

TECHNICAL

Pebble Mine Project Third-Party EIS

Prepared for
US ARMY CORPS OF ENGINEERS
PEBBLE LIMITED PARTNERSHIP

JANUARY 29, 2018



Objective. Concise. Delivered.

January 29, 2018

James Fueg, Vice President – Permitting
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Subject: Proposal for Third-Party EIS Contractor for the Pebble Mine Project

Dear Mr. Fueg:

Thank you for the opportunity to present the Pebble Limited Partnership (PLP) and US Army Corps of Engineers (USACE) with the enclosed proposal to support the National Environmental Policy Act (NEPA) compliance process for the Pebble Project. With our relevant project experience and subject matter expertise, AECOM will meet the following objectives for preparing a streamlined and legally defensible EIS, effectively engaging relevant stakeholders.

Objective.

We will complete preparation of the Environmental Impact Statement (EIS) in 21 months through a streamlined NEPA process and systematic application of objective science expertise. AECOM has the Alaska-based team, technical approach, process tools, and large-scale mining project third-party NEPA experience to deliver an objective and concise EIS.

We understand that scientifically accurate analyses are key to successful, timely document completion given the strong public spotlight on the project. Our approach is founded on objective analyses from world-class experts and individuals with deep experience in the issues and in preparing third-party EISs, underscored by a firm that maintains a strong reputation for objective assessments. Our expert water, fisheries, and mining focus teams are formed to establish objective criteria that frame the actual and relevant issues, and to evaluate and present impacts and potential mitigations with a quantitative base. We have a team to deliver the essential sound, objective, expert treatment of the issues in a NEPA context.

Concise.

AECOM is differentiated as the team with recent relevant experience— on the Donlin Gold EIS—that allows us to streamline and leverage methods that worked well and to incorporate improvements from lessons learned. We will focus on concise chapters in the body of the EIS and judiciously use appendices for detailed technical information.

Delivered.

We recognize the critical value of time in completing this EIS. Our proposed schedule delivers the Final EIS in 21 months. We will meet this schedule by concurrent chapter development, concise writing, team sequestering at critical process moments, and the commitment of key team members. AECOM is also differentiated by our ability to respond to new issues based on our deep bench strength of in-house resources. We are the team with the ability to reach quickly around the world for the right expertise, as needed.





We recognize the project as the most discussed mine development project proposed in Alaska. We built our approach knowing that the NEPA process must anticipate and address questions from Alaskans and other stakeholders about what the proposed project looks like and what the positive and negative impacts may be. We anticipate that comments may number over a million during scoping and on the Draft EIS. AECOM will apply systematic processing of comments so that all are catalogued, reviewed, and evaluated promptly with a plan, a tool set, and a process to address the comments. We have the public involvement experience with controversial projects to focus public dialogue on the issues rather than the process or behavior of the contractors, proponent, or agency— helping to keep the EIS on schedule.

By AECOM

AECOM (NYSE:ACM) will be the prime contractor. We have a global environmental practice with local Alaska knowledge and expertise. We have considerable experience in mining-related NEPA with the USACE both in Alaska, including the Donlin Gold EIS and Chuitna Coal Mine Supplemental EIS, and in the lower 48 states. In addition to our extensive in-house team, we propose several specialized subcontractors to address specific issues and provide unique services: **Keith Torrance, PhD**, Sustainable Earth Research, LLC; **Dilip Mathur, PhD** and **Ken Cash**, Normandeau Associates; **Sheyna Wisdom**, Fairweather Science, LLC; **Jim Richardson**, ResourcEcon; **Patty Murphy**, E3 Alaska; **Derek Rizzo**, Ecosystem Sciences, LLC; **Jim Aldrich**, Arctic Hydrologic Consultants; **Ned Gaines**, Brice Environmental Services Corporation; **Sam Merritt** and **Dean Anderson**, NightOwl Discovery; and **Joseph Meyer, PhD**, Applied Limnology Professionals, LLC.

Our endpoint is to prepare a concise, clear, one-voice, legally defensible and thorough EIS for the USACE that embodies a streamlined approach to NEPA. AECOM is privileged to be considered for the role of third-party NEPA contractor. We are eager to work together with the USACE to demonstrate this streamlined approach to the EIS process on a world-class project.

For any questions about the proposal or AECOM's resources and commitment, please contact Bill Craig, Project Manager, at any of the numbers below.

Sincerely,

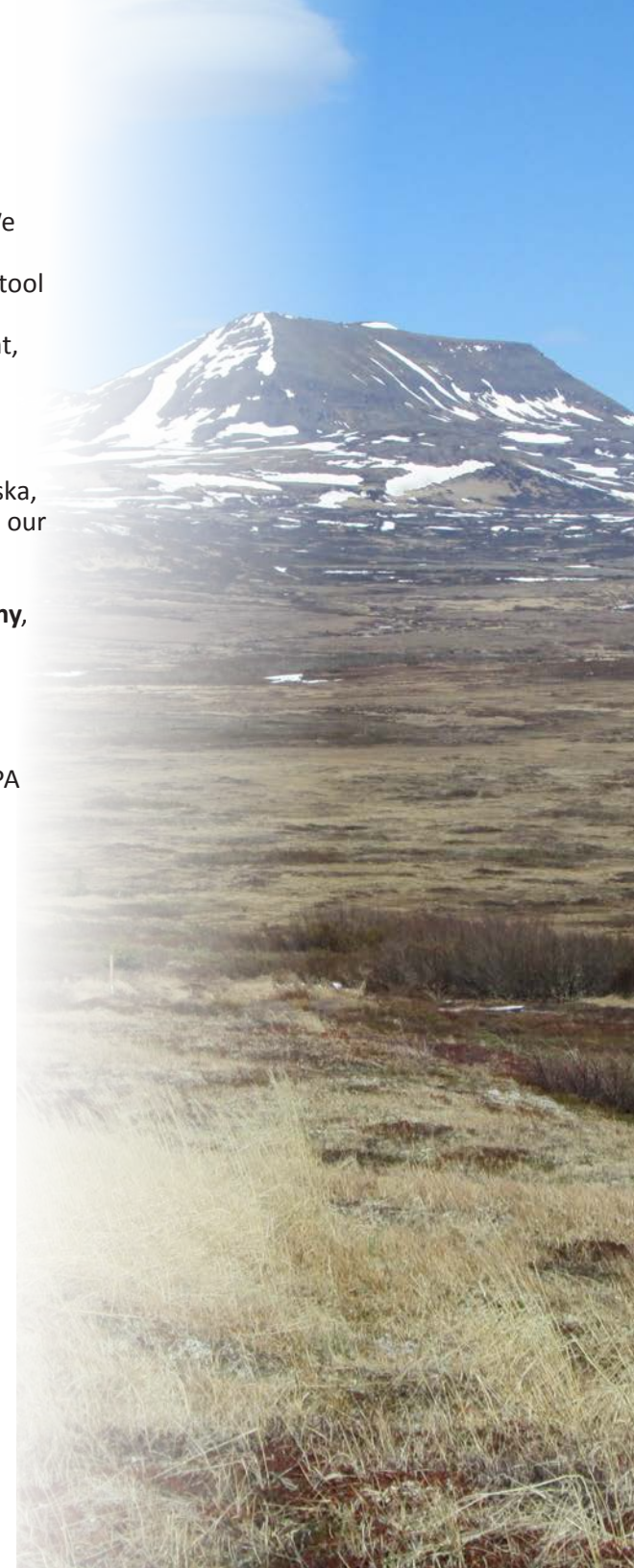
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A handwritten signature in black ink that reads "Bill Craig".

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01. Statement of Understanding

The Pebble deposit, one of the world's largest copper-gold-molybdenum deposits, was discovered in 1988 on State of Alaska land open for mining. The potential for impacts resonates personally with many individuals within the region, throughout the state, and beyond Alaska. Interest in the Pebble Mine Project (Pebble Project) comes from a diverse cross-section of individuals, organizations and agencies that have varying perceptions of the potential effects. In particular, concerns related to the impacts on the Bristol Bay sockeye salmon fishery dominate the public discourse. Whether the dialogue focuses on direct impacts to habitat, changes in water flow or quality, or the potential for tailings dam failure—the discussion includes fish.



AECOM understands the delicate balance between economic development and potential environmental consequences. We propose a specialized team of experts to drive schedule and write a concise, science-based, legally defensible Environmental Impact Statement (EIS) document.

AECOM and its legacy companies have keenly observed the Pebble Project for more than a decade. We recognized the need for a National Environmental Policy Act (NEPA) review and associated EIS. We have intentionally avoided assignments or positions (such as the Stand for Salmon initiative) that would have created a real or perceived conflict of interest or questions regarding our firm's objectivity. We have anticipated this opportunity and worked on relevant projects that prepare us for this moment to present our team and our passion for tackling the Pebble Project's complex technical, procedural and regulatory issues in a systematic and deliberate manner. The Pebble Project's high profile requires a team with proven, unbiased third-party contractor experience supporting the US Army Corps of Engineers (USACE), a team with expertise in mining and mineral processing operations, a team committed to deliver the document, and a team that has worked together successfully on similar projects. AECOM provides that team. We have the technical expertise to deliver objective, clear and concise evaluations of the key issues, and developed a project management approach that facilitates a 21-month schedule to reach the Final EIS.

Pebble Limited Partnership (PLP) filed its application for a Department of the Army (DA) permit under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act with the USACE. PLP's proposed project includes four major components:

Our Project Manager, Bill Craig, will be dedicated to the project and will forgo commercial fishing.

1. The mine site, which includes an open pit mine, subaqueous tailings storage facility, 230 megawatt power plant, and camps and processing facilities.
2. The Amakdedori Port, with docking facilities to receive freight and export concentrate, and dredged channel to accommodate the design vessels.
3. A transportation corridor to include 65 miles of roads and an 18-mile ferry crossing of Lake Iliamna.
4. A natural gas pipeline, approximately 188 miles in length, to originate near Happy Valley on the Kenai Peninsula, cross Cook Inlet, and parallel the transportation corridor from the port to the power plant at the mine site.

These four components represent a suite of potential impacts—beneficial and adverse—including economic development opportunities and potential environmental consequences.

Based on the Pebble Project's history, our understanding of the proposed action, and our extensive experience completing complex projects in Alaska, AECOM has identified the technical, procedural and regulatory challenges anticipated in the NEPA process. Our approaches to the key issues are presented in Table 1, with additional details presented in **Section 2, Technical Approach and Methods**.

Table 1. Key Environmental Challenges and AECOM Approach

ISSUE	DESCRIPTION	APPROACH
Technical Challenges		
Impacts to fish (i.e., sockeye salmon)	<ul style="list-style-type: none"> Fish are a key resource in the area and thus a key component of the impact assessment process. Issue perception is important as potential impacts to fish have been previously portrayed in a negative way implying loss of the entire Bristol Bay sockeye salmon fishery. 	<p>Our focused team of fish subject matter experts (SMEs) will:</p> <ul style="list-style-type: none"> Conduct a focused review of baseline information applying the current Pebble Project footprint. Describe the baseline conditions to assess impacts from the proposed project and potential alternatives. Provide an overall assessment of the “net” impacts to fish from the project. Work in sequestered sessions with water resource, chemistry and habitat restoration experts as needed to complete assessments consistent with other interrelated resources.
Impacts to water flow and quality	<ul style="list-style-type: none"> Water flow and quality matter primarily because impacts to water flow or quality could affect fish. Commercial and subsistence users are concerned that water quality degradation could harm the reputation of the Bristol Bay sockeye salmon fishery “brand.” 	<p>Our water team will:</p> <ul style="list-style-type: none"> Bring complementary knowledge and experience to the project (e.g., geochemists, hydrologists, and hydrogeologists). Focus on reviewing and independently verifying PLP’s water model and baseline flow conditions as well as current water quality. Determine adequacy of information for characterizing impacts of the proposed Project initially, recognizing alternatives may require additional data and/or modeling. Assess impacts to streamflow including proposed outfall locations. Consider all water discharges and dust in assessments of potential impacts on quality. Work in sequestered sessions to minimize review times and revision efforts while maximizing consistency with related resource SMEs’ efforts when preparing draft impact analyses. EXAMPLE: <i>AECOM recently used a sequestered work session approach on the Midas Gold Stibnite EIS project for preparing technical reports, expediting our internal reviews and technical editing for those deliverables.</i>
Potential for tailings dam failure	<ul style="list-style-type: none"> The potential for, and impacts from, tailings dam failure must be evaluated as part of the EIS. Issue perception is important in that dam failure has been portrayed at varying likelihoods, and as potentially causing loss of or impacts to the Bristol Bay sockeye salmon fishery. 	<p>Our embankment specialists will:</p> <ul style="list-style-type: none"> Review PLP’s proposed design and assess risk. Recommend an early-stage risk assessment to inform the EIS. Describe results of that failure scenario within the EIS, ruling out any “worst case” scenarios given the limited probability of any such event(s). EXAMPLE: <i>AECOM successfully used this approach on the Donlin Gold EIS, which will serve as the model for our approach.</i>
Review and synthesis of many technical studies	<ul style="list-style-type: none"> The EIS preparation team must be able to objectively analyze the relevance of studies prepared over the past two decades and their conclusions, when such information is submitted through public or agency comment or at the direction of USACE. 	<p>Our process will:</p> <ul style="list-style-type: none"> Start with receipt of data or reports through our technical Deputy Project Manager (DPM). As data or reports are received and entered, our DPM will notify discipline (physical, biological, and social resource) leads and SMEs. Compile information within a document control system. Our Aconex system is searchable by keyword, will be accessible to all team members, and will allow each SME to quickly identify and retrieve studies relevant to specific resources. Initiate information review concurrent with writing the affected environment for the proposed action (based on PLP’s Project Description), providing an early assessment of whether data are adequate or if data gaps need to be filled to complete the EIS.
Procedural Challenges		
Informing and educating the public regarding the Pebble Project as currently proposed	<ul style="list-style-type: none"> The EIS must objectively portray the project. Current information within the public domain may or may not accurately portray the Pebble Project, which may increase public concerns related to potential project impacts. 	<p>AECOM recognizes the importance of disseminating accurate information about the Pebble Project and will:</p> <ul style="list-style-type: none"> Work closely with the USACE to implement a public involvement program that meets NEPA requirements while providing fact-based, proactive communication responsive to potentially conflicting information or misinformation. Provide webinars, videos, and other appropriate media tools as a key means of information dissemination—that is, communication aimed at educating outside of scoping periods. Mobilize in-house resources to execute a broad range of media applications including video production, to provide proactive or, if needed, reactive communications to clarify information when appropriate. EXAMPLE: <i>AECOM has successfully used videos on prior projects to convey project description information, including anticipated changes and/or impacts. See AECOM examples, “Citizen’s Guide to Effective Participation in the NEPA Process” and “Public Involvement: A Case Study.”</i>

Table 1. Key Environmental Challenges and AECOM Approach *(continued)*

ISSUE	DESCRIPTION	APPROACH
Managing public comments received during the NEPA process	<ul style="list-style-type: none"> At least one million comments are likely to be submitted during Pebble Project scoping and on the Draft EIS. These comments will need to be reviewed, categorized, and quickly responded to (if appropriate) in order to maintain schedule. The US Environmental Protection Agency (USEPA) has received approximately one million comment submittals on its recent call for public comment on its proposal to withdraw the CWA restrictions on the Pebble Mine Deposit, which demonstrates the intense interest and number of comments that should be expected during scoping and on the EIS. 	<p>Our approach to comment management, similar to our management of technical documents and data, will:</p> <ul style="list-style-type: none"> Rely on a defined process, robust system, and an experienced “strike team” to parse and categorize comments quickly and consistently for dissemination to the appropriate discipline lead and SMEs. Utilize a specialized subcontractor, NightOwl Discovery, and Relativity software, to manage, process and streamline coding.
A NEPA document that withstands legal challenges	<ul style="list-style-type: none"> Legal actions likely will follow regardless of the decisions made, and require an EIS document, process and Administrative Record that are legally sufficient and can stand up to scrutiny. 	<p>AECOM recognizes that the defensibility of the EIS ultimately will rely upon the Administrative Record. We will:</p> <ul style="list-style-type: none"> Follow a defined process (similar to our process for technical study review) to manage the Administrative Record, use the Aconex system, and task a DPM with oversight of the Administrative Record to establish the structure of the record in coordination with the USACE.
Regulatory Challenges		
Alternatives development, including CWA 404(b)(1) development	<ul style="list-style-type: none"> The EIS must be developed from the start with consideration of CWA 404(b)(1) requirements. The EIS alternatives may be designed or developed to meet the USACE requirement to select the least environmentally damaging practicable alternative, economizing time and effort to address this requirement. 	<p>During alternatives development, AECOM will:</p> <ul style="list-style-type: none"> Integrate consideration of this requirement throughout the NEPA process and in developing the EIS. Document each of the alternatives PLP has reviewed and independently assess feasibility and potential to reduce environmental impacts. Capture and assess feasibility and potential for impact reduction of each of the alternatives suggested during scoping and by cooperating agencies. Only those alternatives that are both feasible and have potential to reduce environmental impacts will be assessed in detail. EXAMPLE: <i>The alternatives process used for the Donlin Gold EIS was successful. Cooperating agency comments on the Preliminary Final EIS did not disagree with the process or the dismissed alternatives. AECOM believes that our Donlin experience will allow us to streamline alternatives development for the Pebble Project EIS.</i>
Meeting schedule	<p>Two schedule drivers exist:</p> <ul style="list-style-type: none"> Executive Order 13807, which outlines the policy of the federal government to make timely decisions (within two years) on reviews and authorization decisions. The PLP and USEPA settlement agreement associated with lawsuits filed by PLP against USEPA related to the USEPA’s issuance of a Proposed Determination under CWA Section 404(c). The settlement sets a deadline for the Final EIS to be complete and available within 48 months of the date of the settlement agreement (May 2021). 	<p>Our approach to meeting a 21-month schedule, presented in Section 3, includes:</p> <ul style="list-style-type: none"> Completing multiple tasks concurrently, e.g., initiating scoping, baseline data collection and review with drafting of affected environment and environmental consequences (for the proposed action based on PLP’s Project Description) to quickly assess data gaps and/or adequacy. Conducting sequestered work sessions for SME teams with interrelated resource impacts (e.g., fish and water quality) to maintain a consistent technical approach and reduce internal review time and technical editing. Providing preliminary draft chapters to USACE first for review, followed by a complete Preliminary Draft EIS going to USACE and cooperating agencies for concurrent review. Preparing a detailed work breakdown structure within individual tasks to easily identify task initiation dates and thus avoid critical path delays. Mobilizing a team of experts that has worked together on the Donlin Gold EIS, to capitalize on lessons learned and leverage ability to work and communicate effectively as a team. Engaging additional resources when needed to provide different expertise or added capacity needed (e.g., public comment response), with our ability to reach into a deep bench of staff.

AECOM is ready to handle these challenges, objectively and effectively, with a dedicated project manager (PM), Bill Craig; dedicated deputy project managers (DPMs), Elizabeth Bella (technical) and Tara Bellion (financial); and a team of experts who take pride in what they do and doing it well from start to finish. We formed our team through careful consideration of the likely Pebble Project challenges, selecting individuals who bring specific knowledge and skill to the process and technical analyses to ensure a defensible process and document. A majority of our team comes from in-house AECOM experts and staff, many of whom are Alaska-based and long-time Alaska residents. They know and understand the regional mining and fisheries industries, climate constraints, work conditions, construction seasons, and regulatory requirements. Equally important, our PM, DPMs, senior advisors, and many of our technical leads have worked together on multiple projects and are currently completing the Donlin Gold EIS. **We can effectively “hit the ground running” on the Pebble Project EIS without a learning curve given our ability to work together and communicate as a team.** In addition, we have selected specialized subcontractors to address specific issues (refer to Section 3.1). AECOM specifically chose individuals, not firms, to augment our team—selecting highly specialized and regarded experts, many of whom we have worked with previously on similar projects.

Third-Party Contractor Role

AECOM’s long history of serving in third-party contractor roles, combined with our experience providing environmental and engineering services to numerous clients in the mining, power, transportation, and oil and gas industries, allows us to clearly understand what is needed from the third-party NEPA contractor supporting the USACE. **Our team becomes an extension of the lead agency team, responsible for completing**

analyses at the direction of the USACE. In addition to committing our team to supporting the lead agency, AECOM comes with an expansive network of technical experts and NEPA practitioners that can be mobilized if and when needed. We provide objective advice, recommendations, and analyses beginning with review of applicant-provided data and modeling through the impact assessment—all focused on informing USACE decision-making. Our role includes augmenting data collection or modeling, if applicant-provided data or analyses are unavailable or insufficient. We diligently document communications, processes and decisions made along with their rationale, avoiding unnecessary reports or document creation to maintain focus on a defensible record on behalf of the USACE. Our team also understands that the contractual relationship with the applicant PLP requires accountability for our time and project costs, and that any changes to our scope or anticipated efforts will be communicated and authorized consistent with the contract.

To convey our understanding, approach, and commitment to USACE and PLP, our proposal presents the following:

- Our strategic approach to key issues, including technical topics, as well as procedural details **(Section 2)**.
- Our approach to project management, including our team organizational structure, commitment, and communication protocols **(Section 3)**.
- The qualifications of proposed key team members, particularly as such qualifications relate to the anticipated key issues **(Section 4)**.
- Our team’s expertise and project experience, demonstrated by current and prior project examples **(Section 5)**.

Demonstrated Experience

Third-Party Contractor Roles

- Donlin Gold EIS, Alaska
- Chuitna EIS, Alaska
- Midas Gold Stibnite EIS, Idaho
- Lone Star Mine EIS, Arizona

Engineering and Environmental Service Projects

- Red Dog Mine, Alaska
- Green’s Creek Mine, Alaska
- Kennecott Mine, Utah
- Morenci Mine, Arizona



02. Technical Approach and Methods

This section presents AECOM's methodology for completing the challenging steps and addressing key environmental issues. As the Request for Proposal (RFP) Statement of Work adequately describes work required for straightforward tasks, this section addresses tasks that require more detailed description.

2.1 Task 1 Project Management

AECOM's approach to project management emphasizes:

- A PM with experience working for the USACE on major NEPA and CWA 404(b)(1) compliance efforts.
- Two DPMs to assist the PM with technical NEPA process and cost and schedule components.
- A principal-in-charge (PIC) who will work with USACE and PLP management to ensure that the AECOM team is meeting technical and project management expectations, and to bring company resources to bear if necessary to make changes.

As required in the RFP, **Section 3** of this proposal details AECOM's approach for project management, administration and coordination.

2.2 Task 2 Public Involvement and Agency Coordination

The overriding public engagement goal for the Pebble Project EIS will be establishing that the USACE and the EIS process are perceived as fair, objective, neutral and meaningful. AECOM is

“ [The AECOM] team did an excellent job in designing and implementing the public outreach program for this EIS.”

State of Alaska Natural Gas Development Authority

aware of inaccurate information that is available to the public regarding the Pebble Project, and recognizes that communication with the agency and public stakeholders must be fact-based. Proper messaging and education allow stakeholders to take advantage of important public involvement opportunities like scoping and to understand how to make meaningful contributions. In addition to coaching stakeholders on how to participate in the NEPA process, our team will listen to the concerns and suggestions raised, will respectfully address them through EIS development, and will report back to the public on how concerns have been addressed.

THE RIGHT TEAM. Project area experience and a demonstrated history of relaying technical information to the public, coordinating Tribal consultation and executing public meetings in rural Alaska. Through our experience with the Donlin Gold EIS and directly for federal agencies, AECOM is cognizant of the needs and agendas of a multitude of stakeholders, all within the construct of preparing a sufficient and defensible NEPA document.

THE RIGHT APPROACH. Supporting the USACE through an effective website and webinars to continually inform and prepare for comment periods, the ability to handle a large volume of comments, and a commitment to engage and listen to stakeholders. AECOM realizes that every project is different, and every agency has different needs and requirements. We have experience with NEPA documents under various agencies, and will tailor public engagement strategies that meet the needs of the USACE. Our recommended strategy for public engagement is described below, however, it can be scaled or otherwise modified to meet USACE NEPA and CWA 404(b)(1) compliance objectives.

“ The work accomplished is groundbreaking...It shows us a way to handle public comments on a large scale in a way that is both manageable and legally defensible.”

National Marine Fisheries Service

SUPPORT DEVELOPMENT OF THE PUBLIC INVOLVEMENT PLAN

Within the first week of project initiation, AECOM will work collaboratively under the direction of the USACE and with input from the PLP as appropriate to develop and implement a Public Involvement Plan (PIP). The PIP will help keep the public meetings and public comment period in line with the 21-month schedule proposed for the EIS. Ensuring that the public and agencies are informed and have adequate opportunities to provide feedback is critical to preparing a legally defensible document. NEPA projects in rural Alaska must consider the communication style and information dissemination challenges of the affected communities. We have extensive experience working with small, remote communities with a majority Alaska Native population and culture.

The PIP will include the strategy, content, schedule and roles/responsibilities for all of the components of the public involvement and agency coordination task. In particular, it will address 1) development of key messages, fact sheets, and Frequently Asked Questions (FAQs) common to several public involvement components, and 2) parallel and sequential aspects of executing public involvement and agency coordination within the project schedule. AECOM will assist the USACE PM to:

- Develop the key, consistent messaging for all communications and outreach regarding the EIS.

- Design, populate, launch and maintain the Pebble Project EIS website during the first few weeks of the project. The website will include interactive project maps, project and NEPA fact sheets, FAQs, and appropriate links to other websites, and will also support submittal of public comments.
- Develop a project mailing list and update throughout the project.
- Send four newsletters: 1) at the time of the Notice of Intent, 2) as a summary of the scoping meetings, 3) at the announcement of the Draft EIS, and 4) at the announcement of the Final EIS.
- Use local radio stations and newspapers to distribute notices, advertise public meetings and circulate information. For the Donlin Gold EIS, AECOM coordinated with local stations to give the USACE time on air prior to scheduled meetings to discuss the project and talk about how the public can comment. AECOM arranged a Yup'ik translation of a short version of the Donlin Gold EIS Executive Summary and released it as a series of podcasts on local radio.
- Advertise and host webinars to describe the Pebble Project, the EIS process, description of alternatives to be analyzed, and how to effectively participate (the Bristol Bay Native Corporation routinely uses webinars to communicate with its shareholders).

AECOM will provide factual information on the proposed action, alternatives under consideration, and assessment of environmental consequences in a manner that can easily be received and understood. AECOM suggests preparation and distribution of a series of short videos on the EIS process and how this EIS will address key issues. The videos would succinctly describe the Pebble Project as it has evolved

from the original proposal, with SMEs explaining their work and how they evaluate effects. The videos could be uploaded to popular outlets such as YouTube and available on the website. **The benefit of this method is that the USACE would be leveraging a venue that is currently being used to circulate misinformation.** We believe it is imperative to portray the EIS process as fair and unbiased, using the most effective means at our disposal.

PUBLIC SCOPING PLAN AND MEETINGS

AECOM will start work on the Scoping Plan and Package as outlined in the RFP immediately after completing the PIP. Through the website, webinars, and newsletters, the public will be prepared on what to expect with Public Scoping, and provided focused information on project components, key issues being considered, meeting locations and comment period, and how and where to submit effective comments. **AECOM concurs with the proposed meetings in 10 communities**, four of which (King Salmon/Naknek and Iliamna/Newhalen) can be combined in two meeting locations due to road connections. We anticipate completing the meetings in the Bristol Bay communities in one week, primarily using charter aircraft. AECOM has substantial experience in managing highly charged public meetings, including some of the Donlin Gold EIS meetings and projects like the Yosemite Valley Plan EIS, where meetings were held in 14 California locations and had hundreds of people testifying.

Timing. It will be important to complete scoping by early May before residents begin preparation for the commercial fishing season and subsistence activities.

Project Website Experience

AECOM developed a similar project [website](#) that included a feedback capability where users could self-sort their own comment or request a type of feedback, include contact information, attach files, and select a location on a map that their comment applies to. (Note: when visiting this site click “Include a map location with this feedback” for map features to display.) AECOM also maintains the website [DonlinGoldEIS.com](#).



TRIBAL ENGAGEMENT

AECOM supported USACE for its government-to-government (G2G) Tribal consultation efforts for Donlin Gold EIS and Chuitna Coal Supplemental EIS, and for National Marine Fisheries Service (NMFS) G2G compliance for two decades. Throughout the Donlin Gold EIS process, AECOM assisted the USACE in holding teleconferences, presenting materials at the Bureau of Indian Affairs Rural Provider's Conferences, hosting a Traditional Ecological Knowledge Subsistence Technical Working Group workshop, coordinating the National Historic Preservation Act (NHPA) Section 106 process, and organizing attendance at Tribal Council meetings.

One of the first steps will be to identify the potentially affected, federally recognized governments. We will assist the USACE in engaging federally recognized tribes in the NEPA project and, as appropriate, the NHPA Section 106 programmatic agreement process. Many of the tribal councils in the region are on the record opposing the Pebble Project and its advance to permitting. AECOM recommends that they

be invited to participate and ensured that their concerns will be considered in the process of preparing the EIS. It will also be important to brief participating tribes on G2G Executive Order guidance, tribal role in NEPA, and expectations and requirements for effective participation. Time will be allocated for meeting separately with tribal government representatives during the scoping and Draft EIS meeting visits to communities. Webinars can be used where meetings are not possible.

SCOPING SUMMARY REPORT

AECOM has extensive experience with the USACE and other federal agencies in preparing focused scoping reports that summarize the content of large volumes of public comments. The AECOM Scoping Summary Report will follow all the requirements outlined in Task 2.5 of the RFP's Statement of Work. Comment management for scoping and the Draft EIS is described in the following section.

Managing and Analyzing the Anticipated High Volume of Comments

AECOM expects that scoping will generate in excess of one million comments during the scoping comment period and a similar volume of comments for the Draft EIS. Working closely with USACE, the AECOM team will: 1) develop and evolve comment topics and categories for proper categorization and future response; 2) determine what is considered a substantive versus a non-substantive comment; and 3) analyze, process, and categorize comments in accordance with the above decisions.

Donlin Gold EIS—Lesson Learned

Agency, public, and non-governmental organization (NGO) comments on the Donlin Gold Draft EIS were very technical and complex. For the Pebble Project EIS, we propose a specialty subcontractor and software to streamline processing of the large volume of comments anticipated.

All of these tasks will be supported by Relativity, a powerful and flexible software capable of handling millions of documents for projects similar to the Pebble Project EIS. As comments are collected, AECOM will categorize, process, analyze, and summarize comments in real-time. AECOM has partnered with NightOwl Discovery and two of their experts in the application and customization of Relativity, to provide an efficient and reliable database solution to solve the complex challenge of processing the anticipated volume of public comments within a short period of time.

Choosing Relativity

AECOM completed a comparative evaluation of several comment analysis electronic software database systems to determine the best software solution prior to final selection of Relativity (see Table 2). We initially screened several comment management platforms, narrowing our evaluation to three: CommentWorks, CommentSense, and Relativity. Relativity emerged as the best web-based system for handling large volumes of documents, including public comments.

Table 2 illustrates why we selected Relativity. Our software comparison applies a red-yellow-green analysis, where green indicates the software meets the need, yellow indicates the software could meet the need with customization, and red indicates the software does not meet the need and cannot be customized to do so.

Relativity far exceeds the other platforms, and provides the following benefits:

- Meets an aggressive time schedule for setup, customization, and staff training.
- Provides USACE with a dashboard for real-time statistical analyses.
- Scales to any size.
- Captures web-form and e-mail documents for automated entry, and imports comments and documents from multiple sources.

	CommentWorks	CommentSense	Relativity
Need or Capability in Processing Comments			
Rapid setup, customization, and user training			
Quickly processes large document volume (~2 million in a single comment period)			
Links to project website to capture web-form and e-mail comments automatically			
Imports Microsoft Word, PDF, and hard copy submissions			
Identifies, tags, sorts, analyzes, and tracks unique comments by type or topic			
Parses a single submission into multiple unique comments			
Applies predictive analytics to partially automate comment parsing			
Identifies and tracks multiple comment submissions from a unique commenter: individuals and agencies/organizations			
Able to make bulk changes to categories of comments			
Assigns comments to a reviewer with automated email reminders			
Responds to comments in the software			
Reviews/revises/approves/locks responses			
Able to apply stock responses individually or in bulk			
Generates reports by unique submission, comment category, response, geographic distribution, etc.			
Creates reports showing trends and metrics			
Provides 24/7 technical support			
Provides user-friendly interface			
Allows client access/use with minimal training			
Able to identify and redact to protect confidential or sensitive comments			
Sophisticated dashboard that displays real-time status of comment coding and processing			

Green = software meets the need
 Yellow = software could meet the need
 Red = software does not meet the need

- Utilizes artificial intelligence to aid in document categorization and comment parsing.
- Allows users to respond to, review, and approve responses directly within the software.
- Supports sophisticated searching (e.g., keywords across the entire dataset).

Public Comment Processing and Analysis

Beginning immediately at Notice to Proceed (NTP), our subcontractor NightOwl Discovery will begin setting up the coding software and training the Relativity system. (We will train the system and resolve any bugs in advance using comments USEPA received on its notice to withdraw.) As comments are collected, AECOM will use Relativity to process all comments. We will manually review all agency, NGO and PLP comment coding as well as select public comments. Comments from scoping will further refine and train the system so that Draft EIS comments can be processed faster and more accurately.

Over the scoping comment period and during the comment period for the Draft EIS, all work will be overseen by PM Bill Craig. Work will proceed in accordance with the decisions made at the initial project kick-off meeting. This work will occur in real-time, concurrent with receipt of comments.

REPORTS AND SUMMARIES

At completion of the scoping and Draft EIS comment periods, and after validating with USACE that no more public comments will be accepted, AECOM will produce a Draft Scoping Report for USACE review. For the Draft EIS, the report will include draft responses to comments, prepared by appropriate AECOM SMEs. After receiving USACE comments on the Draft Reports, AECOM will produce the Final Scoping Report and Draft EIS Comment Analysis Report.

AGENCY COORDINATION

AECOM will assist the USACE in all aspects of agency coordination, including:

- Cooperating agency meeting structure, agendas, content, facilitation, frequency, action items and meeting minutes.
- Assistance with technical presentations and workshops as deemed necessary.
- One-on-one meetings as warranted.
- Review of formal agency comments submitted on documents for review, including the Preliminary Draft EIS and Preliminary Final EIS.

PUBLIC MEETINGS/HEARINGS

Public hearings will be held in the same communities in which scoping occurred. The logistical, scheduling and technical support that AECOM will provide the USACE is very similar to that described for scoping. Meetings will be conducted with graphic and technical support material, a second court reporter, CDs of the Draft EIS, Draft EIS hardcopies for reference, and computers/tablets for individual comment submission. As with the scoping meetings, AECOM recommends that time be scheduled in communities to meet with representatives of federally recognized tribal governments.

2.3 Task 3 Draft EIS

OUTLINE

AECOM will develop an outline modeled after the Donlin Gold EIS while accounting for project differences. The draft outline will be provided to the USACE PM and when approved made available to agencies and the public during the scoping process.

DATA GAP ANALYSIS

USACE is neither a proponent for nor an opponent of the Pebble Project and is required to prepare an objective EIS. **In AECOM's third-party contractor role, we will serve as an extension of USACE**

Central to AECOM's Approach

- Comments will be collected in an efficient, organized, and systematic way and entered into the Relativity database, ensuring removal and/or proper marking of sensitive, redundant, or other special data.
- The Relativity software will be trained prior to scoping begins using comments EPA received on their proposal to withdraw. This will ensure rapid processing of scoping comments.
- AECOM coding staff will manually review for quality all agency, applicant, and key stakeholder coding.
- AECOM will assign a collective, dedicated group to address initial processing and analysis.

staff and will be responsible for independently reviewing, evaluating and verifying all materials used in the analysis. We will independently verify baseline documentation, feasibility of proposed alternatives and mitigation, models, and calculations whether provided by PLP, cooperating agencies, other government agencies, NGOs or the public. Independent verification is a basic and fundamental role as the third-party contractor and when performed carefully, results in credible and defensible analyses.

AECOM assumes that PLP will provide electronic copies of its baseline data within one week of NTP and AECOM will use document management program Aconex to batch load the documents.

Other potential reference material will also be obtained and loaded into Aconex to compile the project library. Aconex will facilitate rapid searching and use of documents by our SMEs and will be used to manage all EIS references and other project documents. Aconex is also designed to manage the Request for Information process and will streamline maintenance of the Administrative Record. The

Aconex. The library for the Donlin Gold EIS was difficult to manage without Aconex.

library will also be made available to the public on the EIS website.

Within two weeks of NTP, AECOM key personnel will begin drafting the Affected Environment sections for the proposed project (based on PLP's Project Description). A key focus in the first month will be to assess the completeness of available baseline and design information for the proposed action and to identify any obvious gaps in time for the 2018 field season. AECOM proposes combining the drafting of Affected Environment and review for data gaps as it will be more efficient than separate sequential processes and will help ensure preparation of concise deliverables.

AECOM recommends two iterations of the data gap reports. The Preliminary Data Gap reports will be limited to the adequacy of baseline data for only the proposed project and would be provided in draft form to the USACE within five weeks of NTP, and when approved, to the cooperating agencies and PLP. This will allow early identification of gaps before the 2018 field season.

Necessary and available data for the alternatives will be assessed after they are identified and the Data Gap Reports will be revised and redistributed.

PRELIMINARY DRAFT EIS

AECOM will receive the draft Purpose and Need Statement from USACE and complete the technical editing to make **Chapter 1** consistent with the approved Project Style Guide. Chapter 1 fulfills foundational requirements under NEPA and CWA 404(b)(1) guidelines.

Development of alternatives to the proposed project will be an especially important task considering USACE's obligations under CWA 404(b)(1) guidelines. Chapter 2, Alternatives will contain introductory material on the USACE and NEPA regulatory setting and describe the process that was used to develop alternatives.

AECOM proposes to incorporate PLP's Project Description verbatim and then reduce, eliminate, or expand detail as needed for impact analysis (i.e., more detail for features that generate public and agency concern).

We recommend a streamlined version of the process we used to develop the Donlin Gold EIS alternatives. There will be two primary sources for developing the "full range" (as required by the Council on Environmental Quality [CEQ]) of alternatives: 1) those PLP considered and eliminated in developing the proposed project; and 2) those suggested during scoping by agencies or the public. AECOM recommends the following steps to develop alternatives:

- During one of the early cooperating agency meetings, PLP should be allowed to present the alternatives they considered and the rationale for dismissal.
- AECOM will develop criteria for evaluating/screening alternatives and seek USACE and cooperating agency input (this is straightforward from CWA 404(b)(1) and CEQ guidance and will be very similar to Donlin Gold EIS criteria).
- When the alternatives from scoping are available, AECOM will compile all the known alternatives (this will be the first cut at the "full range") and provide to the USACE and agencies for review.
- AECOM will conduct an initial screening of the alternatives against the criteria. Alternatives that obviously fail the screening criteria can be quickly dismissed.
- Remaining alternatives may require development of design concepts to better understand feasibility and potential to reduce environmental impacts. AECOM has designers and engineers who can do that work, or the

Streamlining

- We will apply lessons learned from previous similar work. Our Donlin Gold EIS experience will allow us to be more concise and faster on the Pebble Project EIS.
- AECOM will focus on concise chapters in the body. We will use appendices for detailed technical information.

USACE may allow PLP to use its experts to prepare the concept and then AECOM would independently review and verify.

- After the alternatives are screened and an initial assessment and documentation of feasibility completed, a workshop with the agencies is recommended. Holding this workshop too early in the process could result in unfocused brainstorming of concepts that hold little potential to be feasible or reduce impacts.
- After any action items from the agency workshop are addressed, AECOM will develop Chapter 2 descriptions of the alternatives that survive the screening process and document the rationale for dismissal of the others. AECOM will look for ways to combine alternative options to reduce the overall number of alternatives and therefore length and complexity of the EIS.

As mentioned earlier for data gap assessment, SMEs will begin **Chapter 3 – Affected Environment** for the proposed project within two weeks of NTP. AECOM will streamline by preparing concise sections focused on the important issues and avoid being encyclopedic. We will maximize use of appendices and avoid redundant information between (and within) sections. Once alternatives are settled, the affected environment sections will be updated to include any new footprint.

Environmental Consequences for the proposed project can be combined with Chapter 3 or be a stand-alone Chapter 4. That section can be started as soon as USACE approves the impact methodology. We recommend methodology that quantifies impacts to the extent possible and avoids subjective terms such as low, minor, or moderate. This should reduce cooperating agency disagreement and assist with numeric comparison of alternatives. Indirect and cumulative impacts will be evaluated and described.

Methodology for Specific Resources

The key environmental issues that have been highly publicized are: potential mine effects on fisheries and water, and fear of a tailing dam failure. These issues are interrelated to some degree and will be the hot button issues that require the most care. However, to be complete and defensible, the EIS will need to address other topics that if not handled properly could delay completion of the EIS. These include topics subject to formal processes such as cultural resources, vegetation and wetlands, air quality, and threatened and endangered species.

Fish

- Fish are the key natural resource concern.
- Impacts to aquatic habitat, water flow, or quality have the potential to impact fish.

Fish

This issue is primarily focused on salmonids and has four components: impacts to fish habitat; potential for fisheries ecotoxicology (physiology, behavior and mortality); aquatic resources mitigation; and indirect effects on commercial/subsistence/recreation use of fish. By understanding the biological systems within a NEPA context, our team of scientists and SMEs will evaluate the potential direct, indirect and cumulative impacts on fisheries and aquatic resources.

Our team will:

- Assess all available information, including baseline study data and reports, agency reports, and currently-accepted scientific literature, to develop a detailed and accurate description of the fisheries and aquatic resources and issues within the analysis area.
- Evaluate alternatives to conduct a scientific, fact-based analysis of potential impacts by applying our in-depth understanding of fish life history and habitat; ecotoxicology and physiology; and fisheries management.
- Based on the linkage between foreseeable impacts to fish and fish habitat, assess potential indirect effects on commercial, subsistence, and recreational harvest and consumption of fish.
- Assess proposed aquatic resources mitigation.

Fish Habitat Impacts

A scientifically sound and defensible analysis of potential effects to fish, particularly salmonids, will be one of the most visible and contentious aspects of the Pebble Project EIS.

- The Pebble deposit straddles headwaters of two highly productive Bristol Bay drainages, the Nushagak and Kvichak Rivers. A healthy Bristol Bay fishery is considered critical to the economic, cultural and ecological health of Bristol Bay.
- The high productivity elevates the perceived environmental effects associated with large-scale metals mining within the Bristol Bay watershed. Strongly held opinions by both regulators and the general public in regards to potential effects on fish and fish habitat will require careful and objective NEPA analysis and assessment of proposed mitigation measures.

- The complexity and interconnectedness of the hydrologic systems in the project area present unique challenges when analyzing potential effects to fish and fish habitat.

AECOM will conduct a scientific, fact-based analysis of all project activities and elements related to fish distribution, abundance, behavior and habitat.

- Proposed project elements could affect salmon and resident fish (e.g., whitefish, pike, and trout) and essential fish habitat (EFH) through water diversion, changes in temperature regime and water quality, displacement in streambeds, and barge traffic.
- Roads and project construction could increase sediment loads in streams, alter stream banks, cause erosion in adjacent areas, and introduce pollution to fish habitat from accidental spills.
- Habitat alterations will be evaluated in terms of their potential impacts to the spawning, rearing and migration life stages of Pacific salmon and other anadromous or resident fish species.
- The EIS will quantify the impact using metrics such as miles and acres of stream habitat and stream flow, for both the project-related impacts and the proposed aquatic mitigation projects.

Fisheries Ecotoxicology

Potential for release of mining-related contaminants and potential adverse impacts on ecological receptors can affect the survival, growth, reproduction and behavior of organisms, particularly fish populations.

- The extent, severity, and frequency of potential ecological impacts due to potential environmental release of mine-related contaminants depend on release scenarios,

resulting exposure (contaminant concentrations in environmental media), complete exposure pathways, and relevant ecological criteria (degree of protection against adverse effects).

- There has been a publicized claim that copper impairs olfactory functions in salmon at concentrations below Alaska’s current hardness-adjusted aquatic life criteria thus greatly elevating this issue.

Baseline studies of the watershed have established that concentrations of metals are largely below Alaska’s aquatic life criteria, with the exception of arsenic and copper in the upper reaches of the South Fork of the Koktuli River.

- Lead and nickel detected in the Upper Talarik Creek are likely related to bedrock geochemistry. Instances of elevated copper and arsenic can be attributed to the natural processes involving release of metals as surficial sulfide minerals oxidize.

The Ecological Risk Assessment Guidance for the Superfund [ERAGS, USEPA (1997)] is the general framework for the impact assessment.

- Available environmental data from the Environmental Baseline Study (2004–2008) and a multidisciplinary approach (for contaminant release and fate and transport) will be used to develop conceptual models for ecological exposure for a range of release scenarios, including low-level continuous or intermittent releases and major discrete releases (as applicable).
- AECOM geochemists, engineers, hydrologists, ecotoxicologists, and modelers will collaborate to predict the magnitude, frequency, and extent of exposure to and effects of mining-related chemicals and physical disturbances.

- **Estimates of potential exposure will be compared to relevant environmental criteria for the protection of ecological receptors.**

The most protective criteria between the hardness-based water quality criteria (WQC) are currently used by the Alaska Department of Environmental Conservation (ADEC) and the USEPA.

- For the evaluation of potential impacts from copper on fish populations, we will apply the Biotic Ligand Model (BLM)-based approach (USEPA, 2007), which is being adopted by many states either on a state-wide or site-specific basis. In a recent meta-analysis of aquatic effects criteria for copper, Meyer and DeForest (2018) demonstrated that BLM-based WQC are considerably more protective of olfactory and behavior impairment in aquatic organisms than are hardness-based WQC. BLM WQC calibrated to the olfactory-impairment data for coho salmon (*Oncorhynchus kisutch*) by Meyer and Adams (2010) will be used to test for potential sublethal effects to salmonid fishes.
- The overall risk estimates for the ecological receptors will be framed in the context of overall populations based on: geographical extent of impacts (e.g., proportion of impacted areas within the watershed); habitat-specific extent of impacts (e.g., proportion of impacted habitat in the watershed); and ecological extent of impacts (e.g., proportion of population impacted in the entire fishery).
- Analysis of uncertainties in the assessment approach and assumptions will also be documented to support regulatory decisions on the findings of the impact assessment.

Aquatic Resources Mitigation

Opportunities exist within the analysis area to develop successful aquatic resources mitigation for impacts that cannot be avoided.

- The position of the project in the watershed and existing relic habitat present mitigation opportunities to enhance fish habitat and ecosystem services. Our team has decades of experience in impact analysis, constructability review, design, construction and monitoring of similar applications across Alaska.
- AECOM will assess PLP’s proposed methods to avoid and minimize impacts to Bristol Bay and Cook Inlet salmon fisheries and present these as “design features.” Habitat enhancements proposed by PLP to mitigate for unavoidable impacts could take the form of stream flow supplementation, improving connectivity to existing but inaccessible habitats, physical habitat manipulation and improvement, and other projects. AECOM will assess the feasibility and effectiveness of proposed habitat enhancements and other mitigation suggested by the public and agencies.

The EIS will present the assessment of unavoidable impacts, the beneficial impacts from enhancements, and an overall (or net) assessment of impacts. **Once the net assessment is completed, AECOM will evaluate the indirect effect to the Bristol Bay commercial, subsistence, and recreational fisheries.**

Water is the Issue for the Pebble Project to Solve

- Concerns about fish stem from concerns about water management.
- An objective analysis of water impacts will result in a defensible assessment of impacts to fish and fisheries.

Water

A primary and critical focus for this NEPA effects analysis is the evaluation of mine development effects on water resources.

- Waters within the project area have high surface and ground water quality even within mineralized areas. Water is also a primary link between mine development effects and impacts to fish, wildlife, and ultimately humans in the region. Concerns about negative water quality effects on other critical resources are strongly held by the public and regulatory reviewers alike. This elevates the necessary standard of objectivity and defensibility of the NEPA effects analysis.
- The project location straddles the headwaters of two drainages. Concern has been expressed on groundwater connectivity at the site and difficulty in containing potential contaminants.
- **An accurate, objective and defensible analysis of effects, based on application of sound science and an understanding of mining process, hydrologic systems, and water chemistry will be critical to success of the EIS process.** Review of all phases of the proposed project must adhere to NEPA regulatory process to ensure a legally defensible end product, and to constrain the expansion of scope beyond regulatory requirements, which has resulted in substantial schedule slip on other large EIS projects.

The analysis of effects on surface and groundwater resources uses a variety of tools and information sources to 1) develop a detailed understanding of surface and groundwater systems on and around the site; 2) understand the interactions of surface and groundwater systems with other environmental features; and 3) evaluate activities and elements of the proposed project to develop a realistic analysis of the effects of the proposed project on water resources. Some of the primary tools include:

- Baseline monitoring data, collected from the site over multiple years to support fact-based analysis.

- Surface and groundwater modeling that simulates baseline and projected hydrologic and hydrogeologic systems to understand water balance, flow regimes, recharge mechanisms and seasonal flow patterns.
- Information from PLP that lays out specific development plans, provides design and operational detail and demonstrates the basis of a well thought out project to support an accurate effects analysis.
- The complexity of hydrologic and hydrogeologic systems in the project area is reflected in the data and observations collected to date, which presents challenges in completing the NEPA effects analysis in the connectivity of watersheds.
- The proposed project could directly impact three primary watersheds: the North Fork Kaktuli River, South Fork Kaktuli River and Kaskanak Creek watersheds. A fourth watershed, Upper Talarik Creek, may not be directly impacted under the development plan; however, hydrologic data suggest that cross-basin flow occurs between South Fork Kaktuli River and Upper Talarik Creek, which may still necessitate mitigation to limit effects on water resources.

Understanding the issues, the NEPA review process, and using the available detailed site information will support a focused and defensible evaluation of the existing conditions and effects of the proposed project.

- AECOM will review mine planning information; evaluate the applicability of modeling completed for the project, including testing assumptions and boundary conditions; and assess the effectiveness of modeling in predicting water flow, both above and below ground, and water balance onto and off of the project site.

- This review will be conducted concurrently with the initial phases of the EIS development. Information obtained through this review will be incorporated into the Affected Environment section of the EIS, and will set the foundation for a focused and accurate effects analysis. Any identified gaps in data, modeling, or mine plans will be communicated through the USACE to obtain clarification, or augment data or analysis in support of the NEPA review process.

Safety of Proposed Tailings Embankments
Concerns about tailings dam failure and adverse effects on Bristol Bay watersheds have been a longstanding concern. Issues related to mining and mine tailings must be thoroughly and expertly addressed throughout the NEPA process in documents, presentations and all interactions with the public.

- The potential for a significant seismic event and vulnerability of a high tailings dam has been a persistent criticism of the Project. The recent accounts of tailings dam failures at Mount Polley in British Columbia and Bento Rodrigues in Brazil have heightened public concerns with potential tailing dam failures.

An accurate representation of PLP's dam design and thorough understanding of construction and maintenance best management practices are critical to an objective discussion of the issue. AECOM will review the design and technical specifications of PLP tailings storage facilities (TSF). We were retained to conduct independent technical reviews of the Mount Polley and Bento Rodrigues failures, and we have the global and local experience to review proposed TSF seepage and discharge controls.

The effects of various geotechnical, seismic and hydrologic hazards on the structure will be presented in the EIS based on an independent review and assessment of the safety and stability

of the TSF embankment, including disclosure of design criteria, safety factors, input assumptions and stability analyses conducted by PLP.

- Until recently, mine project EISs did not typically evaluate the probability or environmental consequences of tailings dam failure. However, due to the previously mentioned high profile dam failures around the world, the quantitative approach taken in the Donlin Gold EIS analyzed the consequences of an unlikely, but not worst case, tailings release.
- AECOM proposes to analyze at least one potential tailings dam failure scenario in the Pebble Project EIS that is considered a low likelihood, high consequence event, but not worst case. We recommend that this be informed by an early Failure Modes Effects Assessment (FMEA) for the proposed TSF embankment and equivalent alternatives as appropriate. The FMEA would be developed with participation by representatives from the State of Alaska Dam Safety Office, the USACE, AECOM, PLP and its consultants, and cooperating agencies.
- Risk determinations in the FMEA will be determined based on quantitative probability criteria to achieve a consensus of opinion regarding the likelihood of different modes of failure and the potential size of a release from each. The results will be screened to determine a scenario to carry forward for impact analysis in the EIS. Basing the failure scenario on work

completed by FMEA experts will result in a defensible scenario for the EIS.

- Additional design options may be considered, or mitigation and monitoring measures recommended. Some of the technical issues to be reviewed and analyzed in the EIS include the effects of earthquakes (ground shaking) on the structure, stability modeling, seismic deformation modeling, TSF siting and foundation preparation, and the potential for discharge release to the environment.

Mitigation

Many mitigation measures will be suggested throughout the NEPA process to reduce environmental impacts. CEQ requires identification of “all relevant, reasonable mitigation measures that could improve the project.” **AECOM will capture all mitigation measures that are suggested throughout the process and assess reasonableness and probability of the measures being implemented per CEQ guidance.** AECOM will streamline the process that was followed for Donlin Gold EIS and move much of the detail to an appendix. The body of the EIS will present PLP’s design features (i.e., avoidance and minimization), the process used to identify and assess mitigation measures, and the reasonable measures likely to be implemented.

Preparation of the Preliminary Draft EIS

The Preliminary Draft EIS content will focus on key issues and regulatory requirements; minor issues will be dismissed and technical data relegated to appendices. All resource sections and chapters will be edited and formatted to comply with the Project Style Guide and the USACE. When complete, they will be provided individually to USACE for review. USACE comments will be addressed and the PDEIS will be compiled and provided to the cooperating agencies for review and comment. AECOM recommends only one review by the cooperating agencies prior to publishing the Draft EIS. (We

Approach and Methods for Other Important Resources

- Wetlands, cultural resources, air quality, subsistence and endangered species must be addressed properly.
- AECOM includes experts for each of these topics to ensure the EIS addresses them with appropriate technical rigor.
- AECOM successfully addressed these issues for the Donlin Gold EIS and will streamline based on lessons learned from that effort.

do not anticipate it to be necessary to provide a “camera ready” review draft to the cooperating agencies as was done on Donlin Gold EIS.)

DRAFT EIS

Some cooperating agencies may express concern that the Preliminary Draft EIS does not meet their needs in some way or that it needs to be reissued for another cooperating agency review. Bill Craig and AECOM’s senior advisors (especially Jon Isaacs, Bill Killam and Anne Baldrige) will support the USACE PM in finding ways to address agency concerns, move the process forward and maintain the schedule. It will be important to assess risk carefully to be sure this does not open the need for a Supplemental Draft EIS or legal challenge. AECOM will be available as needed to support the USACE PM. We also have other senior mining, NEPA, and planning staff available as needed, all of whom have experience resolving thorny issues raised by regulatory agencies.

AECOM specialists will address cooperating agency comments by editing the EIS where appropriate and developing responses to each comment in a simple matrix. When comments have been addressed to the satisfaction of the USACE PM, the document will undergo final editing and formatting before being distributed.

Successful FMEA. AECOM applied the results of an early FMEA to the Donlin Gold EIS. Cooperating agencies lobbied for a much more severe scenario (loss of 20 percent of maximum contents) but AECOM consistently resisted and defended the FMEA process. Agency objection was absent in the comments on the Preliminary Final EIS.

2.4 Task 4 Final EIS

PRELIMINARY FINAL EIS

Section 2.2 describes how public hearings on the Draft EIS will be conducted and how comments will be processed and analyzed. Following completion of comment processing, AECOM SMEs will prepare comment response for review by the USACE, and edit the DEIS as directed. Comment responses will be presented in a Comment Analysis Report (CAR) provided to the cooperating agencies with the Preliminary Final EIS.

We will prepare the draft CAR concurrently with EIS editing to produce the Preliminary Final EIS, systematically focusing authors on concurrent comment response and associated document revisions. **Our goal is to streamline necessary revisions to the EIS while addressing all substantive issues, to produce a Preliminary Final EIS that will allow the rapid production of the Final EIS.** We will work closely with the USACE through the review process to produce a high-quality Preliminary Final EIS ready for distribution to cooperating agencies.

FINAL EIS

AECOM will incorporate cooperating agency comments on the Preliminary Final EIS to produce the Final EIS as directed by the USACE. We will work with USACE through the final reviews for NEPA/CEQ compliance, and follow stringent and detailed quality checks for readability, grammar and formatting. With USACE's final approval, we will prepare the document for both electronic and hard copy publishing, and for publication on the website; we will meet all eNEPA requirements. The final

CAR will be publicly available when the Final EIS is published.

DRAFT RECORD OF DECISION

AECOM will prepare a Draft Record of Decision (ROD) for USACE. A USACE ROD is similar in many ways to other federal agency RODs with two primary additional sections:

- The ROD will need to address the requirements of the CWA 404(b)(1) guidelines which require selection of the Least Environmentally Damaging Practicable Alternative.
- The Public Interest Review which requires that the project not be contrary to the public interest.

AECOM will prepare a Draft ROD that addresses all USACE requirements. It will be provided to the USACE PM in Microsoft Word.

2.5 Task 5 Other Documents and Analyses

AECOM SMEs in Endangered Species Act (ESA) compliance, Section 106 NHPA and EFH consultation will assist the USACE PM with planning each of the compliance steps to ensure they finish on time and do not become critical path for the EIS. Environmental Justice and Human Health will be sections of the EIS and should not need any effort under Task 5. CWA 404(b)(1) and public interest support would be part of preparing the draft ROD. AECOM expertise with these important processes and our recent Donlin Gold EIS experience will allow us to streamline compliance to assist the USACE PM.

2.6 Task 6 Administrative Record

A comprehensive Administrative Record that is continually updated is crucial for supporting a legally defensible document. Our team has experience managing hard copy and electronic Administrative Records for complex and controversial EIS projects. The Administrative Record for the Pebble Project EIS will be updated continually throughout the project and will have the capability to easily retrieve materials supporting planning decisions. AECOM will use an indexed file system already established by the USACE that was similar to the record for the Chitna EIS. Our Administrative Record lead will develop this comprehensive indexed file plan to be utilized for the project's duration. Once the file plan has been agreed upon, AECOM will maintain an electronic Administrative Record in which all pertinent correspondence, deliverables, technical reports, background data and analyses are filed. Use of the Aconex system for data management will facilitate populating the Administrative Record. The Administrative Record will meet the standards outlined in the USACE's Administrative Record Management Plan.

Deliverables will include a draft and final Administrative Record file plan developed for the USACE with the Project Management Plan (see Section 3) and a complete electronic Administrative Record at the conclusion of the EIS. AECOM assumes that the USACE, PLP and the cooperating agencies will provide relevant documents for inclusion in a timely manner. AECOM will update the Administrative Record monthly and inspect the electronic Administrative Record.

03. Project Management Plan and Schedule

Understanding the imperative of schedule, AECOM proposes a schedule for completion in 21 months. AECOM's core team is assembled and completing the final editing of the Donlin Gold EIS and committed to this schedule. We recognize the 21-month schedule presents challenges for an EIS; however, our ability to streamline the approach we just completed for the Donlin Gold EIS will allow for successful completion. Our approach to project management and detailed schedule below demonstrates key aspects of our commitment to completing the EIS in this timeframe.

Perfect Timing. AECOM's team is finishing the Donlin Gold EIS and can immediately shift to the Pebble Project EIS

- Both EIS documents address similar issues
- No inefficiencies due to a newly assembled team
- No learning curves on major drivers such as CWA 404(b)(1) and large hard rock mine EIS

PROJECT MANAGER AND MANAGEMENT TEAM APPROACH

Hit the Ground Running. Our approach to project management immediately begins several concurrent tasks. Project management must recognize USACE and PLP expectations for attention to scope, schedule, and resources dedicated to the project. To that end, our management team will enable consistent flow of information from the USACE PM to appropriate members of the AECOM team, through our PM and DPMs. This team structure, shown in Figure 2 AECOM Team Organization, will continue momentum in the process by having clearly defined roles and responsibilities for each management team

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member. This structure worked well to advance the Donlin Gold Final EIS and will allow us to expedite the process without sacrificing accuracy or technical rigor.

Bill Craig is our proposed PM (Section 4.1). **Bill brings his prior project management experience from the Donlin Gold EIS and Point Thomson Project, both of which involved USACE EIS and CWA 404(b)(1) efforts.** He is known for bringing a consistent, even-tempered, and forward-moving hand to his projects. Further, he is measured and careful by nature in both written and oral communication, with a deliberate and controlled approach focused on critical path task completion. Bill inspires strong loyalty from colleagues. This AECOM management team operates in many ways like a small business in terms of style (co-located key staff who have long worked together and trust each other), but like a large business in terms of project controls, capacity and resources. Bill is a seasoned PM who is well versed in effectively doing business in AECOM and has and will again meld subcontractors into a coherent team—a task made simpler because many of our subcontractors have worked with AECOM before.

Bill will be supported by an exceptional, Alaska-experienced team that includes the following key personnel:

- Technical DPM, Elizabeth Bella, PhD
- Financial DPM, Tara Bellion
- PIC, Jennifer Frownfelter
- Tribal relations and public involvement lead, and senior advisor, Jon Isaacs

- Quality assurance/quality control (QA/QC) lead, Sasha Forland
- Assessment of infrastructure alternatives lead, Paul McIlvena
- Assessment of mining alternatives lead, Cecil Urlich, PE
- Physical sciences lead, Michael Gray, PG
- Biological sciences lead, Wes Cornelison
- Social sciences lead, Amy Rosenthal
- Technical advisor for fish, Dilip Mathur, PhD, Normandeau Associates
- Technical lead for fish, Ken Cash, Normandeau Associates

Bill Craig will be accountable for AECOM performance and his management team will provide continuity of communication with the USACE as well as oversight of internal staff and subcontractors. Key personnel will be 100 percent committed to their tasks so the Pebble Project EIS is objective, concise and delivered on time. For the percent availability in 2018 and 2019 for these key personnel, please see their biographies in Section 4 Staff Qualifications and Table 4.

Management Commitment

I certify that the key personnel identified in this proposal will be directly involved in preparing the Pebble Project EIS.

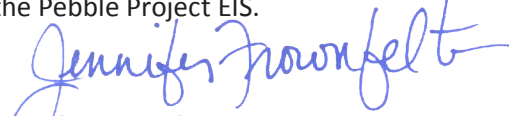
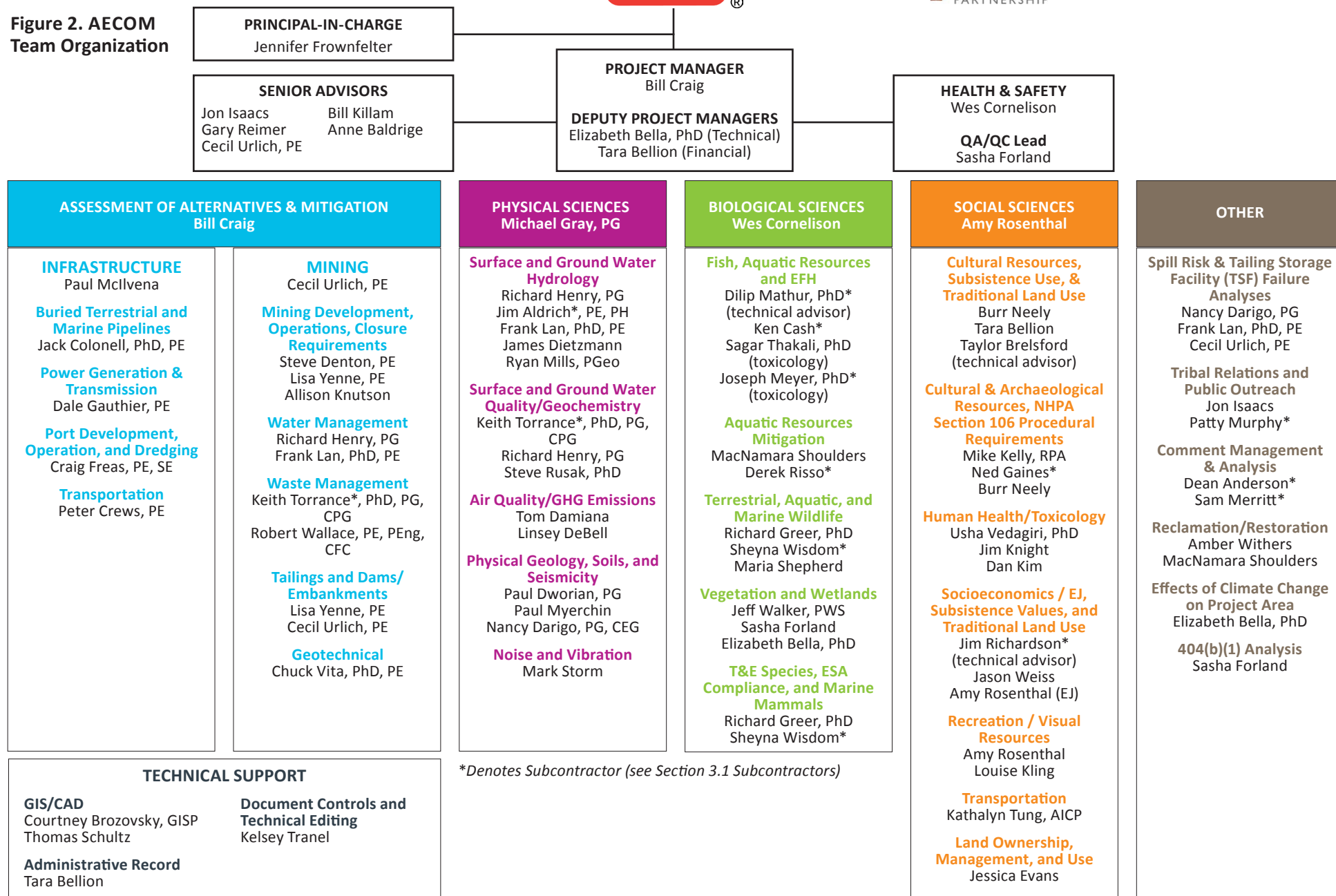

Jennifer Frownfelter



Figure 2. AECOM Team Organization



SUBCONTRACTORS

PROVEN SUBCONTRACTORS. In addition to the NEPA experience and technical subject matter expertise within AECOM, **we routinely partner with selected firms to augment our capabilities and address specific resources where we believe that recognized experts working in Alaska will add value to the process and the resulting document.**

We specifically chose individuals, not firms, to augment our team—selecting highly specialized and regarded experts, most of whom we have worked with previously on similar projects. See Section 4.0 Staff Qualifications and Table 4 for more details. All resumes are in Appendix A.

- Joseph Meyer, PhD, Applied Limnology (salmonid toxicology)
- Jim Aldrich, PE, PH, Arctic Hydrologic Consultants (surface and ground water hydrology, senior on-call expert)
- Ned Gaines, Brice Environmental (cultural and archaeological resources)
- Patty Murphy, E3 Alaska (tribal relations and public outreach)
- Derek Risso, Ecosystem Sciences (aquatic resources mitigation)
- Sheyna Wisdom, Fairweather Science (marine mammals)
- Dean Anderson and Sam Merritt, NightOwl Discovery (comment management and analysis)
- Dilip Mathur, PhD, and Ken Cash, Normandeau Associates (fisheries)
- Jim Richardson, ResourceEcon (technical advisor, socioeconomics, commercial fishing and economic feasibility)
- Keith Torrance, PhD, PG, CPG, Sustainable Earth Research LLC (waste management, surface and ground water quality/geochemistry)

COMMUNICATIONS

REGULAR AND FRANK COMMUNICATIONS.

Internally, the key AECOM personnel have worked together frequently and have established communication styles that will serve the EIS well. In addition to the weekly team meetings, communication within the AECOM team (and subcontractors) will be conducted via meetings, email, and instant messaging. Project-generated documents will be saved to a secure server hosted in Anchorage and Bill Craig's permission will be required for access.

Externally, technical direction will be provided by the USACE to the AECOM project management team through Bill Craig. The project management team and the discipline leads will be responsible for directing the work of the SMEs. All agency and public contact will be prearranged with the USACE PM.

As proved valuable with the Donlin Gold EIS, **AECOM proposes weekly update meetings with the USACE to review progress, schedule, upcoming tasks and potential needs (Bill Craig and the USACE PM will communicate more frequently).** AECOM anticipates weekly calls with USACE and PLP to update PLP on progress, discuss information needs and coordinate on other documents that PLP is anticipated to lead, such as draft Biological Assessments for Section 7, EFH assessment and the draft CWA 404(b)(1). Bill will lead the weekly update calls for EIS-related updates and will involve appropriate key staff. AECOM also anticipates a monthly meeting with PLP to review the progress report and invoice and these will normally be attended by Bill Craig and Jennifer Frownfelter (Jen will normally attend by telephone). Similar meetings were held successfully for the Donlin Gold EIS.

The AECOM team will refer all media inquiries to the USACE and all team members have

signed confidentiality agreements. The AECOM receptionist will be briefed and trained on how to handle Pebble-related calls.

SCHEDULE

COMPLETION OF THE EIS WITHIN A

21-MONTH SCHEDULE. To meet this objective, key management tools include an initial baseline schedule, continuous schedule oversight, and proactive issues mitigation. The major element of schedule control will be proper advance planning and establishment of deadlines for each task and work element. **Our proposed schedule (Gantt chart, Figure 3) shows the project's critical path/ milestones and includes the start and completion dates (deadlines) for each task and work element.** Our project controls coordinator will be responsible for updates to the schedule and communicate reminders about upcoming tasks that need to be initiated, as well as those that should be nearing completion. The project controls coordinator will provide updated copies of the project schedule for review on at least a monthly cycle to the AECOM project management team and in the progress reports to USACE and PLP.

Based on our detailed preliminary schedule (Figure 3), we expect a thorough discussion with USACE regarding many of the critical decision points in the context of our proposed management and technical approaches—specifically with respect to the ESA Section 7, NHPA Section 106, and EFH compliance processes.

In addition to the detailed baseline schedule, several key management and documentation approaches are necessary to accomplish this schedule (Table 3).

“... highest compliments on their ability to produce under difficult deadlines and facilitate the process.”

