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September 24, 2021

Ormat Nevada, Inc.  
6140 Plumas St.  
Reno, NV 89519

**ATTN: Ms. Erica Freese (efreese@ORMAT.COM)  
Mr. Mark Hanneman (mhanneman@ORMAT.com)**

**RE: PROPOSAL TO PROVIDE WATER MONITORING SERVICES FOR THE  
MAMMOTH COMPLEX GEOTHERMAL PROJECT, MONO COUNTY,  
CALIFORNIA**

Ms. Freese and Mr. Hanneman,

McGinley & Associates Inc. (McGinley) is pleased to submit this proposal to provide Water Monitoring Services for the Mammoth Geothermal Project located in Mono County, California. This proposal is based on the scope of work as outlined in the Request for Proposal (RFP) dated May 2021, the Ormat responses to questions dated June 4, 2021, and subsequent site visits in June 2021 (stream gaging sites) on August 18, 2021 (monitoring well sampling). This proposal only includes Monitoring well sampling and data collection as part of the Groundwater Monitoring and Response Plan (GMRP). The water sampling and data collection associated with the Long Valley Hydrologic Advisory Committee (LVHAC) has been provided as a separate proposal.

## 1. INTRODUCTION

### 1.1 Project Understanding

It is our understanding Ormat Nevada, Inc. (Ormat) seeks a qualified team to conduct agency-required groundwater monitoring in Mono County, CA to support the Mammoth Geothermal Complex and Casa Diablo IV projects. The scope includes water sampling and data collection from Groundwater Monitoring and Response Plan (GMRP) geothermal monitoring wells for calendar year 2022. Sampling and monitoring activities will be conducted on a quarterly basis. Additionally, biannual data summaries will be prepared along with an annual summary report.

Field data collection will be conducted per the methods outlined in the USGS Techniques of Water Resources Investigation Series (USGS 2003) and the USGS National Field Manual for the Collection of Water-Quality Data (USGS 2018). All collected samples will be analyzed by a California-certified environmental laboratory that performs Title 22 analyses and all reports will be stamped by a California-registered professional geologist/certified Hydrogeologist (CHg).

### 1.2 McGinley Qualifications

McGinley has extensive experience in the collection and monitoring of surface water and groundwater sources across Nevada and California for geothermal projects, mining projects, oil and gas projects

and contaminated site investigations and remediations. McGinley collects literally thousands of water samples per year and has experience and expertise with nearly all sampling techniques, equipment, protocols, and analytes. We maintain a variety of in-house surface and ground water sampling equipment and supplies and can easily procure any equipment or supplies that we may need that we do not have in-house.

Additionally, McGinley has Mammoth Complex hydrologic monitoring familiarity having developed the web-based data portal for the Mammoth Geothermal Complex monitoring program. McGinley built this data portal with the feedback from the Long Valley Hydrologic Advisory Committee (LVHAC). The data portal incorporates historical data from all monitoring locations subject to the proposal, except the monitoring wells that are just being constructed. McGinley has been participating in the LVHAC meetings for updates and coordination on data portal data entry, for which we are currently responsible.

### **1.3 Key Project Personnel & Experience**

The primary personnel that will support the work outlined above and their respective roles are discussed below. Resumes for project personnel are provided in Attachment 1.

#### **Anthony Dimpel, PE, CEM - Vice President**

Mr. Anthony Dimpel is a Professional Environmental Engineer and Nevada Certified Environmental Manager. His areas of expertise include project management, regulatory engagement, water discharge permitting, site assessment and remediation, and air quality permitting and support. Mr. Dimpel has significant project management experience in managing projects and provide senior support and oversight for Ormat, as well as many other types of private and public-sector clients.

Mr. Dimpel would provide senior oversight and support as well as contract administration for the project.

#### **Dwight Smith, PE, PG, CHg, WRS – Principal Hydrogeologist**

Mr. Smith has over 30 years of experience as a consulting hydrogeologist, specializing in groundwater and surface water resources in California and Nevada. His professional experience includes: water resources development feasibility, water resources management, regional and watershed scale hydrogeologic assessments, groundwater recharge and sustainability evaluations, well design and aquifer pumping assessments, water rights surveying and research, design of dewatering systems, geochemical evaluations to assess sources of water, computer-aided groundwater and surface water flow modeling, stream flow gaging, stream and groundwater interaction studies, spring evaluations, baseline hydrology monitoring, water quality management plans, and environmental impact evaluations.

Mr. Smith has managed water chemistry sampling in strict adherence to USGS protocols, for ultimate publication in the USGS NWIS database for spring, well, and precipitation sampling, Mr. Smith has over 30 years of experience in monitoring of water levels and water chemistry in monitoring well networks for many types of conditions and purposes. Mr. Smith will be the Principal Hydrogeologist responsible for overseeing the implementation of all technical aspects of the scope of services for Ormat.

#### **Allison Collett, MS – Staff Hydrogeologist**

Mrs. Collett is a Staff Hydrogeologist with ten years of academic and professional experience in the hydrologic sciences. Her experience includes field work associated with large scale hydrogeologic investigations, water quality sampling, groundwater monitoring networks, stream flow gaging, oversight of drilling activities, analytical data review, technical report writing, safety coordination and

contractor oversight. She also has background in aqueous geochemistry, groundwater modeling, and engineering geology. She is experienced in surface water and open channel flow measurement techniques and methods. Ms. Collett's responsibilities will be to coordinate and implement fieldwork activities. Ms. Collett has excelled in this area for McGinley, having managed hydrologic data collection in monitoring networks with up to 100 monitoring points, for both physical and chemical parameters, including monitoring wells, vibrating wire piezometers, springs, streams, and climate monitoring stations.

### **Alexa Terrel, MS – Staff Hydrologist**

Ms. Terrell is a hydrologist with seven years of professional and academic experience within the environmental and hydrological sciences. She has a professional focus in the hydrogeological sciences relating to water resource development and management, including extensive hydrologic data collection, GIS, well siting and design, discharge permitting, aquifer pumping test analysis, catchment-scale groundwater flow simulations, spring, surface water, and groundwater monitoring, regional scale hydrogeological assessments, and water rights mapping. Ms. Terrel's will assist with field measurements, and also be responsible for data compilation, data management and report preparation.

### **Garrett Frey – Staff Hydrogeologist**

Mr. Frey is a hydrogeologist with nine years of professional experience in hydrogeologic evaluations, data collection, well drilling, aquifer testing, surface water gaging, monitoring programs, and geologic evaluations. Mr. Frey will assist with field monitoring and measurement activities.

### **Patrick Johnson – Data Management and GIS Specialist**

Mr. Johnson has unique skills in GIS and database development and management, including coding and creating client-specific data portals. Mr. Johnson developed the current Mammoth Geothermal Complex data portal will provide input to the project team on data formatting for efficient input and uploading into the project-specific data portal.

## **2. PROJECT APPROACH & SCOPE OF WORK**

The scope of work included in this proposal consists of the following:

- **Task 1:** Prepare Internal Sampling and Analysis Plan (SAP)
- **Task 2:** Conduct Quarterly Sampling and Monitoring Events
- **Task 3:** Data Compilation and Prepare Biannual Data Summary Reports
- **Task 4:** Project Management

Descriptions of each task to be implemented under this contract are summarized below.

### **2.1 Task 1: Prepare Internal Sampling and Analysis Plan (SAP)**

It is McGinley's understanding that no SAP is required to be prepared or submitted to the agency for review or approval. As such, McGinley will prepare a simple internal SAP to ensure that all sampling and monitoring activities are properly carried out. The SAP will be made available to Ormat for review. McGinley believes that the preparation of the SAP is good policy to ensure sample collection and monitoring activities are properly carried out.

The SAP will include the following information:

- Monitoring and measurement locations and Site ID
- Monitoring frequency

- Required field measurements and laboratory analytical
- Sample container, preservation, and storage requirements
- Sample labeling and chain-of-custody protocols
- Field methods and procedures
- Required field equipment and supplies

The SAP will be made available to all members of the project team

## 2.2 Task 2: Conduct Quarterly Sampling and Monitoring Events

The monitoring wells to be sampled under the GMRP are summarized in Table 1 below. Three of these locations are dual completed, nested monitoring wells, so the water level, water chemistry and down-hole temperature logging will be conducted on nine wells total.

A field inspection of monitoring well sites will be conducted prior to the initial round of sampling so that appropriate access, equipment and supplies may be secured. This will also assure the proper communications cables and software are secured for quarterly data downloads from the bubbler water level monitoring systems.

Continuous water level data is being recorded by pressure transducers housed at the well head for each well. The quarterly recorded data will be downloaded from the data loggers. Static water level measurements will be made using a wire-line sounder for data QC and adjustments/corrections to recorded pressure data and conversion to true depths to groundwater, relative to the site datum being used.

Vertical temperature profiles will be collected using a temperature sensor with depth logging at 10 ft intervals and 2-minute sensor equilibration time at each depth station. Wells up to 1300 ft will require temperature logging over the complete saturated interval. The monitoring wells are equipped with bubbling tubes for water level measurement. It is assumed that the bubbling tubes may be temporarily removed to conducted temperature logging, and water chemistry sample collection (as described below) to prevent entanglement of equipment.

Collection of meaningful geochemical samples from monitoring wells will require well purging prior to sample collection, or use of discrete-zone sampling equipment to collect a water sample from the submerged screen zone. The appropriate method to be used for water chemistry sampling will be dependent on the well characteristics, including depth to groundwater, total depth of the well, saturated column within the well, and rate of well yield.

For purposes of cost estimation, McGinley has assumed that five wells will be sampled using purging methods, and four will be sampled using discrete-zone sample collection. For purged wells, McGinley will measure purged water characteristics for stabilization of field parameters of temperature, EC and pH during purging. Purging will be conducted with a piston pump assembly, comparable to that currently utilized by the USGS. Costs for all sampling equipment is included in this cost estimate.

The saturated column (well casing volume), yield, or static depth to groundwater for some monitoring wells may be unrealistic to purge with low-flow pumping methods. In these cases, McGinley will use a discrete-zone sampling device. The sampler will be lowered to the screened interval of the piezometer, opened to allow groundwater sample inflow, then closed and raised to land surface. For purposes of cost estimating, it is assumed that 4 wells will be sampled using the discrete-zone method.

Sample collection and monitoring activities will be performed pursuant the methods outlined in the USGS Techniques of Water Resources Investigation Series (USGS 2003) and the USGS National Field Manual for the Collection of Water-Quality Data (USGS 2018). Sampling and measurements will include decontamination of equipment before use in each well. Sample handling will include collection, storage, and transport under chain-of-custody procedures.

