



**BISHOP LOSS OF CONTAINMENT
GALETON, COLORADO
WATER WELL SAMPLING AND ANALYSIS PLAN
(WWSAP)**

Version 3.0

Prepared on Behalf of:
Noble Energy, Inc.

Prepared By:
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Little Rock, AR 72118

May 8, 2025

Change Management

Change 001: April 25, 2025 v2.0 to v3.0

- Edits to text per Chevron and ECMC COA dated 4/25/25
- Added Table 2 to add additional analytes per ECMC COA.
- Added text; If visual impacts are detected at the wellhead during the visual site inspection that precedes sampling, as documented with pictures and field notes capturing the location where the sample is to be collected, wells will also be analyzed using methods as specified in **Table 2**.
- Language modified in 4.1 and 4.2 to clarify when wellhead accessible

	Name/Position	Date Signed
Prepared By:	Ken Forster, Senior Consultant	05/8/2025
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Change 002

-

	Name/Position	Date Signed
Prepared By:		
Approved By:		

1.0 Introduction and Purpose

This Water Well Sampling and Analysis Plan (WWSAP) was prepared by CTEH® on behalf of Noble Energy, Inc. (Noble) in response to the Bishop Loss of Containment in Galeton, Colorado. The incident occurred on 4/6/2025. The GPS coordinates for the approximate location of the release Site are: (40.505384, -104.585581). The location of the incident is depicted on the Site Location Map in **Attachment A**.

A total of 14 Available Water Sources (as defined by ECMC) were identified within a one-mile radius of the site (well API 05-123-52071). Only the subset of those that are within ½-mile radius of the site are required by ECMC to be sampled for compliance per Rule 615.

The objectives of this water well sampling program are to:

1. Complete a physical field survey of the locations of each water well found during the desk-top water well survey to verify if the wells are active and are currently being used, and to determine if there are any water treatment systems at the wells.
2. Collect water samples from the well column of the identified water wells to evaluate potential impacts to domestic and irrigation wells.

2.0 Health and Safety

All Site personnel will review and adhere to the incident Site Safety and Control Plan (ICS Form 208) and company/contractor-specific Health and Safety Plans (HASP), as applicable. Daily tailgate safety briefings will be conducted prior to going into the field. Additional safety briefings may be given prior to undertaking particular activities if conditions change. In general, sampling will only be conducted during daylight hours by qualified personnel and under weather or other environmental conditions that do not create unsafe working conditions. The appropriate personal protective equipment (PPE) will be utilized for each task. Any incident will be promptly reported in accordance with the Site-specific Site safety plan and Unified Command (UC) objectives.

3.0 Data Quality Objectives

The data collected during field activities will be used to assess potential exposures to human health and the environment to potential constituents of interest (COI) related to the release.

A strategic planning approach based on scientific methods will be employed for data collection activities providing a systematic procedure to ensure the type, quantity, and quality of data used in decision-making will be appropriate for the intended application. All samples will be submitted to the analytical laboratory for a Level II data quality package. Additionally, 10% of samples may be submitted to the analytical laboratory for a Level IV data quality package.

4.0 Water Well Monitoring and Sampling

4.1 Location and Frequency

Water samples will be collected from influent and effluent water sources fed by water wells. Initially, all accessible water wells within a one-mile radius of the release area will be sampled. The radius of wells to be sampled may change depending on the analytical data of the initial sampling results. A map and a list of the initial water well locations are provided in **Attachment B**. Prior to sampling activities, a physical field survey will be conducted for each well to verify the exact location, address, and Well Owner information.

One water well monitoring/sampling event will initially be conducted at each wellhead, if accessible. If any COIs are detected at any of the wells, additional monitoring/sampling events may be conducted as needed and/or requested by the regulatory agency or Unified Command.

4.2 Visual Observation of Wellhead

Prior to opening the wellhead, field personnel will photo-document the condition of the well cover. If the well is open or has no well cover, field personnel will photo-document the condition of the wellhead and notify the project lead before proceeding to monitor/sample the well. If the wellhead is physically inaccessible or unable to be opened at the time of sampling (i.e., wellhead is sealed, or pump is installed), field personnel will photo-document the conditions preventing sampler access and notify the project lead for potential follow up.