GCI

Figure 3. AECOM Proposed Schedule for Pebble Project EIS

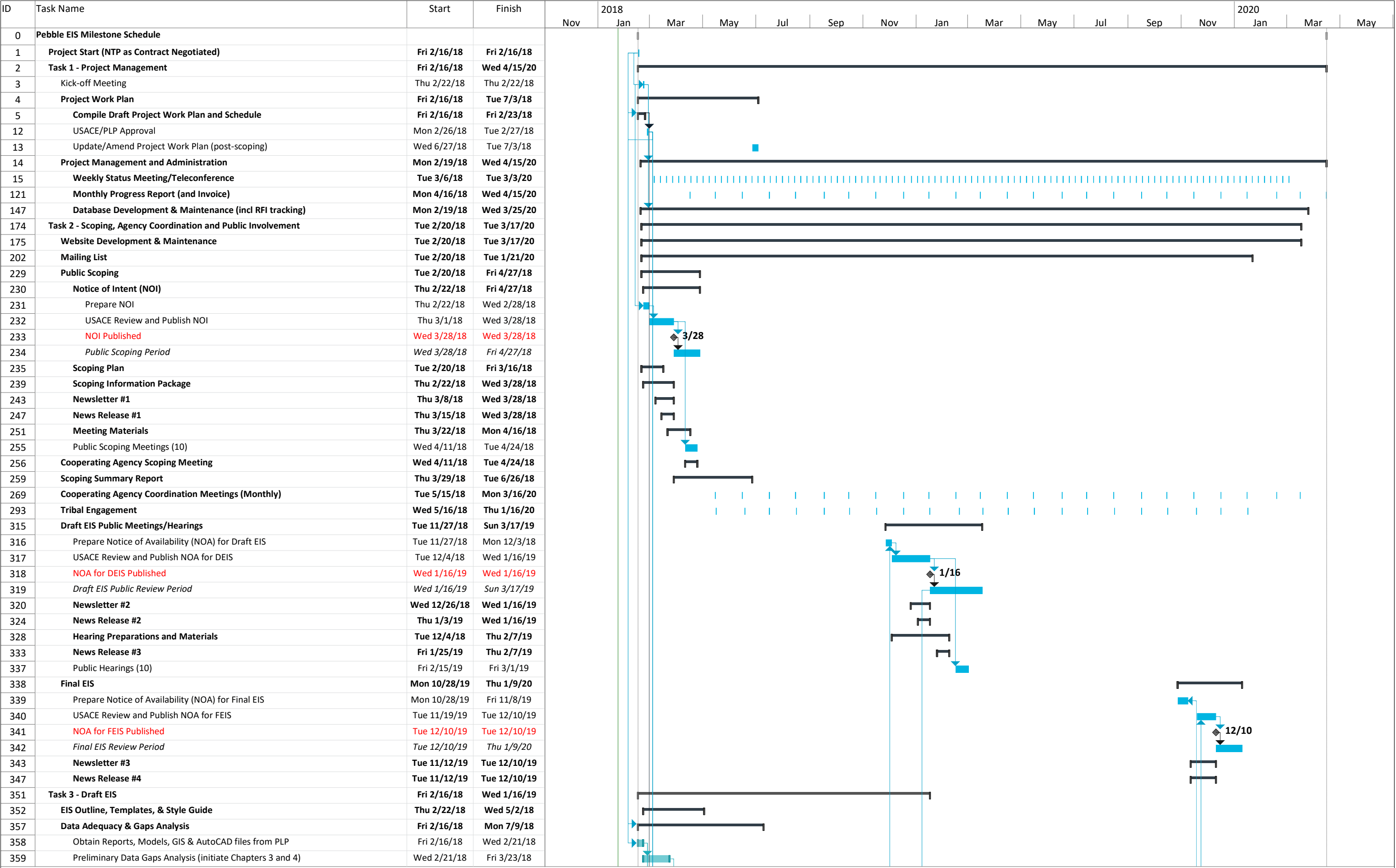


Figure 3. AECOM Proposed Schedule for Pebble Project EIS *(continued)*

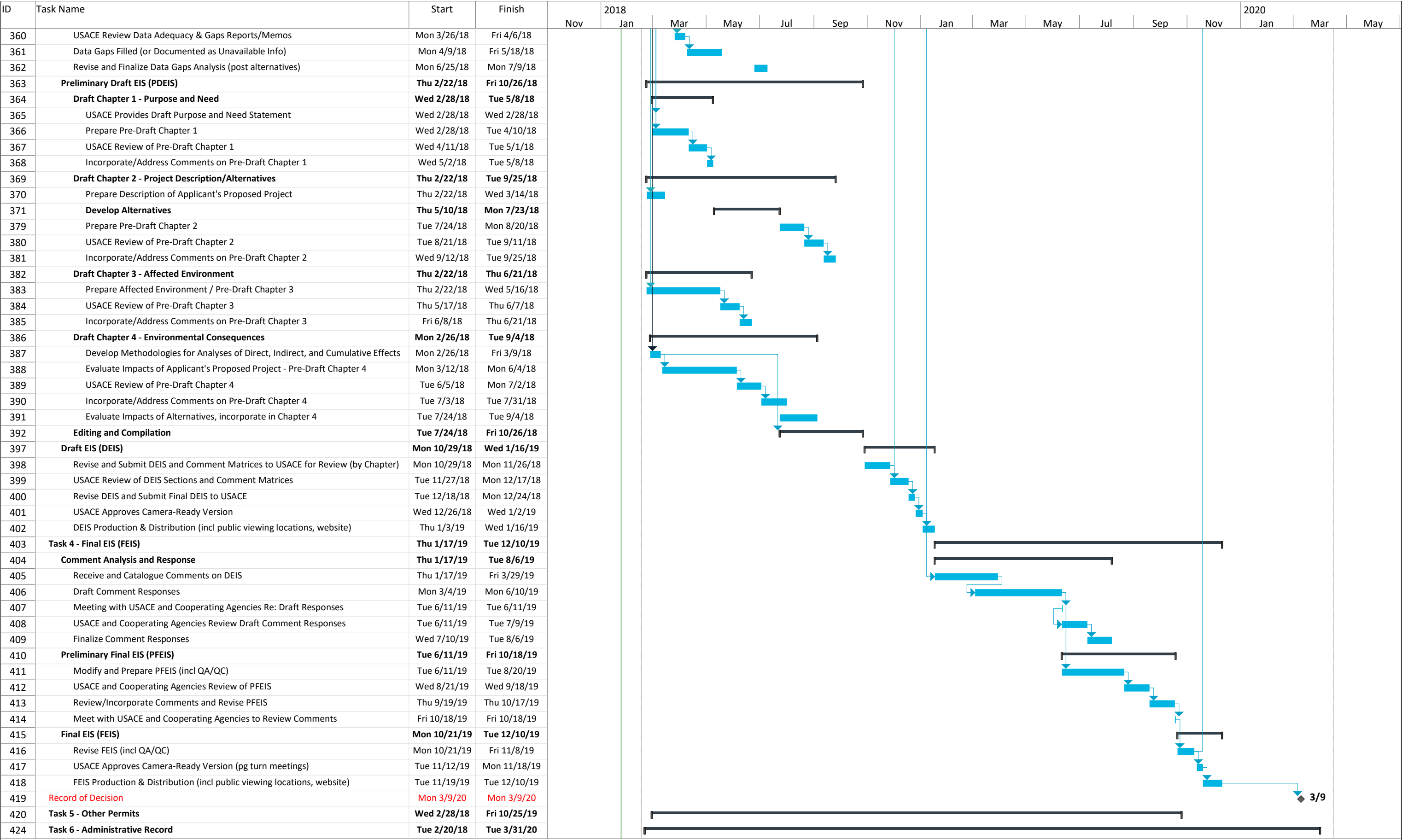


Table 3. Key Approaches to Meeting 21-Month Schedule

Approach	Benefit	Schedule Value
Initiate work on data gap analysis, alternatives, affected environment and environmental consequences prior to and during scoping	Allows work to progress in parallel. For example the scoping preparation and data gaps and adequacy reviews can occur concurrently	Significantly reduces timeframes compared to task-at-a-time approach. <i>Note: these tasks cannot finish until scoping is completed.</i>
Sequestered work sessions	Key members of the team will assemble in dedicated work spaces and timeframes to push through analyses, document reviews, and final editing	Expedites deliverables
Maximize use of tables and graphics to portray complex or quantified information, without repeating such information in narrative formats	Streamlines internal reviews and revisions; minimizes potential for inconsistencies; and reduces document size	Ultimately reduces agency review time and volume of comments
Add additional staff from AECOM deep bench if needed to address emerging issues	Removes need to procure and bring subcontractors up to speed	Reduces potential for delays

COST CONTROL AND MANAGEMENT**DEDICATED DPM AND STRONG PROJECT MANAGEMENT CONTROLS.**

During execution of the project, the AECOM PM and Financial DPM will monitor and control project activities and use internal reporting and project dashboard functions within the AECOM project management tool platform (ePM). **Review meetings will be held bi-weekly with the project team to track and discuss earned value versus actual costs so that project adjustments can be made before cost overruns and schedule delays occur.** Additionally, the Financial DPM will review cost on a weekly basis to identify outliers, unexpected charges, and/or additional items to discuss with the PM and PLP, as applicable.



Please know we appreciate your diligence on both keeping to schedule as well as staying within the most recent budget mod.”

Donlin Gold

Authorized project changes will be tracked and documented within ePM’s change management system. Changes or adjustments during the course of the project may include changes in project staff assignments, deliverable schedules, subcontractor purchase orders, and estimates to complete for each project task. Once changes are approved by USACE and PLP, the change records will be initiated in ePM and approved through proper internal channels and communicated to the project team.

AECOM proposes to provide detailed progress reports and monthly invoices for approval and payment with costs broken down according to the proposed work breakdown structure.

NON-DISCLOSURE REQUIREMENTS

Bill Craig will lead an AECOM project team meeting at least weekly with key AECOM personnel, staff, and subcontractors. A very important standing agenda item will be non-disclosure; Bill will stress the importance of maintaining the confidentiality of all project information until it is approved for

distribution through approved channels. AECOM is very experienced with controversial NEPA projects and will consistently reinforce to team members the importance of being careful not to share information with acquaintances, friends or the media (whether announced as media or not).

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

AECOM uses a proven quality management system (QMS) that is certified to the internationally renowned ISO 9001:2008 standard, yet sufficiently flexible to address the specific requirements of this project. Quality management is central to our project management approach, and our project team includes individuals assigned to specific quality roles under our system. AECOM’s QA/QC lead, Sasha Forland, will lead the quality management process for this project. **The key to our technical quality requirements is to involve experienced technical leads in the planning and implementation of the technical approach early and often during the project.**

04. Staff Qualifications

4.1 Project Manager – Bill Craig

BS. 27 years experience/17 with AECOM.
Location: Alaska. Availability 2018/2019:
100%/100%



Our PM Bill Craig has 27 years of professional experience, including 17 with AECOM in Alaska.

He has led large multidisciplinary teams for projects including the Cordova Oil Spill Response Facility EIS, the Point Thomson Project (applicant support of the EIS), and most recently the Donlin Gold EIS. In addition, Bill has 17 years of experience in Prince William Sound's commercial salmon fishing industry. Bill will be dedicated to the project and will forgo commercial fishing. Bill will also lead the assessment of alternatives and mitigation, and the spill risk and TSF failure analyses team.

Technical and Regulatory Experience

Bill's previous work provided an ideal blend of technical and regulatory understanding for the assignment. He has worked on many NEPA compliance projects including four that were either third-party roles for the USACE or had significant USACE involvement for CWA 404(b)(1) issues. Bill's recent work leading the Donlin Gold EIS from the Preliminary Draft through preparation of the Final EIS has given him recent and relevant experience with large mine projects, associated impacts, and contemporary regulatory issues. Bill led the alternatives assessment and impact analysis for the Donlin Gold EIS and the Cordova Oil Spill Response Facility, both with industrial roads/transportation corridors. The Point Thomson Project, Cordova EIS, and Donlin Gold EIS had ports and navigational channel design, dredging and disposal (including ocean dumping evaluations under Section 103 of the Marine Protection, Research and Sanctuaries

Act), and ship traffic. The Beluga to Fairbanks EIS, Point Thomson Project and the Donlin Gold EIS had natural gas pipelines. His previous extensive experience in water quality studies and National Pollutant Discharge Elimination System (NPDES) and Alaska Pollutant Discharge Elimination System (APDES) permitting gives him a solid understanding of water quality science and permitting regulations that will be a key topic in this EIS. His background in commercial fishing provides a unique and valuable understanding of the fishing industry and the importance of salmon and healthy habitat to subsistence and coastal communities. At the same time, Bill believes in, understands, and cares about the objective NEPA process on which he has built his career, and about how the process works in large-scale, rural Alaska projects.

People

Bill knows how to work with people. He has been managing staff at AECOM for six years and knows how to work with large interdisciplinary teams to produce quality deliverables under difficult deadlines. For the Pebble Project EIS, Bill brings over the core team he has been leading for the Donlin Gold Final EIS. This team is a high-performing and experienced NEPA team that works well together; there will be no learning curve that would be expected with a newly assembled team. Bill and his team have worked with many of the agency staff that will be involved and have established professional relationships that will add to the efficiency of the AECOM team in meeting expectations. In addition, Bill's deliberate demeanor will be an asset in dealing with the public and agency stakeholders.

Project Management Systems

The Pebble Project EIS is a complex and fast moving project that demands a team with project management systems suitable for and tested on similarly challenging projects. AECOM has advanced project management systems, developed and continuously improved on many projects over time. As an AECOM certified PM, Bill knows how to employ these systems, as do his certified DPMs. These strong software and project controls make tracking and controlling costs routine, allowing Bill to focus on interacting with his technical team, USACE and PLP.

Temperament

While Bill has been described as "quiet," his ability to inspire, facilitate, and manage the demands of a large EIS project cannot be overstated. Bill leads by example and pushes team members to do their best, recognizing and refining talent and skills to find the best and most productive role for each team member. Bill exhibits a razor-sharp focus in identifying issues at the earliest stage to deftly set the stage for successful resolution in complex projects with many moving parts. His behind-the-scenes efforts have given him the well-deserved reputation of being unflappable. His team would agree there is no crisis, challenge, or unanticipated change—at any scale—that Bill cannot handle. His professional and personal experience and lessons learned, along with attention to detail and conscientious approach to management, have brought him to this point in his career as the ideal candidate for this role and this project.

References: John Wilkinson, ExxonMobil (Retired), john@wilkieenvllc.org, 908-601-8483; Sue Ban, ECO49 Consulting LLC, sueban@eco49.com, 907-301-7185; Dan Graham, PE, Donlin Gold, dgraham@donlingold.com, 907-273-0200

4.2 Team Overview

Our management team is ready to organize, to lead, to direct, and to inspire our team to complete this challenging project on time. Our team is centered on our PM and our two DPMs, supported by a PIC and Senior Advisors, as well as Technical Discipline Leads. We are ready to start immediately—and are excited for the opportunity to work on this project within this timeline. AECOM, and specifically, our dedicated team members, have strategically and carefully worked for the past decade to be part of this project, avoiding any potential conflicts of interest.

Our management team structure has clearly defined roles and responsibilities to facilitate the consistent flow of information from USACE to the AECOM team. This helps to avoid confusion and to complete complex NEPA projects on time. In addition, the AECOM team brings decades of focused and complementary experience with mining, port, and natural gas pipeline projects, along with knowledge of key issues such as mine site water management, tailings dam construction, salmonid biology, and commercial and subsistence fisheries that will collaboratively provide efficient and successful execution of this project.



PRINCIPAL-IN-CHARGE AND SENIOR ADVISORS

Jennifer Frownfelter, Principal-in-Charge

BS, MS. 21 years experience/18 with AECOM.
Location: Oregon. Availability 2018/2019:
25%/25%



Jennifer has more than 20 years of experience in environmental planning. She is the AECOM Northwest Region Impact Assessment and Permitting Manager and has worked on various controversial permitting projects requiring extensive public involvement and expert witness testimony. Her project experience includes serving as PIC or PM for NEPA process and document preparation efforts, as well as permitting with state and local agencies. She has served as a client account manager, PIC, and PM managing various types of stakeholder and public processes often required for project success. **AECOM has specifically selected Jennifer to serve on this team as an AECOM corporate representative that can quickly manage changes and make resources available to this project; she will not be involved in day-to-day project operations and will be the key resource to solve problems.** As PIC, she has supported various project management teams with securing and mobilizing AECOM staff and provided the direct communications to project proponents regarding financial matters.

References: Victoria Peacey, Resolution Copper Company, victoria.peacey@riotinto.com, 520-689-3313; Mark Lambert, USFS, mblambert@fs.fed.us, 970-385-1240; Brent Gifford, Arizona Public Service, brent.gifford@aps.com, 602-250-5160

Jon Isaacs, Senior Advisor, Tribal Relations and Public Outreach Lead

BA. 43/29 with AECOM. Location: Alaska.
Availability 2018/2019: 90%/90%



Jon has served in similar roles for Donlin Gold and Chuitna Coal EISs and has established productive relationships with the USACE Alaska District staff. A seasoned NEPA professional, Jon brings experience from a variety of Alaska NEPA projects including Point Thomson and Izembek Road EIS efforts and many Alaska NEPA Environmental Assessments for various clients NMFS and Bureau of Land Management (BLM). **He will also lead public outreach and tribal relations. Jon has participated in developing and implementing NEPA public involvement and tribal engagement plans for the last 20 years**, including the recent Donlin Gold EIS, the Izembek National Wildlife Refuge Land Exchange EIS, and Effects of Offshore Development Activities in the Arctic EIS. His project experience for the City of Dillingham, Lake and Peninsula Borough, and Bristol Bay Coastal Resource Service Area has developed relationships in the region and understanding of regional stakeholders and issues.

References: Mridula Srinivasan, NMFS Office of Science and Technology, mridula.srinivasan@noaa.gov, 301-427-8179; Steve Davis, NMFS Regional NEPA Compliance (Retired), steven.k.davis@gmail.com, 907-360-3627; Stephanie Brady, US Fish and Wildlife Service Conservation and Policy Planning, stephanie_brady@fws.gov, 907-306-7448

Gary Reimer, Senior Advisor

BA. 35+/4+ with AECOM. Location: Alaska.
Availability 2018/2019: 20%/0%



Gary, a certified PM, served as PM for Chuitna Coal EIS and serves as senior advisor for the Midas Gold Stibnite Mine EIS. Gary brings considerable Alaska NEPA experience from his previous BLM roles managing both the BLM Bay Resource Management Plan/EIS and the Trans-Alaska Pipeline (TAPS) Renewal EIS, an 18-month project leading to a Final EIS. In his previous role of BLM Anchorage District Manager, Gary led G2G consultations with many Bristol Bay tribes as part of the Bay Plan EIS effort.

References: Dan Graham, Donlin Gold, dgraham@DonlinGold.com, 907-273-0200; Jason Berkner, USACE, jason.r.berkner@usace.army.mil, 907-753-5778; Charlotte L. MacCay, SolstenXP, cmaccay@aol.com, 907-317-9449

Cecil Ulrich, PE, Senior Advisor; Assessment of Mining Alternatives Lead; Tailings and Dams/ Embankments; Spill Risk & TSF Failure Analyses (Senior On-Call Expert)

MSc, BE, BSc, PE/Alaska. 45/41 with AECOM.
Location: Washington. Availability 2018/2019:
90%/90%



Cecil is a civil/geotechnical engineer with 35 years of mining and tailings experience including geotechnical, hydrology and geology studies. He has managed design, construction and inspections on Red Dog Mine tailings dam and raises in Alaska since 1988, and he developed tailings dam closure concepts for the mine closure plan. He annually inspects the Tundra Mine tailings dams and a landfill in Northwest Territories and managed the landfill design. Cecil developed closure concepts and cost estimates for the Colomac Mine tailings ponds in Northwest Territories, was engineer-of-

record for liner construction quality assurance of Greens Creek Mine liner installations, and is mine alternatives development lead for the Donlin Gold EIS.

References: Anne Williamson, Twin Metals Minnesota, LLC, awilliamson@twin-metals.com, 651-842-6828; Bruce A. Howard, Teck Washington Incorporated, bruce.howard@teck.com, 509-446-5348; Michael Gonzales, Teck Alaska Incorporated, michael.gonzales@teck.com, 907-426-9320

Bill Killam, Senior Advisor

BA, 43/27 with AECOM. Location: Colorado.
Availability 2018/2019: 75%/75%



Bill is a senior NEPA PM with more than 27 years of experience in mine permitting, EIS and EA preparation, and prefeasibility studies in nine states. Bill has managed or contributed to 23 third-party EISs or EAs for the USFS, BLM, USACE, OSMRE, and DOE, including nine mining EIS or EA projects (hardrock and coal; surface and underground). He has provided permitting, prefeasibility, or other environmental support to nine more mining projects and contributed to 20 federal agency EIS/EA projects. His most recent assignments included three years as lead environmental consultant assisting Twin Metals Minnesota with their permitting and prefeasibility studies for a proposed underground copper mine. Bill has served as senior NEPA advisor for the Donlin Gold EIS and the Resolution Copper Mining Baseline Hydrological and Geotechnical Data Collection EA.

References: Pat Gochmour, Mining Industry Consultant, pat@gochnours.com, 303.906.0748; Mark Nelson, USDA Forest Service, mrnelson@fs.fed.us, 303.275.5094; Anne Williamson, Twin Metals Minnesota, awilliamson@twin-metals.com, 651.842.6828

Anne Baldrige, Senior Advisor

MBA, BS. 39/4 with AECOM. Location:
Colorado. Availability 2018/2019: 30%/30%



Anne has 39 years of experience specializing in environmental impact assessment, permitting, and management for natural resource development projects. Her main areas of expertise include management of interdisciplinary environmental impact assessments and regulatory compliance/problem-solving. She has worked on many complex mining and oil and gas projects both domestically and internationally, including heap leaching and milling projects for recovery of gold, silver, copper, platinum, palladium, cobalt, lead and zinc. She is known for her ability to problem-solve difficult situations and develop plans for success and for her ability to understand technical information and communicate this information verbally or in writing to a wide variety of audiences.

References: Michael W. Langley, USACE, Michael.w.langley@usace.army.mil, 602-230-6953; Claudette Horn, PNM Resources, claudette.horn@pnmresources.com, 505-241-2019; Steve Hinkemeyer, Trapper Mining Inc., steve@trappermine.com, 970-824-4401x460



PROJECT MANAGEMENT TEAM

The project management team includes Elizabeth Bella and Tara Bellion.

Elizabeth Bella, PhD, Technical DPM; Vegetation & Wetlands; Effects of Climate Change on Project Area

BS, MS, PhD. 20/3 with AECOM. Location: Alaska. Availability 2018/2019: 100%/100%



Elizabeth has 20 years of planning and applied ecology experience. She currently serves as DPM and biological sciences lead for the Donlin Gold EIS. Elizabeth will lead all technical aspects of this project. She has NEPA experience in hydroelectric, energy, and timber management resource areas, and extensive wetlands and biology experience. She leads the planning group for AECOM's Anchorage office, specializing in NEPA, state and federal permit applications, federal permit consultations, and public involvement processes. She has on-the-ground project experience throughout remote regions of both southwest and southeast Alaska. Climate change expertise includes NEPA climate policy, vulnerability assessments, community adaptive management planning, and biogeoclimatic modeling applied to habitat and landscape type change.

References: P. Chris McKee, USFWS, paul_mckee@fws.gov, 907-786-3572; Dan Graham, PE, Donlin Gold, dgraham@donlingold.com, 907-273-0200; Dr. Barbara Schrader, USDA Forest Service, bschrader@fs.edu.us, 907-586-7863

Tara Bellion, Financial DPM, Subsistence; Administrative Record; Comment Analysis

BS, 22/22 with AECOM. Location: Alaska. Availability 2018/2019: 75%/80%



Tara, a certified PM, served this DPM role well for the Donlin Gold EIS and earned a reputation from USACE for NEPA coordination, preparation of Administrative Records, transparent budgeting, strong workload and schedule management and senior NEPA expertise. She also is a NEPA subsistence specialist, a role she has served for the Donlin Gold EIS and several large, complex, and controversial NEPA projects. Tara will focus on schedule, budget and project coordination especially through the comment analysis, leading the Administrative Record process, technical editing, and deliverable production processes. Tara has extensive experience as an impact assessment practitioner and, in addition, has led the comment analysis team for every large EIS performed in the AECOM Alaska operations during the past seven years, including the Donlin Gold EIS, the Izembek National Wildlife Refuge Land Exchange EIS, and Effects of Offshore Development Activities in the Arctic EIS. To augment this experience, Tara has also been the task lead for development and preparation of administrative records for numerous large and complex NEPA documents.

References: Dan Graham, Donlin Gold, dgraham@DonlinGold.com, 907-273-0200; Candace Nachman, NMFS, candace.nachman@noaa.gov, 301-427-8031; Joan Kluwe, NPS, joan_kluwe@nps.gov, 907-644-3535

DISCIPLINE LEADS

For assessment of NEPA alternatives and mitigation, Bill Craig will oversee this interdisciplinary task to ensure the work complies with USACE requirements under CWA 404(b)(1). See his biography in Section 4.1. Cecil Ulrich, PE, will lead the assessment of mining alternatives and mitigation. His biography is in Section 4.2.

Paul McIlvena, Assessment of Infrastructure Alternatives Lead

BEng, 33/11 with AECOM. Location: British Columbia. Availability 2018/2019: 20%/20%



Paul is a senior manager in AECOM's North American mining practice skilled in all types of mine development projects, including surface and underground mines, mine infrastructure, transportation logistics and shipping ports. He is an experienced PM for large mining projects in northern climates; with multiple sites; with marine transport by barge between the mine and process plant; and numerous other multi-component mining projects. He has broad experience with mining infrastructure projects in Alaska, Canada, and Australia, including slurry pipelines, bulk materials handling, process plants, shipping terminals/ports, power generation, transportation and logistics in remote/cold regions and socially/environmentally sensitive locations.

References: Brian Kennedy, Teck Resources, brian.kennedy@teck.com, 604-699-4077; Brian Wong, Teck Coal Ltd, brian.wong@teck.com, 250-425-8954; Dirk Naumann, Quest Rare Minerals Ltd., dirk.naumann@questrareminerals.com, 514-220-2087

Michael Gray, PG, Physical Sciences Lead

BA, PG. 30/29 with AECOM. Location: Montana. Availability 2018/2019: 100%/100%



Michael brings experienced leadership as physical science discipline Lead. He is an accomplished large-project PM most recently leading the data collection efforts for the Alaska LNG project. He worked on the Donlin Gold EIS and has long and close working relationships with key project staff such as Nancy Darigo, PG (Donlin Gold EIS discipline lead) and Paul Dworin, PG (Chuitna Coal EIS and Midas Gold Stibnite EIS discipline lead). Collectively, they bring a wealth of experience to this project, particularly with the key experts, many of whom have worked closely together before. Mike's deliberate and decisive manner is very similar to our PM, Bill Craig, and the two will work seamlessly together. Additionally, Mike has direct experience with federal environmental processes under NEPA, the Comprehensive Environmental Response, Compensation, and Liability Act, and guidance under the Federal Energy Regulatory Commission (FERC) and the USEPA. He has worked extensively within State of Alaska regulatory frameworks, including ADEC.

References: Philip Brinkmann, ExxonMobil, philip.e.brinkmann@exxonmobil.com, 907-202-3171; Jeff Raun, ExxonMobil, jeff.raun@exxonmobil.com, 907-441-7202; Laura Desmond, PRL Logistics, Inc., laura.desmond@pacrimlog.com, 907-947-0029

Wes Cornelison, Biological Sciences Lead, Health and Safety Lead

BA. 17+/7+ with AECOM. Location: Alaska. Availability 2018/2019: 100%/100%



Wes is a fisheries scientist with over 15 years of relevant experience, most recently providing senior review for NEPA biological affected environment and environmental consequences reports for the Midas Gold Stibnite EIS and the NOAA

Fisheries Science Center NEPA Environmental Assessment program. Wes served as DPM for the Alaska LNG project, where he was responsible for the management and implementation of numerous physical and biological resource impact investigations including wetlands and vegetation, fisheries, wildlife, noise, and air quality. Wes is a proven and accomplished task supervisor for large-scale projects in Alaska and beyond. His role will apply his biological knowledge and ability to maintain a demanding schedule, ensure interdisciplinary coordination, and operate within budget. Wes is a "get it done" leader whose style both contributes to and complements the rest of the management team and the other discipline leads.

References: Chris L. Humphrey, PE, exp Energy Services, chris.humphrey@exp.com, 907.868.1185 x4101; Jon A Schmidt, PhD, exp Energy Services, jon.schmidt@exp.com, 850.385.5441 x 322; Mike LaVoie, Eastern Band of Cherokee Indians, michlavo@nc-chokeee.com, 828-359-6113

Amy Rosenthal, Social Sciences Lead; Recreation

BS, MS. 22/10 with AECOM. Location: Oregon. Availability 2018/2019: 80%/80%



Amy, a certified PM, assumes the same role she performs for the Donlin Gold EIS, the social environment lead. She has considerable Alaska and mining NEPA experience as the PM for BSWI EIS and the land use/land planning SME for the Midas Gold Stibnite EIS. Previously, she was the PM for the 2007 Ring of Fire EIS for BLM Alaska. Amy is a technical expert in NEPA analysis and cumulative impact assessment, with a proven ability to manage large-scale, controversial projects for federal and commercial clients.

References: Joan Kluwe, NPS, joan_kluwe@nps.gov, 907-644-3535; Dave Fuller, BLM, dfuller@blm.gov, 707-825-2315; Candace Nachman, NMFS, candace.nachman@noaa.gov, 301-427-8031

KEY SUBJECT MATTER EXPERTS**Dilip Mathur, PhD, Normandeau Associates, Technical Advisor, Fish, Aquatic Resources & EFH**

PhD, MS, MSc, BSc. 50/40 with Normandeau. Location: New Hampshire. Availability 2018/2019: 80%/80%



Dilip has over 50 years of experience in consulting on environmental and operational issues related to hydro, steam, and nuclear generating stations throughout the US. He participated in development and review of environmental impact reports dealing with migratory species. His expertise lies in the fields of thermal discharges; anadromous fish restoration (clupeids and salmonids); integration of fish behavior data with power plant operations; turbine and non-turbine passage survival of salmonids; turbine and spillways rehabilitation relative to development of friendlier fish passage, particularly of Pacific salmonids; delineation of effects of power plants on aquatic ecosystems; fisheries biology; data analysis; and population dynamics.

References: Kimberly Long, Exelon BSC, kimberly.long@exeloncorp.com, 610-331-0344; John Esler, Portland General Electric, john.esler@PGN.com, 503-464-8563; Steven Hays, Fish and Wildlife Senior Advisor, Retired (effective 1/26/2018), sghays51@msn.com, 509-679-7034

Ken Cash, Normandeau Associates, Technical Lead for Fish

MS, BS, 23/11 with Normandeau. Location: New Hampshire. Availability 2018/2019: 85%/85%



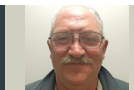
Ken has over 23 years of experience conducting research to determine impacts of resource development projects and mitigation actions on Pacific Salmon. He is an expert with designing research and monitoring studies involving anadromous salmonids and assessing distribution, behavior, and survival of multiple species and life stages. Ken has extensive experience in

experimental design, agency negotiation, and successful implementation and management of large interdisciplinary projects.

References: *Fenton Khan, Fishery Biologist, USACE, Portland District, fenton.o.khan@usace.army.mil, 503-808-4777; Ruthann Haider, USACE, Walla Walla District, ruth.haider@us.army.mil, 509-527-7214; Mark Capelli, SoCal Area Recovery Coordinator, NOAA Fisheries, mark.capelli@noaa.gov, 805-963-6478 x14*

MacNamara Shoulders, Fish, Aquatic Resources and EFH; Reclamation/Restoration

BS. 32+/2 with AECOM. Location: Alaska.
Availability 2018/2019: 100%/100%



Mac has 35 years of technical and project management experience, and is a subject matter expert in fish and stream restoration. He has extensive regulatory and environmental expertise in compliance with requirements for comprehensive environmental baseline studies, integration of environmental factors into project engineering and alternative analysis, and presentation of information to meet the requirements of NEPA. Recent projects include the Fish Protection Plan for the Chuitna Coal Mine to mitigate impacts to 22 miles of anadromous fish streams. He is currently the fisheries and restoration lead for the Midas Gold Stibnite EIS. Projects also have included annual inspection, assessment and maintenance for 600 anadromous and resident fish stream crossings for 10 years on TAPS.

References: *Pete Nagel, Alyeska Pipeline Service Company, peter.nagel@alyeska-pipeline.com, 907-787-8700; Dan Graham, Donlin Gold, dgraham@donlingold.com, 907-273-0200; Mark Wiggin, Deputy Commissioner, State of Alaska DNR, mark.wiggin@alaska.gov, 907-269-8431*

Mike Kelly, RPA, Cultural & Archaeological Resources, NHPA Section 106 Procedural Requirements (Senior On-Call Expert)

BA, MA. 37/33 with AECOM. Location: Oregon.
Availability 2018/2019: 50%/65%



Mike has over 38 years of experience and manages AECOM's cultural resources program in the Pacific Northwest region and throughout the western US. He has been responsible for directing numerous archaeological investigations throughout Alaska and the Pacific Northwest, the Great Basin, California, and the Pacific region. He served as the cultural resources technical lead for environmental impact analysis and Section 106 Compliance support for the Donlin Gold EIS; he also managed support of cultural resources investigations for the Alaska LNG Project, an 800-mile corridor connecting Alaska's North Slope with a proposed LNG facility in south central Alaska – a role he provided for the earlier Alaska Pipeline Project corridor studies.

References: *Charles Holloway, Los Angeles Dept of Water and Power, charles.holloway@ladwp.com, 213-367-0285; Aaron English, TetraTech, aaron.english@tetrattech.com, 208-489-2851; Kris McCaig, Teck American Inc., kris.mccaig@teck.com, 509-623-4501*

Jeff Walker, PWS, Wetlands Lead

BS, PWS. 21/17 with AECOM. Location: Washington. Availability 2018/2019: 50%/50%



Jeff has 21 years of experience as a botanist and over 17 years as a professional wetland scientist. He has directed vascular and nonvascular plant surveys, performed monitoring of rare plant populations, and conducted noxious weed surveys. He has conducted wetland delineations and reconnaissance investigations throughout

the Pacific Northwest and successfully acquired wetland and environmental permits and approvals for numerous large and small projects. Jeff has designed, inspected, and monitored several wetland mitigation projects. He has experience writing NEPA EIS documents and conducted ESA consultations for large projects regarding federal and state-listed threatened and endangered (T&E) species.

References: *Gene Akiaten, Shell Puget Sound Refinery, gene.akiaten@shell.com, 360-299-0180; Alan Sugino, Boeing Commercial Airplanes, alan.k.sugino@boeing.com, 425-495-5953; Stephen Lincoln, City of Kent, slincoln@kentwa.gov, 253-856-5552*

Sasha Forland, QA/QC Lead; Vegetation & Wetlands; CWA 404(b)(1) Evaluation

BS. 17/8 with AECOM. Location: Alaska.
Availability 2018/2019: 100%/100%



Sasha has 17 years of experience in environmental permitting and compliance. She specializes in research, coordination, and preparation of environmental permit applications and NEPA documents. Sasha has experience in federal regulatory and compliance processes, including USACE CWA Section 404 wetlands dredge and fill / Section 10 Rivers and Harbors Act navigable waters permitting; Section 7 ESA consultation; and Magnuson-Stevens Fishery Conservation and Management Act consultation and EFH assessments. She is also experienced in state permitting processes, including Alaska Department of Natural Resources (ADNR) land use permits, Alaska Department of Fish and Game (ADF&G) fish habitat permits, ADNR temporary water use authorizations, and the ADEC APDES program. Sasha's exceptional attention to detail has proved valuable for technical quality reviews and technical editing of NEPA documents.

References: Roy Thomas, Alaska Railroad Corporation, thomasr@akrr.com, 907-265-2520; Jeanette Greenbaum, Alaska Railroad Corporation, greenbaumj@akrr.com, 907-265-2440; Erika Denman, ExxonMobil Corporation, erika.denman@exxonmobil.com and denman.erika@gmail.com, 907-350-2127

Tom Damiana, Air Quality

BS, MS. 19/10 with AECOM. Location: Colorado. Availability 2018/2019: 20%/20%



Tom is a certified PM and senior air quality engineer with 19 years of experience as an air quality consulting professional. Tom has a strong background in air quality measurements, modeling, construction permitting and the regulations driving these activities. Through his years of interacting with regulatory authorities, Tom has become known as a respected technical authority by the State of Alaska, USEPA Region 10, and the BLM National Operations Center. Tom's extensive experience includes conducting air quality permitting activities involving new sources, source modifications and facility de-bottlenecking. As a senior technical specialist, Tom has been a part of several EISs, analyses, and monitoring for power plants and process heaters, permit applications, and air quality monitoring assignments throughout Alaska.

References: Brad Thomas, CPAI, brad.c.thomas@conocophillips.com, 907-263-4741; Jim Pfeiffer, Global Projects Organization (in support of the AGDC and AKLNG), jim.pfeiffer@bp.com, jpfeiffer@agdc.us, 281-896-6754; Claudette Horn, Environmental Services, Public Service Company of New Mexico, claudette.horn@pnmresources.com, 505-241-2019

4.3 Qualifications for the AECOM Team

A brief overview of staff integral to the Pebble Project EIS but not profiled above are shown in Table 4. All resumes are in **Appendix A**.

4.4 Personnel Changes

On major projects, key personnel occasionally need to be replaced. This should be anticipated and Bill Craig and AECOM will carefully manage personnel change to ensure there is minimal impact to progress. In most cases, professional people provide advance indication that they need to be replaced allowing for an orderly transition but this is not always possible. Steps that will be taken to replace the key personnel listed above or any of our lead SMEs include:

- Notification of the USACE and PLP
- Identification of potential replacements (within AECOM and subcontractors)
- Interview potential replacements to determine their level of expertise and availability
- Notify the USACE and PLP in writing of the proposed change, provide a resume for the replacement, and obtain approval
- Establish a billing rate with PLP
- Onboard the replacement by carefully orienting them to the project and project team

Bill Craig would lead this process with Jennifer Frownfelter directly involved in her role as PIC. Senior advisors would help identify and interview candidates. AECOM's depth of staff would provide ready access to a pool of experts but we will not hesitate to use subcontractors if they provide superior value to the project.

“The experts gelled into a cohesive team that viewed nothing as a limitation.”

US Department of Homeland Security Federal Emergency Management Agency

4.5 Conflict of Interest

AECOM made a full statement regarding A. Conflict of Interest and B. Statement of Financial Interest in our Pebble Mine Project Third-Party EIS – Statement of Qualifications, Section 02 Conflict of Interest, dated September 13, 2017. Since then, we have added several staff and subcontractors to our team. The updated Conflict of Interest statements are attached as **Appendix B**.

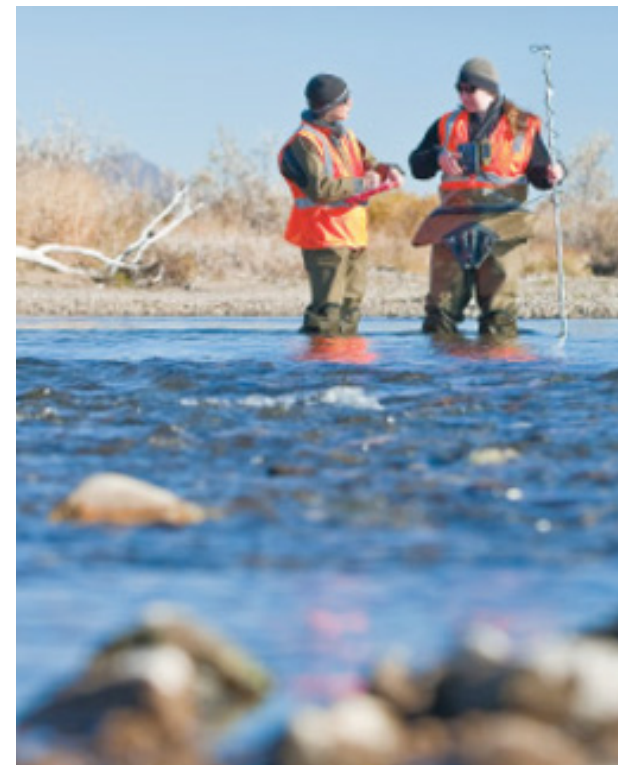


Table 4. Qualifications for AECOM Team (Not Profiled Above)								
Subject Matter Experts (alphabetically)	Education/Certification, Total Years Experience; Years with Current Firm	Why Chosen for this Project	Office Location	Availability 2018/2019 (percent)	EISs and Regulatory Compliance for Large Mines	EISs and Regulatory Compliance Projects	Alaska Experience	Third-Party Work for USACE with Focus on 404(b)(1)
JIM ALDRICH, PE, PH (Arctic Hydrologic Consultants), Surface and Ground Water Hydrology (Senior On-Call Expert)	MS, BS 39	Lead surface water hydrologist on Donlin Gold EIS; hydrologist on Umiat and Foothills West Road EISs; extensive water resources engineering experience in Alaska related to mines, roads, pipelines, drainage and erosion control structures. He will provide lead surface water hydrology expertise, with a strong focus on engineering and operational interfaces and effects on surface water flow and quality.	AK	10%/10%	■	■	■	■
DEAN ANDERSON (NightOwl Discovery), Comment Management and Analysis	BS 20/16 NightOwl	Expert in the application and customization of Relativity software, AECOM's selected comment management system	MN	30%/40%				
TAYLOR BRELSFORD , Subsistence Use & Traditional Land Use (Technical Advisor)	MA, BA 38/12 AECOM	Pre-eminent expert in subsistence management and Traditional Ecological Knowledge. Extensive experience with subsistence issues in Alaska, including on Donlin Gold EIS.	AK	90%/90%	■	■	■	■
COURTNEY BROZOVSKI, GISP , Technical Support – GIS/CAD	BS/GISP 4/3 AECOM	Expert GIS professional with large-project experience. Lead for Point Thomson GIS work.	AK	60%/80%	■	■	■	■
JACK COLONELL, PhD, PE , Buried Terrestrial and Marine Pipelines	PhD, MS, BS 51/24 AECOM	Senior engineer and SME with extensive, relevant experience in Alaska. First-hand knowledge of Cook Inlet characteristics.	AK	40%/20%		■	■	■
PETER CREWS, PE , Infrastructure – Transportation	BS/PE 17/17 AECOM	Civil engineer with experience evaluating road concepts and embankments. Peter assisted with road and port alternatives for Donlin Gold EIS and also provided NEPA engineering support for the Izembek EIS.	AK	80%/80%	■	■	■	■
NANCY DARIGO, PG, CEG , Seismicity; Spill Risk & TSF Failure Analyses	MS, BS 35/30 AECOM	Serves as physical sciences lead on Donlin Gold EIS; SME in geohazards, seismicity, and dam failure spill risk for Donlin Gold impacts analysis; 20 years Alaska NEPA experience on mining, pipeline, gas plant, roads, ports, bridge, forestry, and intertie projects.	AK	50%/50%	■	■	■	■
LINSEY DEBELL , GHG Emissions	MS, BA 17/11 AECOM	NEPA air quality resource lead on Donlin Gold, Yukon Flats Land Exchange, and Foothills West EISs in Alaska; strong background in climate change research, dispersion modeling in support of PSD permit applications, ambient monitoring, fugitive dust analysis, and emission inventory management.	CO	20%/20%	■	■	■	■
STEVE DENTON, PE , Mining Development, Operations, Closure Requirements (Senior On-Call Expert)	BS 45/1 AECOM	Extensive experience with mines and mining infrastructure in Alaska; including mine exploration, permitting, construction, development/ operations, dam safety, water rights, ore hauling, natural gas, power, roads, and marine facilities; senior advisor on Chuitna Coal SEIS; former VP Engineering and General Manager Usibelli Coal Mine.	AK	25%/25%	■	■	■	■
JAMES DIETZMANN , Surface Water Hydrology	BS 28/21 AECOM	Surface water hydrologist for Donlin Gold, pipeline, and forestry EISs in Alaska; strong background in stream crossing field surveys, channel hydraulic and hydrologic system modeling, surface and groundwater monitoring, discharge analysis, and baseline studies at mine sites in Alaska and Canada.	AK	100%/100%	■	■	■	■
PAUL DWORIAN, PG , Physical Geology and Soils	MS, MBA/PG Alaska, CPG 30/29 AECOM	Physical sciences lead for Chuitna Coal Mine and Midas Gold Stibnite EISs; geology and geohazards SME on Donlin Gold EIS; strong background in baseline studies and abandoned mine remediation projects. Worked geology and physical science related topics for BSWI.	AK	30%/50%	■	■	■	■

Table 4. Qualifications for AECOM Team (Not Profiled Above) <i>(continued)</i> Subject Matter Experts (alphabetically)	Education/Certification, Total Years Experience, Years with Current Firm	Why Chosen for this Project	Office Location	Availability 2018/2019 (percent)	EISs and Regulatory Compliance for Large Mines	EISs and Regulatory Compliance Projects	Alaska Experience	Third-Party Work for USACE with Focus on 404(b)(1)
JESSICA EVANS , Land Ownership, Management, and Use	MS, BS 9/7 AECOM	Planner who has contributed to many NEPA documents. Lands SME, spills author, and public involvement lead for Donlin Gold EIS. Currently assisting the Midas Gold Stibnite EIS scoping comment analysis. Lands SME for BSWI and worked on-site in BLM's Anchorage Field Office lands office to assess complicated lands records and case files.	AK	85%/85%	■	■	■	■
CRAIG FREAS, PE Infrastructure – Port Development, Operation, and Dredging (Senior On-Call Expert)	BS 48/22 AECOM	Senior ports and harbor engineer with more than 40 years experience in Alaska.	AK	60%/80%			■	
NED GAINES (Brice Environmental) , Cultural & Archaeological Resources, NHPA Section 106 Procedural Requirements	MA, BA 18	Senior anthropologist with significant Alaska experience who has worked on several NEPA projects including Chuitna Coal SEIS.	AK	75%/100%	■	■	■	
DALE GAUTHIER, PE , Infrastructure – Power Generation & Transmission (Senior On-Call Expert)	MBA, BS 36/12 AECOM	Extensive experience in design and management of renewable and fossil fuel power and energy projects, including solar, biogas, thermal energy, and cogeneration plants.	CA	20%/20%				
RICHARD GREER , Terrestrial, Aquatic, and Marine Wildlife; T&E Species, ESA Compliance, and Marine Mammals (Senior On-Call Expert)	PhD, MS, BA 33/3 AECOM	Senior biologist with significant Alaska environmental impact experience related to fish and wildlife/birds. Very involved with the Point Thomson NEPA effort (from the applicant's side).	AK	100%/100%	■	■	■	
RICHARD HENRY, PG , Mining – Water Management; Surface and Ground Water Hydrology; Surface and Ground Water Quality/Geochemistry	MS, BS/PG 39/15 AECOM	Nearly 40 years of experience in evaluating water issues in mining, in and out of Alaska. He is exceptionally strong in flow and transport modeling and geochemical analysis. He will provide lead expertise in groundwater modeling evaluation, geochemical analysis and water resources impact assessment.	CO	50%/50%	■	■	■	
DAN KIM , Human Health/Toxicology	BS 19/7 AECOM	Senior risk assessor who is working on the Donlin Gold EIS.	CA	50%/50%	■	■	■	■
LOUISE KLING , Visual Resources	MS, BS 25/12 AECOM	Senior visual SME for Donlin Gold EIS and many other projects including Izembek, Point Thompson, BSWI and Midas Gold Stibnite EISs. Well versed in visual simulations and impact methodology.	OR	25%/50%	■	■	■	■
JIM KNIGHT , Human Health/Toxicology	MS, BS, BA 28/3 AECOM	Senior ecological risk specialist who worked on Donlin Gold EIS to address risk to wildlife from the pit lake after closure.	CO	50%/50%	■	■	■	
ALLISON KNUTSON , Mining Development, Operations, Closure Requirements	BS 16/3 AECOM	Recent and broad mining experience and serves a similar role on the Midas Gold Stibnite EIS. Recent experience serving Teck Alaska for Red Dog Mine's tailings dam and operations support.	ID	25%/25%	■	■	■	■
FRANK LAN, PE , Mining – Water Management; Surface Water Hydrology; TSF Failure Analyses	PhD, MS, BS 27/2 AECOM	Principal water resources engineer with nearly 30 years of experience in the application of surface water hydraulic and hydrologic analysis and modeling to sites worldwide, including sites in Alaska. He will provide lead expertise in surface water hydrology, surface water modeling, and effects analysis.	CO	20%/20%	■	■	■	

Table 4. Qualifications for AECOM Team (Not Profiled Above) <i>(continued)</i>									
Subject Matter Experts (alphabetically)	Education/Certification, Total Years Experience, Years with Current Firm	Why Chosen for this Project	Office Location	Availability 2018/2019 (percent)	EISs and Regulatory Compliance for Large Mines	EISs and Regulatory Compliance Projects	Alaska Experience	Third-Party Work for USACE with Focus on 404(b)(1)	
SAM MERRITT (NightOwl Discovery) , Comment Management and Analysis	JD, BA 13+/8 NightOwl	Expert in the administration and application of Relativity software, AECOM's selected comment management system.	MN	30%/40%					
JOSEPH MEYER, PhD (Applied Limnology Professionals) , Toxicology	PhD, BS 41	Senior SME in bioavailability and toxicity of metals to aquatic organisms, including salmonids. Extensive experience related to fisheries, mining, and copper. Published refereed expert on whether aquatic life criteria for copper protect against impairment of chemosensation, mechanosensation, and behavior in fish and aquatic invertebrates, including salmonids.	CO	5%/5%	■	■	■		
RYAN MILLS, PGEO , Ground Water Hydrology	MSc, BSc 16/14 AECOM	16 years of experience in hydrogeologic assessment for mine development, mine permitting and mine closure, and experienced as a technical reviewer for the British Columbia Ministry of Mines. Ryan will support groundwater modeling evaluation and impact assessment, bringing unique insight into regulatory issues related to mine water management.	BC	30%/40%	■	■			
PATTY MURPHY (E3 Alaska) , Tribal Relations and Public Outreach	25	Knowledge of project area communities will be helpful for arranging scoping and Draft EIS meetings. Very experienced with public involvement and stakeholder engagement throughout Alaska.	AK	40%/40%		■	■		
PAUL MYERCHIN , Soils	BS 20/19 AECOM	SME for soils, contaminated site and hazardous materials evaluations for Donlin Gold and Chuitna EISs; strong background in soil and water field surveys, environmental site characterization and remediation, and geotechnical investigations.	AK	30%/40%	■	■	■	■	
BURR NEELY , Cultural & Archaeological Resources; Traditional Land Use	MA, BA 18/1 AECOM	Senior specialist well versed in all aspects of cultural resource management driven by NHPA Section 106, NEPA, Section 404 and local level regulatory compliance.	WA	50%/50%	■	■	■		
JIM RICHARDSON (ResourceEcon) , Socioeconomics / EJ, Subsistence Values and Traditional Land Use (Senior Technical Advisor)	MS, BA 40 years	Principal economist with primary expertise in community and regional impact assessment and fisheries and marine economic impact analysis. Strong background in the economies of rural Alaska and has completed many projects for the USACE.	AK	55%/45%		■	■		
DEREK RISSO (Ecosystem Sciences) , Aquatic Resources Mitigation	MS, BA 20	Expert in habitat modeling, fisheries ecology, and salmonids. Extensive fish and aquatic background on western U.S. rivers. Current effective working relationship on the Midas Gold Stibnite EIS with MacNamara Shoulders.	ID	50%/85%	■	■			
STEVE RUSAK , Surface and Ground Water Quality/ Geochemistry	PhD, MSc, BS 19/7 AECOM	Water and sediment quality SME on Donlin Gold EIS, Midas Gold EIS, and has consulted for Red Dog Mine several times. Extensive experience in geochemistry, water chemistry, and speciation and transport of metals in the environment in support of water management planning and NEPA analysis for projects in Alaska. He will support surface water quality issues and effects analysis.	AK	70%/70%	■	■	■	■	
THOMAS SCHULTZ , Technical Support – GIS/CAD	BS 9/9 AECOM	Expert GIS professional. GIS lead and analyst for Donlin Gold EIS, Midas Gold Stibnite EIS, BSWI RMP/EIS, and Izembek NWR Land Exchange.	AK	75%/75%	■	■	■	■	
MARIA SHEPHERD , Terrestrial, Aquatic, and Marine Wildlife	BA 31/6 AECOM	Wildlife, bird, and habitat SME. SME on Donlin Gold EIS, Midas Gold Stibnite EIS and several other Alaska NEPA projects including Izembek EIS and BSWI RMP/EIS.	ID	30%/70%	■	■	■	■	

Table 4. Qualifications for AECOM Team (Not Profiled Above) <i>(continued)</i> Subject Matter Experts (alphabetically)	Education/Certification, Total Years Experience, Years with Current Firm	Why Chosen for this Project	Office Location	Availability 2018/2019 (percent)	EISs and Regulatory Compliance for Large Mines	EISs and Regulatory Compliance Projects	Alaska Experience	Third-Party Work for USACE with Focus on 404(b)(1)
MARK STORM , Noise and Vibration	BS 27/11 AECOM	AECOM leader for noise and vibration impact assessment and mitigation. SME for Donlin Gold EIS, leading noise assessment for Midas Gold Stibnite EIS. Primary author for noise on Point Thomson Expansion Environmental Report.	CA	20%/20%	■	■	■	
SAGAR THAKALI , Ecological Risk Assessor/Toxicology	PhD, BS, BA 15/4 AECOM	Experience identifying relevant exposure pathways and receptors and conducted an ecological risk assessment for a former barite mine/refinery in Camamu Bay, Brazil.	PA	25%/25%	■	■		
KEITH TORRANCE, PG, CPG, PH (<i>Sustainable Earth Research LLC</i>), Mining – Waste Management; Surface and Ground Water Quality/Geochemistry	PhD, MRes, BSc 35	35 years of Alaska experience in geology, hydrogeology, mine reclamation and waste management, including direct experience with the Pebble Project, where he managed hydrological and water quality data collection, and acid rock drainage (ARD) field studies. He will provide lead expertise in water quality and geochemical analysis.	AK	75%/75%	■	■	■	
KELSEY TRANEL , Document Controls and Technical Editing	BA 7/6 AECOM	Technical editor and support for Donlin Gold EIS and document control lead for Alaska LNG.	AK	90%/90%	■	■	■	■
KATHALYN TUNG, AICP , Transportation	MP, BSc 12/10 AECOM	Transportation SME on Midas Gold EIS. Also worked on the Chuitna Coal Mine SEIS, BSWI RMP/ EIS and others.	ID	50-70% / 60-80%	■	■	■	■
USHA VEDAGIRI, PhD , Human Health/Toxicology (Senior On-Call Expert)	PhD, MS, BS 26/15 AECOM	Senior human health risk assessment SME for human health on Donlin Gold EIS. Knows the State of Alaska Health Impact Assessment process and how it integrates with NEPA.	CA	25%/40%	■	■	■	■
CHUCK VITA, PhD, PE , Mining – Geotechnical	PhD, MS, BS 45/21 AECOM	Infrastructure and environmental SME. Arctic and cold regions engineering. Many years of Alaska experience, including Red Dog Mine.	WA	60-80%/60-80%	■	■	■	
ROBERT WALLACE, PE, PEng, CFC , Waste Management	MBA, MEng, BEng AECOM	Extensive experience with ponds and surface impoundments for mining operations. Nearly 45 years of waste management consulting. Provided design consultation and expertise on the geomembrane liner for the Stage IX and Stage X Raise design and construction at Red Dog Mine.	CA	30%/50%	■	■	■	
JASON WEISS , Economics	MS, BIE 22/18 AECOM	Principal economist on numerous NEPA projects. Extensive experience with USACE projects.	ME	50%/50%		■		
SHEYNA WISDOM (<i>Fairweather Science</i>), Terrestrial, Aquatic, and Marine Wildlife; T&E Species, ESA Compliance and Marine Mammals	MS, BS 19/7 Fairweather	SME for marine mammals with significant impact assessment and mitigation experience. Ten years managing marine science program in Cook Inlet and the Arctic. Very well known to and respected by NOAA Fisheries.	AK	30%/30%		■	■	
AMBER WITHERS , Reclamation/Restoration	BS 17/10 AECOM	Mining engineer with background in mine reclamation, closure design, permitting and cost estimation. Serves similar role on the Midas Gold Stibnite EIS.	UT	30%/30%	■	■		
LISA YENNE, PE , Mining Development, Operations, Closure Requirements; Tailings and Dams/Embankments	MSCE, BSCE 24/23 AECOM	Extensive experience with the evaluation, design, construction and closure of tailings facilities worldwide including geotechnical investigations and dam siting and design. Was PM for Kennecott's Tailing Impoundment Expansion Studies in Utah for storage up to 2.2 billion tons of tailing.	CO	15%/15%	■	■		

05. AECOM's Experience

5.1 AECOM as Third-Party NEPA Contractor

AECOM brings extensive local knowledge and relevant national expertise to the Pebble Project EIS. **AECOM and its legacy companies—including the addition of URS Corporation in 2014—have been providing NEPA services since the act's inception in 1970, supporting thousands of projects nationwide.**

AECOM has completed many environmental analyses for mining and infrastructure projects throughout Alaska and the US (principally under NEPA), and has prepared a wide variety of environmental documents for both project proponents and lead federal agencies. (See some relevant examples in Sections 5.2 and 5.3.) Our NEPA practitioners are focused on preparing documents that address the relevant technical issues, withstand legal challenge, and are written in a clear style accessible to the public.

Our reputation for providing legally defensible scientific analyses for highly controversial projects, particularly in Alaska, is second to none. NMFS has relied on AECOM to successfully rectify NEPA documents that have been remanded from courts for nearly two decades. Our adherence to the NEPA process, understanding critical issues, and systematically providing strong logic and justification of conclusions is executed by our highly experienced PMs and technical specialists across the spectrum of environmental, engineering, and social science disciplines. The wide range of environmental and engineering services offered by AECOM allows us to bring global engineering expertise in mining and infrastructure (including tailings dams, water treatment, pipelines, power, ports, and surface transportation), project

development and operations. Together with our environmental practitioners, this provides strong support to the NEPA process, particularly alternatives development, evaluation, and determination of feasibility. In addition, our staff connects virtually across the globe through a network of technical practices, affording us the ability to provide the right resources to address very specific technical or engineering issues when such needs arise.

The AECOM team brings considerable experience in mining-related NEPA with the USACE (as both lead and cooperating agency) in Alaska and the lower 48 states. AECOM has provided third-party prime contractor support to the USACE as the lead federal agency on Alaska projects including the Donlin Gold EIS and Chuitna Coal Mine Supplemental EIS. These projects included consideration of development and operational impacts from necessary infrastructure, such as ports and harbors, natural gas pipelines, roads, power generation, industrial roads, and electrical transmission lines as well as ancillary mining and logistical facilities of various scale and sizes.

In addition, our team brings extensive Alaska experience on NEPA projects with many different lead federal agencies, and numerous cooperating agencies—from land and resource management, such as the BLM's Bering Sea and Western Interior Resource Management Plan and EIS, to specific infrastructure NEPA projects such as the Izembek Road EIS prepared for the National Park Service. (See Table 5 in Section 5.3.) Finally, AECOM has supported developing mining projects in Alaska for over 35 years, including the Red Dog Mine, Fort Knox Mine, Valdez Creek Mine, Kensington Mine, Greens Creek Mine, and Usibelli Mine. AECOM team professionals on this project have

supported mining projects in the western US, Canada, and internationally. We understand how mining projects are developed.

The AECOM team understands USACE expectations specifically within Alaska, as well as the regulatory requirements of the USACE and other federal agencies that have decision-making authority associated with the project. We are well-practiced with preparing the three-part purpose and need required for USACE NEPA projects. Our team has extensive experience conducting scoping and public meetings in Alaska for USACE as well as for other federal agencies. For example, for the Donlin Gold Draft EIS public meetings, AECOM planned and facilitated 17 meetings, including in Anchorage and in rural Alaska, and assisted with continuous tribal government consultation.

Similarly, AECOM has prepared numerous EIS analyses that meet the requirements of CWA 404(b)(1), whether the USACE was the lead federal agency or cooperating agency relying upon the EIS for CWA 404(b)(1) decision-making. This includes at Midas Gold Stibnite, or reviewing the applicant-generated CWA 404(b)(1) analysis which we helped prepare for ExxonMobil on the Point Thomson Project.

AECOM also brings experience on NEPA projects with other lead federal agencies, some of whom may be cooperating agencies on the Pebble Project EIS. This includes specific infrastructure NEPA projects such as the Izembek Road EIS prepared for the USFWS, and numerous NEPA and Marine Mammal Protection Act compliance projects for NMFS. AECOM prepared and executed Tribal Engagement Plans for both NMFS and USFWS. (See Table 5 in Section 5.3.)

MANAGING PUBLIC COMMENTS

AECOM has managed large numbers of public comments on controversial NEPA projects for over two decades. Our comment analysis team brings together a staff that has been working together for many years implementing a mature workflow structure that is proven through several NEPA EIS projects. Not only is the AECOM methodology for processing and reviewing comments proven but project staff gained additional experience processing both Scoping and Draft EIS comments from the Donlin Gold EIS, Chuitna EIS, Midas Gold Stibnite EIS scoping comment analysis and several other large controversial EIS projects that generated hundreds of thousands of comments. AECOM staff will work closely with our teaming partner, NightOwl Discovery, experts in the application and customization of the Relativity software, to provide an efficient and reliable database solution to solve the complex challenge of processing, coding, analyzing, and reporting on the substantial number of anticipated public comments within a short period of time. A description of this software is provided in Section 2.2.

COMPILING THE ADMINISTRATIVE RECORD

Producing solid administrative records has been an AECOM strength and will be undertaken by our experienced team. Examples include the Izembek Land Exchange EIS, where our administrative record was well reviewed by the USFWS and upheld when challenged; Resolution Copper where our administrative record and careful documentation helped the USFS prevail in a legal challenge before the federal district court; and Chuitna Coal where our administrative record was accepted by the Alaska District of the USACE. Our proposed project team includes key players from those projects who are also experienced in responding to Freedom of Information Act (FOIA) requests.

5.2 Representative Project Descriptions

Our project examples feature two recent mining EIS projects where we served as the third-party NEPA contractor for the Alaska District of the USACE and another project where we assisted the applicant through the NEPA process (Point Thomson).

DONLIN GOLD EIS

Dan Graham, Donlin Gold, 907-273-0200

Period of performance: 2012 to 2018

Contract Value: \$15.9 million

AECOM is nearing completion (March 2018) for a third-party EIS for this proposed hardrock gold mine with infrastructure that includes the mine site, power plant, barge landings, and 315-mile long natural gas pipeline. The EIS is led by the USACE and supports both the CWA Section 404 and BLM right-of-way authorizations. It included four other agencies and six tribal governments as cooperating agencies. The project area encompasses 66 tribes and other communities. AECOM supported the USACE with public meetings in 14 communities, G2G consultation, and the NHPA Section 106 Programmatic Agreement.

Key Project Issues

Responsiveness to Alternative Development and Options. The alternative development processes involved an extensive review of options or sub-alternatives. The AECOM team established formal alternative evaluation criteria and tested a range of alternative options for technical and financial feasibility. This formal process allowed AECOM to carefully document the rationale for considering but dismissing suggested alternatives that were not carried forward for detailed analysis. This allowed a complete NEPA record of alternatives considered while ultimately saving time and money in the EIS development by eliminating infeasible scoping suggestions from further consideration. Cooperating agency comments on the Preliminary



Final EIS did not raise any concerns with the alternatives process.

Potential Tailings Dam Failures. AECOM analyzed potential tailings dam failures in the EIS, a step requested by USACE after the Mount Polley incident in Canada. AECOM developed the failure scenario from an early Failure Modes Effects Assessment (FMEA) that was conducted specifically to inform the EIS process. The FMEA was developed with participation by representatives from the State of Alaska Dam Safety Office, the USACE, AECOM, Donlin Gold and its consultants, and cooperating agencies. Basing the failure scenario on the work completed by FMEA experts resulted in a defensible scenario for the EIS.

Effective Public and Tribal Involvement. Scoping was conducted over a three-month period and visited 13 communities in the Yukon-Kuskokwim Region and Anchorage. At the USACE's behest, AECOM fostered a multifaceted public and community engagement effort designed to reach rural and Alaska Native residents. Included were supplemental presentations at regional conferences, targeted subsistence workshops and bilingual radio call-in shows, websites, newsletters sent to nearly 7,000 addresses, including every mailbox in the project area, and thorough pre-meeting coordination. The process yielded over 2,700 individual comment submissions that were used to identify issues, alternatives, and mitigation measures to be analyzed in the EIS. AECOM and the USACE conducted public meetings on the Draft EIS in 17 communities, and successfully managed approximately 5,000 substantive comments that were incorporated into the Final EIS.

Mitigation and Monitoring. Both mitigation and monitoring were of special concern to the agencies and AECOM facilitated two mitigation workshops to focus on the justification and feasibility of proposed measures. The Final EIS includes an assessment of their feasibility and which agency has the ability to require them in their RODs.

Key Staff. Bill Craig, Jon Isaacs, Gary Reimer, Elizabeth Bella, Tara Bellion, Mike Gray, Amy Rosenthal, Bill Killam, Sasha Forland, Cecil Ulrich, Taylor Brelsford, Jim Aldrich, Steve Rusak, Linsey DeBell, Tom Damiana, Usha Vedagiri, Louise Kling, Mike Kelly, Peter Crews, Nancy Darigo, Jessica Evans, Kelsey Tranel, Thomas Schultz.

CHUITNA COAL MINE SUPPLEMENTAL EIS PacRim Coal

Dan Graham (now with Donlin Gold)
907-273-0200

Period of performance: 2006 to 2017

Contract Value: \$2.5 million

AECOM led a third-party Supplemental EIS (SEIS) for the Alaska District of the USACE covering the proposed construction and operation of a surface coal mine with infrastructure that includes the mine site, coal conveyor trestle, coal loading port and a diesel fuel pipeline. The USACE was the lead federal agency for the CWA and Rivers and Harbors Act of 1899 permits, with the USEPA, USFWS, State of Alaska, NMFS, and the Native Village of Tyonek as cooperating agencies. After some delays in the project definition, AECOM worked with the USACE to manage the NEPA process and produce the preliminary draft SEIS on schedule and within the approved budget. AECOM successfully managed a large number of agency comments that were



Chuitna Proposed Ladd Landing Port Site

received. These comments were resolved, and the SEIS was approaching public release of the draft SEIS when the company placed the project on hold and ultimately terminated their efforts to permit the project. The USACE wanted to assure a complete administrative record, given the start and stop history of this effort. AECOM completed the administrative record to USACE requirements.

Key Project Issues

Resource Protection. This project proposed to mine and restore 10 miles of the headwaters of anadromous salmon streams. Similar to the Midas Gold Stibnite EIS, there was considerable engineering work done on stream restoration and construction of replacement stream habitat. Water resources, fisheries, cultural resources, subsistence and impacts to commercial fishing were especially important issues. AECOM addressed highly inter-related resources (e.g., surface and groundwater, fisheries and wildlife), and evaluated potentially suitable engineering alternatives, based on NEPA and USACE CWA 404(b)(1) requirements.

Tribal Concerns. Tribal issues were significant because the recognized tribe/cooperating agency was publically opposed to the project. Mitigation effectiveness was a substantial issue because this was the first recent time that mining would have been allowed through an important salmon stream, a major driver of the tribal opposition. AECOM supported the USACE in meetings with the Native village of Tyonek. The preliminary draft and the revised draft chapter marshalled available science to both demonstrate viability of the stream restoration and as required by NEPA case law, address the concerns of dissenting scientists.

Public and Agency Dissent. AECOM recommended to USACE and then adopted a comprehensive approach to address published “dissenting science” articles related to stream restoration and hydrology, and to assess mitigation effectiveness and anadromous stream restoration. This approach was developed to meet evolving case law from the US 9th Circuit Court of Appeals. AECOM

also worked closely with the USACE to address challenges caused by a cooperating agency that was formally opposed to the project and actively lobbying against the project.

Project Delays. While the project had been complicated by stops and starts initiated by the applicant, AECOM remained responsive and committed to the effort, meeting all negotiated schedule and budget requirements. In early 2015, AECOM was asked to restart the effort and pursue the project to a Preliminary Draft EIS, which we accomplished within schedule and budget.

Late-included Alternative. The Supplemental EIS designation can be misleading in that the USACE directed that a full project EIS be conducted. The supplement was to include one alternative from an earlier 1990 EIS for the project. AECOM implemented a joint, tightly integrated permitting process with the State of Alaska and USACE.

Key Staff. Gary Reimer, Jon Isaacs, Maria Shepherd, Mac Shoulders, Louise Kling, Paul Dworjan, Kathalyn Tung.

POINT THOMSON UNIT PERMITTING SUPPORT/ NEPA COMPLIANCE

ExxonMobil and Partners

John Wilkinson, ExxonMobil (Retired),
john@wilkieenvllc.org, 908-601-8483
North Slope, Alaska

Period of performance: 2009 to 2017

Project Value: \$34 million

With Bill Craig as PM, AECOM assisted ExxonMobil Corporation with environmental baseline studies, federal/state/local permitting, and NEPA compliance strategies on this proposed project to produce gas condensate on the North Slope of Alaska. AECOM worked with a team totaling 50 subcontractors and SMEs who researched, wrote, and conducted technical reviews of physical, biological, and social resources. Exxon specifically looked to AECOM to lead subcontractor management for them and directed multiple SMEs to our team. AECOM completed a comprehensive

Environmental Report (ER) providing baseline resource information and information such as Purpose and Need, Alternatives, Impact Assessment, and Mitigation Measures to support the permitting/approval process. The ER focused on major issues, identifying proposed mitigation measures and assessing their effect on reducing potential impacts.

Key Issues

Fish and Water. AECOM conducted a fish study to determine abundance and distribution during the summer barging season. We delineated wetlands using desktop methods with ground truthing and conducted aerial bird surveys, and recommended mitigation measures to minimize the project's effects to the environment. AECOM prepared the USACE Section 10/404 permit application with associated Preliminary Justification Document

(PJD), draft CWA 404(b)(1) evaluation, and wetlands functional assessment.

Permitting Strategy. We prepared a NEPA compliance strategy and a Permitting Plan outlining strategies to complete the EIS process and obtain the approximately 40 federal, state, and local permits/approvals required. The USACE was the lead agency for the EIS and we provided strategic advice and reviewed draft submittals prepared by the USACE third-party contractor. This was a highly visible EIS involving the USFWS and USEPA as cooperating agencies. It took significant effort and strategy to keep the EIS focused on reasonable alternatives and analysis of environmental consequences. We assisted the applicant with arguments showing that their proposed project was the least environmentally damaging practicable alternative under the CWA 404(b)(1) guidelines.

Local Involvement. AECOM inventoried and incorporated Native traditional knowledge and assisted ExxonMobil with local stakeholder involvement/outreach, including tribal governments and Alaska Native Regional Corporations.

Key Staff. Bill Craig, Jon Isaacs, Tara Bellion, Sasha Forland, Jessica Evans, Kelsey Tranel, Thomas Schultz, Maria Shepherd, Mac Shoulders.

5.3 Recent and Current Projects

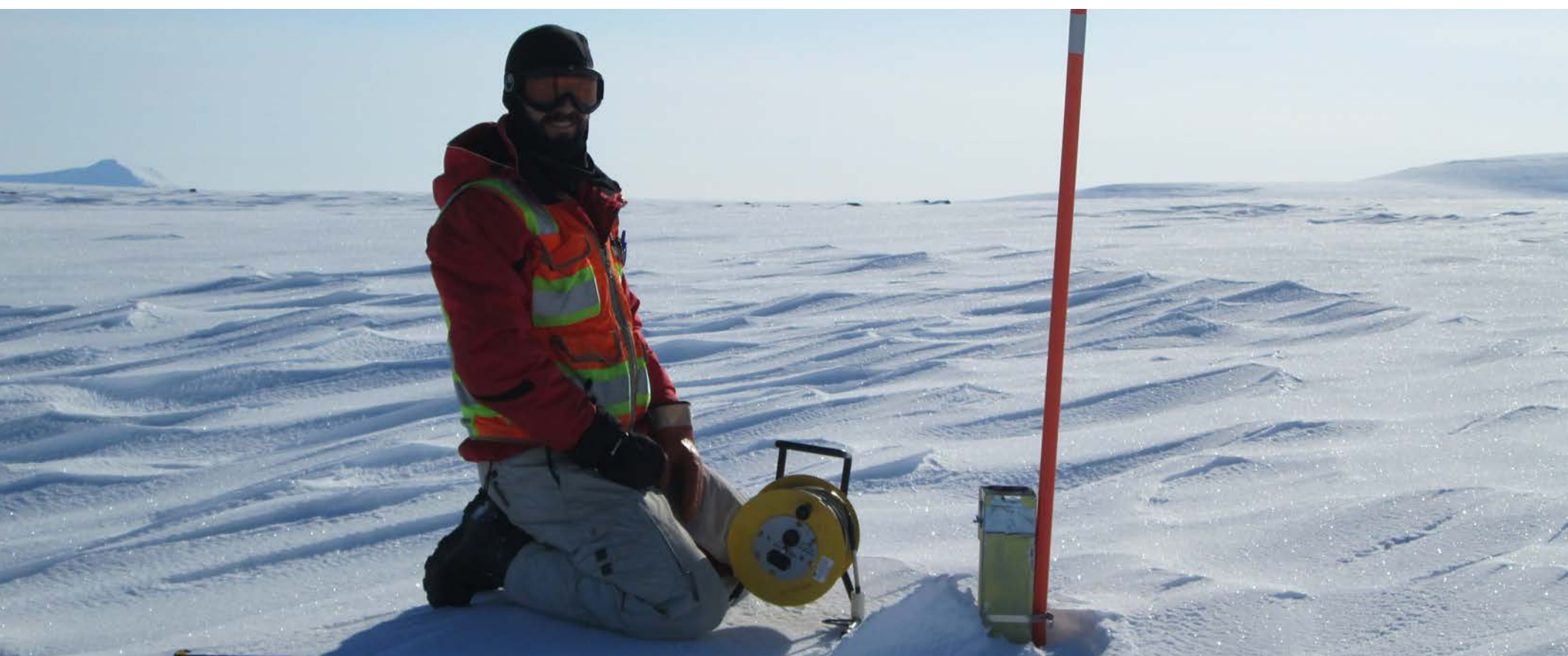
AECOM has many contracts with USACE, USEPA, NMFS, and USFWS throughout the US. The nature of work varies and includes remediation, research, and NEPA compliance. Table 5 presents a description of some recent (within the last five years) and current contracts in Alaska with these agencies, NGOs which may be active with the Pebble Project, and Alaska Native entities.