**Table 1 - Groundwater Level Measurements**

Well	Data		
	Quarterly Temperature (vertical temperature profile)	Quarterly Geochemistry Data**	Quarterly Bubbler Tube Transducer Download
Ormat 14A-25	X	X	X
Ormat 28A-25	X	X	X
BLM Off-Lease 1	X	X	X
Ormat 28-25	X	X	X
BLM Off-Lease 2	X	X	X
BLM Off-Lease 3	X	X	X

\* Manual ground-water level measurement needs to be made to ensure accuracy of transducers

\*\* Chemistry data includes major ions, nutrients, arsenic, boron, fluoride, and lithium.

### 2.3 Task 3: Data Compilation and Prepare Biannual Data Summary Reports

Data collected on a quarterly basis will be compiled in a format suitable for entry to the Mammoth Complex hydrologic data portal, as provisional data. It is assumed that water level and temperature data will be used to compute daily average values, and the continuous (20-minute) data will be compiled for use and review. All data will go through QA/QC review at the end of the year, as part of publication of the Annual Summary Report. Data compilation will include conversion of pressure to water level data – using the true elevations and the site-specific reporting datum that has been historically used. Chemistry data will be reported in units consistent with historical reporting.

McGinley will prepare one biannual data summary report for the data collected during the 1<sup>st</sup> and 2<sup>nd</sup> quarter 2022 sampling events and one annual summary report which will include a summary of all data collected during 2022. It was assumed that no stand-alone biannual data summary report for the 3<sup>rd</sup> and 4<sup>th</sup> quarter of 2022 would be needed as that data will be included in the Annual Summary Report.

### 3. SCHEDULE

The anticipated scheduling of project work is summarized in Table 2.

**Table 2 - Anticipated Project Schedule**

Task	Task Start	Task Finish
<b>Task 1 – Sites Orientation and Preparation of the Internal SAP</b>	10/1/2021	11/31/2021
<b>Task 2 - Conduct Quarterly Monitoring Events</b>		
Task 2a – 1 <sup>st</sup> Quarter 2022	1/1/2022	1/31/2022
Task 2b – 2 <sup>nd</sup> Quarter 2022	4/1/2022	4/30/2022
Task 2c – 3 <sup>rd</sup> Quarter 2022	7/1/2022	7/31/2022
Task 2d – 4 <sup>th</sup> Quarter 2022	10/1/2022	10/31/2022
<b>Task 3 – Data Compile and Biannual/Annual Data Summaries</b>		
Task 3a – 1 <sup>st</sup> and 2 <sup>nd</sup> Quarter 2022 Summary	6/1/2022	7/31/2022
Task 3b – Annual Summary Report	12/1/2022	2/20/2022
<b>Task 4 - Project Management</b>	For the life of the Project	

#### 4. COST ESTIMATE

Work will be conducted on a time and materials basis in accordance with our Ormat 2021 Consulting Services Agreement. The estimated costs to provide the monitoring services including program initiation and calendar year 2022 monitoring is \$89,305.00, as summarized below and detailed in the attached cost estimate spreadsheet. This estimated cost will not be exceeded without prior authorization by Ormat.

Task	Description	Estimated Cost
1	Site Orientation and SAP	\$4,615.00
2	Quarterly Monitoring (4 quarters):  Groundwater measurements and sampling, including chemistry analyses, including geochemistry sampling from 6 monitoring wells (3 dual completions) with well purging prior to sample collection.	\$76,600.00
3	Data Compilation and Reporting	\$8,090.00
<b>Total Estimated Cost</b>		<b>\$89,305.00</b>

#### Assumptions and Exclusions:

- Field measurements and sample collection will require 5 field days (including travel) for a two-person hydrologic crew.
- Equipment to conduct sampling and field measurements is included in this proposal, as follows:
  - Bennet piston pump system for well purging
  - Solinst discrete-zone sampler for in-place sample collection
  - Decon equipment for pump system
  - Air compressor to operate pump
  - Temperature sensor and host system for wells up to 1300 ft in depth
- Nine monitoring wells total, with five sampled for groundwater chemistry using purging methods, and four sampled using a discrete-zone sampling device.
- Laboratory analytical costs are included in the costs for the Quarterly Monitoring task.

- Field work scheduling will be dependent on favorable weather conditions within the target months for monitoring.
- Ability to sample sites in January and April will be dependent on snow cover and having reasonable site access for safe data acquisition.

## 5. CLOSING

McGinley and Associates, Inc. appreciates the opportunity to submit this proposal and we look forward to working with you on this project. Should you have any questions regarding this Proposal, please contact Dwight Smith at (775) 838-2366 or [dsmith@mcgin.com](mailto:dsmith@mcgin.com). If this Proposal and our attached Terms for Professional Services are acceptable to you, please sign the Acceptance below and email it back to us at [dsmith@mcgin.com](mailto:dsmith@mcgin.com), or other suitable form of contract may be provided by Ormat to authorize the work.

Respectfully submitted,

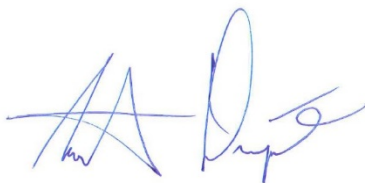
**McGinley and Associates, Inc.**



Garrett Frey  
Project Hydrogeologist



Dwight L. Smith, PG, CHg  
Principal Hydrogeologist



Anthony Dimpel, PE, CEM  
Vice President

**ACCEPTANCE**

McGinley & Associates, Inc. (McGinley) is hereby authorized to furnish all labor and materials required to perform the environmental consulting services described herein, for which the Client agrees to pay all professional fees in said Proposal according to McGinley's standard Terms for Professional Services.

ACCEPTED BY:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name, Title

\_\_\_\_\_  
Date



ORMAT  
Mammoth Hydrologic Monitoring  
GMRP Monitoring Wells

Description	Dwight Smith, Principal	Staff Professional	Field Tech or Drafting	Admin	Subtotal Professional Services	Laboratory Costs, Supplies, Equipment	Vehicle @ \$0.57 / mile	Per Diem @ \$200.00 /day	Task Total
Rate	\$180.00	\$110.00	\$90.00	\$65.00		cost + 15%			
<b>Task 1 Start-Up and SAP</b>									
Initial site inspections	2	10	10	1	\$2,425.00		\$150.00		\$2,575.00
SAP Preparation	2	12	4		\$2,040.00				\$2,040.00
<b>Task 1 Subtotal</b>	4	22	14	1	\$4,465.00		\$150.00		<b>\$4,615.00</b>
<b>Task 2 - Monitoring Well Sampling, Temperature Profile and Depth to Groundwater</b>									
Equipment and Sampling Prep			2	2	\$310.00	\$2,500.00			\$2,810.00
Travel to and from Project Site		6	6		\$1,200.00				\$1,200.00
Field Measurements, Recorder Downloads (Quarterly) for 9 sites including dual piezos.	1	4			\$620.00		\$150.00		\$770.00
Vertical temperature profiles at 9 monitoring wells/piezos	1	46			\$5,240.00		\$100.00	\$800.00	\$6,140.00
Geochemical sampling at 6 sites (3 dual completions) including purging for 5 wells and discrete sampling for 4 wells.	1		50		\$4,680.00	\$2,500.00	\$250.00	\$800.00	\$8,230.00
<i>Quarterly Subtotal</i>	3	56	58	2	\$12,050.00	\$5,000.00	\$500.00	\$1,600.00	\$19,150.00
<i>Annual Subtotal</i>	12	224	232	8	\$48,200.00	\$20,000.00	\$2,000.00	\$6,400.00	\$76,600.00
<b>Task 2 Subtotal</b>	12	224	232	8	\$48,200.00	\$20,000.00	\$2,000.00	\$6,400.00	<b>\$76,600.00</b>
<b>Task 3 -Data Compile and Reporting</b>									
Quarterly data compile and data management	2	32		1	\$3,945.00				\$3,945.00
Biannual and Annual Reports	4	24	8	1	\$4,145.00				\$4,145.00
<b>Task 3 Subtotal</b>	6	56	8	2	\$8,090.00				<b>\$8,090.00</b>
<b>Total Estimated Annual Cost</b>									<b>\$89,305.00</b>

## 2021 SCHEDULE OF FEES FOR PROFESSIONAL SERVICE

### Professional Fees

<b><u>Staff</u></b>	<b><u>Rate (per hour)</u></b>
Subject Matter Expert	\$250.00
Sr. 3 <sup>rd</sup> Party Review	\$200.00
Principal	\$180.00
Sr. Associate	\$170.00
Project Manager	\$160.00
Senior Professional	\$140.00
Project Professional	\$130.00
Staff Professional II	\$120.00
Staff Professional I	\$110.00
GIS Specialist	\$110.00
Environmental Scientist	\$100.00
Technician	\$90.00
Drafting	\$90.00
Engineering Intern	\$75.00
Administration	\$65.00

*Note: Expert Witness Rate: 2 times normal billing rate*

### Equipment

<b><u>Description</u></b>	<b><u>Rate</u></b>
Oil/water interface probe	\$75/day
Multi-Meter w/Flow Through (Base)	\$115/day
- Each probe used	\$25/day
Water level meter	\$45/day
PH/Conductivity/Temp. meter	\$25/day
Dissolved Oxygen (DO) meter	\$25/day
Data logger/Transducer	\$125/day
PID/OVM	\$125/day
Generator	\$60/day
HazCat kit	\$15/sample
PetroFlag® kit	\$20/sample
Bailers	\$10 each
Level B PPE	\$500/day
Level C PPE Set	\$75 each
Level D Tyvex coveralls	\$12 each
Sampling tubes, brass	\$7 each
Submersible/Peristaltic pump	\$50/day
Variable flow purge pump	\$100/day
Air sample pump & vacuum chamber	\$25/day
Air sample bag	\$15/each
Anemometer	\$35/day
Portable Bladder Pump + Controller	\$130/day
Powered Hand Auger	\$50/day
Mercury Respirator Cartridge	\$60/set
Sampling kit	\$15 each
Trimble GPS unit	\$100/day

### Reimbursable

<b><u>Description</u></b>	<b><u>Rate</u></b>
Mileage	per federal rates
Per diem (excluding lodging)	\$55/man-day
Vehicle onsite	\$10/hour
Utility trailer	\$65/day
Subcontractors	cost + 15%

**McGINLEY & ASSOCIATES, INC.**  
**TERMS FOR PROFESSIONAL SERVICES**

**THE AGREEMENT:** Together, the McGinley & Associates Inc. (COMPANY) proposal of September 24, 2021 and the elements herein will constitute the entire AGREEMENT, superseding any and all prior negotiations, correspondence, or agreements whether written or oral. Any changes to this AGREEMENT must be mutually agreed to in writing.

