stormwater Pollution Prevention Plan Development

Drafted engineering drawings and accompanying narratives as part of the pre-construction permitting processes in Wisconsin, Illinois, and Indiana for multiple natural gas clients. Project scopes included stormwater modeling, stormwater BMP selection and placement, and submission of permits to the appropriate agency.

Wetland Delineation

Worked as a wetland technician on a proposed large-scale solar site in Oregon. Technician responsibilities included in-field data collection for all three wetland criteria (hydric soils, hydrophytic vegetation, and hydrology) and data entry post observation.

Biological Baseline Surveying

Supported a long-term biological baseline survey for a proposed mine development in Nevada. Participated in meandering presence-absence surveys for special status plants and noxious weeds, as well as a Mojave Desert Tortoise pre-relocation population survey.

Contaminated Groundwater Monitoring

Served as a sampling technician on a large groundwater monitoring effort in Colorado for an oil and gas client. Responsibilities included bailer-based sampling, data management in EQuIS, sample management and delivery, waste disposal, and field notation.

Small-scale Construction Permitting

Created state and local permit applications for a small compressor station construction site for a Midwest utility. The team provided comments on the stormwater management design and drafted a modified Stormwater Pollution Prevention Plan (SWPPP) to accompany the local permit application.

Solar Site Plan Development

Supported solar site civil team in designing small to mid-size solar energy sites in the Midwest U.S. Project scopes included maintenance road design, stormwater management, and erosion and sediment control.

Geothermal Development Site Civil Feasibility Assessment

Supported site civil engineering team in a feasibility study for a geothermal development in Northern California. The team drafted a technical report, road and drill pad design figures, and cost estimates for each proposed geothermal site.

In-Situ Soil Stabilization Plan Development

Supported the West Coast remediation engineering team in drafting several in-situ soil stabilization plans in California for transportation/infrastructure clients. Technical responsibilities included CAD drafting, GIS figure development, and report writing.

Stormwater Sampling

Supported North Carolina stormwater team on quarterly inspection, monitoring, and sampling scopes for a transportation client.

Ground Penetrating Radar Oversight

Oversaw a ground penetrating radar survey on a former landfill site in Virginia for an energy client. The oversight role entailed leading daily tailgate meetings, communicating with project contacts (client representatives, ERM project management team, and county officials), ensuring timely completion of assessment tasks by the subcontractor, and maintaining a detailed log of work (Daily Progress Reports, photos, field notes).

Wetland Monitoring

Served as a technician on a restored wetland monitoring effort on a cancelled pipeline development in North Carolina. Using the USACE wetland delineation guidelines, the technician role included in-field data collection and data entry tasks.

Remediation Stormwater Design

Supported stormwater management team in designing and drafting a revised pipe layout, retention pond, and level spreading system for a chemical manufacturing facility in Wisconsin. The design responded to a VOC spill and sought to trap the contaminant in soil on site for future removal.

Commercial Site Stormwater Design

Drafted engineering drawings for a commercial development on the Florida Gulf Coast. Project scope included stormwater modeling, stormwater BMP selection and placement, and wetland-conscious revision of proposed site design.

Diversion and Dewatering Plan Development

Supported stormwater management team in designing a diversion and dewatering plan for an erosion repair at a California utility. Primary responsibilities included cofferdam design calculations and design report edits.

Construction Cost Estimation

Developed detailed cost estimate for a mining client in North Carolina. Estimate scope included pre-construction, materials, labor, planting, and post-construction costs for a set of visual obstruction berms surrounding the mine site.

Air Quality Emissions Reporting

Assisted air quality team with a long-standing annual emissions inventory project for a North Carolina. Project tasks included Greenhouse gas reporting and data analysis.

KEY PROJECTS PRIOR TO JOINING ERM

Rural Drinking Water Treatment Assessment

Served as a Project Lead for the Engineers Without Borders University of Notre Dame Chapter's international project in Ecuador. Responsibilities included directing qualitative and quantitative research efforts, report writing, interfacing with public and nonprofit stakeholders, and completing project management tasks. In-country, she led field activities for monitoring of an existing treatment train and environmental site assessment for larger-scale treatment (including surface water sampling, mapping/surveying, and stakeholder engagement).

Superfund Site Environmental Assessment

Supported ongoing characterization of radioactive contaminants at the Jackpile Mine nuclear waste site in rural New Mexico, U.S. Techniques used included gamma spectroscopy, X-ray fluorescence, electrospray ionization mass spectrometry (ESI-MS) alongside standard lab skills (sampling, technical writing, data analysis, bookkeeping, lab safety).

Wastewater Treatment Expansion for Phosphorus Removal

Drafted a 90% design of a phosphorus removal facility for a wastewater treatment plant in Colorado. Project work included flow/contaminant analysis, treatment method selection, and preliminary facility design to create a design report and plan set.

Rural Road and Bridge Development

Assisted engineering crew with road and bridge construction efforts for timber sales in North Idaho. She worked with an end-to-end timber sale team to conduct preliminary site assessments and terrain surveys, generate road designs, and monitor construction efforts in the field as a Site Inspector.

Science Communication Program Design

Researched, developed, and delivered educational programs for technical and non-technical audiences using historic texts and plans alongside modern scientific data. Program topics included regional geology, hydrology, infrastructure, and night sky interpretation with a focus on personal connection to the environment.

Steve Boyce, PE MBA

Partner

Steve's 30-plus years in mining as both an operator and consultant has informed his ability to understand needs and effectively assemble and lead the right team to create value. He is an expert and thought leader in mine closure and permitting, with a deep understanding of the mining lifecycle and key hurdles for each project. He has expertise in fluid management and mine waste design, evaluation, and operations and the liabilities associated with mining during operations and in closure. Steve is a strong advocate for developing a thorough technical approach that recognizes the need for a thoughtful and beneficial legacy.

EXPERIENCE: 33 years' experience in exploration and mine design, permitting, and closure.

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EDUCATION

- Master of Business Administration, University of Nevada, USA 1999
- Master of Science, Civil Engineering, University of Nevada, USA 1992
- Bachelor of Science, Civil Engineering, University of Nevada, USA 1991

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Professional Engineer (Civil), California USA #53964
- Professional Engineer (Civil), Nevada USA #
- SME Registered Member, 04160390

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Mine Closure
- Exploration and Mine Permitting

- Mine Waste Management
- Reclamation and Asset Retirement Obligation estimates
- Risk Evaluation and Management

KEY INDUSTRY SECTORS

- Mining
- Minerals Exploration

HONOURS AND AWARDS

- Insert or delete if not applicable
- Add additional, as appropriate

PUBLICATIONS

- Insert or delete if not applicable
- Start with most recent publications (of last 5 years)
- If this list is extensive, relocate this entire sub-section to the end (after Key Projects)

KEY PROJECTS PRIOR TO JOINING ERM

Mine Closure, Big Ledge Mine, National Oilwell Varco, Nevada USA, 2017-2019

Provided initial open pit mine closure evaluation and designed an HDPE/Rock composite cover system to close an acid-generating waste rock facility. Tradeoff and risk analyses, fluid management options evaluation, preliminary pit backfill design. This work led to a multi-agency award for the client and increased certainty in the path forward to site stabilization and closure at this high-precipitation mountain site.