Table 5. Sample AECOM Contract Work with USACE, NMFS, USFWS, ANCs, and NGOs

Entity/Project Name	Project Type
USACE/Donlin Gold Project EIS (third party)	EIS
USACE/Chuitna Mine EIS (third party)	EIS
NMFS/Cook Inlet Beluga	Recovery Plan Activities
NMFS/Alaska Fisheries Science Center	EA for NOAA Fisheries
NMFS/Effects of Oil and Gas Activities (Arctic Seismic and Drilling in the Arctic Ocean)	Draft EIS and Final EIS
NMFS/Arctic Open Water Meetings	Public Involvement, Peer Review Facilitation
USFWS/Izembek National Wildlife Refuge Land Exchange	EIS
Chenega IRA Council /Small Community Emergency Response Plans (SCERP)	Disaster/Emergency Response Planning
Kipnuk Tribal Council	Engineering Analysis, Engineering Study
Ahtna Environmental, Inc./RPO Sharpe Facility (via USACE Sacramento)	Remediation
Trout Unlimited (NGO)/Icicle Creek Fish Passage	Fish Passage Assessment, Recovery Plan Activities
The Nature Conservancy (NGO)/ IDIQ Engineering Services	Coastal/Marine Engineering, Beneficial Use Studies
The Nature Conservancy (NGO)/Lower Consumnes Restoration	CEQA, Permitting, Raptor Surveys
The Nature Conservancy (NGO)/Las Arenitas Wetland	Alternatives Analysis, Assessment
The Nature Conservancy (NGO)/Lyons Valley	ESA
The Nature Conservancy (NGO)/Regional Advance Mitigation Planning (RAMP) Pilot Program	RAMP Framework Implementation
World Wildlife Fund (NGO)/Review of Screening Tools to Assess Sustainability and Climate Resilience of Infrastructure Development	Impact Assessments/Studies
World Wildlife Fund (NGO)/Study to develop and pilot a UK natural capital stress test	SEA/EIA



Resumes



Objective. Concise. Delivered.

**Management Team
and Senior Advisors**



Bill Craig

Project Manager; NEPA Alternatives

Education

BS, Environmental Studies, State University of New York,
College of Environmental Science & Forestry, 1990

Years of Experience

With AECOM: 17
With Other Firms: 10

Training / Certifications

AECOM Certified Project Manager
USACE Construction Quality Management for Contractors
OSHA 10-hour Construction Safety and Health
HAZWOPER 40-hour OSHA Training
North Slope Training Class

Mr. Bill Craig, an AECOM certified project manager, brings his prior project management experience from the Donlin Gold EIS and Point Thomson Project, both of which involved US Army Corps of Engineers (USACE) environmental impact statements (EISs). For the Donlin Gold project, he also led the National Environmental Policy Act (NEPA) alternatives development, spill risk, and tailing storage facility (TSF) scenario development processes. He is known for bringing an unflappable, even-tempered, and forward-moving hand to his projects. Further, he is measured and careful by nature in both written and oral communication with a deliberate and controlled approach focused on critical path task completion. Bill inspires strong loyalty from colleagues, including other members of the management team and the discipline leads.

Bill brings a unique background to the proposed project manager position for the Pebble EIS. Each summer since 2002, he has taken a short leave to commercial fish for salmon in Area E (Copper River and Prince William Sound) where he owns a drift gillnet vessel and limited entry permit. While Bill obviously cares about salmon and habitat, he has made his primary career in impact assessment and permitting. Bill will ensure that the Pebble EIS objectively describes and compares the impacts (both positive and negative) to fish and all resources of concern. Bill will be dedicated to the Pebble Project EIS and will forgo commercial fishing.

Why Chosen for This Project

- AECOM-certified project manager
- Recent EIS for a large Alaska Mine Project
- Significant USACE NEPA and permitting experience
- Extensive Alaska experience
- Excellent safety record
- Deliberate and controlled management approach focused on critical path task completion
- Unflappable, measured communication skills

Bill's technical expertise includes preparing EISs, impact analyses, permitting, and project management for Alaska development projects. He efficiently uses company project management systems to complete complex projects on time and within budget. Bill has an excellent safety record.

Bill's previous work provided an ideal blend of technical and regulatory understanding for the assignment. He has worked on many NEPA compliance projects including four that were either third party roles for the USACE or had significant USACE involvement for CWA 404(b)(1) issues. Bill's recent work leading the Donlin Gold EIS from the Preliminary Draft through preparation of the Final EIS has given him recent and relevant experience with large mine projects, associated impacts, and contemporary regulatory issues. Bill led the alternatives assessment and impact analysis for the Donlin Gold EIS and the Cordova Oil Spill Response Facility, both with industrial roads/transportation corridors. The Point Thomson Project, Cordova EIS, and Donlin Gold EIS had ports and navigational channel design, dredging and disposal (including ocean dumping evaluations under Section 103 of the Marine Protection, Research and Sanctuaries Act), and ship traffic; the Beluga to Fairbanks EIS, Point Thomson Project and the Donlin Gold EIS had natural gas pipelines. His previous extensive experience in

Bill Craig, *continued*

water quality studies and National Pollutant Discharge Elimination System (NPDES) and Alaska Pollutant Discharge Elimination System (APDES) permitting that gives him a solid understanding of water quality science and permitting regulations that will be a key topic in this EIS. His background in commercial fishing provides a unique and valuable understanding of the fishing industry and the importance of salmon and healthy habitat to subsistence and coastal communities. At the same time, Bill believes in, understands, and cares about the objective NEPA process on which he has built his career, and about how the process works in large-scale, rural Alaska projects.

Project Experience

USACE Alaska District, Donlin Gold EIS, Alaska.

Project Manager responsible for preparing a third-party EIS for this proposed large open pit mining project in Western Alaska. Initially served as the deputy project manager through preparation of the Preliminary Draft EIS, when he became the project manager. Developed and screened alternatives, led the oil spill and tailings failure risk and impact section, and is the primary interface with the lead federal agency and the applicant. Advises on complex NEPA compliance strategy and issues potentially affecting schedule, and manages budget and subcontractors. Currently, the team is completing preparation of the Final EIS.

ExxonMobil Production Company, Point Thomson Project, Alaska.

Project Manager. Responsible for leading a team of AECOM and subcontractor subject matter experts and staff assisting ExxonMobil through the NEPA process and acquisition of major environmental permits. In 2009, the AECOM team completed an Environmental Report (which described the purpose and need, proposed project, environmental baseline and likely impacts), and assisted with the Project Description and a Draft USACE 404 Permit Application to initiate the NEPA

process. Major tasks in 2010 included preparation of the State Pipeline Coordinator's Office Right-of-Way Application for the Export Pipeline, assisting with Requests for Information generated by the NEPA process, and completion of several field-studies. Activities in 2011 included preparation of the draft North Slope Borough Master Plan and Rezone Application, state permit applications, Final 404 Permit Application, Plan of Operations, Biological Assessments, and assistance with an analysis of the Least Environmentally Damaging Practicable Alternative (LEDPA) as required under the Clean Water Act guidelines. Most major federal permits and authorizations were obtained in 2012 and the project has been constructed.

ExxonMobil Production Company, Point Thomson, Alaska.

Project Manager. Responsible for a team of AECOM and subcontractor subject matter experts and staff assisting with pre-permitting activities for what may be next at Point Thomson. Activities in 2016 and 2017 included updating the environmental report, biological assessments, and essential fish habitat assessment.

National Marine Fisheries Service, Effects of Oil and Gas Activities in the Arctic Ocean EIS, Alaska.

Senior scientist. Preparation of a programmatic EIS to assess effects of oil and gas exploratory activities in US Beaufort and Chukchi seas. Responsibilities included senior review and editing of the oil spill scenario and effects section.

USACE, QA/QC for Northern and Southern Area Offices, Alaska.

Project Manager. AECOM provided QA and other construction and administrative personnel to assist military construction projects at Joint Base Elmendorf, Fort Wainwright, and Fort Greeley. Responsible for staffing, tracking burn, and invoicing for this five-year project.

USACE and Alaska Natural Gas Development Authority, Beluga to Fairbanks Natural Gas (B2F) Pipeline EIS, Alaska.

Deputy project manager. The AECOM team was contracted to prepare a third-party independent EIS for the B2F project, under the direction of the USACE as the lead federal agency and the Bureau of Land Management as a cooperating agency. AECOM was responsible for technical support to the USACE in all phases of the EIS, from the Scoping meetings held in spring 2009 through the Final EIS, slated for June 2010, and the Record of Decision in July 2010. The project was suspended prior to release of the Draft EIS.

Alaska Railroad Corporation, Fort Wainwright Rail Realignment, Environmental Assessment and Project Permits, Alaska.

Deputy project manager responsible for completion of the environmental assessment and permit applications for five miles of new rail. The realigned rail would impact wetlands, require a new river crossing, and affect existing land uses. Permit applications included USACE Section 10/404, US Coast Guard Bridge, and Title 41 (fish streams).

Bureau of Indian Affairs, Cordova Oil Spill Response Facility EIS, Cordova, Alaska.

Deputy project manager. Responsible for preparation of the draft EIS and permit applications, including USACE Section 10/404 permit applications, for construction of a deepwater dock and 4.5 miles of new road. Utilized staff from seven AECOM offices and four subcontractors to complete the conceptual design of the proposed project and three build alternatives, describe the affected environment, and predict environmental consequences.



Jennifer Frownfelter

Princial-in-Charge

Education

MS, Public Policy, Duke University, 1998

MS, Environmental Management, Duke University, 1998

BS, Environmental Biology, University of Colorado, 1994

Years of Experience

With AECOM: 18

With Other Firms: 2+

Key Skills

Program/project management Environmental planning

Natural resource management

NEPA

Ms. Jennifer Frownfelter has served as principal-in-charge and project manager for many National Environmental Policy Act (NEPA) process and document preparation efforts. As principal-in-charge, she supports various project management teams with securing and mobilizing AECOM staff and provides the direct communications to project proponents regarding financial matters. She has worked on various controversial permitting projects requiring extensive public involvement and expert witness testimony and worked with such agencies as the US Forest Service (USFS), Bureau of Land Management (BLM), US Bureau of Reclamation, National Park Service, and state land departments and wildlife management agencies.

Why Chosen for This Project

- AECOM Vice President and environmental impact assessment leader
- Over 20 years conducting and managing environmental projects
- Recent third-party NEPA permitting efforts for mining projects, including Midas Gold EIS

Project Experience

US Forest Service, Midas Gold Idaho, Gold Stibnite Project Environmental Impact Statement (EIS), Valley County, Idaho. Principal-in-Charge for third-party NEPA contractor efforts to prepare an EIS related to proposed mine development and restoration activities in the Payette National Forest and Boise National Forest. Conduct periodically scheduled communications with Payette Forest Supervisor and Midas Gold to ensure expectations are met by the AECOM team. Manage contractual matters, including prime and subcontractor agreement negotiations, providing financial oversight to AECOM team, and providing monthly scope, schedule, and budget updates to Midas Gold Idaho.

Resolution Copper Mining, Baseline Hydrological and Geotechnical Data Gathering Activities Environmental Assessment (EA), Pinal County, Arizona. Principal-in-Charge for third-party efforts to prepare an EA related to proposed data gathering activities in the Tonto National Forest. Managed financial and contractual matters and assisted with a comprehensive public involvement program, as well as prepared technical analyses for the EA.

Jennifer Frownfelter, *continued*

Peabody Western Coal Company, Kayenta Mine Permit Renewal Environmental Assessment, Arizona. Principal-in-Charge for EA, draft Finding of No Significant Impact (FONSI), Supplemental Biological Assessment (BA), and Biological Evaluation (BE) of the Kayenta Mine for Peabody Western Coal Company (a subsidiary of Peabody Energy), the Office of Surface Mining Western Region Office, and the Navajo Nation Department of Fish and Wildlife. Analyzed hydrology and air quality data provided by others and evaluated the potential environmental effects of renewing the surface coal mine permit for up to five years. The Supplemental BA and the BE evaluated the potential effects on federally listed species and Navajo Nation species.

BP Wind Energy of North America, Mohave County Wind Farm Project Environmental Impact Statement, Mohave County, Arizona. Principal-in-Charge for a third-party EIS related to a proposed 500 megawatt wind farm on federal land managed by the BLM and Bureau of Reclamation (Reclamation). Worked closely with the BLM and six cooperating agencies including Reclamation, Western Area Power Administration, National Park Service, Arizona Game and Fish, Mohave County, and the Hualapai Tribe. Facilitated communications through a password-protected project website that promoted real-time coordination and secure transfer of information. Also supported the BLM by developing a comprehensive public involvement program that included preparation of scoping reports, stakeholder briefings, media outreach, newsletters, public open houses, and a comment database.

BLM, Resource Management Plan (RMP)/EIS, Ironwood Forest National Monument (IFNM), Arizona. Principal-in-Charge/Project Manager. Managed the project from 2003 through 2008 and subsequently served as principal-in-Charge for the continuing efforts through Record of Decision (ROD). Completed the RMP and EIS for the BLM, which is responsible for managing the IFNM. Prepared the Draft RMP/EIS, managed analysis of the 12,000 comments received, and prepared the Proposed RMP/Final EIS, which the BLM released in September 2011. The Record of Decision was signed in February 2013.

Arizona Public Service (APS), Sun Valley to Morgan (formerly TS-5 to TS-9) 500 Kilovolt (kV)/230kV Transmission Line Siting Project, Northwest Maricopa County, Arizona. Project Manager. Developed and managed the project schedule and deliverables; conducted technical reviews of environmental analyses for land use, visual resources, and biological resources; participated at public and agency meetings; managed AECOM (as URS) staff efforts; and provided expert testimony at the public hearings. URS sited 40 miles of 500kV/230kV transmission line by conducting environmental studies and coordinating public participation activities. Analyses included a review of potential impacts on existing and planned land use, visual resources, biological resources, and cultural resources, documented in an application for a Certificate of Environmental Compatibility (CEC). Following issuance of the CEC assisted APS, as proponent's consultant, through the NEPA process with the BLM, as a result of the decision to locate the proposed transmission line on federal land. Provided technical advising, alternatives analyses, and technical support for preparation of the NEPA document. The team also prepared the draft Plan

of Development (POD) and for the EIS, contributed information required for Chapters 1 (Purpose and Need) and 2 (Description of the Proposed Action and Alternatives), and completed baseline inventories for Chapter 3 (Affected Environment). The team provided data and advising on the project description and potential mitigation during development of the Draft EIS and clarifications to responses to technical comments on the Draft EIS. The ROD was signed in January 2014. AECOM supported an amendment to the CEC which required testimony at administrative hearings in early 2015. AECOM also supported APS with perfecting the POD required for the Notice to Proceed with construction, which was granted in March 2017.

APS, Ocotillo Modernization Project CEC Application, Tempe, Arizona. Project Manager. AECOM (as URS) conducted environmental studies and assisted with the implementation of a public involvement program in support of APS's application for a CEC for the proposed addition of combustion turbines at the Ocotillo Power Plant in Tempe, Arizona. The existing Ocotillo Power Plant is owned and operated by APS and includes aging steam turbines in need or replacement. The team worked with APS to conduct a thorough analysis of the environmental impacts by reviewing and incorporating available data, preliminary engineering information, and prior studies. The team also worked closely with APS to conduct a public involvement program consistent with prior siting projects to ensure the public was provided with ample opportunity to express concerns. This program included stakeholder briefings, newsletters, a public open house, and preparation and presentation of an animated video simulation touring the site describing the project. The video was made available at azenergyfuture.com.



Jonathan D. Isaacs

Senior Advisor; Tribal Relations and Public Outreach

Education

BA, Environmental Studies, University of California, 1972

Years of Experience

With AECOM: 29

With Other Firms: 15

Affiliations

Institute of the North, Board of Directors

Training

National Environmental Policy Act (NEPA)

Public Engagement and Facilitation

Environmental and Social Risk Assessment

Leadership

Publication

Spies et al., Pew Environmental Group and Ocean Conservancy, 2011. An independent review of USGS Circular 1370: "An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska". Chapter 7, Cumulative Impacts.

Mr. Jon Isaacs, Vice President, will serve as a senior advisor on the Pebble project. Jon recently served as a senior advisor and principal-in-charge (PIC) for both Donlin Gold and Chuitna Coal and has established productive relationships with the US Army Corps of Engineers (USACE) Alaska District staff. A seasoned NEPA professional, Jon brings experience from a variety of Alaska NEPA projects including Point Thomson and Izembek Road EIS efforts and many Alaska NEPA Environmental Assessments (EAs) for various clients including National Oceanic and Atmospheric Administration (NOAA) Fisheries and the Bureau of Land Management (BLM). He will help guide key tasks such as cumulative effects analysis, mitigation/monitoring, and public involvement.

Jon is a senior social scientist and NEPA compliance specialist with 44 years of experience working for the mining industry, fishing industry, oil industry, power utilities, federal/state/local government, and Alaska Native stakeholder groups. He has broad expertise in:

- Environmental and social impact assessment
- Regulatory compliance
- Strategic planning and risk assessment
- Economic and socioeconomic analysis
- Community planning/climate change response
- Acquisition and incorporation of Traditional Ecological Knowledge
- Stakeholder engagement/public participation methodologies

His regional comprehensive and coastal management planning projects for Alaska Native regional governments have sought to balance

Why Chosen for This Project

- 43 years of Alaska NEPA experience
- Cumulative effects expert
- Complex environmental and social impact assessments
- Indigenous stakeholder engagement
- Incorporation of traditional ecological knowledge

recognition and protection of indigenous values and traditional uses of lands and waters with guidance and support for sound resource development activities.

Jon has been working on Alaskan projects since 1974 with a major emphasis on program management, complex environmental and social impact assessment documents, and working with a wide variety of stakeholders. For the past 20 years, he has managed strategic NEPA compliance projects for National Marine Fisheries Service (NMFS), either after a project was remanded by the courts or subject to high levels of controversy and stakeholder scrutiny. Prior to joining AECOM legacy companies, he worked for the Federal Energy Regulatory Commission (FERC), preparing NEPA compliance documents for large natural gas pipeline and LNG terminal projects.

Project Experience

USACE, Donlin Mine EIS, Alaska. Principal-in-Charge for the Donlin Mine EIS, which involves a large open pit gold mine, barge transport system, and 324-mile natural gas pipeline. Providing strategic NEPA compliance guidance, independent technical review, and leading NEPA compliance training for cooperating agencies, including the US Environmental Protection Agency, Bureau of Land Management, US Fish and Wildlife Service, and participating federally recognized tribes.

USACE, Chuitna Coal Project Supplemental EIS Alaska. Principal-in-Charge for the Chuitna Coal Supplemental EIS (SEIS), providing strategic NEPA

Jonathan D. Isaacs, *continued*

compliance guidance, independent technical review for a proposed surface coal mine, conveyor transport systems, and ship loading trestle.

ExxonMobil Corporation, Point Thomson Gas Cycling Project, NEPA Compliance, Community Engagement and North Slope Borough Master Plan, Alaska. AECOM Contract Manager for providing regulatory compliance support (including NEPA compliance) and oversight to ExxonMobil Corporation for the Point Thomson Gas Recycling Project on the North Slope of Alaska. Also the AECOM technical lead for environmental documentation/ impact assessment for the USACE 404(b)(1) permit application, NEPA compliance strategy, and Master Plan development for submittal to the North Slope Borough.

Alaska LNG Project, Point Thomson Gas Sales, Alaska. Identification of major issues associated with regulatory and NEPA compliance and requirements for modification of existing permits associated with expansion of the Point Thomson facility for major natural gas sales. This includes addressing social impact and First Nation engagement issues.

ConocoPhillips Alaska (CPA), Greater Mooses Tooth 1-2 SEIS Review, Environmental Report. Senior contributor to a critical review of the Greater Mooses Tooth (GMT) 1 SEIS. Review comments focused on subsistence, sociocultural, socioeconomic, and environmental justice chapters, and were used by CPA in commenting on the SEIS and negotiating permit conditions. Social environmental lead for preparation of the GMT 2 environmental report supporting permit applications.

Strategic Regulatory Assessment for Developing Underground Coal Gasification in Western Cook Inlet, Alaska. Principal-in-Charge for strategic risk

assessment and permitting strategy for developing an underground coal gasification project in Western Cook Inlet.

Strategic Regulatory and Infrastructure Assessment for Developing Canyon Creek Coal Leases, Alaska. Principal-in-Charge for developing a strategic environmental, regulatory, and stakeholder issue assessment associated with development of the Canyon Creek Coal Leases in Southcentral Alaska.

Strategic Regulatory Assessment for Developing MAN Alaska Mining Project, Alaska. Principal-in-Charge for developing a strategic environmental, regulatory, and stakeholder issue assessment associated with development of the MAN Alaska Project in Interior Alaska. Work included briefing foreign investors on the project.

Department of Natural Resources, Best Interest Finding for Canyon Creek Coal Leases, Alaska. Principal-in-Charge for developing sections of a Department of Natural Resources Best Interest Finding associated with development of the Canyon Creek Coal Leases in Southcentral Alaska.

Mitsubishi Corporation, Pebble Copper Mine Strategic Regulatory Compliance Assessment, Alaska. Project Manager for a strategic regulatory compliance assessment, quantitative risk assessment, stakeholder analysis, and monthly reporting on regulatory and legislative activities associated with the development of the Pebble Copper Project in Alaska. Work included briefing foreign investors in the project. *[Please review Appendix B for Conflict of Interest Statement.]*

BHP Billiton Western Arctic Coal Environmental Studies, Alaska. Contract Manager for environmental baseline studies for coal development project in the vicinity of Point Hope and Point

Lay. Assisted with stakeholder engagement and traditional knowledge efforts.

NMFS/Bureau of Ocean Energy Management Effects of Oil and Gas Activities in the Arctic Ocean EIS, Alaska. Principal-in-Charge for large, multi-disciplinary programmatic EIS to assess effects of oil and gas exploratory activities on marine mammals in Arctic Ocean (US Chukchi and Beaufort Seas. Project involved 1) developing potential impact mitigation measures, 2) seismic exploration/ exploratory drilling scenarios for assessing the potential effects of oil and gas exploration activities on marine mammals in the Chukchi and Beaufort seas, and 3) a comprehensive regional cumulative effects assessment. It also includes public involvement with all eight communities Inupiat communities, incorporation of traditional ecological knowledge (TEK), assessing impacts on both marine mammals and availability of marine mammals for subsistence purposes.

Alaska Department of Environmental Conservation, Oil and Gas Alaska Pollution Discharge Elimination System (APDES) General Permit and Ocean Discharge Criteria Evaluation (ODCE) Project, Cook Inlet, Alaska. Principal-in-Charge, stakeholder engagement strategy and senior facilitator for Alaska Department of Environmental Conservation APDES general permit renewal for oil and gas production activities in Cook Inlet, Alaska.



Gary Reimer

Senior Advisor

Education

BA, Political Science Studies, California State University at Los Angeles, 1975

Graduate Work in Business, San Jose State University

Years of Experience

With AECOM: 4+

With Other Firms: 30+

Affiliations

Alaska Minerals Commission (Governor's Appointment in 2014 to a 3-year term)

Training

BLM Advanced Land Tenure

BLM/USFS Lands for Line Officers

BLM Solicitor-provided Alaska Native Claims Settlement Act (ANCSA) and Native Allotment Training

Mr. Gary Reimer has over 35 years of experience as a manager or resource specialist in land management, National Environmental Policy Act (NEPA) issues, resource management planning, and permitting. He has held leadership roles on complex and high-profile environmental impact statements (EISs).

Gary joined AECOM after a long career with the Bureau of Land Management (BLM), which included serving as the Field Manager for the BLM Anchorage Field Office and the District Manager for the Anchorage District Office. He has a history of working with both state and federal government agencies, and played a key role on an EIS for the Renewal of the Grant of Right-of-Way for the Trans-Alaska Pipeline System (TAPS) which was completed in 18 months. He has a depth of experience in lands and realty in Alaska, including experience with the BLM's Alaska Conveyance Division. Gary held leadership roles on the development of Alaskan Resource Management Plan (RMP)/EISs, including the Bay, Ring of Fire, and Kobuk-Seward RMP/EISs. The Bay Plan EIS covered the larger Bristol Bay area and included leading tribal and Alaska Native Claims Settlement Act (ANCSA) corporation consultation for the BLM.

Why Chosen for This Project

- Considerable USACE NEPA experience
- Highly knowledgeable of Alaska lands issues
- Has managed an 18 month major EIS
- Has managed an EIS to completion and led tribal consultation in the Bristol Bay area for the BLM

Project Experience

US Forest Service, Stibnite Gold EIS, Idaho. Senior NEPA Advisor and alternatives specialist. Completed scoping; completing review of applicant-submitted environmental documents and baseline reports and are working on alternatives. Using an accelerated approach similar to being proposed for the Pebble Project EIS, where scoping, alternatives development, data gaps review, affected environment assessment, and environmental consequences of the proposed action are being done at generally the same time.

US Army Corps of Engineers (USACE), Chitna Coal Supplemental EIS, Alaska. Project Manager. Assumed project manager role post-alternative development to bring the project to completion. Responsible for all phases of Draft and Final Supplemental EIS preparation. Project has issued and received comments on the preliminary draft and was nearly ready to issue a Draft Supplemental EIS when the proponent cancelled the project.

BLM, Bering Sea/Western Interior Resource Management Plan/EIS, Alaska. Principal-in-Charge, ANCSA/ANILCA Advisor and Realty Lead. Currently reviewing output from alternative workshops and completed submissions of the Affected Environment.

Gary Reimer, *continued*

USACE, Donlin Gold EIS, Alaska. Social Environment discipline and task lead. Led the interdisciplinary EIS team for the Social Environment and led or co-led tasks for purpose and need and alternative development. Work included review of the applicant-submitted environmental evaluation document and preparation of necessary requests for additional information from the applicant. Developed the alternative option screening criteria including technological and economic feasibility. Led technical team to prepare the recommendations as to which options can be eliminated from further consideration and which should be carried forward for analysis. Also served as senior realty specialist for federal land management questions.

BLM, Central Yukon Resource Management Plan/ EIS Scoping, Alaska. Principal-in-Charge. Principal-in-Charge for the BLM Central Yukon Field Office RMP/EIS scoping support project. Provided senior oversight, coordinated with BLM management, and reviewed lands and access related to scoping comment analysis.

BLM, Anchorage District Office, Alaska. District Manager. Managed the Anchorage District Office (ADO) covering 22 million acres of public lands, including the Unakaleet, Delta, and Gulkana Wild and Scenic Rivers, the Iditarod National Historic Trail, and the Campbell Creek Science Center. ADO includes two Field Offices (Anchorage and Glennallen) and the Nome Field Station. Directed the merger of the then separate Field Offices into a District. Oversaw EIS/RMP completion for three geographically large BLM planning areas (Bay, Ring of Fire and East Alaska) and several environmental assessments. NEPA work also included the management plan for the Delta Wild and Scenic River. Served repeatedly as the BLM's line officer for NEPA scoping, draft EIS, ANILCA Section 810 and Government to Government meetings, often in rural Alaska towns and villages.

Built relationships with village and tribal villages over the course of repeated visits spanning several NEPA, lands, or permitting issues. Dealt with controversial lands/NEPA actions involving trespass cabins and an emergency road, the latter which involved lands with wilderness characteristics (LWC) and the new LWC policy. Received Department of the Interior's Take Pride Award in 2009 in recognition of ADO's many successful partnerships programs. (Prior to AECOM.)

BLM, Anchorage Field Office (AFO), Alaska. Field Manager. AFO managed 17 million acres of public lands. Led significant RMP/NEPA efforts including the Bay, Ring of Fire and relevant aspects of the Kobuk Seward EIS/RMPs. Represented the BLM in NEPA scoping, draft EIS and other public and government to government meetings. Handled controversial lands and land legal issues (with associated NEPA) including some along the Unakaleet Wild and Scenic River. Sponsored a thorough NEPA assessment of BLM's reindeer grazing permitting and led NEPA public meetings in Nome. In 2006, spent four months as the Field Manager for BLM Utah's Price Field Office to help steward their EIS/RMP through schedule, budget, and scope challenges. Helped focus the EIS development, steered key documents through the directorate approval project, and negotiated a significant budget reduction from contractor proposal. (Prior to AECOM.)

BLM, Division of Conveyance Management, Alaska. Deputy State Director. Exercised a mandate to reinvent and reorganize BLM Alaska's Conveyance Division. Productivity doubled the first year and has been sustained ever since. The Division provided technical support to what became the Alaska Lands Transfer Acceleration Act of 2004. During and subsequent to this assignment, officiated land transfer ceremonies to ANCSA Corporations in rural villages. (Prior to AECOM.)

BLM, Federal/State Joint Pipeline Office, Office of Pipeline Monitoring, Alaska. Deputy Authorized Officer. Reassigned to the Joint Pipeline Office (JPO) to help respond to a series of Congressional hearings critical of Trans-Alaska Pipeline System (TAPS) oversight. Worked with outside contractors to reorganize JPO and develop a risk-based oversight program. Named as the first state/federal Operations Officer to lead coordinated and consistent compliance monitoring of the federal grant and state lease. Later became the BLM deputy for TAPS but continued to coordinate state and federal TAPS oversight. Key decisions included the reauthorization of the 30-year TAPS right-of-way (managed an EIS within 18 months), the approval of Alyeska Pipeline Service Company's Quality Assurance Program, a precedent-setting valve performance and replacement agreement, and oversight of two sizable oil spills (the Check Valve 92 spill of 1996 and the Milepost 400--pipeline shooting--spill of 2002). Had a leadership role in the after action report for the Milepost 400 spill. Directed federal NEPA efforts for all authorizations. JPO received an early Hammer Award from Vice President Gore to recognize its joint state/federal operations industry oversight role. Served as Authorized Officer (BLM Office of Pipeline Monitoring Chief) for the federal grant for TAPS throughout 1996. (Prior to AECOM.)



Cecil Ulrich, PE

Mining Lead; Tailings and Dams/ Embankments; Spill Risk & Tailing Storage Facility (TSF) Failure Analyses (Senior Advisor)

Education

Cold Regions Engineering Short Course, University of Washington, 2004

MSc, Geotechnical Engineering, University of Calgary, Alberta, 1972

BE First Class Honors, Engineering Science, University of Auckland, 1970

BSc, Senior Scholarship, Mathematics, University of Auckland, New Zealand, 1968

Years of Experience

With AECOM: 41

With Other Firms: 4

Registrations/Certifications

Professional Engineer/Alaska/ No. 11095

PE/British Columbia/No. 11229

PE/Northwest Territories

PE/Washington/No. 31611

PE/Oregon/No. 17530

PE/California/No. C047933

PE/Idaho/No.10704

US Federal Regulatory Energy Commission (FERC) approved dam inspector

US Department of Labor Mine Safety and Health Administration (MSHA) Newly Employed, Inexperienced Miner certification

Affiliations

American Society of Civil Engineers

Association of State Dam Safety Officials

Society of Mining Engineers of the American Institute of Mining, Metallurgical and Petroleum Engineers

Mr. Cecil Ulrich is a principal civil/geotechnical engineer with 35 years of mining and tailings experience including geotechnical, hydrology and geology studies. He is a hands-on contributor with cold regions and Arctic experience and a work approach oriented to solving problems and developing innovative solutions. Cecil is the mine alternatives development lead for the Donlin Environmental Impact Statement (EIS).

Cecil has managed design, construction and inspections on Red Dog Mine tailings dam and raises in Alaska since 1988, and he developed tailings dam closure concepts for the mine closure plan. He annually inspects the Tundra Mine tailings dams and a landfill in the Northwest Territories, and managed the landfill design. Cecil developed closure concepts and cost estimates for the Colomac Mine tailings ponds in the Northwest Territories and was engineer-of-record for liner construction quality assurance of the Greens Creek Mine liner installations.

For the State of Alaska, Cecil helped prepare its "Guidelines for Cooperation with Alaska Dam Safety Program." He is now helping Mining Association of Canada update its "Tailings Design and Construction Guidelines."

Why Chosen for This Project

- Lead mining, geotechnical, and tailings dam specialist on Donlin Gold EIS
- Principal civil/geotechnical engineer
- Extensive experience with tailings and liner construction, mining operations, and closure concepts at mines in Alaska (Red Dog, Greens Creek), Pacific Northwest, and Canada

Project Experience

US Army Corps of Engineers (USACE), Donlin Gold EIS, near Crooked Creek, Alaska. Mine alternatives development manager for a third-party EIS for the USACE. Reviewed engineering issues that arose such as liner systems, dam stability, tailings deposition, water management, seepage controls, and surface covers, etc. Made presentations and participated in discussions at public hearings in Anchorage, Bethell, Aniak and Crooked Creek.

Greens Creek Mine Tailings Expansion, Admiralty Island, Alaska. Engineer-of-record for construction quality assurance and reporting of the installation of the liner system soils and geosynthetics for the Stage 2 expansion of the tailings facility.

State of Alaska Department of Natural Resources, Dam Safety and Construction Unit, Alaska.

Assisted in developing "Guidelines for Cooperation with the Alaska Dam Safety Program," that outlined analyses and information needed for dam owners to obtain certificates of approval for construction, modification or operation of dams. The focus was on simplicity and user-friendliness to include relevant and necessary details.

Red Dog Mine Tailings Dam, Stages I to VI, Alaska.

Project manager for design, drawings, specifications, operations manuals, emergency action plan and resident engineering for Stages I to VI of the rock fill tailings dam, and seepage collection system that included a starter dam five raises, and a liner, concrete cutoffs, underdrain, and seepage collection pond and pumpback system for secondary seepage control.

Cecil Urlich, PE, *continued*

Red Dog Mine Water Supply Dam, Alaska. Project manager for design, drawings, specifications, operations manuals, emergency action plan and resident engineering for a rock fill water supply dam that included a liner and concrete cutoffs for seepage control and a side-channel spillway.

Red Dog Mine Tailings Dam Stability Analyses, Alaska. Project manager for stability and seepage analyses of the mine tailings dam after ten years of operation and six raises, stability analysis of a pipe bench built along the upstream slope of the dam, stability analyses of dust control groins built over the tailings beach, and an update and expansion of the Operations and Maintenance Manual and Emergency Action Plan.

Red Dog Mine Tailings Dam Stage VII and VIII Raises, Alaska. Project manager for Stage VII, VIII and IX raise designs. Managed completion of geotechnical investigations, design reports, drawings, specifications and construction quality assurance (CQA) manual, responded to State of Alaska comments on applications to construct. Responsible for CQA field management of construction and preparation construction completion report for state operations permit.

Red Dog Mine Tailings Facility Failure Mode and Effects Analysis (FMEA), Alaska. Participated as the tailings main dam subject matter expert in an FMEA for the Red Dog tailings facility. Focal areas of the dam were seismic design criteria, stability and seepage, life expectancy of the rock fill, drain and geosynthetic parts of the dam, and compatibility of the ultimate dam configuration with the preliminary mine closure plans.

Red Dog Mine Tailings Dam Future Raises to Closure, Alaska. Project manager of conceptual designs of the tailings dam future raises to closure, with focus on stability, seepage control and freeboard, as part of an ongoing closure and reclamation plan being prepared by others for the mine. Participated in closure plan public and stakeholder information and feedback meetings and workshops.

Red Dog Mine Water Diversion System Hydrology and Hydraulics Evaluation, Alaska. Project manager for updated hydrology and hydraulic analyses on the mine water diversion system and contributory drainage area based on changes to the open pit mine and its catchment area since the system was constructed in 1993.

Kensington Mine near Juneau, Alaska. Project manager of site selection evaluation, geotechnical studies, creek diversion studies, and conceptual designs of a tailings disposal system that included a 240-foot-high dam built as a starter dam and raises, and assessment of tunnel options for a creek diversion.

Holden Mine Tailings Piles, near Lake Chelan, Washington. Geotechnical task manager and interacted with the US Forest Service for evaluations and conceptual designs of methods to relocate a creek and stabilize three historic tailings piles that were developed by upstream construction using tailings, and whose slopes have experienced erosion from creek flooding and wind action, as part of a mine closure and reclamation feasibility study

North Bend Gravel Operation EIS, North Bend, Washington. Geotechnical design lead for a third party EIS for the King County Department of Development and Environmental Services. Special focus was transportation and stability of slopes that were planned to have roads cut across them.

Jay Dike Engineering Review Panel, Dominion Diamond, Northwest Territories. Member of a 3-person engineering review panel for the current design and ultimate construction of a 3-mile-long circle dike in a lake. Purpose was to allow for dewatering of the diked area for development of an open pit diamond mine.

Copper Mountain Mine Tailings Release, British Columbia. Tailings expert member of a team retained by British Columbia Ministry of Mines and Energy to conduct a root cause analysis of a tailings release. Included consultation with two First Nations bands.

Mount Polley Mine Tailings Dam Breach, British Columbia. Project manager for developing a cost estimate to re-build the breached Mount Polley tailings dam to its pre-breach condition for the dam insurer, FM Global. The evaluation included a site visit and interviews with mine operations staff shortly after the breach occurred.

Tundra Mine Tailings Dams, Northwest Territories, Canada. Completed safety inspections of five tailings dams with two tailings ponds at an abandoned mine, identified potential borrow for dam repairs, designed emergency repairs for two dams, reviewed construction, operations and performance history of the dams and ponds, prepared inspection reports, and prepared designs and specifications to repair all five dams.

Twin Metals Tailings Facility, Minnesota. Task manager for developing unit costs for all elements of mine closure and review of the design by others of a ring-shape tailings dam with respect to optimizing the dam design and tailings disposal and management plan to account for closure of the tailings facility.



Bill Killam

Senior Advisor

Education

BA, Anthropology, Sociology, and Psychology, Lake Forest College, 1973

Years of Experience

With AECOM: 27

With Other Firms: 16

Areas of Expertise

National Environmental Policy Act (NEPA) Project Management/Strategy

Environmental Impact Statement and Assessment Preparation

Federal Agencies Coordination

Permitting

Mr. Bill Killam is a senior NEPA Project Manager with more than 27 years of experience in mine permitting, environmental impact statement (EIS) and environmental assessment (EA) preparation, and prefeasibility studies in nine states. Bill has managed or contributed to 23 third-party EISs or EAs for the US Army Corps of Engineers (USACE), US Forest Service (USFS), Bureau of Land Management (BLM), Office of Surface Mining Reclamation and Enforcement (OSMRE), and Department of Energy (DOE), including nine mining EIS or EA projects (hardrock and coal; surface and underground). Additionally, he has provided permitting, prefeasibility, or other environmental support to nine additional mining projects and contributed to 20 federal agency EIS/EA projects. His most recent assignments included three years as lead environmental consultant assisting Twin Metals Minnesota with their permitting and prefeasibility studies for a proposed underground copper mine. Bill also serves as senior NEPA advisor for the Donlin Gold EIS and had the same role for the Resolution Copper Mine Baseline Hydrological and Geotechnical Data Collection EA.

Bill's experience includes extensive work in third-party NEPA roles, where he has addressed time-sensitive issues on projects, successfully meeting the needs of both the lead agency and proponent. His understanding of the importance of communication (among the project team, cooperating agencies, tribal entities, and the public) stems from his experience

Why Chosen for This Project

- National AECOM NEPA expert with significant mining and agency coordination experience
- Currently a senior advisor on the Donlin Gold EIS; worked on the Resolution Mine NEPA EA

and "lessons learned" in a variety of situations. In addition to his NEPA expertise, Bill's education and background include anthropology/archaeology, and he brings 42 years of experience with cultural resources management, archaeology, and Native American consultation.

Project Experience

USACE, Donlin Gold Project EIS, Alaska. Senior NEPA strategist for third-party EIS for the proposed gold mine near the village of Crooked Creek, Alaska. In addition to open pit mine and infrastructure construction, operation, and closure, the project includes improved and new port facilities, barging supplies up the Kuskokwim River, and a 300-mile natural gas and diesel pipeline. Issues include impacts to wetlands, wildlife, aquatic resources, the Iditarod National Historic Trail, native villages and villagers, subsistence resources, and social values.

Resolution Copper Mining, Hydrologic and Data Collection Environmental Assessment, Oak Flat, Arizona. Senior peer reviewer for EA related to a hydrologic and geotechnical data collection program on the Tonto National Forest. The project entails a series of drill holes, test trenches, and access roads designed to assist with the development of an underground copper mine and associated facilities. During a legal challenge to the EA, the courts ruled that the EA was legal and sufficient.

Bill Killam, *continued*

Twin Metals Minnesota (TMM) Mine, Minnesota.

EIS lead consultant and project manager assisting TMM with the permitting of a proposed major underground copper, nickel, and platinum group metal mine in northern Minnesota. EIS scope included working with TMM environmental and engineering staff to incorporate environmental controls and impact mitigations into the mine design. Prepared the environmental, water balance, and reclamation sections of the prefeasibility study, assisted with a hydrogeological drilling plan of operations for the Superior National Forest, sampled and analyzed groundwater samples from an existing (closed) exploratory shaft, and contributed to a Minnesota Scoping Environmental Worksheet for the hydrogeology drilling program.

OSMRE, Trapper Mining Inc., EA for Federal Coal Leases C-07519 and C-070641 Mining Plan Modification, Moffat County, Colorado. Senior NEPA reviewer of a fast-track EA for a coal mining operation under a District Court Order. The mine had not had a detailed NEPA evaluation under current NEPA requirements since the early 1980s, so AECOM developed the EA as a new document and did not tier from a previous NEPA document. The EA was completed for a mining plan modification decision through OSMRE within the Court-ordered seven-month timeframe.

Freeport-McMoRan Copper & Gold, Inc., Copper Mountain Mine EA, Grant County, New Mexico. Project Manager for this EA related to the Tyrone Mine Expansion for Phelps Dodge (now FMI). The EA was prepared for the BLM (Las Cruces District) in response to a Mine Plan of Operations Closure/Closeout Plan.

Freeport-McMoRan Copper & Gold Inc., Chino and Cobre Mines Prefeasibility Study, Grant County, New Mexico. NEPA specialist responsible for preparing environmental and permitting sections of the prefeasibility study to determine the best means of combining two existing mine operations.

Freeport-McMoRan Copper & Gold Inc., Chino and Cobre Mines NEPA and MPO/CCP Data Gap Analysis, Grant County, New Mexico. NEPA specialist for this follow-on to the prefeasibility study. The project included reviewing hundreds of data sets and developing a database of pertinent documents and spatial (GIS and CAD) data sets. A data gaps report summarized the project's findings and provided guidance for future data gathering efforts necessary for a potential NEPA analysis for future mine expansion.

Rhino Energy, Red Cliff Mine EIS, Grand Junction, Colorado. Project Manager for a third-party EIS for CAM Colorado (Rhino Energy) and the BLM (Grand Junction Field Office). The proposed project included a new underground coal mine and related facilities, including a 15-mile rail spur and new 69 kV transmission line crossing public and private lands. The Draft EIS was released for public review, and over 18,000 comments were received, coded, and catalogued. Issues included wildlife conflicts, extent of cumulative impact analysis, methane release/global warming, wilderness impacts, railroad/highway crossings, and public/private land conflicts for the transmission line.

DOE, Medicine Bow Fuel and Power Project EIS, Carbon County, Wyoming. Project Manager for a third-party EIS for DOE and the project proponent (DKRW Advanced Fuels LLC). The Medicine Bow Fuel and Power Project includes an Industrial Gasification and Liquefaction (IGL) plant that would convert mined coal into liquid gasoline. Conducted ecological and cultural resources surveys; prepared an Administrative Draft EIS and groundwater technical support document; conducted agency consultation; and prepared a BLM Plan of Development. At the client's direction, the project was put on hold.

BLM, State of Montana, Zortman-Landusky Mine Expansion EIS, Montana. Human resources discipline leader for this third-party EIS for a gold mine expansion. Major issues include American Indian concerns regarding impacts to traditional cultural properties. A draft MOA was prepared for federal agency Section 106 compliance.

BLM, Lisbon Valley Copper Project EIS, Moab, Utah. Senior project oversight and cultural resources task manager for a third-party EIS for this proposed copper mine for Summo Corporation.

Newmont Gold Company, South Area Operations Expansion EA, Elko, Nevada. Assistant Project Manager and prepared the cultural resources, paleontological, and project description sections of an EA for a mine expansion. Principal author of a Plan of Operations and a Comprehensive Project Description.

Constellation Copper Corporation, Cashin Mine Initial Environmental Review, Montrose County, Colorado. Project Manager for the initial data review and determination of issues to help the client determine the feasibility of developing the historic Cashin copper mine in western Colorado as a surface facility. Issues include biological and cultural resources, water quality, and a nearby Wilderness Study Area. The initial review included consultation with the BLM and identified potentially significant environmental issues that would need to be addressed during permitting of the mine.



Anne Baldrige

Senior Advisor

Education

MBA, Finance and Accounting, Regis University, 1992
BS, Geology, University of Pittsburgh, 1979

Years of Experience

With AECOM: 3
With Other Firms: 35

Technical Specialties

Mining Environmental Compliance
Environmental Impact Studies Environmental Permitting
Environmental Assessments Site Reclamation
Environmental Audits/Due Diligence
Feasibility Studies
Environmental Management Systems

Ms. Baldrige is a senior project manager with 35 years of experience specializing in environmental impact assessment, permitting, and management for natural resource development projects. Her main areas of expertise include environmental data collection and permitting, management of interdisciplinary environmental impact assessments, environmental and due diligence audits, and regulatory compliance/ problem-solving. Anne has worked on complex projects with the involvement of multiple agencies and significant public and non-governmental organization interest. She is known for her ability to problem solve difficult situations and develop plans for success and for her ability to understand technical information and communicate this information verbally or in writing to a wide variety of audiences.

Anne has both domestic and international experience primarily in the mining and oil and gas industries. She has worked on projects throughout the US and in Canada, Australia, Mongolia, Fiji, Bolivia, Chile, Brazil, and India. Types of projects include heap leaching and milling projects for recovery of gold, silver, copper, platinum, palladium, cobalt, lead and zinc; coal mining and preparation plants; bauxite mining and processing; oil shale recovery through pyrolysis; conventional and unconventional oil and gas projects; coal bed methane projects; salt recovery through solar evaporation; carbon capture and storage; underground injection wells for disposal or remediation; and associated features to these projects such as remote accommodations, water storage reservoirs, and land or water access routes.

Why Chosen for This Project

- Senior expert in all aspects of mining environmental issues, including indirect and cumulative impacts
- Extensive experience in environmental evaluations, permitting, health, safety, environment and community planning as well as materials and waste management

Project Experience

US Army Corps of Engineers (USACE), Lone Star Ore Body Development Project Environmental Impact Statement (EIS), Arizona. Project manager for completion of an EIS for an expansion of the Freeport McMoRan Safford operations to include the Lone Star ore body and associated features (development rock stockpiles, heap leach stockpiles, road infrastructure and power infrastructure). The USACE was the lead agency and EPA was a cooperating agency. Assumed project management role after release of the Draft EIS and assumed responsibility for reviewing and responding to comments on the Draft EIS and incorporating changes into the Final EIS. Substantial comments were received on the Draft EIS from EPA and other agencies including the Bureau of Land Management (BLM), US Fish and Wildlife Service (USFWS), Arizona Game and Fish Department, and the City of Safford. Key issues were impacts to the Gila River and other nearby drainage and riparian zones, and mine closure and reclamation.

Public Service Company of New Mexico (PNM), EIS for San Juan Mine Deep Lease Expansion Project, New Mexico. Serving as a technical advisor to PNM for the EIS process and as Project Manager for development of supporting information related to the indirect impacts from the combustion of coal from the San Juan Mine at the San Juan Generating Station (SJGS) operated by PNM including ambient air quality modeling, deposition modeling, greenhouse gas emissions calculations, a human health risk

Anne Baldrige, *continued*

assessment and an ecological risk assessment. Project is under a court-ordered deadline for completion of the EIS by August 2019. The coal combustion at the SJGS is considered an indirect effect but the detailed information requirements were part of a Court case and information development is being closely monitored by the lead agency and cooperating agencies. The timeline for completion of the studies at the SJGS is compressed to approximately one-third to one-half of the typically expected time to complete the work based on similar projects. The key issue is working with the lead agency and the third party EIS team to appropriately characterize the indirect impacts of the SJGS.

US Department of the Interior, Office of Surface Mining Reclamation and Enforcement (OSMRE), Trapper Mining, Environmental Assessment (EA) for Federal Coal Leases C-07519 and C-070641 Mining Plan Modification, Colorado. Project manager for completion of a fast-track EA for a coal mining operation under a District Court Order to complete the EA within seven months. The lead agency was OSMRE and cooperating agencies included the BLM, State of Colorado (five state agencies), two county agencies, and the USFWS. The mine had not had a detailed NEPA evaluation under current NEPA requirements since the early 1980s so the EA was developed as a new document and did not tier from a previous NEPA document. The EA was completed for a mining plan modification decision through OSMRE within the Court-ordered seven-month timeframe.

US Bureau of Reclamation, Navajo Generating Station/Kayenta Mine EIS, Arizona. Mining technical expert for EIS for a complex project involving multiple federal agencies and combining the effects of mining of coal and the associated use at a coal-fired power plant. Responsible for the descriptions of existing conditions, proposed action and alternatives as related to the Kayenta Mine and for educating resource specialists in the complexity

of coal mining on Indian lands under different regulatory frameworks, including pre-law, the SMCRA Initial and Permanent programs, and coal mine reclamation and bonding requirements.

Cripple Creek & Victor Gold Mining, Cresson Mine, Mine Life Extension Amendment Permit Documents, Colorado. Assisted in development of the Colorado Division of Reclamation, Mining and Safety permit documents for this amendment expanding the existing operations at the Cresson Mine to include the addition of a milling operation and a second valley fill leach pad. Was brought in to assist when consultant preparing the permit documents was unable to understand and convey mining, heap leaching and milling information in a manner that would be understandable to those with limited experience in mining.

Battle Mountain Gold Company (BMGC), Environmental Management for the Crown Jewel Project, Washington. As BMGC's Director/Vice President of Environmental and Governmental Affairs, led environmental evaluations and permitting for the Crown Jewel Project in north central Washington. Project facilities included an open pit mine, cyanide mill, tailings facility, water storage reservoir and pipeline, and associated facilities. The Project had significant opposition from the local, state, and national environmental communities. Approximately 30 permits or approvals were required and approximately 4 federal agencies, 8 state agencies and a local agency were cooperating agencies to the EIS development, with the US Forest Service and the Washington Department of Ecology serving as joint lead agencies under NEPA and the Washington SEPA. In addition, the site lies close to the Canadian border and discharges would flow into Canada, so several Canadian agencies were involved in NEPA consultation and the permitting process. The Colville Tribe also has interest in the land associated with the mining operation and many tribal members were opposed to the project. Almost all natural resource

areas were considered key issues and significant effort was placed into the permit documents. In addition, that State of Washington did not recognize the Bevill Amendment and tailings were required to be tested as hazardous waste using bioassay methods. As the project lead, managed budgets for the permitting including spending by the third-party EIS contractor and their subcontractors, baseline study contractors and permit development consultants; coordinated and attended agency meetings and participated in agency conference calls; developed permitting schedules and strategies; participated in public meetings; provided consultation and review of all project related environmental documents including various permit applications for air, water, waste, Section 404 and reclamation permits; and provided BMGC Management Team and Board updates on the progress of permitting. Participated in hiring of the local environmental staff and also led a series of informational sessions put on by the company to educate the community about various aspects of the mining operation and environmental practices. Provided factual and expert witness testimony in a legally binding arbitration with Crown Jewel joint venture partners.

BHP Billiton, Jansen Potash Project Health, Safety, Environment and Community (HSEC) Plan and Materials and Waste Management Plan, Saskatchewan. Prepared the HSEC plan for this large-scale Phase 1 drilling program. The 200-page HSEC plan included information on key health and safety issues as well as environmental management and referred to a stand-alone community plan. Also developed the Materials and Waste Management Plan included information on materials handling and storage and management of all wastes to be generated during the drilling program.



Elizabeth Bella, PhD

Deputy Project Manager (Technical); Vegetation & Wetlands; Effects of Climate Change on Project Area

Education

PhD, Ecology, University of California-Davis, Dept. of Environmental Science and Policy, 2009. Focus: conservation policy, invasion biology

MS, Forestry, University of Montana, College of Forestry and Conservation, 1998. Focus: forestry, vegetation ecology

BS, Dual major: Biology and Forestry, SUNY-College of Environmental Science and Forestry, 1996

Years of Experience

With AECOM: 3

With Other Firms: 17

Certifications

AECOM Certified Project Manager

US Department of Agriculture (USDA) Contracting Officer Representative (COR)

Training

USDA Forest Service NEPA 1900-1 course

US Army Corps of Engineers (USACE) Certified Wetlands Delineation

Alaska National Interest Lands Conservation Act (ANILCA) training course

Peer Reviewer, Journal of Environmental Management

Peer Reviewer, Invasive Plant Science and Management

As proposed co-deputy project manager (technical) for the Pebble EIS project, Dr. Elizabeth Bella will focus on contractor coordination and external/ agency coordination as the USACE directs. She will also assist the team as a senior advisor for the biological sciences.

Elizabeth, an AECOM certified project manager, is the Biological Environment Discipline Lead and co-deputy project manager for the Donlin Gold EIS. She has 20 years of planning and applied ecology experience and has served as project manager, deputy project manager, discipline lead, or senior scientist on large-scale NEPA projects in mining, hydroelectric, energy, and timber management fields, as well as on smaller-scale planning, wetland, or research-based biology projects. She leads the planning group for AECOM's Anchorage office, specializing in NEPA projects, state and federal permit applications, federal permit consultations, partner coordination, and public involvement processes. She has on-the-ground experience in planning, outreach, and research projects throughout remote regions of southwest and southeast Alaska.

Elizabeth has field experience in botanical, vegetation, soil, raptor, cattle, visual, and wetland surveys; and has developed and led comprehensive invasive species management programs. She has applied technical skills in vegetation ecology, coastal adaptation tools, technical writing and editing, invasive species biology, science communication, wetland science, botany, threatened and endangered species, and predictive modeling. Climate change experience includes application of climate policy

Why Chosen for This Project

- Strong, personable coordination skills
- Biological sciences subject matter expert
- Extensive Alaska experience
- Senior roles on large-scale NEPA projects in mining and other industries

in NEPA, multi-agency vulnerability assessments, community planning workshop facilitation, collaboration on adaptation and resilience planning projects through partnerships and grants, and biogeoclimatic modeling applied to habitat and landscape type change.

Project Experience

USACE, Donlin Gold LLC, Donlin Gold EIS, Alaska.

Deputy Project Manager, leading all technical aspects of the project, and biological resources discipline lead. Large-scale EIS examining a proposed gold mine project in southwest Alaska. Components include a large open pit gold mine, 300-mile natural gas pipeline, and associated transportation infrastructure. Key issues include barge transportation impacts, mercury abatement, impacts to surface and subsurface water quality and quantity, and socioeconomic effects in the region.

National Park Service, Arctic Network Natural Resource Condition Assessment, Alaska. Project Manager/senior ecologist. NPS's Arctic Park Network chose a novel approach in crafting their Natural Resource Condition Assessment Report (NRCA) as a series of peer-reviewed published journal articles and internal peer-reviewed reports analyzing critical natural resource vital signs. Coordinated the project team and principal investigators, organizing the report by thematic chapters incorporating I signs to create a flexible, dynamic document to help guide future management under changing climate conditions in the network.

Elizabeth Bella, PhD, *continued*

Alaska Department of Transportation (ADOT), Shelter Cove Wetland Delineation, Alaska. Senior ecologist. ADOT proposed to extend Ketchikan-connected road system to a road system in the Shelter Cove area to improve and expand access and recreational opportunities in the area. Conducted wetland delineation field work, assisted with wetland mapping and plant identification, and reviewed the final wetland report.

US Fish & Wildlife Service, Alaska Landscape Conservation Cooperatives, Alaska. Senior ecologist/planner. AECOM was subconsultant to Agnew::Beck in developing a program to deliver and implement coastal resilience and adaptation information and planning strategies to communities and resource managers in western Alaska. AECOM assisted with stakeholder outreach and facilitating hub community workshops, and compiled a compendium of coastal change tools, databases, reports, and resources as a key deliverable.

National Oceanic and Atmospheric Administration (NOAA), Alaska Fisheries Science Center Environmental Assessment (EA), Alaska. Senior ecologist. This project provided environmental and analytical support services for developing programmatic NEPA EAs for the National Marine Fisheries Service (NMFS) for all six national Fisheries Science Centers. For the Alaska EA, wrote the special Resource Area chapter sections, reviewed the affected environment chapter review, and collaborated on map/figure revisions for these sections.

USACE, PacRim Coal, LP, Chitna Coal Supplementary EIS, Alaska. Senior ecologist. Served as senior technical reviewer for vegetation and wetland chapters, and senior technical editor for bird sections.

US Fish & Wildlife Service, USDA Forest Service, and National Park Service, Chugach Climate Change Vulnerability Assessment, Alaska.

Senior ecologist/climate change modeler. Modeled landscape and local-level ecological change to determine vegetation successional pathways for short- and long-term planning recommendations. Specific forecasting included infrastructure development strategies to prevent wide-scale invasive plant issues in critical areas, reduction of existing invasions, and recommended planting strategies for long-term forest and landscape structure maintenance. (Prior to AECOM.)

US Fish & Wildlife Service, Kenai National Wildlife Refuge, Kenai Mountains to Sea Initiative, Alaska.

Senior ecologist. Assisted in analysis, reports, and mapping to maintain landscape connectivity by conserving anadromous riparian corridors on the rapidly changing Kenai Peninsula with partners including Kachemak Heritage Land Trust, Cook Inletkeeper, Audubon Alaska, and Kenai Watershed Forum. Develop mitigation bank locations (key public and private land corridor options) by working with landowners, agencies, and tribal entities within permitting regulatory and ANILCA context. (Prior to AECOM.)

US Fish & Wildlife Service, Tree Regeneration Rate-Fire Severity Study, Alaska. Lead ecologist. Established pilot study to determine regeneration potential in varying fire severity conditions for key tree species in post-spruce bark beetle conditions across latitudinal variation in western Kenai Peninsula; establish groundwork for long-term common garden/adaptation forestry study. (Prior to AECOM.)

Alaska Power and Telephone Company, Yerrick Creek Hydroelectric Project, Alaska. Project Manager/wetland scientist. Preliminary Jurisdictional Determination wetland delineation and Threatened, Endangered, and Sensitive Plant survey for a proposed hydroelectric project on Yerrick Creek, near Tok, Alaska, for the Alaska Power & Telephone Company. Managed the project and conducted the wetland and rare plant survey field work. (Prior to AECOM.)

USDA Forest Service, Resurrection Creek Restoration Project Phases I & II, Alaska. Senior ecologist for large-scale restoration project on trail, creek, and landscape with historical mining features with multiple inholdings and use permits. Tasks included restoration design process through in-stream reconstruction, reference conditions inventory, and pre- and post-vegetation cover monitoring. Organized native plant materials for replanting sites. Conducted stakeholder meetings on mercury and access concerns, and post-construction recreational vision. Implemented invasive plant control and prevention plan and monitoring. (Prior to AECOM.)



Tara Bellion

Deputy Project Manager (Financial);
Comment Analysis; Administrative
Record; Subsistence

Education

BS, Marine Science and Biology, University of Tampa, 1993

Years of Experience

With AECOM: 22

With Other Firms: 1

Training

Hydrogeomorphic Assessment of Wetland Functions in Interior Alaska

HAZWOPER 40-Hour OSHA Training

HAZWOPER 8-Hour Refresher

HAZWOPER 8-Hour Supervisors Training

Ms. Tara Bellion is an environmental project manager with 22 years of experience with federal resource management planning, rural community engagement and planning, and project and document controls. She is extremely proficient in preparation of defensible decision file records and administrative records for NEPA projects and the Freedom of Information Act (FOIA) process. She has been the task-lead for development of decision files and preparation of administrative records for several large and complex NEPA documents.

Tara is also an experienced impact assessment practitioner who has authored the subsistence analysis of several large, complex, and controversial NEPA projects. She brings significant know-how in project management, budgeting and scheduling, management of subcontractors, coordination of project teams, and execution of deliverables. Tara specializes in public involvement, identifying and interpreting public issues and concerns, leading comment analysis teams, and designing comment analysis database systems. She has also led the comment analysis team for every large environmental impact statement (EIS) performed in the AECOM Alaska operations during the past six years.

Why Chosen for This Project

- 22 years on NEPA projects in Alaska, including the Donlin Gold EIS, BSWI RMP/EIS, Izembek NWR EIS, and more
- Highly experienced with administrative record protocols, efficient capture of records, and leading comment analysis teams on large EIS projects
- Subsistence analysis for large, complex NEPA projects

Project Experience

US Army Corps of Engineers (USACE), Donlin Gold EIS, Alaska. Fiscal deputy project manager, project management team, task lead quality assurance and quality controls, public involvement, comment analysis and administrative record, senior technical staff for subsistence analysis. In charge of the finances, invoicing, scheduling, budgeting, and subcontractor contract management of this project. Responsibilities also include public involvement; management, design, and leadership for the project comment analysis database teams for scoping and the Draft EIS; updates to the project website; and leading the development of the administrative record and responding to FOIA requests. Contributed to the subsistence analysis, reviewed the findings of the 810 Analysis, and is a technical senior reviewer of this EIS.

Bureau of Land Management (BLM), Bering Sea Western Interior Resource Management Plan (RMP)/EIS, Alaska.

Task lead for administrative record and author for subsistence impact analysis. Currently acting as administrative record lead, providing guidance to the on-site administrative assistant and contractor's staff. Lead for the subsistence analysis as subsistence harvest and resource management on BLM-managed lands is a key issue of concern for the public.

BLM, Bering Sea Western Interior RMP/EIS Alternative Development Scoping, Alaska.

Comment analysis lead. Senior reviewer for comment analysis of alternatives scoping meeting comments and development of alternatives scoping report.

Tara Bellion, *continued*

ExxonMobil Production Company, Point Thomson Project, Alaska. Subsistence and traditional land use analysis impact assessment. NEPA compliance and support for ongoing activities regarding subsistence issues and impact assessment.

US Fish and Wildlife Service (USFWS), Izembek National Wildlife Refuge Land Exchange EIS, Alaska. Task lead for administrative record, comment analysis database, public involvement specialist, and author for subsistence analysis. Task lead for development, coordination, and ongoing management of the Administrative Record. This record was upheld during litigation following the Record of Decision for this project. Subsistence analysis lead. Involved in development of the scoping report and Draft EIS comment analysis reports, coding, and comment analysis of over 31,000 public comments received during public scoping and 90,000 comments to the Draft EIS.

BLM, Central Yukon RMP/EIS, Alaska. Public involvement lead. Organized and planned logistics, set up for meeting facilitation for 12 public outreach meetings in BLM's planning area in the interior of Alaska where subsistence harvest on BLM-managed lands is a key topic.

ConocoPhillips Alaska, Greater Mooses Tooth (GMT) Analysis, Alaska. Subsistence impact assessment. Pre-NEPA compliance and support for development of the GMT 1 and GMT 2 projects regarding subsistence issues and impact assessment.

BLM, Northwest California Integrated RMP/EIS Update, California. Administrative record lead, public involvement and comment analysis. Task lead for development and coordination of the Decision File and Comment Analysis system for Envisioning and Scoping. Also leading the comment analysis team.

US Forest Service, Stibnite Mine Gold Project EIS, Idaho. Involved in development of the scoping report and comment analysis for this EIS which is for an open pit gold mine in central Idaho. Key issues

being evaluated for this EIS include fisheries, stream restoration, recreation, access, impacts to surface and subsurface water quality and quantity, and socio-economics.

National Marine Fisheries Service, Effects of Oil and Gas Activities (Arctic Seismic and Drilling) in the Arctic Ocean Draft and Final Supplemental EIS, Alaska. AECOM (then URS) prepared a large, multi-disciplinary Programmatic EIS to assess effects of oil and gas exploratory activities (seismic and drilling) on marine mammals in the US Arctic Ocean (US Chukchi and Beaufort Seas). The Bureau of Ocean Energy Management (BOEM) and North Slope Borough were participating agencies for this controversial EIS. Part of the project management team, task lead for development and coordination of this project's administrative record and comment analysis system and heavily involved in public involvement coordination for this project from 2009-2016. Comment analysis of the SEIS included over 156,000 public comments. Comment analysis database manager for the scoping, DEIS, and SEIS phases of the project.

US Army Garrison, Fort Wainwright, Alaska Real Property Master Plan Programmatic Environmental Assessment (EA). Project Manager responsible for project financials, budget, schedule and implementation of technical quality planning and review and delivery of final EA.

US Forest Service, Tongass Forest Plan 5-Year Review Project. Project manager who led the AECOM team during comment analysis and coding of public concerns. Submissions were received from stakeholders, public meetings, tribal governments and the Forest Service during the public outreach process for review of the 2008 Tongass Forest Management Plan. Developed web-based comment analysis system and management of comment analysis database with over 150,000 form letters received during outreach to stakeholders.

National Marine Fisheries Service (NMFS), Bowhead Whale Subsistence Harvest EIS, Alaska. Technical reviewer, quality assurance and quality

control and document control lead. Team member for the sociocultural and cumulative effects analysis in this EIS prepared by the NMFS to implement International Whaling Commission action authorizing traditional whaling by 11 Alaska Native communities. Responsibilities for the Final EIS included editing document controls, comment response coordination, and reviewing bowhead subsistence harvest and transportation sections for the EIS.

NMFS, Arctic Marine Mammal Protection Act Monitoring Strategy Meeting, Alaska. Task manager and meeting facilitator. The goal of this workshop was to identify and begin prioritizing specific key questions that future monitoring can be designed to answer and to fill critical information gaps to best inform future Marine Mammal Protection Act and Endangered Species Act analyses and decisions for marine mammals and subsistence resources in the Arctic.

Unicom, GCI TERRA Southwest Phase II and TERRA Kotzebue Northwest Phase II Environmental Assessment (EAs) and TERRA Yukon Phase EA, Alaska. Task lead for quality assurance and quality control and author of subsistence and cultural resources assessments. For these third-party EAs prepared with the USFWS and BLM for GCI, authored the subsistence impact assessment and cultural resource impact assessment. The purpose of these projects was to deliver broadband internet to Southwestern and the Yukon-Kuskokwim Delta regions of Alaska.

NMFS, Arctic Stakeholder Open Water Workshop, Anchorage, Alaska. Project manager and public involvement lead. Public involvement and logistical support to NMFS for the organization and facilitation of the 2011, 2012, and 2013 Arctic Open-Water workshop and Peer Review Panel meetings involving 200+ attendees from NMFS, the Bureau of Ocean Energy Management, the oil and gas industry, the North Slope Borough, the Alaska Eskimo Whaling Commission, research institutes, non-governmental organizations, and the public. The purpose was to discuss impacts to marine mammals and subsistence resource impact assessment.

Discipline Leads



Paul McIlvenna

Infrastructure Lead; Buried Terrestrial and Marine Pipelines

Education

Bachelor of Engineering (Hons) Mechanical, University of Southern Queensland, 2002

Years of Experience

With AECOM: 11

With Other Firms: 22

Publications and Technical Paper

P. McIlvenna & R. Mossad, "Two Dimensional Transfer Chute Analysis using a Continuum Method," Third International Conference on CFD in the Minerals and Processing Industry, December 2003.

Mr. Paul McIlvenna's experience includes underground and surface mines, numerous mining methods, shipping terminals/ports, manufacturing plants, solid waste handling, process plants, power generation balance of plant, transportation and logistics, novel processes, demanding locations (remote, cold, dry, socially or environmentally sensitive, etc.), and off-site project facilities. Paul is highly experienced at evaluation of alternative materials handling technologies including slurry, conveyor, rail, road, aerial systems, cableways (and even airships). He has worked on mining infrastructure projects in Alaska, Canada, and Australia.

Paul has many years of experience on the early phases of project development and thrives on finding ways to unlock the best value in a future project. He works equally well at concept development as detailed design, troubleshooting and plant optimization/upgrades.

Why Chosen for This Project

- Broad experience with mining infrastructure projects in Alaska, Canada, and Australia
- Slurry pipelines, bulk materials handling, process plants, shipping terminals/ports, power generation, transportation and logistics
- Work in remote/cold regions and socially environmentally sensitive locations

Project Experience

COSIA (Canada's Oil Sands Industry Alliance), Alberta.

Study manager for low energy intensive alternatives for ore handling in an oil sands mine. The evaluation included comparisons of slurry handling to other long-distance material transport technologies.

Teck Coal, Elkview Mine, British Columbia.

Project Manager and materials handling lead for prefeasibility study for Baldy Ridge Extension Conveyance system. Includes evaluation and development of a range of overland bulk transport technologies including conveyor, slurry and emerging technologies over steep terrain.

Etihad Rail, Abu Dhabi, United Arab Emirates.

Strategic planning for the proposed Etihad Rail national rail network across the UAE. Site selection, development and bid evaluations of rail terminals, for a variety of bulk materials including aggregates, clinker, cement, coal and taconite. Transportation options evaluated include conveyor, truck, slurry and Rail-vveyor.

Strange Lake B Zone Prefeasibility Study, Quest Rare Minerals, Quebec/Newfoundland and Labrador (NL).

Study manager for a rare earth mine, road and port project in northern and southern Québec/NL.

Paul McIlvenna, *continued*

SLBZ Site Selection Study, Quest Rare Minerals, Quebec. Study manager of site selection study for a rare earth metals processing plant. Transportation options evaluated included slurry pipelines. Slurry pipelines utilized for transport of tailings to the residue deposition site.

Tata Steel Minerals, DSO Timmins EPCM Project, Quebec. Materials handling lead, then engineering manager, for the EPCM delivery of a 4.2 MTPA iron ore mine-rail-port project near Schefferville, Quebec. Included slurry pipelines within the process plant and tailings systems.

Teck, Red Dog Mine, Alaska. Program Manager of the 2017 projects portfolio related to the tailings main dam and the fresh water dam, including Stage XI and Stage XII raises of the tailings dam, geotechnical investigations, various dam upgrades pipeline corridor impacts.

ZeroGen Site Selection and Prefeasibility Study. Engineering manager and mechanical discipline lead for the world's first IGCC+CCS clean coal power station. Evaluated seven proposed power station sites, and completed PFS design for all site infrastructure and balance of plant. Evaluated a range of transportation options for delivery of coal to the ZeroGen site, including slurry pipelines.

Teck Coal, Elkview Mine, British Colombia. Project manager for the BRE Project Tunnel Rehabilitation Feasibility Study. Geotechnical investigations, full rehabilitation of the 38-year-old ground support for a 1.5-kilometer-long tunnel housing a critical conveyor and mine services and tailings slurry pipeline.

Ernest Henry Mine Expansion, Cloncurry, Queensland. Project manager for underground mine infrastructure concept study. Scope of study covered underground crushing, conveying & hoisting of 6 MTPA copper/gold ore from 1120 meters below surface. Also included mine services and surface conveyors. The underground dewatering system involved design of slurry pumping to the surface.

Wandoan & Greater Wandoan Coal Projects, Queensland. Optimisation studies for location and routes of permanent site tailings slurry pipelines, roads rail and other infrastructure.

Xstrata, Mount Isa Open Pit Concept Study, Queensland. Study manager and materials handling lead for extensive long-term capital works programme for the Mount Isa Mine complex of open cut and underground mines and concentrator infrastructure to secure the long-term future operations at Mount Isa. This project involved mega-infrastructure across a large mining complex including long-distance slurry transport to the tailings dam sites.

Nanango, Kunioon Coal Project, Queensland.

Owner's engineer mechanical team leader for the final feasibility study of the proposed Kunioon Coal Mine to supply coal for 25 years to Tarong Power Station and Tarong North Power Station. The project included development of a new mine at Kunioon, ROM crushing & handling facilities, a 14.5-kilometer overland conveyor system through sensitive environmental areas, and connection to the existing coal handling preparation plant (CHPP) at Meandu Mine. An upgrade of the CHPP was also included in this project. Fines waste slurry from the mine was designed for return to the processing plant ~15 kilometers away via transport on the underside of the conveyor.

Abbot Point Coal Terminal, Bowen, Queensland.

Mechanical discipline leader for feasibility study and detailed design of the Stage 2A outloading system expansion. This project involved handling of waste slurry from the berths and returning to shore by a slurry return system on the underside side of the conveyor.

Dalrymple Bay Coal Terminal, Queensland.

Held several project positions over four years for mechanical design of expansions to the port. The offshore conveyor system was designed to return slurry coal waste from the berth to shore by handling the slurry on the underside of the conveyor.



Michael Gray, PG

Physical Sciences Lead

Education

BA, Geology, Humboldt State University, Arcata, California, 1986

Years of Experience

With AECOM: 29
With Other Firms: 1

Registrations/Certifications

Registered Professional Geologist, Alaska, #461
AECOM Certified Project Manager

Areas of Expertise

Physical Sciences Analysis
Environmental Baseline Studies
Hydrologic/Hydrogeologic Studies
NEPA Analysis

Training

HAZWOPER 40-hour OSHA Training
HAZWOPER 8-hour Supervisor Training
NSTC North Slope Training (2003, 2011)
Learn-to-Return Wilderness Survival/Bear Awareness (2008, 2011, 2013, 2014)
Learn-to-Return Open Water Survival (2011)

Mr. Michael Gray brings experienced leadership as Physical Sciences Discipline Lead. He is an accomplished large-project manager, most recently leading the multidisciplinary data collection efforts for the Alaska LNG project. He provides technical expertise and is deputy Physical Environment lead for the Donlin Gold environmental impact statement (EIS), and has long and close working relationships with key project staff proposed for the Pebble Project EIS. He understands how to develop and lead collaborative technical teams to successfully accomplish challenging technical work tasks.

Michael is a senior geologist and project manager supporting AECOM projects in Alaska and the Pacific Northwest. He has 30 years of experience, 25 of those in Alaska, providing project management and technical subject matter expertise on a variety of resource development projects. He is a registered Professional Geologist in the State of Alaska.