**STANDARD OF CARE:** CLIENT recognizes that subsurface conditions may vary from those observed at locations where borings, surveys, or explorations are made, and that site conditions may change with time. Data, interpretations, and recommendations by COMPANY will be based solely on information available to COMPANY. COMPANY is responsible for those data, interpretations, and recommendations, but will not be responsible for other parties' interpretations or use of the information developed.

Services performed by COMPANY under this AGREEMENT are expected by CLIENT to be conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession practicing contemporaneously under similar conditions in the locality of the project. Under no circumstances is any warranty, expressed or implied, made in connection with the providing of services.

**SITE ACCESS AND SITE CONDITIONS:** CLIENT will grant or obtain free access to the site for all equipment and personnel necessary for COMPANY to perform the work set forth in this AGREEMENT. CLIENT will notify any and all possessors of the project site that CLIENT has granted COMPANY free access to the site. COMPANY will take reasonable precautions to minimize damage to the site, but it is understood by CLIENT that, in the normal course of work, some damage may occur and the correction of such damage is not part of this AGREEMENT unless so specified in the PROPOSAL.

COMPANY will take reasonable precautions to avoid known subterranean structures and utilities, and CLIENT waives any claim against COMPANY, and agrees to defend, indemnify, and hold COMPANY harmless from any claim or liability for injury or loss, including costs of defense, arising from damage done to subterranean structures and utilities not identified or accurately located. In addition, CLIENT agrees to compensate COMPANY for any time spent or expenses incurred by COMPANY in defense of any such claim, with compensation to be based upon COMPANY's prevailing fee schedule and expense reimbursement policy.

**BILLING AND PAYMENT:** Invoices will be submitted to CLIENT by COMPANY, and will be due and payable upon presentation. If CLIENT objects to all or any portion of any invoice, CLIENT will so notify COMPANY in writing within fourteen (14) calendar days of the invoice date, identify the cause of disagreement, and pay when due that portion of the invoice not in dispute. The parties will immediately make every effort to settle the disputed portion of the invoice. In the absence of written notification described above, the balance as stated on the invoice will be paid.

Invoices are delinquent if payment has not been received within thirty (30) days from date of invoice. CLIENT will pay an additional charge of one and one-half (1.5) percent per month (or the maximum percentage allowed by law, whichever is lower) on any delinquent amount, excepting any portion of the invoiced amount in dispute and resolved in favor of CLIENT. Payment thereafter will first be applied to accrued interest and then to the principal unpaid amount. All time spent and expenses incurred (including attorney's fees) in connection with collection of any delinquent amount will be paid by CLIENT to COMPANY per COMPANY's current fee schedules. In the event, CLIENT fails to pay COMPANY within sixty (60) days after invoices are rendered, CLIENT agrees that COMPANY will have the right to consider failure to pay COMPANY's invoice as a breach of this AGREEMENT.

**TERMINATION:** This AGREEMENT may be terminated by either party seven (7) days after written notice in the event of any breach of any provision of the AGREEMENT or in the event of substantial failure of performance by the other party, or if CLIENT suspends the work for more than three (3) months. In the event of termination, COMPANY will be paid for services performed prior to the date of termination plus reasonable termination expenses, including, but not limited to the cost of completing analyses, records, and reports necessary to document job status at the time of termination.

**RISK ALLOCATION:** Many risks potentially affect COMPANY by virtue of entering into this AGREEMENT to perform professional services on behalf of CLIENT. The principal risk is the potential for human error by COMPANY. For CLIENT to obtain the benefit of a fee that includes a nominal allowance for dealing with COMPANY's liability, CLIENT agrees to limit COMPANY's liability to CLIENT and to all other parties for claims arising out of COMPANY's performance of the services described in the AGREEMENT. The aggregate liability of COMPANY will not exceed \$50,000.00, or the cost of professional services, whichever is the lesser for negligent professional acts, errors, or omissions, and CLIENT agrees to indemnify and hold harmless COMPANY from and against all liabilities in excess of the monetary limit established above.

**McGINLEY & ASSOCIATES, INC.**  
**TERMS FOR PROFESSIONAL SERVICES**

Limitations on liability and indemnities in this AGREEMENT are business understandings between the parties voluntarily and knowingly entered into, and shall apply to all theories of recovery including, but not limited to, breach of contract, warranty, tort (including negligence), strict of statutory liability, or any other cause of action, except for willful misconduct or gross negligence. The parties also agree that CLIENT will not seek damages in excess of the limitations indirectly through suits with other parties who may join COMPANY as a third-part defendant. Parties means CLIENT and COMPANY and their officers, employees, agents, affiliates, and subcontractors.

Both CLIENT and COMPANY agree that they will not be liable to each other, under any circumstances, for special, indirect, consequential, or punitive damages arising out of or related to this AGREEMENT.

**DISCOVERY OF UNANTICIPATED HAZARDOUS MATERIALS:** Hazardous materials may exist at a site where there is no reason to believe they could or should be present. COMPANY and CLIENT agree that the discovery of unanticipated hazardous materials constitutes a changed condition mandating a renegotiation of the scope of work or termination of services. COMPANY and CLIENT also agree that the discovery of unanticipated hazardous materials may make it necessary for COMPANY to take immediate measures to protect health and safety. CLIENT agrees to compensate COMPANY for any equipment decontamination or other costs incident to the discovery of unanticipated hazardous materials.

COMPANY agrees to notify CLIENT when unanticipated hazardous materials or suspected hazardous materials are encountered. CLIENT recognizes the existence of law and agrees to make any disclosures required by such law to the appropriate governing agencies. CLIENT also agrees to hold COMPANY harmless for any and all consequences of disclosures made by COMPANY that are required by governing law. In the event the project site is not owned by CLIENT, CLIENT recognized that it is CLIENT's responsibility to inform the property owner of the discovery of unanticipated hazardous materials or suspected hazardous materials.

Notwithstanding any other provision of the AGREEMENT, CLIENT waives any claim against COMPANY and, to the maximum extent permitted by law, agrees to defend, indemnify, and save COMPANY harmless from any claim, liability, and/or defense costs for injury or loss arising from COMPANY's discovery of unanticipated hazardous materials or suspected hazardous materials, including, but not limited to, any costs created by delay of the project, and any cost associated with the possible reduction of the property's value.

**DISPUTES RESOLUTION:** All claims, disputes, and other matters in controversy between COMPANY and CLIENT arising out of or in any way related to this AGREEMENT will be submitted to "alternative dispute resolution" (ADR) before and as a condition precedent to other remedies provided by law. If and to the extent CLIENT and COMPANY have agreed on methods for resolving such disputes, then such methods will be set forth in the "Alternative Dispute Resolution Agreement" which, if attached, is incorporated into and made a part of this AGREEMENT. If no specific ADR procedure is set forth in this AGREEMENT, then it shall be understood that the parties shall submit disputes to mediation as a condition precedent to litigation.

If a dispute at law arises from matters related to the services provided under this AGREEMENT and that dispute requires litigation instead of ADR as provided above, then:

- (1) the claim will be brought and tried in judicial jurisdiction of the court of the county where COMPANY's place of business is located and CLIENT waives the right to remove the action to any other county or judicial jurisdiction, and
- (2) the prevailing party will be entitled to recovery of all reasonable costs incurred, including staff time, court costs, attorney's fees and other claim related expenses.

**GOVERNING LAW AND SURVIVAL:** The law of the State of Nevada will govern the validity of these TERMS, their interpretation and performance. If any of the provisions contained in this AGREEMENT are held illegal, invalid, or unenforceable, the enforceability of the remaining provisions will not be impaired. Limitations of liability and indemnities will survive termination of this AGREEMENT for any cause.

# **ATTACHMENT 1**

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## **Qualifications Resumes**

**Dwight L. Smith, PE, PG, CHg**  
**Principal Hydrogeologist**

**Professional Experience**

Mr. Smith has over 30 years of experience as a consulting hydrogeologist, specializing in groundwater and surface water resource evaluations in the Western U.S., primarily in Nevada and California.

His professional experience includes: water resources development feasibility, water resources management, regional and watershed scale hydrogeologic assessments, groundwater recharge and sustainability evaluations, well design and aquifer pumping assessments, water rights surveying and research, design of dewatering systems, geochemical evaluations to assess sources of water, computer-aided groundwater and surface water flow modeling, stream flow gaging, stream and groundwater interaction studies, spring evaluations, water quality management plans, and environmental impact evaluations.

Mr. Smith has consulted to a wide range of clients, including municipalities; city, county, state and federal agencies; regional water authorities; agricultural operations and districts, Indian tribes; private industries including power, mining and manufacturing; resort and recreational developments; commercial and residential establishments; private land trusts; and to other civil, geotechnical, and environmental engineering firms.

Mr. Smith is a recognized expert in hydrogeology in Nevada having testified in over a dozen water right hearings before the Nevada State Engineer, and has testified in civil proceedings in California and Nevada.

**Education**

- B.S., Geological Engineering, Colorado School of Mines, 1988
- M.S., Hydrogeology, University of Nevada, Reno, 1996

**Certifications and Registrations**

- P.E. – Professional Geological Engineer in Nevada, No. 11906
- C.Hg – Certified Hydrogeologist in California, No. 194
- P.G. – Professional / Registered Geologist in California and Arizona, No's. 5974 & 28482
- W.R.S. – Water Right Surveyor in Nevada, No. 1045

**Select Project Experience**

**Basin and Regional Scale Hydrogeologic Studies**

- Hydrologic evaluations including Salinas River flows and reservoir storage evaluations, groundwater-surface water interaction modeling, and other technical support for ongoing litigation settlement efforts in the Salinas Valley, Monterey County, California, on behalf of the **Salinas Valley Water Coalition, Monterey County, CA.**