After monitoring/sampling has been completed and the well cover is re-secured, field personnel will again photo-document the condition of the well cover.

If the wellhead is damaged at any point during the opening, closing, and/or monitoring/sampling process, field personnel will immediately notify the project lead, who will notify Noble.

4.3 Visual Observation and Documentation of Odors

If the wellhead is not sealed and is accessible, an aliquot of water will be drawn from the well for observation using approved materials (e.g., single-use bailer). Observations of product and/or odor, or lack thereof, will be made (e.g., visual observation of separate phase liquids, color, and clarity; character and strength of odor). Observations will be recorded in a log book and a digital field form, along with other details about the residence and sampling event. If observations of product and/or odor indicate the presence of product in a well, additional site investigation(s), including, but not limited to additional sampling and/or manual removal of product, may be performed. If the wellhead is sealed, this activity will not be performed.

The aliquot of drawn well water will be disposed of in accordance with the Waste Management Plan. If a wellhead is physically sealed, inaccessible, or the well column is blocked by a pump or any other obstruction, field personnel will document the reason and report the finding to the project lead for potential follow up.

4.4 Water Well Sampling

Field personnel will determine the presence/absence of a water filtration system through property owner questionnaire and/or visual inspection. If a home/well has a filtration component installed, such as a carbon filter, sediment filter, sand filter, and/or water softener, the field personnel will collect a pre-treatment water sample at an influent valve prior to the bladder tank, and a post-treatment water sample at the effluent source (e.g., sink faucet). If a pre-treatment sample before the influent bladder tank cannot be collected due to accessibility issues (such as, if there is no valve before the bladder tank), field personnel will document the reason and will collect a post-treatment water sample at the nearest accessible location (e.g., closest to the pre-treatment water source). If the home does not have a filtration component installed, field personnel will collect a single sample at a kitchen or utility sink faucet. If water is collected from a sink faucet, all attempts will be made to remove the faucet aerator. If the aerator cannot be removed or the homeowner does not allow it to be removed, field personnel will attempt to find a faucet that does not have an aerator.

Prior to sample collection, field personnel will flush the system for a minimum of five minutes with a fully opened faucet or valve to allow the water lines to flush and the system water pump to engage.

Observations of product and/or odor (or lack thereof) will be made during each water sampling event (e.g., visual observation of separate phase liquids, color, and clarity; character and strength of odor). Observations will be recorded in a log book and a digital field form, along with other details about the residence and sampling event.

4.4.1 Sampling Methodology and Analysis

Water well samples will be decanted directly into laboratory supplied sample containers and submitted to Enthalpy Labs, 1725 W. Elk Place, Denver, CO 80211, or to Pace National, 12065 Lebanon Rd, Mt. Juliet, TN 37122. Both laboratories are certified under the National Environmental Laboratory Accreditation Program (NELAP). Submitted samples will be analyzed as presented in **Table 1**. If visual impacts are detected at the wellhead during the visual site inspection that precedes sampling, as documented with pictures and field notes capturing the location where the sample is to be collected, wells will also be analyzed using methods as specified in **Table 2**.

To support emergency response efforts, analytical results for the bolded analytes will be reported by the receiving laboratory under rush turnaround time (TAT). The remaining samples will be submitted under a separate chain-of-custody and reported separately to avoid delaying priority analytical results. Methods

and analytes may be modified and/or reduced once detailed characterization of the source constituents is completed, or if requested by the regulatory agency or Incident Command. Wells will be analyzed, using methods from Colorado Energy & Carbon Management Commission (ECMC) Rule 615.e.(2) as specified in **Table 1**, and presented in **Attachment C**.