Rock Dump Area Closure, Jerritt Canyon Mine, First Majestic Silver, Nevada USA, 2022-2024

Developed risk evaluation for closure options for waste rock presenting high-TDS seepage. Revised approach with the client and regulators to develop comprehensive geochemical evaluation and water balance to better inform closure selection process. Evaluated active and passive water treatment options, cover opportunities, and permitting hurdles to affect permanent closure in a high-precipitation alpine location.

Heap Leach Closure, Wood Gulch, Homestake/Barrick, Nevada USA, 2007-2010

Provided risk-based evaluation of closure options for a discharging heap leach pad where store-and-release cover solutions were shown to be ineffective. Developed the first-ever HDPE/rock/soil composite liner system used in Nevada mining for source control.

Heap Leach Closure, Bald Mountain Mine, Kinross Gold, Nevada USA, 2020-2023

Evalauted existing soils and developed a store-and-release soil cover design to develop a final plan for permanent closure at the site. Used existing ponds to allow a stepwise approach to passive fluid management system development to optimize closure expenditures. Staged closure

provided the client with the opportunity to refine the volume and area of passive evaporation cells as cover efficacy could be determined empirically.

Reclamation Cost Estimate, Multiple Projects and Clients, 2006-2024

Provided many reclamation cost estimates and helped develop the Standardized Reclamation Cost Estimator (Parshley 2006). Utilized deterministic models and the SRCE to complete mine reclamation cost estimates for internal stakeholders, regulatory surety purposes (bonds), and to develop estimates for Asset Retirement Obligations per Sarbanes Oxley. Completed or advised on models in Nevada, Idaho, Arizona, California, New Mexico, Canada, Alaska, Australia, Mongolia and completed AROs for two Nevada mines continuously from 2020 through 2023.

Ruby Hill Underground Mine Permitting, Ruby Hill, i80 Gold Corp, Nevada USA, 2022-2024

Provided turn-key mine permitting solution for client to support underground mine operations with a split mineral estate. Brought key team members together, including external consultants and specialists, to develop a mine plan of operations (MPO), reclamation permit modification, air quality operating permit modifications, water pollution control permit major modification, and environmental assessment under the National Environmental Policy Act. Met key deadlines and managed the federal and state processes for client to target mining in 2024.

Mine Development, Arturo, Barrick/Goldcorp, Nevada USA, 2012-2013

Led the process team for the Barrick-Dee Mining Venture between Goldstrike and GoldCorp for the Arturo Project Feasibility Study SPS300 and process engineering design. Worked with the contracted design engineer to develop a risk-based design for Arturo heap leach facilities that utilized lessons learned from Cortez Area 34, Bald Mountain's Mooney Heap, and the Marigold heap leach facilities. Provided lead support for completion of the MPO and through the successful NEPA process. Managed development of the Feasibility Study design and operating plans for the 80 MT heap leach pad and processing facility for the project.

Technical Services Superintendent, Barrick Goldstrike, Nevada USA, 2013-2016

Led a team of 30 technical services professionals to include process control engineers and technicians, reliability engineers, electrical engineers, predictive maintenance technicians, capital projects engineers, plant engineers, and the process training department. Completed numerous reliability initiatives, plant refurbishment, capital projects, CIL expansion for the Goldstrike Roaster, Autoclave, and CIL/RIL plants. Completed major projects successfully on time and on budget, including the addition of two new CIL tanks at the Roaster ahead of schedule and under budget, leading early additional gold recovery and favorable project financials.

Mine Development, Arturo, Barrick/Goldcorp, Nevada USA, 2012-2013

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NEPA process. Managed development of the Feasibility Study design and operating plans for the 80 MT heap leach pad and processing facility for the project.

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David Abranovic, PE

Partner

David has 38 years of experience in the environmental and mining sectors, focusing on mine closure, soil, ground water, and surface water investigation and treatment. He serves as the Qualified Party on several ERM's General Contractors licenses. His expertise includes development of statistical sample designs of all environmental media; remediation system design; surface impoundment/repository design; the development of risk-based corrective action strategy; conceptual site model development; and surface and ground water fate and transport modeling, remedial investigation, and feasibility studies.

EXPERIENCE: 38 years' experience in environmental and mining sectors

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EDUCATION

- MS. Environmental Engineering, Arizona State University, 1996, USA
- BS. Hydrogeology and Geophysics, Northern Arizona University, 1986, USA

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Professional Engineer, Arizona (#35947)
- Professional Engineer, Utah (#8846817-2202)
- Qualified Party for ERM General Contractor Licenses in Arizona, New Mexico, and Utah
- 40-Hour OSHA Hazardous Waste Operations and Emergency Response
- Mine Safety and Health Administration, Surface Miner Training, 2007, Refresher 2022

FIELDS OF COMPETENCE

- Remedial Investigation/Feasibility Studies (RI/FS)
- Preliminary Assessment/Site Inspection (PA/SI)
- Engineering Evaluation/Cost Analysis (EE/CA)

- Risk Assessment & Risk-Based Corrective Action
- Plan of Operations
- National Environmental Policy Act (NEPA)
- Regulatory Negotiation
- Environmental Compliance Auditing
- Mine Closure Design & Reclamation
- Hydrodynamic and Sediment Transport Modeling
- Acid Rock Drainage Treatment Design
- Groundwater Monitoring System Design
- In situ Chemical Oxidation & Bioremediation

KEY INDUSTRY SECTORS

- Mining and Metals
- Transportation
- Manufacturing

PUBLICATIONS

- Bats in the Adit-Addressing Safety Risks and Preserving Bat Habitat, Mine Closure 2010 Vina del Mar Chile.
- Persulfate Stability Is The Limiting Factor For ISCO In Fine Grained, Iron-Rich Media, Battelle Remediation of Chlorinated and Recalcitrant Compounds. May 2006.
- Successful Remediation of Fuel Utilizing Source Removal and Natural Attenuation. Battelle Remediation of Chlorinated and Recalcitrant Compounds. May 2004.

KEY PROJECTS

Project Coordinator, RI/FS at National Priorities List Superfund Site, 2011 to the present

Duties include acting as the primary client liaison to USEPA and the Utah Department of Environmental Quality, consent decree negotiation, public engagement, development of sampling strategies, coordination of a large technical team that includes human health and ecological risk assessors, analytical chemists specialized in dioxin and polychlorinated biphenyls analysis, and remediation engineers. Project includes a multiphase RI/FS of soil, sediments, surface and groundwater and air within a five mile radius of an active magnesium production facility. The project also includes extensive treatability testing of innovative waste capping technologies to support FS analysis.