- Hydrogeologic data collection for a comprehensive evaluation of basin-scale flow system, water budgets and perennial yield for **Dixie Valley, Churchill and Pershing Counties, Nevada**, including valley-floor and mountain-block spring reconnaissance and data collection, assistance with installation and operation of a 9-gage high-altitude precipitation network, and installation and operation of a 23-gage stream flow and playa run-on network, conducted in corporation with the USGS as part of corporative studies funded by the Bureau of Reclamation. As the culmination to the team scientific studies, a regional groundwater flow model was prepared to potential future pumping scenarios, which included the entire geographic area of three hydrographic basins, representation of shallow valley floor flow systems and deep geothermal flow systems, and high salinity geothermal and brine water transport - BOR & Churchill County.
- Evaluations of agricultural water management strategies as part of the SGMA Groundwater Manage Plan for **Sierra Valley, Plumas and Sierra Counties, CA**.
- Regional-scale and local-scale hydrogeologic evaluations in support mining water supply development, including work presented in a water rights hearing and for an EIS, within the **Diamond Valley Regional Flow System** and adjacent basins, including **Kobeh Valley, Antelope Valley, Pine Valley, and Diamond Valley, Eureka County, Nevada**. Major work tasks included examination of water budgets and perennial yield, well field exploration and test well drilling programs, aquifer testing, pit area drilling and hydrogeologic data collection, stream flow gaging, basin-line hydrologic data collection efforts, assistance with long-term monitoring plan development, and agency and stakeholder presentations – General Moly, Inc.
- Hydrogeologic review of sources and occurrence of arsenic in the groundwater of **Ralston Valley, Nye County, Nevada** in review of possible alternative blending sources to the existing Tonopah Public Utilities municipal system. Interflow Hydrology compiled and collected additional data on the distribution and potential sources of arsenic to groundwater, including development of a conceptual flow and sources model, exploration drilling to assess vertical distribution of arsenic in the existing Rye Patch well field, and test well drilling to assess aquifer conditions and water quality in an alternative source area further up-gradient in the regional flow system. The work successfully identified an alternative source for blending for Tonopah Public Utilities, displacing the need to construct and operate an arsenic treatment facility - Tonopah Public Utilities.
- Hydrogeologic Evaluations of **Muddy River Springs and Regional Carbonate Aquifer in southern and eastern Nevada**, including examination of spring flow sources and explanations for seasonal and long-term variability in water levels and spring discharges, and evaluations in support of the multi-year aquifer testing of the MX-5 well - Southern Nevada Water Authority.
- Hydrogeologic evaluations of **Tikaboo and Three Lakes Valleys** and the Ash Meadows portion of the **Death Valley Regional Flow System, Nye, Clark and Lincoln Counties, Nevada** in support of proposed groundwater development and a water right hearing - Southern Nevada Water Authority.
- Comprehensive groundwater and surface water resource evaluations in **Smoke Creek Desert, Washoe County, Nevada** – including exploration drilling programs, regional aquifer testing, defining basin water balance and perennial yield, aqueous chemistry to evaluation sources of aquifer recharge and define the flow system, and numeric glow modeling of the flow systems, including work with the Desert Research Institute for

groundwater discharge and evapotranspiration evaluations, and USGS for regional scale geophysical evaluations – Sempra Power Generation.

- Review of hydrogeologic conditions and potential impacts to **Ash Meadows and Devils Hole** from proposed shifts in pumping distributions in western **Amargosa Desert, Nye County, Nevada**, including water right hearing participation and development of an approach with the Nevada State Engineer for off-setting impacts associates with water right transfers – Ponderosa Dairy.
- Shallow and surfacing groundwater evaluations, regional monitoring well network, and aqueous geochemistry assessments to define sources and occurrence of regional shallow water table conditions in an urbanized portion of **Las Vegas Valley** – City of Henderson, Nevada.
- Hydrogeologic evaluations of **Coyote Spring Valley** and associated **Regional Carbonate Aquifer** Interpretations, **Clark and Lincoln Counties, Nevada**, in support of a water rights hearing - Coyote Springs Investments.
- Hydrogeologic and review of wells and farming in **Smith Valley, Lyon County, Nevada**, including review of Walker River issues and perennial yield of groundwater to support the farms, done as part of a due diligence review for farm acquisition – Confidential Client.
- Hydrogeologic evaluations of **Warm Springs Valley, Washoe County, Nevada**, including review of basin perennial yield, numeric flow modeling of a proposed artificial recharge-storage-recovery project, monitoring well construction, and establishment and operation of a stream and spring flow gaging network – Intermountain Land and Cattle.
- Hydrogeologic investigation of **Granite Springs and Kumiva Valleys, Churchill and Pershing Counties, Nevada**, including defining the flow system and providing estimates of basin recharge and discharge and perennial yield – ATS & C-Punch Ranch in cooperation with Churchill County.
- Basin-fill and regional potentiometric water-level database development, mapping, and assessment for over 30 Hydrographic Basins in **Eastern and Central Nevada and Western Utah** - Southern Nevada Water Authority.
- Hydrogeology, well and aquifer testing, water rights review, and consumptive water uses evaluation for the **Tracy Segment of the Truckee River, Washoe and Storey Counties, Nevada** – Grand Slam Enterprises.
- **Martis Valley** groundwater recharge and perennial yield assessment, **Placer and Nevada Counties, CA**, conducted as part of the Martis Valley regional planning effort – Martis Valley Property Owners Trust.
- Hydrogeologic evaluations of the **Dry Valley and Bedell Flat, Washoe County, Nevada**, including estimates of water budgets and perennial yield, testing well drilling program, aquifer testing, and numeric flow modeling, in support of water rights permits and EIS impact analyses – Intermountain Water Supply.
- Hydrogeology of the **Cabazon Basin, Riverside County, CA** including defining groundwater conditions and basin water budget.
- Multi-basin water supply feasibility review, **Northeastern Nevada** - Coastal Power Company.
- Potential for land subsidence from water level declines, **Wickenburg, Maricopa County, Arizona** - Toyota Testing Facility.



- Hydrogeologic evaluations, sustainable yield estimates, test well drilling program and aquifer testing at the **Hamilton Ranch, Big Bear Lake, San Bernardino County, CA.**

### Numerical Groundwater Flow Modeling

- **Dixie Valley Regional Flow Model** using MODFLOW-NWT with MT3D, including simulation of shallow basin-fill systems, deep geothermal flow systems, and saline playa environment - Churchill and Pershing Counties, Nevada - U.S. Bureau of Reclamation & Churchill County.
- **Mt Hope Regional Flow Modeling** process wellfield water supply and open-pit mine dewatering modeling using MODFLOW-SURFACT of a portion of the Diamond Valley Flow System, including Kobeh, Antelope, Pine and Diamond Valleys, Eureka County, Nevada, for use in water rights hearings and the project EIS – General Moly.
- **Fort Cady Borate Solution Mining Project** numerical flow modeling using MODFLOW2005 and MT3D for UIC permitting (Region 9 EPA) for a solution mining project in southern CA, including deep injection and pumping recovery, solute transport, and land subsidence.
- **Cascade Project** numerical flow modeling using MODFLOW USG for prediction of open-loop earth heat system wellfield performance and effects of operation at a 200-250 gpm pumping and injection rate adjacent to Lake Tahoe and Incline Creek, Washoe County, Nevada.
- **Tahoe Keys Pump Lift Station** dewatering options modeling using MODFLOW USG, South Lake Tahoe, California.
- **Pahrump Valley**, Nye and Clark Counties, Nevada, numerical flow modeling for assessment of long-term water resource management strategies including artificial recharge and pumping redistributions, using a model version developed by the Desert Research Institute.
- **Bizkaia Subdivision**, numerical flow modeling of potential nitrate buildup and transport resulting for proposed use of individual septic systems for a development in Elko, NV, using MODFLOW and MT3D.
- **Olympic Valley Groundwater Flow Model**, Professional Peer Review for Squaw Valley Public Utilities District, Placer County, CA.
- **Klondike Wellfield**, Goldfield Public Utilities, Esmeralda County, Nevada, local-scale MODFLOW-USG model for wellfield capacity review.
- **Colorado River Regional Groundwater Flow System**, Professional Peer Review of a MODFLOW model prepared to simulate regional flow in a carbonate aquifer system of Southeastern Nevada and Southwestern Utah, for the Southern Nevada Water Authority.
- **Lower Virgin River Numerical Flow Modeling (MODFLOW)**, Southern Nevada and Northwestern Arizona – Southern Nevada Water Authority.
- **Smoke Creek Desert Basin**-scale Numerical Flow Modeling of the Smoke Creek Desert, Washoe County, Nevada using MODFLOW with solute transport for salinity - Sempra Power Generation.
- **Bedell Flat** Basin-scale Numerical Ground-Water Flow Modeling for an EIS, Washoe County, Nevada - Intermountain Water Supply.
- **Dry Valley** Basin-scale Numerical Flow Modeling for an EIS, Washoe County, Nevada - Intermountain Water Supply.

- **Pioneer Meadows Temporary Barrow Pit Dewatering** Facilities numerical flow modeling and dewatering system design, Sparks, Nevada.
- Professional Peer Review of a MODFLOW groundwater model prepared for Herlong Utility Coop, **Honey Lake Valley, CA.**
- **Warm Springs Valley**, Washoe County, Nevada, MODFLOW simulation of basin-scale effects of Artificial Recharge for use in project design and a water rights hearing, Intermountain Water Supply.
- **Hassayampa Wash Sub-Basin**, Arizona, Professional Peer Review of a MODFLOW Model.
- **Wadsworth Aggregate Pit Dewatering Model** using MODFLOW, Lower Truckee River, Washoe County, Nevada.
- **Stampmill Estates** MODFLOW Modeling for Water Quality (Nitrate) Management, Wadsworth, Nevada.
- **Steamboat Creek Drop Structure** Seepage and Hydrostatic Uplift Analysis (SEEP2D) - Washoe County Regional Transportation Commission.

#### Well Drilling, Design and Aquifer Testing

- **Squaw Valley Public Services District** - PlumpJack Municipal Well, Design, Drilling, Well Construction Inspection, and Pumping Tests, Placer County, CA.
- **NDOW Mason Valley Fish Hatchery** - New domestic well, and replacement fish hatchery water supply Well R1; plugging and abandonment of old hatchery supply Wells A1, A2, and C2.
- **USFWS Lahontan National Fish Hatchery** replacement hatchery water supply well, Gardnerville, NV.
- **Lander County Public Works** - Battle Mountain Wells 7 and 8 pumping assessment, review of casing collapse issues, and exploration drilling program development for a new municipal well.
- **Lander County Public Works** - Mountain View Gold Course, Exploration Well 9-A and 4-A zone water quality testing, new irrigation well 9-A design, construction inspection, and pumping tests.
- **Northern Nevada Industrial Center** - hydrogeologic services to drill eight test wells, and complete four production wells for a new water system to serve large-scale industrial development.
- **Silver Spring Mutual Water Company** - Deodar Replace Well Design, Drilling, Well Construction Inspection, and Pumping Tests, Lyon County, Nevada.
- **NV-Reno Industrial**, Carson River induction test wells, Lyon County, Nevada.
- **Grizzly Lake Community Services District** - Delleker Test Well, Dual Zone Water Quality and Yield Testing, Portola, CA.
- **Sierra County Water Works District No. 1** - Calpine Test Wells, Dual Zone Water Quality and Yield Testing, and Municipal Well No. 3 Design, Sierra Valley, CA.
- **Sierra Brooks** - Municipal Well No. 3, Drilling and Construction Inspection, Loyalton, CA
- **Cascade Project** – Earth Heat System, Pumping and Injection Wells Evaluations, New Injection Well, Wellfield testing and operations evaluations, Incline Village, Nevada.
- **Resort at Squaw Creek** - Golf Course Irrigation Well 18-4; rehab and inspection of Wells 18-1, 18-2, and 18-3R; rehab and testing of Perini and Fourth Fairway test wells.