Table 1 Well Water Sampling Analysis Summary¹

Analysis	Method	Sample Container	Preservative	Hold Time
BTEX plus 1,2,4-TMB and 1,3,5-TMB ²	US EPA 8260D	2 x 40 mL HCl VOAs	HCL to pH < 2; Ice, maintained at 0-4°C	14 days
Total Petroleum Hydrocarbons (TPH) – Diesel Range Organics (DRO), Gasoline Range Organics (GRO) C6-C10, and Oil Range Organics (ORO) C10-C36	US EPA 8015D	2 x 40 mL HCl VOAs	HCL to pH < 2; Ice, maintained at 0-4°C	14 days
SVOCs ³	US EPA 8270D	2 x 40 mL HCl VOAs	HCL to pH < 2; Ice, maintained at 0-4°C	14 days
pH	SM4500-H+ or US EPA SW846 9040C	1 X 125 mL plastic	Ice, maintained at 0-4°C	<15 mins
Specific Conductance	SM2510B or US EPA SW846 9050A	1 X 125 mL plastic	Ice, maintained at 0-4°C	28 days
Total Dissolved Solids (TDS)	SM2540C	1 x 1 L plastic	Ice, maintained at 0-4°C	7 days
Dissolved gases (methane, ethane, and propane)	Lab-specific SOP for analysis if in-line sample collection vessel such as IsoFlask® used, or RSK175 (for use with 40 mL vials)	IsoFlask® or 40 mL vials	HCL to pH <2; Ice, maintained at 0-4°C	14 days preserved, 7 days non-preserved, recommend 48 hours
Alkalinity	SM 2320B	1 x 125 mL plastic	Ice, maintained at 0-4°C	14 days
Anions ⁴	US EPA 300.0 or SW846 9056	1 x 250 mL plastic	Ice, maintained at 0-4°C	Nitrate and Nitrite - 2 days Bromide, chloride, fluoride, sulfate - 28 days
Phosphorus	US EPA 365.1 or SM4500-PA	1 x 250 mL plastic	Ice, maintained at 0-4°C	NA

Cations ⁵	US EPA 200.8 or SW846 6010D/6020A	1 x 250 mL plastic	HNO ₃ , Ice, maintained at 0-4°C	6 months
Other elements: Barium, Boron, Selenium, and Strontium	US EPA 200.8 or SW846 6010D/6020A	1 x 250 mL plastic	HNO ₃ , Ice, maintained at 0-4°C	6 months
Presence of bacteria (iron related, sulfate reducing, and slime forming)	BART ⁶ Method, days to reaction or 100 cfu/100 mL	Unfiltered, Sterile plastic	Ice, maintained at 0-4°C	Test should be initiated within 24-48 hours of sample collection

¹ Bolded analytes will be reported by the receiving laboratory under rush turnaround time (TAT).

² Full suite US EPA 8260D will be run, but only BTEX and the trimethylbenzenes listed will need to be reported.

³ Semivolatile organic compounds (SVOCs) via US EPA 8270 need only be run if visual impacts are detected at the wellhead during the visual site inspection that precedes sampling, as documented with pictures and field notes capturing the location where the sample is to be collected.

⁴ Bromide, chloride, fluoride, sulfate, and nitrate and nitrite as elemental nitrogen

⁵ Calcium, iron, magnesium, manganese, potassium, and sodium

⁶ BART – Bacterial Activity Reaction Test

As discussed above, wells will also be analyzed using methods as specified in **Table 2** only if the visual impacts are detected at the wellhead.

Table 2 Additional Well Water Sampling Analysis Summary ¹

Analysis	Method	Sample Container	Preservative	Hold Time
VOCs	US EPA 8260D	2 x 40 mL HCl VOAs	HCL to pH < 2; Ice, maintained at 0-4°C	14 days
Metals ²	US EPA 6020B/7199	6020B - 1 x 250 mL plastic 7199-Cr – 1 x 50 mL plastic; field filter kit	6020B - HNO ₃ , 7199Cr - buffer, Ice, maintained at 0-6°C	6020B - 6 months 7199-Cr – buffer pH adjustment within 24 hours as needed, analysis within 28 days
Total Organic Carbon	SM 5310B	1 x 250 mL amber glass	HCL to pH < 2, Ice, maintained at 0-6°C	28 days
Total Nitrogen (TKN), Ammonia	351.2, 353.2, 350.1, SM 4500 Norg	1 x 250 mL plastic	H ₂ SO ₄ , Ice, maintained at 0-6°C	28 days
Nitrate-nitrite	US EPA 353.2 or Anions 300.0	1 x 250 mL plastic	Ice, maintained at 0-6°C	2 days
Methylene blue active substance sensitivity (MBAS)	SM 5540 C-2011	1 L plastic or glass	Ice, maintained at 0-4°C	2 days

¹ Bolded analytes will be reported by the receiving laboratory under rush turnaround time (TAT).