Technical Lead, RI/FS at Upper Columbia River Site, 2019 to present

Worked closely with the client and a large multi-disciplinary consultant team on the development of the Data Quality Objectives for the Phase 3 Sediment Study. Task lead for the preliminary nature and extent sample design, including the development of a sediment sampling hierarchy for

multiple sediment sampling methodologies. Development of contaminant fate and transport conceptual site models for riverine and upland portions of the site. Project also included development of anthropogenic background study for metals in upland soils. Development of technical and regulatory strategies related to the RIs as well as treatability testing and FS.

Partner In Charge, Mineral Exploration for Confidential Client, 2022-2023

The project consisted of the planning and execution of a coring project to characterize a lithium clay deposit on Bureau of Land Management (BLM) managed land located in Southwestern Nevada. The goal of the project was to collect information to support the development of a resource model and included all planning and contracting of a mineral exploration required to execute the drilling program. Obtained all necessary federal and county permits required. Worked closely with the Las Vegas BLM office to obtain a Notice of Intent permit for the drilling program, including the implementation of all necessary biological and cultural clearances of the areas of disturbance, as well as reclamation of the drill pads and access roads. The project also required negotiation with the National Park Service to obtain and access permit for drilling equipment and field crews. Worked with the client to develop core logging, splitting, photo documentation, and handling procedures. Identified significant data gaps that may be critical with respect to the timely completion of a future Plan of Operation and National Environmental Policy Act clearance for future exploration activities.

General Contractor Qualified Party (QP), Demolition of Historical Smelter Complex for Confidential Client, 2018-2019

Worked closely with the client as QP for ERM's General Contractor License to conduct demolition of the historical Magma Copper Smelter Complex in accordance with specifications and an agreement with the Arizona Department of Environmental Quality (ADEQ) under the Voluntary Remediation Program and Aquifer Protection Permit requirements. Reclamation activities included the removal of the remaining processing facilities, including the buildings and stack at the Smelter Complex. The scope of work for this project included asbestos abatement, waste removal, and demolition of numerous buildings and associated aboveground piping and ancillary equipment that were impacted by heavy metals. In addition, the 300-foot stack was also demolished, and all waste material was segregated on site prior to disposed at a suitable landfill. Oversaw the development of a Stormwater Pollution Prevention Plan and monitoring of control measures.

Partner In Charge, South32 Hermosa Project Social Impact and Opportunity Assessment, 2019-2020

Conducted a community perception survey to understand the level of community support for or opposition to the Project and to inform targeted efforts to strengthen relationships, and gain input on community priorities to better inform strategic investment. Utilized the outcomes of the pre-feasibility study (i.e. the preferred development option) along with data from the stakeholder consultations to evaluate community impacts (both positive and negative) and identify opportunities for community engagement and enhancement activities.

Partner In Charge, South32 Hermosa Geochemical Data Gap Assessment, 2021

Worked closely with South32 and ERM subject matter experts to conduct a compressive review of historic and recently completed geochemical work, including baseline studies of soils, sediments, and water; NAG/PAG models for waste and tailing. The consolidated information was compared to the proposed mine plan life cycle activities, and the state, federal, and international guidelines to identify significant data gaps that may be critical with respect to the timely completion of pending and future operating permits.

ERMs Qualified Party, Magma Copper Smelter Complex Demolition for Confidential Client, 2018

The project included demolition of nine former smelter buildings and two cooling towers using conventional demolition methods; and explosive demolition of a 300-foot smoke stack. The challenges included working inside active mines, and preparing crumbling smoke stack for explosive demolition (e.g., safety hazards posed by lose debris that could fall from the stack). Provided partial field oversight of the project as QP on ERM's General Contracting License, including the management of solid waste and development of surface water best management practices.

Partner In Charge, Big Sandy Lithium Mine Exploration Environmental Assessment (EA), Hawkstone Minning, 2016-2018

Oversaw the completion of an EA for a mineral exploration project on BLM managed land in Arizona. The project included biological and cultural resource surveys and coordination with BLM on final preparation of the EA report.

Partner In Charge, Mine Plan of Operations (MPO), Copperstone Gold Mine in Quartzite Arizona, 2019

Worked with a team of subject matter experts to update the MPO to include increased production, a dewatering and surface evaporation/infiltration basin system, as well as numerous ore processing and refining facilities. Project also required the development of storm water best management practices and submittal of a Multi Sector General permit notice to ADEQ.

Senior Technical Support and Regulatory Liaison, MPO, Confidential Mine Site in Superior Arizona, 2013

Prepared for approval by the Tonto National Forest. The MPO addressed all mining and mining-related activities conducted on the Tonto National Forest managed property, including operation of a sedimentation basin, Forest Roads needed for hauling, and expansion of mining operations to include claims located on Tonto National Forest managed lands.

Senior Technical Support, Sulfate Reducing Bacteria (SRB) Acid-Rock Drainage (ARD) Pilot Test, Madison Mine, Missouri, 2009-2012

Provided senior technical support to design and implementation team for a bench and pilot-scale treatability studies utilizing SRB for treatment of ARD. Field scale pilot-study included a 7,000 gallon gravity flow subsurface SRB bioreactor and aeration system to treat 20 gallons per minute

of metals impacted ARD. Pilot test successfully reduced metals to allowable permit limits prior to discharge into a regulated surface water body.

Environmental Compliance Audits, Midus and Loan Tree Mines, Nevada, Newmont, 2007

Audits included review of all facility operations to ensure adherence to permit and legal requirements.

Water Compliance Audits, Ray Mine and Hayden Complex, 2007

Audits included review of all facility operations to ensure adherence to permit and legal requirements.

International Compliance Audit Program, Asia, Central America and South America, Confidential Client, 2004-2006

Responsibilities included audit protocol development, scheduling, resource allocation, and budget management.

Partner In Charge, Mine Closure, Arizona, Confidential Client, 2009-Present

The project included the implementation of interim safety measures that quickly reduced the safety risks associated with the site. Worked closely with client to formulate long-term use objectives and mitigate current and future risks at the property. Developed mine closure procedures to prevent human access to the mine features and ensure compliance with state and federal laws, including evaluating critical habitat of threatened or endangered species; identifying historic and/or cultural assets present; and demonstrating that the site does not pose a threat to area water quality. Evaluated the mineralogy and geochemistry of mine related waste rock to evaluate the acid rock generation by conducting acid base accounting and synthetic leaching analysis.

Oversaw an internal bat survey to assess habitat and ventilation of underground workings to support the design of bat-compatible closures. Permanently closed 46 features by backfilling, installation of a polyurethane foam plug, and the installation of culvert type bat compatible closures. Negotiated memorandum of understanding for removal of approximately 20,000 cy of historic tailings from BLM land. Conducted cultural and biological surveys (including Sonoran Desert Tortoise burrow survey) to support an EE/CA and remedial action plan development. Conducted an EE/CA to delineate mining related material and minerals on BLM land provided technical oversight of the design and construction of a rock-mulch capped repository.