- **City of Tonopah Public Utilities** - Exploration and test well drilling, aquifer testing, and new municipal Wells 9 and 10 design and construction supervision for development of a low arsenic content municipal water source in Ralston Valley, Nye County, Nevada.
- **City of Tonopah Public Utilities** - Wells 5 to 8 rehabilitation, Ralston Valley, Nye County, Nevada.
- **Sadler Ranch** - Shipley Hot Spring Impact Mitigation Well, exploration, test well drilling, and high-capacity production well design for an augmentation source of geothermal water to hot springs, Diamond Valley, Eureka County, Nevada.
- **C-Punch Ranch** – Test well in Granite Springs Valley, followed by design, inspection and testing for six new high-capacity irrigation wells.
- **Esmeralda County Public Works/Utilities** – Community of Goldfield Klondike Wellfield, Municipal Well Rehabilitation and Wellfield Sustainable Yield Testing.
- **Esmeralda County Public Works/Utilities** – Community of Dyer well design and construction inspection.
- **General Moly - Mt Hope Project** - Well field exploration, test wells, and aquifer testing program in Kobeh Valley for a mining and milling water supply, Eureka County, Nevada.
- **Martis Valley West Parcel** - Exploratory drilling and test well program, Placer County, CA
- **Squaw Valley Mutual Water Company** - Wells No. 1 and 2 Rehabilitation and Testing, Placer County, CA
- **Mt. Rose Ski Area** - Snowmaking Wells No. 1 and 2, well siting, design, development and testing, Washoe County, Nevada.
- **Sugar Bowl Ski Area** - Snowmaking test well drilling, Placer County, CA.
- **Royal Gorge Ski Area** - Exploration and Test Wells Program for new water supply development, Placer and Nevada Counties, CA.
- **Big Chief Lodge** - Well pumping tests for dependable water supply analyses, Placer County, CA.
- **Duraflex International Corporation** - Industrial well rehabilitation, Washoe County, Nevada.
- **Ancil Hoffman Golf Course**, Sacramento County Parks & Recreation, Well Performance and Well Yield.
- **Deule Vocation Facility**, CA Department of Corrections, Well Performance Evaluation -.
- **Community of Imlay** - Municipal Well Siting, Design, Construction Inspection and Testing.
- **City of Fallon** - Municipal Well No. 4 Design, Construction Supervision, and Testing.
- **Shadow Creek Golf Course** – Exploration Drilling and Wells 1-5 Design, Drilling Supervision and Pumping Tests, Las Vegas, Nevada.
- **Bellagio Resort and Casino** - Production Wells Design, Construction Inspection and Testing for Resort Water Features, Las Vegas, Nevada.
- **Pyramid Lake Paiute Tribe** - High School Municipal and Irrigation Well.
- **University of Nevada** - Carlin Fire Training Academy Facility and Training Water Supply Wells.
- **NDOT** - Washoe Lake wetlands test wells, and production well.
- **NDOT** - Facility wells at Montgomery Pass, Sunnyside and Lund.
- **Intermountain Water Supply** - Dry Valley Test Well Drilling Program, Washoe County, Nevada.

- **Sempra Energy** - Smoke Creek Desert Exploration Drilling and Test Wells Program including long-term aquifer tests, Washoe County, Nevada.
- **Alpine Springs County Water District** - Performance Evaluation of Horizontal Wells, Placer County, CA.
- **Pine Ridge** - Exploration and Production Wells Drilling and Testing, Portola, CA.
- **Gold Mountain Community Services District** - Well Performance Evaluations and New Well Construction, Portola, CA.
- **Incline Village General Improvement District** - Exploration Wells Program, Lake Tahoe, Nevada.
- **Kaiser Micromill** - Well Construction and Aquifer Testing, Storey County, Nevada.
- **Kal Kan Dry Food** - Well Construction and Aquifer Testing, Washoe County, Nevada.
- **Tonopah Resources** - Industrial Water Supply Well, and facility water quality monitoring wells.
- **Las Vegas Water Pollution Control Facility** - Dewatering Well System, Clark County Sanitation District.
- **Glenshire Mutual Water Company** - Well Designs and Standard Specifications, Truckee, CA.
- **City of Corona** - Municipal Well Design, Construction Supervision, and Testing.
- **City of Simi Valley** - Municipal Well Drilling Supervision.
- **City of Big Bear Lake** - Municipal Well Drilling Supervision.
- **Holcomb Valley Ranch** - Test Well Drilling Program.
- **Community of Coto de Caza** - Test Well Drilling Program for Groundwater Development, Golf Course Irrigation, and Shallow Groundwater Suppression.

#### Watershed Scale Hydrogeologic Studies

- Evaluation of the occurrence and presence of naturally occurring elevated arsenic in shallow groundwater being intercepted by the sewer collection system in the South Truckee Meadows, Washoe County, Nevada, including installation of a 32-well shallow groundwater monitoring network, for Washoe County Community Services Department.
- Compiled hydrologic and water quality data and prepared a Work Plan for a shallow groundwater impact evaluation for treated effluent discharge to the Swan Lake playa, required as a condition of issuance of wastewater treatment facility discharge permits to Washoe County and City of Reno, prepared for Washoe County Community Services Department.
- Evaluation of potential construction water supply well locations for a proposed 45 turbine wind farm on the Walker Ridge, Lake County, CA.
- Groundwater sources and occurrence in the West Martis Creek watershed and at a localized development area with shallow and surfacing groundwater concerns, Placer County, CA.
- Geothermal well and Truckee River interaction investigation at the River Inn property, Washoe County, Nevada.
- Well performance and hydrogeologic evaluation for new well locations for the Gold Mountain Community Service District, Plumas County, CA.
- Hydrogeologic evaluation for the Meadow Ranch Project EIS near Calpine, including surface water and groundwater resources, Sierra County, CA.

- Appraisal of groundwater development potential near the Great Basin Ready Mix Plant, Mustang, Washoe County, Nevada.
- Hydrogeologic evaluation of Alpine Meadows for new horizontal and/or vertical well development, Placer County, CA.
- Hydrogeologic evaluation of a portion of Hungry Valley for a proposed industrial facility, Washoe County, Nevada.
- Sierra Highlands water resources development and hydrogeologic evaluation for an EIS, Portola, CA.

### Surface Water Gaging and Hydrologic Studies

- Humboldt River – Groundwater pumping and river flow connections, interactions, and potential stream flow depletion evaluations, northern Nevada.
- San Joaquin River, flood flows, infiltration losses, shallow aquifer storage and banking potential across a large private ranch, Merced County, CA.
- Salinas River – Detailed surface water, groundwater and reservoir operations modeling as part of litigation settlement evaluations for the Salinas Valley Water Coalition, Monterey County, CA.
- Walker River flow system evaluations, including quantification of flows through the Walker River Paiute Tribe Reservation, hydrologic effects of Weber Reservoir, and technical evaluations of options to account and manage conveyance of water rights through the Lower Walker River, Nevada.
- Walker River evaluations of flows, storage and decreed/permitted water rights on the system, in support of water right litigation settlement discussions, CA and Nevada.
- Little Truckee River - preliminary assessment of Perazzo Meadows restoration effects to stream flows and down-stream water rights diversions to Sierra Valley, Sierra County, CA.
- Inventory of springs and streams in four hydrographic basins (Newark, Ruby, Huntington and Long Valleys) for compliance with inter-basin place of use for water rights.
- Inventory of springs and streams in Kobeh Valley for for compliance with inter-basin place of use for water rights.
- Characterization of water-righted springs in the Roberts Mountains, including geologic interpretations of spring controls.
- Dixie Valley stream flow gaging network - operation of a 22-gage network to collect data on ephemeral and perennial runoff and stream flows in Dixie Valley, Churchill and Pershing Counties, Nevada.
- Warm Springs Creek, Spring and Stream Flow Gaging Network operation and management, and technical evaluations of the feasibility of proposed artificial recharge of stream flows, Washoe County, Nevada.
- Kobeh, Pine and Antelope Valley Regional Stream and Spring Flow Monitoring - assisted with installation of stream gages, conducted miscellaneous stream and spring discharge monitoring for regional baseline data collection, conducted a comprehensive inventory of spring and stream flows in Kobeh Valley for submittal to the Nevada Division of Water Resources, Eureka and Lander Counties, Nevada.
- Truckee River and Martis Valley Tributaries Surface Water - Groundwater Interaction Study for tributaries to the Upper Truckee River, including base flow stream



measurements, chemistry data collection, and historic gage data interpretations, Placer and Nevada Counties, CA.

- Virgin River seepage run stream flow measurements in assistance to multiple public agencies - Clark County, Nevada.
- Truckee River Infiltration Gallery Assessment - Kal Kan Foods, Storey County, Nevada.
- Galena Creek Surface Water Diversion – Infiltration Collector, Montreux Development, Washoe County, Nevada.
- Granite Creek stream flow measurements and diversion locations review for non-potable water uses, Washoe County, Nevada.
- Duck Lake Valley, Reconnaissance Surface Water Resources Assessment, Washoe County, Nevada.
- Ophir Lake Project, Surface Water Resources and Potential for Artificial Recharge, Washoe Valley, Nevada.
- Hamilton Canyon Dam Feasibility, Sonoma County, CA.
- Dixie Valley intermediate and high altitude precipitation gage network (9 gages) installation and operation assistance, including precipitation water chemistry sample collection, Churchill County, Nevada.
- Granite Springs and Kumiva Valley precipitation gage network (6 gages) installation and operation, Pershing County, Nevada.

### Water Rights Management and Research

- Abstracting of active surface water rights and spring rights in the Walker River tributary watershed, CA and Nevada.
- Comprehensive research of Water Rights in 10 Hydrographic Basins in Eastern Nevada and Western Utah - Southern Nevada Water Authority.
- Detailed Water Rights Research and Committed Water Rights Assessment for Spring Valley – Southern Nevada Water Authority.
- Research and Committed Water Rights Assessment for the Tracy Segment Hydrographic Area – Gland Slam Enterprises.
- Truckee River Water Rights Availability Assessment - Washoe County Regional Water Planning Commission.
- Truckee River Water Rights Recovery Program - Truckee Meadows Water Authority.
- University of Nevada, Reno, Main Station Farm and Valley Road Farm Water Rights Consulting.
- Kiley Ranch, Reno, Water Rights Research, Surveying and TMWA Banking.
- MGM Resorts International, Las Vegas - Water Rights Development, Management, and Proofs for all MGM properties in Las Vegas Valley, including Shadow Creek Golf Course and Bellagio Casino.
- Operating Engineers JAC, Wadsworth, Nevada - Water Rights Management and Proofs.
- Midas Joint Venture, Water Rights Research, Northern Nevada.
- Marshall Ranch, Washoe County, Nevada, Water Rights Appropriations, Vested Claims, Artificial Recharge, and Proof of Beneficial Use.