² arsenic, cadmium, hexavalent chromium, copper, lead, nickel, silver, and zinc

Field observations such as odor, water color, sediment, bubbles, and effervescence as well as the presence or absence of H₂S gas will be documented. If a free or dissolved gas (methane, ethane, or propane) concentration greater than 1.0 milligram per liter (mg/L) is detected in a water sample, gas compositional analysis and stable isotope analysis of gas will be performed to determine gas type. The additional compositional analysis, if needed, is specified in **Attachment C** (ECMC Rule 615.e.(4)). If gas compositional analysis and stable isotope analysis are performed, those samples will be submitted to Dolan Integration Group (DIG) Laboratory, 11025 Dover Street, Suite 800, Westminster, CO 80021.

5.0 Sample Handling and Documentation

5.1 Sample Handling

Water samples will be collected in laboratory-supplied sample containers appropriate for the intended analysis, packaged, labeled, and immediately placed in a cooler and retained on ice pending laboratory analysis. Custody seals will be placed on each sample-containing cooler, and chain-of-custody procedures will be maintained from the time of sample collection until arrival at the laboratory to protect sample integrity. Samples will be shipped or otherwise transported to the laboratory within a timeframe that meets recommended holding times.

5.2 Sample Labeling

Sample containers will be clearly labeled with the following information:

- Unique sample identification;
- Sample matrix;
- Sampler name or initials;
- Date and time of sample collection;
- Analysis to be performed; and
- Bottle and preservative type.

Labeling may include quality assurance (QA) sample designations (e.g., for matrix spike/matrix spike duplicate [MS/MSD] samples or field duplicate samples).

6.0 Quality Assurance

Sampling will be carried out in conjunction with a well-defined quality assurance (QA) program. The goal of the field QA program is to document that samples are collected without the effects of accidental cross- or systematic contamination and refers to the sampling, analysis, and data validation procedures for generating valid and defensible data. To provide QA for the proposed sampling event, the following sampling, analysis, and data validation procedures (**Table 4**) may be performed as deemed necessary by the CTEH project manager, project technical director, or environmental lead in accordance with sampling equipment and activities:

Table 4 Quality Control Sample Summary

QC Sample	Analytical Group	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria
Trip Blank (TB), matrix matched ¹	VOCs	One set of vials per cooler	Accuracy / Bias / Contamination	Target analyte(s) detected in the associated project samples must have concentrations <1/2 the LOQ
Field Blank ² , co-located	All	One daily	Accuracy / Bias / Contamination	
Field Duplicate, co-located	All	One per 10 field samples per matrix	Precision / Representativeness	If both the original and duplicate results are $\geq 5 \times$ LOQ, the RPD is recommended to be $\leq 30\%$ * for aqueous samples. If either the original and duplicate results are $< 5 \times$ LOQ, the difference should be \leq the LOQ for aqueous samples
Matrix Spike / Matrix Spike Duplicate ³ , co-located	All, excluding pH	One per 20 field samples per matrix	Accuracy / Bias / Contamination / Representativeness	Accuracy and precision criteria as documented by the laboratory
Rinsate Blank ⁴	All	One per 10 field samples per matrix; or one daily	Accuracy / Bias / Contamination	
Cooler Temperature Blank ⁵	Temperature only	One per cooler	Representativeness	Upon arrival at the laboratory, samples may not exceed 6°C and aqueous samples may not be frozen. For samples received the same day of collection, evidence of cooling must be present. During laboratory storage, samples must be maintained at a temperature between 0°C and 6°C. Samples must not be frozen, with the exception of water-preserved VOC samples, which must be frozen within 48 hours of collection.

¹ TBs will be included in bottle shipments from the laboratory. Aqueous TBs will be prepared using VOC-free water in a 40mL preserved VOA vial with no headspace. At the sampling site, a TB will be packed in each cooler containing VOC samples and shipped to the laboratory with the site samples and required documentation (e.g., chain-of-custody form).