With his diverse professional background, Mike has served in a variety of technical and management roles for a wide range of clients, including mining, oil and gas, manufacturing, and local, state and federal government. He has direct experience with federal environmental processes under the National Environmental Policy Act (NEPA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and guidance under the Federal Energy Regulatory Commission (FERC) and the Environmental Protection Agency (EPA). He has worked extensively within State of Alaska regulatory frameworks, including Alaska Department of Environmental Conservation (ADEC).

Why Chosen for This Project

- More than 25 years of experience in Alaska as a physical resources scientist
- Experienced in NEPA analyses on major Alaska EIS projects
- Currently deputy Physical Sciences lead for Donlin Mine EIS
- Strong team building skills

Project Experience

US Army Corps of Engineers (USACE), Donlin Gold LLC, Donlin Creek Mine EIS, Alaska. Deputy physical sciences lead. Responsible for developing and managing physical environment sections for a major EIS (2012 – present). Areas of technical responsibility include geology, groundwater and surface water hydrology, water quality, soils, seismic, meteorology, geochemistry, air quality, noise, climate change, and spills. Manage diverse subject matter experts for completion of technical analysis of existing environment and project impacts, including addressing multiple rounds of agency/public comments.

Alaska Natural Gas Development Authority (ANGDA), Beluga-to-Fairbanks Natural Gas Pipeline EIS, Alaska. Technical expert responsible for developing existing environment information and analysis of impacts for an EIS covering a 380-mile long pipeline between Beluga and North Pole, Alaska. Technical areas of responsibility included geology, soils, geologic hazard conditions, and permafrost.

US Fish and Wildlife Service, Izembek National Wildlife Refuge Proposed Land Exchange EIS, Cold Bay, Alaska. Technical expert responsible for supporting development of physical environment sections of EIS for a proposed road from the communities of King Cove to Cold Bay. Technical areas of responsibility included geology, hydrology, and hazardous risk analysis associated with a planned land exchange involving private and public lands.

Michael Gray, PG, *continued*

ExxonMobil, Alaska LNG Environmental and Regulatory Support Services (ERSS), Alaska.

Project Manager responsible for all aspects of ERSS contract for the Alaska LNG Project. Scope included design and execution of multidisciplinary scientific and engineering field studies spanning the State of Alaska, regulatory support (Federal Energy Regulatory Commission [FERC] and state agencies), stakeholder engagement, socioeconomic analysis, and safety and logistical support. Direct responsibility for technical and quality performance, safety, and cost management. Direct interface with client team for technical and project management issues, managed technical and support staff, and developed and implemented project execution plans. Oversaw the effective implementation of a robust project controls process to manage and track all project costs. Project was recognized with ExxonMobil safety awards, and AECOM Technical Excellence award.

ExxonMobil, Alaska Pipeline Project ERSS, Alaska.

Program Manager responsible for all aspects of technical management and execution of ERSS for the Alaska Pipeline Project (APP). Scope included design and execution of baseline environmental studies over an 850-mile project area, FERC license application development, socioeconomic analysis, stakeholder engagement, and safety and logistics oversight. Directly interfaced with client, managed technical and support staff, and developed and implemented strategic plans.

US Forest Service, Salt Chuck Mine, Alaska.

Project Manager responsible for directing a detailed Engineering Evaluation/Cost Analysis of an abandoned mine site in Southeast Alaska. This project included review and synthesis of historic and newly generated site data, evaluation of human health risks and ecological risk, and development and assessment of appropriate removal actions under CERCLA.

BHP Billiton, Western Arctic Coal Baseline Environmental Studies, Northwest Alaska.

Technical expert supporting baseline environmental studies for coal exploration and delineation of resources in northwest Alaska. Responsible for development of physical sciences information including geomorphology, soils, permafrost, hydrology, and water quality.

BP Exploration (Alaska) Inc., Beaufort Sea Oil and Gas Development/Northstar Project EIS, Alaska.

Technical expert responsible for developing physical environment information for an offshore oil development EIS. Project included detailed impact analysis of geotechnical, hydrologic, permafrost, coastal erosion, and sea ice concerns.

US Forest Service, Mahoney, Gold Standard, and Sealevel Mines, Tongass National Forest, Alaska.

Lead investigator responsible for completing Engineering Evaluation/Cost Analyses of multiple abandoned mine sites under CERCLA. Project included review of current and historic site data, coordination of field activities, analysis of environmental impacts, and evaluation of potential risks to human health and the environment.

US Forest Service, Khayyam Mine, Omar Creek Mine, and Apex Mine, Alaska.

Lead consultant responsible for technical and managerial oversight of two Preliminary Assessment/Site Investigation programs for abandoned mine sites in Southeast Alaska. These projects included review and synthesis of historic and newly generated site data, evaluation of exposure pathways and potential receptors, and Hazard Ranking in accordance with US Environmental Protection Agency processes.

Bureau of Land Management (BLM), Ring of Fire Resource Management Plan and EIS, Alaska.

Technical expert responsible for review and update of plans for management of geologic resources within the Ring of Fire management area. Responsibilities included evaluation of resources, review of existing management plans and development of new management plans, and close interaction with BLM technical staff.

US Forest Service, Coffman Cove, Alaska. Technical expert responsible for assessing impacts related to acid rock drainage from road beds on Prince of Wales Island, Alaska. Assessment included analysis of construction materials and impacts on surface water quality and fish resources.



James "Wes" Cornelison

Biological Sciences Lead; Health and Safety

Education

MS, Biology, Western Carolina University, 2005

BS, Economics, Appalachian State University, 1996

Years of Experience

With AECOM: 7+

With Other Firms: 10

Areas of Expertise

NEPA Impact Assessments

Fisheries Ecology

Stream and Wetlands Restoration

Environmental Permitting

Training

Wetland functional assessment

Engineered log jams

River morphology and application

Applied fluvial geomorphology

NEPA: Writing the perfect EA/FONSI and EIS

Stormwater BMP inspection and maintenance

Applied wetland ecology

Low impact development

Watershed assessment of river stability and sediment supply

Publication

Wesner, JS, JW Cornelison, CD Dankmyer, PF Galbreath, and TH Martin. Ecological differences between genetically distinct strains of brook trout (*Salvelinus fontinalis*) in Southern Appalachia: pH tolerance, growth, mortality and diet. Transactions of the American Fisheries Society 140:37-44, 2011.

Mr. Wes Cornelison most recently provided senior review for NEPA biological affected environment and environmental consequences reports for the Stibnite Gold environmental impact statement (EIS) and the NOAA Fisheries Science Center NEPA Environmental Assessment program. Wes served as deputy project manager for the Alaska LNG project, where he was responsible for the management and implementation of numerous physical and biological resource impact investigations including wetlands and vegetation, fisheries, wildlife, noise, and air quality. Wes is a proven and accomplished task supervisor for large-scale projects in Alaska and beyond. His role as biological sciences lead will apply his biological knowledge and ability to maintain a demanding schedule, ensure interdisciplinary coordination, and operate within budget. Wes is a "get it done" leader whose style both contributes to and complements the rest of the management team.

Wes has over 17 years of professional experience in natural resource management and a proven track record conducting and overseeing environmental investigations for resource development projects including NEPA impact assessments, environmental permitting and compliance monitoring. Wes has designed and executed environmental investigations for resource development projects across Alaska and the Pacific Northwest including Pacific salmon spawning and rearing surveys, habitat assessments, freshwater fish distribution and abundance surveys, and species characterization studies. Wes has served as the technical studies manager for various biological impact investigations across Alaska including wetlands, vegetation, and wildlife surveys.

Why Chosen for This Project

- Deputy Project Manager and baseline studies for Alaska LNG project
- Senior reviewer for Stibnite Gold EIS
- Senior biologist and natural resource management specialist
- Fisheries author and subject matter expert

He has prepared numerous scientific technical reports for federal, state, tribal and local agencies including environmental assessments and EISs.

Project Experience

US Forest Service, Stibnite Gold Project EIS, Idaho. Senior technical reviewer. Responsible for senior technical review of the biological resource sections. Key issues include fisheries, stream restoration, recreation, access, impacts to surface and subsurface water quality and quantity, and socioeconomics.

National Marine Fisheries Service, Fisheries Science Centers Environmental Assessment, Nationwide. Lead fisheries biologist and principal author for this nationwide effort to assess the environmental effects of conducting fisheries research in US marine waters. Key issues include the incidental take of protected species (marine mammals, sea turtles, and birds) by fisheries research activities. Associated efforts include preparation of applications for incidental take of marine mammals and consultations regarding the Endangered Species Act, Essential Fish Habitat, and National Marine Sanctuaries.

ExxonMobil, Alaska LNG Project, Alaska. Deputy project manager/technical studies manager. Responsible for management and implementation of desk analysis and technical field studies for the Alaska LNG Project, a proposed 800-mile liquefied natural gas transmission pipeline. Developed technical field study protocols in accordance with federal and state agency requirements, trained

James “Wes” Cornelison, *continued*

and managed environmental field staff, prepared scientific permit applications, implemented a robust health and safety program and developed semi-annual budgets. Direct responsibility for technical and quality performance, schedule, safety, and cost management. Served as direct interface with client representatives for technical and program management issues, managed technical and support staff, and developed and implemented project execution plans.

Exxon Mobil Midstream Gas Investments, Alaska Pipeline Project, Alaska. Environmental studies task lead. Responsible for the implementation of fish, wetlands, wildlife and hydrologic field investigations for a proposed 800-mile natural gas transmission pipeline from Alaska’s North Slope to Canada. Developed technical field study protocols in accordance with agency permitting requirements, prepared environmental permit applications, trained and managed environmental field staff, implemented a quality assurance program and developed semi-annual budgets. Responsible for the development of Federal Energy Regulatory Commission (FERC) Environmental Reports in support of the application for a FERC Certificate of Public Convenience and Necessity, and provided documentation for the FERC EIS process.

Eastern Band of Cherokee Indians, Cherokee, North Carolina. Watershed manager. 1) Project Manager for a fisheries research study designed to collect baseline data and monitor riverine fishes, specifically *Catostomidae*. Constructed, installed, and operated a resistance-board fish weir and collected biological data. Trained staff on resistance-board weir operating procedures and fisheries sampling methods, performed line-transect surveys and conducted boat electrofishing surveys. Trained field staff on various fisheries sampling methods. 2) Developed and implemented an EPA 319 Non-Point Source Pollution grant to restore and enhance two functionally impaired wetlands. Delineated and functionally assessed the wetlands,

secured the necessary state and federal permits, developed a native plantings list and monitoring plan, and performed construction oversight. Directly responsible for contractor oversight and permit compliance. Project involved the control and removal of invasive species with prescribed burns and herbicide applications. 3) Developed and implemented an EPA 319 Non-Point Source Pollution grant to restore and enhance fisheries habitat on a major tributary to the Oconaluftee River. Project involved geomorphic characterization, fish habitat assessment, fisheries and benthic sampling and the installation of fish habitat improvement structures including bank placed materials and bank cover structures. Directly responsible for construction oversight and contractor performance.

Blue Ridge Ecological, Hiwassee, Georgia.

Project Manager for the biological and water quality components of a watershed assessment study for the City of Hiwassee’s wastewater treatment facility upgrade project. Performed stream habitat assessments, water quality sampling, and fish and benthic collections and identifications in accordance with established procedures developed by the Georgia Department of Natural Resources. Analyzed and summarized data, prepared a technical report, and presented results to the City of Hiwassee and permitting agencies.

North Carolina State University, Marble, North Carolina.

Fisheries biologist in charge of field data collection for a previously undescribed and imperiled species, the sicklefin redhorse (*Moxostoma sp.*). Responsible for the operation of two resistance-board fish weirs, collecting biological data, and PIT (passive integrated transponder) tagging/scanning to determine recapture status. Performed micro-habitat assessments, tracked fish with radio telemetry equipment, and collected spawning substrate samples. In charge of operating a vessel under challenging/hazardous conditions and supervising field technicians.

Mountain Aquaculture Research Center,

Cullowhee, North Carolina. Senior research technician. Conducted a three-year comparative ecology research project between two strains of wild brook trout. This project was part of a regional effort to protect and conserve the southern Appalachian brook trout, an endemic char to the southern Appalachian Mountains. Designed and executed a series of experiments measuring thermal and acidity tolerances and compared growth/diet characteristics between the two strains. Study involved remote backpack electroshocking and fish collections, population abundance estimates, PIT tagging, removal, processing and interpreting otoliths and diet analysis using a non-lethal flush pump. Prepared a technical report and presented results to local Trout Unlimited chapters, North Carolina Division of the American Fisheries Society and the East Coast Trout Management and Culture Workshop.

US Army Corps of Engineers, Hermiston, Oregon.

Fisheries technician in a turbine-tag study for juvenile Chinook salmon, sockeye salmon, and steelhead at the McNary Dam, Columbia River, Oregon. Project evaluated the mortality rate of anadromous juvenile salmon as they passed through hydroelectric turbines. In charge of operating a small vessel under hazardous conditions, tracking smolt with radio telemetry equipment, recovery and tag removal, and collecting and analyzing biological data.



Amy C. Rosenthal

Social Sciences Lead; Environmental Justice (EJ); Recreation

Education

MS, Environmental Science/ Alaska Pacific University, 2003
BS, Forestry/University of Massachusetts at Amherst, 1994

Years of Experience

With AECOM: 10
With Other Firms: 12

Affiliations

MS, Environmental Science/ Alaska Pacific University, 2003
BS, Forestry/University of Massachusetts at Amherst, 1994

Certification

AECOM Certified Project Manager

Ms. Amy Rosenthal will be the social resources environment lead for the Pebble Project environmental impact statement (EIS), the same role she performs for Donlin Gold EIS. She has considerable Alaska and mining National Environmental Policy Act (NEPA) experience as the project manager for Bering Sea-Western Interior Resource Management Plan/ EIS and the wilderness and inventoried roadless areas subject matter expert for the Stibnite Gold EIS. Previously, she was social and economic task lead and subject matter expert for the Izembek Land Exchange for the US Fish and Wildlife Service. As with the other discipline leads, she will be joined by subject matter experts with whom she has worked closely for years.

Amy is a senior environmental planner and AECOM certified project manager with over 22 years of practical environmental resource management, planning, regulatory, and academic experience. She is a technical expert in NEPA analysis and cumulative impact assessment, with a proven ability to manage large-scale, controversial projects for federal and commercial clients, including the US Army Corps of Engineers (USACE), Bureau of Land Management (BLM), National Marine Fisheries Service (NMFS), USFWS, Bureau of Ocean Energy Management (BOEM), and the National Park Service (NPS). She has served as a discipline lead or senior technical expert on NEPA projects in mining, oil and gas exploration, and hydroelectric fields. Amy has extensive experience with federal land management and policy, rural community planning, and all aspects of the public involvement process, as well as broad technical expertise in social science issues regarding public lands, recreation, visitor use, visual resources, wilderness, carrying capacity, and wild and scenic rivers.

Why Chosen for This Project

- Senior social scientist
- Subject matter expertise in recreation and planning
- Leader and contributor to numerous Alaska and Lower 48 NEPA documents
- Social environment lead for Donlin Gold EIS

Project Experience

USACE, Donlin Gold Environmental Impact Statement (EIS), Alaska. Task lead and NEPA specialist. This large-scale EIS examines the proposed Donlin Gold mine project in southwestern Alaska. Key environmental issues include barge transportation impacts, human health impact assessment, mercury abatement, impacts to surface and subsurface water quality and quantity, and socioeconomic effects in the region. Amy helped to manage the physical environment subject matter experts and reviewed analyses for the affected environment, environmental consequences, and cumulative effects sections through the release of the Draft EIS. With a large number of affected tribes across Western Alaska and eight cooperating agencies, this EIS faces a challenging stakeholder landscape and complex inter-agency relations. Amy is currently serving as the social environment task lead.

BLM, Bering Sea-Western Interior (BSWI) Resource Management Plan (RMP)/EIS, Alaska. Project Manager. This RMP/EIS is associated with approximately 13.4 million acres of BLM-managed public lands in a 62.3 million acre planning area in western Alaska. Responsibilities include team management and coordination, subcontractor management, setting and tracking schedule, and technical direction and preparation of the RMP revision and EIS. The AECOM team facilitated alternatives development over a three-week period in collaboration with BLM interdisciplinary (ID) teams and cooperating agencies.

Amy C. Rosenthal, *continued*

US Forest Service, Stibnite Gold Project EIS, Idaho. Subject matter expert. This EIS will examine a proposed open-pit gold mine in Idaho. Subject matter expert in charge of the Wilderness and Inventoried Roadless Areas Technical Reports.

USFWS, Izembek Land Exchange EIS, Alaska. Social and economic task lead and subject matter expert. Preparation of an EIS to address the potential impacts resulting from a proposed land exchange and road corridor within Izembek National Wildlife Refuge and Wilderness. Duties involved coordination and supervision of multiple authors and ensuring quality deliverables, participation in client meetings, and coordinating public involvement tasks including comment analysis, project scoping report, newsletter development, and public meeting materials. Also the senior resource specialist and author for the wilderness section of the EIS, identifying direct, indirect, and cumulative impacts to this resource.

National Marine Fisheries Service, Effects of Oil and Gas Activities in the Arctic Ocean EIS, Alaska. Project Manager. This large, multi-disciplinary, programmatic EIS assesses the effects of oil and gas exploratory activities (seismic and drilling) on marine mammals in the Arctic Ocean (US Chukchi and Beaufort seas). Duties included coordinating public involvement and government-to-government consultation with all coastal communities (Kotzebue, Kivalina, Point Hope, Point Lay, Wainwright, Barrow, Nuiqsut, Kaktovik), gathering and incorporating Traditional Knowledge into the EIS, direct, indirect, and cumulative impacts analyses, coordination of team staff and six subcontractors, adherence to schedule, budget tracking and invoicing, and document production.

Alaska Department of Transportation and Public Facilities, Iliamna-Nondalton Road Improvements Environmental Assessment (EA) Re-Evaluation and Cumulative Impact Study (CIS) Alaska.

Deputy Project Manager. This project re-evaluated the 2001 EA to make certain that it met regulatory requirements, and that the CIS was based on the most recent assessment of environmental consequences. Coordinated the re-evaluation of the EA. Duties included coordination of team staff, adherence to schedule, budget, and quality deliverables.

Alaska Department of Transportation and Public Facilities, Iliamna-Nondalton Road Cumulative Impact Study, Alaska. Deputy Project Manager.

This study analyzed the cumulative effects to a road between Iliamna and Nondalton, including a bridge across the Newhalen River. The earlier proposed Pebble Mine plan was a part of this analysis. Duties included client interface, team coordination, budget tracking, background research, and analysis of cumulative effects.

Alaska Energy Authority (AEA), Susitna-Wantana Hydroelectric Project, Recreation and Aesthetic Resources Program, Alaska. Recreation task lead.

AEA was proposing to create a single dam on the Susitna River, halfway between Anchorage and Fairbanks, Alaska. The project team developed and implemented study plans for three years (2012-2014) of data gathering and analysis for recreation and aesthetic resources within the project area. Served as the recreation task lead, and coordinated with subcontractors on developing surveys, conducting field reconnaissance, and analyzing recreation data.

BLM, Northwest California Integrated RMP/EIS Assistance, California. Project Manager.

The BLM is revising and combining two RMPs and associated Land Use Plan Amendments to address management of lands associated with the Redding and Arcata Field Offices in northern California. The AECOM team is supporting BLM by providing writer/editor support for the RMP/EIS, including the Planning Assessment Report and Alternatives Development Report; public involvement planning and logistics, including developing a concept for and facilitating Envioning meetings; and maintaining the Administrative Record. Responsibilities include coordinating closely with BLM to monitor scope, schedule, and budget, and overseeing the project team.

BLM, Northwest California Integrated RMP/EIS Alternatives Development and Environmental Consequences, California. Project Manager.

The AECOM team is assisting the Redding and Arcata Field Offices in developing their management alternatives through a series of facilitated workshops with the BLM ID teams and cooperating agencies. AECOM is also responsible for writing the Environmental Consequences section of the RMP/EIS, in close collaboration with the BLM. Serves as project manager, and provides guidance and coordination between the client and the AECOM team.

**Subject Matter
Experts and Staff**



Dilip Mathur, PhD (Normandeau Associates) Fish, Aquatic Resources, and Essential Fish Habitat

Education

PhD, Fisheries Management and Biometrics, Auburn University

MS, Fisheries Biology and Marine Ecology, Cornell University

MSc, Zoology, University of Delhi, India

BSc, Zoology (Honours), University of Delhi, India

Years of Experience

With Normandeau Associates: 40

With Other Firms: 10

Professional Certifications

Certified Fisheries Professional, American Fisheries Society

Affiliations

American Fisheries Society

Fellow of the American Institute of Fishery Research Biologists

Reviewer for multiple journals

Associate editor (AFS)-1980-1981

Dr. Dilip Mathur is a vice president and technical director at Normandeau Associates, Environmental Consultants. He has over 50 years of experience in consulting of ecological, environmental, fish behavioral responses to large scale hydro, steam, and nuclear generating stations throughout the United States. He conducted, directed or participated in large-scale ecological and fish behavioral studies including salmonids on the Columbia River Basin. Since 1995, he has provided oversight on a multitude of salmonid issues under an indefinite delivery, indefinite quantity (IDIQ) contract with the US Army Corps of Engineers (USACE) Walla Walla District. He has participated in development and review of environmental impact reports dealing with migratory species including potential effects of removal of Lower Snake River hydroelectric dams. His expertise lies in the fields of thermal discharges; fish behavior (both anadromous and migratory species); anadromous restoration of migratory species (salmonids and clupeids); rehabilitation of turbines and spillways relative to development of friendlier fish passage particularly of Pacific salmonids; developed statistical methods to isolate effects of power plants from natural variations on ecological communities, integration of fish behavior data with power plant operations for minimizing adverse effects.

Why Chosen for This Project

- Pre-eminent specialist in fish (both anadromous and migratory species) behavioral responses to large-scale power and industrial facilities
- Salmonid behavior expert
- Expert in fisheries biology, data analysis, and population dynamics
- Expert in thermal discharges, anadromous restoration of migratory species, and development of friendlier fish passages

Dilip has served as an associate editor for the American Fisheries Society and routinely acts as independent reviewer for several journals. He has chaired technical sessions at several conferences and served on selection committees of professional societies. He has presented numerous papers on migratory species at professional conferences and is well published, including several publications on Pacific Salmon in peer-reviewed journals. A partial list of these publications and presentations is provided below.

Dilip's expertise has required his testimony as a subject matter witness in adjudicatory proceedings on issues related to fish passage, probability of restoration of anadromous species, instream flow requirements for migratory species, and water quality. He has extensively interacted with the media and public on behalf of clients regarding environmental education and dissemination of technical information to both friendly and hostile groups.

Project Experience

T.W. Sullivan Hydroelectric Station Relicensing, Willamette River, Oregon. Assisted in implementation of fish passage studies, statistical modeling of water quality parameters to isolate the effects of station operation from natural variations, review of historical fisheries data on salmonids, and assisted in preparation of environmental impact reports.

Dilip Mathur, PhD (*Normandeau Associates*), continued

Blue Heron Mills Station, Willamette River, Oregon. Prepared expert report including an extensive literature review on potential effects of heated discharge on salmonids in the Willamette River.

USACE, Biological Services, Walla Walla, Washington. Program Manager. Providing a variety of biological services relative to the impact of hydro-dams on Pacific Salmon in the Snake River including potential impact of removal of Lower Snake River hydroelectric projects (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams). This included assessment of the effects on the ecology of salmonids, fish behavior, spawning habitat, recreation fishery, habitat, TRE species, and transport of pollutants. [1996 -present]

Conowingo Hydroelectric Station Relicensing, Exelon, Pennsylvania. Project Manager and expert witness on issues related to fish passage, water quality, turbine passage, effects of water fluctuations on fishes and other biota, flow requirements of organisms, and instream flow methodologies.

Representative Peer-reviewed Publications including Pacific Salmonids

Mathur, D., P. G. Heisey, J. R. Skalski, and D. R. Kenney. 2000. Salmonid smolt survival relative to turbine efficiency and entrainment depth in hydroelectric power generation. *Amer. Water Res. Bull.* 36:737-747.

Mathur, D., P.G. Heisey, J.R. Skalski, and D. R. Kenney. 1999. Survival of Chinook salmon smolts through the surface bypass system collector at Lower Granite Dam, Snake River. Pages 119-127 in M. Odeh, editor. *Innovations in fish passage technology*. American Fisheries Society, Bethesda, MD.

Mathur, D., P. G. Heisey, E. T. Euston, J. R. Skalski and S. Hays. 1996. Turbine passage survival estimation for juvenile salmon smolts at a large dam on the Columbia River. *Can. J. Fish. Aquat. Sci.* 53:542-549.

Mathur, D., W. H. Bason, C. A. Silver, and E. J. Purdy, Jr. 1985. A critique of the Instream Flow Incremental Methodology. *Can. Jour. Fish. Aquat. Sci.* 42:825-831.

Mathur, D., R. M. Schutsky, E. J. Purdy, Jr., and C. A. Silver. 1981. Similarities in acute temperature preferences of fishes. *Trans. Amer. Fish. Soc.* 110:1-13.

Mathur, D., T. W. Robbins, and E. J. Purdy, Jr. 1980. Assessment of thermal discharges on the zooplankton community in Conowingo Pond, Pennsylvania. *Can. Jour. Fish. Aquat. Sci.* 37:937-944.

Mathur, D., and C. A. Silver. 1980. Statistical problems in studies of temperature preference of fishes. *Can. Jour. Fish. Aquat. Sci.* 37:733-737.



Ken Cash

(Normandeau Associates)

Fish, Aquatic Resources & EFH

Education

MS, 1995, Wildlife Ecology, Mississippi State University, Mississippi

BS, 1992, Wildlife and Fisheries Science, South Dakota State University, South Dakota

Years of Experience

With Normandeau: 11

With Other Firms: 11

Mr. Ken Cash has over 23 years of experience conducting research to determine impacts of resource development projects and mitigation actions on Pacific Salmon. He is an expert with designing research and monitoring studies involving anadromous salmonids and assessing distribution, behavior, and survival of multiple species and life stages.

Ken has extensive experienced in experimental design, agency negotiation, and successful implementation and management of large interdisciplinary projects.

Why Chosen for This Project

- Extensive research related to impact determination of impacts of resource development projects on Pacific Salmon
- Significant project experience with the U.S. Army Corps of Engineers (USACE)

Project Experience

CALTRANS/ESA Impact Assessment of Bay Bridge Pier Demolition. Project Manager.

Normandeau was part of a multi-disciplinary team assessing potential impacts of the explosive demolition of the old Bay Bridge support pier on fish and other aquatic organisms. Normandeau conducted hydroacoustic surveys to determine fish distribution near the pier prior to demolition at high slack tide and assess potential impacts to aquatic resources in San Francisco Bay. Normandeau was responsible for study design, team coordination, data collection, data analysis, and reporting of fish abundance and distribution in the study area. Results of this investigation were used to determine the impact of the demolition on aquatic resources, determine efficacy of this approach to remove remaining bridge piers, and assess measures used to mitigate fish injury and take of state and federally listed threatened and endangered species including juvenile salmon and Delta Smelt.

Georgiana Slough Junction Barrier Study. Project Manager/Technical Lead. California Department of Water Resources implemented the Georgiana Slough Junction Barrier Study (GSJB) to test the effectiveness of multiple fish diversion technologies to prevent out-migrating juvenile Chinook Salmon and Steelhead from entering Georgiana Slough. The GSJB Study featured a mark-recapture (mark-detection) experimental design that used acoustically tagged juvenile Chinook salmon and Steelhead to test the response of fish encountering

Ken Cash (*Normandeau Associates*), continued

the divergence between the Sacramento River and Georgiana Slough and estimate the impact of this migration pathway on overall juvenile survival. The overall goal was to find effective mitigation measures to reduce impacts of Delta water diversion facilities on the survival of outmigrating juvenile fish and assist recovery of ESA listed fish stocks.

Vernalis Adaptive Management Plan, San Joaquin Group Authority SJGA. Project Manager/Technical Lead. Provided technical expertise to SJGA team developing strategy for conducting large-scale salmon survival and hydraulic habitat studies on the San Joaquin River, CA. The study goal was to assess the impact of timing and duration of increase instream flows on juvenile salmon survival. Assisted study plan development, study site selection, installation and operation of acoustic telemetry equipment and data review. Trained U.S. Fish and Wildlife Service Staff (USFWS) Staff with installations, operation, troubleshooting of acoustic telemetry systems. Provided training with automated data processing and remote powering techniques to SJGA team. Analyzed acoustic data and provided status reports to USFWS. Participated in developing 2010 study report and assisted SJGA with 2011 study plan, proposal and budget development.

U.S. Army Corps of Engineers. Project Manager. Literature search and modeling to estimate impacts of predation on in-river migrating juvenile salmon and Steelhead if the fish transportation release point is moved 240 km downstream of its current location in the Columbia River.

U.S. Army Corps of Engineers. Principal Investigator. McNary Dam fish passage and survival evaluations. Evaluated salmon and Steelhead behavior and dam passage survival using acoustic telemetry to assess fish passage mitigation measures and the impact on juvenile fish survival through the Columbia River hydropower system. (Prior to Normandeau.)

U.S. Army Corps of Engineers. Principal Investigator. Three-dimensional behavior and passage of juvenile Chinook Salmon, Sockeye Salmon, and Steelhead at The Dalles Dam. Evaluated three-dimensional fish approach behavior to The Dalles Dam to assist the placement of a behavioral guidance structure to divert fish from turbine passage routes in support for reducing hydropower impacts to ESA listed salmon and Steelhead recovery. (Prior to Normandeau.)

U.S. Army Corps of Engineers. Principal Investigator. Hydroacoustic and Three-Dimensional acoustic fish tracking of Chinook Salmon and Steelhead to evaluate the multiple fish passage technologies at Lower Granite Dam. Determined effectiveness of the passage technologies during different project operation treatments and forebay structure configurations to improve ESA listed salmon and steelhead survival and reduce hydropower impacts to stock recovery. (Prior to Normandeau.)

U.S. Army Corps of Engineers. Phase III Pump-back tests for Richard B. Russell Dam Environmental Impact Statement. Quantified fish entrainment during pump-back operations using active hydroacoustics, upstream full recovery netting of turbine unit, and downstream bulkhead slot netting. Conducted hydroacoustic data processing, analysis, QAQC of database, and summary reporting. (Prior to Normandeau.)

Fish and Wildlife Service/National Biological Survey. Field Supervisor. Tustumena Lake Sockeye Salmon studies were completed to assess the impacts of annual stocking and test program assumptions including spawning habitat limitation, underutilized lake productivity, and limited genetic variation. Led aerial and land-based radio-tracking effort to identify beach spawning habitat and document spawning success by adult Sockeye salmon in Tustumena Lake, Alaska. Monitored

Sockeye Salmon fry outmigration timing from tributary streams and rearing lake productivity. Conducted salmon spawning surveys and mapped spawning habitat. Collected genetic samples to quantify variation in spawning sub-populations of Sockeye salmon within the Kaslof River and Tustumena Lake spawning tributaries. (Prior to Normandeau.)

Representative Peer-reviewed Publications including Salmonids

Cash, K. M., D. M. Faber, and T.J. Darland. 1998. Distribution of Juvenile Salmonids Detected by point sampling hydroacoustic surveys in the forebay of Lower Granite Dam. Pages 77-116. in Adams et al. 1998. Migrational characteristics of Juvenile spring chinook and steelhead in the forebay of Lower Granite Dam relative to the 1998 surface bypass collector and Behavioral Guidance Structure Tests. Report to the U.S. Army Corps of Engineers, Walla Walla, Washington.

Cash, K.M., N.S. Adams, D.W. Rondorf and D.M. Faber. 2005. Three-dimensional behavior of juvenile salmon approaching The Dalles Dam. American Fisheries Society 135th Annual Meeting, Anchorage, Alaska.

Cash, K.M. T. W. Hatton, E.C. Jones, C.E. Walker, J.M. Hardiman, M.D. Sholtis, N.M. Swyers, G.L. Rutz, S. N. Lampson, L.S. Wright, T.D. Counihan, D.W. Rondorf, and N. S. Adams. 2006. Passage, Survival, and Approach patterns of Juvenile Salmonids at McNary Dam, 2006. Anadromous Fish Evaluation Program 2006 Annual Research review, Portland, Oregon.



MacNamara "Mac" Charles Shoulders

Fish, Aquatic Resources and EFH; Reclamation / Restoration (Senior On- Call Expert)

Education

BS, Biology, Linfield College, 1978

Certificate Education, University of Alaska, Fairbanks, 1988

Years of Experience

With AECOM: 4

With Other Firms: 13

Areas of Expertise

Environmental assessments

Habitat assessments

Stream hydrology and assessment

Stream and habitat restoration

Stream crossing design and maintenance

Environmental study design

Affiliations

American Fisheries Society

Publications

"Restoration of Marion Creek at the Trans-Alaska Pipeline near Coldfoot, Alaska," 11th Cold Regions Conference Anchorage, Alaska. 2011

"Allison Creek Dam Removal and Stream Restoration Near Valdez, Alaska," ASCE Conference. 2004

"Conversion of McCallum Creek from a braided channel to a single channel morphology," ASCE Engineering and Restoration Conference, Reno, Nevada. 2001

Mr. Mac Shoulders has 35 years of technical and project management experience, and is a subject matter expert in fish and stream restoration. He has extensive regulatory and environmental expertise in compliance with requirements for comprehensive environmental baseline studies, integration of environmental factors into project engineering and alternative analysis, and presentation of information to meet the requirements of the National Environmental Policy Act (NEPA). Recent projects include the Fish Protection Plan for the Chuitna Coal Mine to mitigate impacts to 22 miles of anadromous fish streams. He is currently the fisheries and restoration lead for the Midas Gold Stibnite Mine EIS.

Mac's projects include the annual inspection, assessment and maintenance for 600 anadromous and resident fish stream crossings for 10 years on the Trans-Alaska Pipeline (TAPS). He successfully implemented the concept of Natural Channel Design to establish standardized assessment and maintenance practices from Prudhoe Bay to Valdez to ensure fish passage. He was also the project lead for the design, permitting and construction of over 2.5 miles of stream restorations in 14 different locations along TAPS for locations with legacy impacts to stream morphology causing chronic pipeline integrity concerns and resultant loss of aquatic habitat. Mac also managed an interdisciplinary team for retrofitting construction-era legacy culverts and low-water crossings to current fish passage standards for TAPS Right-of-Way Renewal and EIS.

Why Chosen for This Project

- Extensive Alaskan stream restoration experience drawn from Chuitna Coal and the Trans Alaska Pipeline
- Fish lead for Stibnite Gold (teaming with Derek Risso) to address controversial stream restoration issues

Project Experience

US Forest Service, Stibnite Gold Project EIS,

Idaho. Fisheries lead. Leading the fisheries impact analysis for an environmental impact statement (EIS) for an open pit gold mine in central Idaho. This is a complex fisheries project involving numerous stakeholders including the Nez Perce Tribe. Coordinating with cooperating agencies regarding data adequacy, impact analysis, population analysis, surface water impacts, restoration design and alternatives development.

PacRim Coal, Chuitna Coal Mine Supplemental EIS, Alaska.

Project Manager/technical lead. Project manager and technical lead for developing fisheries mitigation and habitat restoration for the proposed Chuitna Coal Mine near Beluga, Alaska. Responsible for quantitative fisheries and habitat assessments and mitigation of approximately 5 miles of anadromous fish streams. Served as technical lead for habitat mitigation design and agency interaction with the Alaska Department of Fish and Game.

MacNamara “Mac” Charles Shoulders, *continued*

Alyeska Pipeline (Trans Alaska Pipeline System, or TAPS), Alaska. Project Manager for pipeline right-of-way program and rivers and floodplains program. Responsible for the annual inspection, assessment and maintenance for 600 anadromous and resident fish stream crossings for 10 years. Successfully introduced the concept of Natural Channel Design to establish standardized assessment and maintenance practices from Prudhoe Bay to Valdez to ensure fish passage. Managed an interdisciplinary team for retrofitting construction era legacy culverts and low-water crossings to current fish passage standards for TAPS Right-of-Way Renewal and EIS. Project team lead for the design, permitting and construction of over 2.5 miles of stream restorations in 14 different locations along TAPS (annual budget \$2 million) for locations with legacy impacts to stream morphology causing chronic pipeline integrity concerns and resultant loss of aquatic habitat.

Alyeska Pipeline Service Company, Various Permits and Reviews, Alaska. Subject matter expert. Consulted on technical design, negotiated permit conditions, and prepared narratives on approximately 100 major river and floodplain projects. Permits and reviews included: Alaska Department of Fish and Game Title 16 Fish Habitat, Alaska Department of Natural Resources Lands, US Bureau of Land Management (BLM) lands, US Army Corps of Engineers Sections 401 and 404 Permits/Certifications, and Alaska Coastal Zone Program reviews.

Alyeska Pipeline Service Company, Alaska. Incident Command System (ICS) environmental unit leader / fish and wildlife. Coordinated response to issues regarding fish and wildlife protection along the TAPS/Valdez Marine Terminal and Prince William Sound. Member of the Immediate Response Team for emergencies along the 800-mile TAPS for 20 years. The team utilized

the ICS to respond to oil spills, floods, earthquakes, forest fires, and other man-made and natural disasters. Response training included Incident Command/ National Incident Command System, operations facility response, control actions, emergency maintenance and repairs, highway tanker spills, emergency rescue, swift water rescue, helicopter slinging and operations, airboat operator certification, jet boat operator certification, and wildlife collection and stabilization. Participated on over 50 responses including a 500-year flood and an earthquake measuring 8.0 on the Richter Scale.

Alaska Liquefied Natural Gas (AKLNG) Pipeline Project, Alaska. Physical and biological technical studies manager. Responsible for design and implementation of physical/biological field studies for the AKLNG Project. Managed field implementation of study plans, sampling protocol, permit compliance and reporting quality assurance and safety. Serve as subject matter expert for resource reporting and waterbody crossing evaluations.

AKLNG Treatment Plant Winter Test Trenching and Mine Site Investigations, Prudhoe Bay, Alaska. Project lead. Project lead responsible for all aspects of implementing the 2015 winter test trench program and mine site investigations near West Dock. This project was to test the feasibility of dredging barge channels during the winter for AKLNG Gas Treatment Plant Sea Lift and a geotechnical investigation for a mine site and water reservoir. Responsible for development of all project documents including scope of work, safety plan, regulatory compliance manual, quality assurance plan, emergency response plan, implementation plan and simultaneous operations plan with BP Seismic. Coordinated and implemented the construction of offshore ice roads and pads, ground-fast and floating ice trenching activities, bathymetric profiling and geotechnical mine site investigations.

US Army Corps of Engineers (USACE), Mustang Oil Field Development, Anchorage, Alaska. Project manager. Responsible for environmental impact assessments and permitting for the Mustang Oil Field Development. The projects consisted of construction of a road, production pad, gravel mine site and oil transfer pad. USACE was lead agency on the projects and responsible for drafting a project Environmental Assessment (EA). ERM's Environmental Reports were drafted to mirror an Environmental Assessment and were delivered to USACE for use in drafting the EA.

ConocoPhillips, Contaminants in Subsistence Foods Study, North Slope, Alaska. Deputy project manager. Responsible for technical support and project administration for the ConocoPhillips Contaminants in Subsistence Foods Study as per the required operating procedure A-11 of the BLM Final Activity Plan for the National Petroleum Reserve-Alaska on the North Slope. Responsible for study plan strategies and development, project management and technical support.

US Coast Guard, Alaska Federal/State Preparedness Plan, Alaska. Project manager for developing a programmatic Biological Assessment of the Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases for the US Coast Guard and the US Environmental Protection Agency in response to potential litigation.



Michael S. Kelly, RPA

Cultural & Archaeological Resources, NHPA Section 106 Procedural Requirements (Senior On-Call Expert)

Education

MA, Anthropology and Historical Archaeology, University of Nevada, Las Vegas, 1986

BA, Anthropology, University of California, Santa Barbara, 1978

Years of Experience

With AECOM: 33

With Other Firms: 4

Registrations

Registered Professional Archaeologist

Affiliations

Society for American Archaeology

Society for Historical Archaeology

Mr. Michael Kelly, principal archaeologist, manages AECOM's cultural resources program in the Pacific Northwest region and directs archaeological studies throughout the western United States. Michael has over 38 years of experience in cultural resource management and has been responsible for directing numerous archaeological investigations throughout Alaska and the Pacific Northwest, the Great Basin, California, and the Pacific region. He served as the cultural resources technical lead for environmental impact analysis and Section 106 Compliance support for the Donlin Mine Project in Southcentral Alaska. Michael managed support of cultural resources investigations for the Alaska LNG Project, an 800-mile corridor connecting Alaska's North Slope with a proposed LNG facility in Southcentral Alaska – a role he provided for the earlier Alaska Pipeline Project corridor studies.

Additional recent or ongoing studies include archaeological inventory of approximately 20 miles of proposed railroad corridor for extension of the Alaska Railroad from Fairbanks to Fort Wainwright, and supervision of inventory and recordation of World War II and Cold War era properties on Adak Island, Alaska. Michael has also served as principal archaeologist for inventory and subsurface survey of the proposed the Huna Tribal House Project, Glacier Bay National Park and Preserve, Alaska; conducted inventory and subsurface survey for a Federal Emergency Management Agency (FEMA) investigation on the Kenai Peninsula; directed large-scale archaeological inventory and evaluation

Why Chosen for This Project

- Lead archaeologist for many NEPA projects including the Donlin Gold EIS and Izembek EIS
- Leading Section 106 process for the Donlin Gold EIS

efforts for US Forest Service projects on Kosciusko and Chichagof islands; and directed archaeological inventory for the mainland corridor of the Juneau Access Improvement Project for the Alaska Department of Transportation and Public Facilities (ADOTPF).

Project Experience

US Army Corp of Engineers (USACE), Donlin Mine Project, Alaska. Cultural resource task lead. Preparation of an environmental impact statement (EIS) of a 6,500-acre mine site, 315 miles of pipeline corridor, and 100 miles of access road in south-central Alaska. Currently leading the Section 106 compliance effort for this project, in conjunction with the USACE, Bureau of Land Management (BLM), State Historic Preservation Office (SHPO), and Donlin Gold, including facilitating efforts to complete the Programmatic Agreement.

Exxon-Mobil Corporation, Alaska LNG Project, Alaska. Cultural resource task lead. Cultural resources inventory of a proposed 800-mile natural gas pipeline extending from Prudhoe Bay to Southcentral Alaska.

Exxon-Mobil Corporation, Alaska Pipeline Project, Alaska. Cultural resource task lead. EIS and cultural resources inventory of a proposed 840-mile natural gas pipeline extending from Prudhoe Bay to the Alaska-Yukon Territory border.

Michael S. Kelly, RPA, *continued*

RIM Architects, Huna Tribal House Project, Glacier Bay National Park and Preserve, Gustavus, Alaska. Principal archaeologist. Archaeological inventory and subsurface survey of a proposed Tlingit tribal house near Bartlett Cove in Glacier Bay National Park, Alaska. Prepared for Glacier Bay National Park, under contract to RIM Architects.

US Navy, Adak Island OU B-2 Cultural Resources Survey, Adak Naval Complex, Adak Island, Alaska. Principal archaeologist. Archaeological and historic resources inventory of selected remediation areas within the Adak Island National Historic Landmark. Prepared for Naval Facilities Engineering Command Northwest, Silverdale, Washington.

USDI Minerals Management Service, Arctic Seismic EIS, Beaufort and Chukchi Seas, Alaska. Principal archaeologist. Prepared technical sections of an EIS addressing off-shore impacts from seismic exploration of the coast of northern and northwestern Alaska.

FEMA, Kasilof Road Relocation Project, Kenai Borough, Alaska. Principal archaeologist. Archaeological inventory and subsurface survey of a proposed road realignment, Kenai Peninsula, Alaska.

US Coast Guard, Quillayute River Project, Clallam County, Washington. Principal archaeologist. Archaeological inventory and tribal consultation for a US Coast Guard facility expansion along the coast of northern Washington.

US Forest Service, Kosciusko Island Project, Tongass National Forest, Alaska. Principal investigator. Archaeological inventory and site evaluation along high sensitivity coastal areas and documentation of prehistoric sea cave occupation sites on Kosciusko Island, southeast Alaska.

US Coast Guard (USCG), Air Station Port Angeles, Clallam County, Washington. Principal investigator. Archaeological surface and subsurface survey, USCG Group/Air Station Port Angeles, Ediz Hook, Washington.

US Forest Service, Eight Fathom Timber Sale EIS, Chichagof Island, Alaska. Task leader. Archaeological research design, inventory, resource documentation, and site evaluations for USDA Forest Service, Tongass National Forest.

US Forest Service, Ushk Bay EIS, Chichagof Island, Alaska. Task manager. Archaeological sensitivity analysis, inventory, resource documentation, and site evaluations, under contract to USDA Forest Service, Tongass National Forest.

Alaska Natural Gas Development Agency, Alaska Natural Gas Pipeline, Alaska. Principal archaeologist. Environmental impact analysis of a proposed 200-mile pipeline from Fairbanks to Anchorage.

Alaska Railroad Corporation, Eielson Branch Realignment Project, Fairbanks, Alaska. Principal archaeologist. Archaeological inventory of approximately 20 miles of proposed railroad corridor

for extension of the Alaska Railroad from Fairbanks to Fort Wainwright.

Juneau Access Road Improvement Project, Southeast Alaska. Senior archaeologist. Cultural resource inventory and subsurface survey of a 72-mile corridor from Juneau to Skagway for Alaska Department of Transportation.

Teck American Incorporated, Upper Columbia River Remedial Investigation/Feasibility Study (RI/FS) Sediment Sampling, Stevens County, Washington. Principal archaeologist. Providing archaeological services to assist Teck American Inc. with RI/FS for the US Environmental Protection Agency. Assisting with archaeological survey, tribal and agency coordination, and monitoring for various beach and in-water sampling locations between Grand Coulee Dam and the Canadian border, including within the National Park Service Lake Roosevelt National Recreation Area.

Portland General Electric (PGE), Cascade Crossing Transmission Line Project, Morrow, Gilliam, Sherman, Wasco, Clackamas, and Sherman Counties, Oregon. Principal investigator. Archaeological inventory and evaluation of approximately 220 miles of proposed and alternative transmission line corridor, north-central Oregon.



Jeff Walker, PWS

Vegetation and Wetlands

Education

BS, Botany and Environmental Studies, University of Washington, 1995

Wetland Science and Management Certification, University of Washington, 2000

Years of Experience

With AECOM: 17

With Other Firms: 4

Registrations

Professional Wetland Scientist, #1485, 2005

Affiliations

Society of Wetland Scientists

Society for Ecology Restoration

Areas of Expertise

Permitting

Botany

Wetland Science

Threatened & Endangered Species

NEPA, SEPA, and ESA Compliance

Wetland Restoration Design and Construction

Mr. Jeff Walker has 21 years of experience as a botanist and over 17 years as a wetland scientist, including numerous projects in Alaska. He has directed vascular and nonvascular plant surveys, performed monitoring of rare plant populations, and conducted noxious weed surveys. He has conducted wetland delineations and reconnaissance investigations throughout the Pacific Northwest and successfully acquired wetland and environmental permits and approvals for numerous large and small projects.

Jeff has designed, inspected, and monitored several wetland mitigation projects. He has experience writing National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) environmental impact statement (EIS) documents. He has conducted Endangered Species Act (ESA) consultations for large projects regarding federal- and state-listed threatened and endangered species. Jeff develops wetland reports, biological assessments, impact assessments, compensatory wetland mitigation plans, monitoring reports, conservation assessments, and vegetation restoration plans.

Why Chosen for This Project

- Subject matter expert in vegetation and wetlands
- Vegetation specialist for Izembek National Wildlife Refuge Land Exchange EIS and numerous projects across Alaska
- Wetland delineation task lead for Adak resource surveys

Project Experience

US Navy, Adak Former Naval Complex Biological and Cultural Resource Surveys, Adak, Alaska.

Wetland task lead for 600-acre wetland delineation and supporting report. The project involves the ongoing removal of munitions and explosives of concern at Operable Unit (OU) B 2 at the former Adak Naval Complex. These studies were conducted to meet the substantial permit requirements under CERCLA (Comprehensive Environmental Response, Compensation and Liability Act of 1980). Field work included wetland delineations and threatened and endangered species surveys for Aleutian shield fern (*Polystichum aleuticum*). Found three Alaska state sensitive species (*Antennaria dioica*, *Listera convallarioides*, and *Sieversia pentapetala*) during surveys. Completed wetland delineation report and contributed to the wildlife habitats report. In addition, drafted agency notification letters on behalf of the Navy.

Jeff Walker, PWS, *continued*

Alaska Department of Transportation, Juneau Access Improvements Project, Alaska. Task leader and principal investigator for special status plant surveys along proposed transportation corridor through the Tongass National Forest. Survey sites were remote and required travel via helicopter and navigation with Global Positioning System (GPS). Completed a Biological Evaluation for US Forest Service Sensitive Species with potential to occur along the alternative alignments. Also produced Vegetation Technical Memorandum detailing the methodology and results of the botanical survey including discussion of noxious weeds and other special status plants.

US Fish and Wildlife Service, Izembek National Wildlife Refuge Land Exchange EIS, Alaska.

Wrote vegetation specialist report and EIS sections analyzing the proposed exchange of land within an existing national wildlife refuge (NWR) for several parcels of undeveloped land on and near the Alaska Peninsula. The exchange land within the NWR would be used for a road to connect a native community with a nearby airport. The vegetation specialist report included a discussion of vegetation communities and land cover types, rare plants, and weeds on all exchange parcels.

Shell Puget Sound Refinery, Crude by Rail – East Gate, Anacortes, Washington. Project manager and task lead for crude oil unloading facility on refinery property. Multidiscipline project included wetland delineation, mitigation, cultural resource investigation, endangered species act consultation, environmental permitting, 404(b)(1) alternatives analysis, and agency negotiation. Tasks have also included providing expert witness testimony during Skagit County permit hearings. The mitigation package for the project included design of a 73-acre estuary restoration in Padilla Bay. Mitigation design considerations included sea level rise, subsidence, protection of adjacent infrastructure, and encouragement of salt marsh formation.

Alaska Department of Transportation, Access Improvements, Ketchikan, Alaska. Conducted a wetland delineation in a remote area on Revillagigedo Island in southeast Alaska. Field work involved working from helicopters, traversing challenging terrain, and mapping wetlands with GPS.

Exxon Mobil Corporation and TransCanada Corporation, Alaska Pipeline Project, Alaska. Conducted analysis of vegetation along a proposed 800-mile-long natural gas pipeline route. Work included writing survey protocols, leading the survey crew, and writing the subsequent report with the survey findings. The field work included collecting data on vegetation cover types, rare plants, and invasive species, and merchantable timber. The project included work in remote areas.

Oregon Resources Corporation, Heavy Mineral Sands Project, Coos Bay, Oregon. Conducted wetland delineations and ordinary high water mark (OHWM) identification in several areas proposed for mining heavy minerals from sand deposits. Work included navigation in second-growth forests, clearcuts, and dense gorse (non-native shrub) stands. Task lead for rare plant surveys which focused on the western lily (*Lilium occidentale*). Completed a botanical survey summary report which was used as part of the ESA consultation documentation.

Washington State Department of Ecology, Buckhorn Mine EIS, Okanogan County, Washington. Prepared wetland and vegetation EIS technical sections for proposed mine. Vegetation technical report included discussions of rare plants, noxious weeds, forest resources, and plants of cultural importance. Responded to comments on the vegetation EIS section. Also performed fieldwork and research to identify impacts from the project to wetlands.



Sasha Forland

Vegetation & Wetlands; QA/QC; 404(b)(1) Analysis

Education

BS, Biology, University of Alaska, Anchorage, 1997

Years of Experience

With AECOM: 8

With Other Firms: 9

Areas of Expertise

Project Management

NEPA documents: Environmental Impact Statements, Environmental Assessments, Categorical Exclusions

Environmental Permitting

Environmental Compliance

Biological Field Studies

Wetland Delineations

CWA Section 404(b)(1) Analysis

Technical Writing

QA/QC

Trainings/Certifications

Certified Inspector of Sediment and Erosion Control (CISEC)

Alaska-Certified Erosion & Sediment Control Lead (CESCL)

Wetland Delineation Training (Richard Chinn Environmental Training, Inc.)

Cooperative Wetland Training Course (Hydrogeomorphic Approach)

National Highway Institute Functional Assessment of Wetlands Training

USACE Training on the Regional Supplement to the 1987 Wetland Delineation Manual, 2006 and 2007

Ms. Sasha Forland is a senior scientist with 17 years of experience in environmental permitting and compliance. She has worked as both an owner and consultant in the environmental and regulatory field covering a wide range of development projects throughout the State of Alaska. She specializes in research, coordination, and preparation of environmental permit applications and National Environmental Policy Act (NEPA) documents. Sasha has experience in federal regulatory and compliance processes, such as US Army Corps of Engineers (USACE) Section 404 Clean Water Act (CWA) wetlands dredge and fill, and Section 10 Rivers and Harbors Act (RHA) navigable waters permitting; Section 7 Endangered Species Act consultation; Magnuson-Stevens Fishery Conservation and Management Act consultation and Essential Fish Habitat assessments. She is also experienced with various state permitting processes, such as Alaska Department of Natural Resources (ADNR) land use permits, Alaska Department of Fish and Game (ADF&G) fish habitat permits, ADNR temporary water use authorizations, and the Alaska Department of Environmental Conservation (ADEC) Alaska Pollutant Discharge Elimination System (APDES) program. Sasha has exceptional attention to detail which has proved valuable for technical quality reviews and technical editing of NEPA documents.

Why Chosen for This Project

- Considerable USACE permitting and NEPA experience on Point Thomson Project
- Assisting in the Donlin Gold EIS with agency comments and playing a lead role in developing the mitigation chapter

Project Experience

USACE, Donlin Mine Project Environmental Impact Statement (EIS), Alaska. Task lead – mitigation, monitoring, and adaptive management; quality assurance / quality controls (QA/QC) lead; senior technical review. Part of the core team developing the Final EIS. Responsibilities include comment analysis associated with mitigation, monitoring, and adaptive management measures; contribution to the mitigation section of the EIS; technical reviews (biological resources), and QA/QC lead for development of the Final EIS.

ExxonMobil Production Company, Point Thomson Development Project Permitting Support, Alaska.

Task manager. Task lead providing permitting and compliance support to ExxonMobil for development of the Point Thomson Initial Production System project. Managed a team of subject matter experts involved in the preparation of numerous state, federal, and local permit applications (e.g., CWA Section 404 and RHA Section 10 Department of the Army permit; ADNR material sales contract, land use and temporary water use permits; ADF&G fish habitat permits; Biological Assessments for Endangered Species Act Section 7 consultation). Worked side-by-side with the client's Environmental and Regulatory analysts from the pre-development permitting stage, throughout construction, and into operations of the facility. Managed a database developed by AECOM that was used as a management tool to track project permits from submittal to issuance and to ensure that permits were received on time for each project milestone. Also managed a team responsible for

Sasha Forland, *continued*

reviewing applicable oil and gas laws and regulations, as well as all permits issued for the project, to extract conditions/stipulations for incorporation into a robust compliance tracking database. Continues to provide project management services and regulatory support to advance permitting for future Point Thomson work.

Alaska Railroad Corporation (ARRC) Capital Projects, Alaska. Environmental permits analyst. As a former employee of the ARRC, one of two personnel responsible for permitting and NEPA for all railroad construction and maintenance projects. Prepared Environmental Assessments (EAs) and Categorical Exclusions (CATEXs) for ARRC projects funded by federal agencies, such as the Federal Railroad Administration (FRA) and Federal Transit Administration (FTA). She assisted project managers with review of third-party EISs prepared for ARRC's larger rail expansion projects, including the Port MacKenzie Rail Extension EIS with the Surface Transportation Board as the lead federal agency. Also assisted with environmental management and compliance associated with railroad operations. Responsibilities included wetland delineations, environmental permitting such as CWA Section 404 permitting and 404(b)(1) analyses, NEPA and Section 106 documentation, preparation of Stormwater Pollution Prevention Plans (SWPPPs), environmental oversight and inspections, and participation in the railroad's Incident Command System. (Prior to joining AECOM.)

Entrix Inc., Alpine Satellites Development Project EIS, North Slope, Alaska. Project scientist/task leader. Assisted with preparation of the terrestrial and aquatic environment sections of an EIS for the Alpine Satellites Development Project. The project involved a proposed expansion of ConocoPhillips Alaska Inc.'s Alpine oilfield in the Colville River Delta. Coordinating Agency: Bureau of Land Management.

Aurora Gas and Fairweather E&P Services, Inc., West Side Cook Inlet Wetlands Surveys, Tyonek,

Alaska. Project scientist/task leader. Project lead for conducting wetland delineations and preparing wetland delineation reports for several proposed natural gas exploration and development projects on the west side of Cook Inlet near Tyonek. Wetlands surveys evaluated potential wetlands impacts associated with proposed new exploration pads and pad extensions, pipelines, and access roads. Reports were prepared to assist the client with obtaining jurisdictional determinations and permits under Section 404 of the Clean Water Act.

PDC Consulting Engineers and Alaska Department of Transportation and Public Facilities, Aleknagik, Ekwok, and Manokotak Airport Improvements, Bristol Bay Region, Alaska. Project scientist/task leader. Primary author for the natural environment and hazardous materials tasks for EAs evaluating impacts from planned improvements at airports in Aleknagik, Ekwok, and Manokotak, in accordance with Federal Aviation Administration requirements.

Marathon Oil Company, Beaver Creek Pipeline Environmental Services, Kenai, Alaska. Project scientist/task leader. Prepared an EA for a proposed eight-mile-long pipeline connecting a natural gas pipeline in the Kenai National Wildlife Refuge near the Beaver Creek Oil and Gas Unit, to the Kenai-Ninilchik Pipeline in Kenai. The EA evaluated potential impacts of the project on wildlife and habitat, wetlands, and other land uses in the area and discussed state and federal coordination, permits, and clearances required to construct the project.

ConocoPhillips Alaska, Cosmo Environmental Planning and Permitting, Anchor Point, Alaska. Project scientist/task leader. Assisted in conducting a biological survey of the proposed Cosmo oil and gas development site near Anchor Point on the Kenai Peninsula. Responsibilities included surveying the project area for vegetation communities, wetlands, and avian and mammalian activity; reviewing available literature and other sources of information

for biological concerns in the area; and preparing a biological report for the project area.

Unocal, Swanson River Satellites Natural Gas Development Project Preliminary EIS, Kenai National Wildlife Refuge, Alaska. Project scientist/task leader. Assisted in field investigations in the Kenai National Wildlife Refuge to assess wildlife species and habitat types and delineate wetlands in the project area. Field investigations included vegetation surveys, wetland delineations, and small mammal sampling. The data collected from the surveys were used for the preparation of an EIS for the proposed exploration and development of three natural gas satellites from the Swanson River Oil Field.

Alaska Department of Transportation and Public Facilities, Copper River Highway Milepost 0 to 10 Bicycle/Pedestrian Path, Cordova, Alaska. Project scientist/task leader. Led field investigations and prepared biological reports for a proposed pedestrian/bicycle path in Cordova. The path extends along the Copper River Highway into the Chugach National Forest. Conducted wetlands analysis and sensitive vegetation assessment in accordance with U.S. Forest Service protocols, bald eagle survey, survey for nesting waterfowl, and Phase I Preliminary Site Assessment.

BP Exploration (Alaska) Inc., USACE, Beaufort Sea Oil and Gas Development/Northstar EIS, Alaska. Assistant scientist/biologist. Assisted with preparation of the final EIS. Responsible for literature review and research, writing responses to public comments, and managing the compilation of the administrative record at the completion of the project. Project involved effects of development on marine and terrestrial habitats, marine mammals, fish, and other biological resources and socioeconomic impacts, including subsistence.



Thomas A. Damiana

Air Quality

Education

MS, Aerospace Engineering, Texas A&M University

BS, Aerospace Engineering, Texas A&M University

Graduate Studies, Atmospheric Science, University of Wyoming

Years of Experience

With AECOM: 10

With Other Firms: 9

Areas of Expertise

Air Emissions Measurement & Characterization

Air Emissions Inventory Development (Stationary/Transportable)

Offshore Air Emissions Inventory Development (Stationary/Transportable)

Air Monitoring at Remediation Site Perimeters

Air Pollution Control Engineering

Air Quality Compliance Design, Implementation & Management

Atmospheric Dispersion Modeling

Environmental Impact Assessment & Statements

New Source Review (NSR) Regulatory Consulting

Affiliations

Air & Waste Management Association

American Meteorological Society

Mr. Tom Damiana is a project manager and senior air quality engineer with 19 years of experience as an air quality consulting professional. Tom has a strong background in air quality measurements, modeling, construction permitting and the regulations driving these activities. For the last 15 years, he has executed and managed projects for a wide range of projects and clients including metallic and non-metallic minerals processing, oil and gas processing, upstream oil and gas, gas compression and transmission, power generation, hydrogen reforming, and diesel hydrodesulphurization. He has conducted Prevention of Significant Deterioration (PSD) and state Best Available Control Technology analysis for power generation turbines and process heaters. Tom has extensive experience with dispersion models to support ambient air quality impact assessments and risk evaluation. He has specific modeling skills with most US Environmental Protection Agency (USEPA) Appendix W preferred and alternative models (AERMOD, CALPUFF, AERSCREEN, and OCD) as well as many specialty models for dense gas, near wake and pipeline rupture dispersion modeling. Tom's extensive experience includes conducting air quality permitting activities involving new sources, source modifications and facility de-bottlenecking.

Tom has provided a wide range of air quality consulting services under the jurisdiction of the Bureau of Ocean Energy Management (BOEM); Federal Outer Continental Shelf (OCS) program administered by USEPA Region 10, Federal Prevention of Deterioration (PSD) program administered by Alaska, Colorado, and Arizona; state and local major and minor source programs

Why Chosen for This Project

- Strong background in atmospheric science and dispersion modeling, PSD and BACT analyses
- Senior technical specialist for several EISs, analyses, and monitoring for power plants and process heaters, permit applications, and air quality monitoring in Alaska

in Alaska, Wyoming, Colorado, Utah, and Nevada; Title V permitting and compliance activities; and both applicant-side and third-party NEPA support at the direction of the Federal Energy Regulatory Commission (FERC), the US Fish and Wildlife Service (USFWS), the Bureau of Land Management (BLM), and the US Army Corps of Engineers (USACE).

Through his years of interacting with regulatory authorities, Tom has become known as a respected technical authority by the State of Alaska, USEPA Region 10, and the BLM National Operations Center. Though he has worked with a wide cross section of industries ranging from power generation to industrial gas production, his focus has been the onshore and offshore upstream petroleum sector in Alaska.

Project Experience

ConocoPhillips Company/British Petroleum (BP)/Exxonmobil/Transcanada, Alaska LNG Project Pre-FEED, Alaska. BP, ConocoPhillips, ExxonMobil, and TransCanada are working together to progress an Alaska LNG project. The project consisted of a natural gas treatment plant on the Alaskan North Slope designed to remove gas impurities, an 800+ mile 42-inch pipeline and eight (30kHP) compressor stations designed to move approximately 3.5 billion cubic feet of gas per day. The pipeline was proposed to terminate in Southcentral Alaska with an LNG Plant, storage facility, and marine offloading facility capable of producing a maximum of 6.3 million tons per annum. The marine offloading facility is a two berth operation designed to handle 15-20 LNG carriers per month. Subject matter expert on the

Thomas A. Damiana, *continued*

air quality team supporting the project engineering teams for the LNG facility and terminal, the Gas Treatment Plant and the Pipeline. Provided technical support, directed extensive near-field and long-range dispersion modeling for over a dozen configurations and locations, conducted preliminary emissions estimates, identified potential air permitting critical pathways and mitigation strategies, and helped to develop long-range permitting strategies including recommendations related to air quality and meteorological monitoring. This support provided recommendations ahead of project pre-FEED. Once the project moved to FEED, support shifted to providing all the air quality assessments necessary to support development of Resource No. 9 of the FERC application.

ConocoPhillips Alaska, Inc. (CPAI), Greater Mooses Tooth #1 Development Project, Supplemental Environmental Impact Statement (SEIS), National Petroleum Reserve, Alaska. Air quality technical specialist. The proposed project included the first oil and gas development within the National Petroleum Reserve Alaska. The development project includes full field oil development from satellite pads under both roadless (aircraft only) and roaded alternatives and pipeline transport and a central gathering and production facility for oil, gas, and water separation/handling. The project included accounting for emissions and impacts from wellsite construction, developmental drilling, production, and well maintenance. Responsibilities included air quality modeling; air emission inventory development; and review and preparation of existing climate, and air quality narratives. This work was conducted under the direction of ConocoPhillips Alaska, Inc. who was asked to provide specific studies for use by the BLM who was the lead agency. Work conducted centered around the development of comprehensive near-field (AERMOD) and far-field (CALPUFF) ambient air quality impact analyses for five alternatives and five scenarios covering construction through full field development.

CPAI, Greater Mooses Tooth #2 Development Project, SEIS, National Petroleum Reserve, Alaska. Air quality technical specialist providing applicant side support for the preparation of an SEIS. The development project included full field oil development from satellite pads under both roadless (aircraft only) and roaded alternatives and pipeline transport and a central gathering and production facility for oil, gas, and water separation/handling. The SEIS was developed by a BLM subcontractor; therefore, support of this project focused on shadowing the BLM contractor, reviewing their deliverables on behalf of the applicant and assisting the applicant with project strategy. This included developing emissions and impacts from wellsite construction, developmental drilling, production, and well maintenance. Responsibilities included air quality modeling; air emission inventory development; and review and preparation of existing climate, and air quality narratives. Work conducted centered around the development of comprehensive near-field (AERMOD) and far-field (CALPUFF) ambient air quality impact analyses for 5 alternatives and 5 scenarios covering construction through full field development.

USFWS, Yukon Flats Land Exchange EIS, Alaska. Air quality and climate change technical specialist for the preparation of a third-party EIS. The proposed project included land exchange and acquisitions within the Yukon Flats National Wildlife Refuge, and subsequent hypothetical full field oil development and production. Responsibilities included air quality modeling; preparation of existing climate, air quality, and climate change sections; and responding to public comments.

CPAI, Alpine and Western North Slope Native Community Engagement Support, North Slope, Alaska. Provided support and participated in various stakeholder engagement meetings with local communities and a regional native health consortium. Meetings were focused on environmental and cultural impacts to local communities from existing and proposed large scale oil development in the Colville River Delta and the National Petroleum Reserve in Alaska. Support included preparation of presentation materials and participation in meetings as a subject matter expert to answer technical questions related to air quality monitoring, regional ambient air quality and data interpretation.

CPAI, Chukchi Sea Exploratory Drilling Program, Chukchi Sea, Alaska. Air quality permit application for an exploratory drilling program conducted more than 50 miles offshore on the Outer Continental Shelf. Because of the project location, air quality permitting was initially governed by 40 CFR Part 55 rules and the permitting authority was USEPA Region 10. Several Part 71 applications were developed and submitted to satisfy Part 55 requirements. As permits were being issued, Clean Air Act revisions shifted the project to the jurisdiction of the BOEM. Several Exploration Plans were developed and submitted to BOEM; however, in the end CPAI shelved these applications. The emissions inventory included a jack-up drill rig, and a large complement of support vessels (i.e., icebreakers, supply ships, and oil spill response vessels), which were included according to Part 55 rules. Provided project management and was involved in writing the ambient air quality impact analysis, developing the emissions inventory, and conducting OCD, AERMOD and ISC-PRIME dispersion modeling of NO₂, SO₂, CO, PM₁₀, and PM_{2.5} emissions.



James "Jim" W. Aldrich, PE, PH (*Arctic Hydrologic Consultants*) Surface and Ground Water Hydrology (Senior On-Call Expert)

Why Chosen for This Project

- Lead surface water hydrologist on Donlin Gold EIS
- Hydrologist on Umiat and Foothills West Road EISs
- Extensive water resources engineering experience in Alaska related to mines, roads, pipelines, drainage, and erosion control structures

Education

MS, Environmental Science, University of Alaska, 1979

BS, Forest Watershed Management, Utah State University, 1973

Years of Experience

39

Registrations

Professional Engineer: Alaska, CE6902

Professional Hydrologist, American Institute of Hydrology, # 284

Awards

Supervised the design and construction of an 8,300-foot flood-control dike that was subsequently selected by the National Society of Professional Engineers as one of nine Outstanding Engineering Achievements constructed in the US during 1990.

Publications

Aldrich, J.W. 1983. Soil Erosion on Subarctic Forest Slopes. *Journal of Soil and Water Conservation* 38(2): 115-118.

Mr. James Aldrich has 39 years of hydrologic and hydraulic engineering experience in the planning, permitting, design, and construction of pipeline, road, airport, railroad, utility and mine projects in Alaska. He has provided hydrologic and hydraulic engineering assessments and designs for the construction of highway and railroad bridges and culverts; oil and gas pipelines; gravel, surface coal and gold mines, riverbank-erosion-control; in-stream material sites; flood-control structures; water supply projects; surface and ground water quality assessments; and environmental impact assessments and statements. With regard to mining he has provided expertise to both public and private sector clients, including Alaska Department of Natural Resources (DNR) Division of Mining, Land, and Water (DMLW), Alaska Department of Fish and Game, Alaska Office of the Governor, US Army Corps of Engineers (USACE), Bureau of Land Management (BLM), and the US Department of Justice (DOJ), Usibelli Coal Mine, and ARCO Alaska.

With regard to environmental impact statements (EISs) and environmental assessments (EAs), Jim has been a hydrology and river engineering subject matter expert for the Donlin Gold EIS, the Nanushuk EIS, and the Foothills West Road EIS. For both the Donlin and Nanushuk EISs, he assisted with the preparation of the affected environment, environmental consequences, mitigation, and cumulative effects sections, including the effects of climate change. On the Foothills West EIS, he assisted with the data gap analysis prior to the

request for the EIS being withdrawn by the Alaska Department of Transportation. With regard to EAs, Jim prepared the affected environment, environmental consequences, mitigations, and cumulative effects sections of an environmental document for the ExxonMobil Point Thomson Pipeline Project. He also provided similar information for the environmental document prepared for the original Alpine Development. He has assisted with the hydrologic and water resources data collection effort associated with the Alaska Gas Pipeline project Federal Energy Regulatory Commission (FERC) application.

Jim has reviewed mining applications for the DNR DMLW, specifically reviewing those sections related to surface and ground water drainage and spillway design, conformance with state and federal regulations, and surface and groundwater quantity and quality impact predictions. He has also designed erosion and water quality control measures for mines, including drainage channels, sediment ponds, spillways, and erosion control measures capable of meeting state and federal performance stipulations. Jim's pipeline experience includes river engineering and drainage design, design review, and/or river crossing and drainage construction supervision on the Trans Alaska Pipeline, the Badami Pipeline, the Alpine Pipeline, and the Meltwater Pipeline, among others. He has conducted several long-term lake water supply assessments using a combination of statistical and physical modeling techniques.

James “Jim” W. Aldrich, PE, PH (*Arctic Hydrologic Consultants*), continued

Project Experience

AECOM/USACE, Donlin Gold Mine EIS, Western Alaska. Lead surface water subject matter expert. Led the preparation of the affected environment, environmental consequences, mitigation, and cumulative effects sections of the EIS, including an independent evaluation of the impact of flow reduction on Crooked Creek, and the impact of barge prop wash on bed and bank stability of the Kuskokwim River.

DOWL/USACE, Nanushuk EIS, North Slope, Alaska. Lead surface water subject matter expert. Led the preparation of the affected environment, environmental consequences, and mitigation sections of the Draft EIS, including independent assessments of the timing of flood-peak flows and the impact of ice-affected conditions on the water surface elevations to be used for design of the facilities.

AECOM/USACE, Foothills West Road EIS, North Slope, Alaska. Lead surface water subject matter expert. Evaluated hydrologic issues associated with alternative road alignments associated the proposed Foothills West Road EIS.

ExxonMobil, Point Thomson Pipeline, North Slope, Alaska. Hydrologic/river engineer. Prepared the affected environment, environmental consequences, mitigation, and cumulative effects sections of an environmental document that was provided by ExxonMobil for submission to the EIS team.

State of Alaska, Division of Mining, Proposed Diamond Chuitna Coal Mine Hydrologic Assessment, Cook Inlet, Alaska. Project Manager-hydrologic/hydraulic engineer. Performed a technical review of the proposed drainage and sedimentation designs. Tasks included the evaluation of: diversion channel stability, spillway design, predicted effluent water quality from settling ponds, and the magnitude of the design discharge.

Usibelli Coal Mine, Inc., Gold Run Pass Mine, Healy, Alaska. Project Manager-hydrologic/hydraulic engineer. Developed drainage and sediment control plans for the Gold Run Pass Mine. Project included: collection of site specific information; sizing settling ponds and designing a flocculent system that would provide an effluent that would meet both state and federal water quality regulations; designing the principal and emergency spillways; and preparing design criteria for the diversion ditches and site restoration.