### Environmental-Contaminant Evaluations

- High Salinity Agricultural Irrigation Evaluation as a Groundwater Mitigation Alternative - Buffalo Valley & Lower Reese River, Nevada.
- Warm Springs Valley Groundwater Quality Management Plan, Washoe County, Nevada.
- Mining Site Soil and Groundwater Contamination Characterization and Monitoring Network - Northeastern Nevada.
- Environmental Characterization of Soil and Groundwater Contamination at the Mountain Warfare Training Center, CA – US Department of Defense.
- Environmental Remediation of Fuel Contaminants in Soil and Groundwater - Lassen Union High School, Susanville, CA.
- Silver Lake Landfill Remediation, Reno, Nevada.
- Solid Waste Assessment Testing (SWAT) Evaluations and Groundwater Quality Monitoring Networks at approximately 12 Landfill Facilities, Riverside and San Bernardino Counties, CA.

### Publications & Seminar/Conference Presentations

Smith, D.L., 2020, **Lower White River Flow System of Southern Nevada: Technical Challenges of Water Supply from a Regionally Connected Aquifer & Opportunities for Conjunctive Use of Water Resources**; Nevada Water Resources Association Annual Conference, Las Vegas, NV, invited panel speaker.

Smith, D.L., 2019, **Lower White River Flow System of Southern Nevada: Technical Challenges of a Regionally Connected Aquifer and Opportunities for Conjunctive Use of Water Resources**; USCID 12<sup>th</sup> International Conference on Irrigation and Drainage, Reno, NV, invited speaker.

Smith, D.L., 2018, **Nevada Water Supply Status Update - Rural Basins**, Nevada Water Law Seminar, Reno, NV, invited speaker.

Smith, D.L., 2018, **Groundwater: A Brief Overview of Concepts and Issues**, speaker for the Sierra Nevada College summer naturalist program, Sagehen Creek Field Station, CA.

Smith, D.L., 2017, **Perennial Yield versus Sustainable Yield**, invited speaker for the Nevada Water Resources Association 2017 Annual Conference, Reno, NV.

Smith, D.L., 2016, **Tools for measuring water supply and quality impacts; tips for effectively presenting complicated concepts for judges and juries and for demonstrating specific impacts in courts and before the State Engineer**, invited speaker for Law Seminars International, *Water Resource Management, Science and the Law*, Reno, NV.

Smith, D.L., 2014, **Connection and Interrelationship between Stream Flow and Groundwater, and Methods for Characterization and Determination**, invited speaker for Law Seminars International, *Hydrology and the Law*, Reno, NV.

Smith, D.L., and Childress, J.M., 2012, **Observations of Elevated Chloride and Bromide Contents in Bulk Precipitation and Mountain Block Spring Samples in Dixie Valley**,

**Churchill and Pershing Counties, Nevada, 2012 NWRANevada Water Conference**, Las Vegas, NV, abstract and presentation.

Childress, J.M., and Smith, D.L., 2012, **Arsenic Distribution in Groundwater of Ralston Valley, Nevada and Identification of Alternative Groundwater Sources for the Town of Tonopah**, 2012 NWRANevada Water Conference, Las Vegas, NV, abstract and presentation.

Blazer, D.J., Barter, H.W., and Smith, D.L., 2011, **Development of a Coupled Pit-Dewatering and Post-Closure Lake-Development Model for Projections of Long-Term Mining Impacts**, paper and abstract presentation to the 2011 MODFLOW and More Conference, International Center for Groundwater Modeling, Golden, Colorado.

Smith, D.L., 2010, **Diamond Valley Numeric Flow Modeling and Observed Responses to Four Decades of Agricultural Pumping above the Estimated Perennial Yield**, 2010 NWRANevada Water Conference, Las Vegas, NV, abstract and presentation.

Childress, J.M., Smith, D.L., and Katzer, T.K., 2010, **Hydrogeology of Granite Springs Valley, Nevada & Geochemical Evidence for Pleistocene-Age Recharge Waters in a Closed-Basin Valley-Fill Aquifer**, 2010 NWRANevada Water Conference, Las Vegas, NV, abstract and presentation.

Smith, D.L., 2008, **Hydrogeology of Martis Valley, Placer and Nevada Counties, CA**, public seminar sponsored by the Truckee River Watershed Council, Watershed Issues Forum.

Ayoub, A., Collier, S., and Smith, D.L., 2008, **Review of Climate Variation and Hydrologic Responses at the Muddy River Springs, Clark County, Nevada - Comparison of Climate Indices for use in Partitioning Climate and Pumping Influences**, 2008 NWRANevada Water Conference, Mesquite, NV, abstract and presentation.

Smith, D.L., 2007, **Utility of Numeric Flow Models in Administration of Nevada Water Rights**, Association of Engineering Geologist 2007 Annual Conference, Los Angeles, CA, abstract and presentation.

Smith, D.L., 2006, **Groundwater & Surface Water Management – Technical Issues**, in *Water Rights Management: Use and Shared Use Agreements in Nevada*, Lorman Education Services seminar, Reno, Nevada.

Smith, D.L., Johnson, J., Kistingner, G., and Donovan, D., Burns, A., 2004, **“Climate and Barometric Pressure Influences on Pederson Spring Discharge and the Carbonate Aquifer near the Muddy Springs, Southern Nevada”**. *Journal of the Nevada Water Resources Association*, Fall 2004, Vol. 1, No. 1, pp. 76 – 103.

Smith, D.L., Johnson, J., Kistingner, G., and Donovan, D., 2004, **“Implications of Barometric Pressure and EH-5B Water Levels to Discharge of Pederson Spring, Clark County, Nevada”**, 2004 NWRANevada Water Conference, abstract and presentation.

Smith, D.L., Albright, C.A., and Smitherman, J., 2003, **“Availability of Decreed Truckee River Water Rights and Projections of Future Water Demands in the Truckee Meadows Area**,



**Southern Washoe County, Nevada**”, 2003 NWRANevada Water Conference, abstract and presentation.

Johnson, J., Smith, D.L., and Katzer T., 2002, “**Regional Carbonate Aquifer - A Hypothesis of Terminal Groundwater Outflow to the Colorado River**”, 2002 NWRANevada Water Conference, abstract and presentation.

Smith, D.L. and Guitjens, J.C., 1999, “**Characterization of Urban Surfacing Groundwater in Northwest Henderson, Clark County, Nevada**”, *Environmental and Engineering Geosciences*, Vol. IV, No. 4, pp. 455 - 478.

Smith, D.L. and Katzer, T., 1998, “**Lemmon Valley Water Resources Project - Marshall Ranch Alternative, Proposed Development of a Supplemental Water Supply for the North Valleys Area of Reno**”, 1998 NWRANevada Water Conference, abstract and presentation.

Smith, D.L. and Guitjens, J.C., 1996, “**Shallow and Surfacing Groundwater in an Arid Urban Environment**”, *Proceedings of the ASCE North American Water and Water Environment Congress of 1996*.

**Anthony M. Dimpel, P.E., C.E.M.**  
**Vice President**  
**Senior Project Manager**

## **Professional Experience**

Mr. Dimpel is a Professional Engineer and Certified Environmental Manager with nine years of professional environmental consulting experience. His primary areas of expertise include project management, regulatory engagement and negotiations, mine site permitting, air quality permitting and dispersion modeling, water discharge permitting, and site assessment and remediation. Mr. Dimpel has experience in managing small to large-scale projects in the mining, energy, industrial, and manufacturing sectors. He possesses a strong working knowledge of virtually all aspects of environmental permitting and compliance and maintains effective relationships with regulatory authorities.

In his role as Vice President of McGinley and Associates he also oversees business operations, business development, client relations, and sustainable growth. He also has a background in engineering research and currently serves as a part-time instructor at the University of Nevada, Reno in the civil and environmental engineering department.

## **Education**

M.S., Civil and Environmental Engineering, University of Nevada, Reno, 2012.

B.S., Civil Engineering, University of Nevada, Reno, 2010.

## **Certifications and Registrations**

Professional Engineer-Environmental, Nevada, #024029

Certified Environmental Manager, Nevada, CEM # 2353

AERMOD Atmospheric Dispersion Modeling Training

MSHA Part 46, New Miner Training

OSHA Hazwoper 40 Hour Certification

## **Selected Project Experience**

- **Relief Canyon Mine, Pershing County, NV** - Project Manager responsible for overseeing the preparation of a waste rock geochemical characterization program, pit lake water quality model and report, rapid infiltration basin design, and air quality impact statement in support of a BLM plan of operations modification. Project included oversight of the geochemical sampling and analytical programs which included static testing, humidity cell testing, and column testing. Directed activities of several field staff and office staff during implementation of the project. Approximate contract value: \$300,000

**Confidential Mining Client, Pershing County, NV** - Project Manager responsible for overseeing and assisting in the preparation and implementation of a large-scale hydrologic field program designed to collect the necessary data to support the NEPA process and state of Nevada permitting for a planned open-pit gold mine. Field program included the installation of approximately 15 vibrating wire piezometers and monitoring wells, approximately 30 borehole injection tests utilizing an inflatable packer system, air-lift testing, surface water weir and drive-point piezometer installations, and multiple long-term aquifer pump tests. Our scope also included the preparation of the hydrologic characterization baseline report and development of both the local (pit-dewatering) and regional

numerical groundwater flow models required for permitting. Directed activities of approximately 10 field and office staff during implementation of the project. Approximate contract value: \$1,500,000

- **Diamond X Ranch, Minden, NV** – Project Manager in charge of designing and implementing a Sampling and Analysis Plan (SAP) to characterize the extent of metals contaminated soils, sediment, surface water, and groundwater at former cattle grazing ranch. Metal contamination resulted from flood irrigating the ranch with surface water that had been impacted by Acid Mine Drainage. Directed activities of five field staff and three office staff during the implementation of the project. Approximate contract value: \$1,000,000
- **Former Sagehill Gun Club, Reno, Nevada** – Project Manager responsible for designing and implementing a Remedial Action Plan to mitigate lead and polycyclic aromatic hydrocarbons soil contamination at a former shotgun shooting club to prepare the site for residential development. Directed activities of four field staff and two office staff during the implementation of the project. Approximate contract value: \$500,000

### *Air Quality*

- **Mining Projects**
  - **Jerritt Canyon Mine, Jerritt Canyon Gold, LLC., Elko, Nevada**
  - **Relief Canyon Mine, Pershing Gold Corporation, Lovelock, Nevada**
  - **Florida Canyon Mine, Rye Patch Mining US Inc., Imlay, Nevada**
  - **Pinson Mine, Atna Resources Inc., Humboldt County, Nevada**
  - **Joy Engineering, Several Aggregate Pits, Various Nevada Locations**
  - **Norman D. Sweeney Construction, Various Aggregate Pits, Winnemucca, NV**
  - **Multiple Baker Hughes a GE Company Mine and Mill Sites**
  - **Reward Mine, CR Reward LLC, Nye County, NV**
  - **Gemfield Mine, Gemfield Resources LTD, Esmeralda County, NV**
  - **Mt Hamilton Mine, Mt. Hamilton LLC,**

Project Manager responsible for preparing Nevada Division of Environmental Protection Title V/Class I and Class II new and revision Air Quality Operating Permit applications, Mercury Operating Permit to Construct, and various permitting action requests for the facility with assistance from staff resources. Activities include performing air dispersion modeling, developing emissions inventory, providing recommendations on equipment selection and placement, assisting mine in determining required facility boundary, regulatory reporting, and serving as regulatory liaison.