² Water used for FBs will be target analyte-free water provided by the laboratory. At the sampling site, when ready to collect an FB, the FB water provided by the laboratory will be opened, along with a corresponding empty bottle also provided by the laboratory. The FB water will be poured into the empty (receiving) sample bottle, the cap will be closed, and this filled bottle will be labeled as the FB. The FB will be packed and shipped to the laboratory with the site samples and required documentation (e.g., COC form).

³ Known quantities of the method analytes are added to this preserved field sample in the laboratory. The MS is processed and analyzed exactly like a sample to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate sample extraction, and the measured values in the MS must be corrected for background concentrations.

⁴ In the event of reusing equipment and needing to decontaminate in the field, rinsate blank would be collected for any sample equipment using target analyte-free water. Equipment rinsate blanks would be collected if the sampling equipment or sample bottles are not certified clean by the vendor or laboratory providing the equipment.

⁵ Samples requiring thermal preservation must be placed on ice upon collection. If no temperature blank is provided, a representative sample container from each cooler will be used to measure the temperature (with an infrared thermometer).

6.1 Field Calibration

Instruments used in the field as part of this sampling event are anticipated to consist of water quality meters, pH meters, conductivity meters, GPS units, digital cameras, and handheld data collection devices such as tablets and/or smart phones. Equipment requiring calibration will be maintained daily in accordance with manufacturer recommendations and instructions. Operators of each piece of equipment are responsible for maintaining (including proper battery charge) and operating this equipment such that it conforms to each respective manufacturer's specifications.

6.2 Trip Blanks

Trip blanks identify contamination in on-site sample handling and transportation. They are prepared by the laboratory and travel with samples to and from the laboratory to ensure that analyte or compound detections in investigative samples are not a result of contamination during the handling or sampling process prior to analysis. One trip blank will be placed in each sample-containing cooler prior to transport to the laboratory for VOC analysis. Additional trip blanks may be included at the discretion of the CTEH project manager, project technical director, or environmental lead.

6.3 Field Blank Samples

Field blank samples identify on-site contamination in sample collection, handling, and analysis. Field blanks will be prepared by providing a set of samples containers filled with distilled water (preferably provided by the laboratory) prepared in the field. The submitted field blank will be submitted such that the laboratory is not aware that it is a blank (i.e., the sample ID will not identify it as a "blank" for any specific sample location). At least one field blank may be collected each day that field samples are collected.

6.4 Field Duplicate Samples

For approximately every ten samples collected in the field, one field duplicate will be collected and submitted for laboratory analyses to verify the reproducibility of the sampling methods. Field duplicates will be collected at the same time and location as the parent sample and will be submitted as a separate sample to the laboratory for analysis consistent with the prescribed analyses. The submitted duplicate will be submitted such that the laboratory is not aware that it is a duplicate (i.e., the sample ID will not identify it as a "duplicate" for any specific sample location).

6.5 Field Split Samples

Split sampling is a technique where multiple samples are collected from the same location at the same time and then sent to separate laboratories for analysis. Split sampling may facilitate sampling across multiple parties (i.e. stakeholders and regulatory agencies) and/or may be collected to determine accuracy of the data being reported. Field split samples may be collected at the discretion of representatives of the regulatory agency or Incident Command.

6.6 Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate (MS/MSD) samples refer to field samples spiked at the laboratory with the target analytes prior to analysis to assess method performance and any effects of matrix interference. Approximately one in twenty samples will be analyzed as MS/MSD samples.

6.7 Laboratory QA

Laboratory quality control procedures will be conducted in a manner consistent with relevant State and federal regulatory guidance. Deliverables will contain the supporting documentation necessary for data validation. Internal laboratory quality control checks will include method blanks, matrix spikes (and matrix spike duplicates), surrogate samples, calibration standards, and laboratory control standards (LCSs).

Third-party data verification/validation will be performed by Environmental Standards, Inc. Data verification/validation will include, at a minimum, sample holding times, accuracy, precision, contamination of field-generated or laboratory method blanks, and surrogate compound recovery. Accuracy will be determined by evaluating LCS and MS recovery. Precision will be determined by evaluating laboratory and field duplicate samples.

Level II data verification will be performed on 100% of the samples. Additionally, Level IV data validation will be performed on approximately 10% of the samples. The components of data verification/validation are summarized in **Table 5**.