ARCO Alaska, Inc., Alpine Development, North Slope, Alaska. Lead river engineer. Collected field data and developed hydrologic and hydraulic designs for a new oil field facility on the Colville River Delta (CRD) and a 35-mile pipeline between Kuparuk and the CRD. Tasks included: 1) eight years of hydrologic data collection; 2) development of flood-peak discharge-frequency relations; 3) development of a 2-D surface water model to estimate design flood elevations and velocities; 4) development of one-dimensional water surface profile models for 6 pipeline river crossings along the 35-mile long pipeline; 5) development of riverbed scour and bank-migration estimates at pipeline river crossings; 6) preparation of the water resources sections of an environmental assessment; and 7) development of a water balance model to estimate the ability of local lakes to meet anticipated water demands over the life of the project.

State of Alaska, Division of Mining, Proposed Wishbone Hill Mine Hydrologic Assessment, Palmer, Alaska. Project Manager-hydrologic engineer. Performed a technical review of the methods used and the predicted impacts of coal mining on the surface and ground waters.

State of Alaska, Division of Mining, Poker Flats Mine Drainage Channel, Settling Pond and Spillway Design Review, Healy, Alaska. Project Manager-hydrologic/hydraulic engineer. Provided technical evaluation of the drainage and sediment control designs proposed for the Poker Flats Mine. Reviewed diversion channel and spillway designs, sediment yield estimates, sediment storage volumes estimates, flood frequency and magnitude estimates, and assessed the likely effluent water quality.

ARCO Alaska, Inc., Mine Site Rehabilitation Plan Development, North Slope, Alaska. Project Manager/chief hydrologist. Prepared mine site rehabilitation plans for five gravel-mining sites on the North Slope of Alaska. The purpose of the plans was to increase the usefulness of the sites for fish and wildlife production. The plans contained: a brief history of the mine site; a site description; a rehabilitation plan describing the manner in which the site would be re-graded to provide fish over-wintering areas, littoral zones, and waterfowl nesting islands; a revegetation plan for upland areas; a rehabilitation schedule; and a rehabilitation monitoring plan.

US Department of Justice, Methods and Costs Associated with Reducing the Sediment Load from the Rybachek Mine, Fairbanks, Alaska. Project Manager/chief hydrologist. Identified sediment control practices that could be used to reduce the sediment load from the mine, and estimated the costs of implementing the practices.



Dean Anderson, (*NightOwl Discovery*) Comment Management

Why Chosen for This Project

- Expert in the application and customization of *Relativity* software, AECOM's selected comment management system

Education

University of Minnesota College of Biological Sciences

Years of Experience

With NightOwl Discovery: 16

With Other Firms: 4

Software Expertise

kCura Relativity
kCura Relativity Analytics
kCura Relativity Assisted Review
kCura Relativity ECA
kCura Relativity Legal Hold
kCura Relativity Processing
Autonomy Introspect
Brainspace Discovery
Clearwell Legal Hold/
Processing/Review
EnCase eDiscovery
Equivio Zoom
Index Engines Octane
Intelligent Voice
Ipro Allegro/eCapture
Lexis Nexis LAW/Early Data
Analyzer/DiscoveryIQ
Microsoft O365 eDiscovery
Microsoft SQL Server
NexLP Story Engine
Nuix eDiscovery
Nuix Director
Nuix Web Review & Analytics

Dean Anderson has been with NightOwl Discovery in various roles since 2002 and has been involved in Litigation Support since 1998. Dean currently leads NightOwl's discovery service operations. Dean is an eDiscovery expert and technologist with many years of experience overseeing large scale electronic discovery operations and databases. Dean evaluates emerging technology platforms and designs and develops processes and quality assurances around them. Dean leads NightOwl's Lean Excellence program and strives for a company-wide culture of continuous improvement and an intense customer focus across all divisions.

Project Experience

- Has directed eDiscovery operations on hundreds of petabytes of data
- Managed operation of many large (500 million+ record) databases
- Designed and developed MissionControl™ (2015 kCura Innovation Award Finalist)
- Member of EDRM Search project
- Extensive analytic, data culling and filtering exercises
- Member of EDRM Search project
- Relativity Certified Administrator
- Relativity Certified Review Specialist
- Nuix Certified eDiscovery Specialist
- Veritas eDiscovery Certified Sales Expert
- Veritas eDiscovery Certified Sales Expert +
- Lean Six Sigma Green Belt

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Taylor Brelsford

Senior Advisor/Reviewer for Subsistence

Why Chosen for This Project

- Pre-eminent expert in subsistence management and Traditional Ecological Knowledge
- Extensive experience with subsistence issues in Alaska

Education

MA, Anthropology, McGill University, 1983

BA, Anthropology, University of Alaska Anchorage, 1977

Years of Experience

With AECOM: 12

With Other Firms: 26

Areas of Expertise

Subsistence Management

Subsistence Research

NEPA and Social Impact Assessment

Traditional Ecological Knowledge

Tribal Consultation

Public Involvement

Affiliations

Society for Applied Anthropology

Mr. Taylor Brelsford is an Environmental Anthropologist with 38 years of professional and academic experience in subsistence management, NEPA analysis, Traditional Ecological Knowledge, and public involvement. Taylor has served as project manager for challenging environmental impact statement (EIS) projects with important subsistence issues for the US Army Corps of Engineers (USACE), National Marine Fisheries Service (NMFS), and US Fish and Wildlife Service (USFWS), in addition to several assignments focused on improving understanding of the role of subsistence and Traditional Knowledge in energy sector environmental reviews and decisions.

He has extensive academic and applied experience in understanding modern subsistence practices and development decisions. In the last decade, Taylor has worked on a number of environmental impact statement (EIS) projects with high-profile and controversial subsistence issues. Most recently, he led the large, multi-disciplinary contract team assisting the USACE on the Donlin Gold Project EIS, up through the release of the Draft EIS. For a team advising Mitsubishi Corporation about its early investment in the Pebble Project, he analyzed issues in subsistence and Indigenous affairs. For the 14 years prior, Mr. Brelsford served with the Federal Subsistence Management Program at the USFWS and Bureau of Land Management (BLM). He helped to design a subsistence fisheries research program and served senior advisor on subsistence technical and regulatory matters to the BLM State Director in his role as voting member of the Federal Subsistence

Board. On a special assignment to the Joint Pipeline Office, Taylor helped to successfully resolve concerns over the subsistence impact analysis in the EIS for the Trans Alaska Pipeline System (TAPS) Right-of-Way Renewal. Taylor also lived and worked in western Alaska during the early years of his career, teaching for the University of Alaska-Fairbanks Bristol Bay Campus in Dillingham, and directing a tribal resource program for the Kuskokwim Native Association in Aniak.

Project Experience

USACE, Donlin Gold EIS, Alaska. Project Manager. Through the release of the Draft EIS, led a large contract team preparing the EIS examining the proposed large-scale Donlin Gold mine project in southwestern Alaska. Key environmental issues include barge transportation impacts, subsistence, fisheries impacts, mercury abatement, impacts to water quality, and socioeconomic effects in the region. With 66 affected tribes across Western Alaska and 8 cooperating agencies, this EIS faced a challenging stakeholder landscape and complex inter-agency relations.

NMFS, Updated Bowhead Whale Subsistence Harvest EIS, Alaska. Project Manager. Successfully concluded the sociocultural and cumulative effects analysis in an updated EIS prepared by NMFS to implement International Whaling Commission action authorizing traditional whaling by 11 Alaska Native communities. Key issues included subsistence practices, co-management with the Alaska Eskimo Whaling Commission, climate change, and the increasing pace of oil and gas exploration in the Beaufort and Chukchi seas.

Taylor Brelsford, *continued*

Pioneer Natural Resources Alaska, Inc., Subsistence Research Coordination Workshop, Nuiqsut, Alaska. Senior staff. Provided technical and logistic support to organize, facilitate and report results of this subsistence-focused workshop. Jointly sponsored by Pioneer and the North Slope Borough, this workshop brought together 50 scientists, managers, and local residents to hear of research results, identify improvements to working relationships, and develop future research priorities for subsistence issues in Alaska.

BLM, Alaska State Office, Federal Subsistence Management Issues, Alaska. Anthropologist/ subsistence coordinator. Primary advisor to the BLM State Director on federal subsistence management matters. Coordinated implementation of the federal priority within the BLM field offices, developed agency policies and agency positions on federal subsistence regulations. Coordinated BLM subsistence impacts analyses, as required by Section 810 of ANILCA. On special assignment, worked with Argonne National Laboratories to finalize sections on subsistence uses and impacts for the EIS on the Trans-Alaska Pipeline System right-of-way renewal. (Prior to AECOM.)

USFWS, Fisheries Information Services Division, Alaska. Acting lead social scientist. Designed and initiated social science research in a new subsistence fisheries management program; involved five federal agencies, Alaska Department of Fish and Game, and local, regional and statewide Alaska Native tribal organizations and their fisheries groups. Led technical reviews and development of recommendations resulting in Federal Board selection of subsistence fisheries harvest surveys and traditional ecological knowledge studies worth approximately \$4.7 million in the first three years. (Prior to AECOM.)

College of Rural Alaska, Rural Development Department, Alaska. College instructor. For the Bristol Bay Campus in Dillingham, designed and offered university instruction using a seminar discussion format and distance delivery technologies. This included 14 different introductory and advanced courses on subsistence policy, land claims, resource conservation and Alaska Native political action. Provided public and university service to promote application of academic knowledge through technical assistance to a range of local, regional, and state-wide agencies, primarily on issues of subsistence policy. (Prior to AECOM.)

Kuskokwim Native Association, Alaska. Tribal project administrator, realty officer and natural resource program director. For a regional tribal association based in Aniak, Alaska, initiated a Native Allotment program under contract to the Bureau of Indian Affairs, providing realty services to Native allotment holders in 12 small villages. Also implemented a program of information, education, and advocacy to protect traditional and contemporary subsistence uses of member villages. Monitored policy and regulatory developments with frequent reports to villages. Represented the region in the deliberations leading to the Alaska Department of Natural Resources' Kuskokwim Area Plan. (Prior to AECOM.)

Mitsubishi Corporation International, Base Metals Unit, Due Diligence and Risk Assessment, Acacia Project, Australia. Community relations and socioeconomics analyst. Prepared analyses of Indigenous affairs (Aboriginal Community Engagement), subsistence harvest patterns, socioeconomic trends, and cultural heritage resources.

USFWS, TERRA SW Broadband Telecommunications Environmental Assessment (EA) Project, Alaska. Project Manager for this third-party independent EA concerning telecommunications infrastructure in southwest Alaska on the Togiak National Wildlife Refuge, BLM-administered lands, and the Lake Clark National Park and Preserve.



Courtney Brozovsky, GISP

Technical Support – GIS/CAD

Education

BS, Environmental Science, Alaska Pacific University, 2010

Years of Experience

With AECOM: 4

With Other Firms: 3

Certification

Certified Geographic Information Systems Professional (GISP)

Affiliations

Alaska Arc User Group, President, 08/2016 – Present

Ms. Courtney Brozovsky is a seasoned expert with seven years of professional experience using geographic information systems (GIS), and is a certified GIS professional (GISP). She is a lifelong Alaskan resident, and her experiences are tailored to the state's unique ecological and land management issues. Her exemplary work wins praise from clients; the majority of her clients are developing environmental impact statements (EISs) for different sectors, of which three are mining projects.

Courtney is skilled in data management, metadata and documentation, adherence to project standards and guidelines, multi-user editing, ArcGIS Server, ArcGIS Online, equipment maintenance, and GPS field data collection. She uses the State of Alaska's Land Administration System to research land records, as well as the Bureau of Land Management's (BLM's) Spatial Data Management System. She also uses specialized graphics software Adobe Photoshop and Illustrator and can create and manipulate graphics. Courtney is currently the president of the Alaska Arc User Group, a local professional association, and her duties include active involvement in the GIS community and inviting GIS users to speak at monthly meetings.

Why Chosen for This Project

- Expert GIS professional
- Significant project experience on large, complex projects for federal and industry clients
- Lead for Point Thomson GIS work

Project Experience

US Forest Service, Midas Gold, Inc, Stibnite Gold EIS, Idaho. Produces maps for summary reports and the EIS from requests originating from subject matter experts. Strategically shares workload with lead GIS specialist and other project members. Reviews draft figures for quality assurance and quality control using an internal AECOM figure review checklist. Performs aquatic ecology geospatial analyses using project provided LiDAR data and derived products to determine feasible locations for fisheries habitat mitigation and potential aquatic resource impacts.

BLM National Operations Center, Bering Sea-Western Interior Resource Management Plan (RMP)/EIS, Alaska. Serves as consultant GIS lead and communicates closely with BLM GIS staff to follow Department of Interior (DOI) data procedures for a complex land management RMP/EIS. Performs work within the BLM secured network and Citrix Farm which includes figure generation for internal decision-making, EIS figures, and supporting spatial analyses across RMP alternatives. Developed a GIS strategy document before performing GIS work to clearly define expectations and use of BLM technology and practicable standards, including data schema, structure, and Federal Geographic Data Committee (FGDC) metadata standards.

Courtney Brozovsky, GISP, *continued*

BLM National Operations Center, Bering Sea-Western Interior Visual Resource Inventory Assistance, Anchorage, Alaska. Assembled input geospatial data for visual scenic quality, visual scenic sensitivity, and visual distance zone analyses within a 62.5-million-acre planning area. Collaborated with a visual resource subject matter expert to refine the data model inputs and refine the analyses and geospatial calculations using BLM methodology, which will support the resulting RMP/EIS. The final visual resource inventory was compiled using the final outputs for scenic quality, sensitivity, and distance zones. Produced maps and acreage calculations for the summary report.

USACE, Donlin Gold, LLC, Donlin Gold EIS, Crooked Creek, Alaska. Functioned as a part of an efficient GIS team to produce hundreds of complex technical figures adhering to strict formatting guidelines for a critical EIS. Enforced organizing the inventory of figures, documents, and data sources using a Microsoft Access database. Performed spatial analyses by calculating project component proximity to known locations of resources that could experience potential impacts.

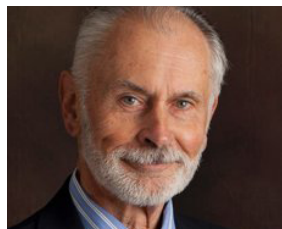
USACE, PacRim Coal, LP, Chitna Coal, Supplemental EIS, Tyonek, Alaska. Drafted hundreds of EIS figures on a controversial and highly visible Alaskan coal project. Produced figure templates for quick figure creation for a limited budget, converted source AutoCAD project component data into GIS for spatial resource analyses across alternatives, and automated spatial analyses for subject matter experts using ArcGIS Model Builder. Spatial analyses included acreage calculations for land status, vegetation and wetlands, local subsistence areas, as well proximity calculations of sensitive cultural locations to the project alternatives.

Confidential Client, Anchorage, Alaska. Develops maps for the project description, environmental report, preliminary jurisdictional determination, as well as other required permitting documents. Receives project data from client to incorporate into a unified project geodatabase to adhere to client GIS global practices. Delegates assignments to staff members of proper expertise to execute tasks and meet deadlines.

Confidential Client, Anchorage, Alaska. Provides as-needed GIS support for operation and permitting activities directly for the client. Prepares maps, calculations, and other requirements as needed for annual emergency response drills. GIS tasks are performed or delegated as necessary to appropriate technical staff.

The Usand Group, A2A Project Engagement, Winnipeg, Manitoba. Enhanced maps and figures for federal Section 508 compliance. Maps with provided native files were modified to have clearer colors, text, and symbols for increased visibility for those who may have limited vision. Provided text for Alt text descriptions to comply with Section 508, which describe the purpose of figures to those unable to view them by traditional means. Graphics derived from other sources were modified to the best practicable extent using either Adobe Illustrator or Photoshop to enhance the images.

Confidential Client, Anchorage, Alaska. Participated in field preparation activities such as loading GPS units for field use and producing field maps for environmental studies. Retrieved data from field visits, performed post-processing of GPS data, and performed quality analysis and quality control checks. Created a system to simplify data editing and transmittal to the client in an SDE environment, and administered the environment for multiple simultaneous editors. In addition, facilitated a noise study analysis desktop study and paleontology desktop study, as well as produced figures and managed data for several different disciplines, including environmental due diligence. Modeled avoidance criteria for wetlands data to quickly assess approximately 30,000 polygons.



Joseph M. "Jack" Colonell, PE, PhD

Burried Terrestrial and Marine Pipelines

Education

PhD, Civil Engineering, Stanford University, 1966

MS, Civil Engineering, Washington State University, 1962

Fulbright Scholar, Coastal Engineering, Delft Technical University, Delft, Netherlands, 1960-61

BS, Civil Engineering, University of Colorado, Boulder, 1958

Years of Experience

With AECOM: 24

With Other Firms: 14

Academia and Research: 13

Registrations

Professional Engineer (Civil), Alaska, #4395

Professional Engineer (Civil), Washington, #9294

Diplomate, Coastal & Ocean Engineering, ASCE Academy of Coastal, Ocean, Port & Navigation Engineers

Affiliations

American Society of Civil Engineers (ASCE), Fellow, Life Member

American Society for Engineering Education

The Oceanography Society

Dr. Jack Colonell, PE, has served for more than four decades as principal engineer and/or subject matter expert for coastal, ocean, and port engineering aspects of resource development and infrastructure projects in Alaska, Hawaii, Lower-48 states, and several locations abroad. Jack is qualified to provide guidance on *Burried Terrestrial and Marine Pipelines* by virtue of his experience with several iterations of the Alaska natural gas pipeline project and his design and direction of environmental baseline studies for marine and terrestrial pipelines in Alaska, Gulf of Mexico, Caspian and South China Seas. He is similarly well-suited to support *Port Development and Operation*, for which he brings first-hand knowledge of Cook Inlet's extreme tides, strong tidal currents, and very active seabed, due to his direction of oceanographic and hydrodynamic analyses of effects of the proposed Knik Arm Crossing at Anchorage and his familiarity with coastal and ocean processes elsewhere in Cook Inlet.

Prior to entering full-time consulting, Jack was Professor of Civil & Ocean Engineering at the University of Massachusetts Amherst, and of Marine Science at the University of Alaska Fairbanks.

Why Chosen for This Project

- Senior engineer and subject matter expert with extensive, relevant experience in Alaska
- First-hand knowledge of Cook Inlet characteristics

Project Experience

BP Exploration Alaska (BPXA), North Slope Crude Oil Pipelines Integrity Management, Alaska. Senior consultant. BPXA operates nine common carrier pipelines in the North Slope oilfields. In response to an order from Department of Transportation, BPXA was preparing environmental and operational risk assessments for all nine pipelines. Provided analyses of environmental risks due to potential spills of crude oil and natural gas liquids, and also directed the consultant that was preparing hydrologic analyses of oil spill fate and transport.

Alaska North Slope Gas Producers, Alaska Gas Pipeline Feasibility, Multiple States. Led team of 60 engineers and scientists, supported by 20 subcontractors in five states, in performing environmental and engineering feasibility studies along the US segments (approx. 1,900 miles) of two route alternatives for a 54-inch, high-pressure gas pipeline from Prudhoe Bay to Chicago. After assembling environmental and regulatory information, the team assembled 11 environmental resource reports for each route, as required for the pipeline license application to be submitted to the Federal Energy Regulatory Commission.

Confidential Clients, Engineering Alternatives and Environmental Risks for Offshore Pipelines in Arctic Environments, Alaska. For this Joint Industry Study, supported by four Alaska North Slope producers, served as Project Manager and lead coastal/ocean engineer to evaluate shore-approach and shore-crossing alternatives for five sites along the Beaufort and Chukchi Sea coasts.

Joseph M. “Jack” Colonell, PE, PhD, *continued*

Shell Philippines Exploration, Malampaya Natural Gas Pipeline EIS, Philippines. A 600-kilometer pipeline (60 percent subsea, 40 percent buried terrestrial) would transport gas from South China Sea to Luzon Island. Directed teams of Philippine scientists as they conducted environmental studies and developed assessments of potential effects of pipeline construction and operation on physical, biological, and human environments.

Azerbaijan International Operating Company, Caspian Sea Environmental Baseline Study, Azerbaijan. Supervised teams of Azeri and expatriate scientists to design and conduct extensive baseline studies in the Azerbaijan sector of the Caspian Sea, which produced an environmental information database unprecedented, both in size and quality for any location in the Caspian Sea. The database included oceanographic and geological information for the entire 600-square-kilometer Azeri-Chirag-Gunashli project area and also the 100-km subsea pipeline route to Sangachal terminal site near Baku, capital of Azerbaijan. The database provided the basis for Environmental Impact Assessment of the project in the newly independent former Soviet republic.

Denali Commission, Climate Change-Related Coastal Issues, Alaska. Subject matter expert on coastal erosion and flooding related to climate change. Provided susceptibility analyses of several Alaska coastal communities to increased erosion and/or flooding due to oceanographic events associated with reduced Arctic sea ice cover and increased storm frequency and intensity.

ExxonMobil Development Company (EMDC), Alaska Pipeline Project, Alaska. Provided strategic consultation for logistical planning and environmental permitting of proposed port development at Prudhoe Bay, which would require extensive dredging through shallow and environmentally sensitive Beaufort Sea.

Knik Arm Bridge and Toll Authority, Knik Arm Crossing (KAC) EIS, Alaska. Supervised oceanographic studies and hydrodynamic modeling to evaluate potential effects of the proposed bridge and its approaches on the Knik Arm marine environment. Also evaluated effects of KAC project on sedimentation in the Port of Anchorage.

Chevron EMC, Coastal Erosion Remediation and Risk Assessment, Alaska. Provided expert guidance on several coastal engineering issues associated with remediation of Chevron's former refinery site in Nikiski. These included forensic analysis of severe erosion events, evaluation of claims by commercial fishermen that existing seawall has reduced access to the beach, and long-term adequacy of current erosion protection measures.

Alaska Clean Seas (ACS), Beaufort Sea Marine Access Evaluation, Alaska. ACS, the North Slope oilspill response organization, operates from several temporary facilities on Beaufort Sea coast. To support ACS's need for permanent docks and operational facilities, performed (with colleagues) an area-wide North Slope screening study to identify marine access sites and evaluated each on operational design criteria and environmental issues.

Cominco, Red Dog Mine, Arctic Port & Ore Loading Facility, Alaska. Designed and conducted coastal process investigations in support of the Chukchi Sea port site for the Red Dog Mine in northwest Alaska. Objectives of the studies included evaluation of the potential impact of port facilities on archaeological and culturally important sites on the Chukchi Sea coast.

TengizChevroil, North Caspian Marine Terminal Planning, Kazakhstan. Provided consultation on environmental risks and engineering feasibility of several alternatives for transporting very large oilfield production modules to a coastal location on the north Caspian Sea. Evaluated dredging, causeway construction, and combinations thereof, with due consideration to potential environmental impacts of each alternative.

AECOM (as legacy URS Corporation) for Panama Canal Authority (PCA), Panama Canal Expansion Environmental, Social and Health Impact Assessment (ESHIA), Panama. On behalf of PCA, provided technical review of the ESHIA to verify that content and quality would meet requirements of the Equator Principles to ensure project eligibility for funding by worldwide financial organizations.

Confidential Client, LNG Terminal Feasibility Studies, Gulf of Mexico. Subject matter expert for physical oceanography, coastal engineering, seawater intake/outfall design, and environmental risk assessment for four potential LNG receiving terminals from Mobile, Alabama, to Corpus Christi, Texas.

Federal Aviation Administration, San Francisco Airport Expansion EIS, California. Several alternatives were proposed for expansion of San Francisco Airport, most involving extension of existing runways into San Francisco Bay. Provided senior technical review and quality control for EIS on oceanography, hydrodynamic modeling, sediment transport and effects on maritime operations within the Bay.



Peter S. Crews, PE (Infrastructure) Transportation

Education

BS, Civil Engineering, University of Alaska Anchorage, 2000

Years of Experience

With AECOM: 17

With Other Firms: 0

Registrations

Professional Civil Engineer, Alaska, #10938

Areas of Expertise

Arctic Engineering

Highway Design

NEPA Projects

Planning Studies

Civil Site Design

Permitting

Drainage

Training/Certifications

AECOM Certified Project Manager

Mr. Peter Crews has 17 years of civil engineering experience working for public and commercial clients throughout the State of Alaska. He has worked on a wide range of projects, including NEPA projects, planning studies, and feasibility studies, as well as design and construction, all with a focus on transportation. His work includes port facilities, underground utilities, street and highway design, site development, drainage design, and flood control. Peter's experience includes evaluating road concepts and embankments. He assisted with road and port alternatives for the Donlin Gold EIS and also provided NEPA engineering support for the Izembek EIS.

Project Experience

US Army Corps of Engineers (USACE), Donlin Gold Environmental Impact Statement (EIS), Alaska.

Transportation engineer. Supported this large-scale EIS examining the proposed Donlin Gold mine project in southwestern Alaska that included transportation infrastructure to support 200 barge supply trips per year on the Kuskokwim River. Focused on Alternative feasibility analysis of transportation options, which included barge transportation alternatives, roads, ports, and airports.

US Fish and Wildlife Service (USFWS), Izembek Refuge EIS, Cold Bay, Alaska.

Transportation engineer. The project required analysis of several alternatives as part of an EIS for the USFWS. Project included preliminary design of two 20-mile gravel road alternatives, fish passage culverts, construction cost estimates, and material site locations. Design

Why Chosen for This Project

- Extensive Alaska transportation engineering experience
- Experience evaluating road concepts and embankments
- Worked on road and port alternatives for the Donlin Gold EIS
- Provided NEPA engineering support for the Izembek EIS

concerns included minimizing the road footprint, grades, impacts to wetlands, and snow drifting. Provided road engineering, construction cost estimates, maintenance cost estimates, and authored portions of the EIS.

CanAm Canyon Creek Coal Lease Transportation System Options Regulatory and Cost

Considerations Analysis, Alaska. Transportation engineer. Civil engineer for the transportation analysis and cost analysis portion of the feasibility study. Developed alternatives for rail, road, and ports, and completed cost estimates. Duties included analysis of terrain, wetlands, and land use issues, development of construction costs, and report writing.

National Park Service, Serpentine Hot Springs Transportation Access Study, Alaska.

Design engineer. For the Bering Land Bridge National Preserve, supported a feasibility study and costs estimates for potential improvements in access to Serpentine Hot Springs on the Seward Peninsula near Nome. The study considered road and airport design over permafrost soils, remote construction, and gravel material sites.

National Park Service, Herman Leirer Road Multimodal Trail, Seward, Alaska.

Transportation engineer. Provided pre-design engineering support for concept planning of a multi-modal trail. The project entailed assembling base maps, attending public meetings, and providing technical recommendations for the concept design.

Peter S. Crews, PE, *continued*

Golovin Native Corporation, Golovin Quarry Project, Alaska.

Transportation engineer. Responsible for developing two ten-mile-long road alternatives and cost estimates for a feasibility study. Duties included filed reconnaissance, preliminary road design, design report, and cost estimates.

Alaska Department of Transportation and Public Facilities (ADOT&PF), Eagle River Road, Milepost 5.3 to 12.6, Eagle River, Alaska. Project Manager and civil design engineer. As a consultant for ADOT&PF, managed a multi-disciplinary design team to deliver the project on time and within budget. Design responsibilities included a Design Study Report, alignment design, earthworks calculations, mass balance of soil materials, grading design, drainage design, culvert design, cost estimating, specification writing, and right of way determination.

ADOT&PF, Eagle River Loop Road, Eagle River, Alaska. Project Manager and design engineer. Project consultant for ADOT&PF. Assisted in the design of Eagle River Loop Road Rehabilitation. Duties included retaining wall design, intersection grading design, sidewalks, pedestrian Americans with Disabilities Act (ADA) compliant curb ramps, and construction support.

ADOT&PF, South Channel Bridge, Unalaska, Alaska. Design/civil engineer. Performed design of roadway along the coast on each end of the proposed \$21 million South Channel bridge replacement. Design included utility relocations, signing and striping.

Kipnuk Engineering Study, Alaska. Project Manager and design engineer. The feasibility study was funded by a grant from the State of Alaska. The goal of the study was to determine the most suitable combination of solutions to mitigate riverbank erosion, flooding, and ground settlement. Project tasks included field reconnaissance and bathymetric survey, hydrology and hydraulic analysis, erosion analysis, flood analysis, and ground settlement analysis. Concept designs for erosion protection included sheetpile walls, rip rap revetment, and articulating concrete block matting. Challenges included cost estimating for remote locations and scour depths up to 60 feet.

Valdez Lowe River Dike Renovation, Alaska.

Project Manager and design engineer for design of a new levee section and improvements to the existing dikes for the protection of Alpine Woods Subdivision in Valdez, Alaska. Task included hydrology and hydraulic analysis, earthworks, riprap design, cost estimating, drawings, and specifications and support for Federal Emergency Management Agency certification of the levees.

ADOT&PF, Wasilla-Fishhook Road Rehabilitation, Wasilla, Alaska.

Lead design/civil engineer. A \$6 million ADOT&PF project to straighten and widen three miles of road and provide a separated pathway. Responsibilities included a Design Study Report, alignment design, earthworks and soil mass balance calculations, grading design, hydrology calculations, storm drain design, detention basin design, culvert design, cross section determination, utility conflict resolution, cost estimating, and right-of-way determination.

Chugach Powder Guides, Girdwood Heliport Road, Girdwood, Alaska.

Design engineer. Preliminary design of an access road extending from an existing Alaska Department of Transportation airport road north through airport property to a potential site for a future heliport building. The roadway design considered mass balance of soil materials, and minimizing/avoidance of wetland areas.

USACE, FTW306 Railhead Facility, Ft. Wainwright, Alaska.

Project Manager and design engineer. Design/build project for the USACE to construct a functional railhead for Stryker vehicle deployment. The project entailed mass excavation of permafrost soils and replacement with non-frost-susceptible (NFS) gravels. Duties included project management, earthwork volume calculations, and site and drainage design.

USACE, School Age Services Center, Fort Wainwright, Alaska.

Design engineer for a design/build project for the USACE to construct a 21,000-square-foot \$15 million child care facility. The project entailed mass excavation of permafrost soils and replacement with NFS gravels. Project included water and sewer design, site and drainage design, assisting with Section 404 Wetland Permit issues, and development of construction drawings and specifications.



Nancy Darigo, PG, CEG

Seismicity, Spill Risk & Tailing Storage Facility (TSF) Failure Analyses

Why Chosen for This Project

- Pre-eminent subject matter expert in geohazards, seismicity, and dam failure spill risk
- 20 years of Alaska NEPA experience on mining, pipeline, gas plant, roads, ports, bridge, forestry, and intertie projects
- Physical sciences lead on Donlin Gold EIS

Education

MS, Geology, University of Southern California, 1984

BS, Geology, Summa Cum Laude, Duke University, 1979

Years of Experience

With AECOM: 30

With Other Firms: 5

Registrations /Certifications

Professional Geologist, Alaska, #423

Certified Professional Geologist, AIPG, #9690

Certified Engineering Geologist, California, #1872

Professional Geologist, California, #4402

AECOM Certified Project Manager

Areas of Expertise

Engineering geology

Seismic assessment/geohazards

Hydrogeology

Environmental analysis/site assessment

Contaminated sites

Remote field investigations

Affiliations

American Institute of Professional Geologists

Association of Environmental & Engineering Geologists

Alaska Mining Association

Training

Learn-to-Return Survival Training: Aviation/Helicopter Land Egress, Bear Awareness & Defense, Firearm Safety

Surface Mine Hazard Certificate

North Slope- Unescorted and H2S

HAZWOPER OSHA Training

Ms. Nancy Darigo is a principal geologist with more than 30 years of experience in engineering geology, seismic/geohazard assessment, and environmental impact analysis. As a 20-year resident of Alaska, she has gained broad experience on a variety of mining, pipeline, and marine projects throughout the state. Nancy currently serves as physical sciences lead on the Donlin Gold environmental impact statement (EIS), a role which has included technical input on seismic/geotechnical and dam failure issues, principal author of geohazards and seismic impacts analysis, participant in a preliminary Failure Modes Effects Analysis (FMEA) workshop for assessing dam failure scenarios, and development of memoranda regarding a screening approach for partial tailings dam release in the environmental impact statement (EIS) and Mount Polley comparative dam design and regulations.

Nancy completed a surface fault crossing investigation of the eastern Castle Mountain fault for the proposed Alaska Natural Gas Development Authority (ANGDA) Beluga-to-Fairbanks (B2F) pipeline, and served as principal author of geohazard sections of the B2F EIS. She has served as senior technical reviewer or principal author of seismic and geohazard issues on a number of other EISs in Alaska, including the Knik Arm Bridge EIS, Bureau of Indian Affairs (BIA) Cordova Dock EIS, Bureau of Land Management (BLM) Ring of Fire Planning Area EIS, and Chugach Electric Southern Intertie EIS.

She is very familiar with the seismic setting and surface fault rupture potential on the Alaska

Peninsula and Cook Inlet region through a number of LNG plant siting studies, and due diligence review of seismic conditions and tailings dam modeling at the Pebble Mine Project for potential Mitsubishi investment. She served as subject matter expert on seismic and geologic hazards issues for Alaska Pipeline Project Federal Energy Regulatory Commission (FERC) permitting, and provided technical input on liquefaction hazards for Trans-Alaska Pipeline System (TAPS) recertification.

Project Experience

US Army Corps of Engineers (USACE), Donlin Gold EIS (including Kuskokwim River Barging and Natural Gas Pipeline), Alaska. Physical sciences lead responsible for managing multiple subject matter experts and completion of several EIS chapters, including geotechnical/seismic and spills/dam failure issues. Completed technical reviews of physical baseline and impacts sections; principal author of geohazards/seismicity impacts and physical environment mitigation; physical sciences representative at village public meetings; addressed multiple rounds of agency/public comments; and participant in Failure Modes Effects Analysis (FMEA) workshop for assessing dam failure scenarios. Developed and reviewed technical memoranda on options for dam failure approach in EIS; Mount Polley comparative regulations and dam design; screening approach for partial dam failure assessment in EIS; and pipeline routing through Alaska Range.

Nancy Darigo, PG, CEG, *continued*

Alaska Natural Gas Development Authority (ANGDA), Fault Zone Crossing Evaluation/Engineering Design and EIS, Beluga to North Pole, Alaska. Principal geologist/project manager for surface fault investigation of eastern Castle Mountain-Caribou fault zone; and principal author of geology, soils, and geohazard/seismic chapters for Beluga-to-Fairbanks (B2F) Natural Gas Pipeline EIS. Fault study included literature search, detailed aerial photo review, helicopter-based field reconnaissance, soil sampling, and GIS mapping of multiple fault splay crossings; interface with pipeline design engineer for conceptual design; recommendations for further fault investigation; and principal author of report. Evaluated geohazard/seismic conditions and impacts for EIS, including landslides, permafrost, fault rupture, ground shaking, and liquefaction issues.

Knik Arm Bridge and Toll Authority (KABATA) and HDR, Inc., Knik Arm Crossing EIS and Geotechnical/Seismic Technical Reports, Alaska. Task manager/principal author of geology, soils, and seismic hazards sections for EIS, including evaluation of slope stability issues near Port of Anchorage; direct/indirect and cumulative impacts; interfacing with contractors on geotechnical and seismic issues; and technical reviewer/secondary author of geotechnical and seismic technical report appendices to EIS.

Mitsubishi Corporation, Third-Party Due Diligence/Permitting Review, Pebble Mine Project, Alaska. Senior geologist and physical resources technical lead responsible for review and summary of existing seismic and hydrologic conditions, surface and groundwater chemistry, water balance and seismic modeling of proposed tailings impoundments, and input for multi-disciplinary risk evaluation of potential client investment. [This project was discussed in AECOM's Statement of Qualifications, 02 Conflict of Interest, under AECOM.]

BHP Billiton, Western Arctic Coal Project Baseline Environmental Studies, Alaska. Physical sciences manager/principal geologist for two-year baseline studies associated with potential coalfield development project. Responsible for oversight of physical resources tasks; design and implementation of mapping program for surface geology, permafrost, and slope stability hazards, including literature review, hazard criteria development, reconnaissance field program design, and aerial photograph/satellite imagery mapping; and design of lake and coal sampling programs for water stratification and acid rock drainage (ARD) studies for underwater coal disposal.

ExxonMobil, Alaska Pipeline Project (APP) Environmental, Regulatory, and Support Services (ERSS), Alaska North Slope to Canada. Principal geologist/subject matter expert advisor on fault crossings, permafrost settlement, stream crossing erosion, dredging, and water supply issues, and related regulatory workshops and presentations. Conducted permit compliance audits and engineering/environmental interface for fault trench field studies in eastern Alaska. Lead for final FERC Resource Report 6 for geological resources and seismic hazards. Co-author of elevated vs. buried pipeline NEPA environmental effects analysis report.

D.J. Nyman & Associates, Preliminary Seismic Hazard Assessment, North Slope to Valdez, Alaska. Senior geologist responsible for data compilation and assistance with technical interpretation of liquefaction hazards for proposed Alaska natural gas pipeline and Trans-Alaska Pipeline System (TAPS) recertification.

BIA, Cordova Oil Spill Response Facility EIS, Cordova, Alaska. Principal geologist responsible for review of seismic hazards and liquefaction issues for alternatives conceptual design; and impacts analysis for geologic hazards and marine sedimentation, including ground shaking, liquefaction, tsunamis, avalanches, debris flows, and rockfall; and response to agency/public commentary.

ConocoPhillips, Geotechnical/Seismic Suitability Reviews for Site Screening Evaluations, Multiple LNG Terminal Sites, South-central Alaska. Principal geologist responsible for conducting reviews of available site characteristics for siting of LNG terminals at 8 coastal locations, including evaluation of foundation conditions, peat extent, and geohazards (earthquakes, slope stability, tsunamis/marine sediment slumping, and flooding).

Metropolitan Water District and Los Angeles Department of Water and Power Dams, Seismic Hazard and Slope Stability Studies, Inyo and Los Angeles Counties, California. Senior geologist responsible for geohazard studies at filtration plant, control center, and two dams. Projects involved aerial photo analysis, geologic mapping, interpretation of structural/fault deformation features, geotechnical borehole interpretation, and regulations review.

Alaska North Slope (ANS) Gas Sponsor Group c/o ARCO Alaska; and Exxon Company USA and BP Exploration (Alaska), Seismic/Geologic/Geotechnical Assessments of Proposed LNG Plant Sites, Cook Inlet and Port Valdez, Alaska. Senior geologist responsible for geologic mapping, surface faulting, seismic hazards, slope stability/bluff retreat assessments, subsurface soil and groundwater characterization, and avalanche hazards for plant siting at Tyonek, Nikiski, and Valdez.



Linsey J. DeBell

Greenhouse Gas (GHG) Emissions

Education

MS, Earth Science (Geochemical Systems), University of New Hampshire, 2003

BA, Creative Studies Biology (Marine Science), University of California Santa Barbara, 1998

Years of Experience

With AECOM: 11

With Other Firms: 6

Areas of Expertise

Project management

Greenhouse gases

Climate change

Air quality compliance management

Air quality regulatory review

Air quality permitting

Air quality and meteorological monitoring

Impact assessment

Air quality resource specialist

Atmospheric dispersion modeling

Affiliations

Air and Waste Management Association (A&WMA)

Training

Unescorted North Slope Training from NSTC

Hydrogen Sulfide (H₂S) from NSTC

Basic Driver Training-Smith System from BP

AECOM Certified Project Manager

Ms. Linsey DeBell is a leader of AECOM's air quality practice and has successfully managed projects and tasks with scopes of work including impact assessment, process improvement, capital project permitting, and risk management for clients in various market sectors and geographies. She has served as the air quality and climate change resource lead on over 10 impact assessments, including for the US Army Corps of Engineers (USACE). Linsey is effective at engaging with agency counterparts and agency project managers and also at collaborating with other resource leads. Relevant to climate change analysis, she supported the Bureau of Land Management (BLM) in building an internal climate change toolset for supporting their staffs' NEPA reviews. She has extensive North Slope Alaska air quality experience and has been a lead air quality resource on several high profile Alaska impact assessments.

Why Chosen for This Project

- Strong background in climate change research
- Dispersion modeling in support of PSD permit applications, ambient monitoring, fugitive dust analysis, and emission inventory management
- NEPA air quality resource lead on Donlin Gold EIS, Yukon Flats Land Exchange EIS, and Foothills West EIS in Alaska

Project Experience

USACE and Alaska Department of Transportation and Public Facilities, Foothills West Transportation Environmental Impact Statement (EIS), Alaska.

Air quality resource lead for proposed 110-mile road from the Dalton Highway/Trans-Alaska Pipeline System (TAPS) to the Umiat Oil and Gubik Gas fields. Issues include public access to the road, impacts on village use of the area for subsistence, and impacts to regional hydrology, tundra, and caribou migrations.

USACE, Donlin Gold EIS, Alaska. Air quality resource lead for a third-party EIS for the proposed construction of an open pit hardrock gold mine with infrastructure that includes the mine site, power plant, barge landings, and 315-mile long natural gas pipeline right-of-way. The alternative development processes involved an extensive review of options or sub-alternatives. The project established formal alternative evaluation criteria and tested a myriad of alternative options for technical and financial feasibility. Efforts were worked through the cooperating agencies via workshops.

USACE, PacRim Coal, LP, Chuitna Coal Project Supplemental EIS (SEIS), Alaska.

Air quality resource senior reviewer for a third-party SEIS for the proposed Chuitna Coal project. The SEIS analyzes potential impacts of the controversial coal mine, personnel housing, airstrip, infrastructure corridor (conveyor, access roads, and power lines) and a coal export facility and logistics center on Cook Inlet. Key issues included effects on fisheries, wildlife, subsistence, and waterways surrounding the coal project.

Linsey J. DeBell, *continued*

BLM, Greenhouse Gas (GHG) Toolkit, Nationwide.

Project Manager and senior technical resource for a project with the BLM National Technical Operations Center to develop a toolkit to support the assessment of climate change under NEPA. The toolkit took the form of a database of GHG calculators and references that is searchable by a custom webpage interface. The webpage was designed to be hosted from BLM's intranet.

US Fish and Wildlife Service, Yukon Flats Land

Exchange EIS, Alaska. Technical reviewer. The EIS evaluated a potential land exchange and possible future oil and gas development of the traded parcel in the Yukon Flats region of Alaska. Provided responses to comments received on the air quality and climate change sections of the draft EIS.

ConocoPhillips Company/British Petroleum (BP)/ExxonMobil/TransCanada, Alaska LNG Project Pre-FEED, Alaska.

The Alaska LNG project consisted of a natural gas treatment plant on the Alaskan North Slope, an 800+ mile 42-inch' pipeline, and an LNG Plant, storage facility and marine offloading facility in Nikiski.. Served on this project as the air quality lead assigned to support the project engineering team for the Gas Treatment Plant. In this role, provided interface management support between the air quality team and the engineering team and between the project and co-venture air quality subject matter experts and developed and maintained tools to track progress towards a key project objective. Technical support included directing extensive near-field dispersion modeling, preliminary emissions estimates, identifying potential air permitting critical pathways and mitigation strategies, and helping to develop long-range permitting strategies.

ConocoPhillips Alaska Inc (CPAI), Deadhorse Prevention of Significant Deterioration Ambient

Air Quality and Meteorological Monitoring,

Alaska. Quality assurance manager for an ambient air quality and meteorological monitoring station. Negotiated achievable data quality objectives for monitoring PM2.5 in low ambient concentration environments.

CPAI, Title V Permit Program, Alaska. Extension of staff support to CPAI's Title V Permit program covering their North Slope facilities. Support included annual compliance certifications, completing renewal applications, modification applications, commenting on draft permits, completing applicability determinations and supporting emission reporting. Supported the program for eight years with increasing responsibility culminating as senior technical resource and task leader on the project.

CPAI, Compliance Tracking and Reporting

Support, Alaska. Built various Excel spreadsheet tools for tracking operational data and/or calculating air emissions for drilling activities. Included in the spreadsheet were reports for tracking compliance with the Title V Operating Permit. Provided end-of-year annual emission reporting support for six years including QA/QC of data and evolving tools to align with current operations.

BP Exploration Alaska (BPXA), Air Quality Compliance and Permitting Support, Alaska.

Extension of staff support to BPXA's Title V Permit program covering over 20 facilities, including six major oil and gas gathering and processing facilities, a central power station, and a large gas handling and processing complex. Support has included completing renewal applications, modification applications, commenting on draft permits, completing applicability determinations, annual compliance certification support, and EMIS system updates. Have supported the program for nine years with increasing responsibility. Current role is project

manager and senior technical resource on the project.

BPXA, West End Development Project Air Quality Support, Alaska.

Started on the project as a technical resource and concluded the project as the Project Manager. Provided air quality permit applicability and permitting strategy support for potential expansion of an existing oil and gas development region including an oil and gas production facility on the North Slope of Alaska. Evaluated design options for project components at multiple impacted facilities from a regulatory and air quality impacts perspective. Provided assistance in the design of the project preconstruction monitoring program, and also conducted modeling and provided justification for obtaining a waiver from the State of Alaska from that monitoring. This resulted in considerable cost savings to the project and eliminated a critical path item from the project schedule.

TransCanada and ExxonMobil, Alaska Pipeline Project (APP), Alaska.

Project air quality subject matter expert. Working as part of a multi-company, integrated project team, AECOM provided management and technical support for the certification and permitting of the APP sponsored by TransCanada and ExxonMobil. Responsibilities included development of white papers and presentations on topics including preconstruction monitoring, background ozone concentrations, developing representative background concentrations from available datasets that are impacted by exceptional events with high secondary formation of PM and local sources, wrote and reviewed the quality assurance project plan (QAPP) for the proposed monitoring program.



Stephen "Steve" W. Denton, PE

Mining Development, Operations, Closure Requirements (Senior On- Call Expert)

Education

BS, Mining Engineering, University of Alaska, Fairbanks, 1975

Years of Experience

With AECOM: <1

With Other Firms: 43+

Registrations

Registered Professional Mining Engineer, Alaska, 1982

Registered Professional Civil Engineer, Alaska, 1989

Registered Professional Engineer, Florida, 2017

Affiliations

Alaska Miners Association

Resource Development Council

American Exploration and Mining Association

American Society of Civil Engineers

Society for Mining, Metallurgy and Exploration

Mr. Steve Denton is a third-generation Alaskan and second generation graduate from the University of Alaska Fairbanks School Of Mines with 43 years of experience in mining, consulting and construction. For approximately 28 years, he was with Usibelli Coal Mine, Inc., in various roles, including union miner, mine engineer, consulting engineer, VP Engineering, general manager and VP business development. In those roles, he has been responsible for day-to-day mine operations, design, permitting and management of new mine start-ups, coal process facility construction, international coal sales and operation of a marine coal export facility. He also gained a working knowledge of the natural gas, utility power, and coal conversion industries during his tenure with Usibelli. For most of his remaining career he was a self-employed consulting engineer working on projects throughout Alaska in public works and roads, marine facilities, exploration, permitting, mine development/operations and construction. Steve also has significant experience working on remote projects in Arctic Alaska and working for Alaska Native Corporations on projects aimed at development of their natural resources.

Why Chosen for This Project

- Extensive experience with mines and mining infrastructure in Alaska, including mine exploration, permitting, construction, development/operations, dam safety, water rights, ore hauling, natural gas, power, roads, and marine facilities
- Senior advisor on Chuitna Coal Supplemental EIS
- Former VP Engineering and General Manager, Usibelli Coal Mine

Project Experience

US Army Corps of Engineers (USACE), Chuitna Coal Mine Supplemental Environmental Impact Statement (EIS), Alaska. Subconsultant to AECOM performing in advisory capacity as Senior Mining Engineer for Supplemental EIS preparation.

Confidential Client, Alaska Coal Property Acquisition, Alaska. Evaluated resources, mining feasibility and economics of potential acquisition targets. Develop draft exploration plan and budget for acquired property.

Electric Power Development Corp. (J-Power), Alaska Hydroelectric Project Evaluation, Alaska. Assisted Japanese independent power producer investigate potential for hydroelectric power development in Alaska. Researched projects, evaluated project viability, risks, markets and utility impacts. Liaison with project developers and arrange meetings and site visits as required.

PacRim Coal, LP, Chuitna Coal Mine Permit, Alaska. Application for 12-million-ton-per-year coal mine near Tyonek. Preparation of draft blasting plan for permit application.

Usibelli Coal Mine, Inc., Wishbone Hill Feasibility Study Update, Alaska. Update to feasibility study originally completed in 2012. Evaluated opportunities for capital and operating cost reduction. Prepared revised operating plan to facilitate the same, provide help with economic analysis and lead report preparation.

Stephen “Steve” W. Denton, PE, *continued*

Confidential Client, Coal Operations Review, Southeast US. Reviewed current mine operations in southeast US for opportunities to improve efficiency, operations, quality control and management. Conducted on-site review and prepare recommendations for improvement.

Arcadis US, Inc (prime consultant), Whitehorse Copper Project, Alaska. Due diligence evaluation by the Alaska Industrial Development and Export Authority regarding potential investment in Skagway ore terminal expansion. Performed evaluation of mining and ore processing plan.

URS Alaska LLC (prime consultant), Skagway Ore Terminal Master Plan, Alaska. Development of a master plan for significant increase in volume of mineral concentrate through the Alaska Industrial Development and Export Authority’s Skagway bulk commodity export facility. Subconsultant providing advice on operational and facility improvements, cost estimates and mineral resource potential.

Tercon Alaska LLC, Fort Knox Leach Ore Haul, Alaska. Project manager for approximately last half of the project. Reclaimed 14 million tons of low grade ore from a stockpile, haul and place in heap leach facility approximately one mile from stockpile at Kinross Gold mine near Fairbanks, Alaska.

Usibelli Coal Mine, Inc, Healy, Alaska.

- (2003-2011) VP Business Development. Responsible for evaluation and promotion of potential new businesses related to expansion of coal markets and related business activities. Export coal sales, management of coal export terminal and acquisition of natural gas exploration interests.
- (2001-2003) General Manager. Management of all aspects of coal mine operating division of Usibelli Coal Mine.
- (1996-2001) Vice President Engineering. Management and supervision of the engineering

department, including mine permitting, for 1.5 million ton per year surface coal mine.

- (1976-1984) Chief Engineer. Responsible for all mine engineering functions. Included new permits under the 1977 Surface Mining Act, new road construction, site development of dragline construction, supervision of tippie construction and general day to day mine operations and design.
- (1972-1974) Summer Intern. Heavy equipment operation for stripping and road construction. Underground miner for bulk sampling program.

Alaska Placer Development, Inc, Livengood Placer Mine, Alaska. Operating placer gold mine at Livengood, employing 8 to 10 miners. General foreman at mine site from early July 1994 through end of sluicing season. Performed safety inspection for tailings impoundment dam in 1995.

City of Thorne Bay, Tolstoi Development Project South Thorne Bay Road – Phase 5, Alaska. A 5.4 mile road construction project to link Tolstoi Bay and Kasaan with the existing Prince of Wales Island road system. Prime consultant for location, survey and design of all-weather road using design standards typical of forest development roads in Southeast Alaska.

Placer Dome US Inc, Evan Jones Mine Development, Alaska. Owner’s representative. Development of a new underground coal mine in the Matanuska Coal Field. Monitored activities of sublessor for compliance with agreements and act as liaison with owner, Placer Dome U.S., Inc.

Arctic Slope Consulting Group, Western Arctic Coal Demonstration Project, Alaska. Delivery of 200 to 400 tons per year of coal for home heating to Western Arctic Alaska villages. Design and on-site supervision of blasthole drilling, overburden removal, coal excavation, coal bagging and coal transportation.

Usibelli Coal Mine, Inc., Healy Clean Coal Project (HCCP), Alaska. Managed proposal to the US Department of Energy under the Clean Coal Technology Program. The HCCP was selected for \$93 million in federal assistance as a result of the proposal.

Alaska Power Authority, Chester Lake Penstock Construction, Alaska. Construction engineer for 3,200 feet of 20-inch-diameter steel penstock from Chester Lake Dam to Metlakatla, Alaska, over rough coastal terrain. Performed layout and design adjustment for fast-track construction.

Meadowlark Farms, Inc, Alaska. Staff Engineer. Helped supervise exploration program and resource evaluation for major Alaska coal exploration program by exploration/reclamation subsidiary of Amax Coal.

Placer Dome US Inc, San Francisco, California. Preliminary cost estimation for production of coal from the lower Susitna field and gold near Nome and development of preliminary mining plans. Cost estimation and consultation regarding mining methods for pre-feasibility level study.

URS Alaska LLC (prime consultant), Alaska Coal Project Permitting, Alaska. Confidential project related to preparation of permitting plan and preparation of permit for advanced exploration program. Senior advisor helping with permitting strategy and mentoring of client’s team on permitting under the Alaska Surface Coal Mine Control and Reclamation Act.

(All experience listed is prior to joining AECOM)



James Dietzmann

Surface Water Hydrology

Education

BS, Watershed Science, with Soil Resources and Conservation Minor, Colorado State University, 1994

Years of Experience

With AECOM: 23

With Other Firms: 0?

Training

American Society of Civil Engineers HEC-RAS Computer Workshop

HAZWOPER 40-hour OSHA Training

HAZWOPER 8-hour OSHA Supervisor Training

HAZWOPER 8-hour OSHA Refresher Training

Mr. James Dietzmann is a surface water hydrologist with 23 years of experience managing and performing hydrologic assessments and environmental investigations. His experience includes preparation of surface water affected environment and environmental consequences sections for mining and oil and gas related environmental impact statements (EISs) including for the US Army Corps of Engineers (USACE), preparing Floodplain Statement of Findings, developing stream monitoring programs for monitoring water surface elevation, stream flow, and water quality; watershed assessments for timber harvest management; channel hydraulic modeling (HEC-RAS); and hydrologic system modeling (HEC-HMS).

James is the surface water hydrologist for Donlin Gold EIS as well as pipeline and forestry EISs in Alaska. He has a strong background in stream crossing field surveys, channel hydraulic and hydrologic system modeling, surface and groundwater monitoring, discharge analysis, and baseline studies at mine sites in Alaska and Canada.

Why Chosen for This Project

- Extensive experience at mine sites in Alaska and Canada
- Stream crossing field surveys
- Channel hydraulic and hydrologic system modeling, surface and groundwater monitoring, discharge analysis, and baseline studies at mine sites in Alaska and Canada

Project Experience

USACE, Donlin Gold EIS, Alaska. Prepared the Affected Environment and Environmental Consequences sections related to surface water resources for the Donlin Gold EIS. Responsible for describing baseline conditions for surface water components including watershed, channel, and streamflow conditions, and mine site water balance. Evaluated potential impacts of the proposed mine site and related facilities development, a transportation corridor (including Kuskokwim River barging and roads), and a 300-mile natural gas pipeline, on surface water resources. Co-wrote a climate change section that evaluated the potential effects of climate change on surface water using the Global Climate Models (GCMs) and Scenarios Network for Alaska Planning (SNAP) precipitation predictions.

National Park Service, Klondike Gold Rush National Historical Park, Dyea Area Site Plan Environmental Assessment (EA), Alaska.

Responsible for developing a 100-year Floodplain Statement of Findings (SOF) for the Taiya River, following NPS Procedural Manual 77-2. Established floodplain and channel cross-sections using NPS-provided Light Detection and Ranging (LIDAR) data. Flood peak magnitude estimated using a combination of USGS Regional Regression Equations and Taiya River USGS gauging data. Incorporated the floodplain SOF into the Dyea Area Site Plan EA.

James Dietzmann, *continued*

National Park Service, Katmai National Park and Preserve, Brooks Camp Area EIS, Alaska.

Responsible for developing a 100-year Floodplain FOS for the Brooks River, following NPS Procedural Manual 77-2. Established floodplain and channel cross-sections using available digital elevation model data and channel cross-section data from USGS discharge measurements. Flood peak magnitude was estimated using USGS Regional Regression Equations. Incorporated the floodplain SOF into the Brooks Camp Area EIS.

Confidential Client, Hydrologic Data Collection, South Central Alaska Liquid Natural Gas (SCLNG), Alaska.

Field crew lead. Collected hydrologic data at streams and rivers along a proposed 800-mile natural gas pipeline route between Point Thomson/Prudhoe Bay to Southcentral Alaska. Hydrologic data collected at each stream crossing included bankfull and ordinary high water width and depth, as well as stream discharge. Additional data collected included characterization of channel bed and bank material by conducting Wolman Pebble Counts.

TransCanada, Alaska Pipeline Project,

Southcentral Alaska. Collected hydrologic data at streams and rivers crossed by a proposed natural gas pipeline from Point Thomson/Prudhoe Bay to Southcentral Alaska. Hydrologic data collected at each stream crossing included bankfull and ordinary high water width and depth, as well as stream discharge. Additional data collected included characterization of channel bed and bank material by conducting Wolman Pebble Counts.

Confidential Client, Alaska Liquid Natural Gas (AKLNG), Alaska.

Field Manager. Provided daily management support for field surveys conducted along a proposed 800-mile natural gas pipeline route. Responsibilities include subcontractor oversight, monitoring field crew compliance with health and safety process and protocols, coordinating daily deployments of field crews, monitoring and communicating conditions assessments during

morning and evening tailgate meetings, tracking field crew progress, QA/QC collected field data. Served as the AECOM point of contact in the field, and provide a critical communication link between field crews and the Project management team

Confidential Client, Surface Water and Groundwater Data Collection, Washington.

Hydrologic data collection included stream discharge measurements and corresponding water surface elevations to develop a stage-discharge relationship for Feasibility Study associated with a former mine site. Mapped channel characteristics including pools, riffles, bed material (Wolman pebble count), and woody debris for channel classification. Collected surface water and groundwater water quality samples, including field parameters (pH, conductivity, etc.), as required based on regulatory agency approved sampling plan.

BHP Billiton, Environmental Baseline Studies, Western Arctic Coal Project, North Slope, Alaska.

Hydrologist responsible for conducting baseline hydrologic assessments on streams and lakes associated with a proposed coal mine. The rivers were monitored to provide hydrologic and water quality information for environmental assessments. Specific tasks included installation of discharge and water quality monitoring sites, observations and documentation of water surface elevations on each river, and measuring stream discharge on each stream throughout the monitoring period. Additional tasks included lake bathymetric and water quality assessment. The lakes were assessed for water quality and lake volume for potential use as future water source to support drilling and ice road construction.

Parsons E & C, 2003 Spring Breakup Assessment, North Slope, Alaska.

Hydrologist responsible for conducting hydrologic assessments on several streams in the Point Thomson Unit project area. The rivers were monitored to provide hydrologic and hydraulic information for engineering and

environmental assessments on the streams in the project area. Specific tasks performed include installation of staff gages at 16 monitoring sites, daily observations and documentation of water surface elevations on each river, recording daily snow and ice conditions during spring breakup conditions, and measuring stream discharge on each stream throughout the monitoring period. Hydrologic analysis performed includes assessing the impact of snow and ice on water surface elevations, the magnitude and timing of flood peaks, and main channel hydraulic roughness.

Parsons E & C, Point Thomson Gas Cycling Project Preliminary Flood Peak Equations, North Slope, Alaska.

Responsible for estimating the 1998 spring-peak discharge and flood-peak magnitude on 12 streams located in the Point Thomson Unit project area on the North Slope of Alaska. The purpose of this task was to determine the magnitude of the peak discharge on each stream for preliminary engineering design criteria of possible stream crossings. Specific tasks included developing HEC-RAS models for each stream for computing hydrologic parameters such as the spring-peak discharge and main channel hydrologic roughness. Each model was calibrated to water surface elevations and discharge measurements taken on each stream in 1998. Additional methods used to compute the spring-peak discharge included the Slope-Area Method. The impact of snow and ice blockage in the channel on the water surface elevation and discharge was also evaluated. The flood-peak discharge estimates computed for each stream were used to modify a set of regression equations that were developed by AECOM (legacy URS) in 2001 for estimating flood-peak magnitude on the North Slope



Paul R. Dworian, PG, CPG, MBA

Physical Geology and Soils

Education

MBA, Alaska Pacific University, Anchorage, 2005

MS, Geology, California State University, Long Beach, 1990

BS, Geology, California State University, Fresno 1986

Years of Experience

With AECOM: 29

With Other Firms: 1

Registrations

Certified Professional Geologist, #10041

Professional Geologist, Alaska, #472

Affiliations

National Ground Water Resources Association

Alaska Ground Water Association (Past President, Secretary)

Training

HAZWOPER 40-Hour OSHA Training

HAZWOPER 8-Hour Supervisor Training

Cold Regions Engineering Training, UAA

Learn to Return Training

Shell Oil Alaska Venture Cultural Awareness, JMP, HSSE training

Mr. Paul Dworian provides natural resources assessment, mitigation, and permitting strategy support for clients throughout Alaska and the Northwest. He has been working in Alaska for 24 years. Paul is the physical sciences lead for the Chuitna Coal Mine and Midas Gold environmental impact statements (EISs), as well as the geology and geohazards subject matter expert on Donlin Gold EIS. He also provided senior review of geology and physical science related topics for the Bering Sea/Western Interior Resource Management Plan (RMP). He has a strong background in baseline studies and abandoned mine remediation projects.

Why Chosen for This Project

- 24 years of Alaska experience in the physical sciences
- Geology and geohazards subject matter expert
- Baseline studies and abandoned mine remediation
- Physical sciences lead for the Chuitna EIS and Midas Gold EIS, and senior reviewer for the Bering Sea/Western Interior RMP

Project Experience

US Forest Service, Midas Gold EIS, Idaho. Physical sciences lead. Project intends to reactivate and remediate a historic gold mine on Forest Service land. Work included senior review and management for production of studies on water resources, water rights, soils, hazardous materials, geotechnical engineering, geology, air, and climate change. Also facilitated public meetings.

US Army Corps of Engineers (USACE), Chuitna Coal Mine EIS, Alaska. Physical sciences lead. Work included studies of noise, soils, air quality, oceanography, geomorphology, hazardous materials, surface water, groundwater, geochemistry. Responsible for preparing draft and final versions of the affected environment and environmental consequences sections of the document.

USACE, Donlin Gold Mine EIS, Alaska. Subject matter expert. Prepared draft geology and geohazards sections for the affected environment and environmental consequences. Assisted with preparation of Draft EIS soils section. Responded to soils comments for final EIS.

Bureau of Land Management (BLM) Bering Sea/Western Interior (BSWI) RMP, Alaska. Subject matter expert. Provided senior review of leasable, salable, and locatable minerals section, as well as the air, climate change, fish, wildland fire, sections of the plan. Prepared surface water, groundwater, renewable energy, and hazardous materials sections of plan.

Paul R. Dworin, PG, CPG, *continued*

BLM, Central Yukon Resource Management Plan, Alaska. Subject matter expert. Mineral resources and development, and physical sciences including groundwater, surface water, seismic, soils, geology, air, noise, climate change.

US Forest Service, Human Health and Ecological Risk Assessments for the Mahoney Mine, Alaska. Project Manager. This project involved providing site-specific human health and ecological risk assessments at an abandoned zinc mine near Tongass National Forest in Southeast Alaska. The project also included the collection of soil and groundwater samples for laboratory analysis. Provided project oversight, and overall project management, for development and implementation of the sampling program, and oversight and review of the risk assessment documents.

Confidential Client, Underground Coal Gasification (UCG) Project, Alaska. Project Manager for permitting and physical science studies for a large UCG project on Cook Inlet.

Alaska Department of Natural Resources (ADNR), Point Mackenzie UCG Best Interest Finding (BIF), Alaska. Project Manager. Principal author for this work which included a detailed evaluation of the potential wildlife, recreational, surface water, and groundwater impacts of the project, and potential mitigation measures.

ADNR, Canyon Creek Coal Project, BIF, Alaska. Principal-in-Charge and primary reviewer. Provided senior review for the BIF for a proposed coal mine in Alaska.

Enstar Gas, Cannery Loop Gas Field, Kenai, Alaska. Geologist. Prepared a geological evaluation of the Cannery Loop gas field for re-use as a gas storage facility. This work included a review of existing geology documentation, and preparing a written report on the geologic hazards of the area.

Alaska Industrial Development and Export Authority, Skagway Ore Terminal, Alaska. Project Manager. There were concerns that ore handling at the terminal had resulted in widespread heavy metals impacts to the surrounding soil and water. In addition, minor petroleum spills had occurred at the facility. These impacts needed to be documented prior to transfer of the property. Responsible for investigation of the Skagway Ore Terminal and evaluation of the nature and extent of the of hydrocarbon and metals contamination at the site. The project involved the installation of multiple wells and borings, as well as off-shore sampling using both a dart sampler and a Van Veen bottom grab sampler.

BLM Alaska, On-Call Multi-Disciplinary Engineering And Environmental Services, Alaska. Program Manager/lead consultant. Work completed under this contract has included site assessments, waste characterization, landfill design, environmental engineering services, and on-call services to evaluate sites containing unidentified drums and other debris that could contain hazardous waste. Primarily responsible for senior review of documents, planning, and project oversight.

US Forest Service (USFS), Apex and El Nino Mines, Preliminary Assessments/Site Investigations (PA/SI), Alaska. Lead consultant/contract manager. Completed PA/SIs at two mines near Pelican, Alaska, and an engineering evaluation/cost analysis (EE/CA) at a former mine site in southeast Alaska. The project involved sampling and characterization of acid rock drainage and other wastes left over from mining. The draft report for this project was submitted two weeks ahead of schedule.

USFS, Salt Chuck Mine EE/CA, Southeast Alaska. Lead consultant/contract manager. The former mine site, located near Thorne Bay, is the largest abandoned mine in Southeast Alaska. Work consisted of site characterization, a risk assessment, and a feasibility study.

USFS, Three EE/CAs at Former Mine Sites near Ketchikan, Alaska. Project Manager. Numerous abandoned mine sites are present on USFS property, which the agency is planning on remediating in the near future. The purposes of the EE/CAs were to 1) collect samples of the soil, sediment, groundwater, tailings, and surface water to evaluate the potential presence of contamination; 2) complete a risk assessment to evaluate potential damage the contaminant may do to human health and the environment, and 3) evaluate potential remedial actions and provide rough-order-of-magnitude costs. Worked on all aspects of this project.



Jessica Evans

Land Ownership, Management, and Use

Education

MS, Bioregional Planning, University of Idaho, 2008

BS, Environmental Studies and Bioregional Planning, Utah State University, 2005

Years of Experience

With AECOM: 7

With Other Firms: 2

Certifications

AECOM Certified Project Manager

Areas of Expertise

Environmental permitting and regulatory compliance

NEPA compliance

Stakeholder engagement

Comment analysis

Community, environmental, participatory planning

Environmental, regional, and watershed planning

Recreation resources

Lands management

GIS/ESRI

Affiliations

American Planning Association, Alaska Chapter

National Association of Environmental Professionals

Ms. Jessica Evans has seven years of relevant experience as an environmental scientist in the AECOM Alaska office working as a lead in public involvement efforts, which includes coordinating public meetings, community presentations, writing/distributing newsletters, maintaining websites, organizing media outreach, and managing cooperative agency consultation. She is a subject matter expert in lands and realty, including in-depth lands and realty training and research in public lands records and data. She has a degree in bioregional land management and planning and is versed in large-scale land use planning as well as plat records research.

Jessica has extensive NEPA experience in land use, recreation, transportation, and spill risk analysis. She has been heavily involved in environmental permitting projects with AECOM. She is also a core member of the comment analysis team, which includes comment coding, creating statements of concern, and writing Comment Analysis Reports. Jessica is an AECOM certified project manager and is training for her American Institute of Certified Planners (AICP) certification.

Why Chosen for This Project

- Lands subject matter expert, spills author, and/or public involvement lead for many NEPA projects
- Seven years of Alaska experience leading public involvement efforts

Project Experience

US Army Corps of Engineers (USACE), Donlin Gold Mine Environmental Impact Statement (EIS), Alaska.

Public involvement lead/subject matter expert. AECOM is preparing an EIS for the proposed construction of a gold mine in the Yukon-Kuskokwim Region of Alaska. As a member of the leadership team, serves as public involvement lead. Duties include coordinating public scoping meetings, community presentations, writing/distributing newsletters, maintaining the EIS website, organizing media outreach, and managing cooperative agency consultation. Also a core member of the comment analysis team for the EIS, which includes comment coding, creating statements of concern, and writing the Comment Analysis Report. Subject matter expert for the lands, recreation, and transportation sections, deputy social discipline lead, and managing the spill risk effort.

Bureau of Land Management (BLM), Bering Sea Western Interior Resource Management Plan (RMP)/EIS, Alaska.

Public involvement lead/subject matter expert. AECOM is preparing an RMP/EIS for the BLM in the western interior of Alaska. As a member of the leadership team, serves as public involvement lead. Subject matter expert for the lands and realty section, which involves additional scope for specific lands and realty training and research in the BLM lands records and data. Core member of the comment analysis team for the EIS, which includes comment coding, creating statements of concern, and writing the Comment Analysis Report.

Jessica Evans, *continued*

US Forest Service, Stibnite Gold Project EIS, Idaho. Subject matter expert for lands and realty of an EIS for an open pit gold mine in central Idaho. Member of the comment analysis team following the scoping meetings.

BLM, Central Yukon RMP/EIS, Alaska. Subject matter expert. Assisting EMPSi (prime contractor) preparing an RMP/EIS for the BLM in Central Alaska. Subject matter expert for the lands and realty section.

USACE, Chitna Coal Project Supplemental EIS, Alaska. Subject matter expert for cultural resources for a surface coal mine and export facility within the Beluga Coal Field of Southcentral Alaska, approximately 45 miles west of Anchorage.

State Division of Homeland Security & Emergency Management, Hazard Mitigation Plans, Alaska. Planner, public involvement. AECOM is writing and updating Multi-Jurisdiction Hazard Mitigation Plans for 25 rural Alaska communities. Conducting the research, teleconferences, and writing the multi-jurisdictional plans (including Tribal and Municipal governments) for six rural villages. Managing all aspects of the plan: research, community involvement, city coordination, and document preparation. Under previous contracts, she has written an additional five plans.

Unicom/GCI TERRA Project Environmental Assessments (EAs), Alaska. Deputy project manager for four EAs for the proposed construction of microwave repeater towers to extend broadband internet through interior Alaska. Deputy project manager for the TERRA-Yukon EA, working with the project manager in budgeting, scheduling, administrative record, and personnel management. Responsible for writing several social environment sections of all EAs, and leading the public involvement components.

National Marine Fisheries Service, Effects of Oil and Gas Activities in the Arctic Ocean EIS, Alaska. Technical staff writer, project support for a programmatic EIS to assess effects of oil and gas exploratory activities in US Beaufort and Chukchi seas. Heavily involved in the comment analysis effort, which included comment coding, creating statements of concern, and writing the Comment Analysis Report. Subject matter expert for the recreation and land use sections for the EIS, and helped maintain the administrative record, as well as providing various other project, logistical, and document support.

Glacier Bay National Park and Preserve; Huna Tribal Cultural House Environmental Assessment. Deputy Project Manager for an EA for the National Park Service to assess sites and designs for a cultural tribal house. Working with the project manager in budgeting, scheduling, administrative record, and management of personnel. In addition, author of the land use and recreation and the visitor services sections.

Alaska Energy Authority, Susitna-Watana Hydroelectric Project, Alaska. Recreation and Aesthetics Resource Reports. Deputy Project Manager for several studies for AEA for a Federal Energy Regulatory Commission (FERC) license application, including the recreation resource study. The project analyzes recreation uses and projected demand/capacity for facilities, and visual resources and sound analyses for a primitive area in Alaska. Work entailed significant public involvement through one-on-one stakeholder interviews, and extensive field work to map, classify, and assess the condition of trails and facilities. Duties also include data analysis, writing FERC-recorded reports, and assisting the project manager in budgeting, scheduling, study planning, and managing personnel.

ExxonMobil Point Thomson Project Permitting and NEPA Compliance Requirements. Permit compliance/special projects. AECOM assisted ExxonMobil with acquisition of major environmental permits. Core project team member and had responsibilities in many factions of the project including GIS support, NEPA compliance, permitting, mitigation, and permit compliance. From 2012, led a complex effort to document permit compliance in a regulatory framework. Key contributions from 2010 to 2012 included two Biological Assessments, USACE Section 404 permit applications, Temporary Water Use Permit applications, Water Right permit applications, Plan of Operations, North Slope Borough Master Plan and Rezone Application, and compensatory mitigation prioritization.

City of Sand Point, City Comprehensive Plan Update, Sand Point, Idaho. Planner. Primary land use planner and public involvement coordinator. The plan addresses land use issues, community goals and objectives, and implementation strategies.

GCI, FCC NEPA Compliance, Various Locations, Alaska. Deputy Project Manager. The project was to ensure NEPA compliance on FCC tower sites by researching items on the FCC NEPA checklist. Led the work flow and submission of deliverables, as well as assisted the project manager in budgeting, scheduling, and management of personnel.