- **Energy, Industrial, and Manufacturing Projects**
  - **Aqua Metals, Lead-Acid Battery Recycling Plant , Storey County, Nevada**
  - **Tesla Motors Gigafactory, Lithium Ion Battery Manufacturing Facility, Sparks, Nevada**
  - **Ormat Geothermal Technologies, Multiple Geothermal Power Plants**
  - **Bango Refining, Used Oil Recycling Facility, Fallon, Nevada**
  - **Clean Dried Processing, Pet Food Ingredient Drying Facility, Silver Springs, Nevada**
  - **Thiessen Team USA, Elko Shotcrete Facility, Elko, Nevada**
  - **Min-Ad, Dolomitic Limestone Feed Supplement Facility, Winnemucca, Nevada**
  - **Cyanco, Sodium Cyanide Production Plant, Winnemucca, Nevada**
  - **Asian Union Electronic Chemicals, High-Purity Chemical Production Facility, Reno, Nevada**
  - **Vogue Cleaners, Dry Cleaning Facility, Elko, Nevada**

Services provided to above facilities include air quality permit applications and modifications, stack testing coordination, record keeping and reporting support, regulatory liaison, compliance support, air quality dispersion modeling, regulatory negotiations

### *Other Experience*

- **Nevada Chemical Accident Prevent Program**
- **Emergency Spill Response**
- **Third Party Review – Hazardous Waste Determination**
- **Underground Storage Tank System Closure**
- **Special Use Permits**
- **NEPA Air Quality Impact Assessments and Baseline Studies**
- **Indoor Air Quality**

### **Professional Affiliations**

Nevada Mining Association

The Associated General Contractors of America

**Allison Collett**  
**Staff Hydrogeologist**

**Professional Experience**

Allison is currently a Field Engineer with 10 years of professional experience that includes: large scale hydrogeologic investigations, pilot hole development, safety coordination and contractor oversight. She is currently the field lead for a hydrogeologic data collection program near Lovelock, Nevada. Responsibilities include collecting water level data, stream flow measurements, installing vibrating wires piezometers/transducers, programming and maintaining loggers, and collecting water quality samples. Data is collected using Geokon loggers, In-Situ loggers, sounders and a YSI portable meter. When necessary, she trains colleagues who are new to projects and unfamiliar with the program and/or equipment.

She serves as a safety coordinator, ensuring contractors follow clients' Master Safety Plans by attending and conducting safety meetings in conjunction with contractors and vendors entering jobsites. She also ensures all vehicles are equipped with the required safety equipment.

She previously has been responsible for monitoring and sampling groundwater and surface water networks in Eastern Montana. This included collecting groundwater level data, obtaining field parameters such as pH, specific conductivity, temperature, dissolved oxygen and nitrate, as well as sampling sites for isotopes, inorganics (major cations/anions and trace metals) and organics (extractable and purgeable hydrocarbons, methane and diesel/gas range organics).

Allison has also worked on a pilot hole program for a mine in Arizona while overseeing the drilling of the pilot holes and conducting tests to determine aquifer properties. This included the collection of water quality parameters and conducting air-lift and injection tests. Data was collected using Hanna Portable meters, sounders, Divers and In-Situ loggers. She also installed vibrating wire piezometers (VWPs) and time-domain reflectometers (TDRs) with the aid of drillers in designated pilot holes.

**Areas of Engineering Experience**

- Hydrogeological Engineering
- Mining Engineering
- Geophysics

**Professional Record**

- 2019 to Present: McGinley and Associates; Hydrogeologist
- 2017 to 2019: WSP, Hydrogeologist
- 2015 to 2017: Montana Bureau of Mines and Geology; Professional Scientist/Hydrogeologist
- 2014: Montana Bureau of Mines and Geology; Hydrogeology Research Assistant
- 2013: Newmont Mining Corporation; Geotechnical Engineering and Hydrogeology Intern
- 2009 to 2012: Montana Bureau of Mines and Geology; Hydrogeology Research Assistant
- 2009 to 2011: Montana Tech; Research Assistant

**Education**

- Master of Science in Geoscience: Hydrogeological Engineering, University of Montana, 2014
- B.S., Geological Engineering with Geophysics Minor, University of Montana, 2012

## Certifications and Registrations

- MSHA, Part 48, License No. 6849
- OSHA 30-hour Construction

## Select Project Experience

### Hydrogeological Projects

- **McGinley & Associates;** Oversaw drilling operations for aquifer testing program. Recorded notes and observations in field book and reported daily progress to client and supervisors. Installed vibrating wire piezometers in boreholes and programmed associated Geokon loggers for client. Installed and programmed In-Situ transducers in monitoring wells. Installed gauging stations at various surface water sites. Download water level data from loggers; also provide maintenance and, when necessary, troubleshoot loggers. Collect stream flow measurements using a Swiffer velocity meter. Collect water quality samples. Review and upload data in the office. Maintain testing equipment and properly and safely use equipment to provide accurate results.
- **Big Sky;** groundwater sample collection, stream flow measurements, obtaining field parameters, analyzing existing water quality samples and using results to characterize aquifers within the study area.
- **North Hills;** lithological models, regional groundwater models, groundwater sample collection, stream flow measurements, obtaining field parameters, oversaw aquifer tests.
- **Newmont;** updated slope stability models, analyzed data from aquifer tests, hydraulic conductivity.
- **WSP;** Oversaw the drilling of pilot holes for a monitoring program. Recorded notes and observations in field book and reported daily progress to client and supervisors. Conducted air-lift and injection tests on pilot holes for aquifer analysis. Collected data using water quality meters, sounders, Divers and In-Situ water level loggers. Installed grouted-in vibrating wire piezometers (VWPs) and time-domain reflectometers (TDRs) in boreholes. Maintained testing equipment and properly and safely used equipment to provide accurate results.
- **Montana Bureau of Mines and Geology;** Set up sample network for groundwater characterization in areas near oil and gas development throughout northeastern Montana. Collected groundwater samples in accordance to Montana Bureau of Mines and Geology Procedures and Standards for isotopes, inorganics (major cations, major anions and trace minerals) and organics (EPH, VPH, and Methane). Proposed sampling project around Medicine Lake Wildlife Refuge to USFWS and received enough funding to cover the cost of 20 samples in 2016. Monitored groundwater and surface water sites in accordance with the Montana Bureau of Mines and Geology Procedures and Standards. Data collection included stream flow, water levels, and water quality parameters. Processed hydrogeochemistry data using Aquachem 2014.2 and Excel 2016. Results were summarized in a report and used to characterize aquifers in the study area.

**Alexa Terrell, M.S.**  
**Hydrogeologist**

**Professional Experience**

Ms. Terrell is a hydrogeologist with seven years of professional and academic experience within the environmental and hydrological sciences, and with over three of those years in professional consulting practices. She has a professional focus in the hydrogeological sciences relating to water resource development including extensive data collection, well siting and design, oversight on well drilling in alluvial and hard rock environments and well construction, discharge permitting, aquifer pumping test analysis, catchment-scale groundwater flow simulations, spring, surface and groundwater monitoring and regional scale hydrogeological assessments. She specializes in monitoring network planning, spatial data analysis and representation. Her experience is focused mainly in California and Nevada with international experience in Germany and the Middle East. She has additional work experience in aspects of project management, and field and laboratory experience in environmental studies and surface hydrology. Ms. Terrell has worked on projects for local, county, state and federal government, as well as private land developers, golf courses, ski resorts, non-profits and academic research.

**Education**

M.S., Hydrogeology, University of Goettingen, Germany, 2018.

B.S., Environmental Studies, University of California, Santa Barbara, 2012.

**Certifications and Training Courses**

OSHA, 29 CFR 1910 40-Hour, Hazardous Waste Operations and Emergency Response (HAZWOPER)

Mine Safety and Health Administration (MSHA) Part 48, Surface Miner Training

NEPA/CEQA Integration Course for Professionals

**Relevant Professional Experience**

*Well Drilling, Design and Aquifer Testing*

- **Washoe County South Meadows Arsenic Mitigation Study** - Project oversight on the well network design and installation of 31 monitoring wells in roadways around South Reno. Developed and sampled the groundwater in the wells for constituents of concern and monitored water levels monthly. Took soil samples from monitoring wells during drilling as well as hand augered samples to create a representative network. Responsible for the analysis and visual representation of soil and water chemistry and water level results and data management.
- **NDOW, Mason Valley Fish Hatchery Production Well** – Project oversight on old well abandonment, well drilling, design, construction and aquifer testing for a large production well for the fish hatchery facilities. Including analysis of a three monitoring well network and the effects of pumping on water temperatures within the production and monitoring wells.



- **NDOW Mason Valley Fish Hatchery Domestic Well** – Collection of well log, and water chemistry data to determine aquifer properties, site mapping, existing well water quality sampling, new domestic well construction oversight and conducting of an aquifer pumping test.
- **Carson River Induction Test Wells** - Oversight of three test wells drilling, well design and construction, conducting pumping tests, water sampling and data analysis. Installation of a six piezometer monitoring network for surface water level monitoring during TW-A pumping test.
- **Northern Nevada Industrial Center Test Well #4** – Project oversight on drilling and well construction, conducting pumping tests and water sampling for a test well, to be future industrial well. Spring monitoring for water chemistry parameters and discharge before during and in the recovery of the TW-A pumping test. Obtained discharge permits for discharge into an ephemeral drainage.
- **Resort at Squaw Creek golf course well rehabilitation and pumping tests** – Conducting pumping tests on three rehabilitated golf course irrigation wells. Additionally, monitoring a network of 16 monitoring wells during the pump tests.
- **Squaw Valley Monitoring**- Monthly, spring through fall, manual monitoring of water levels in a network of piezometers along with transducer continuous water level data management.
- **Webber Lake Campground Well** – Project oversight on drilling, well construction, and aquifer testing of a low-capacity transient-occupancy well. Permitting of discharge to land surface application.
- **Battle Mountain Golf Course** – Oversight on pumping test setup and aquifer testing analysis. Permitting of discharge to land surface application.
- **Grizzly Lake Community Service Department Delleker Test Well**- Project oversight on the drilling, well design, construction and pumping test of a dual-zone test well. Analysis for water quality and quantity of the two zones tested.
- **Sierra Brooks Municipal Well No. 3** - Well drilling, design and construction oversight for a municipal well.