Partner In Charge, Blackhawk Mine Tailings Reclamation Design, 2010-2013

Oversaw restoration project at the Blackhawk Mine Site for the State of New Mexico as part of a bankruptcy settlement with the ASARCO Trust. Settlement provided a limited fixed budget for reclamation of the site. Coordinated a team of ERM professionals to develop an innovative project approach that would meet budgetary constraints, of the New Mexico Office of Natural Resources Trustee (ONRT). Served as regulatory liaison to the New Mexico Environment Department (NMED) Mining Environmental Compliance Section, to ensure that reclamation design would meet all applicable requirements. A portion of impoundment, including an adjacent borrow area, was located on BLM property. Conducted a data gap investigation to determine the volume of suitable

cover material available in the BLM borrow area and conducted a failure analysis of the current tailings Impoundment #3 cap and surface water diversion system. Oversaw a team of design engineers to develop an innovative capping approach that included a vegetated rock mulch tailings impoundment cap. This design successfully achieved ONRT and NMED performance criteria within the project budget constraints. This project also involved extensive surface water modeling to support the development of drainage channel designs for both run-off and run-on. Project required the development of a surface water model based on the 100-year storm event to support diversion channel designs and specifications that would efficiently segregate and route all clean surface water away from the impoundment, and capture all potentially impacted run-off from the impoundment in an evaporation toe pond. This approach effectively turned the site into a "zero-discharge-facility" eliminating the need for long-term storm water control measures, and significantly reducing long-term maintenance costs. Completed the 100 percent design submittal for the Preliminary Impoundment Reclamation Plan, BLM Borrow Area Restoration Plan, and Erosion Control Plan. Construction of the tailing cap is scheduled to be completed by NMED in 2015.

Partner In Charge, BLM Nevada Abandoned Mine Sites PA/SI, 2015

Oversaw the completion of PA/SIs at six abandoned mines throughout Nevada. Investigations included delineation of near surface extent of contamination within the study area. The focused field investigation included select field screening for individual metals with an XRF, and the collection of surface soil samples for laboratory analysis. A Screening Level Risk Assessment was completed for each site to compare target metals concentrations detected in soils to conservative risk-based screening levels in order to identify contaminants of potential concern that warranted further evaluation. All six PA/SIs were completed within schedule and budget.

Technical Lead, Wickenburg Mill Site EE/CA, BLM, 2009-2010

The purpose of the project was to develop cleanup alternatives for treatment of impacted soil with manganese, arsenic antimony, and lead. The selected remedy included removal, consolidation, and capping of impacted soil into an onsite repository.

Technical Lead, Brunckow Mine Site Investigation, Cochise County, Arizona, BLM, 2009

The purpose of the SI was to assess the threat posed to human health and the environment by extracted mining material related to the Site, and to determine the need for additional investigations under Comprehensive Environmental Response, Compensation, and Liability Act or other appropriate actions.

Rosemont Copper Mine Environmental Due Diligence Review, Arizona, Multiple Confidential Clients, 2005 and 2009

Conducted multiple evaluations of the necessary permits for the proposed open pit copper mining project, as well as an evaluation of the procedure and schedule for obtaining Forrest Service approval of the Environmental Impact Statement.

Alex Hood Msc, MBA, EP

Partner Mining

Alex Hood is a Partner at ERM based in Scottsdale, Arizona, specializing in mine closure and the remediation of hardrock and mineral mine sites across North America. She is a recognized environmental leader with deep expertise in legacy site management, post-closure stewardship, and community-integrated planning. With a career spanning North and South America, Australia, and Europe, Alex brings global insight to complex closure challenges, including permitting, technical due diligence, and perpetual care frameworks. Her strategic leadership on high-profile U.S. projects—such as the Giant Mine Remediation Program and Red Dog Mine Closure Plan—demonstrates her commitment to sustainable outcomes and her ability to align multidisciplinary teams around long-term environmental and social goals.

EXPERIENCE: 20+ years' experience in Mining Sector

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EDUCATION

- Masters of Business Administration, Executive Management, Royal Roads University, Canada, 2024
- Masters of Science, Environmental Practice, Royal Roads University, Canada 2018
- Masters of Science, Environment and Resource Studies, University of Waterloo, Canada, 2009
- Diploma of Excellence in Ecological Restoration and Rehabilitation, University of Waterloo Canada, 2008
- Diploma of Excellence in Environmental Assessment, University of Waterloo, Canada 2008

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Arizona Mining Association (AMA) Member
- Certified Ecological Restoration Practitioner, Society of Ecological Restoration
- Society for Mining, Metallurgy and Exploration (Member and Student Mentor)
- International Network for Acid Prevention, (Member and Organization Committee)
- United Nations Decade on Ecosystem Restoration, (Training Facilitator and Instructor)
- Women in Mining Canada (Member and Former Board Member)
- Prospectors and Developers Association of Canada (Member)

HONOURS AND AWARDS

- Canadian Land Reclamation Association Project Excellence, Global Bat rehabilitation
- CEO Award Business Improvement: Snap Lake Mine | De Beers Canada Inc
- CEO Award Business Improvement: Victor Mine | De Beers Canada Inc
- CEO Award Safety Health and Environment | De Beers Canada Inc.

PUBLICATIONS

Planning the End from the Beginning: Stakeholder Engagement in Post-Mining Land Use | Lead author | Mine Closure Proceedings 2025

When Mine Closure Lacks Dollars and Sense: Common Pitfalls and Practical Solutions in Mine Closure Planning | Lead author | Mine Closure Proceedings 2025

Food Web and Dietary Niche of Lake Trout in a Subarctic Lake. | Co-author | North American Journal of Fisheries Management 2019

Evaluating outcomes of restoration ecology projects on limited budgets: assessment of variation in sampling intensity and sampling frequency for four habitat types. | Co-author | Restoration Ecology 2018

A Cautionary Note: Ceriodaphnia dubia Inter-Laboratory Test Variability| Co-author | Bulletin of environmental contamination and toxicology Inter-Laboratory Test Variability | Co-author | North American Journal of Fisheries Management 2019

JOURNAL REVIEWER

- Journal of Arctic Science; Technical Reviewer (2023- present)
- Resources Policy; Reviewer (2019-present)

CONFERENCE SPEAKER AND TECHNICAL REVIEWER

- North American Mine Closure Working Group, Member and Facilitator 2017-present
- ACG: Mine Closure Speaker, Mine Closure Lessons Learned and Integrated Stakeholder Engagement
- Canadian Ecotoxicology Workshop 2010-2017, Organizer and Presenter (Aquatic effects and Incorporation of Traditional Ecological Knowledge)
- International Network for Acid Prevention, 2019-2023 Organizing Committee, Facilitator and Technical Reviewer
- UN Decade of Restoration Global Course Facilitator 2023-2024 – Ecological Restoration
- Society of Ecological Restoration Conference 2023 (Conference presenter, Lessons learned from mining on bat habitat remediation)
- Conservation of Arctic Flora and Fauna (CAFF) Flora Group Workshop, Presenter and Workshop Participant, 2018 Finland.
- Technical Reviewer Planning for Closure 2023, 2024 (Chile)
- ACG: Mine Closure 2023 Panel Member, The future of Mine Closure, (Reno Nevada)
- Society of Mining, Metallurgy and Exploration (2024) Presenter, Technical Reviewer