Izembek National Wildlife Refuge Land Exchange/ Road Corridor Environmental Impact Statement, Alaska. Comment analyst. AECOM prepared an EIS for the Fish and Wildlife Service for a land exchange in the Izembek National Wildlife Refuge. Ms. Evans was a core member of the comment analysis team, which included comment coding, creating statements of concern, and writing the Comment Analysis Report.



Craig Freas, PE, SE, PEng (Infrastructure) Port Development, Operation, and Dredging (Senior On- Call Expert)

Education

BS, Civil Engineering, Pennsylvania State University, 1969

Years of Experience

With AECOM: 22

With Other Firms: 25

Registrations

Professional Engineer, Alaska (AELC3873)

Professional Engineer (Structural), Alaska (AELT14269)

Professional Engineer, Alberta (12992)

Professional Engineer, Yukon Territory (1452)

Professional Engineer, British Columbia (112725)

Professional Engineer, Nova Scotia (11083)

Areas of Expertise

Foundations

Structural Analysis

Heavy Civil & Marine

Professional Associations

American Concrete Institute, Member

Mr. Craig Freas, PE, SE, is a senior project manager, a registered civil engineer in Alaska and several Canadian provinces, and a registered structural engineer in Alaska. Craig has over 47 years of experience and has practiced in Alaska since 1970. He has managed major projects in every region of the state from Prudhoe Bay to Ketchikan, and from Ft. Yukon to Shemya on the Aleutian Chain. His specialties include foundations, structures (including docks and ports), remote construction, and facilities exposed to harsh environmental conditions – wind, waves, currents, ice – including over 40 marine assignments in Alaska and Canada.

Why Chosen for This Project

- Expert in ports, docks, remote construction, and facilities exposed to harsh environment
- Practiced in Alaska since 1970, managing major projects in every region of the state
- Over 40 marine assignments in Alaska and Canada

Project Experience

Confidential Client, Straight of Canso, Nova Scotia.

Project Manager. The scope of work includes rock excavation and fill to create a 16-acre uplands laydown area, dredging (including rock), wharf 133 meters x 18 meters x 30 meters (height), asphalt paving, stormwater collection and treatment, shore protection, and associated appurtenances. The wharf is constructed of multiple, precast concrete caissons that are wet-towed to the site, sunk, and ballasted with rock. The caissons are designed to support heavy loads from self-propelled module transporters (SPMTs), and point loads from heavy industrial components. Loads will be transferred onto the wharf dynamically from barges using SPMTs or from vessels using onboard cranes. This pre-FEED design involved detailed analysis of the load transfer processes and the resulting soil-structure interaction, overturning forces and global stability.

Confidential LNG Project, British Columbia. Project Manager for multi-office team supporting a major international engineering and construction company for design of marine structures as part of a \$15 billion LNG project. The services included geotechnical, coastal, and structural engineering for the materials offloading facility (MOF), a temporary construction jetty and linkspan to offload construction equipment and personnel, and an LNG Jetty. The MOF will be used to offload about 50 modules up to about 6,000 tonnes each. The site is remote, subject to large tidal fluctuations (over 6 meters), inaccessible by road and with no uplands laydown or support areas. Soft marine deposits over relatively shallow steeply sloping bedrock resulted in challenges for pile foundation designs. The estimated cost of the marine structures is \$350 million.

Craig Freas, PE, SE, PEng, *continued*

Potash Terminal, Prince Rupert, British Columbia.

Marine lead as part of a multi-disciplinary team, performed a third-party review (FEL3 documents) of marine facilities associated with a \$750 million proposed potash terminal in northern British Columbia. The review included constructability, availability of work force and cost of labor, construction risks, construction sequencing and the general design approach. Major structures included a 570-meter-long pile-supported conveyor and access trestle, and a 254-meter-long pile-supported berth. The berth supported a traveling ship loader. All piles on the project required socketing into shallow bedrock. The estimated cost of the marine structures, including dredging exceeded \$150 million.

Usibelli Coal Mine, Coal Export Expansion Study, Alaska. Managed the marine terminal alternatives analysis for three potential shipping points with rail access: Seward, Whittier, and Pt. MacKenzie, as a part of an overall study. Developed marine structure concepts and prepared Class 5 estimates. The project looked at various production increases from the existing 1.0 million tonnes per year (MTpy) up to about 3.0 MTpy with port construction costs up \$150 million.

Skagway Ore Terminal Master Plan, Skagway, Alaska. Project Manager for Redevelopment Plan for an existing ore terminal at Skagway, Alaska, owned by the Alaska Industrial Development and Export Authority. The terminal is a transshipment point for mines in the Yukon Territory. It is a congested site, with a marine berth that competes with cruise ship vessels during the summer tourist season. Mineral concentrates are trucked to Skagway in 50-tonne loads, where they are placed in a storage shed and then conveyed to and loaded on ships.

Hecla Greens Creek Corrosion Investigation Services, Greens Creek Mine, Admiralty Island, Alaska. Managed a corrosion review of the port facility and numerous bridges in 2010 that resulted in

large cost savings to Hecla, and construction quality assurance of a tailings expansion liner system in 2011.

Poor Man Mine, Prince of Wales Island, Alaska.

Project Manager for a floating ore loading terminal for a proposed magnetite mine on the Kaasan Peninsula, Prince of Wales Island. Shallow bedrock and extreme tidal range dictated the use of a floating loader with large diameter pipe piles socketed into bedrock. In addition to the loader float, other structures included the conveyor support system and concrete gravity anchors. The fixed-arm loading system included winches on the loader float to slew vessels

Ketchikan Shipyard Expansion Phase II,

Ketchikan, Alaska. Project Manager for a master plan to expand the Ketchikan Shipyard. Managed all contractor work on the \$150-million Ketchikan Shipyard Expansion program since 2003. The plan involves major utility upgrades, construction of two large (250 feet x 100 feet by 100 feet [high]) repair and assembly halls, steel fabrication shops, machine and electrical shops, administrative offices, and employee spaces. The Ketchikan Shipyard is owned by the Alaska Industrial Development and Export Authority, a state agency, and operated by Alaska Ship and Drydock, a private company. Accordingly, the expansion program represents a public-private partnership. In addition to identifying needed tooling and equipment, the master plan included sections on shipyard management and employee training systems. The expansion is to be federally funded based in part on job creation in economically challenged southeastern Alaska.

Cook Inlet Ferry, Upper Cook Inlet, Alaska. Project Manager for design of two ferry terminals, one at Point Mackenzie on the west side of Knik Arm and the other near Ship Creek on the east side of Knik Arm. These terminals are to serve a year-round ferry service between downtown Anchorage and the Matanuska-Susitna Borough. The terminals involve 160-foot-long linkspans (hinged ramps) that must accommodate a tidal range of over 40 feet. This part

of the Upper Cook Inlet experiences heavy winter ice conditions and currents up to about 8 knots. In addition to the linkspans, the terminals include mooring and breasting dolphins, the synchronized winch systems for the linkspans, access trestles, shore power connections for the ferry, terminal buildings, access roads, and associated utilities. Work included concept studies, field investigations, permitting assistance, and design. The estimated construction cost is about \$30 million, including the Port Mackenzie terminal building which has been completed. The balance of the facilities are under design.

Kachemak Bay Multi-Purpose Ocean Dock Preliminary Design, Homer, Alaska. Principal-in-Charge and Project Manager for preliminary design of a dock to serve the US Coast Guard buoy tender, Alaska Marine Highway System ocean-going ferries, cruise ships, and fuel barges. Work included evaluation of on-shore infrastructure, vehicular access, and associated support facilities. Need for the project was based upon replacement of an existing timber dock. Solution had to maintain existing ship traffic during construction. The estimated cost of the facility was \$10.5 million.

Deep Water Dock, Homer, Alaska. Project Manager and Principal-in-Charge of design for a 360-foot x 40-foot precast concrete dock with a 500-foot x 28-foot approach trestle. The dock and trestle are supported by steel pipe piling driven in to a thick layer of soft marine deposits. The dock, fendering system, and dolphins are designed to handle 45,000 dead-weight tonnage (DWT) vessels. The deck is designed for heavy forklift loads. This structure is subject to ice loadings.



Edmund “Ned” Gaines, RPA (Brice Environmental) Cultural & Archaeological Resources, NHPA Section 106 Procedural Requirements

Education

MA, Anthropology (Archaeology), University of Arizona, 2006

BA (Magna Cum Laude), Anthropology major with Religious Studies minor University of Arizona, 2002

Years of Experience

18

Registrations

Registered Professional Archaeologist

Affiliations/Training

Cultural and Natural Resources: An Integrated Management Strategy, (National Preservation Institute)

NEPA Compliance and Cultural Resources (National Preservation Institute)

Consultation and Protection of Native American Sacred Lands (National Preservation Institute)

Certified in CPR and wilderness first-responder medical aid

Learn to Return Arctic Survival Training

Outdoor and Cold Weather Survival

Bear Safety and Firearm Handling

Mr. Ned Gaines is a senior cultural resource specialist and archaeologist with 18 years of experience, the last 11 living and working in Alaska, performing work for public and private sector clients on projects throughout the state. He has extensive experience with cultural resources management and regulatory compliance for mining projects including working in the Kuskokwim River region of southwestern Alaska.

Ned's experience includes National Historic Preservation Act (NHPA), National Environmental Policy Act (NEPA), Alaska Historic Preservation Act (AHPA), Paleontological Resources Preservation Act (PRPA), Native American Graves Protection and Repatriation Act (NAGPRA), Archaeological Resources Protection Act (ARPA) and other state and federal regulatory compliance. He provides research design and protocols development, performs and directs all aspects of cultural resources fieldwork—survey, monitoring, testing, and excavation, and provides data analysis and report preparation. Ned has staffed and managed field teams of archaeologists; overseen and directed subcontractors; and provided technical review of reports. He has provided state and federal agency consultation; consultation with Native American tribes and organizations; and facilitated compliance with cultural resource regulations, impacts analysis, and project planning.

Why Chosen for This Project

- 18 years of experience as a cultural resource specialist and archaeologist, cultural resource management
- 11 years of demonstrated knowledge and experience with Alaskan archaeology and history; ensuring full regulatory compliance with the Section 106 of the NHPA and other state and federal regulations pertaining to cultural resources and Native American traditional and sacred sites

Project Experience

Incorporated Research Institutions for Seismology (IRIS) Earthscope Transportable Array Cultural and Paleontological Survey and Monitoring, Yukon Delta National Wildlife Refuge, Alaska. Project Manager and principal investigator.

Performed cultural and paleontological resources survey, inventory and monitoring for seismometer installation the Yukon Delta National Wildlife Refuge, southwestern Alaska. Developed research, led consultation with Alaska SHPO, and USFWS, authored final report and all aspects of project management. Yukon-Kuskokwim Delta, Alaska.

Alaska LNG Project, Alaska. Manager for cultural resources, subsistence, socioeconomic, traditional knowledge, ethnography and paleontological studies for the Alaska LNG project. All aspects of project management including personnel, task and budget management; client management; research design and protocols development; Native, community and stakeholder consultation; overseeing subcontractors.

USACE, Chitna Mine Project SEIS, Alaska.

Cultural resource specialist. Cultural resource specialist for a third-party SEIS to evaluate the potential impacts of a new coal mine in the Cook Inlet region of southcentral Alaska, under the direction of the USACE and contracted with PacRim.

Edmund “Ned” Gaines, RPA (*Brice Environmental*), continued

USACE, Regional EIS for Surface Coal and Lignite Mining, Texas. Cultural resource specialist. Native liaison, cultural resource and Traditional Knowledge specialist for third party EIS to analyze potential impacts within defined geographic regions in Texas that may be affected by future USACE permit decisions for future surface coal and lignite mine expansions.

Alaska DOT&PF, Foothills West Transportation Access Project, North Slope, Alaska. Cultural and paleontological resource specialist. Cultural and paleontological resource specialist for a third-party EIS to evaluate the potential impacts of a new all-weather road from the Dalton Highway to Umiat, Alaska, under the direction of the USACE and contracted with Alaska Department of Transportation and Public Facilities.

ExxonMobil TransCanada, Alaska Pipeline Project. Traditional Knowledge and Ethnography Studies, task lead. Responsible for managing Traditional Knowledge and Ethnography studies. Conducted all aspects of project management including managing \$1.2 million budget, developing study protocols and methods, scheduling, client management, directing sub-contractors, and Tribal consultation.

Alaska DEC, Village Safe Water Data Recovery and Human Remains Excavation, Hooper Bay, Alaska. Project Manager and principal investigator. Directed impacts mitigation, Section 106 NHPA consultation, site excavation, human remains recovery and analysis, and Tribal and community consultation related to archaeological site and human burial impacts from water line installation. Managed project and lead author of final report. Yukon-Kuskokwim Delta, Alaska.

BLM, Ochoa Mine Project EIS, New Mexico. Cultural resource specialist. Cultural resource specialist for a third-party EIS to evaluate the potential impacts of a new polyhalite mine in southeastern New Mexico, under the direction of the BLM Carlsbad Field Office and contracted with Intercontinental Potash. Lea County, New Mexico.

Positions Held: Senior Cultural Resource Specialist/Archaeologist, Brice Environmental Services Corporation, Anchorage, Alaska.

(2017-present). Senior archaeologist responsible for overseeing and directing all aspects of Brice Environmental Services' cultural resources services.

Senior Cultural Resource Specialist/Applied Anthropologist, AECOM, Fairbanks, Alaska. (2011-2017). Project director/manager for Phase I cultural resources inventory and survey, Phase II NRHP evaluations, and Phase II mitigation of adverse effects; Section 106 tribal and agency consultation; NHPA, NEPA, AHPA, PRPA, NAGPRA, ARPA and other state and federal regulatory compliance. Conducted all aspects of project management including personnel, task and budget management; client management; research design and protocols development; directing fieldwork; lead author of reports; applied anthropology; agency and tribal consultation; negotiating multi-party Programmatic Agreements; paleontological resources impacts analysis; and overseeing sub-contractors. Provided cultural resource services for public and private sector clients on variety of projects throughout Alaska. Major projects included serving as socio-cultural studies manager for Alaska LNG (directing cultural resources, traditional knowledge, ethnography, subsistence studies, and socioeconomic impacts analysis), task manager for traditional knowledge and ethnographic studies for the Alaska Pipeline Project. Directed more than 12 other archaeological projects throughout Alaska.

Cultural Resource Specialist/ Archaeologist, Colorado State University, Center for the Environmental Management of Military Lands, Fort Wainwright and Fort Richardson, Alaska. (2008-2011). NHPA, ARPA, NAGPRA, NEPA and PRPA consultant for the U.S. Army; Project Director and Principal Investigator for Phase I, II, and III survey, monitoring, testing, and excavation; budget management (up to \$750k annually); field crew supervision (up to 35 crewmembers, multiple crews, multiple projects); EIS cultural resource analysis; database management; technical report preparation; GIS; stakeholder engagement, and tribal consultation.

Staff Archaeologist, Northern Land Use Research, Inc., Fairbanks, Alaska. (2006-2008). Field Director for Phase I, II and III survey, monitoring, testing, and excavation for public and private sector clients on variety of projects throughout Alaska; project director for Phase I survey and monitoring, records and archival research; laboratory analysis; GIS; database management; and report preparation.

Technician, Arizona State Museum Bioarchaeology Laboratory, Tucson, Arizona. (2004-2006). Human remains excavation, analysis, curation and repatriation, burial and cremation excavations, tribal consultation, NAGPRA compliance.

Technician, Colorado State University, Center for the Environmental Management of Military Lands, Ft. Wainwright Donnelly Training Area, Delta Junction, Alaska. (2002-2003). Phase I survey and phase II site evaluations.

Technician/Crew Chief, Desert Archaeology, Inc. Tucson, Arizona. (2000-2002). Phase I, II and III survey, monitoring, and excavation on various projects in the U.S. Southwest.



Dale Gauthier, PE, MBA (Infrastructure) Power Generation & Transmission (Senior On-Call Expert)

Education

MBA, University of San Diego, 1981

BS, Mechanical Engineering, University of Arizona, 1978

Years of Experience

With AECOM: 12

With Other Firms: 24

Registrations/Certifications

Professional Mechanical Engineer, California, #21302

Certified Energy Manager (CEM)

Mr. Dale Gauthier has more than 36 years of energy and power experience and AECOM's Los Angeles Regional Business Line Leader responsible for power, energy & industrial projects in the region. Dale has provided development and design expertise to utility and distributed renewable as well as fossil fuel projects worldwide, providing project design and execution leadership. Most recently, Dale was AECOM's Renewable Market Segment Leader for the Western United States and developed and managed annual revenue exceeding \$41 million in design, procurement, and construction content for solar projects. Some of the more recent projects that have or are in development under Dale's leadership are the Techren Solar Nevada 300 MW solar PV project located in Boulder City, Nevada; the Siyathemba Solar 50 MW solar park in South Africa; California State University Fullerton 4.5 MW cogeneration plant and Beacon Solar, a 200 MW project in Kern County California; and Los Angeles Department of Water and Power's Pine Tree 10 MW project. Prior to that role, Dale led AECOM's Energy Efficiency Project Development Team for the Western United States.

Why Chosen for This Project

- Extensive experience in design and management of renewable and fossil fuel power and energy projects, including solar, biogas, thermal energy, and cogeneration plants

Project Experience

Harper Construction SA, Siyathemba Solar One, Pretoria, South Africa. Managed all preliminary solar array design and energy performance modeling of a utility scale 50 MW solar park to be submitted in the South African REIPP Round 3 solicitation. Worked with the AECOM South African team that provided all civil, including hydrology and drainage design, environmental review and compliance; medium voltage collection, and substation design; transmission generation tie (gen-tie) design.

US Naval Facilities Engineering Command Southwest, Box Canyon Photovoltaic, Camp Pendleton, California. Successfully led the capture and delivery of the 1.4 MW solar landfill cap project. AECOM provided full DC, structural, civil, geotechnical, and hydrologic design. AECOM also provided all equipment procurement for the solar project under subcontract to the construction contractor.

Dale Gauthier, PE, MBA, *continued*

Los Angeles Department of Water and Power (LADWP), Pine Tree I Solar Photovoltaic, Los Angeles, California. Successfully led the capture and delivery of the 10 MW solar project. The project is unique in the use of multiple panel tilt angles in an effort to maximize the capacity and output of the solar project to deliver the lowest levelized cost of energy (LCOE) for the project. Project scope is full design, procurement, and construction support to LADWP IBEW construction forces. The project includes a guaranteed minimum energy (GME) contract provision.

California State University, Plant Upgrade and Expansion, San Marcos, California. Managed the design team for central plant upgrade and capacity expansion, and comprehensive Science building HVAC retrofits. An additional 1,300 tons of new chiller capacity was added, converting the central utility plant to all variable flow. Deficiencies were identified and corrected in the existing thermal energy storage (TES) chilled water tank that delivered an additional 7,000 ton-hours of chilled water capacity to the campus buildings. Other deficiencies in the original central plant design, including improper cooling tower design, were also corrected. This project resulted in over \$550,000 in annual energy savings and will receive approximately \$1.1 million in incentives.

City of Imperial Valley, Renewable Energy Project Development, Imperial Valley, California. Program Manager for a comprehensive renewable energy program to evaluate the viability of producing economic levels of anaerobic digester gas (biogas) production from various waste organic materials. The project included analytical and empirical studies to predict and evaluate biogas production, identify viable existing technology to support biogas production, technical and economically feasible biogas uses, including development of complex financial models. Managing engineering resources to develop cost and performance criteria for the project.

Caterpillar Capital Company, Inc., Landfill Gas Recovery, San Diego, California. Project Manager for multiple landfill gas (LFG) recovery projects ranging from 700 kW to 2.8 MW. Projects were designed and constructed to run exclusively on LFG generated on site. Responsible for project design including power generation equipment, LFG compression equipment, plant electrical systems including utility electrical interconnection, and fire protection system. All plants were designed for remote monitoring and control capability. 1994

California State University (CSU), HVAC System Upgrade and Expansion, Fullerton, California.

Project Manager for the development team performing preliminary assessment, investment grade assessment, and project implementation under the CSU MEA Comprehensive Energy Services Program. The multi-year project is responsible for upgrading much of the campus existing HVAC systems, expanding the campus central plant, and other infrastructure improvements. Additionally, energy efficiency improvements were developed including CO2 demand ventilation and converting constant volume HVAC systems to variable air volume. A new central plant 4.5 MW cogeneration system was added to expand the existing heating, cooling, and on-site power capabilities to the campus.

Tannehill Oil Company, Cogeneration, Taft, California. Project Manager for a 17 MW cogeneration project. The system consists of two 8.5 MW combustion gas turbines with full heat recovery for steam production to be used in production of high viscosity Kern County oil. Managed plant design, permitting, commissioning and start-up. This plant operates with availabilities consistently exceeding 96 percent annually.



Richard Greer, PhD

Terrestrial, Aquatic, and Marine Wildlife; T&E Species and ESA Compliance (Senior On-Call Expert)

Education

Post-Doctoral Fellowship, Forestry, West Virginia University, 1988-1990

PhD, Zoology, University of Wyoming, 1988

MS, Wildlife Resources, University of Idaho, 1982

BA, Zoology and Marine Sciences, University of New Hampshire, 1974

Years of Experience

With AECOM: 3

With Other Firms: 30+

Affiliations

The Wildlife Society

Waterbird Society

Training/Certifications

HAZWOPER, 40 Hour, 8 Hour Refresher

Dr. Richard Greer has over 30 years of worldwide experience investigating and mitigating environmental effects of development on wildlife populations and their habitat. He is responsible for developing federal/state and international environmental impact assessments (including US Army Corps of Engineers (USACE), Minerals Management Service/Bureau of Ocean Energy Management (MMS/BOEM), Bureau of Land Management (BLM), Federal Energy Regulatory Commission (FERC), and Department of Energy (DOE). He has prepared natural resource damage assessments, oil spill response, ecological risk assessments, and mitigation regarding threatened and endangered wildlife and plants. While with Exxon, Rich was a technical expert and manager for wildlife programs associated with the Valdez oil spill and development/spill contingency planning worldwide. He co-authored an MMS/BOEM technical review of the impacts of artificial light associated with oil platforms in the Arctic on marine fauna. Since 2009, Rich has supported and managed wildlife evaluations for the ExxonMobil Point Thomson project on the North Slope.

Why Chosen for This Project

- Senior biologist with significant Alaska experience related to fish and wildlife/birds
- Very involved with the Point Thomson NEPA effort

Project Experience

ExxonMobil Development, Point Thomson Gas Development Project, Alaska.

Environmental and regulatory advisor; wildlife program manager. ExxonMobil activities on Alaska's North Slope included an environmental impact statement (EIS), biological opinions and assessments, mitigation, community consultation, and field programs, including polar bear den surveys, eider surveys, caribou monitoring, fish studies, sediment, polycyclic aromatic hydrocarbons, and marine acoustics.

MMS/BOEM, Alaska. Wildlife biologist. Co-author and project manager for technical review of impacts of artificial light associated with oil and gas platforms in the Arctic on marine fauna (birds, marine mammals, fish, invertebrates), and design of light monitoring program.

Exxon Valdez Oil Spill, Alaska. Natural Resource Damage Assessment (NRDA) program manager for wildlife studies. Managed a series of Exxon-supported field studies and published papers that focused on impacts to seabirds and marine mammals throughout the Gulf of Alaska (murre, sea otters, harbor seals, and killer whales). NRDA expert witness at deposition for civil litigation regarding seabird injury.

Richard Greer, PhD, *continued*

Imperial Oil Resources Ventures Ltd. (IORVL), Beaufort Sea Exploration Drilling Program EA, Canada. Wildlife biologist. IORVL's proposed project evaluated the potential effects of an exploratory well in the Canadian Beaufort Sea offshore of the Northwest Territories. Supported development of the EA focusing on sensitive avian and marine mammal impacts.

Enron, FERC, Calypso Pipeline EIS, Multiple States. Deputy Project Manager. FERC third-party EIS for a 5.8-mile onshore and 36-mile offshore natural gas pipeline system from coastal Florida to US Exclusive Economic Zone. Responsibilities included management of wetlands, coral reef, vegetation, wildlife, fisheries, and threatened and endangered species issues. Also drafted the marine biological resources, threatened and endangered species, and essential fish habitat chapters.

Dominion Gas, FERC, Greenbrier Pipeline EIS, Multiple States. Biological sciences leader. FERC third-party EIS for a 280-mile natural gas pipeline system from West Virginia to North Carolina. Responsibilities included management of wetlands, vegetation, wildlife, fisheries, and threatened and endangered species issues. Drafted wildlife and threatened and endangered species chapters, along with the biological assessment.

Argus, Rockspring, BLM, East Lynn Lake Coal Lease Draft EIS, West Virginia. Fish and wildlife leader. BLM third-party Draft EIS for a proposed underground coal mine in West Virginia. Leader for biological assessment, state and federal agency coordination, and development of fish and wildlife resources, threatened and endangered species, and cumulative effects chapters.

Sempra Energy, BLM, Granite Fox Power Plant Draft EIS, Nevada. Wildlife biologist. Supported development of a third-party DEIS () for a proposed coal-fired power plant in Nevada.

DOE, Yucca Mountain Rail Corridor/Rail Alignment Draft EIS, Nevada. Ecologist. Provided review of wildlife, vegetation, and threatened and endangered species chapters for Yucca Mountain Geologic Repository for Nuclear Fuel Disposal Draft EIS for the DOE in Nevada.

ExxonMobil Pipeline Oil Spill, Montana. Planning team member. Field response to pipeline rupture on Yellowstone River, Montana. Command Center activities included coordination of shoreline cleanup and assessment (SCAT) field work, landowner claims, and fish and wildlife impact assessment.

US Fish and Wildlife Service (USFWS), Stuyvesant Oil Spill, California. Wildlife program manager. Bean dredging spill in Humboldt Bay, California support included wildlife injury determination, seabird population modeling, and development of seabird restoration options in cooperation with the State of California and USFWS.

Potomac Electric Power Company, Chalk Point Oil Spill, Maryland. Wildlife program manager. Support for pipeline rupture in Chesapeake Bay, Maryland, included field studies, developing wildlife injury assessments, and assessing restoration options for muskrat, terrapin, bald eagle, osprey, great blue heron, and waterfowl populations.

Exxon, Arthur Kill Oil Spill, New York. Technical analyst/program manager. Exxon Bayway Refinery pipeline rupture in New York Harbor focused on determining injury to nesting wading bird populations. Evaluated reproductive success and foraging patterns of herons and egrets that nested on islands of Arthur Kill and Kill van Kull. Coordinated winter waterfowl survey. Sampled fish, benthic invertebrates, and sediment.



Richard L. Henry, PG (Mining) Water Management; Surface and Ground Water Hydrology; Water Quality/Geochemistry

Education

PhD, Geochemistry, Colorado School of Mines, Expected May 2018

MS, Geology, University of Georgia, 1978

BS, Geology, University of Georgia, 1975

Years of Experience

With AECOM: 15

With Other Firms: 24

Registrations

Licensed Professional Geologist, Wyoming, No. PG 3313

Areas of Expertise

Geochemistry

Hydrogeology

Geochemical Modeling

Reactive Transport Modeling

Groundwater Flow Modeling

RI/FS, RFI/RI, CMS, IM/IRA, RD/RA

Risk-Based Corrective Action

Radiochemistry

Radiation Safety

Mineral Resources

Environmental Statistics

Risk and Dose Assessment

Performance Assessment

Dr. Richard Henry is a principal hydrogeologist and geochemist with 35+ years of progressively responsible, customer-focused consulting and industry experience. He has been responsible for the management and technical direction of complex environmental permitting, characterization, and remediation projects conducted under various federal entities, including the US Forest Service, US Air Force, Department of Energy, Nuclear Regulatory Commission US Environmental Protection Agency (USEPA), Superfund (CERCLA), Resource Conservation and Recovery Act (RCRA), and Interstate Technology and Regulatory Council (ITRC) regulations and guidance.

Richard is experienced in the evaluation of soil, geologic, geochemical, mineral, and water resources for environmental assessment, impact, and resource management studies in the western US. He has supported water resource evaluations for environmental impact assessments (EISs) and certificates of environmental compatibility (CEC). He prepared the water resources chapters for several CECs in Arizona including the Arizona Public Service (APS) Sun Valley to Morgan 500/230kV Transmission Line Project, APS Ocotillo Power Plant, and Starwood Solar I. As part of the Starwood project team, he presented direct testimony before the 11-member Arizona Corporation Commission (ACC) Power and Transmission Line Siting Committee. He also recently

Why Chosen for This Project

- Geochemical and flow and transport modeling (vadose and saturated flow), EIS impact analysis, aquifer testing and analysis, deep well installation, pump and treat systems, engineered covers, ARD evaluation, tailings discharge predictions for mines in the western US

prepared the geologic, mineral, and water resources chapters for the Chocolate Mountains Aerial Gunnery Range Legislative Environmental Impact Statement (LEIS) in California and the geochemical characterization chapter for a porphyry copper-gold tailings to support the Kennecott Northeast Tailings Impoundment Expansion EIS. Work included review and evaluation of static and kinetic geochemical characterization data for the tailing, long-term tailings oxidation profile modeling using PYROX, and geochemical mixing models using PHREEQC to predict long-term seepage water quality

He is experienced in flow and transport modeling including 1-, 2-, and 3-D analytical and finite difference and finite element vadose and saturated zone flow, contaminant, and reactive transport modeling, and uncertainty and sensitivity analyses. Example model experience includes MODFLOW, MT3DMS, RT3D, PHT3D, HYDROGEOCHEM, VS2DT, HYDRUS, HP1, and HELP.

His geochemical modeling experience includes EQ3/6, PHREEQC, Geochemist's Workbench, WATEQ4F, MINTEQA2, NETPATH, AquaChem and similar programs, including source code and thermodynamic database modification and validation to ensure technical and legal defensibility of the results.

Richard L. Henry, PG, *continued*

Project Experience

US Forest Service, Buckhorn Gold Exploration Project EIS, Washington.

Prepared a work plan to assess potential changes in surface water and groundwater quality due to EBE's proposed exploration drilling, borehole abandonment, and drilling fluids and cuttings management. Estimated concentrations of representative potential constituents of concern (PCOCs) using a geoenvironmental model approach that recognizes the ore deposit mineralization and other characteristics controls the composition of acid rock drainage (ARD) or neutral mine drainage (NMD) discharges under undisturbed (i.e., natural or pre-mine) and disturbed (i.e., mining or post-mine) conditions.

US Forest Service, Forest Service Road 3030 ARD Evaluation, Prince of Wales Island, Alaska.

Evaluated the ARD potential of the pyritic black Descon Shale based on static and 39-week long kinetic humidity cell test results. Determined the neutralization requirements using static and kinetic test results of shale/limestone mixtures for use as asphalt cemented road base to minimize generation of ARD.

Rio Tinto Kennecott, Bingham Canyon Mine, Northeast Tailings Expansion EIS, Utah.

Performed geochemical characterization of porphyry copper-gold mine tailing for the expansion of the existing tailing impoundment to support EIS and mine permit. Work included review and evaluation of static and kinetic geochemical characterization data for the tailing, long-term tailings oxidation profile modeling using PYROX, and geochemical mixing models to predict seepage water quality using PHREEQC.

Rio Tinto Kennecott, Bingham Canyon Mine, Post-Closure ARD/NMD Prevention and Minimization Strategy, Rio Tinto, Utah.

Prepared post-closure ARD/NMD prevention and minimization strategy for 9,200 acre porphyry copper-gold tailings impoundment. Work included a review and summary of regulatory and Rio Tinto Kennecott Copper (RTKC) requirements, closure and reclamation objectives, existing and future site conditions, applicable prevention and minimization technologies, and development of a final post-closure strategy.

Rio Tinto Kennecott, Bingham Canyon Mine, Post-Closure Tailings Water Quality and Quantity Predictions, Utah.

Predicted post-closure tailings seepage water quantities using HELP and water quality using PHREEQC mixing and PYROX oxidation models for the North Tailings Impoundment to determine whether the draindown waters require long-term management and/or treatment following closure, and assessed knowledge gaps, data needs, and likely future work.

Peabody Western Coal Company, Kayenta Mine Permit Renewal Environmental Assessment, Arizona.

Reviewed and updated surface water and groundwater resources affected environment and environmental and cumulative impact sections of the environmental assessment (EA) document in support of the mine permit renewal. Review included the regional surface water and groundwater hydrogeologic setting, water quality conditions, surface impoundment seepage evaluation, groundwater flow modeling, water use and supply impacts, and a cumulative hydrologic impact analysis.

UMETCO, Former Wilson Vanadium Mine, Arkansas.

Characterized the geochemistry of former vanadium mine spoils to determine their long-term potential for generating ARD and possible long-term impacts to groundwater and surface water quality. Evaluated possible remediation options to passively treat potential ARD metals and sulfate releases to groundwater and surface water using an in-situ permeable reactive barrier composed of limestone, an organic substrate, and zero-valent iron (ZVI). Conducted bench and field pilot tests to assess the effectiveness of the proposed permeable reactive barrier PRB.

ASARCO, Elder Gulch Tailings Impoundment, Arizona.

Performed water balance, seepage analysis, ARD, and water quality impact analysis for an Aquifer Protection Permit at a porphyry copper mine. Analysis included reactive transport modeling of potential contaminant sources on groundwater quality. Evaluated Best Available Demonstrated Control Technologies (BADCT) to minimize groundwater quality impacts.

FMI Chino-Cobre Mines, EIS Document Database Development, New Mexico.

Reviewed and prepared environmental document database to determine if sufficient baseline geochemical data, including acid generation potential, and hydrogeological information were available to develop an EIS for the Chino-Cobre porphyry copper mine in New Mexico.



Dan Kim

Human Health/Toxicology

Education

BS, Environmental Toxicology, University of California, Davis, 1997

Years of Experience

With AECOM: 7
With Other Firms: 12

Training/Certifications

OSHA HAZWOPER 40-Hr Health and Safety Training

Mr. Dan Kim is a senior human health risk assessor with 19 years of professional experience supporting private sector (petroleum and paper mill industries), public utility clients, and Department of Defense (DoD) base and facility closure/transfer projects and US Army Corps of Engineers (USACE) projects. Dan has consistently focused on Health Risk Assessments conducted according to guidance by the US Environmental Protection Agency (USEPA), Alaska Department of Environmental Conservation (ADEC), and/or regional and local agencies. In the past five years, Dan has added environmental impact statement (EIS) and environmental social and health impact assessment (ESHIA) support for health impact assessments (HIAs) for projects in Alaska, California, the Midwest, and Gabon, Africa. He also has three years of experience as a staff toxicologist in the public health sector working at NSF International, Ann Arbor, Michigan.

Dan has performed technical data research on toxicological subject matter as well as public health. His human health risk assessment experience includes evaluations of pesticides, polychlorinated biphenyls (PCBs), dioxins, total petroleum hydrocarbon (TPH), heavy metals, and considerations of land use. He also analyzes vapor intrusion of volatile organic compounds (VOCs) from sub-surface sources into residential and commercial buildings.

Why Chosen for This Project

- Senior risk assessor who is working on the Donlin Gold EIS
- Experience with emerging issues including health impact assessments for mining and oil and gas projects

Dan has developed conceptual site models (CSM) for multi-pathway exposure scenarios (i.e., sediment, surface water, groundwater, soil, and air) for direct exposure and indirect such as subsistence and indoor air pathways.

Project Experience

USACE, Chuitna Coal Mine EIS/HIA, Alaska.

Scientist and technical researcher. Research and technical support/writing of the HIA that was part of an EIS in conjunction with Alaska Department of Health and Social Services (ADHSS) and Newfields Companies for the Chuitna Coal mining operation in the region. The HIA covered construction, operation and post-closure for the proposed Chuitna coal mine encompassing the following areas: Kenai Peninsula Borough, Beluga, and the Alaska Native village of Tyonek.

USACE, Donlin Gold Mining and Transfer Operation EIS/HIA, Alaska.

Scientist and technical researcher. Research and technical support/writing of the HIA that was part of an EIS in conjunction with Alaska Department of Health and Social Services (ADHSS) and Newfields Companies for the Donlin Gold mining operation in the Yukon Kuskokwim region. The HIA covered construction, operation, and post-closure for the proposed Donlin gold mine, associated mining infrastructure and more than 300 miles of pipelines and transportation routes encompassing

Dan Kim, *continued*

the following census tracts and areas: Bethel and Yukon-Koyukuk Census Areas, Kenai Peninsula and Matanuska-Susitna Boroughs, Yukon Kuskokwim Health Corporation Service Area, and small Alaska Native villages.

USACE, Eklutna Army Site, Alaska. Technical reviewer for the human health risk assessment data and calculations in the Phase II Remedial Investigation, meeting USEPA (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]) and ADEC requirements. The investigation involved soil and soil gas contamination by polycyclic aromatic hydrocarbons (PAHs) and chlorinated solvents. The focus was the protection of subsistence harvesters and consumers during hunting and berry picking. Also evaluated were ceremonial event participants and potential recreational visitors and trespassers.

USACE, Bonneville Lock and Dam Project, Bradford Island, Oregon. Risk assessor. Sediments in the vicinity of Bradford Island in the Columbia River near the Bonneville Dam are contaminated with PCBs from transformers and metals (lead, copper) from other operations at the island. Human health issues of concern include potential risks to for subsistence and recreational consumers of fish and shellfish. Conducted the risk assessments for the site.

Chevron, Effects of Fracking on Community Health, Pennsylvania. Analyst on the team conducting a health baseline study for multiple counties in Pennsylvania as part of a proposed ESHIA and also conducting a research-oriented study of the health effects of fracking from an epidemiological standpoint, focusing on health outcomes such as respiratory disease and low birth weight.

Enbridge Energy, LP, Enbridge Flanagan Pipeline, Cross-continental North America. HIA analyst for an EIS for a 600-mile pipeline to be built by the Enbridge Pipeline Inc., for the conveyance of crude oil from Western Canada to the Midwest and Gulf of Mexico. An HIA was included as part of the pipeline. Provided health data research, tabulation, and graphical design assistance of the HIA which covers 31 counties in four states.

Confidential Client, Health Impact Assessment, Beaver County, Pennsylvania. Scientist and technical researcher supporting a HIA as part of an overall Impact Assessment, for a confidential energy project in Pennsylvania. Participated on the team for collecting and reviewing health, social, and economic information from national, state, and regional sources to build a picture of the baseline health status of the affected communities and potential health-related impacts due to the proposed high-visibility project.



Louise Kling

Visual Resources

Education

MS, Landscape Ecology, Utah State University, pending thesis defense

BS, Biology, Lewis and Clark College, 1994

Years of Experience

With AECOM: 12

With Other Firms: 13

Affiliations

River Management Society, Northwest Chapter President

National Association of Environmental Professional

Ms. Louise Kling is a senior environmental planner with over 25 years of experience in environmental research and planning. Her career began with nearly a decade working for the US Forest Service in Washington State. She applies this experience to projects requiring federal and state-specific environmental compliance and documentation. Her technical practice focusses on land use, visual, and recreation resources. Louise has applied her expertise to diverse projects, including land use planning, mining, renewable energy, oil and gas, transmission, hydropower, pipeline, port, transportation, and fire management. Her work emphasizes innovative and solution-orientated approaches for projects sited in or adjacent to special management areas such as Wild and Scenic Rivers, Wilderness Areas, and National Scenic and Historic Trails.

Louise maintains an active professional role in the field of visual resources, and is widely respected for her role in advancing knowledge of this topic. She has served on several national panels on visual resources, and recently participated as an expert reviewer for the Bureau of Land Management (BLM) Best Management Practices for Visual Resources for Renewable Energy Facilities.

Why Chosen for This Project

- Senior visual subject matter expert for Donlin Gold, Isebek, Point Thomson, BSWI, and Stibnite Gold EISs
- Well versed in visual simulations and impact methodology
- Recreation subject matter expert

Project Experience

US Forest Service, Stibnite Gold Environmental Impact Statement (EIS), Idaho. Social resources lead for the Stibnite Gold Project. The proposed project will reclaim historically impacted areas; replant extensively reduced forest cover; restore stream channels, wetlands, and fisheries; restore fish passage on the East Fork of the South Fork of the Salmon River; and create a sustainable ecosystem over the 20-year construction, operation, and closure life cycle of the project. Overseeing the completion of EIS analyses for cultural resources, visual resources, recreation, wilderness (the Frank Church River of No Return Wilderness), inventoried roadless areas, public health and safety, access & transportation, socioeconomic, environmental justice, and land use. The impact analyses for these social resources considers the influence of a new road adjacent to wilderness, potential for increased visitation, and impacts from noise and night lighting from the operation of the mine.

USACE, Donlin Gold Mine EIS, Alaska. Visual resource technical lead. The project includes an open pit mine, access roads, shipping channel, a 300-mile natural gas pipeline, and a 40-mile of electrical transmission line. Sensitivities associated with this project include the Iditarod National Historic Trail, Native communities, and cultural resources. Leadership role in working directly with the BLM to address concerns around potential project-related impacts to these areas.

Louise Kling, *continued*

NMFS/Bureau of Ocean Energy Management (BOEM), Effects of Oil and Gas Activities in the Arctic Ocean EIS, Alaska. Visual resources lead. Completed a visual impact analysis and authored visual resources sections of EIS for a proposal to permit seismic testing, oil exploration, and extraction in the Chukchi and Beaufort Seas in Alaska. This project required characterization of winter and summer conditions in offshore areas of the Arctic, and identification of potential impacts to visual resources. Analysis emphasized consideration of sensitive viewers, such as Native communities, recreators, and tourists in the US Fish and Wildlife Service (USFWS) administered Arctic National Wildlife Refuge and Arctic Maritime National Wildlife Refuge.

Exxon-Mobil, Point Thomson Project Third-Party EIS Review, Alaska. Visual resources lead. Conducted a visual assessment of the proposed Point Thomson Project using USACE methodology. Served as third-party consultant to developer, providing internal review of Draft EIS. Authored a technical paper comparing visual resource methodology used by the US Forest Service, BLM, and USACE. Findings were presented at an interagency meeting and used to select appropriate methodology to support the EIS.

Susitna-Watana Hydroelectric Project, Federal Energy Regulatory Commission (FERC) Study Report, Recreation and Aesthetics (Exhibit E), and Recreation Management Plan, Alaska Energy Authority, Alaska. Recreation and aesthetics technical lead for a large-scale 700 MW hydroelectric project located in the Railbelt Region of Alaska. The proposed project includes construction of a new 735-foot dam, access roads, and approximately 120 miles of electrical transmission lines. Responsible for preparation of the FERC Resource Reports for Aesthetics (including Soundscape), License Application, and development of a Recreation Resource Management Plan. Led stakeholders in numerous technical working group meetings focused on potential aesthetics. As part of this task, developed public messaging and presentation materials. In this capacity, instrumental in building trust among key stakeholders as the project progressed through the permitting process.

Alaska Natural Gas Development Authority (ANGDA), Beluga to Fairbanks Natural Gas Pipeline System EIS, Alaska. Visual resources lead. Conducted visual resource impact assessment for the EIS for a proposed 460-mile natural gas pipeline located in south-central and interior Alaska. Approximately 250 miles of the proposed alignment has not received prior visual resource inventory work by the BLM, US Forest Service or the National Park Service, and thus required classification of existing resources. Visual assessment was completed using aerial photography from a 360-degree streaming video, following methods adopted from the BLM and Federal Highway Administration.

Unicom/GCI, TERRA-SW, TERRA-NW, and TERRA-NW Phase III Project EAs, Alaska. Visual resources lead. Completed EAs of project to expand terrestrial broadband services to rural communities in southwest Alaska. The project would require the installation of new microwave communications sites and underground fiber cable. Sites are proposed on private lands, and federal land administered by the USFWS and the BLM. This impact assessment involved consideration of the Iditarod National Historic Trail, BLM-identified Lands with Wilderness Characteristics, and coordination with the Alaska State Historic Preservation Office.

Palomar Gas Transmission Project (PGT), Mt. Hood National Forest / West-wide Energy Corridor, FERC Land Use, Recreation and Aesthetics Resource Report, Oregon. Visual resources lead. Conducted a visual resources assessment of portions of the Mt. Hood National Forest crossed by the proposed pipeline. Updated lands classified using the outdated Visual Management System to be consistent with the Scenery Management System, per guidance contained in the West-wide Energy Corridor Record of Decision. Worked with a diverse interdisciplinary team to develop precedent-setting mitigation and design options focused on sensitive areas, including the Pacific Crest Trail, designated viewshed areas, and federally-designated Wild and Scenic Rivers. Authored Scenery Management Plan.



James "Jim" W. Knight

Ecological Risk/Toxicology (including Fish Toxicology)

Education

MS, Business Administration, Colorado State University, 1986

BS, Forest Management, University of Maine, 1978

BA, English, University of Michigan, 1976

Years of Experience

With AECOM: 3

With Other Firms: 25

Training/Certifications

40-hour OSHA HAZWOPER Training

8-hour OSHA HAZWOPER Refresher Training, Annually

Affiliations

Society of Environmental Toxicology and Analytical Chemistry

Mr. Jim Knight is an environmental scientist/risk assessor with a diverse background in evaluating the impacts of contaminants on a variety of aquatic and terrestrial habitats as well as human health throughout the United States. He has been responsible for a wide range of projects, from straightforward assessments associated with a single contaminant to complex, multi-chemical, multi-receptor assessments. He has also served as a project manager or task manager on projects which resulted in the development of comprehensive remedial investigation (RI), feasibility study (FS) and environmental impact statement (EIS) reports. Jim's focus has been on regulatory issues affecting the mining, oil and gas, forest products and chemical industries as well as U.S. Department of Energy (DOE) and Department of Defense (DOD) facilities.

Jim has significant knowledge of environmental problems associated with metals, petroleum-related products, polychlorinated biphenyls (PCBs), dioxins, chlorinated solvents, and explosives. A number of his work products have resulted in regulatory submittals under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), National Environmental Policy Act (NEPA) and other federal and state programs. Jim has conducted over 50 human health and ecological risk assessments as well as other types of reports in both the public and private sector.

Why Chosen for This Project

- Senior ecological risk specialist who worked on Donlin Gold EIS to address risk to wildlife from the pit lake after closure

Project Experience

US Army Corps of Engineers (USACE), Donlin Gold EIS, Alaska.

Provided a comprehensive review of ecological risk issues associated with an EIS for a proposed mine site in Alaska. Focus was on potential risks for wildlife from exposure to toxic compounds and metals in a pit lake and other water storage facilities and the impact of fugitive dust deposition during future construction and operations. The potential for risks associated with an overturn scenario where high concentrations of metals in lower levels of the pit lake rise to the surface, was also evaluated.

Agrium/NuWest Industries, Inc., Ecological Risk Assessment, Idaho.

Conducted comprehensive screening level ecological risk assessments at three historic phosphate mining sites: the North Maybe Mine East Mill Dump, the North Maybe Mine Open Pit, and the South Maybe Canyon Mine Open Pit. These risk assessments addressed the potential for adverse effects on receptors exposed to metals in upland soil associated with the overburden waste rock as well as perennial or seasonal pit lakes, with an overall objective of assuring protection of ecological resources and livestock.

James “Jim” W. Knight, *continued*

Atlantic Richfield Company, Copper Mine Ecological Characterization, Yerington, Nevada.

Risk assessor who provided expertise and risk strategies for a number of ecological and human health issues associated with a copper mine site. Primary focus was on developing a comprehensive understanding of the ecology for each of the operating units including an offsite waterway. Also worked on developing conceptual site models for each of the operating units, as well as the overall mine site. Developed a work plan for the eventual sampling approach for the offsite waterway. Served as a senior reviewer for a comprehensive wildlife monitoring program performed on a weekly basis throughout the mine site.

Exxon Mobil Corporation, Natural Resource Damage Assessment and Associated Research, Montana. Provided expertise on a number of ecological issues associated with petroleum-related contamination in the Yellowstone River. Initial focus was on developing a comprehensive EIS for the contaminated area of the river. Following the initial emergency response, worked with a team of researchers on developing an understanding of the ecology of the river (biota, woody debris piles, historical angler use, etc.) as part of the NRDA process. Developed several presentations for the client as well as sampling strategies for biota (fish and amphibians). [Prior to AECOM]

Atlantic Richfield Company, Ecological Characterization of Copper Mine, Nevada.

Provided expertise and risk strategies for a number of ecological and human health issues associated with a copper mine site in Yerington, Nevada. Developed a comprehensive understanding of the ecology for each of the operating units including an offsite waterway as well as developing conceptual site models. Developed a work plan for the eventual sampling approach for the offsite waterway. Served as a reviewer for a comprehensive wildlife monitoring program performed on a weekly basis throughout the mine site. [Prior to AECOM]

Freeport-McMoRan (FCX), Environmental Services at a Large Mining Site, New Mexico.

At the Chino copper mine site, provided technical reviews on multiple work plans and RI/FS reports associated with multiple regulatory programs including the overlap between discharge permits issued by the New Mexico Environment Department – Groundwater Quality Bureau, a Closure permit, and a CERCLA-like consent order. Additional human health and ecological issues under multiple programs were also investigated. [Prior to AECOM]

US Department of Energy, Ecological Risk Assessment at Rocky Flats, Colorado. Served as an integral member of a project team that was tasked with completing a comprehensive final site-wide risk assessment for the Rocky Flats site near Denver. Project team was comprised of risk experts from several companies in the Denver area. Specific tasks included the evaluation of terrestrial and aquatic ecological risks associated with exposure to a number of chemical and radiological contaminants found at site. A year after the completion of draft risk assessment, addressed agency comments. [Prior to AECOM]

US Navy, Risk Assessment and Project Management, California.

Project Manager, lead ecologist and risk assessor for over five years on a number of projects at Point Molate in Richmond, California, on the San Francisco Bay. Developed risk-based TPH screening levels that were protective of human health and the environment (terrestrial and aquatic receptors) in soil, surface water and groundwater. Responsible for a comprehensive evaluation of the ecological risks to the offshore environment from petroleum-related contamination associated with the site. Reviewed or worked on several RI and FS reports. [Prior to AECOM]

US Navy, Installation Coordinator, Feasibility Study and Ecological Risk Assessment, California.

Served as installation coordinator at Moffett Airfield in Mountain View, California, for two years. Position included monthly project meetings with client and agency representatives. In addition to this role as installation coordinator, also served as project manager and lead ecologist/risk assessor on the development of a FS for a contaminated waterway. The FS included a \$1.2 million field investigation and a comprehensive risk assessment of receptors using the waterway. [Prior to AECOM]



Allison Knutson

Mining Development, Operations, Closure Requirements

Education

BS, Civil and Environmental Engineering, Lehigh University, 2001

Years of Experience

With AECOM: 3
With Other Firms: 13

Registrations

Engineer in Training, Colorado

Affiliations

American Society of Civil Engineers
Idaho Mining Association
Society for Mining Metallurgy and Exploration

Training/Certifications

OSHA HAZWOPER 40-Hour Training
MSHA 24-Hour Surface Miner Training
Wetland Delineation
USACE Construction Quality Management
DOT Maintenance of Traffic

Publications

A.H. Knutson, D. K. Vernon (2014). Selenium Management Options at Waste Rock Dump Sites. Tailings and Mine Waste '14. Keystone, Colorado.

Ms. Allison Knutson has 16 years of experience assisting clients with remediation solutions for land with environmental or physical hazards. She has address typical as well as unique site issues, including but not limited to: acid rock drainage, diversion of surface water, consolidation of waste rock, neutralization of multiple media, repository design, closure of subsidence structures (pits, shafts, adits), grading and drainage, and revegetation. Ms. Knutson has evaluated treatment methods for various site media; typically groundwater, surface water, vegetation, biota, soils, and sediment. Treatment methods have included physical, chemical, mechanical, and biological technologies; and have been explored in both passive and active capacities. She compiles these technologies into action alternatives and runs comparative analysis in order to make recommendations for remediation.

Allison's experience includes familiarity with a variety of mines including gold, silver, molybdenum, copper, mercury, fluorspar; and assessment of their corresponding environmental impacts, such as heavy metal and arsenic contamination, acid rock drainage, effects to threatened and endangered species, leachate management, and human health risks. She also has an awareness of historical and cultural designations and coordination of the required actions to preserve and protect these resources. She has conducted public hearing meetings and prepared response documents to private, public, state, and federal stakeholders' comments and concerns. Allison has also designed and coordinated post-closure monitoring and compliance programs.

Why Chosen for This Project

- Recent and broad mining experience
- Serves a similar role on the Stibnite Gold EIS
- Recent experience serving Teck Alaska for Red Dog Mine's tailings dam and operations support

Project Experience

US Forest Service, Midas Gold Idaho, Inc., Stibnite Mine EIS, Idaho. Provided expertise in site investigation, feasibility studies, permitting and construction, and mine remediation and closure, as applicable to the NEPA EIS process. Specifically developed and analyzed alternatives with respect to mine processes, development rock and tailings handling and storage, and final closure configuration feasibility.

Teck Alaska, Inc., Red Dog Mine Tailings Dam and Operations Support, Alaska. Assisted in preparation of Engineering Review Panel presentations, Construction Completion Reports and O&M Manuals for Tailings Main Dam. Managed tasks for water supply dam hazard classification upgrade; including seepage and stability analyses, water level recording and trigger levels, piezometer installation plan, and updates to Emergency Response Plan and O&M Manual.

Agrium Hydro and CCD Center of Excellence. Provided specific expertise to Agrium Centers of Excellence in the areas of hydrology, hydrogeology, construction specifications, standard operating procedures, and cap and cover design. Developed tools for evaluation of both typical and refined cap and cover applications and components. Evaluated material and cost saving options for cover types and assessed alternatives to capping. Led focus study groups in discussion and preparation of deliverables. Provided presentation materials to client for demonstration of program progress to management.

Allison Knutson, *continued*

Agrium/Nu-West, North Maybe Mine Open Pit SOU, North Maybe Mine Creeks SOU, North Maybe Mine East Mill Dump SOU, South Maybe Canyon Mine Open Pit OU, Remedial Investigation/Feasibility Studies (RI/FSs), Idaho.

Conducted RI/FSs at the North Maybe and South Maybe Canyon Mines near Soda Springs, Idaho. Managed investigation into the nature and extent of contamination at the site, and assessment of the potential risk to human health and the environment in order to develop remedial alternatives. Investigated the extent of migration of contamination and any

changes in its physical or chemical characteristics, to provide for a comprehensive understanding of its nature and extent. Prepared RI/FS work plans, sampling and analysis plans, quality assurance plans, and site health and safety plans. Updated the site conceptual models, refined and documented preliminary remedial action objectives and alternatives, evaluated the need for treatability studies, compiled Applicable or Relevant and Appropriate Requirements (ARARs), and managed field investigations. Managed data collection, tracking, validation, and reporting.



Frank Lan, PhD, PE (Mining) Water Management, Surface Water Hydrology, TSF Failure Analyses

Education

PhD, Water Resources, Colorado State University, 1990

MS, Water Resources, Colorado State University, 1986

BS, Civil Engineering, Wuhan University, China, 1983

Years of Experience

With AECOM: 25

With Other Firms: 2

Registrations

Professional Engineer, Colorado, #38115

Dr. Frank Lan is a principal water resources engineer with more than 25 years of successful experience in the application of surface water and groundwater hydraulic/hydrologic (H&H) analysis and modeling to the planning and design in various water resources projects for domestic and international clients. His expertise includes multi-dimensional surface and groundwater flow and solute transport modeling and analysis, hydrologic modeling/analysis, sediment transport and river engineering, hydraulic structure design, dam break analysis, floodplain delineation, mitigation and management, storm water planning and modeling, urban drainage design, alluvial geomorphology, water management modeling, and statistical analysis.

Frank is best known for his extensive experience in applying numerical models to various water resources applications. An expert in GoldSim™, he has developed water management models for numerous mine sites around the globe. He is an expert in applying 3D CFD models to solve complex hydraulic problems in the design of dam and spillways, pump stations, intakes and outlets, mixing tanks/ponds, and others. His clients include the Bureau of Reclamation, US Fish and Wildlife Service (USFWS), Natural Resources Conservation Service (NRCS), local governments, and other countries (Canada, Australia, Spain, Argentina).

He has conducted or led numerous GoldSim water balance, hydrologic, and tailings dam breach modeling studies for traditional dams and tailings dam for mine sites around the world, with clients including FMI, Rio Tinto, BHP Billiton, Umetco, and

Why Chosen for This Project

- Principal water resources engineer with over 25 years of experience in applying surface water and groundwater hydraulic/hydrologic analysis and modeling

others. He was one of the key researchers to develop the rheological relationships that are used in the simulation of mud/debris flows (for tailings) in FLO-2D, special software designed for routing of tailings flows.

Frank is experienced with numerous surface and subsurface flow and sediment transport models, including FLOW-3D, Ansys CFX, SRH-2D, FLO-2D, HEC models (HEC-1, 2, 5, 6, RAS, HMS, ResSim), SRH-2D, GSTAR-3, FEQ, DAMBRK, FLDWAVE, GoldSim, TAB2, RMA2, FESWM, SED2D, RMS, SWMM, HSPF, MIKE-11, MODFLOW. He is an expert in applying sophisticated 3D computational fluid dynamic (CFD) modeling for many water related projects, in particular to the design of dams and spillways (more than 60 around the world in the last 10 years). A few example projects include:

- Ashton Dam Overtopping and Spillway CFD Modeling, PacifiCorp, Ashton, Idaho
- Ruby Dam Rehabilitation, Montana Department of Natural Resource Commission, Montana
- Hinze Dam Stage 3 Enhancement Spillway and Fishway CFD Modeling, State Water, Queensland, Australia
- Murchison Dam Spillway Evaluation CFD Modeling, Hydro Tasmania, Tasmania, Australia
- Tesla Energy Dissipation Structure (EDS) CFD Investigations, Colorado Springs Utility, Colorado
- Dam Rehabilitation CFD Modeling, Various Locations, US Fish and Wildlife Service
- Lake Roberts Dam Spillway Rehabilitation CFD Modeling, New Mexico

Frank Lan, PhD, PE, *continued*

Project Experience

Red Dog Mine Water Balance Modeling, Red Dog, Alaska. Task manager for developing a site-wide water management model based on GoldSim and PHREEQC for the Red Dog Mine. The model simulates complex hydrologic processes through the pits, mine waste dump, seepage collection systems, TSF, three water treatment plants, mill, and a sand filter plant that controls the discharge of treated water to offsite to satisfy EPA discharge criteria. Site-specific climate model and runoff procedures were established for the site in order to provide better calibration to historical data. The model also considered hydrologic variations due to climate changes.

Sierrita Mine Site-Wide Water Management Model, Sierrita, Arizona. Project manager for development of a site-wide probabilistic water management model for the Sierrita Mine near Green Valley, Arizona. The Goldsim computer modeling platform was applied to model the complicated water usages in the mine that include the pits, the hydromet, the mills, concentrators, the tailings impoundments and the well fields. A stochastic precipitation-runoff model was also developed to simulate rainfall/runoff for the life of the mine in the future.

Jadar Mine Water Management Modeling for Rio Tinto, Loznica, Serbia. Lead engineer to develop surface water H&H and GoldSim water balance model for the proposed new mine that includes the calibration of a hydrologic model to recorded stream gauge data and probabilistic water balance modeling for various proposed mine operations.

Twin Metals Minnesota Mine, Babbitt, Minnesota. Lead engineer to develop a GoldSim water management model (quantity and quality) for the proposed mine to help evaluate the feasibility of the project. Stochastic modeling of precipitation, evaporation, snow melting and others are implemented

to evaluate the uncertainty in key input parameters. The model was used to size the potential flood detention pond and pumping facilities at the site.

American Electric Power (AEP) Mitchell Plant, West Virginia; Cardinal Plant, Ohio; Welsh Plant, Texas; Rockport Plant, Indiana. Task manager and lead engineer to develop waste water/mass management models for the power plants and evaluate alternatives to reduce chemical loadings to the receiving rivers to meet US Environmental Protection Agency (USEPA) compliances. Water quality modeling was accomplished by applying the Goldsim modeling platform that seamlessly links with the geochemical model PHREEQC for more complicated geochemistry modeling for the lakes and ponds.

Umetco, Wilson Creek Water Management Study, Hot Springs, Arkansas. Technical advisor for a site-wide water management study that included developing outflow rating curves for various outlet structures in the watershed, developing a GoldSim water balance and mass balance model to evaluate treatment and management options to meet USEPA discharge criteria for the future.

Minera Peñasquito Mine Water Balance Assessment, Mexico. Technical advisor and reviewer for conducting GoldSim water balance assessment of the proposed tailings storage facilities for GoldCorp. The assessment evaluated the make-up water for several TSF options.

Yeelirrie Mine Water/Water Quality Modeling, Western Australia. Lead engineer to develop a water management model based on the Goldsim modeling platform for the mine sites to evaluate alternatives to reduce salt and sediment loading to the receiving rivers downstream of the mine site. Treatment options included various retention ponds, use of open pits, and others.

Confidential Client, Australia. Lead engineer to develop a probabilistic water balance model based on Goldsim simulation platform to simulate the water distribution/balance for a large tailings storage facility for the proposed 25-year life span of the facility and determine the confidence levels for key design parameters to be used for developing the facility management plan. Probabilistic modeling includes the rainfall-runoff, evaporation, seepage, slurry feed, and many others.

Kennecott Mine, Salt Lake City, Utah. Technical advisor on applying a probabilistic Goldsim water quality model to evaluate alternatives to improve the water quality for the mine discharge to Salt Lake. The model include both water quantity and quality simulations for the entire mine facility, including mills, reservoirs, tailings facilities, springs, etc.

Freeport McMoRan Inc., New Mexico, Arizona, Colorado. Conducted tailing dam breach and flood inundation studies for several tailing dams for several FMI mine sites, including Bagdad, Morenci, Tyrone, Sierrita and Miami. All studies were based on assuming either liquefaction or non-liquefaction for the tailings but all considered runoff of the tailings during the breach. As a consequence of tailings being washed out during the breach, the runouts were modeled as non-Newtonian fluid and two dimensional hydrodynamic model FLO-2D was used for the analysis. Emergency action plans (EAPs) were prepared as a result of the dam breach studies.

Rio Tinto Kennecott Mine, Utah. Conducted tailing dam breach and flood inundation studies for several tailing dams for the tailings dams at Kennecott for development of the emergency action plans (EAPs). Non-Newtonian fluid was modeled using FLO-2D to account for tailings being washed out during the breach. EAPs were prepared as a result of the dam breach studies.



Samuel "Sam" L. Merritt, Esq., (NightOwl Discovery) Comment Management

Why Chosen for This Project

- Expert in the administration and application of *Relativity* software, AECOM's selected comment management system

Education

JD, Yale Law School

Bachelor's Degree in Philosophy and Political Science,
Truman State University

Years of Experience

With NightOwl Discovery: 8
With Other Firms: 5+

Certifications

Electronic Discovery Specialist through ACEDS
Relativity Certified Administrator through kCura
Relativity Review Specialist through kCura

In 2010, Sam Merritt joined NightOwl Discovery, and is currently a Senior Portfolio Manager. Prior to joining NightOwl, Sam practiced complex commercial litigation for five (5) years in New York City at an AmLaw 100 law firm.

He brings many years of experience managing both large and small-scale document reviews in complex litigation matters. As an associate at both large (500+ attorneys) and small (10 attorneys) law firms, Sam was responsible for supervising discovery in a large number of diverse matters. He brings a wealth of experience in both managing projects as well as communicating between attorneys, litigation support, and IT specialists. Sam has extensive experience managing terabytes of data for AmLaw 200 firms and Fortune 500 clients, consisting of large complex products liability and tort matters. Sam has extensive experience managing large-scale attorney review projects, and recently helped oversee a review of more than 1 million documents, with 8 million pages produced in multi-state and multi-party productions, in a review with more than 100 reviewers.

Most recently, Sam has worked with managing the entire eDiscovery portfolio for a Midwestern Fortune 500 company. In particular, he has dealt with the coordination of review and migration of data between several platforms, including Clearwell, Concordance, and Relativity.

Project Experience

- Directed and managed over 400 projects on a large-scale basis
- Managed and participated in large and small scale document review projects
- Client Communication Liaison between Litigation Support, IT, and Litigation Teams
- ESI and electronic data management• Managed electronic data collections
- ESI-based production protocol
- Extensive data culling and filtering exercises
- Experience with multiple document review platforms
- Load file manipulation
- Lean Six Sigma Green Belt

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Joseph "Joe" S. Meyer, PhD (*Applied Limnology Professionals LLC*) Toxicology

Education

PhD, Zoology, University of Wyoming, 1986

BS, Chemical Engineering, Lehigh University, 1973

Years of Experience

41

Affiliations

Society of Environmental Toxicology and Chemistry

Dr. Joe Meyer has 41 years of experience in applied limnology and the fate and effects of environmental contaminants. He specializes in the bioavailability and toxicity of metals to aquatic organisms, whole effluent toxicity (WET) testing, and water quality regulations; and he provides technical and litigation support to clients. His project experience includes the effects of mining-related waters on aquatic and terrestrial organisms, with contributions from a variety of metals (e.g., aluminum, cadmium, copper, iron, lead, manganese, nickel, and zinc). Recent emphasis has included investigating whether aquatic life criteria for copper protect against impairment of chemosensation (detection of odors), mechanosensation (detection of physical disturbances), and behavior in fish and aquatic invertebrates.

Joe has a multidisciplinary background in aquatic toxicology, ecology, biogeochemistry, and engineering. His studies of the toxicity of chemicals (e.g., aluminum, cadmium, copper, lead, nickel, selenium, silver, zinc; aromatic hydrocarbons in wastewaters from synthetic fossil fuel processes; and saline surface waters) in fresh waters have placed him in the forefront of the field of aquatic toxicology. He assisted the US Environmental Protection Agency (USEPA) in developing the Biotic Ligand Model of cationic metal toxicity, which has become a central component in current and pending revisions of aquatic life criteria/guidelines for many metals in the US and worldwide. In the past, he led a team of researchers investigating bioavailability and bioreactivity of waterborne and dietborne metals to aquatic organisms. They also investigated photolysis of dissolved organic matter and its binding to

Why Chosen for This Project

- Senior subject matter expert in bioavailability and toxicity of metals to aquatic organisms, including salmonids
- Extensive experience related to fisheries, mining, and copper
- Published refereed expert on whether aquatic life criteria for copper protect against impairment of chemosensation, mechanosensation, and behavior in fish and aquatic invertebrates, including salmonids

copper; contributions of biofilm to diel cycling of zinc; effects of ammonia, dissolved oxygen, and bacterial infections on endangered Lost River suckers; effects of boron on trout populations; and toxicity of time-varying exposures to chemicals. Currently, Joe is investigating the toxicity of metal mixtures and major ions to aquatic organisms, and he has been lead author for two review papers about the effects of copper on olfaction in fish.

Dr. Meyer has lead-authored or co-authored 68 refereed journal articles, 1 refereed monograph, 12 book chapters, and 217 presentations at scientific meetings. He also was lead editor of "Toxicity of Dietborne Metals to Aquatic Organisms" (SETAC Press, 2005) and lead author of "Effects of Water Chemistry on Bioavailability and Toxicity of Waterborne Cadmium, Copper, Nickel, Lead, and Zinc to Freshwater Organisms" (SETAC Press, 2007).

Project Experience

Copper Development Association Inc., Effects of Copper on Olfaction in Salmon, New York. 2010-2015. Provided technical support related to effects of copper on olfaction (the sense of smell) in salmonid fishes.

Copper Development Association Inc., Technical Support Related to Development of Saltwater Criteria for Copper, New York. 2010-2014.

Provided technical support related to effects of copper on behavior and in marine fish. Includes developing a biotic ligand model for olfaction in saltwater salmonids, co-authoring a white paper about behavioral and olfactory effects of copper, and reviewing public comments.

Joseph “Joe” S. Meyer, PhD (*Applied Limnology Professionals LLC*), continued

Mining Client, Fisheries Support at Copper Mining Site, Washington. 2010-2014. Helped to analyze historical fisheries, metals, and physical habitat data to help determine natural resource damages due to metals in the receiving water.

Copper Development Association Inc. and International Copper Association, Expert Witness: Effects of Copper on Salmon. 2010-2011. Prepared an expert rebuttal report and testified in a regulatory appeal hearing before the State of Washington Department of Ecology's Pollution Control Hearing Board (PCHB), regarding the draft benchmark for copper in a proposed revision of the State's Industrial Stormwater General Permit. Explained the importance of water quality parameters (e.g., pH, alkalinity, hardness, and dissolved organic carbon) in modifying the toxicity of and olfactory impairment caused by copper to salmon and other aquatic organisms, and why a lower copper benchmark would not be scientifically justified.

Mining Client, River Health Assessment at Mining Site, Manitoba, Canada. 2010. Analyzed water and sediment quality, invertebrate and fish communities, and instream toxicity tests in an adjacent river and lakes, in support of remediation of a former Cu and Ni mining operation.

Rio Tinto, Effects of Copper on Olfactory Responses and Behavioral Avoidance in Salmonid Fishes. 2007-2008. Analyzed data about the effects of copper on olfaction (smelling) and behavior in salmonid fishes (trout and salmon). Modified the current Biotic Ligand Model of the acute toxicity of copper to aquatic organisms, to predict olfactory response of coho salmon to copper.

Mining Client, Water Quality Support at Copper Mining Site, Washington. 2010. Analyzed water quality data, aquatic life criteria, and ARARs at a remote, former copper mining site that is to be remediated. Recommended a toxicity testing program to determine water effect ratios for Cd, Cu and Zn in the receiving water, to decrease uncertainties related to metal toxicity in the very low

hardness creek water. Also recommended particle-size analysis for Al and Fe in the receiving water, to decrease uncertainties related to the toxicity of colloids of those metals.

Mining Client, Natural Resource Damage Assessment and Risk Assessment for Mines and Smelters, Arizona. 2007-2010. Helped quantify toxicity of acid metalliferous ponds to migrating waterfowl, including developing probit models and cumulative water consumption curves from laboratory data (equations account for initial thirst of migratory waterfowl and then end in steady state) to model predicted waterfowl mortality at the tailings ponds. Evaluated potential toxicity of ephemeral “rainfall” pools to aquatic organisms, including comparison of water quality criteria using hardness-based and BLM-based approaches. Reviewed chemical analyses of rainfall-pool waters that were based on standard 0.45-µm filtration and on ultrafiltration, and provided recommendations for applicability to the State of New Mexico's water quality standards. Helped interpret results of chemistry analyses and plant toxicity tests that were conducted with soils from potentially contaminated sites downwind from smelters.

Mining Client, Water Quality Compliance Support at Copper Mining Site, Washington. 2011-2014. Helped to evaluate strategies to comply with water quality criteria in a creek that will receive effluent from a proposed water treatment facility at a former metal-mining site. Assisted engineers and hydrologists to optimize treatment effectiveness and flow rates for the effluent from the facility to achieve compliance, and to calculate receiving-water chemistry after mixing with the effluent. Coordinated effluent-mixing calculations by hydrologists using the CORMIX model.

Mining Client, Sampling Program at Former Mine Site, Alaska. 2016. Helped to design sampling program for water, sediments, soils, and terrestrial and aquatic organisms along shoreline at a former mine in Prince William Sound, Alaska.

Mining Client, AKART Compliance Support at Copper Mining Site, Washington. 2012-2014. Coordinated engineering support to determine if the design of a proposed water treatment facility at a former metal-mining site would meet the State of Washington's AKART (All Known, Available, and Reasonable Treatment) requirements for discharge of the effluent into a receiving water.

Mining Client, Basinwide Site Assessment, Mexico. 2012-2013. Assisted with an evaluation of potential environmental concerns related to a new mining operation, in relation to background natural and anthropogenic influences in the basin.

Relevant Journal Articles

DeForest, D.K., R.W. Gensemer, J.W. Gorsuch, **J.S. Meyer**, R.C. Santore, B.K. Shephard, and J.M. Zodrow. 201_. Effects of copper on olfactory, behavioral, and other sublethal responses of saltwater organisms: Are estimated chronic limits using the Biotic Ligand Model protective? *Environmental Toxicology and Chemistry*: in review.

Meyer, J.S. and D.K. DeForest. 201_. Protectiveness of copper water quality criteria against impairment of behavior and chemo/mechanosensory responses: An update. *Environmental Toxicology and Chemistry*: in review.

DeForest, D.K. and **J.S. Meyer**. 2015. Critical review: Toxicity of dietborne metals to aquatic organisms. *Critical Reviews in Environmental Science and Technology* 45:1176-1241.

Meyer, J.S. and G.G. Pyle. 2013. Effects of anthropogenic chemicals on chemosensation and behavior in fish: Organismal, ecological, and regulatory implications. *Fisheries* 38:283-284.

DeForest, D.K., **J.S. Meyer**, R.W. Gensemer, B.K. Shephard, W.J. Adams, R.L. Dwyer, J.W. Gorsuch and E.J. Van Genderen. 2011. Are ambient water quality criteria for copper protective of olfactory impairment in fish? *Integrated Environmental Assessment and Management* 7:145-146.

Meyer, J.S. and W.J. Adams. 2010. Relationship between biotic ligand model-based water quality criteria and avoidance and olfactory responses to copper by fish. *Environmental Toxicology and Chemistry* 29:2096-2103.