#### *Local and Regional Hydrogeological Assessment*

- **Tahoe Keys Pump Station** construction dewatering- Data collection of well logs, groundwater chemistry and water levels as well as research papers into local groundwater contamination and groundwater flow models for data input into a localized groundwater flow model for dewatering.
- **Walker Ridge Wind Farm** construction well feasibility study - Data collection of geological maps, well logs, and remote sensing of fault features for well siting and hydrogeological interpretation for potential groundwater yield.



- **City of North Las Vegas Garnet Valley** – Lower White River Flow System regional hydrogeological assessment, evaluation of water rights, pumping inventories, water level monitoring data, water chemistry data, springs in Garnet Valley and nearby hydrobasins for use in a hydrographic basin groundwater flow model to assess static, pumping, and pump and recharge scenarios. Mapping of the regional and hydrographic basin, calculating localized aquifer transmissivities for regional groundwater resource analysis.
- **Gold Mountain Community Service District** Test Well Siting - Remote sensing using aerial imagery of fault zone features and use of geological maps to site test wells around the community for future municipal water supply well.
- **Mt. Rose Ski Tahoe Snowmaking Well #3** – Snow making well siting using geological maps, and aerial imagery.
- **Sugar Bowl Ski Resort**- Test well site selection for snow making wells using geological maps, well logs, and remote sensing of fault zones in aerial imagery.
- **Granite Peak Ranch** - Data collection and analysis on water chemistry of springs and wells basin-wide to determine water chemistry types.
- **Lemmon Valley Water Reclamation Facility**- Data availability assessment for permitting discharge of reclaimed water into Swan Lake. Collection of well logs, water chemistry and water level data and on-site verification of existing wells for a future monitoring plan.
- **Sierra County Calpine** - Data collection of geological maps, well logs, water chemistry, for siting of a small municipal well.

#### *Map Creation - GIS*

- Historic River Maps digitization of the San Joaquin River channelization using ArcGIS.
- Use of ArcGIS for determining optimal study site locations for an endangered species habitat study in Sierra County.
- Digitization of water utility easements for Sacramento County using ArcGIS.
- Delineation and analysis of numerical model scenarios for groundwater catchments in the Lower Jordan valley transboundary aquifer using ArcGIS for the SMART-MOVE integrated water resource management in the Lower Jordan rift valley.

#### *Spring and Hydrology Studies*

- Weekly karstic spring network monitoring of nine local springs, including two used in the City of Goettingen's water supply. Monitored all springs for electrical conductivity, pH and temperature as well as taking water samples.
- Stream flow stage monitoring for a storm water hydrograph study near Fort Bragg, CA.

### *Numerical and 3-D Modelling*

- Creation of a 3-D hydrogeological model of the karstified Weendespring catchment using ArcGIS.
- Numerical simulation of saturated flow dynamics of the karstified Weendespring system, Goettingen, Germany using COMSOL Multiphysics. Creation of a catchment scale inverse saturated flow model using gathered and available data for spring discharges, weather data, geology, fault zones and water chemistry to determine hydrogeological properties of the system and understand the role which fault zones could play in groundwater flow.

### *Laboratory Experience*

- Water quality laboratory testing for inorganic, organic and microbial constituents for ISO standards of post-treatment and in-system drinking water for the City of Bitola.
- Verification of laboratory and field chemistry data from hundreds of central valley and central coast farms for input into the Central Valley Regional Data Center.
- Preparation of rock and water samples for isotope and constituent analysis for the isotope chemistry laboratory at University of Goettingen.

### *Environmental Work*

- Sorting of benthic macroinvertebrate for determining water quality based on analysis of diversity and quantity for the Center for Watershed Sciences at University of California, Davis.
- Field work collecting water samples from flood irrigated fields for a sediment transport study for the State of California to compare erosion of flood versus drip irrigation at multiple farms in the central valley. Included running settleable solids analysis on the water samples to determine transport of soil in the irrigation water.

### **Conference Posters**

- Terrell, A., Veltri, M., Sauter, M., Schmidt, S., Kordilla, J., 2017, **Preferential flow paths in a karstified spring catchment: A study of fault zones as conduits to rapid groundwater flow**. American Geophysical Union Fall Meeting 2017, New Orleans, USA, December 11-15. Poster.
- Veltri, M., Terrell, A., Kordilla, J., Schmidt, S., Sauter, M., 2018, **Effects of fault systems on unsaturated and saturated flow dynamics in karst aquifers**. FHDGG Meeting, Bochum, Germany, March 21-24. Poster.

**Garrett J. Frey**  
**Project Hydrogeologist**

## **Professional Experience**

Mr. Frey is a Hydrogeologist and Geologist with nine years of professional experience in both the water resource and mineral sectors that includes: water well design, construction oversight, and permitting; water resource and groundwater investigations; hydraulic modeling, aquifer pumping testing, environmental drilling and assessments of soil and groundwater contamination; discharge permitting; water quality sampling; stream flow gauging, mineral exploration management and technical oversight; mineral exploration notice of intent and plan of operation permitting, 3D geologic modeling; GIS analysis; surface mapping and sampling; mining claim staking; and technical report writing. Mr. Frey has an excellent working knowledge of many types of environmental and geotechnical drilling methods.

## **Education**

B.S., Hydrogeology, University of Nevada, Reno, 2012.

B.S., Geology, University of Nevada, Reno, 2012.

## **Certifications and Professional Organizations**

Geological Society of Nevada (GSN)

Nevada Water Resource Association (NWRA)

Society for Mining, Metallurgy, & Exploration (SME)

MSHA Part 48, Surface Miner Training.

OSHA 10 Hour Certification

## **Select Project Experience**

- **Confidential Private Developer, Washoe County, NV** – Conduct hydrogeologic investigations including spring surveys, stream flow gauging, and precipitation gauging to assess surface and groundwater potential for proposed residential and commercial development in Cold Springs, Nevada. Design and implement CSAMT and gravity geophysical survey to target exploratory groundwater drilling program. Design, permitting, and oversight for an eight test well drilling program and aquifer pump testing.
- **Confidential Private Developer, Washoe County, NV** – Hydrogeologic review of all available drilling data for Cold Springs Nevada, including historic drill data as well as physical drill cuttings for over 20 recent drill cuttings to create data base of hydrogeologic and subsurface lithologic data. Compile all geophysical, lithologic, hydrogeologic, and surface mapping data into 3D geological modeling software to create a robust geological model in support of basin scale hydrologic model used to assess perennial yield of basin. Presented findings and conclusions to municipal water purveyors and in water rights hearings as an expert witness.

- **Great Basin Water Co., Washoe County, NV.** – Completed hydraulic distribution models for multiple municipal water systems in Cold Springs and Spanish Springs for Integrated Resource Plans (IRP) required by the Public Utilities Commission of Nevada (PUCN) and for multiple private developer’s feasibility studies. All hydraulic modeling assessed if the existing or proposed residential and commercial developments met the state administrative code requirements for both pressure and flows for average day demand, maximum day demand, and fire flow scenarios.
- **NuLegacy Gold Corporation NV, Eureka and Elko Counties, NV** – Manage a team of four geologists on multiple mineral exploration projects in remote locations. Targeting, delineation, and 3D geological modeling of gold and silver deposits. Technical oversight and detailed logging and interpretation of diamond core and reverse circulation drilling programs. Direct environmental permitting at Notice of Intent (NOI) and Plan of Operation (POO) on BLM and private land. Surface geological mapping and drafting using GIS software. Design, implement, and interpret geophysical surveys including CSAMT, induced polarization, gravity, seismic, gradient array, and magnetics. Construct deposit scale 3D geological models integrating data from over 400 drill holes, large geophysical data sets, and district scale geologic mapping to generate and select drill targets.
- **City of Fernley Wastewater Treatment Plan, Lyon County, NV** – Design and oversight for a monitor well drilling program required by an environmental agency’s administrative order of consent (AOC) to assess and identify source of nitrate in groundwater. Aquifer pump testing and discrete depth zone sampling, determine hydraulic conductivity and hydraulic gradient of aquifer below wastewater treatment plant.
- **Great Basin Water Co., Washoe, Elko, and Nye County, NV; Mohave County, AZ** – Technical specification preparation, bidding support, and technical oversight for municipal well rehabilitation for dozens of wells in Spanish Springs, Cold Springs, Spring Creek, Pahrump Nevada, as well as Fort Mohave, AZ. Well rehabilitations consisted of mechanical and chemical treatments of municipal wells including: shock chlorination, acid treatments, liquid CO<sub>2</sub> injections, high pressure jetting, well liner design and installation and subsequent aquifer pump testing.
- **Great Basin Water Co., Washoe and Elko Counties, NV** – Target and design multi-hole exploratory groundwater drilling programs using available geophysical data, public utility pump data, and historic well data to identify suitable locations for municipal well replacements. Technical specification preparation, bidding support, and technical oversight for drilling, aquifer pump testing, and discharge permitting. Analysis of exploratory drilling and follow-up design and oversight of test well and large diameter production well permitting, drilling oversight, and aquifer pump testing.
- **Pacific Gas & Electric Topock Compressor Station, San Bernardino County, CA** – Design and oversight of freshwater supply wells for hexavalent chromium water treatment plant. Rehabilitation of treatment plant injection wells. Sonic drilling and trenching program to assess hexavalent and asbestos contamination of groundwater and soils in and around natural gas compressor station and subsequent monitoring well drilling program in and around contaminated areas.
- **Pacific Gas & Electric Hinkley Compressor Station, San Bernardino County, CA** – Design and oversight of large diameter freshwater supply wells for natural gas compressor



station and municipality. Design and oversight of monitoring well drilling program in and around areas contaminated with hexavalent chromium.

- **California Water Service, CA** – Design and drilling oversight for numerous large diameter municipal water wells for Central Valley and Coastal municipalities. Operations included discrete depth zone testing, water sampling, lithologic logging, well design, and up to 96 hour aquifer pump testing.