LANGUAGES

- English, native speaker
- French, CEFR B1; Bilingual Certification

- Spanish, CEFR B2

FIELDS OF COMPETENCE

- Mine Site Rehabilitation and Closure Planning
- Environmental and Sustainability Corporate Strategy Development and implementation
- Mine Site Rehabilitation and Closure Planning
- Environmental and Sustainability Corporate Strategy
- Biological Studies Strategy and Implementation
- Due Diligence and Project Acquisition
- Risk Management
- Stakeholder engagement
- Permitting and Legislative compliance
- Project Management
- Sustainable Innovation Integration

KEY INDUSTRY SECTORS

- Mining and Metals

KEY ERM PROJECTS

Partner in Charge and Technical Lead, Red Dog Mine Closure Plan, AK (2024-present)

Currently serving as the strategic and technical lead for the development and implementation of the Red Dog Mine Closure Plan, one of the most complex and high-profile mine closure efforts in North America. This ongoing role involves leading integrated, multidisciplinary scopes across geochemistry, hydrology, engineering, and stakeholder engagement to design a closure strategy that ensures long-term environmental stability and regulatory compliance. I guide scenario planning, adaptive management frameworks, and risk-based decision-making while collaborating closely with Indigenous communities, state and federal regulators, and Teck's internal teams. My leadership ensures that legacy land use, water quality, and reclamation goals are aligned with both technical feasibility and community values.

Partner in Charge and Technical Lead, Giant Mine Perpetual Care Plan, Canada (2024-present)

Actively leading strategy and multidisciplinary integration for the Giant Mine Remediation Program, one of Canada's most complex and long-term legacy mine projects. The site includes extensive arsenic trioxide contamination, underground mine workings, and deteriorated infrastructure from historic gold mining operations. My role involves coordinating across geotechnical, hydrogeological, risk assessment, and stakeholder engagement disciplines to develop a perpetual care framework that ensures environmental and social stewardship in perpetuity. I work closely with Indigenous communities and federal agencies to integrate the legacy and lived experiences of local people into closure planning, ensuring that technical solutions are grounded in cultural relevance and long-term sustainability.

Regulatory and Technical Lead, CKPC, Heavener Lease Environmental Site Investigation, OK (2024)

Served as the technical lead for a supplemental Environmental Site Investigation at a 183-acre abandoned coal mining site in Oklahoma, supporting CPKC's Fair Market Value (FMV) initiative and

environmental liability assessment. The site included legacy infrastructure such as coal dryers, rail loading systems, and residual stockpiles. I facilitated alignment between ERM technical teams and CPKC stakeholders, supported the development of a targeted sampling strategy to assess coal residuals and acidic seeps, and completed the technical report including interpretation of analytical results and next steps development. I collaborated with regulatory agencies to ensure compliance and transparency, and integrated historical site data with new findings to refine liability estimates and update the environmental risk register. This project contributed to ERM's broader expertise in abandoned mine lands characterization, risk evaluation, and remediation planning.

Technical Lead and Subject Matter Expert, Various Clients (including Rio Tinto, Glencore, Couer, AngloAmerican, Sibelco, Nevada Gold Mines amongst others)

As a seasoned subject matter expert and technical reviewer, I provide strategic guidance and multidisciplinary oversight across global mining projects, with a focus on landform design, remediation planning, water quality and acrid rock drainage management, revegetation, and long-term risk mitigation. My work integrates ecological, hydrological, and geotechnical considerations to support sustainable closure outcomes and regulatory compliance. I specialize in translating complex environmental data into actionable strategies, facilitating stakeholder engagement, and aligning legacy site conditions with contemporary remediation frameworks. My contributions span conceptual design through implementation, ensuring resilient land use transitions and enduring environmental stewardship.

KEY ROLES PRIOR TO JOINING ERM

Agnico Eagle Mining 2020-2023 (employee)

Director Closure and Legacy; Critical Infrastructure, Risk Management and Closure Group

Managed 1200 historic mining properties and 21 sites in active mine closure or care and maintenance. Lead teams of up to 35 employees plus contractors and consultants. Member of 5 Mine Closure working groups at provincial, federal, and international level. Directed mine closure planning and execution at legacy sites to ensure regulatory compliance, human, and wildlife safety. Provided technical review and expert advice to 15 operating Mines globally in seven jurisdictions with complicated Acid Rock Drainage and mine water and stability challenges across the group. Supported the analysis of potential projects and life of mine plans to reduce uncertainty and financial loss. Oversaw and socialized changes to Asset Retirement Obligations (ARO), to reduce costs and uncertainty. Achieved zero harm across sites. Completed closure engagement and incorporated in mine design with 12 First Nations communities. Developed and implemented a corporate mine closure standard and guideline.

De Beers Victor Mine 2017-2020 (employee)

Environmental Superintendent

Managed the preparation of multiple, concurrent regulatory applications for the short-term and long-term needs of the Victor Mine. Oversaw a multi-million-dollar environmental department budget. Managed the resolution of regulatory issues (Metal and Diamond Mining Effluent Regulations, and other federal and provincial/territorial regulatory changes and legal challenges

related to methyl mercury and seepage water in the region) that had the potential to impact site operations. Developed and Implemented Mine Closure Plans through to execution. Developed strategic guidelines for policies and procedures and established new programs. Developed a permitting strategy for existing and future projects, overseeing strategy implementation. Built a strong, committed, multi-disciplinary team by leading, motivating, and delegating. Completed 3 complex Environmental Assessments for two mine sites.

De Beers Snap Lake Mine 2010-2017 (employee)

Environment and Permitting Superintendent

Provided subject matter expertise regarding laws, regulations, guidelines, and industry standards. Communicated regulatory information and collaborated with cross-functional teams on the preparation of information required to ensure regulatory compliance. Led junior environmental staff involved in on-site compliance monitoring program. Led community engagement discussions and delivered public presentations. Translated technical information for regulatory packages with data for a non-technical audience. Oversaw and managed permitting and closure planning. Lead external stakeholder engagements including regulators and Indigenous communities. Authored and reviewed reports and other submissions to regulatory agencies. Managed consultant work scope, budget, and financial reporting.