Ryan Mills, PG

Ground Water Hydrology

Education

MSc, Hydrogeology, McMaster University, 2004

BSc, Environmental Science, McMaster University, 1999

Years of Experience

With AECOM: 14

With Other Firms: 2

Registrations

PGeo, British Columbia

PGeo, Alberta

Areas of Expertise

Mine Closure, in Cold Regions

Hydrogeology

Environmental Assessment

Mine Permitting

Affiliations

British Columbia Ground Water Association

International Association of Hydrogeologists

International Mine Water Association

National Ground Water Association

Association of Professional Engineers and Geoscientists of British Columbia

Association of Professional Engineers and Geoscientists of Alberta

Training

Improving Hydrogeologic Analysis of Fractured Bedrock Systems

Aquifer Testing and Data Analysis

Interpretation of Pumping Tests in Complex Settings

Water Quality Data Management and Modelling

Well Design and Rehabilitation

Mineral Exploration Safety Course

Visual MODFLOW Groundwater Modelling

Mr. Ryan Mills is a senior hydrogeologist with 16 years of experience collecting, analyzing and presenting hydrogeological data in British Columbia, Yukon, Northwest Territories, Nunavut, Ontario, and Turkey. He is an external hydrogeology technical reviewer for the British Columbia (BC) Ministry of Environment and BC Ministry of Energy and Mines and has completed several reviews of Mines Act permit applications and Environmental Assessment Certificate applications. Ryan has significant experience in the following areas:

- Environmental assessment
- Mine closure and reclamation in cold regions
- Mine permitting
- Water and waste management

Ryan also has experience with all aspects of project execution including program design and implementation, data analysis and report writing, project management, managing multidisciplinary teams, liaison with regulatory agencies, and coordination of complex programs at remote mine sites. His extensive field experience includes deep borehole drilling, permeability testing and instrumentation, groundwater sampling, environmental and mineral exploration borehole drilling in both soil and bedrock settings, test pit investigations, monitoring and supply well installation, aquifer testing, bedrock core logging, soil classification and geological mapping including significant experience in alpine, discontinuous and continuous permafrost environments.

Why Chosen for This Project

- Strong background in environmental impact analysis, mine dewatering assessments, baseline data collection, water supply wells, and closure investigations for mines
- Extensive field experience including in alpine, discontinuous, and continuous permafrost environments
- External technical reviewer for BC Ministry of Energy and Mines permit applications

Project Experience

BC Ministry of Energy and Mines, BC Ministry of Environment, Hydrogeology Review, Various Mine Sites, British Columbia. Hydrogeology discipline reviewer. Recommended permit conditions in support of Mines Act permitting and environmental assessment approvals at multiple coal and metal mines including: Quinsam, Brule, Sukunka, Silvertip, Bul River, Red Chris, Dome Mountain and Gibraltar.

Yukon Government, Abandoned Mine Closure Investigations, Mount Nansen Mine, Carmacks, Yukon. Project manager for site investigation and reclamation planning at the Mount Nansen abandoned porphyry gold mine. Designed and implemented hydrological, hydrogeological, geotechnical, water quality and geochemical investigations to support closure planning. Included design of the closure spillway, tailings covers waste pile reshaping, pit backfill, tailings water balance, receiving environment water quality modelling (GoldSim) and permafrost evaluations. Evaluated monitoring data to meet regulatory and permitting requirements. Design drawings and preliminary costing were also completed.

Ryan Mills, PG, *continued*

Indigenous and Northern Affairs Canada, Environmental Impact Statement (EIS) of Mine Closure Plan and Water Supply Evaluations, Faro Mine, Faro, Yukon. Hydrogeology discipline lead for environmental assessment of final closure plan for one of Canada's largest abandoned mines. Project involves assessment of impacts of mine waste and a 5-kilometer-long valley bottom tailings impoundment on groundwater and surface water quality in an alpine region. Part of a large multidisciplinary team focused on conducting EIS of mine closure plan. Evaluated the susceptibility of Town of Faro water supply wells to potential contamination in Vangorda Creek based on an analysis of groundwater levels, pumping data and water quality data.

Public Works and Government Services Canada (PWGSC), Abandoned Mine Closure Investigations, Colomac Mine, Northwest Territories. Technical lead for detailed hydrogeological assessment of two sentinel monitoring wells in a discontinuous permafrost region. Investigation involved installation of temporary packers, measurement of vertical groundwater gradients and completion of pumping tests on discrete monitoring intervals for compliance monitoring during the Adaptive Management Phase.

PWGSC, Abandoned Mine Water Balance and Water Quality Model, Tundra Mine, Northwest Territories. Technical lead for development of site-wide water balance and water quality model (GoldSim) to support closure design and establishment of long-term compliance monitoring points. Included assessment of Adaptive Management Phase and far future steady-state scenario in response to comments from Independent Peer Review Panel to support future Water License Amendment Process.

BC Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) Crown Land Opportunities and Restoration Branch (CLORB), Abandoned Mine Closure Planning and Remediation, Atlin Ruffner Mine, Atlin, British Columbia. Managed the site characterization of soil, sediment, waste rock, tailings, surface water and groundwater contamination at the abandoned Atlin Ruffner underground lead-silver mine site in support of reclamation planning, implementation and monitoring. The project involved a dam safety review and design/implementation of water diversion structures at a remote alpine site. Prepared water balance and water quality model. Managed the design and costing of water management structures and covers for two tailings ponds. This project won the BC Technical and Research Committee on Reclamation award for outstanding Reclamation Achievement in 2012 for an innovative approach to permitting closure of an abandoned mine with multiple regulatory constraints.

Saskatchewan Research Council, Abandoned Mine Closure Planning and Environmental Assessment, Gunnar Mine, Uranium City, Saskatchewan. Hydrogeologist for characterization and modelling to support completion of a comprehensive EIS for rehabilitation of the Gunnar Abandoned Uranium Mine and Mill Site consistent with Canadian Environmental Assessment Agency (CEAA) guidance. Installed instrumentation to characterize pit lake hydrology and interaction working closely with geotechnical engineering team.

BC MFLNRO CLORB, Abandoned Mine Closure and Reclamation, Emerald Glacier Mine, Houston, British Columbia. Project coordinator for site investigation and remedial options assessment at Abandoned Emerald Glacier Mine - Mill and Tailings Site under the BC Crown Contaminated Sites Program. Assisted with development of preferred option analysis and costing for risk-based remedial plan to cap tailings and contaminated soil, and decommission a water supply dam. Dam stability was also assessed. Project included liaison with MFLNRO and MOE regarding dam decommissioning and Water Act permit.

BC MFLNRO CLORB, Abandoned Mine Tailings Investigations and Reclamation Planning, Toquaht Bay Marina and Campground, Ucluelet, British Columbia. Technical Lead for design and implementation of a detailed groundwater flow and geochemistry evaluation for the historic Brynnor iron mine tailings deposit in the marine foreshore to guide remedial planning. The investigation revealed complex geochemical processes at the freshwater/saline interface were controlling trace metal dissolution and mobility. Remedial option development and consultation process is underway.

Western Copper and Gold, Casino Mine Baseline Environmental Assessment, Dawson City, Yukon. Technical lead for baseline hydrogeological investigations including drilling, packer testing and instrumentation with vibrating wire piezometers and thermistors to characterize permafrost to support the Permafrost Forecasting System (PFS) and EIS for the proposed open pit porphyry copper gold mine. Contributed to water balance, water quality model and water management plans to support EA/permitting.

Yukon Zinc, Hydrogeology Investigations and Environmental Assessment, Wolverine Mine, Ross River, YK. Developed a hydrogeological conceptual model and estimated mine inflows for the Yukon Zinc (Wolverine) mine as part of an EIA and mine permitting.



Patricia "Patty" Murphy (E3 Environmental) Tribal Relations and Public Outreach

Why Chosen for This Project

- Expert stakeholder engagement coordinator
- Extensive experience with rural communities throughout Alaska, including three years leading stakeholder engagement for the Alaska LNG project

Years of Experience

25+

Certifications

2016 IAP2 Certified

Training

2014 Cultural Awareness Training

2014 Learn to Return

Bi-lingual, Yup'ik and English

Ms. Patty Murphy has over 25 years of experience conducting and planning outreach activities with communities throughout Alaska. Certified by the International Association for Public Participation (IAP2), Patty specializes in rural projects and is fluent in the Yup'ik Language. Her goal is to build and maintain relationships with key stakeholders, thereby ensuring stakeholders are recognized as partners working toward strategic goals. Her extensive public involvement experience includes three years of experience leading stakeholder engagement for the Alaska LNG project with outreach to rural communities throughout Alaska, and she is currently continuing in that role on behalf of AGDC. Other experience includes stakeholder outreach for transportation work on DOT&PF's Yukon River Bridge Reconnaissance Study; assistance with the Alaska Railroad's master planning efforts for rail, road, and marine assets in Seward; and coordination for the Chikuminuk Lake Hydro Dam project in southwest Alaska.

With E3, Patty works with clients to develop and implement stakeholder engagement plans and strategies to suit unique conditions. She builds and maintains stakeholder relationships, from average citizens and tribe members to government representatives at all levels. Patty evaluates the effectiveness of public outreach strategies and risks and identifies them to clients to ensure effective management and foster the genuine participation of stakeholders. She manages stakeholder databases and outreach activities and ensures documentation for National Environmental Policy Act (NEPA) compliance. Patty meets strict deadlines for outreach

and deliverables and leads preparations for and facilitates activities associated with meetings, forums, special events, and other outreach activities and communications. She interacts with media sources and develops media strategies for public outreach, and provides content and updates for various clients on environmental and socioeconomic issues. Patty identifies and catalogs broad stakeholder interests regionally, statewide and nationally. She travels to remote areas as needed.

Patty has served as Project Manager/Administrator and Operations Manager for the Nuvista Light & Electric Cooperative. There, she oversaw coordination of events and activities for Board of Directors, facilitation of Board and Corporate communications, and the Board of Directors elections. Served as the interim executive director. Coordinated public relations and traveled to communities to conduct community events and meetings. Updated resident listings and provided communications with tribal governments and city offices and residents throughout the Association of Village Council Presidents (AVCP) Yukon Kuskokwim region. Supported the objectives of the Community Development Plan (CDP) in multiple communities by coordinating project development, designing and implementing new projects, reviewing each program's project performance, implementing plans for improvement, and coordinating advertising and outreach activities. Coordinated the stakeholder meetings for the Chikuminuk Lake Hydro Dam Project to meet strict deadlines and meet the project's NEPA requirements.

Patricia “Patty” Murphy (*E3 Environmental*), continued

Prior to her work with Nuvista, Patty was community development plan coordinator, executive assistant and executive administrator for the Coastal Villages Region Fund (CVRF). She supported senior CVRF staff, coordinated events and activities of the CVRF Board of Directors including outreach, and oversaw CVRF Board and CVRF Corporate communications. Coordinated community events, updated resident listing and provided communication with tribal and city council offices and residents. Traveled to CVRF communities and coordinated and conducted community meetings. Managed the CVRF Board of Director elections. Arranged travel, hotel, board meetings, retreats, and staff meetings. Administered donations, funeral assistance, and promotional items. Assisted HR department as requested. Managed the Board of Directors and Executive Department budgets and reviewed and approved invoices. Supervised 2 administrative assistants and the travel department.

Project Experience

Alaska LNG, Pipeline Project, Alaska. Lead stakeholder engagement coordinator. Oversaw stakeholder engagement for the Alaska LNG project, stretching across communities the length and breadth of the state. Ensured the team met strict deadlines for outreach and deliverables. Worked closely with the client to develop a public involvement plan, guide outreach activities, and maintain administrative record. Facilitated and conducted meetings, forums, special events, and other outreach activities and communications. Documented stakeholder contact and efforts through a stakeholder contact management system and ensured all documentation met requirements for administrative record and NEPA requirements. Identified and catalogued broad stakeholder interests regionally, statewide, and nationally. Travel as needed. 2014-2016.

Yukon River Bridge Reconnaissance Project, Dalton Highway, Alaska. Stakeholder engagement. Assisted in creating a Public Involvement Plan and identifying stakeholders for a DOT&PF reconnaissance project on the Yukon River Bridge along the Dalton Highway. Administered stakeholder surveys for local interests as well as trucking and tourism industry stakeholders. Outreach to Native Allotment holders in the area. Maintained

the stakeholder database and tracked stakeholder outreach for administrative record. 2016-current.

Alaska Railroad Corporation, Seward Marine Terminal Master Planning Project, Seward, Alaska. Stakeholder engagement support. Engaged with stakeholders to gather qualitative and quantitative data regarding freight and passenger traffic through the Alaska Railroad’s port in Seward. Worked with a multi-disciplinary team of engineers, architects, planners, environmental specialists, and economic specialists. 2015-current.



Paul J. Myerchin

Soils

Education

BS, Geology, Environmental Emphasis, University of Idaho, 1996

Years of Experience

With AECOM: 19

With Other Firms: 1

Training

ADEC Qualified Environmental Professional

40-hour HAZWOPER and annual refresher 8-hour OSHA HAZWOPER Supervisor Training

North Slope Safety Orientation Training (NSTC), First Aid, CPR, and AED Certification

Confined Space Entry; Fall Protection; Lock-Out, Tag-Out; Fire Extinguisher; and Asbestos Awareness Training

Smith Safe Drivers System 8-hour Training 2015 (2016)

Mr. Paul Myerchin is a life-long Alaskan with over 20 years of experience in geologic sciences, hydrologic assessment, and field program management. His technical capabilities include remedial program development and implementation, health and safety (H&S) compliance, geologic modeling, assessment and site characterization, surface water and hydrogeologic evaluations, environmental analyses, and technical report writing.

Why Chosen for This Project

- Subject matter expert for soils
- Contaminated site and hazardous materials evaluations for Donlin Gold and Chuitna EISs
- Strong background in soil and water field surveys, environmental site characterization and remediation, and geotechnical investigations

Project Experience

US Army Corps of Engineers (USACE), Donlin Gold Environmental Impact Statement (EIS), Alaska. Environmental Author. Providing affected environment and environmental consequence evaluations for soil resources associated with the proposed mine site, support infrastructure, and natural gas pipeline corridor. Responsible for contaminated site and hazardous material baseline evaluations for the proposed project infrastructure.

USACE, Chuitna Coal Supplemental EIS, Alaska. Technical team. Provided support and co-authored a draft hazardous materials evaluation.

Bureau of Land Management (BLM), Bering Sea-Western Interior (BSWI) EIS/Resource Management Plan (RMP), Anchorage Field Office, Alaska. Assisted in the evaluation of soil; water; and locatable, salable, and leasable mineral resources in the BSWI Planning Area, in addition to evaluation hazardous materials. Responsibilities included direct coordination with client representatives for evaluation of resources and conditions.

Paul J. Myerchin, *continued*

ExxonMobil Alaska Production Inc., Point Thomson Expansion Project, Environmental Report (ER), Alaska. Primary and co-author for freshwater resources and hydrology as well as geology and geomorphology for an ER supporting expansion of existing pipeline infrastructure and pad facilities on the eastern Alaska North Slope. Responsibilities included review of existing baseline resources using project specific data and available literature, mitigation assessment; and evaluation of direct and indirect effects and cumulative impacts.

National Oceanic and Atmospheric Administration, Ketchikan Trestle Project, Alaska. Environmental Remediation. Assisting with environmental studies and research in support of architect and engineering upgrades to shoreline infrastructure. Assistance includes environmental impact analysis of proposed activities for draft Environmental Assessment (EA) preparation, in addition to directing support for hazardous building material evaluations for structural demolition.

Alaska Liquid Natural Gas (LNG) Project, Alaska. Field manager and project scientist. Provided multidisciplinary services in support of project related environmental baseline studies in support of a Federal Energy Regulatory Commission (FERC) Resource Report. Supporting roles included field hydrology team lead/crew chief for joint discipline hydrologic and fisheries field studies; paleontological field surveys; Phase I and II site assessment subject matter expert; marine and lake bathymetry field surveys; dredge sampling plan preparation; ice-road construction oversight; and demolition oversight which included characterization for hazardous materials prior to demolition for compliance with state and federal regulations, demolition oversight, and report preparation.

USACE Alaska, Phase II Remedial Investigation (RI), Eklutna Army Formerly Used Defense Sites (FUDS), Alaska. Geologist. Coordinated and prepared the pre-Draft RI submittal with the assistance of multiple AECOM subject matter experts and contractors. Provided technical evaluation and findings associated with a multi-year soil and groundwater investigation program at a site with challenging soil, groundwater, and intertidal characteristics. Acquired data included extensive soil gas, soil, and groundwater results for chlorinated solvents, polynuclear aromatic hydrocarbons, petroleum hydrocarbons, and metals. Responsibilities included evaluation of acquired data and preparation of geologic and hydrogeologic interpretations, conceptual site model; contaminant distribution and fate and transport findings; identification of data gaps; and subsequent recommendations for future activities. The submittal also included a soil and Human Health Screening Level Risk Evaluation for known and potential site users. Additional tasks included coordination of MED compliant deliverables and resolution of USACE comments and concerns.

USACE Alaska, Feasibility Study (FS), Unalakleet Air Force Station FUDS, Alaska. Geologist. Assisted in the preparation of the Draft and Final FS submittals for the Unalakleet Air Force Station AC&W Main Complex. Provided technical environmental data evaluation; resolution of USACE, Alaska Department of Environmental Conservation (ADEC), and public concerns; coordination of MED compliant deliverables, and preparation of public outreach information. Technical assistance also included re-evaluation of existing remedial investigation (RI) data and additional evaluation of remedial alternatives associated with NCP criteria and Guidance for Conducting Remedial Investigations under CERCLA (Superfund).

ConocoPhillips Alaska Inc., Alaska. Project Manager. Provided multiple ADEC compliant Phase II environmental investigation and interim removal action planning documents in response to recognized environmental concerns (RECs) identified in Phase I ESA due diligence evaluations. Comprehensive documents for multiple sites included an Environmental Management Plan, Waste Management Plan, Quality Assurance Project Plan, and Sampling and Analysis Plan. Site-specific work plans for investigation and interim removal actions addressed multiple surface releases using grab and multi-increment investigation sampling methods, Resource Conservation and Recovery Act (RCRA) waste profile characterization, in-place underground storage tank (UST) closure assessment for regulated and unregulated USTs.

Alaska Energy Authority, Water Quality Study, Alaska. Field task lead. Provided assistance with in-stream baseline studies to support preparation of a hydroelectric project license application using the FERC Integrated Licensing Process. Responsibilities included participation with multiple sampling programs requiring remote access by boat or helicopter. Program sampling included the collection of more than 20,000 in-stream water samples, sediment and pore-water sampling; fish collection and tissue sampling, and maintenance of in-stream temperature monitoring sites. Additional tasks included federal, state, and private landowner land access permitting, data analysis, and logistical assistance.



Burr Neely

Cultural & Archaeological Resources; Traditional Land Use

Why Chosen for This Project

- Senior specialist well versed in all aspects of cultural resource management driven by NHPA Section 106, NEPA, Section 404 and local level regulatory compliance throughout Alaska

Education

MA, Northern Studies/Cultural Resource Management,
University of Alaska, Fairbanks, 2002

BA, History, Colorado State University, 1997

Years of Experience

With AECOM: <1

With Other Firms: 17

Registrations

Registered Professional Archaeologist

Affiliations

American Cultural Resource Association – VP, Government Relations

Society for American Archaeology – Government Relations Committee

National Trust for Historic Preservation

Alaska Historical Society

Alaska Anthropological Association

Mr. Burr Neely recently joined AECOM as a senior cultural resource specialist with 18 years of experience in cultural resource management. Burr previously served as General Manager of the largest cultural resource firm in Alaska, where he was responsible for all aspects of client and agency consultation, business development, financial reporting, staff supervision, program management, quality control, and senior technical review. He also provided cultural resource technical expertise for large-scale and complex projects, particularly those involving multiple agencies and stakeholders with detailed research and field program designs. He specializes in project management with expertise in architectural history inventory and mitigation, historic archaeology, and prehistoric site surveys. Burr regularly assists clients with regulatory compliance under Section 106 of the National Historic Preservation Act (NHPA) and analyses required under the National Environmental Policy Act (NEPA). In this role, he coordinates and communicates with clients and regulatory agencies, such as the US Army Corps of Engineers (USACE), Bureau of Land Management (BLM), National Park Service, the Federal Energy Regulatory Commission (FERC), and State Historic Preservation Officers (SHPOs).

Burr has conducted and supervised a broad range cultural resource projects throughout Alaska, Colorado, and western Utah. His recent project work focuses in Alaska where he served as the senior project supervisor or direct project manager on

over 50 cultural resource projects. As one example, he filled various roles as cultural resources crew chief, project manager, and principal-in-charge for the Donlin Mine Project where he initially led field crews surveying the proposed access road between the mine site and Kuskokwim River and later provided research and survey design input, financial reporting, and overall project supervision during other project development phases. Additional mining industry experience in Alaska includes directing and conducting cultural resource studies for the Livengood Mine Project (International Tower Hill Mines near Fairbanks), The Palmer Project (Constantine Metal Resources near Haines), the Kensington Mine (Coeur Alaska near Juneau), and the Nolan Creek Mine (Silverado Gold Mines near Wiseman/Brooks Range). Burr further served as principal-in-charge and internal senior reviewer for cultural resource and subsistence sections of NEPA-driven Environmental Impact Statement (EIS) projects including the Cook Inlet Planning Area EIS for the Bureau of Ocean and Energy Management (BOEM) and the Liberty Project EIS prepared for BOEM on behalf of Hilcorp Alaska.

Burr Neely, *continued*

Project Experience

USACE, Donlin Mine Project EIS, Alaska. Cultural resource program manager. Served in a wide range of roles for the Donlin Mine Project in western Alaska. Provided field crew leadership during survey of the remote mine site's proposed access road to the Kuskokwim River. The field crew identified a significant prehistoric site that later evolved into a community archaeology program involving the village of Crooked Creek. Later served in a variety of project management capacities related to budget development, project controls, field survey study design, and senior technical report reviewer in his role as general manager of the lead cultural resource firm contracted directly by Donlin. His range of experience on this multi-year project demonstrates technical knowledge of Alaska prehistoric archaeology, regional cultural resource survey methodologies and site types, technical reporting, and business responsibilities.

Kensington Mine Project, Alaska. Cultural program manager. Served as the client contact and project manager for the cultural resource components of the Kensington Mine Project where the client proposed to expand operations areas within the mine site boundaries. Per the existing EIS requirements and a Memorandum of Agreement (MOA) between the client, SHPO, and the US Forest Service defining the considerations of historic properties in the project area. Developed the budget, project approach, and coordination field training and deployment schedules. This project exemplifies his experience with complex field logistics including detailed safety requirements, and in developing a field plan to address existing EIS and MOA stipulations regarding cultural resources. Also provided technical review of reports and all client submittals.

Livengood Mine Project, Alaska. Cultural resource program manager. Provided a range of services for the Livengood Mine Project over a multi-year period including field survey and overall program management duties. Supervised and worked closely with the project manager to develop field survey strategies for multiple project components such as the proposed mine site and power line corridor connecting to Fairbanks. Provided budget development oversight, technical review of all client submittals, and helped develop consultation plans. The project site included both prehistoric sites and multiple historic districts related to early mining in the region. This complex array of site types required detailed negotiations and consultation with the BLM and the Alaska SHPO. The project illustrates his experience with consultation among various stakeholders and ability to design, review, and manage complex survey data over multiple years.

BOEM, Cook Inlet Planning Area EIS, Alaska.

Cultural resource program manager. Provided the senior technical review and budget management responsibilities for the renewal of the Cook Inlet EIS in his capacity as General Manager of the Alaska-based firm subcontracted by the third-party EIS team to complete the cultural resource and subsistence components of the EIS on behalf of the BOEM. Supervised a team that wrote these sections of the EIS, and also served as the primary contact for the client. The project involved handling multiple change orders driven by BOEM data requests. The project demonstrates his experience working on large-scale EIS projects and the technical knowledge of regional archaeology (marine and terrestrial) and subsistence research sources.

Liberty Project EIS, Alaska. Cultural resource program manager. Developed the scope and budget for the cultural resources studies required to update the project development plan and EIS for the Liberty Project on Alaska's North Slope. Duties involved continually coordinating the cultural resource budget and timeline within the larger project team's scope and budget. The initial study revealed the need for additional field work and site analyses, which he coordinated and supervised. He also provided the senior technical review of all report deliverables to the client. The project involved numerous change orders and schedule shifts which Mr. Neely successfully managed. The project reveals his knowledge of EIS documentation requirements and ability to manage cultural resource studies in a team environment.



James "Jim" A. Richardson (ResourcEcon) Socioeconomics / EJ, Subsistence Values and Traditional Land Use

Education

MS, Agricultural and Resource Economics, Oregon State University

BA, Economics, University of Calgary, Calgary, Alberta

Years of Experience

With ResourcEcon: 29
With Other Firms: 11+

Presentations

Presentation of Economics of Subsistence for Little Diomed Island – at the US Army Corps of Engineers Tribal Nations Community of Practice Meeting

Presentation of Non-Market Valuation of Fisheries Production, invited speaker at a conference at the Institute of Marine Science (Centro de Investigaciones Pesqueras) in Havana, Cuba

Mr. Jim Richardson of ResourcEcon has provided economic research and consulting services to hundreds of clients over the past 30 years. The firm's primary area of expertise is in fisheries and marine economic impact analysis and community and regional impact assessment. Projects have been completed for regions and communities throughout Alaska as well as the Pacific Northwest, Central America and the Middle East. As Principal Economist and owner of the company, Jim has had the entire range of project responsibility including study design, project management, coordination with other economists and multidisciplinary team members, agency contacts/coordination, completion of economic analyses, report preparation/presentation and quality control.

Jim's experience includes positions as Fishery Economist with the North Pacific Fishery Management Council and the University of Alaska Sea Grant program. In addition, he has completed more than 25 projects for the US Army Corps of Engineers (USACE) in evaluating feasibility of harbor improvements, flood control and as a peer reviewer for work completed for the USACE by others. He has developed a thorough understanding of the economies of communities and boroughs throughout Alaska. He understands the methods and approaches utilized by the USACE and has worked to apply those methods to economic analyses throughout Alaska.

Why Chosen for This Project

- Principal economist with primary expertise in community and regional impact assessment and fisheries and marine economic impact analysis
- Strong background in the economies of rural Alaska and has completed many projects for the USACE

Project Experience

NEPA Benefit Cost Analyses for the North Pacific Fisheries Management Council. As North Pacific Fishery Management Council Staff Economist for two periods (1980-1983 and 2004-2007) Jim provided economic analyses of the benefits and costs of proposed fisheries regulation changes for federal waters off Alaska. This work entailed identifying problems, designing studies, data analyses, report preparation and presentation to the three levels of public process within the Council system (scientists, industry representatives and Council members). All research for the Council was peer reviewed as well as thoroughly reviewed by an extensive public process. Other work for the Council involved authoring specific reports, e.g. Fisheries Governance, a chapter in the book "Managing Our Nation's Fisheries II".

Port and Harbor Feasibility Assessments. Jim has completed economic evaluations for many marine-related economic research projects, including benefit-cost feasibility studies for the Corps of Engineers, Alaska District. This work has included peer reviews for the Corps on economic evaluations completed by others. Past Corps projects include:

- Diomed, Alaska, Feasibility of Wave Protection, June 2012.
- Economic Analyses for the Alaska Barge Landing System Improvements Execution Plan (with URS), January 2011.

James “Jim” A. Richardson (*ResourceEcon*), continued

- Economic Value of Subsistence Activity, Little Diomed, Alaska, December 2011 with Tetra Tech, Inc. et. al.
- Sitka Harbor Design Deficiency Update: Economic Considerations, August 2010.
- Economic Analysis of the Decision Document for Anchorage Harbor Deepening, January 2009.
- McGrath Flood Control Feasibility, With Tetra Tech, June 2008.
- Port of Valdez, Small Boat Harbor Feasibility – Peer Review, February 2007.
- Unalakleet Harbor Improvement Feasibility Study, 2005 (with Tetra Tech).
- Fire Island Port Development Feasibility Study (with Tryck, Nyman & Hayes), 2004.
- Akutan, Small Boat Harbor Feasibility (with Tryck, Nyman & Hayes), 2004
- Unalaska, Alaska Small Boat Harbor Feasibility – Marine Resource Review/ Peer Review, 2004.
- Douglas, Small Boat Harbor Feasibility (with Tryck, Nyman & Hayes), 2003.
- Valdez, Alaska, regional impact analysis, December 2001.
- Peer review of a Corps feasibility assessment on the Columbia River, December 2001.
- Valdez, Alaska Small Boat Harbor Reconnaissance Report (with Tryck, Nyman & Hayes), July 1998.
- Douglas Alaska Small Boat Harbor Reconnaissance Report, (with Tryck, Nyman & Hayes), July 1998.
- Port Lions Alaska, Small Boat Harbor Report (with Tryck, Nyman & Hayes), August 1998.
- Western Alaska Navigation Improvements (with Tryck, Nyman & Hayes), September 1997.
- False Pass, Alaska Small Boat Harbor Reconnaissance Report (with Tryck, Nyman & Hayes), August 1997.

- Wainwright, Alaska Reconnaissance Report (with Tryck, Nyman & Hayes), December 1997
- Unalaska Deep Water Navigation (with Tryck, Nyman & Hayes), July 1995.

Selected Examples of Regional Economic Analyses:

- Alpine Satellites EIS. ResourceEcon had responsibility for analysis of the economic impacts of the project, subcontractor to Entrix.
- Draft EIS for the Pt. Thomson Development Project. ResourceEcon had responsibility for analysis of the economic impacts of this proposed gas to liquids development project, as subcontractor to CH2M Hill.
- Northstar EIS. ResourceEcon was a subcontractor to Dames & Moore with responsibility for analysis of the fiscal impact analysis for local, state and federal governments from the Northstar project.
- Community Impact Analysis and Fiscal Impacts for the proposed Alaska North Slope LNG Project. A stand-alone technical report under NEPA guidelines for the Alaska North Slope LNG Project Sponsor Group (under subcontract to Oasis Environmental, Inc.).
- ResourceEcon completed a study of regional economic need and benefits from the project and funding allocation from the 20 Western Alaska Villages that comprise the Coastal Villages Fund.
- Human Uses and Activities in the Northern Gulf of Alaska. Chapter 10 of “The Gulf of Alaska Biology and Oceanography” (co-authored with Gregg Erickson), Phil Mundy (editor), published by the

Alaska Sea Grant College Program, University of Alaska Fairbanks, ISBN 1-56612-090-x.

- Scientific Peer Reviewer for the Exxon Valdez Trustee Council as an expert in outdoor recreation and human use impacts.

Selected Projects Relating to Fisheries:

- Evaluation of the Status of the Bristol Bay Salmon Fishery as it relates to coastal shipping demand for a private company evaluating the purchase of a barge company serving Western Alaska communities.
- Feasibility Study for Fish Meal Production in Alaska, for Zapata Protein, Inc. (a private corporation that is the largest fish meal producer in the United States).
- Potential Economic Impacts of Community Development Quota Options for Western Alaska Communities, for the Bering Sea Fishermen's Association.
- Fisheries Development in Bahrain. A project to develop strategic planning for fisheries programs for the Ministry of Finance and National Economy (with RDA International).
- El Salvador Aquaculture Feasibility Study. Jim Richardson was the economist for a multi-disciplinary study team evaluating fisheries export project feasibility. The project was funded by U.S. AID for FUSADES, a Salvadorian business development group.
- Sponsored Keynote Speaker, International Symposium on Hatchery Propagation of Cod in Norway, Flodevigen Institute of Marine Science, University of Norway.



Derek Risso (*Ecosystem Sciences*) Aquatic Resources Mitigation

Education

MS, Fisheries and Wildlife Science, Oregon State University
BA, Environmental Studies, Gettysburg College

Years of Experience

With Ecosystem Sciences: 20
With Other Firms: 0

Training

Graduate work in Ecology and Statistics, University of Tennessee at Chattanooga
National Science Foundation Fellowship, Oregon State University
Wetland Delineation Training, USACE
Spatial Stream Network Modeling, US Forest Service
PFC Training, BLM

Derek has over 20 years of experience, all with Ecosystem Sciences, as a fisheries, aquatic, and riparian ecologist with broad experience in aquatic habitat modeling, fisheries ecology, riparian and stream restoration, geomorphology, and water resource management. His experience with land use assessments, salmonids, impact assessment and regulatory projects make him well-suited to assess project impacts and restoration actions.

His work includes fisheries and aquatic habitat assessments, natural resource evaluations, watershed ecology, hydrology assessments, aquatic macrophyte studies, water quality assessments and modeling. Derek manages and implements projects from study design through project completion. He possesses a wide range of technical skills including geospatial, statistical, and habitat modeling applications. His modeling experience includes 1-D and 2-D habitat models for multiple fish species at multiple life stages. His experience makes him well suited not only for technical tasks but also for agency consultation, stakeholder interaction and project management.

Derek has worked on several large-scale projects internationally and in the Western US, but he specializes in impact assessments on salmonid-bearing stream and riverine ecosystems. He has a wealth of experience with federal, state, tribal and regulatory projects. He has used his knowledge and expertise to prepare numerous restoration and enhancement plans, biological reports, impact analyses, modeling exercises, and statistical analysis

Why Chosen for This Project

- Expert in habitat modeling, fisheries ecology, and salmonids
- Extensive fish and aquatic background on western US rivers
- Current effective and synergistic working relationship on the Stibnite Gold EIS with MacNamara Shoulders

of ecosystems. He has experience with environmental impact statements (EISs), environmental assessments (EAs), and Biological Assessments (BAs) under the National Environmental Policy Act (NEPA). He is familiar with US Army Corps of Engineers (USACE), Federal Energy Regulatory Commission (FERC), and US Fish and Wildlife Service documentation and permitting processes.

Project Experience

US Forest Service, Midas Gold Stibnite Mine EIS, Payette National Forest, Idaho. Fisheries ecologist, water rights and water resources specialist for impact assessment and technical report writing as part of NEPA process and EIS. Working as part of a team with AECOM, performed as an integral part of the fisheries and aquatic resources team. His understanding of salmonid life history, aquatic resources and watershed ecology are being utilized on this controversial and complex project which involves impacts to chinook, steelhead, and bull trout populations.

National Oceanic and Atmospheric Administration (NOAA), Merced River Fish Passage Assessment and Design, California. Project Manager and lead aquatic ecologist responsible for fish habitat analysis, anadromous fish passage feasibility analysis, temperature analysis, agency consultation and report writing. This NOAA Fisheries study evaluated the feasibility of providing anadromous fish passage on the Upper Merced River. Fish passage facility siting, habitat evaluations and passage design options were evaluated for several dams on the Upper Merced River.

Derek Risso (*Ecosystem Sciences*), continued

Confidential Client, Hydrologic, Geomorphic, Fish Habitat Suitability, and Water Quality Modeling, Snake River, Idaho. Project Manager and lead ecologist for a scientific team working to develop a technical understanding of target aquatic species and perform in-stream flow studies to assess aquatic habitat, hydraulics and fluvial geomorphic processes as part of a FERC licensing process. Early project phases included life stage-specific habitat salmonid suitability modeling and impact assessment. Current project efforts include modeling winter salmonid habitat under multiple flow regimes and icing scenarios. Responsibilities include salmonid habitat suitability criteria development and model output.

Lower Owens River Project, Environmental Impact Report and Statement, Owens Valley, California. Ecologist and data analyst responsible for assisting lead fisheries scientist's analysis. Ecosystem Sciences was the lead consultant in the preparation of the Final Environmental Impact Report (EIR) and EIS for the Lower Owens River Project in California.

Silver Creek Fish Habitat Assessment and Monitoring, Idaho. Project Manager and lead scientist in charge of evaluating habitat for rainbow and brown trout by surveying, mapping, and performing habitat analyses for spawning, early rearing and juvenile and adult holding habitat within Silver Creek and its tributaries. Cover, substrate, habitat types, depth and flow velocity were all included in the habitat analysis. Red counts were performed, and fish migration barriers assessed. Data analysis on an array of temperature and DO sondes on an annual basis is part of this work.

Tributary Assessment and Restoration Strategy, Snake River, Idaho. Fisheries habitat and geomorphic data analyst for Shoban Bottoms spring creek area. Ecosystem Sciences performed a tributary assessment on four spring creeks within the greater Snake River Ecosystem. The assessment focused on enhancing habitat for Yellowstone Cutthroat Trout.

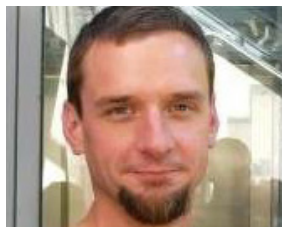
Warmsprings Dam Hydroelectric Project (FERC #13570), Malheur County, Oregon. Project Manager and lead ecologist responsible for overseeing all aspects of a project designed to assess the impacts associated with the development of a hydroelectric generation. Ecosystem Sciences performed fish habitat surveys, lotic and lacustrine fish sampling, landcover classification, GIS mapping and analysis, wildlife habitat mapping and visual encounter surveys. As lead ecologist, responsibilities included assessment of project impacts.

Pacific Northwest Power Planning Council, Columbia and Snake River Salmon Passage and Recovery, Multiple States. Ecosystem Sciences with Chapman Associates evaluated salmon migration, passage and recovery issues. Work included annual review of salmon/steelhead passage data, and presentation of conclusions and alternative recommendations to enhance recovery efforts.

Idaho Department of Environmental Quality, Panther and Blackbird Creeks, East Fork of the South Fork Salmon River Fish and Water Quality Impacts from Mine Leakage, Idaho. Long-term water quality data were used to predict fish response; spawning and recruitment success, and passage interference. Results were used to recommend passage and habitat improvement in the drainages.

Idaho Department of Fish and Game Bioengineering for Anadromous Fish Hatcheries, Idaho. Bioengineering criteria and spawn to hatch/release criteria was developed for the Sawtooth, Rapid River, and McCall hatcheries. Work included selecting hatching sites and catch/release off-site, as well as water supply sources, quality and quantity.

Bonneville Power Administration (BPA), Anadromous Fish Restoration Project Evaluation, Idaho, Oregon, and Washington. Worked with Drs. Chapman and Platts to evaluate BPA-funded salmon/steelhead projects in Idaho's Salmon River basin and river basins in Oregon and Washington. A report provided conclusions and recommendations on each projects effectiveness to improve anadromous fish habitat and productivity.



Steven "Steve" A. Rusak, PhD

Surface and Ground Water Quality; Geochemistry

Education

PhD, Chemistry, University of Otago, New Zealand, 2009

MS, Environmental Science, University of Otago, New Zealand, 2004

BS, Biology, University of North Carolina at Chapel Hill, 1999

Years of Experience

With AECOM: 7

With Other Firms: 12

Affiliations

American Geophysical Union

American Society of Limnology and Oceanography

American Chemical Society

New Zealand Institute of Chemistry

Training

MSHA Part 48 Surface Miner

Basic and Advanced Topics in NEPA (Environmental Impact Training)

AMSEA Cold Water Safety and Survival

Alaska Bear Safety

NRA Firearm Safety

PADI Open Water SCUBA

Red Cross First Aid/CPR

Dr. Steven Rusak has over 19 years of experience as an environmental chemist, analyst, and project manager. His expertise is focused on processes affecting redox speciation of transition metals in the environment. From 2011 – 2013, he was responsible for the geochemical aspects of a water and chemical load balance model developed to inform water management decisions at the Red Dog Mine in Alaska. The integrated reactive transport model evaluates solute release and precipitation reactions resulting from the mixing of process water streams and reservoirs, and provides risk-based forecasts of water balance impacts resulting from changing chemical loads and treatment strategies. This project involved substantial data QA/QC and statistical analysis of baseline hydro-geochemical data and fate and transport analysis.

Dr. Rusak is also responsible for quantitative predictions of water quality impacts for the Donlin Gold Environmental Impact Statement (EIS) and the Stibnite Gold Project EIS. This work addresses trace element release potential from waste rock and tailings based on extensive geochemical characterization of the materials that would be generated by the proposed mining.

He is responsible for collection, analysis, and interpretation of physical, chemical, and biological data, and has authored numerous reports for government and private sector clients. Dr. Rusak has extensive knowledge of sampling design and statistical analysis techniques related to environmental compliance. He has worked with indigenous groups, state and federal agencies, and

Why Chosen for This Project

- Water and sediment quality subject matter expert
- Involved in Donlin Gold EIS, Midas Gold Stibnite Mine EIS
- Has consulted for Red Dog Mine several times

rural communities throughout the United States and internationally. Dr. Rusak has experience with National Environmental Policy Act (NEPA) analysis and National Pollutant Discharge Elimination System (NPDES) permitting under the US Environmental Protection Agency (USEPA), and has published several peer-reviewed articles related to marine and freshwater chemistry. He is interested in the relationships between geochemistry and water quality at mine sites, and the effects of physical and chemical perturbations on concentrations of trace metals in the environment.

Project Experience

US Forest Service, Midas Gold, Stibnite Gold Project EIS, Idaho. Scientist assisting AECOM by using geochemical characteristics of materials specific to the Stibnite Gold Project to define the potential for Acid Rock Drainage (ARD) or leaching of deleterious constituents.

USACE Alaska District, Donlin Gold EIS, Alaska. Scientist. Research and writing about baseline conditions and assessment of potential impacts to surface water quality, groundwater quality, and sediment resources. This work included quantitative predictions of water quality impacts for each alternative based on geochemical data and proposed water treatment practices.

Steven “Steve” A. Rusak, PhD, *continued*

USACE Alaska District, PacRim Coal, Chuitna Coal Supplemental EIS, Alaska. Scientist. Provided technical writing and evaluation of impacts to physical oceanography and coastal water resources for the Chuitna Coal Supplemental EIS. This work included quantitative predictions of water quality impacts for each alternative based on geochemical data and proposed water treatment practices.

Red Dog Mine Tailings Dam Seepage Collection System, Alaska. Scientist. Conducted kinetic modeling for a geochemical analysis of the underdrain and rock drain components of the seepage collection system for a 200-foot-high tailings dam, for purposes of achieving geochemical integrity of the drain system and geotechnical stability of the tailings dam.

Red Dog Mine Water and Chemical Load Balance Model, Alaska. Scientist. Developed a reactive transport model to inform mine water management decisions. The model evaluates geochemical reactions resulting from the mixing of process water streams and reservoirs, and provides risk-based forecasts of water balance impacts resulting from changing chemical loads and treatment strategies.

National Marine Fisheries Service, Effects of Oil and Gas Activities in the Arctic Ocean EIS, Alaska. Scientist. Preparation of a programmatic EIS to assess effects of oil and gas exploratory activities in US Beaufort and Chukchi seas. Provided research and writing about environmental processes, water quality, and physical oceanography of the Alaska arctic offshore continental shelf region.

National Marine Fisheries Service, Fisheries Science Centers, Research Environmental Assessments (EAs), Alaska. Project manager. This project involved preparation of EAs and applications for Letters of Authorization to fulfill NEPA and Marine Mammal Protection Act requirements for fisheries research activities conducted by the six National Marine Fisheries Service Regional Fisheries Science Centers.

Alaska Department of Environmental Conservation (ADEC), Best Management Practices for Placer Mining: Pollution Control to Protect Surface Water Quality, Alaska. Scientist. Developed Best Management Practices (BMPs) for the protection of surface water quality at placer mine sites in Alaska, and worked closely with ADEC and local placer miners to refine the BMPs and ensure their applicability at specific placer mine sites. Dr. Rusak prepared a handbook of BMPs to protect surface water quality at Alaska Placer Mine Sites. The handbook was published by ADEC and is used by placer mine operators throughout the State of Alaska.

Alaska Department of Natural Resources, Preliminary Best Interest Finding (BIF) and Decision for Canyon Creek Coal Lease, Alaska. Project manager. Managed the collection and presentation of information related to water quality, fish, wildlife, and current and projected uses of the proposed coal lease area.

Alaska Department of Natural Resources, Preliminary BIF and Decision for Point MacKenzie Underground Coal Gasification, Alaska. Scientist. Collected and presented information related to water quality, fish, wildlife, and potential impacts resulting from an underground coal gasification project in the Point MacKenzie area adjacent to Anchorage.

ExxonMobil, Point Thomson Project, NEPA Compliance, Alaska. Project support. This project involved preparation of a comprehensive environmental impact mitigation report for the project. Provided NEPA compliance, mitigation, and permitting support.



Thomas "Tom" Schultz

Technical Support – GIS/CAD

Education

BS, Environmental Science, Alaska Pacific University, 2008

Years of Experience

With AECOM: 9

With Other Firms: 0

Training

40 Hour HAZWOPER

Mr. Tom Schultz is a GIS analyst and lead in Anchorage, Alaska. He has a wide range of GIS knowledge and focuses on the following:

- Data Management, including program planning and execution, geodatabase design and maintenance, geodata processing and analysis, geodata creation and conversion, data/metadata standards and quality assurance/quality control (QA/QC).
- Field Data Collection, including data collection program design and implementation, electronic data collection form design, Global Positioning System/Global Navigation Satellite System (GPS/GNSS) operation, data collection, data post-processing, and field navigation.
- Cartographic Presentation, including mapping standards, project template design, and presentation/report figure production.

Substantial ArcGIS Desktop experience and education have given Tom a solid foundation of skills that has allowed him to work on a diverse range of projects including natural resource development, environmental studies, permitting, planning, and hazard mitigation.

Why Chosen for This Project

- Expert GIS professional
- GIS lead and analyst for Donlin Gold EIS, Midas Stibnite EIS, BSWI RMP/EIS, and Izembek National Wildlife Refuge Land Exchange EIS

Project Experience

US Army Corps of Engineers (USACE), Donlin Gold, Environmental Impact Statement (EIS), Yukon-Kuskokwim Region, Alaska. As GIS lead, receives, manages, and disseminates environmental baseline reports and data from Donlin Gold to project teams and participating government agencies. Provides specialized GIS technical support with tasks including data construction and geoprocessing, database management, and production of professional report and presentation figures.

US Forest Service, Midas Gold, Stibnite Mine EIS, Idaho. GIS Analyst for the Midas Gold EIS, providing environmental and physical spatial data analysis for use in technical reports and the EIS. Also provides data management and cartographic support to the project.

Bureau of Land Management (BLM), Bering Sea Western Interior (BSWI) Resource Management Plan (RMP) and EIS, Alaska. GIS manager/analyst, working and communicating closely with BLM GIS staff to follow Department of Interior (DOI) procedures. Perform work within the BLM secured network and Citrix Farm, which includes figure generation for internal decision-making, EIS figures, and supporting spatial analyses across RMP alternatives.

Thomas “Tom” Schultz, *continued*

ExxonMobil, Alaska LNG, Environmental Studies/Regulatory Support, Alaska. From 2013 to 2016, AECOM was been responsible for managing multidisciplinary field studies, regulatory support and planning activities for the high profile gas pipeline project in Alaska. Responsible for developing and managing a GIS data program for all environmental field and desktop studies including archeology, fisheries, hydrology, noise, vegetation, wetland, and wildlife. Also conducted data review, QA/QC and analysis and provided cartographic support for internal, agency, and Federal Energy Regulatory Commission (FERC) resource reports.

TransCanada-ExxonMobil, Alaska Pipeline Project, Alaska. From 2010 to 2012, AECOM provided environmental and regulatory support to the Alaska Pipeline Project as part of its FERC license application program. AECOM's primary role on the project included documentation of baseline environmental conditions along the proposed pipeline corridor, including performance of multi-disciplinary field data collection programs; preparation of resource reports; support of agency interaction; support of engineering and design elements; stakeholder engagement; and, permitting support. Responsibilities were diverse: extended periods of time in the field collecting environment data in a GIS-driven format and providing GPS and data support to field technicians. In the office, specialized in field data QA/QC, geodatabase development, GIS data management, and professional cartographic support for countless reports and presentations. In late 2011, transferred into a management role for local GIS/data-related operations for the project.

US Fish and Wildlife Service (USFWS), Izembek National Wildlife Refuge Land Exchange EIS, Cold Bay, Alaska. Provided specialized GIS technical support for this complex and controversial land exchange project involving federal, state, and private lands. The land exchange, if approved, would remove land from congressionally-designated wilderness for road construction and add land to the perimeter of the wilderness. Tasks included data construction and geoprocessing, database management, and production of professional report and presentation figures.



Maria F. Shepherd

Terrestrial Wildlife

Education

BA, Zoology, University of California, Santa Barbara, 1986

Years of Experience

With AECOM: 6

With Other Firms: 25

Registrations

National Association of Environmental Professionals
Certified Environmental Professional in Environmental Assessment

Training

FHWA NEPA Training, 2003

Wetlands Training Institute, Basic Wetland Delineation, 2002

USACE, Section 404 Training, 2002

USACE, Informal Wetland Delineation Training, 2009

Erosion and Sediment Control Training

NEPA Training

Biological Assessment Training, Certified

Publication

Co-author of "Collision Mortality of Local and Migrant Birds at a Large-Scale Wind-Power Development on Buffalo Ridge, Minnesota". Wildlife Society Bulletin 2002, 30 (3): 879-887

Ms. Maria Shepherd is a senior biologist and AECOM certified project manager with 31 years of experience in environmental impact analysis, environmental permitting and compliance. She specializes in research, coordination, and preparation of National Environmental Policy Act (NEPA) documents and Biological Assessments for Endangered Species Act (ESA) Section 7 consultations. Maria has extensive experience as a technical writer/editor of many different types of environmental compliance documents including many environmental impact statements (EISs) and environmental assessments (EAs). Maria combines an in-depth knowledge of biological resources with years of NEPA experience.

Why Chosen for This Project

- Wildlife, bird, and habitat subject matter expert
- Subject matter expert on Donlin Gold EIS, Midas Stibnite EIS, and several other Alaska NEPA projects including the Izembek EIS and BSWI RMP/EIS

Project Experience

US Forest Service, Midas Gold Stibnite Project EIS, Idaho.

Deputy project manager and biological resources lead. Managing the preparation of the biological resource sections, and serving as deputy project manager for an EIS for an open pit gold mine in central Idaho. Key issues include fisheries, stream restoration, recreation, access, impacts to surface and subsurface water quality and quantity, and socio-economics.

ExxonMobil, Point Thomson Expansion Project, Alaska.

Senior biologist. Preparing Biological Assessments (Bas) for Section 7 consultation with both the National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (USFWS). The BAs analyze the impact of the project on polar bear and polar bear critical habitat, Steller's eider, spectacled eider, bowhead whale, bearded seal, ringed seal and ringed seal critical habitat.

Bureau of Land Management (BLM), Bering Sea Western Interior (BSWI) Draft Resource Management Plan (RMP)/EIS, Alaska.

Task manager for renewable resources. Managing the preparation of the subsistence biology, wildlife, and non-native invasive species sections of the RMP/EIS for the BLM in the western interior of Alaska. Key species being analyzed include caribou. The RMP will revise and supersede the two existing land use plans through a collaborative process with the public and the BLM's partners.

Maria F. Shepherd, *continued*

US Army Corps of Engineers (USACE), Chuitna Coal Project Supplemental EIS, Alaska. Biological resource lead. Managed the preparation of the biological resource sections for a surface coal mine and export facility within the Beluga Coal Field of Southcentral Alaska, approximately 45 miles west of Anchorage. The project includes a coal export terminal and associated port facilities including a two-mile-long elevated conveyor system terminating at a loading berth constructed in Cook Inlet. Also served as the subject matter expert for Terrestrial Mammals and Birds, Threatened and Endangered Species, the 404(b)(1) analysis, and cumulative impacts. Key issues included impacts to wetlands and 11 miles of coho salmon spawning habitat.

USACE, Donlin Gold Project EIS, Alaska. Senior biologist. Prepared the bird and vegetation (including invasive and special status plants) sections of the EIS for a large open pit gold mine in Southwest Alaska, 10 miles north of the village of Crooked Creek on the Kuskokwim River. Components include a large open pit gold mine, 300-mile natural gas pipeline from Cook Inlet to the mine site, and transportation infrastructure to support 200 barge supply trips per year on the Kuskokwim River through the Yukon-Kuskokwim National Wildlife Refuge. Key environment issues include barge transportation impacts, mercury abatement, impacts to surface and subsurface water quality and quantity, and socio-economic effects in the region.

United States Fish and Wildlife Service (USFWS), Izembek National Wildlife Refuge Road EIS, Alaska. Senior biologist. Wrote the bird and land mammal sections of the EIS. This EIS examines the potential effects of a complicated land exchange between the USFWS, the State of Alaska, and Alaska Native Corporations in order to build a road connecting King Cove with Cold Bay through the Izembek National Wildlife Refuge. Key issues included impacts on caribou calving and migration.

National Marine Fisheries Service (NMFS), Arctic Seismic EIS, Alaska. Senior biologist and deputy project manager. Assisted with the project management and with writing the marine mammal and bird sections of the EIS, as well as technical editing of the document. Species analyzed included polar bears and caribou. The large, multi-disciplinary programmatic EIS assesses the effects of oil and gas exploratory activities in the US Arctic Ocean.

BLM, Jarbidge Livestock Grazing Permit Renewal NEPA, Idaho. Deputy project manager and senior biologist. The project consists of multiple EAs and EISs for livestock grazing permit renewals, as well as a Herd Management Area Plan for the Saylor Creek Herd Management Area in southeast Idaho. The NEPA documents will provide allotment-level analysis for livestock grazing allocations, timing, duration, type of livestock, and season of use within the Jarbidge Field Office.

Alaska Department of Transportation and Public Facilities, Permitting Support for Ward Cove Marine Facilities, Alaska. Permitting specialist. Providing an assessment of impacts to marine mammals and Essential Fish Habitat (EFH) in support of the USACE permit application for in-water work including blasting and pile-driving.

GCI NEPA Compliance, Alaska. Project manager. Managing a project to conduct and document reviews of the potential impacts of over 100 communication towers sites relative to Federal Communications Commission (FCC) criteria for environmental processing. Work includes completing FCC NEPA checklists for each site, Section 106 reviews and fieldwork, and informal consultation with the USFWS regarding threatened or endangered species.

NMFS, NEPA Compliance for all Six of the Regional Fisheries Science Centers Research Activities, Nationwide. Senior biologist/technical editor. Wrote several biological resource sections of the EAs, and served as technical editor. This nationwide effort involves assessing the environmental effects of conducting NMFS' fisheries research in US marine waters. The project involves six separate NEPA processes for the Regional Fisheries Science Centers, initially as EAs. Key issues include the incidental take of protected species (marine mammals, sea turtles, and birds) by fisheries research activities. Associated efforts will include preparation of applications for incidental take of marine mammals and ESA Section 7 consultations.



Mark Storm, INCE Bd Cert Noise and Vibration

Education

BS, Aeronautics & Astronautics, Massachusetts Institute of Technology, 1991

Years of Experience

With AECOM: 11

With Other Firms: 15

Registrations

INCE Board Certified, 08004

Affiliations

Institute of Noise Control Engineering (INCE-USA) Board of Directors

Mr. Mark Storm is an Institute of Noise Control Engineering (INCE) Board-certified noise control engineer with over 26 years of experience in architectural acoustics, mechanical systems noise control, and environmental noise assessment and mitigation. He has had various roles with established equipment manufacturers, consulting firms, and startup ventures that include subject matter expert, product engineering management, research and development management, and intellectual property analysis and circumvention.

Mark's engineering and problem-solving skills and experience include noise analyses and sound attenuation projects for facilities, products, and industrial equipment ranging from utility-scale solar power generation systems to internal combustion engine exhaust mufflers and quiet custom air-handling units. Mark's current responsibilities include managing tasks for environmental noise regulation and guidance review, acoustical impact assessment, and noise mitigation planning and compliance evaluation for clients across the Americas, including Alaska.

Why Chosen for This Project

- AECOM leader for noise and vibration impact assessment and mitigation
- Subject matter expert for Donlin Gold EIS
- Leading noise assessment for Stibnite Gold EIS
- Primary author for noise on Point Thomson Expansion Environmental Report
- Directed baseline noise studies for Alaska LNG Pipeline

Mark's specialties include:

Environmental Noise. Evaluation of noise impacts from residential, manufacturing, industrial, power generation and commercial facilities upon sensitive human and wildlife receptors. Services in this area include measurement and prediction programs, mitigation recommendations, participation in public meetings, and expert witness testimony.

Mechanical Noise and Vibration Analysis and Control. Analysis of multiple noise and vibration sources in order to devise and recommend options for feasible and reasonable means of noise control, sound path attenuation and vibration isolation. Services include noise and vibration measurement surveys, detailed model analysis and design recommendations.

Mark Storm, INCE Bd Cert, *continued*

Project Experience

US Forest Service, Midas Gold, Stibnite Mine Expansion and Reclamation Environmental Impact Statement (EIS), Idaho. Noise task leader. Authoring EIS noise section, including predictive analyses and impact assessments for residential, recreation and wildlife receptors.

US Army Corps of Engineers (USACE), Donlin Gold, Kuskokwim River, Alaska. Noise task lead. Performed independent technical review of draft EIS noise section content prepared by another company. Responded to agency comments and project variant development. Project involves a large mining facility, natural gas pipeline construction, and ore yield transport via barge to a southern Alaska port.

Exxon-Mobil, Point Thomson Gas Expansion Project, Alaska. Noise task leader. Authored noise section for Draft Environmental Report. The project would comprise incremental development of infrastructure and facilities within the Point Thomson Unit to support full field development production of condensate and natural gas and condensate from the Thomson reservoir, and a natural gas gathering line connecting Point Thomson facilities with a facility in the Prudhoe Bay Unit.

Exxon-Mobil, Liquefied Natural Gas Liquefaction Facility and Pipeline, Alaska. Noise task leader. Directed baseline outdoor ambient noise surveys and noise-sensitive area (NSA) identification and noise estimates in support of Federal Energy Regulatory Commission (FERC) Resource Report 9 Noise Quality (RR9) requirements.

Alaska Energy Authority, Susitna-Watana Hydroelectric Project, Talkeetna, Alaska. Noise task leader. Directed multi-season soundscape surveys and baseline data analyses (over 3,000 hours of sound level data and audio files) to support aesthetics study. Proposed project is an 800-megawatt (MW) impoundment-type dam in southeastern Alaska.

Echo Bay Exploration, Buckhorn EIS, Okanogan County, Washington. Noise task leader. Supported EIS preparation with predictive noise analysis for multiple exploratory drilling sites.

Resolution Copper, Environmental Assessment (EA), Superior, Arizona. Noise task leader. Prepared EA noise section and participated in public meetings for this test-trench and exploratory drilling project.

Halliburton, Rossi Mine Expansion, Elko County, Nevada. Noise task leader. Authored noise report analyzing barite mine operations expansion noise effects on nearby greater sage-grouse lek. Analysis included three-dimensional sound propagation iterative scenarios and changing topography from project onset to completion.

Calico Mining, Riverside County, California. Noise task leader. Supported EA preparation with predictive noise analysis for multiple exploratory drilling sites.

Cahuilla Gold, Imperial County, California. Noise task leader. Supported EA preparation with predictive noise analysis for multiple exploratory drilling sites.

L&W Stone Corporation, Three Rivers Quarry Expansion, Clayton, Idaho. Noise specialist. Conducted noise analysis for expansion of existing dual-pit flagstone quarry operation near Clayton, Idaho, that included prediction of noise impacts on residential areas and wildlife.



Sagar Thakali, PhD

Toxicology

Education

PhD, Environmental Engineering, University of Delaware, 2006

BS, Civil & Environmental Engineering, Swarthmore College, 1999

BA, Economics, Swarthmore College, 1999

Years of Experience

With AECOM: 5

With Other Firms: 11

Areas of Expertise

Ecological Risk Assessments

Environmental Modelling

Bioavailability Evaluation

Eco Risk-Based Strategies

Dr. Sagar Thakali is a technical expert with over 15 years of research and professional experience in ecological risk assessments (ERAs) and the assessments of contaminant bioavailability, exposure, and ecotoxicity. Sagar specializes in designing and performing ERAs, evaluating and modeling bioavailability and environmental exposure and ecotoxicity, and providing multi-stakeholder remedial strategies:

ERAs:

- Screening and baseline ERAs under RCRA and CERCLA
- Deterministic and probabilistic ERAs
- Sites in Alabama, Connecticut, Georgia, Louisiana, Missouri, New Jersey, North Carolina, Virginia, West Virginia, and Brazil
- Generic ERAs several federal agencies

Bioavailability:

- Biotic ligand models for the aquatic, sediment, and terrestrial systems
- Equilibrium Sediment Benchmarks (ESBs) for metals, PAHs, and other organics

Contaminants:

- Arsenic, copper, lead, mercury, nickel, selenium, and other metals
- PAHs, PCBs, endocrine-active substances, and other organics

Why Chosen for This Project

- Principal subject matter expert in ecological risk assessments
- Experience identifying relevant exposure pathways and receptors and conducted an ecological risk assessment for a former barite mine/refinery in Camamu Bay, Brazil

Assessments, Tests, and Models:

- Chemical scoring and ranking (for personal care products and hydraulic fracking fluids)
- Persistence, Bioaccumulation and Toxicity (PBT) assessments and tests
- Quantitative Structure-Activity Relationships (QSARs) developed by the US Environmental Protection Agency (USEPA) and the Organization for Economic Cooperation and Development (OECD)
- Chemical speciation (using visual MINTEQ and Windermere Humic Aqueous Model [WHAM])

Project Experience

Legacy Mercury Site, Virginia. Leading ecological impact/risk services for a legacy mercury site (23+ miles of a river and the floodplains) in a rural eastern US setting. The technical team is complemented by a Science Team that includes representatives from the regulatory community, non-governmental organizations (NGOs), private citizens, academia and consulting. Such stakeholder engagement has been critical to the success of the program as it enters the remediation phase.

Former Gun Club Site, Connecticut. Conducted a baseline ERA and supported follow-up remedial measures at the Former Lordship Gun Club (former Remington Gun Club) located on Stratford Point at the mouth of the Housatonic River in Stratford,

Sagar Thakali, PhD, *continued*

Connecticut, which operated as a trap and skeet shooting facility from 1926 to 1986. Previous remediation involved removing lead shot and clay target fragments from inter-tidal sediments and upland soils. Lead shot was re-exposed due to erosional forces at the historically remediated areas; an innovative remediation via restoration is underway using artificial reef balls and a living shoreline in collaboration with a local university.

Oil & Gas Manufacturing Complex, Louisiana. Leading ecological impacts/risk services for an active oil & gas manufacturing complex. Constituents of concern include organics and metals; On-going investigation and risk assessment involving upland soils, offsite streams, and groundwater.

Former Explosives Site, Connecticut. Leading ecological impacts/risk services for a large former munitions production site. Constituents of concern include metals (primarily lead) and organics; Supports investigation, remediation, and restoration involving upland soils, wetland hydric soils, stream and lake sediments, and groundwater. Areas of environmental concern are at various stages of the RCRA Corrective Action process.

Former Barite Mine/Refinery, Camamu Bay, Brazil. Provided technical support toward identifying the relevant exposure pathways and receptors and conducted ecological risk assessment for submission to the Ministry of Environment, Brazil.

Pharmaceutical and Industrial Clients, Europe, Australia, New Zealand. Oversaw regulatory testing and performed environmental assessments to support drug and product registration various international jurisdictions, including REACH in Europe.

Research Collaboration, Europe. Collaborated with universities in Belgium and a research center in the UK to investigate the toxicity of copper and nickel toward terrestrial receptors. Used the resulting experimental data to develop the terrestrial

biotic ligand models (TBLMs) for copper and nickel published in the Environmental Science and Technology.

Other Remediation and ERA Experience:

Pompton Lakes, New Jersey. Led baseline ERAs at mercury-impacted RCRA sites—including a probabilistic ERA.

Elkton, Maryland. Led the development of ecological-based remedial goals for pesticides in a CERCLA site.

Power Industry Consortium Literature Reviews. Performed comprehensive literature reviews on ecological effects of arsenic, selenium, thallium, and coal combustion products in soil, water, and sediment for a power industry research consortium.

Connecticut and Massachusetts. Developed risk-based sediment and soil remedial strategies for metals, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs) at various RCRA sites.

Wildlife Protection. Supported development of site-specific mercury Ambient Water Quality Criteria (AWQC) for the protection of wildlife.

Peer-Reviewed Publications

Verslycke, T; Reid, K; Bowers, T; **Thakali, S**; Lewis, A; Sanders, J; Tuck, D. 2014. "The Chemistry Scoring Index (CSI): A Hazard-Based Scoring and Ranking Tool for Chemicals and Products Used in the Oil and Gas Industry." Sustainability 6:3993-4009.

Wang, P; Kinraide, TB; Smolders, E; Zhou, DM; Menzies, NW; **Thakali, S**; Xia, W; Hao, X; Peijnenburg, W; Kopittke, P. 2013. "An electrostatic model predicting Cu and Ni toxicity to microbial processes in soils." Soil Biology and Biochemistry 57: 720-730.

Mayfield, DM; **Thakali, S**; Mehler, TM; Lewis, AS. 2013. "Ecological effects of coal combustion products (CCPs): A literature review of observed effects and

considerations for managing risks." 2013 World of Coal Ash Conference (WOCA), April 22-25, 2013, Lexington, KY

Goodman, JE; Dodge, DG; Prueitt, RL; **Thakali, S**. 2009. "Carcinogenicity assessment of water-soluble nickel compounds." Critical Reviews in Toxicology 39:365-417.

Ponizovsky, AA; **Thakali, S**; Allen, HE; Di Toro, DM; Ackerman, AJ; Metzler, DM. 2008. "Effect of soil properties on nickel partitioning in soil solutions at low moisture content." Geoderma 145:69-76.

Thakali, S; Allen, HE; Di Toro, DM; Ponizovsky, AA; Rooney, CP; Zhao, FJ; McGrath, SP; Criel, P; Van Eckout, H; Janssen, C; Oorts, K; Smolders, E. 2006. "Terrestrial biotic ligand model. 2. Application to Ni and Cu toxicities to plants, invertebrates, and microbes in soil." Environmental Science and Technology 40:7094-7100.

Ponizovsky, AA; **Thakali, S**; Allen, HE; Di Toro, DM; Ackerman, AJ. 2006. "Effect of soil properties on copper release in soil solutions at low moisture content." Environmental Toxicology and Chemistry 25:671-682.

Thakali, S; Allen, HE; Di Toro. 2007. "Applying Terrestrial Biotic Ligand Model (TBLM) to Species Sensitivity Distributions." In Biogeochemistry of Trace Elements: Environmental Protection, Remediation and Human Health. (Eds: Zhu, Y; Lepp, N; Naidu, R. Tsinghua), University Press, Peoples Republic of China.



Keith W. Torrance, PhD, CPG, PMP, (Sustainable Earth Research LLC) (Mining) Waste Management; Surface and Ground Water Quality/Geochemistry

Education

PhD, Environmental and Civil Engineering, University of Strathclyde, Glasgow, UK, 2012

MRes, Geo-environmental Engineering, University of Strathclyde, Glasgow, UK, 2009

BSc (Hons), Geology, University of Glasgow, UK, 1982

Graduate Certificate in Environmental Permitting, University of Alaska Anchorage, 2016

Years of Experience

With Sustainable Earth Research LLC <1

With Other Firms: 35+

Registrations

Certified Professional Geologist, CPG-11647

Professional Geologist – Alaska, License# 696

Fellow Geological Society Chartered Geologist

Professional Hydrologist Water Quality, Certificate 15-HWQ-7009

European Geologist, License 1208

Project Management Professional, PMP – 2034333

Certifications and Training

HAZWOPER 40-hour

certification HAZWOPER Supervisor

USACE Wetland Delineation 38- hour training, Cert. 7261

ASTM Phase I & II Environmental Site Assessment training.

AHERA Asbestos Supervisor 40-hour training, TA40-14-051

EPA/AHERA inspector, T-26708-34486

FEMA ICS-200; ICS-200; IS- 700A

North Slope Training Consortium (NSTC) certified, 006-25025

DOT Hazardous Materials Regulations & Safety Training Course.

Hazardous Waste Handling & Emergency Procedures

Affiliations

Fellow of the Geological Society (FGS)

Professional Member of the Geological Society of America (GSA)

Professional Member of the American Institute of Professional Geologists (AIPG)

Member of the Association of Environmental and Engineering Geologists (AEG)

Vice President of the Society for Environmental Geology and Health, North America (SEGH)

Member – Geochemical Society Member - Alaska Geological

Society (President 2014/15) Member - Alaska Miners Association (AMA) Director

Skills

Contaminated site assessments

CERCLA remedial actions

Database development Hydrology

Remote field work

Report writing

Permitting

RCRA waste

Water quality

Wetland delineations

Groundwater modelling

Baseline environmental studies Sampling plans

Asbestos surveys

Ore microscopy

Clean Water Act

ArcGIS

Phase I & II site assessments

Why Chosen for This Project

- Broad Alaskan experience in geology, hydrogeology, reclamation and waste management
- Solid exposure to project site hydrology from prior work

Dr. Torrance is an environmental scientist, certified professional geologist (CPG) and professional hydrologist (PH) at Sustainable Earth Research LLC, with extensive experience of contaminated site evaluation, geochemistry, permitting, groundwater hydrology, spill response, environmental baseline studies, watershed studies, permitting, and CERCLA remedial actions. He has held senior positions in the environmental and mining sectors in North America and Europe over a career spanning 30 years, including seven years working on remote Alaskan projects. He has worked for two Alaska Native Village Corporations to develop their environmental consulting capabilities with Federal agencies and to develop resources on their lands.

Dr. Torrance has a Master's degree in geo-environmental engineering and a PhD in environmental engineering from the University of Strathclyde in Glasgow, Scotland, in addition to a BSc (Hons) degree in geology from the University of Glasgow. His PhD thesis investigated patterns of arsenic and associated potentially toxic metals in surface water at mine sites in Alaska, Scotland, and Colombia that had been impacted by ore treatment and mine waste disposal, using novel field methods to characterize arsenic speciation.

He was elected a Fellow of The Geological Society in 2009. He meets the requirements of a Qualified Environmental Professional (QEP) in contaminated land in Alaska as defined by 18 AAC 75.325 and Environmental Professional as defined in 40 CFR § 312.10(b) for environmental site assessment. He has taught environmental geology courses at the

Keith W. Torrance, PhD, CPG, PMP, *(Sustainable Earth Research LLC), continued*

University of Alaska Anchorage, and organized environmental sampling workshops in Utqiagvik and Anchorage.

Project Experience

Dr. Torrance had responsibility for the planning, collection, the interpretation of environmental data and reporting on a wide range of remote Alaskan projects. Selected project descriptions are provided below.

Prudhoe Bay Phase I Environmental Site Assessments (ESAs). Conducted Phase I ESAs on 32 tracts owned by the North Slope Borough in Prudhoe Bay leased to oil support companies.

Spill Response – Utqiagvik (Barrow). Developed work and sampling plans at short notice in response to a major accidental release of gasoline from a fuel tank farm. Interfaced with the Alaska Department of Environmental Conservation (ADEC) to report remediation progress and ultimately obtain approval for the closure of the site and disposal of impacted soil.

PFAS Investigation, Utqiagvik. Supported the US Navy's investigations into per- and polyfluoroalkyl substances (PFAS) contamination of drinking water sources at Utqiagvik and community outreach effort to inform the community of potential exposure risks.

Western Alaska Resources. Undertook resource investigations at Wales and Gambell to characterize potential sources of hard rock for riprap for erosion control.

Quintillion Fiber Optic Project, Nome & Kotzebue. Assessed exposure risks from contaminated soil along the terrestrial route of the fiber in Nome, Kotzebue, Wainwright, and Barrow, creating risk maps to identify hazards. Supervised trenching in Nome and Kotzebue.

CRM Compliance Database. Developed a custom relationship database to manage the environmental condition and permit compliance for properties leased from the North Slope Borough.

RCRA Waste Removal – Former Naval Arctic Research Laboratory (NARL). Characterized over 300 drums of unknown waste liquids over two field seasons in Barrow, identifying RCRA-regulated waste and other regulated waste streams. Arranged for their shipment and proper disposal in the lower forty-eight.

Point Thompson Zinc Bromide Spill Response Planning. Tasked with conducting a series of brine migration experiments at Prudhoe Bay to predict the likely behavior of zinc bromide workover fluid releases in an Arctic setting. Revised spill response tactics based on the experimental data collected during these field tests.

Environmental Baseline Surveys, Point Lay & Kaktovik. Completed EBS on US Air Force tracts to facilitate their transfer to the local communities.

The Pebble Project. Managed the monthly collection of hydrological, water quality, and groundwater data as part of the baseline environmental studies at the Pebble Project copper/gold mine site near Iliamna. Collected stream discharge measurements to model watershed of Upper Talarik Creek. Managed acid rock drainage (ARD) field experiments on waste rock and tailings to quantify likely discharges of metals from the tailing storage facilities. Provided client with geochemical interpretation of the effluent analytical data.

Port Heiden Radio Relay Station. Supervised a soil landfarming project to remediate soil contaminated by diesel. Authored sampling plans and site characterization reports on behalf of the client (USAF) and petitioned ADEC to allow reuse the remediated soil. Provided spatial analysis of PCB concentrations in soil at the Radio Relay Site in preparation for excavation and transportation off site.