Government of Canada Department of Fisheries and Oceans 2008-2009 (employee)

Senior Fisheries Management Biologist

Provided subject matter expertise regarding Fisheries Management in the Northwest Territories. Communicated regulatory information to proponents and public in relation to fisheries harvest and stock assessments for both fish and marine mammals. Reviewed, issued, and managed scientific, Commercial, and Subsistence Fisheries Licenses. Lead reviewer for the Mackenzie Gas Pipeline review for DFO. Chair of the Great Slave Lake Advisory Committee, Ingraham Trail Working Group and Tlicho Harvest Study with a multi-stakeholder group with diverse goals to encourage collaboration and sustainable harvests.

Nature Conservancy of Canada Oceans 2008 (employee)

Restoration Research Assistant

Delineated conservation targets of significance and identified threats to alvar and savannah property owners to facilitate the creation of goals and objectives for management. Developed costing and management tools for conservation targets and risk analysis. Public outreach and monitoring of NCC owned sites including restoration plan creation, modeling and execution, easement and annual inspection monitoring, report writing and invasive species management.

Ministry of Natural Resources Ontario (employee) 2007-2008

Biodiversity Monitoring Technician

Wildlife monitoring and data synthesis for studies related to avian nest success in response to silviculture treatments. Assisted with research related to raptors, bats, flying squirrels, reptiles and amphibians within Algonquin Park.

Public Works and Government Services Canada (employee) 2006, 2007

Assistant Environmental Officer

Reviewed government projects to determine Environmental Assessment requirements. Sampled for designated and hazardous materials requiring remediation at government owned properties in Ontario, Quebec and Nunavut. Developing action plans for mitigating and managing hazardous materials focused on asbestos and lead.

Durham District Schoolboard Canada (employee) 2005, 2006

Development and implementation of outdoor education programming for public elementary and high school students.

Jim Boykin

Principal Consultant

Jim is a Principal Consultant in ERM's Land Services division and has over 17 years of experience in the field of Real Estate. For nearly 13 years prior to joining ERM, Jim was a leader in Real Estate & Right of Way at two of the Nation's largest gas and electric utility corporations. He was responsible for leading a team in support of all real estate and right of way activities including property rights acquisition (public & private), vegetation management rights, railroad and state agency license agreements, highway relocation projects, lease & license program management, Public Utility Commission compliance, customer inquiries & investigations, condemnations, expert witness testimony, and strategic initiatives. In addition, Jim has led many transformative initiatives that delivered on best-in-class performance, innovation, and customer experience. Jim looks forward to supporting clients with the most advanced land and right of way solutions.

EXPERIENCE: Over 17 years' total experience in the Real Estate industry and more than 13 years' experience in Power sector real estate & right of way

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EDUCATION

- Master of Science (MS). Accounting, Wilmington University, USA, 2013
- Project Management Certificate. University of Delaware, USA, 2008
- Bachelor of Science (BS). Business Administration, University of Delaware, USA, 2006

PROFESSIONAL AFFILIATIONS & REGISTRATIONS

- Southeastern Electric Exchange (Speaker)
- Energy Association of PA (Speaker)

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Utility real estate and right of way acquisition and/or disposition
- Contract negotiation
- Real estate innovation
- Project management
- Permitting and licensing

KEY INDUSTRY SECTORS

- Power
- Oil & gas
- Telecommunications
- Real estate & land development

HONOURS AND AWARDS

- Leon & Margaret Slocomb Most Outstanding Student Scholarship
- Phi Eta Sigma National Honor Society

KEY PROJECTS

Program management lead for renewable projects

Leads acquisition and landowner outreach efforts for utility, community, and BESS projects through the United States.

CAISO Competitive Solicitation Bid routing

Supported 2023-24 CAISO Competitive Solicitation Bid routing analysis and environmental support for three new transmission lines. This included reviewing land acquisition constraints and acquisition costs to support bid submission. Supported 2022-23 CAISO Competitive Solicitation Bid for routing analysis and environmental support for the Red Bluffs Substation to Mira Loma Substation line. Responsibilities included identifying key target parcels for acquisition and advise on property owner constraints throughout the routing process.

Property and Property Rights Acquisition

Lead a Right of Way (ROW) organization of up to twenty ROW Agents and contractors related to capital project delivery. Duties include planning and executing the acquisition of public and private real estate and ROW, vegetation management rights, railroad and state agency license permitting and license agreements, highway relocation projects, PUC regulation compliance governing ROW, encroachment agreements, customer inquiries and investigations, damage settlements, condemnations, and strategic initiatives.

Lease and License Program Management

Responsible for managing Distribution Operations license agreement portfolio of over 250 annual agreements for one of the nation top utilities. Built a new cloud-based MS teams database to proactively manage the program including a visualization dashboard to analyze billing trends to align with the working and overall budget in excess of $1 million annually.

Rhode Island Energy Utility Acquisition

Led asset integration efforts for the Land and Right of Way team for a 3.5-billion-dollar utility acquisition. This included working with a team to establish a Transaction Services Agreement (TSA) prior to close, organizational structure, process management, IT systems integration, record management, and other activities to integrate the new assets.

Utility Scale Battery Site Strategy & Acquisition

Subject matter expert on the project team to establish the company's battery energy storage system (BESS) program. This included creating and standardizing the land and ROW strategy for securing the required sites and establishing agreements. Successfully secured two BESS sites in PA.

ROW Strategic Initiative (One-Visit)

Executed a strategic ROW initiative for 100% remote and field mobility. A transformation that included an all-electronic workflow with e-signature capabilities, digitizing over 3 million records into a searchable format, and automating tasks leading to a more cost-effective operation and better customer experience. Jim was a speaker at the Southeastern Electric Exchange (SEE) conference on this topic in 2021.

Lewis to Ontario 69kv Transmission Rebuild- New Jersey

6.4 mile rebuild of existing wood pole line to steel through environmentally sensitive areas. Conducted routing study including reviewing existing easements, licenses, and permits to determine constructability and constraints. Worked closely with stakeholders to determine the most feasible and least impactful routing options. Provided technical support as it relates to landowner engagement including securing (2) NJDOT road crossing permits, (1) NJTRANSIT railroad crossing permit and a laydown area for helicopter construction.

Garden State Parkway Transmission Line Relocation Project- New Jersey

11 mile stretch of transmission utility relocations to accommodate road widenings and bridge construction along the Garden State Parkway in New Jersey. This included temporary and permanent relocations of transmission and distribution facilities. Coordinated meetings with all key stakeholders with NJTA and utility to review all draft utility orders and timeframes. Reviewed and secured all the appropriate easements and permits required to successfully complete the project.

New Bloomsburg Substation Project- Pennsylvania

Oversaw a team in connection with the due diligence, permitting, and acquiring distribution rights for a new 69kv substation. This included miles of new distribution lines, coordination with a major University, very complex ownership structures, expert witness testimony.

Jacob Hook

Partner

Jacob (Jake) is a Partner with over 17 years of experience completing large scale demolition and remediation projects. He has extensive experience in completing environmental remediation, decommissioning and demolition projects, including strategy development, cost estimating, regulated building assessments, technical specification development, project planning, and managing field oversight activities. Jake has experience performing soil and groundwater investigations, remediation system operation and maintenance, property due diligence for property acquisitions and divestitures, building regulatory compliance programs, and environmental permitting.

EXPERIENCE: Over 17 years' experience in mining, power, oil & gas, chemical, and manufacturing sectors

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EDUCATION

- B.S. Civil Engineering, University of Illinois (2008)

LANGUAGES

- English, native speaker

FIELDS OF COMPETENCE

- Facility decontamination and demolition
- Project and construction management
- Strategic approaches for site closure
- Facility decommissioning
- Waste management
- Remediation of groundwater, soils and sediments
- Soil and sediment investigations
- Hazardous waste remediation

- Environmental regulatory compliance

KEY INDUSTRY SECTORS

- Power
- Oil & gas
- Pharmaceutical
- Chemical
- Manufacturing

KEY PROJECTS

Coal Plant Selective Abatement and Demolition

Served as the project manager for the turnkey demolition of the coal offloading and handling equipment associated with coal fired power plant. The demolition project included site assessment program for ACM, lead and PCBs, specification development, bid review and contractor evaluation. The field work included the abatement and demolition of the coal offloading and transfer structures including structural dismantlement of the coal offloading structure.

Mine Closure Planning and Demolition Estimate

Lead the development of the infrastructure domain closure plan for a large copper and zinc mine in Alaska. The work including developing the closure scenarios and strategies for the decommissioning and demolition of a large, remote mine site in Alaska as the mine approached its end of life.

Demolition Planning/Scope Development Holland, MI

Served as the project manager for the turnkey demolition of a five-unit coal fired power plant in Michigan. Project tasks initially included performing a Phase I ESA and Phase II ESA followed by targeted soil remediation. The demolition project included site assessment program for ACM, lead and PCBs, specification development, bid review and contractor evaluation. The field work included the full site abatement, hazardous materials management and demolition including the explosive demolition of a multiple boilers and stacks. The project work also included permitting for the closure of the plant's intake structure.

Demolition Planning/Scope Development, Multiple Fossil Power Plants, Arkansas, Mississippi, Louisiana

Served as the project manager for the demolition planning and scope development for multiple (twelve) fossil power plants in Arkansas, Louisiana and Mississippi for a major power generation company. The program represented over $65 million in construction/demolition spend. The program included developing a multi-plant execution and budget management plan, developing and executing a plant decommissioning and hazard assessment program, developing project demolition scopes and bid documents.

- Served as the project manager for the demolition execution oversight as owner's representative of a 234 MW generating facility in Arkansas. Project tasks included site assessment program for ACM, lead and PCBs, specification development, bid review and

contractor evaluation. The field work included the full site abatement, hazardous materials management and demolition including the explosive demolition of a concrete chimney and steel boiler structure.

- Served as the project manager for the demolition execution oversight as owner's representative of 160 MW generating facility in Arkansas. Project tasks included full site abatement, hazardous materials management and demolition, and the explosive demolition of the boiler structures.
- Served as the project manager for the demolition execution oversight as owner's representative of 138 MW generating facility in Mississippi. Project tasks included full site abatement, hazardous materials management and demolition, and the explosive demolition of the boiler structures.
- Served as the project manager for the demolition execution oversight as owner's representative of 80 MW generating facility in Mississippi. Project tasks included full site abatement, hazardous materials management and demolition, and the mechanical demolition of the boiler structure. The project also included the planning and regulatory closure of multiple wastewater treatment ponds.
- Served as the project manager for the demolition execution oversight as owner's representative of a 234 MW generating facility in Arkansas. Project tasks included site assessment program for ACM, lead and PCBs, specification development, bid review and contractor evaluation. The field work included the full site abatement, hazardous materials management and demolition including the explosive demolition of a concrete chimney and steel boiler structure.
- Served as the project manager for the planning and demolition of multiple units within an active power plant in Louisiana. Project tasks included unit decommissioning and isolation, structural assessments of the units, site assessment program for ACM, lead and PCBs, specification development, bid review and contractor evaluation. The field work included the full site abatement, hazardous materials management and demolition within an active plant.

Coal Fired Power Plant Landfill Closure Design

Assisted in the closure design of a coal fired power plant's nonhazardous waste landfill. Key project tasks included developing the waste grading plan and final cover design, construction drawings, performing hydrologic modeling calculations, designing stormwater culverts and discharge structures, designing leachate collection system, and preparing bid documents including specifications and a construction quality assurance plan. The design was used to develop a path forward for the permanent closure of the landfill and reduce the client's long term liability.

Omar Itani, PE

Principal Technical Consultant

A Professional Engineer with 27 years of geotechnical experience in consultancy and design-build contracting. Strategic, technical, and commercial insight has been developed, along with a balanced approach to planning and execution. The geotechnical lifecycle has been covered—from investigations to construction drawings—with contributions made to simple and complex geotechnical systems and applications. Projects have been delivered across the USA, Middle East, Europe, and East Africa, including ports, aviation hubs, tunnels, high-rises, and energy facilities.

EXPERIENCE: 27 years' experience in geotechnical engineering

EMAIL: omar.itani@erm.com

EDUCATION

- MEng. Tunneling Engineering, Technische Universität Graz, Austria, 2015
- MSc, Geotechnical Engineering, Kansas State University, USA, 2000
- BSc, Civil Engineering, Beirut Arab University, Lebanon, 1996

PROFESSIONAL AFFILIATIONS AND REGISTRATIONS

- Professional Engineer (PE) Ohio – Ohio State Board of Registration
- Professional Engineer (PE) Florida – Florida Board of Professional Engineers
- Professional Engineer (PE) Georgia – Georgia State Board of Registration for Professional Engineers and Land Surveyors

LANGUAGES

- English
- Arabic

FIELDS OF COMPETENCE

- Geotechnical Engineering (Consultancy & Design-Build)
- Deep and Shallow Foundation Systems

- Excavation Support Systems (Shoring, Strutting, Anchoring, Dewatering)
- Soil Investigation and Geotechnical Recommendations
- Ground Improvement and Cutoff Wall Design
- Slope Stability and Sinkhole Mitigation
- Diaphragm, Secant, and Contiguous Pile Walls
- Offshore and Marine Geotechnics
- Complex Geotechnical Applications and Superstructure Support
- Project Lifecycle Management (Design to Construction)
- Strategic Planning and Practical Execution
- International Project Delivery (USA, Middle East, Europe, East Africa)
- Technical, Commercial, and Contractual Integration
- High-Rise, Infrastructure, and Energy Sector Projects

KEY INDUSTRY SECTORS

- Energy and Utilities
- Marine and Offshore
- Transportation and Infrastructure
- Industrial
- Residential
- Commercial