Phase I Site Investigations, Yukon River. On behalf of the Yukon River Intertribal Watershed Council, conducted Phase I site assessments in Scammon Bay, Chevak, Arctic Village, and other communities along the Yukon River as part of their brownfield site development program.

Power Plant Remediation, Kaktovik. Provided oversight for North Slope Borough on the remediation of hydrocarbon contaminated soil at the site of the former village power plant.

Lucky Shot Project. Collected baseline environmental water quality data to support permitting of a gold mine development in Hatcher Pass. Published technical paper on the results of arsenic speciation from surface water impacted by the mine adit.

Red Devil Mine. Completed environmental assessments at the site of an abandoned mercury mine on the Kuskokwim River to determine levels of arsenic, antimony and mercury in soils and surface water. Modelled the migration of contaminated groundwater from the smelter site to the Kuskokwim River and provided recommendations on future remediation options to the Bureau of Land Management.

Tank Farm Remediation, Iliamna. Supervised characterization of an abandoned tank farm site in Iliamna with residual soil contamination from fuel leaks. Completed an environmental assessment of the plot and installed groundwater monitoring wells to determine migration to Iliamna Lake. Negotiated on behalf of the client with ADEC to formally close the site and permit redevelopment.

Four Seasons Contaminated Site, Anchorage. Conducted a Phase II ESA at a site in Anchorage and supervised the excavation and treatment of soil contaminated from leaking sub-surface fuel pipes and historical spills. Authored reports on behalf of the client for submission to ADEC outlining the extent of the contamination.



Kelsey Tranel

Document Controls and Technical Editing

Education

BA, Cum Laude, Liberal Studies, Alaska Pacific University, 2011

Years of Experience

With AECOM: 6

With Other Firms: 1

Key Skills

Microsoft Office Programs: Word, Excel, PowerPoint

Web-based File Sharing Platforms: Aconex, WebEx, and SharePoint

Technical Writing and Editing

Ms. Kelsey serves as a technical editor on Donlin Gold EIS and was the lead document control specialist and technical editor for a large oil and gas project for over three years. She has assisted with numerous other diverse and dynamic projects. Kelsey specializes in technical editing and writing, and is well-versed with multiple web-based file sharing platforms. Having previously served as a word processor, Kelsey has a diverse set of skills and is willing to take on any task. She is an asset to any project, providing efficient results with a positive demeanor.

Why Chosen for This Project

- Technical editor and support for Donlin Gold EIS
- Document control lead for Alaska LNG

Project Experience

Army Corps of Engineers (USACE), Donlin Gold Mine Draft Environmental Impact Statement (EIS), Alaska. Technical editor/project support. Currently supporting the Donlin Gold Project as a technical editor and general support staff member. Assisted in editing large volume, multi-chapter documents from various authors for style guide consistency and grammar. Assisted with various other additional project tasks, including database edits/entry and word processing.

Alaska LNG Project, Environmental and Regulatory Support, Alaska. Document controller/technical editor. Served as the document control lead for Alaska LNG. Oversaw all document activity; transmittals, uploads and downloads; managed document registers; and maintained both technical and non-technical documents. Also served as a technical editor for the project, providing editing support for hundreds of documents.

National Oceanographic and Atmospheric Administration, Cook Inlet Beluga Whale Recovery Plan, Alaska. Technical editor/word processor. Assisted with technical editing and word processing for the Cook Inlet Beluga Whale Recovery Plan and related documents. Also provided minor administrative and meeting assistance.

Kelsey Tranel, *continued*

ExxonMobil, Point Thomson Project. Environmental and Regulatory Team, Alaska. RegFrame support. Assigned for a short period of time in-house with ExxonMobil assisting with RegFrame database completion for the Point Thomson Project, working with the environmental and regulatory team.

ExxonMobil/TransCanada, Alaska Pipeline Project, Alaska. Project support/document controller. Assigned to the Alaska Pipeline Project (APP) in its later stages to assist with project closeout. Responsible for maintaining both electronic and hard copy versions of the project central files. This task required excellent skills in organization and task delegation to others. Later was asked to take over the role of document controller; ensured that all project-related transmitted documents were accounted for and transmitted properly.

National Marine Fisheries Service (NMFS) Arctic Seismic & Drilling EIS, Chukchi and Beaufort Seas, Arctic Ocean, US. Word processor/administrative support. Provided word processing support for the NMFS Arctic Seismic Project. Assisted with incorporating authors' edits and comments to the document and the generation of an acronym list while ensuring quality control. Additionally, helped compile and verify references.

National Park Service, Kenai Fjords National Park, Pre-Design Services, Conceptual Design, and Environmental Assessment for Herman Leirer Road Multimodal Trail, Alaska. Administrative support. Helped compile the administrative record for the Herman Leirer Project. She assisted with phone, meeting and email logs, references, and ensured that the "paper trail" for the project was accurately accounted for.

ExxonMobil, Point Thomson Project, Alaska.

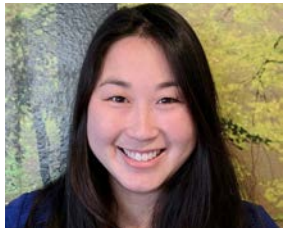
Administrative support/word processing. Assisted with various stages of the Point Thomson Project. Helped with data entry and research for the North Slope parcel list, researching contact information for parcel owners. The deliverable was well- received. Also assisted with minor word processing of various documents throughout the course of this project.

NMFS, Updated Bowhead Whale Subsistence

Harvest EIS, Alaska. Word processor/ administrative support. Provided both word processing and various forms of administrative support for the Bowhead EIS. Assisted with document production during various stages of the project. Also contributed some minor technical editing and assisted with references, ensuring that all references used were accurately accounted for.

Other Experience:

National Park Service, STEP Internships. Served as an intern for two seasons with the National Park Service, first in high school and again in college. Assisted with various administrative tasks, in the creation of PowerPoint presentations, and with research for a climate change project.



Kathalyn "Kathy" Tung, AICP Transportation

Education

Master of Planning, University of Southern California, 2009
Bachelor of Science in Environmental Sciences, University of California, Berkeley, 2004

Years of Experience

With AECOM: 10
With Other Firms: 2

Registrations /Certifications

American Institute of Certified Planners (AICP #29869)
AECOM Certified Project Manager

Affiliations

American Planning Association
National Association of Environmental Professionals
Women in Transportation Seminar

As an AECOM certified project manager, Kathy Tung served as deputy project manager for Chuitna Coal and earned a reputation from both the US Army Corps of Engineers (USACE) and the proponent of bringing NEPA coordination, transparent budgeting, strong workload and schedule management and senior NEPA expertise. Kathy is also a NEPA transportation specialist, a role she also served for Chuitna and now serves on the Stibnite Gold EIS.

Kathy is proficient with project management and preparation of NEPA compliant environmental documents including initial studies (IS), mitigated negative declarations (MNDs), environmental assessments (EAs), and environmental impact statements (EISs) for mining, transportation, port facilities, energy, and infrastructure projects. Kathy also has experience in preparing community impact assessments, conducting public outreach, and habitat restoration planning, including the preparation of site restoration plans. She prepares Clean Water Act Sections 404/401 permits for both individual and regional programmatic projects. She has assisted with biological reconnaissance surveys, rare plant surveys, construction monitoring, and mitigation monitoring.

Why Chosen for This Project

- Proven project coordination experience
- Strong financial and scheduling skills
- Transportation subject matter expert
- Senior NEPA expert
- AECOM-certified project manager

Project Experience

US Forest Service and Midas Gold, Stibnite Gold Project EIS, Idaho. Author and preparer of the Transportation and Access technical report for the proposed gold mine in central Idaho. Provide support in project management tasks including scheduling, budget management, and team coordination. The proposed project includes redevelopment, mining, restoration, closure, reclamation, and monitoring activities in an abandoned and degraded habitat previously known for spawning fish habitat and sensitive cultural resources.

USACE, Chuitna Coal Mine Project Supplemental EIS and 404(b)(1) Permit, Beluga Coal Field, Alaska. Deputy Project Manager and author in the preparation of the Supplemental EIS and USACE 404(b)(1) permit for the construction of a new mining operation including mine site, project infrastructure, and port facilities within the Cook Inlet in Southcentral Alaska in compliance under the Clean Water Act Section 404 and Section 10 Rivers and Harbors Act. Responsibilities include project management and coordination of internal team, facilitation and coordination in agency and team meetings, and conducting research and analysis for various issues including transportation and site access.

Kathalyn “Kathy” Tung, AICP, *continued*

Bureau of Land Management (BLM) Bering Sea-Western Interior Resource Management Plan (RMP)/EIS, Alaska. Provided project management support including financial and scheduling task and analysis for the compilation of previous BLM RMP Standard Operating Procedures, including for mineral and oil exploration and drilling, for development of the RMP of western Interior Alaska in compliance with Federal Land Policy and Management Act (FLPMA) of 1976.

Shell Oil Products, Mormon Island Loading Project IS/ND, Los Angeles, California. Project Manager in the preparation of California Environmental Quality Act documentation for Shell at the Port of Los Angeles's Mormon Island marine oil terminal. The project was for installation of vapor combustion unit and dock safety unit to meet South Coast Air Quality Management District requirements for loading activities. Interfaced with both Shell and Port of Los Angeles staff to collaborate on project progress.

Port of Los Angeles, Berth 164 Valero Marine Oil Terminal Wharf Improvements Environmental Impact Report (EIR), California. Project Manager in the preparation of an EIR for the Port's demolition of the existing timber wharf and construction of a Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS)-compliant loading platform. The proposed permit would also issue a new 30-year lease to the tenant. Prepared the Notice of Preparation-Initial Study, authored various sections, supported client needs of the Port of Los Angeles staff, and coordinated with subconsultants.

Port of Los Angeles, Berths 206-209 EIS/EIR, California. Assistant Project Manager and lead author in the preparation of the EIS/EIR for the proposed redevelopment of Berths 206-209 at the Port of Los Angeles. Authored various sections of the IS/NOP; supported client needs including schedule development and budget maintenance; participated in agency meetings; and conducted research and analysis.

Vandenberg Air Force Base, Replacement of Overhead and Underground Distribution Line, Feeder D1 Environmental Assessment, Santa Barbara County, California. Environmental lead in preparation of the EA for Vandenberg AFB review and approval for the replacement of the main transmission lines located on base. Work closely with lead AFB project manager to efficiently align EA completion with anticipated construction date.

San Diego County Water Authority, USACE 404 Programmatic General Permit, San Diego, California. Assisted in the research, analysis, and preparation of support materials required for the programmatic general permit for routine operations and maintenance activities at Water Authority facilities throughout San Diego County.

Nevada Division of Environmental Protection, Downgradient Study Area Phases 1 and 2 Project Environmental Assessment, Henderson, Clark County, Nevada. Environmental lead in authoring and preparing the EA for Bureau of Reclamation review and approval for the installation of groundwater monitoring wells and implementation of a full-scale geophysical investigation. Coordinating with subject matter experts to complete EA in a timely manner for AECOM to commence proposed monitoring activities. This project includes a formal Section 7 ESA consultation.

City of Los Angeles Department of Water and Power, Elysian Reservoir EIR and Construction Monitoring, California. Authored and prepared the IS and EIR sections, assisted in the visual analysis, and facilitated public meetings during the environmental process for the proposal to cover the Elysian Reservoir to meet new federal water quality standards. Project Manager for coordination and review of the National Historic Properties Act cultural resources memo and Cultural Resources Monitoring Plan for the floating cover alternative. Oversaw biological, cultural, and paleontological construction monitoring and worked closely with the

LADWP environmental and construction managers to ensure cultural compliance and completion of tasks in alignment with the construction schedule.

City of Los Angeles Department of Water and Power, 99th Street Chloramination Station IS/MND, California. Project Manager and lead author in preparation of the MND for the construction of a new chloramination station to meet new federal water quality standards. Preparation of a separate MND for an iron and manganese filtration system and relocation of power lines is underway. Participated in agency coordination meetings; facilitated team meetings; and conducted research and analysis. Received highest remarks for successful project management specifically in the areas of competence and responsiveness from client in May 2017.

Caltrans District 11, I-5/SR-56 Interchange Project EIR/EIS, San Diego, California. Project Manager in the preparation of the EIR/EIS for the proposed construction of the I-5/SR-56 interchange along the controversial I-5 North Coast Corridor in North San Diego County. Authored various chapters; supported client needs, participated in agency coordination meetings including both state and local agencies; facilitated team and public scoping meetings; and conducted research and analysis. Although this project was delayed for many years, Kathy maintained constant communication and collaboration with the client and other contractors to keep the project moving forward.



Usha Vedagiri, PhD

Human Health/Toxicology (Senior On-Call Expert)

Education

PhD, Environmental Science, Rutgers University, 1989
 MS, Environmental Science, Rutgers University, 1982
 BS, Botany, Ethiraj College, Madras, India, 1978

Years of Experience

With AECOM: 15
 With Other Firms: 11

Affiliations

International Association for Impact Assessment (IAIA)
 Society for Environmental Toxicology and Chemistry (SETAC)
 Groundwater Resources Association
 Association for Environmental Health and Sciences (AEHS)

Training / Certification

Ecological Risk Assessment, USEPA, 1990, 1993
 OSHA 40-Hour Health and Safety Training, 1989 et seq.

Dr. Usha Vedagiri has over 25 years of experience in health impact assessment (HIA) and human health risk assessments (HHRAs). She has performed HIAs on numerous projects in Alaska as part of National Environmental Policy Act (NEPA) compliant environmental impact statements (EIS) and also as part of environmental, social and health impact assessments (ESHIA) for industrial and transportation projects. She is also a subject matter expert for health for ESHIAs performed for numerous clients.

Usha is familiar with HIA guidelines published by Alaska and the National Research Council (NRC) as well as international guidance published by the International Finance Corporation (IFC), Oil and Gas Industry Associations for Environmental and Social Issues (IPIECA), and International Council on Mining and Metals (ICMM). She has been invited to conduct HIA training workshops for industrial clients and professional organizations and has delivered numerous HIA presentations at conferences.

Why Chosen for This Project

- Senior human health risk assessment subject matter expert for human health on Donlin Gold EIS
- Knows the State of Alaska Health Impact Assessment process and how it integrates with NEPA

Project Experience

US Army Corps of Engineers (USACE), Donlin Mine Environmental Impact Statement (EIS), Alaska.

Task leader for an HIA that is part of a third-party EIS for a large, high-visibility gold mining operation in Alaska. The HIA covers construction, operation and post-closure for the proposed Donlin gold mine, associated mining infrastructure and more than 300 miles of pipelines and transportation routes. Worked with the Alaska Department of Health and Human Services (DHHS) in identifying data gaps, reviewing the state-prepared HIA, supplemented the state's HIA with additional original work to meet the needs of the EIS, and incorporated it into the EIS to meet NEPA requirements. Represented health topics at a stakeholder workshop in December 2016 to discuss comments on Draft EIS and is currently preparing the Health Section of the Final EIS. Areas of particular concern addressed in the Donlin health assessment include potential exposures to hazardous chemicals, impacts on community physical, mental and social health and health impacts related to transportation and worker housing.

USACE, PacRim Coal, Chuitna Coal Mine EIS, Alaska. Task leader for an HIA that is part of an EIS prepared by AECOM for the proposed Chuitna Coal Mine operation in Alaska. The HIA covers construction, operation and post-closure for the proposed coal mine, associated mining infrastructure and more than 50 miles of coal conveyors, pipelines and onshore and offshore transportation facilities. Worked with the Alaska DHHS in identifying data

Usha Vedagiri, PhD, *continued*

gaps, reviewing the state-prepared HIA, ensuring that it met the needs of the EIS, and incorporated it into the EIS to meet NEPA requirements.

Confidential Client, Health Impact Assessment for a Petroleum Transfer Facility, Anchorage, Alaska. Senior technical reviewer. A confidential client proposed to build a petroleum transfer facility in Alaska that involves construction and operation in environmentally sensitive areas and areas used for subsistence hunting and fishing. An HIA to evaluate the potential impacts of the project on the health of the surrounding communities was performed as part of the NEPA-required EIS. Served on a team of agency and consultant experts who were invited to participate in the scoping of the HIA, and provided on-going support and review during the performance of the HIA and review of the draft and final documents.

US Fish and Wildlife Service, Public Health and Safety Assessment for a Wilderness Area Road Construction Project, Anchorage, Alaska. Senior scientist. Construction of a road through a national wilderness areas was planned so that isolated local communities may obtain safer and more reliable transportation and access to medical facilities and services. A public health and safety assessment was included in the NEPA-required EIS to assess the impacts related to the proposed road construction and operation and its alternatives. Senior reviewer on the assessment and provided guidance and review regarding the scope and execution of the public health assessment.

Alaska Natural Gas Development Authority, Community Health Assessment, Anchorage, Alaska. Senior scientist. Led a community health assessment (CHA) as part of the NEPA-required EIS for the 300-mile Beluga to Fairbanks Natural Gas Pipeline project. Work on this project included evaluation of project impacts on urban, rural and Native Alaskan communities.

USACE, Bonneville Lock and Dam Project, Bradford Island, Oregon. Senior human health risk assessor. Sediments in the vicinity of Bradford Island in the Columbia River near the Bonneville Dam are contaminated with PCBs from transformers and metals (lead, copper) from other operations at the island. Issues of concern include potential risks to human health for subsistence and recreational consumers of fish and shellfish and risks to ecological receptors such as the bald eagle and valued fishery resources. Developed sediment and tissue-sampling plans and is conducting risk assessments for the site. Worked with multiple stakeholders and regulators for this highly visible site to develop strategies and approaches for evaluation and remediation, for development of fish consumption advisories, and consideration of the Columbia River as an exceptional water resource.

Exxon-Mobil, Houston, Texas. Health impact assessment trainer. Health lead on an AECOM team that conducted an invited two-day training session for Exxon-Mobil employees on ESHIA. Received uniformly high commendations from the trainees for the quality of her training session and AECOM was invited back to do a repeat training session in 2017.

Chevron, Effects of Fracking on Community Health, Pennsylvania. Project Manager and health impact assessment task leader. Led a health baseline study for multiple counties in Pennsylvania as part of a proposed ESHIA and also conducting a research-oriented study of the health effects of fracking from an epidemiological standpoint, focusing on health outcomes such as respiratory disease and low birth weight.

Enbridge Energy, LP, Health Impact Assessment for Enbridge Flanagan Pipeline, Cross-continental North America. Senior scientist and HIA technical reviewer for an EIS for a 600-mile pipeline to be built by the Enbridge Pipeline Inc., to convey crude oil from Western Canada to the Midwest and Gulf of Mexico.

The HIA was included as part of the pipeline EIS. Provided assistance with scoping and execution of the HIA which covered 31 counties in 4 states and was also the senior technical reviewer for the HIA.

Confidential Client, Impact Assessment for a Proposed Petrochemical Facility, Eastern US. Health impact assessment task leader. The client was evaluating an active smelting facility as a possible site for a petrochemical plant that would “crack” shale oil into compounds to be used for plastics manufacturing. The client required an ESHIA to assist in assessing the business risks associated with construction or operation of the proposed facility. Led the HIA task and used project-related and on-line resources to perform a rapid assessment HIA for this controversial and highly visible project.

Relevant Presentations and Publications

Patel-Coleman, P., Heath, J., **Vedagiri U.**, and Quiring, S. 2013. A Critical Review of Health Impact Assessment Guidance Documents. Presented at annual meeting of National Environmental Health Association (NEHA), Washington, DC.

Quiring, S., Patel-Coleman, K., **Vedagiri, U.** and Heath, J. 2012. Health Impact Assessment - You Take the Lead. Learning Lab presented at Annual Meeting of NEHA, San Diego, California.

Vedagiri, U., Thistlewaite, W., and Ruoff, W. 2011. Making it Real: Customizing Screening-Level HIAs to Project needs and Lessons Learned. Poster presented at Annual HIA of the Americas Workshop, Oakland, California.



Chuck Vita, PhD, PE

Infrastructure Team, Buried Terrestrial and Marine Pipelines

Education

PhD, Civil Engineering (Geosystems), University of Washington, 1985

MS, Geotechnical Engineering, University of California, Berkeley, 1973

BS, Civil Engineering (with Highest Honors and Civil Engineering Departmental Citation), University of California, Berkeley, 1972

Years of Experience

With AECOM: 21

With Other Firms: 24

Registrations

Professional Engineer/Alaska/#4407

PE/Washington/#16996

PE/California/#C39263

Geotechnical Engineer, California/#GE 864

Affiliations

American Society of Civil Engineers

Dr. Chuck Vita's 45 years of professional experience includes hundreds of civil engineering infrastructure and environmental projects involving site evaluation, development, redevelopment, restoration, cleanup, or waste containment. His geotechnology practice areas cover geotechnical and earthquake engineering, arctic and cold regions engineering, thermal geotechnics, and environmental geotechnics (cleanup and restoration technology).

Chuck's Alaska and related experience spans many years of geotechnical practice on transportation systems, including port and shoreline projects, environmental cleanup projects, LNG facilities, gas processing plants, major oil and gas pipeline systems, and various building and forensic projects.

Project Experience

Alaska Dept. of Environmental Conservation (ADEC), Alaska Risk Assessment (ARA) of Oil & Gas Infrastructure. Member, National Academies Transportation Research Board Committee for the ARA Design Methodology Peer Review. Infrastructure included the North Slope and Cook Inlet facilities and the Trans-Alaska Pipeline System (TAPS). The ARA included environmental, human safety, and financial risks associated with current and long term infrastructure operation and natural hazards. Major issues included analysis methodologies, infrastructure integrity management systems (particularly for aging infrastructure), and complex adaptive systems behavior.

Why Chosen for This Project

- Infrastructure and environmental subject matter expert
- Arctic and cold regions engineering
- Many years of Alaska experience, including Red Dog Mine

Red Dog Mine (RDM) Tailings Main Dam (TMD),

Alaska. Principal geotechnical engineer for engineering analysis and design of the RDM TMD. Responsibility included TMD slope stability analysis and design under static and earthquake loading, including risk management evaluations. Conducted TMD seepage analysis based on SEEP/W modeling and analysis and analysis of historic piezometer data; identified potential TMD failure mechanisms; and conducted evaluation of potential TMD internal erosion. Evaluated seismic performance and risk criteria.

Indian and Northern Affairs Canada Tundra Mine Tailings Dam Embankment, Northwest Territories.

Designed and conducted probability analyses to estimate the risk of the Tundra Mine Tailings Dam embankment failure based on the calculated factors of safety from slope stability analyses along with estimates of the aggregate uncertainty in the stability analyses models and input parameters. Constructed decision tree to show estimated dam failure risk associated with increasing water levels behind tailings dam for Indian and Northern Affairs Canada leadership to direct startup of treatment and pumping operations for prevention of dam failure.

Trans-Canada, Alaska Gas Treatment Plant, Prudhoe Bay, Alaska.

Principal engineer on thermal analysis of insulated gravel pads to protect underlying ice-rich permafrost from thawing. The analysis allowed quantitative assessment of thermal performance, including controlled thaw into underlying permafrost, consistent with thaw strain effects and acceptable settlement performance.

Chuck Vita, PhD, PE, *continued*

Chyoda International Corp, LNG Plant Permafrost Foundation Study, Siberia. Principal engineer for feasibility study of permafrost foundations for LNG processing facilities at an arctic coastal site. Geotechnical considerations included analysis, design and construction of heavy and light foundations systems in ice-rich and ice-poor permafrost, including thermal and creep effects. Foundations systems included driven and slurried piles, shallow foundations, insulated gravel pads, and thermosyphon systems. Conducted follow-up third party review of proposed foundation system for very heavy LNG processing modules at a coastal site underlain by saline permafrost.

US Navy (NAFVAC NW), Freeze-Back Landfill, Point McIntyre, Alaska. Principal engineer on feasibility study (FS) to develop remediation alternatives suitable for the arctic conditions at the uncontrolled coastal landfill located at the former Distant Early Warning (DEW) Line site near Prudhoe Bay. Conducted geotechnical thermal analysis and design of an insulated freeze-back landfill to be used for site cleanup. Landfill containment performance was evaluated in terms of thermal performance, including frozen soil hydraulic conductivity considering effects of unfrozen water content, freezing point depression, pore water salinity, and chemical contaminants. Extreme-value statistical analysis of available historic temperature data was used in the geotechnical thermal analysis to rigorously estimate recurrence intervals and associated confidence levels of estimated yearly thaw demands.

Northwest Pipeline Corp, Alaska Natural Gas Transportation System (ANGTS), Alaska. Principal engineer for geotechnical program development and management for the formerly proposed 745-mile, \$40-billion mega project (3-year full time assignment). Developed and directed major, integrated geotechnical characterization, analysis, and design program. The program focused on planning and design for the 48-inch-diameter chilled

gas pipeline, including bridges, compressor and metering stations, and special designs for hazard areas. (Many of the complex technical challenges and uncertainties encountered during this project were later researched and vigorously modeled as part of my PhD dissertation.)

Alyeska Pipeline Service Company (APSC), Trans Alaska Pipeline System (TAPS), Alaska. Project civil (geotechnical) engineer for erosion control and slope stability study and design for construction. Developed and applied special slope stability analyses and control measures, including grading and drainage. Developed seepage-induced erosion analysis and design, including probability-based analysis of uncertain subsurface and construction conditions; designed and located erosion control structures along buried portions of the alignment. Initiated approach to probabilistic analysis of thaw settlement (continued and developed during PhD).

Coeur d'Alene River Basin (Mining Sites) Superfund Cleanup, Idaho. Principal engineer from 1997–2005 and 2009–2011, provided technical leadership and comprehensive engineering support to the US Environmental Protection Agency (USEPA) on the remedial investigation (RI)/FS, Proposed Plan, and Record of Decision (ROD) as FS manager, and on post-ROD planning, as principal investigator on major technical issues. Represented USEPA on technical issues and interfaced with all major stakeholders, including federal and state agencies and tribes, the Basin Commission Technical Leadership Group (TLG) and project focus teams (PFTs), and public participants at community meetings. Through 2011, provided on-going technical assistance and support to USEPA and the Department of Justice on litigation issues and remedy implementation.

Premier Gold Mine Project, British Columbia. Principal engineer responsible for statistical analysis and interpretation of surface water quality data for closure of this complex former mining site. Analyzed and interpreted historic data, including autocorrelation effects and correlations between analytes.

Gold Gulch Dam, Arizona. Conducted statistical analysis and evaluation of 8 years of groundwater monitoring data statistically testing for significant changes in lead concentration over time. Concluded that a null hypothesis of no change in lead concentrations could not be rejected. Study was conducted in support of Arizona Department of Environmental Quality (DEQ) Aquifer Protection Program. Written report was submitted to ADEQ.

Holden Mine, Washington. Senior consultant on quantifying uncertainty in performance of remedial alternatives, including time-history of metal-loading groundwater discharges to surface water.

Midnite Mine, Washington. Supported development of remedial alternatives for metals contamination. Developed statistical approach to quantify site-area metal exceedances of local background concentrations.

Rex Mine, Idaho. Evaluated stability analysis of tailings piles and proposed mine reclamation plan.

Jack Wait Mine, Idaho. Evaluated site investigation report and engineering evaluation/cost analysis (EE/CA) for mine reclamation.

Gem Portal Mine Drainage, Idaho. Evaluated EE/CA for water treatment.

Nuclear Waste Isolation Site Characterization Projects. Supported developing probabilistic performance assessment methodology for site characterization of high-level waste repository sites.

Yucca Mountain Project, Proposed Nuclear Waste Repository. Supported development of site geotechnical characterization for license application, including safety analysis report (SAR).

Buckhorn Mine Environmental Impact Statement (EIS), Washington. Developed stream hydrograph estimates based on results of numerical surface water-groundwater modeling. Resulted in successful EIS supporting mine development.



Robert Wallace, PE, PEng, CFC, MBA

Waste Management

Education

MBA, University of Alberta, 1982

MEng, Civil (Geotechnical) Engineering, University of Ottawa, 1974

BEng, Civil Engineering, Carleton University, 1972

Years of Experience

With AECOM: 21

With Other Firms: 23

Registrations

1975, Professional Civil Engineer, Alberta, 19737

1987, Professional Civil Engineer, Florida, 67827

1988, Professional Civil Engineer, Arizona, 22007

1988, Professional Civil Engineer, California, 43588

1994, Professional Civil Engineer, Washington, 31613

1999, Professional Civil Engineer, Hawaii, 9724

2010, Professional Civil Engineer, Guam, 1498

Professional Associations

Member, International Geosynthetics Society (IGS)

Member, IGS North America

Member, American College of Forensic Examiners Institute (ACFEI)

Member, ASTM International (ASTM)

Training and Certifications

2015, URS Project Manager Certification, CA

2016, AECOM Project Manager Certification

2016, ACFEI, Certified Forensic Consultant

Mr. Bob Wallace provides project supervision and consultation in civil and geotechnical engineering, especially for containment systems incorporating soils and geosynthetics lining systems. He has extensive experience with the design and construction of ponds and surface impoundments for mining operations. In addition, he has consulted on the design of heap leach pads and tailings storage facilities. At many facilities, he consults on all aspects of waste management. He has been responsible for the design and construction of waste facilities in Kenai, Juneau, and Barrow, AK.

He is an Instructor in the UCLA Extension Program in Recycling and Solid Waste Management. He is a Certified Forensic Consultant with expertise, in particular, with containment systems.

Why Chosen for This Project

- Extensive experience with ponds and surface impoundments for mining operations
- Nearly 45 years of waste management consulting
- Provided design consultation and expertise on the geomembrane liner for the Stage IX and Stage X Raise design and construction at Red Dog Mine

Project Experience

NAVFAC Pacific, Environmental Impact Statement (EIS) Redevelopment for CJMT Program on Tinian and Pagan, CNMI.

Project Subject Matter Expert (SME) for Solid Waste. The Final EIS for the Commonwealth of the Northern Mariana Islands (CNMI) Joint Military Training (CJMT) facilities development on Tinian and Pagan, CNMI is being completed for the site, addressing all aspects of waste generation, handling, processing, and disposal.

NAVFAC Pacific, Solid Waste Study, Solid Waste Feasibility Study (FS), and Waste Characterization Memorandum, Tinian, CNMI.

Project Subject Matter Expert (SME) for Solid Waste. A comprehensive solid waste study was prepared to address the potential needs for waste management associated with the Commonwealth of the Northern Mariana Islands (CNMI) Joint Military Training (CJMT) facilities development on Tinian, CNMI. The update addresses previous assumption validity and reflects decision-making during the preparation of the CJMT Solid Waste Feasibility Study.

Teck Alaska Inc., Red Dog Mine Tailings Main Dam Design and Construction, Kotzebue, Alaska.

Provided design consultation and expertise on the geomembrane liner for the Stage IX and Stage X Raise design and construction. Challenges during construction associated with very cold temperatures were addressed in association with the Construction Quality Assurance (CQA) program for the liner installation. Issues arising from necessary repairs

Robert Wallace, PE, *continued*

were resolved and descriptive presentation of measures implemented were clarified with State regulators to ensure the safe continued operation of the facility.

Los Angeles World Airports (LAWA), Los Angeles International Airport (LAX), Waste Characterization Study and Compliance Matrix, California. Project Subject Matter Expert (SME) for Solid Waste. A waste sort and waste characterization study were conducted for the LAX airport as a preliminary stage of a foodwaste management program. Representative sources included a sit-down restaurant, a fast food restaurant, a coffee bar, and an airline lounge. These were considered representative of the 164 food service establishments at the airport.

Exxon Neftegaz, Waste Management Scope for Design and Operations, Sakhalin Island, Russia. Task Manager. Developed waste management facility operations scopes of work for Waste Management Facilities, Sakhalin Island, Russia, for Exxon Neftegaz Limited FEED documentation. The Chayvo (40 acre active area) and Dekastri (17 acre active area) Waste Management Facilities were being developed for waste management operations in support of oil and gas operations.

RasGas, Waste Management Gap Analysis, Ras Laffan, Qatar. Task Manager and Lead SME. A Waste Management Gap Analysis was prepared, addressing the waste management system at the Ras Laffan LNG Terminal, for RasGas, in Qatar. All aspects of waste management were addressed, including collection, landfilling, recycling, storage, land treatment, and incineration. Shortcomings in the system were identified and recommendations for rectification to achieve trendsetter status for waste management were completed in 2007.

US Environmental Protection Agency (USEPA), Pond Improvements and Evaporation Pond Design and Construction, Yerington, Nevada. Project Manager and Lead Designer. Development of drainage improvements was provided at the Anaconda Mine, in Yerington, Nevada, for the USEPA. The mine was closed in 1998 and the improvements were required to repair damaged ponds managing contaminated site water. One pond was re-lined, another bypassed by surface and pipe transmission improvements, and a new evaporation pond constructed to facilitate reduction of the total water being managed.



Jason P. Weiss, CFM

Economics

Education

MS, Resource Economics and Policy, University of Maine, 1999

BIE, Industrial Engineering, University of Minnesota, Duluth, 1993

Years of Experience

With AECOM: 18

With Other Firms: 4

Registrations

Certified Floodplain Manager, Association of State Floodplain Managers, 2012

Affiliations

Association of Environmental and Resource Economists

Training

USACE, Deepdraft Navigation for Planners and Economists

Areas of Expertise

Economic Impact Assessment

Socioeconomic Impact Analysis

Environmental Impact Analysis

Benefit, Cost Analysis

Demographics and Community Development

Econometric Forecasting

Mr. Jason Weiss has over 20 years of professional experience as a researcher and consultant in the fields of economics, planning, engineering, and community development. Jason specializes in applied economic and socioeconomic analyses, including benefit-cost analysis, triple bottom line analyses (economic, social, environmental), economic impact assessment, incremental cost analysis, commodities forecasting, regional input-output modeling, forecasting, recreational assessments, and socioeconomic impact analysis. He has performed transportation, recreation, environmental restoration, flood damage reduction, and navigation projects.

Jason has successfully completed economic analyses and managed projects for federal agencies, including the US Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), Natural Resources Conservation Service (NRCS), Federal Emergency Management Agency (FEMA), and other federal, state, municipal, and private clients.

Project Experience

USACE Portland District, Mouth of the Columbia River Jetty A and North Jetty Major Rehabilitation, Ecosystem Restoration Study, Oregon. Economist. Conducted cost effectiveness and incremental cost analyses to identify the National Ecosystem Restoration alternative which maximizes the environmental benefits.

Why Chosen for This Project

- Principal economist on numerous NEPA projects
- Extensive experience with USACE projects

USACE Detroit District, Section 206 Ecosystem Restoration Study, Menominee River, Michigan.

Economist. Assessed the ecosystem restoration benefits of fish passage measures at three different study areas along the Menominee River. Identified the social impacts and the incidental benefits produced by each alternative. Used IWR-Planning Suite to conduct cost effectiveness and incremental cost analyses to identify the national ecosystem restoration plan which maximizes the environmental benefits.

Bureau of Ocean Energy Management, Benefits of Renewable Energy Projects in the Outer Continental Shelf, Washington D.C.

Economist. Identified resources and described technical approaches that can be used by authors of environmental assessments (EAs) and environmental impact statements (EISs) to address the beneficial effects that can accrue from the development of alternative energy sources in the Outer Continental Shelf. Audience includes interested members of the general public who seek a better understanding of how benefits can be captured, described, and evaluated during the National Environmental Policy Act (NEPA) process.

USACE St. Paul District, Fargo-Moorhead Flood Risk Management Feasibility Study, Fargo, North Dakota – Moorhead, Minnesota. Project Manager, economist. Developed the regional economic development, other social effects, environmental justice, and transportation analysis portions of the Fargo-Moorhead Flood Risk Management Feasibility Study.

Jason P. Weiss, CFM, *continued*

USACE Fort Worth District, Sulphur River Basin Comparative Analysis, Sulphur River, Texas.

Economist. Built a regional input/output model using IMPLAN for the purpose of comparing the socio-economic implications of five alternative reservoir locations within the Sulphur River Basin of Northeast Texas. Reservoirs will be used for water supply.

USACE, City of Greeley, Review of Northern Integrated Supply Project Supplemental Draft Environmental Impact Statement, Greeley, CO.

Economist. Reviewed and evaluated the Northern Integrated Supply Project Supplemental Draft EIS with a focused effort on identifying issues that could potentially impact the Seaman Water Supply Project and/or the city's other water resource objectives. Provided with city with comments for consideration.

Private Client, Socioeconomic Evaluation, Northeastern Pennsylvania.

Economist. Evaluated the impacts of a proposed power plant on socioeconomic related resource areas such as land use, employment, housing and environmental justice. The analysis updated U.S. Census information on a previously submitted Combined Operating License Application to the Nuclear Regulatory Commission.

Los Angeles County, Socioeconomic Impact Analysis for Power Plant Siting, South Gate, California.

Economist. Estimated the net economic, fiscal, and electric power benefits that would be produced by the construction and operation of proposed electric generating plant. Potential impacts on adjacent communities and demands for public services were also discussed.

Private Client, Socioeconomic Impact Analysis for Power Plant Siting, Beaver County, Pennsylvania.

Economist. Conducted an analysis of the economic and social impacts that would be produced by the construction and operation of proposed electric generating plant. Socioeconomic and community level data were used to determine impacts to local community and environmental justice regulations. Employment information and regional input/output

analysis were used to determine the economic impacts of the facility.

USACE Huntington District, Master Plan Updates, Ohio, Kentucky, West Virginia.

Planner, Economist. Updated master plans at six USACE managed reservoir project areas in Ohio, Kentucky, and West Virginia. The updates involved performing site specific land-use suitability studies, preparation of market studies to identify future recreation areas and facility requirements, and making recommendations for utilization of resources. The updates included the preparation of programmatic environmental assessments to better understand the nature of project related impacts.

FEMA, Socioeconomic Analysis, New Orleans, Louisiana.

Economist. Performed socioeconomic analysis related to NEPA for public assistance projects in the New Orleans Metropolitan Area. An essential component of this analysis is estimating the cumulative impacts of the FEMA actions in Louisiana in the rebuilding of the critical physical infrastructure.

Defense Intelligence Agency, Socioeconomic Analysis for Relocation of Facilities, Washington, D.C.

Economist. Conducted socioeconomic analysis for siting report of relocating Defense Intelligence Agency facilities in three counties. Used regional input-output models, socioeconomic data, and community comprehensive plans to determine impacts of relocations on local communities and environmental justice regulations.

Private Client, Initial Impact Assessment for Petrochemical Plant, Western Pennsylvania.

Economist. Conducted an assessment of the social impacts that would be produced by the construction and operation of a proposed petrochemical plant in western Pennsylvania. Socioeconomic and community level data were used to determine impacts to local community and environmental justice regulations.

USACE Institute for Water Resources (IWR), Using Other Social Effects in Alternatives Analysis,

Arlington, Virginia. Project Manager, economist. Developed a white paper which examined and provided examples of using other social effects (OSE) factors to determine the impacts of alternatives on the human population and the social fabric of a community. The white paper focused on how use OSE as an integral part of the USACE plan formulation and alternative evaluation process. The white paper is intended to be used by District level planners to provide guidance on conducting an OSE analysis.

Private Client, Socioeconomic Analysis of Proposed Low-Level Radioactive Facility Siting, Texas.

Economist. Coordinated the collection, presentation, and analysis of socioeconomic data for a region of interest around a proposed low-level radioactive facility site. The primary issues under investigation in the study were related to environmental justice.

USACE New Orleans District, Projected Residential and Commercial Growth Reanalysis, St. John the Baptist and St. James Parishes, Louisiana.

Economist. Used population growth and a number of socioeconomic factors to project the number and value of residential and commercial structures to be built in the study area.

USACE Baltimore District, Socioeconomic Analysis, Prince William County, Virginia.

Economist. Conducted county level and census tract level socioeconomic analysis of stream restoration project. Used socioeconomic data and community comprehensive plans to determine impacts of project on local community and environmental justice regulations.

USACE Detroit District, Ecosystem Restoration Feasibility Study, Boardman River, Michigan.

Economist. Assessed the ecosystem restoration benefits of potential modification or removal of three dams on the Boardman River. Identified the social impacts and the incidental benefits produced by each alternative. Conducted cost effectiveness and incremental cost analyses using IWR-Planning Suite to identify the national ecosystem restoration plan.



Sheyna Wisdom (*Fairweather Science*)

Marine Wildlife; T&E Species and ESA Compliance

Education

MS, Marine Science, University of San Diego, California, 2000

BS, Biology, Eastern New Mexico University, Portales, 1995

Years of Experience

With Fairweather Science: 7

With Other Firms: 12

Affiliations

Acoustical Society of America

Society for Marine Mammalogy

North Slope Science Initiative Science & Technical Advisory Panel, 2016-2017

Prince William Sound Science Center Board of Directors, 2017-2019

Training and Certifications

Traffic Noise Model Training at Harris, Miller, Miller & Hanson

NHI Highway Traffic Noise

USCG Safety Equipment and Survival Procedures

Areas of Expertise

Marine Mammal Impact Assessment

Preparation of NEPA documents

Biological Assessments

Acoustic Analysis

Noise Impact Studies

Project Compliance

Ms. Sheyna Wisdom has 18 years of experience in program management, marine mammal research, acoustical and biological assessments, permitting, and project field compliance. She is responsible for preparation and review of international, federal, state, and local environmental compliance documents specifically related to marine mammals. Her expertise includes assessment of impacts of noise on wildlife, both terrestrial and aquatic, according to the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA). Sheyna has strong relationships with agencies including National Marine Fisheries Service (NMFS) in both Alaska and Silver Spring, Maryland, and with the US Fish and Wildlife Service (USFWS).

She has managed numerous large-scale, multi-disciplinary marine science programs in Cook Inlet and the Arctic for industry, universities, and agencies for 10 years. As General Manager for Fairweather Science, she is responsible for a staff of seven employees and all business management and development.

Why Chosen for This Project

- Subject matter expert in marine mammals
- Significant impact assessment and mitigation experience
- Ten years of managing marine science programs in Cook Inlet and the Arctic
- Strong relationships with the National Marine Fisheries Service and the US Fish and Wildlife Service

Project Experience

Shell Anchor Retrieval Project, Chukchi and Beaufort Seas, Alaska. Project Manager. One of three project managers responsible for retrieval of large mooring systems on behalf of Shell. My team was responsible for permitting and compliance, stakeholder engagement, travel coordination and crew change logistics, training, and subcontractor management. Relevant permits included incidental take authorization (IHA) from the NMFS, Letter of Authorization (LOA) from the USFWS, and land use permit from the US Army Corps of Engineers and State of Alaska Department of Natural Resources (DNR). Compliance included management of a team of 25 Protected Species Observers (PSOs) and Inupiat Communicator/Observers (ICOs) and reporting to agencies (daily, weekly, monthly, 90-day).

Hilcorp Alaska, LLC, Seismic Program, Cook Inlet, Alaska. Project Manager and technical lead on preparation of IHA application and Biological Assessment (BA) for planned seismic program in Cook Inlet; client/agency interface; negotiations for mitigation/monitoring program. Agencies include both USFWS (sea otters) and NMFS (all other marine mammals).

Olgoonik Fairweather, Chukchi Environmental Studies Program (CSESP), Chukchi and Beaufort Seas, Alaska. Program Manager for multi-disciplinary marine science studies program collecting baseline information in the northeastern Chukchi Sea and Beaufort Sea for ConocoPhillips,

Sheyna Wisdom (*Fairweather Science*), continued

Shell, and Statoil. Managed multiple contractors of various disciplines, coordinated field personnel, obtained necessary permits including LOA, managed permit and safety compliance, coordinated with all various agencies and stakeholders, public outreach, co-author of scientific articles and presentations.

Alaska LNG Environmental Services, Alaska.

Marine mammal technical lead. Senior technical reviewer of environmental compliance documents (MMPA, ESA, National Environmental Policy Act [NEPA], Federal Energy Regulatory Commission [FERC]) specifically related to marine mammals in Cook Inlet and Beaufort Sea. Project lead for Incidental Take Regulations (ITR) application from NMFS for 2018-2022 for marine construction, client/agency interface, and mitigation/monitoring program negotiations. Lead interface with NMFS and technical lead for assessing acoustic impacts.

SAExploration, Cook Inlet Seismic Program, Alaska.

Marine mammal principal investigator. Author of BA in support of IHA for seismic program in Cook Inlet; client/agency interface; negotiations for mitigation/monitoring program. Principal investigator (PI) for monitoring and mitigation program in Cook Inlet. Compliance included management of a team of PSOs and passive acoustic monitoring (PAM) observers; reporting to agencies (daily, weekly, monthly, 90-day).

Apache Alaska, Cook Inlet Seismic Program, Alaska.

Marine mammal principal investigator. Author of IHA and BA for seismic program in Cook Inlet; client/agency interface; negotiations for mitigation/monitoring program. PI for monitoring and mitigation program in Cook Inlet. Compliance, including management of a team of 40 PSOs and PAM observers; reporting to agencies (daily, weekly, monthly, 90-day).

ConocoPhillips Alaska, Cook Inlet Operations, Alaska.

Marine mammal scientist. Responsible for preparation of marine mammal permits related to various Cook Inlet operations. Permits included informal Section 7 consultation for Cook Inlet beluga whale under ESA.

Alaska Oil and Gas Association (AOGA), Beaufort Sea ITR Petition for Polar Bear/Walrus, Alaska.

Marine mammal scientist/Project Manager. Responsible for preparation of 5-year rulemaking application for incidental take of polar bears and Pacific walrus under the MMPA. Potential effects of oil and gas exploration, production, and development were assessed including noise disturbance, physical obstructions, human encounters, and oil spill. Petition accepted by USFWS and regulations renewed in Aug 2011.

Integrated Concepts and Research Corporation (ICRC), Port of Anchorage Marine Terminal Redevelopment Project, Alaska.

Project Manager/marine mammal scientist. Responsible for preparation of IHA and 5-year ITR in accordance with NEPA and the MMPA. IHA application prepared for construction activities in 2008, LOA application prepared for construction activities 2009 – 2014. Primary noise source of concern was pile-driving noise.

Bay Area Transit Authority, Dumbarton Bridge Seismic Retrofit, San Francisco, California. Senior technical reviewer. Provided senior review of IHA under MMPA assessing pile driving noise on marine mammals in San Francisco Bay. Distances to the NMFS underwater noise exposure thresholds were calculated, as well as for various mitigation measures.

Bechers Bay Pier Replacement at Santa Rosa Island, Channel Islands National Park, Ventura, California. Project noise analyst. Prepared noise technical report to assess underwater impacts of pile driving on fish and marine mammals in support

of Environmental Assessment (EA) for replacement of pier. Also assisted with preparation of an IHA under the MMPA. Distances to the NMFS underwater disturbance thresholds marine mammals and fish were calculated for various pile types and sizes of pile drivers and drilling, as well as for various mitigation measures.

North Star Energy LLC, Bradwood Landing LNG Landing Terminal and Natural Gas Pipeline Project, Columbia River, Washington.

Project noise analyst/marine mammal biologist. Prepared section for assessment of underwater noise impacts on wildlife (Steller sea lions, fish) from pile driving and blasting in support of BA, environmental impact statement (EIS), and IHA for NMFS.

Chevron-Texaco, Puerto Coronado Offshore LNG Re-gasification Facility, Baja California Norte, Mexico.

Noise task leader. Prepared noise section and marine mammal section of environmental impact analysis (EIA) for a project to build an offshore LNG regasification facility near the Coronado Islands (approximately 13 kilometers off the coast of northern Baja California). Underwater and airborne noise from construction and operation of the facility to humans and marine wildlife were assessed, with an emphasis on marine mammals (gray whales, dolphins, seals and sea lions).

ExxonMobil Onshore, LNG Re-gasification, Corpus Christi, Texas.

Project noise analyst. Prepared a section assessing underwater noise to marine wildlife as part of the application to the FERC for the proposed Vista del Sol LNG receiving and re-gasification terminal and a connecting natural gas pipeline near Corpus Christi, Texas. Underwater and airborne noise impacts resulting from both construction and operation of all project facilities were evaluated for human and wildlife receptors (dolphins and whales).



Amber Withers

Mining Reclamation/Restoration

Education

BS, Mining Engineering, University of Utah, 2000

Years of Experience

With AECOM: 10

With Other Firms: 7

Registrations

Engineer-In-Training

Affiliations

Society for Mining, Metallurgy, & Exploration (SME), Chapter Chair, 2011 – 2014

Training

OSHA 40-Hour HAZWOPER Training

Mine Safety and Health Administration (MSHA) Trained

Confined Space Training

Construction Engineering Management Training (UDOT)

Mine Closure Planning – A risk-based approach

Office of Surface Mining (OSM), National Technical Training Program (NTTP) Historical and Archeological Resources Course

Abandoned Mine Land, Dangerous Openings

Bonding Estimation

Cost Estimation

Areas of Expertise

Abandoned Mine Lands (AML)

Mining Reclamation

Mining Engineering

AML Land Ownership

Mine Permitting

Ms. Amber Withers is a mining engineer with 17 years of experience in Abandoned Mine Lands (AML), mine reclamation, permitting, and cost estimation. She has extensive project history on a broad range of AML issues, including field inventory and safety hazard assessment of abandoned mines; land ownership research; database development and maintenance; reclamation and closure design; cost estimation and construction.

Amber is currently part of the AECOM team developing the environmental impact statement (EIS) for Midas Gold's Stibnite Mine project. Prior to joining AECOM in 2007, Amber was a project manager with the State of Utah Abandoned Mines Reclamation Program.

Project Experience

US Forest Service, Midas Gold Stibnite Mine

EIS, Idaho. Mine closure specialist. Participated in the preparation of the Draft and Final EIS and coordinated with other resource leads. Participated in development of the Issues and Alternatives Statement, and provided information for the Purpose and Need and Alternatives chapters of the EIS. Participated in several sections of the EIS including land use, socioeconomic, environmental justice, and cumulative impacts.

Rio Tinto Kennecott (RTKC), Tailings Impoundment Engineering Evaluation – Rehabilitation Plan,

Utah. Project Manager and principal author updating the 2014 Tailings Rehabilitation Plan for the North Impoundment. This is a continuation of

Why Chosen for This Project

- Mining engineer with background in mine reclamation, closure design, permitting and cost estimation
- Serving similar role on the Midas Gold Stibnite Mine EIS

the rehabilitation plan update performed as part of the Order of Magnitude (OoM) integrated study AECOM completed in 2015. The update includes the soil cover for the embankment, sequencing interior reclamation, amendments for the interior and seeding for both the interior and embankment. The prefeasibility study is built upon existing studies and designs up through work completed for the OoM integrated closure study completed in 2014, and work from other ongoing studies. AECOM is preparing detailed recommendations to advance the design to a feasibility study level.

Confidential Client, Minerals Facility, Utah.

Environmental compliance auditing. The audit included evaluating compliance with federal, state and local air, water and waste regulations including permitting, reporting and documentation. The audit consisted of reviewing permits and environmental management plans, on-site visits and a final audit report with the findings.

RTKC, Land and Land Associated Services and Support (On Call), Utah.

Project Manager. Main point of contact in assisting Kennecott with land associated services. Tasks include, but are not limited to: reviewing permits; adhering to state rules, standards and format; estimating quantity for bond calculations; spot checking of formulas and quantities; verifying consistency of permits between state agencies; attending meetings; assisting with regulators; and evaluating permit requirements.

Amber Withers, *continued*

RTKC, Tailings Rehabilitation Plan Engineering Project, Utah. Project Manager and principal author updating the 2011 Tailings Rehabilitation Plan for the North Impoundment. The update includes soil cover for the embankment, sequencing interior reclamation, amendments for the interior and seeding for both the interior and embankment. Assessed costs-to-reclaim for the 2019 and 2030 scenarios for North Tailings embankment, North Tailings interior, North Wall of South Tailings, and Central Berm.

American Sands Energy Corp. (ASEC), Notice of Intent (NOI) for a Large Mine Operation (LMO), Mine and Reclamation Plan (M&RP) for the Bruin Point Mine, Utah. Project Manager and main author for the preparation of an NOI for a LMO, M&RP permit for the Bruin Point Mine. Coordinated efforts for compiling and reviewing site evaluations and documentation to satisfy the NOI; large mine permit application for an oil sands mine. Ecological, soil baseline and cultural surveys conducted at the site by a subconsultant were reviewed for any deficiencies. Other support included information of mine operations, anticipated air and water permits, adequacy of hydrology and hydrogeology studies, adequacy and completeness of closure plans, and environmental study needs. Main author for the Groundwater Discharge Permit, Stormwater Pollution Prevention Plan, and the General Construction Permit. Leading a team which is developing the air emission calculation that will be later use in the Air Permit. AaRaptor survey and soil survey were conducted June 2014. Main point of contact with the client and provides any project support required by the team. This project is on-going and the permits are going through public comment.

RTKC, Revision of North Tailings Expansion Permit, Utah. Project Manager and principal author updating the existing mine permit as part of the tailings expansion project. Main point of contact with Kennecott Utah Copper (KUC) and the Utah Division of Oil, Gas and Mining (UDOGM). The update provides a roadmap for mine development, operation, and closure that meets the operating and reclamation standards specified in UDOGM Regulations R647-004.

RTKC, East Waste Rock Extension (EWRE), Utah. Project Manager for the EWRE internal reclamation plan and a principal author in the development of its internal reclamation plan. The project included reclamation of the East Waste Rock Dump at the Bingham Canyon Mine as part of the current mine expansion project. This plan evolved from internal guidance and plans, plans on file with regulatory agencies, EWRE studies and design work, Bingham Canyon Mine site-specific reclamation monitoring, and applicable industry literature. In addition, this plan presents closure concepts, closure execution activities, post-closure monitoring and maintenance programs, and reclamation completion criteria.

Ames Construction, Lake Point Ecological and Soil Baseline Surveys, Utah. Project Manager for conducting and completing site evaluations and documentation to satisfy an NOI, large mine permit application for a gravel pit mine. Ecological, soil baseline and cultural surveys were conducted at the site to support the existing NOI for a large mining operation. Other support included information on mine operations, anticipated air and water permits, adequacy of hydrology and hydrogeology studies, adequacy and completeness of closure plans, and environmental study needs. Main point of contact with the client and provided any project support required by the team. The ecological and soil surveys were completed in one month. Permit was out for public comments within two months.

RTKC, NOI for a Large Mine Operation (LMO), Mine and Reclamation Plan (M&RP) for the Bonneville Crusher Borrow Area, Utah. Project Manager and main author for the preparation of an NOI for an LMO, M&RP permit for the Bonneville Crusher Borrow Area. Coordinated efforts for conducting and completing site evaluations and documentation to satisfy an NOI, large mine permit application for a gravel pit mine. Ecological, soil baseline and cultural surveys were conducted at the site to support the NOI for an LMO. Other support included information on mine operations, anticipated air and water permits, adequacy of hydrology and hydrogeology studies, adequacy and completeness of closure plans, and environmental study needs. Main point of contact with the client and provided any project support required by the team. The ecological and soil surveys were completed in one month. The permit went through a public comment period and received no comment.

Ames Construction, Temple Mountain Asphalt Ridge #1 Mine, Ecological and Soil Baseline Surveys, Utah. Project Manager for conducting and completing site evaluations and documentation to satisfy an NOI, large mine permit application, for a gravel pit mine. Ecological, soil baseline and cultural surveys were conducted at the site. Other support included information on mine operations, anticipated air and water permits, adequacy of hydrology and hydrogeology studies, adequacy and completeness of closure plans, and environmental study needs. The ecological and soil surveys were completed in one month, and the permit application was out for public comments within two months.

RTKC, Alternatives Study for Expanding the Tailings Storage Capacity, Utah. Performed a permit evaluation for expansion of the tailings storage area. Evaluated the Title V air permit, dam safety permit, and the UDOGM large mine permit.



Lisa R. Yenne, PE

Mining Development, Operations, Closure Requirements; Tailings and Dams/Embankments

Education

MS, Civil Engineering, Colorado State University, 1994

BS, Civil Engineering, Cum Laude, Colorado State University, 1992

Years of Experience

With AECOM: 23

With Other Firms: 1

Registrations

Professional Engineer/Colorado

Professional Engineer/Utah

Affiliations

Society for Mining, Metallurgy & Exploration (SME)

United States Society on Dams (USSD) (Member of Tailings Committee)

Colorado Mining Association

American Society for Civil Engineers

Training

MSHA Experienced Miner

Ms. Yenne has over 23 years of diversified civil and geotechnical engineering experience in the mining industry. Her experience is specifically focused in the managing the evaluation, design, construction, and closure of tailings facilities worldwide, including world-class tailing storage facilities. She has been responsible for geotechnical investigations, tailings dam sitings and design, mine closure planning, mine reclamation, construction oversight services, and evaluation of civil engineering and environmental projects.

Project Experience

Kennecott Tailings Expansion Project, Utah.

Project Manager for expanding the existing tailings impoundment at Kennecott. The first part of the project involved completing an alternative study for storage up to 2.2 billion tons of tailing including review of several site locations. Following the alternative study, subsequent phases completed included a prefeasibility, feasibility, and detailed engineering phase. These phases of the project involved managing a multi-discipline team including experts in: electrical, mechanical, tailings delivery and distribution systems, process water system including a new decant barge, surface water conveyance system, cyclone station modification, design of a new tailing embankment adjacent to the existing impoundment, expansion of a historic tailing impoundment, development of a borrow site and quarry for processing drain material, relocation of a railroad, and modification of a highway interchange. The technically challenging geotechnical analysis of

Why Chosen for This Project

- Extensive experience with evaluation, design, construction and closure of tailings facilities
- Geotechnical investigations and dam siting and design
- Former project manager for Kennecott's Tailing Impoundment Expansion Studies (Utah)

the expansion in a seismically active area involved detailed material characterization and was reviewed by industry experts throughout the project phases. The feasibility phase involved over 800 construction drawings, specifications, and a detailed engineering report. A detailed cost estimate and schedule were completed for the feasibility phase. The project also involved providing environmental permitting support including groundwater permit, air permit, quarry permits, and an environmental impact statement (EIS). As part of the overall project management, responsibilities included detailed project control tracking and meeting key performance indicators.

Henderson Mill Tailing Dams Slope Stability, Monthly Engineering Inspections, Pipeline Closure and Misc. Projects, Parshall, Colorado.

Project Manager, design engineer, and/or field engineer for ongoing work at the Henderson Mill Tailings Dams for over 21 years. Recent projects include management of an updated site-specific seismic hazard analysis, updated seismic slope stability analyses, and closure of historic flood bypass pipelines located beneath the embankment shell. Also serves as the engineer-of-record providing monthly inspections of the upstream tailings dams working with the operators and engineer staff on tailings dam construction. Has been the project manager and engineer for design and installation of several phases of horizontal drains installations. This multi-year phased project consisted of evaluating, designing and installing horizontal drains in an upstream method tailing dam to lower the phreatic surface and stabilize

Lisa R. Yenne, PE, *continued*

abutment seepage. Other project work includes establishing threshold piezometric elevations, providing geotechnical recommendations for various projects, recommendations for design of surface water conveyance channel around the tailings impoundment, closure of a historic decant pipeline, and project management of a tailings dam slope cover and surface water management system for active operations that will be incorporated into the closure.

Redrock Diversion Channel, Tyrone Mine, New Mexico. Project Manager on a multi-discipline project for the rehabilitation of a large diversion channel located between two closed tailing dams. The existing channel was a natural drainage area that had eroded and with continued erosion would cause stability issues with the closed adjacent tailings dam. The project scope included an alternatives analysis, detailed design, and construction oversight. Diversion channel construction included four roller compacted concrete drop/check structures to reduce velocity and potential for headcutting and erosion in the future. This project also involved coordination between multiple agencies and contractors.

Tailings Expansion, Peñasquito Mine, Mexico. Project Manager for an updated prefeasibility study for expansion of an existing tailings facility to a new greenfield site. Work completed includes review of thickening of tailings considering the mine plan ore predictions, analyses and update of alternative construction methodology to provide cost savings, conducting laboratory testing and characterization on thickened tailings material, and development of conveyance and process of thickened tailings.

Tailings and Crushed Leaching Stewardship Program, Various Sites, New Mexico, Arizona and Colorado. Senior team member in a training and management program designed to reduce the owners' risks with the operation and closure of tailing

dams and crushed leaching operation. To date, the program has been implemented at over 30 base-metal (copper) mines. The work includes inspecting tailings dams and crushed leaching facilities, teaching a comprehensive short course in tailing dam design and operations, and providing assistance with operational issues.

Climax Mine, 1, 3, and 5 Tailings Dams Slope Stability Analysis and other Miscellaneous Projects, Climax, Colorado. Has worked on the Climax Mine site for over 22 years serving as Project Manager to field engineer on a variety of projects. Recent projects include management of an updated site-specific seismic hazard analysis, updated seismic slope stability analyses, and closure of historic flood bypass pipelines located beneath the embankment shell. Also engineer-of-record providing monthly inspections of the upstream tailings dams working with the operators and engineer staff on tailings dam construction. This project included conducting an extensive field investigation of the historic impoundments and conducting analyses for two historic tailing impoundments that were reactivated. Also served as project manager for the Robinson Tailing Dam Cap that included placing an earth cover over an inactive tailings impoundment and the associated decant pond area. Assisted in evaluating alternatives to raise a tailing dam, which was nearing ultimate height design. The study involved reviewing and evaluating the existing geotechnical data. Several alternatives evaluated included: raising the existing tailing dam, several alternative locations for a new dam, and start-up of a partially reclaimed tailing dam.

Kennecott North Impoundment Completion Design, Salt Lake City, Utah. Project Manager for design of the expansion of an existing tailings impoundment facility to its permitted elevation, by constructing an embankment made from whole tailings founded on an inactive tailings impoundment. Project phases completed included order of

magnitude to detailed engineering. Project involved completing geotechnical seepage and stability analyses, permitting support, process water, tailings delivery, electrical with over 100 supporting drawings, technical specifications, cost estimates and construction schedule.

Kennecott Tailings Impoundment Reprocessing, Salt Lake City, Utah. Project Manager for an order of magnitude study of re-mining and reprocessing of a historic tailings impoundment by either a hydraulic or a dry mining method. The project involved working with an internal team and multiple consultants to develop a design and cost estimate. Major aspects of the project included mechanical and hydraulic conveyance system for tailings, geotechnical evaluation and approach for the mining methods, deposition review, providing a water and power systems, material balance review, and re-processing plant.

Chevron Mining Inc., Questa Mine Remedial Investigation/Feasibility Study, Questa, New Mexico. Geotechnical lead engineer working with the client and multiple consultants during preparation of the Administrative Order on consent/statement of work by the US Environmental Protection Agency. Work included review of potential closure scenarios for the large waste rock facilities, pit subsidence issues, alternatives for floodwater management, and coordination of multiple consultants.

Graysill Mine Reclamation, Colorado. Project Manager for design and construction of a historic uranium mine closure project. Work consisted of closing eight mine adits, excavation and placement of fill materials, processing on-site materials for riprap and cover soils, blasting, and construction of a surface diversion channel. Work was performed at high altitudes in extremely tight working conditions in an area popular with tourists.



Updated Conflict of Interest Declarations



Objective. Concise. Delivered.

Appendix B. Updated Conflict of Interest Declarations

As requested in RFP Attachment A, below are updated conflict of interest declarations for the team, including new team members and subcontractors not included on the earlier Statement of Qualifications (SOQ) statement:

AECOM and its proposed subcontractors do not have any financial or other conflicting interests in the outcome of this project; this applies to each firm and the individuals proposed from each firm, including those added since our SOQ. AECOM's team can provide fair, independent, and impartial reviews, analyses, and facilitation through the NEPA process.

7.1 Changes Since SOQ Statements

New AECOM team members not included in our earlier statement include:

- Taylor Brelsford
- Jack Colonell, PhD, PE
- Sagar Thakali
- Kelsey Tranel
- Chuck Vita, PhD, PE
- Robert Wallace, PE
- Jason Weiss

Keith Torrance, identified in our SOQ as an employee of UMIAQ Environmental LLC, is now employed by Sustainable Earth Research, LLC. New subcontractors to the team are: NightOwl Discovery and Applied Limnology Professionals LLC. Each subcontractor has provided AECOM with statements affirming no past or present managerial, contractual, legal, or financial relationship with PLP, Northern Dynasty Minerals (NDM), or First Quantum Minerals (FQM), nor any

identified future options for such. None of our proposed subcontractors has a financial interest in the outcome of the EIS, nor do the senior management (or principals) of such firms hold any interest in PLP, NDM or FQM.

7.2 Disclosure Statements

AECOM has prepared the following disclosure statements to address any perceptions of potential conflicts associated with the firm and/or specific team members.

7.2.1 AECOM

AECOM was contracted by Mitsubishi Base Metals in 2007 to prepare an analysis of environmental, stakeholder, and regulatory compliance issues associated with development of the Pebble Project when they were contemplating investing the project. During the time period between when Mitsubishi Base Metals made a stock purchase in Northern Dynasty and then later sold their shares, AECOM provided monthly updates on issues associated with the project. AECOM also conducted a one-time semi-quantitative risk assessment and social investment analysis as part of this effort. All work was completed by 2011, when Mitsubishi divested its interests in the project.

7.2.2 Bill Craig, AECOM

Bill Craig has taken a short leave each summer since 2002 to commercial fish for salmon in Area E (Copper River and Prince William Sound). He owns a drift gillnet vessel and an Area E limited entry permit. Bill does not and has not participated in the Bristol Bay salmon fishery and has no financial

interest in any ventures related to Bristol Bay salmon. Additionally, Bill is a member of Cordova District Fishermen United (CDFU), but does not serve on the Board of Directors. Bill is not a member of United Fishermen of Alaska (UFA). As Bill does not have any investment in Bristol Bay fisheries and does not hold board positions in any organizations that may take a public position on the Pebble Project, we believe he does not have a conflict of interest.

7.2.3 Bruce Ford, AECOM

Bruce Ford is a Senior Environmental Biologist in AECOM's Burnaby, British Columbia office. AECOM's senior management and the proposed management team for this project are aware that Bruce is married to an officer of Northern Dynasty. AECOM has not proposed Bruce to work on this project, nor will he have any access to any project information provided to or prepared by the AECOM team beyond what is disclosed through the public process. An internal "firewall" protocol will be implemented, which will be clearly communicated to all team members. This includes specific permissions and/or password protections to access project files managed by the AECOM team. AECOM has effectively implemented such protocols on past and current projects and contracts. In addition, AECOM, as part of our routine business practices, adheres to a strict confidentiality protocol with all of our projects, such that information not released or within the public domain is managed carefully to be accessible and available only to those who need such information.

7.2.4 Keith Torrance, Sustainable Earth Research, LLC

Keith Torrance, identified in our SOQ as an employee of UMIAQ Environmental, LLC, is now employed by Sustainable Earth Research, LLC).

Sustainable Earth Research LLC (SEARCH) is an Anchorage, Alaska-based environmental consulting and training firm, with an emphasis on water geochemistry.

Keith Torrance was employed as an environmental geologist by APC Services LLC, beginning January 2013. At this time, APC Services, LLC was a contractor to PLP, providing environmental consulting services. Specific tasks included measurement of hydrological data in Upper Talarik Creek and Newhalen River, collection of surface water samples, and collection of groundwater samples, monitoring well hydrology and sampling of acid rock drainage field tests. Dr. Torrance was part of this effort, making regular visits to the Pebble site over the course of his employment (January 2013 – November 2014). No conflicting interests exist and Sustainable Earth Research has not been involved in any prior work for the PLP, NDM or FQM.

7.2.5 Ken Cash, Normandeau Associates, Inc.

Normandeau Associates, Inc. is one of the nation's largest science-based environmental consulting firms with over 250 employees located in 19 offices in 13 states. Normandeau's diverse staff of professionals work in partnership with industry, government agencies, energy providers, and the public to develop solutions that enhance economic development, meet regulatory requirements, monitor, protect, and restore our natural resources, and improve communities. No conflicting interests exist and Normandeau Associates has not been involved in any prior work PLP or FQM.

7.2.6 Joseph Meyer, Applied Limnology Professionals, LLC

Applied Limnology Professionals is an environmental consulting firm in Golden, Colorado that specializes in (1) the effects of chemicals (especially metals and major geochemical ions) on aquatic organisms and (2) chemical and biological limnology. Projects include environmental risk assessments, development of water quality criteria and evaluation of their protectiveness, analysis and prediction of the toxicity of metal mixtures, evaluation of effectiveness of water treatment processes, and studies of remediation of mining-impacted waters.

On August 3, 2012, Joseph Meyer (as an employee of Arcadis U.S. at that time) participated in a Pebble Mine Copper-Toxicity Meeting at the headquarters of PLP in Anchorage, Alaska; however, all of his expenses for that meeting preparation, time, and travel were paid by the Copper Development Association and by Arcadis, and nothing was paid for by PLP. While employed by Arcadis U.S. (and also as an independent consultant), Joe has completed work for Rio Tinto that was not related to the Pebble Project. No conflicting interests exist and Sustainable Earth Research has not been involved in any prior work for the PLP or FQM.

7.2.7 Dean Anderson (NightOwl Discovery)

NightOwl Discovery (NightOwl) helps companies in the most demanding industries reach their data management goals. They offer services spanning the information governance spectrum including data collection, data indexing and search, data hosting, lifecycle governance and data remediation. NightOwl's staff of over 120 employees serves clients in locations spanning the U.S., Europe and Asia. NightOwl operates two U.S. data centers as well as data centers in Dublin, Ireland, Dusseldorf, Germany and Hong Kong, China. NightOwl has

managed collections and discovery in over 40 countries and handles discovery management for many large global companies.

No conflicting interests exist and NightOwl has not been involved in any prior work for PLP or FQM.

7.2.8 Sam Merritt (NightOwl Discovery)

No conflicting interests exist and NightOwl has not been involved in any prior work for PLP or FQM.

7.3 Statement of Financial Interest

The CEQ guidelines (NEPA Section 1506.5(c) and the clarifying "NEPA 40 Questions") require that a third-party consultant not have any material interest in the outcome of the EIS analysis and conclusions, so as to ensure that the process and the outcome are unbiased and not tainted by inappropriate external influence. This restriction is generally interpreted to mean that a consultant does not have any financial interest in the outcome of the NEPA process, and more operationally, that a candidate consultant is not working for the project proponent at the same site, or on a project that, while geographically separate, would be impacted by the outcome of the EIS.

The following disclosure statements are provided.

AECOM's past contractual involvement with the Pebble Limited Partnership (PLP) was initiated through Gartner Lee, a company purchased by AECOM in 2008. Gartner Lee, and subsequently AECOM, completed the following efforts for Northern Dynasty (or PLP) in relation to the Pebble Project:

1. Prepared a compilation of data on commercial salmon fisheries and mining activity in the Fraser River watershed up to 2005; this contract with ended in 2007. Staff who participated on this effort were Bruce Ford with support from a number of others who are no longer with AECOM.

2. Provided an environmental monitor/coordinator at the Pebble site for a 2-week shift; this effort (we believe) this occurred in the summer of 2007. Staff who participated on this effort were Bruce Ford and another biologist; the other biologist is no longer with AECOM.
3. Updated the Fraser River study with data through 2010. This report was ultimately submitted by the Pebble Limited Partnership as part of its response to the USEPA's hypothetical review of a mining project in the Bristol Bay watershed; this effort was completed in 2012. Staff who participated on this effort were Bruce Ford and Brian McGill, not on this team, with support from others who are no longer with AECOM (existing AECOM support staff may have worked on the project).
4. Updated the abovementioned Fraser River report with the most recent salmon escapement data in 2014; this effort was completed in May 2015. Staff who participated on this effort were Bruce Ford with support from another biologist; the other biologist is no longer with AECOM (existing AECOM support staff may have worked on the project).

AECOM has no other managerial, contractual, legal, or financial relationships with Pebble Limited Partnership (PLP) or Northern Dynasty Minerals (NDM), beyond those disclosed above, nor does AECOM have any identified future options for such relationship with PLP or NDM. AECOM is not currently working for PLP, NDM, or on a project that is dependent on the outcome of this NEPA process. AECOM does not have any financial or other material interest in the outcome of the NEPA process. Additionally, through various inquiries and to the best of our knowledge, AECOM's senior management who would have access to information, project involvement, or authority over those involved in the NEPA process do not have interests in PLP or NDM.

Our subcontractors shown in our SOQ are: Normandeau Associates, Fairweather Science, ResourcEcon, E3 Alaska, Ecosystem Sciences, Arctic Hydrologic Consultants, and Brice Environmental. Keith Torrance, identified in the SOQ as an employee of UMIAQ Environmental LLC, is now employed by Sustainable Earth Research, LLC. New to the team are: NightOwl Discovery and Applied Limnology Professionals LLC. Each subcontractor

has provided AECOM with statements affirming no past or present managerial, contractual, legal, or financial relationship with PLP or NDM, nor any identified future options for such. None of our proposed subcontractors has a financial interest in the outcome of the EIS, nor do the senior management (or principals) of such firms hold any interest in PLP or NDM.

AECOM and our subcontractors can provide signed statements affirming the above, as required, prior to execution of any contract.



About AECOM

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