PUBLICATIONS

- Underground Risk Allocation in Construction Contracts 2015: applying ÖNORM B2203-1 Edition 2001-12-01 Contract for Underground Cyclic Driving Tunneling works to establish matrices of time dependent costs (2015)
- Artificial Intelligence applications in Geotechnical Engineering. Itani, Omar M. and Najjar, Yacoub M., 2000, "3-D Modeling of Spatial Soil Properties Via Artificial Neural Networks", Transportation Research Record, Journal of The Transportation Research Board No. 1709, pp. 50-59. This publication was presented at the TRB 79th Annual in Washington D.C. (January 2000) and at ANNIE 12th International Conference in St. Louis, Missouri (November 2002)
- Locating Waste Management System Sites Using GIS Technology", Electronic Journal of Geotechnical Engineering, Volume 6, 2001Starrett, S.K., O. Itani, H. Davalos, Y. Najjar, and L. Reddi, 2001"
- Determining the collapsibility potential of natural soils using Artificial Intelligence Modeling and Approach (2000)

KEY PROJECTS PRIOR TO JOINING ERM

Sinkhole Risk Assessment, Orlando, FL

A geotechnical investigation was conducted in Orlando, Florida to evaluate the potential risk of sinkhole occurrence as a geologic hazard. Karst-prone formations were identified through geologic mapping, with analyses performed on the depth, thickness, and behaviour of the underlying soil and rock, alongside groundwater fluctuation patterns. Historical aerial imagery and topographic data were utilized to detect surface anomalies, supplemented by on-site reconnaissance, direct investigations, and geophysical exploration. Groundwater monitoring systems were installed to support long-term observation. Risk levels were assessed based on indicators such as loose or ravelled soils, abrupt groundwater changes, and visible surface depressions or cracking. Finite element modelling was employed to simulate stress distribution and subsidence potential. Known and suspected sinkholes were explored and categorized according to the necessity for remedial measures, with the potential impact of such interventions on future sinkhole activity analysed. Compaction grout plugs were recommended at locations of suspected sinkhole throats, and soft or compressible soils were identified for replacement with engineered fill. In high-risk zones, water infiltration barriers were proposed as alternative mitigation solutions.

Golden Line Metro Project, Doha, Qatar

The geotechnical design-build of ground improvement works for the Golden Metro Line in Doha, Qatar, was undertaken to mitigate risks associated with ground subsidence due to pre-existing fissures formed by karstic occurrences. A comprehensive risk assessment was conducted utilizing critical data obtained from primary and secondary probing, as well as geophysical surveys. The site was classified into zones of high, medium, and low subsidence probability. Based on the depth, size, and location of the identified voids, interpolation and extrapolation techniques were applied to estimate subsidence risks across unprobed areas. FLAC3D was employed as the numerical modelling tool to perform 3D geotechnical and rock mechanics simulations, enabling precise evaluation of ground stability and its impact on the underground metro infrastructure. Subsequently, a targeted grouting campaign was executed, involving primary and secondary injection points, with grout viscosity strategically varied throughout the process to ensure optimal penetration and effectiveness.

The Tower: Dubai Creek Harbor

The Tower at Dubai Creek Harbor, a US$1.3 billion flagship development in Dubai, is being positioned to become one of the tallest man-made structures in the world at 3,773 feet. Designed with a slender central column stabilized by steel cable stays, the project was executed with a 225-foot-deep barrettes foundation system, cable anchorage elements, cast-in-situ bored piles with cathodic protection, and temporary shoring systems. The geotechnical design-build scope was delivered successfully, including a world-record 36,000-tonne foundation load test. Completion was achieved within a one-year timeline, supported by a 350-person workforce operating in double shifts, and over 1 million accident-free man-hours were recorded within a managed budget of US$85 million. Despite its complexity, safe delivery was ensured through rigorous safety protocols and on-site emergency support.

North Alabama Data Centres

Spanning approximately 104 acres, the project site encompasses a complex infrastructure that includes multiple heavily loaded buildings, ancillary equipment areas, a substation, switching yard, water quality ponds, and extensive pavement zones. The buildings feature composite structural slabs and metal roof decks, reflecting robust engineering standards. A comprehensive geotechnical scope was undertaken to evaluate subsurface conditions and establish critical parameters for design and construction. This included site reconnaissance, soil borings, geophysical surveys to assess sinkhole risks in karst terrain, laboratory testing, and specialized assessments such as radon and thermal resistivity testing. Rigorous engineering analysis informed design recommendations, culminating in a detailed geotechnical report that ensured structural integrity and supported successful project execution in a geologically challenging environment.

Railroad & Department of Transportation (DOT) Projects

This category of projects was included to highlight the breadth of nationwide involvement and the depth of experience gained through diverse and technically demanding assignments. Over 150 railroad and Department of Transportation (DOT) projects were supported, involving comprehensive site evaluations, underground investigations, and geotechnical recommendations. For railroad infrastructure, foundation systems were transitioned from wood to concrete piles, and ballast section failures were investigated across multiple states. DOT initiatives were addressed through site investigations supporting liquefaction analyses, ramp and bridge foundation designs, and earth retaining systems. Unique subsurface conditions, such as fractured bedrock, soft clays, and high-water tables, were encountered, requiring innovative solutions. Work was carried out across varied terrains—from the Montana Rockies to the U.S.-Mexico border—under environmental and logistical constraints. Extensive travel exposed new regions and stakeholders, enriching professional perspective and reinforcing adaptability, precision, and perseverance as essential qualities for managing complex, high-stakes projects nationwide.

Silicon Oasis Data Centres

A buoyancy issue caused by rising groundwater was encountered beneath a five-story building within a 2.8-square-mile free-trade zone and technology park established in 2003, resulting in significant structural damage to the underground parking area. To mitigate the problem, a permanent cutoff wall was designed and constructed using specialized diaphragm wall equipment, penetrating 100 feet into rock and extending 1,300 yards in plan. An automated dewatering system was installed to regulate water levels efficiently. Complex challenges—including precise construction tolerances, excavation in strong rock, relocation of mature trees, dismantling of surface structures, and rerouting of sensitive utilities such as military-grade fiber optic cables—were successfully addressed. The project was completed within 1.5 years, and water infiltration was substantially reduced, eliminating structural damage and costly maintenance. Annual savings of US$1.5 million were achieved, underscoring the project's success and exemplifying engineering precision and innovative problem-solving.

Residenze Skyscraper

A residential skyscraper rising to 1,099 feet across 85 stories was engineered with precision and advanced construction techniques. After the completion of shoring works by others, a critical issue emerged when rising water levels were not effectively managed, despite the systems being properly designed and constructed. The challenge was heightened by historical failures at a nearby site, where shoring collapse led to flooding and equipment loss. To stabilize the situation, foundational engineering principles were applied innovatively: controlled water balance was introduced, scuba divers placed sandbags to mitigate soil erosion, and extensive soil improvement and anchor system overhauls were implemented. Over the course of a year, catastrophic failure was successfully prevented in a densely developed area, with all work executed safely and efficiently, demonstrating engineering resilience and problem-solving under pressure.

Thank you

If further information is required, please reach out to:

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