Table 5 Summary of Data Verification/Validation Levels

Data Verification/ Validation Level	Definition
Level I	Sample data reporting only
Level II	Complete QC, including data blanks, spikes, duplicates (including matrix spike duplicates), laboratory control samples, relative percent difference (RPD), and percent recovery
Level III	Items listed in Level 2 plus QC limits and QA batch cross-reference table
Level IV	Items listed in Levels 2 and 3, including sample raw data and chromatograms

7.0 Decontamination Procedures

Decontamination procedures refer to the steps taken to minimize the potential for offsite contamination and cross-contamination between individual sampling locations. Prior to collecting any sample, the following decontamination procedures will be undertaken. Non-disposable sampling equipment such as buckets or tools which contact sampling media will be decontaminated using a bristled brush and a solution comprised of a laboratory grade, non-phosphate detergent (e.g., Alconox or Liquinox) and deionized water. Depending on site conditions at each location, the decontamination of sampling equipment will be conducted either over poly sheeting or in a bucket at the sample location or in a nearby designated area. The sampling equipment to be decontaminated will first be placed in a bucket containing the detergent solution and thoroughly washed using a bristled brush. The items will then be transferred to the second 5-gallon bucket containing deionized water for rinsing. Following the initial rinsing, the item will be held over the third 5-gallon bucket while deionized water is carefully decanted over each item.

Nitrile gloves will be worn by sampling personnel and changed between activities at each discrete sample collection location. Previously worn nitrile gloves will be discarded in appropriate waste receptacles with other Personal Protective Equipment (PPE).

8.0 Sampling Waste Disposal

Decontamination fluids and contaminated PPE will be containerized and collected at the designated onsite waste staging area as needed.

All waste produced onsite will be managed and disposed of in a manner consistent with regulatory guidelines and requirements.

9.0 Data Analysis

Validated water sampling results will be used to evaluate the potential impacts to well water related to potential constituents from the release. Water sampling results will be reviewed for the presence/absence of target analytes and, if a target analyte is detected, the concentration of that analyte will be compared to relevant screening levels. The results of laboratory analyses will be provided to Noble.

9.1 Sampling Results

Sampling results will be compared to background concentrations (if available). Copies of all final analytical results will be provided to Noble. All final analytical results will be provided to the regulatory agency pursuant to ECMC Rule 615.f.

10.0 Records Management

Records management refers to the procedures for generating, controlling, and archiving project-specific records and records of field activities. Project records, particularly those that are anticipated to be used as evidentiary data, directly support current or ongoing technical studies and activities, and provide

historical evidence needed for later reviews and analyses, will be legible, identifiable, retrievable, and protected against damage, deterioration, or loss on a centralized electronic database. Handwritten records will be written in indelible ink in a notebook dedicated to the Bishop LOC incident. Photo logs will be maintained and included on forms 19 and 27 as appropriate. Additional records will likely include, but are not limited to, the following: bound field notebooks on pre-numbered pages, sample collection forms, personnel qualification and training forms, sample location maps, equipment maintenance and calibration forms, chain-of custody forms, maps and drawings, transportation and disposal documents, reports issued as a result of the work, procedures used, correspondences, and any deviations from the procedural records. Documentation errors will be corrected by drawing a single line through the error so it remains legible and will be initialed by the responsible individual, along with the date of change, and the correction will be written adjacent to the error.

Attachment A: Site Location

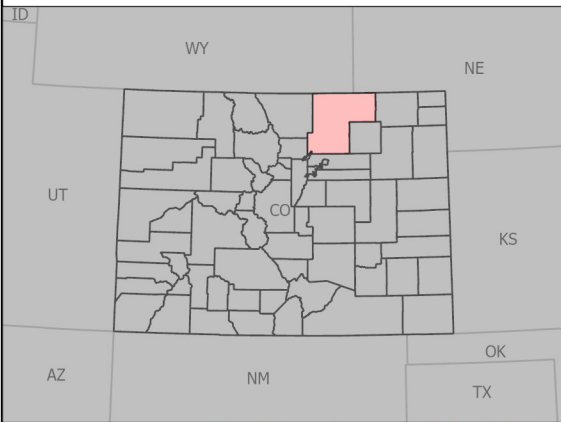


Bishop Loss of Containment

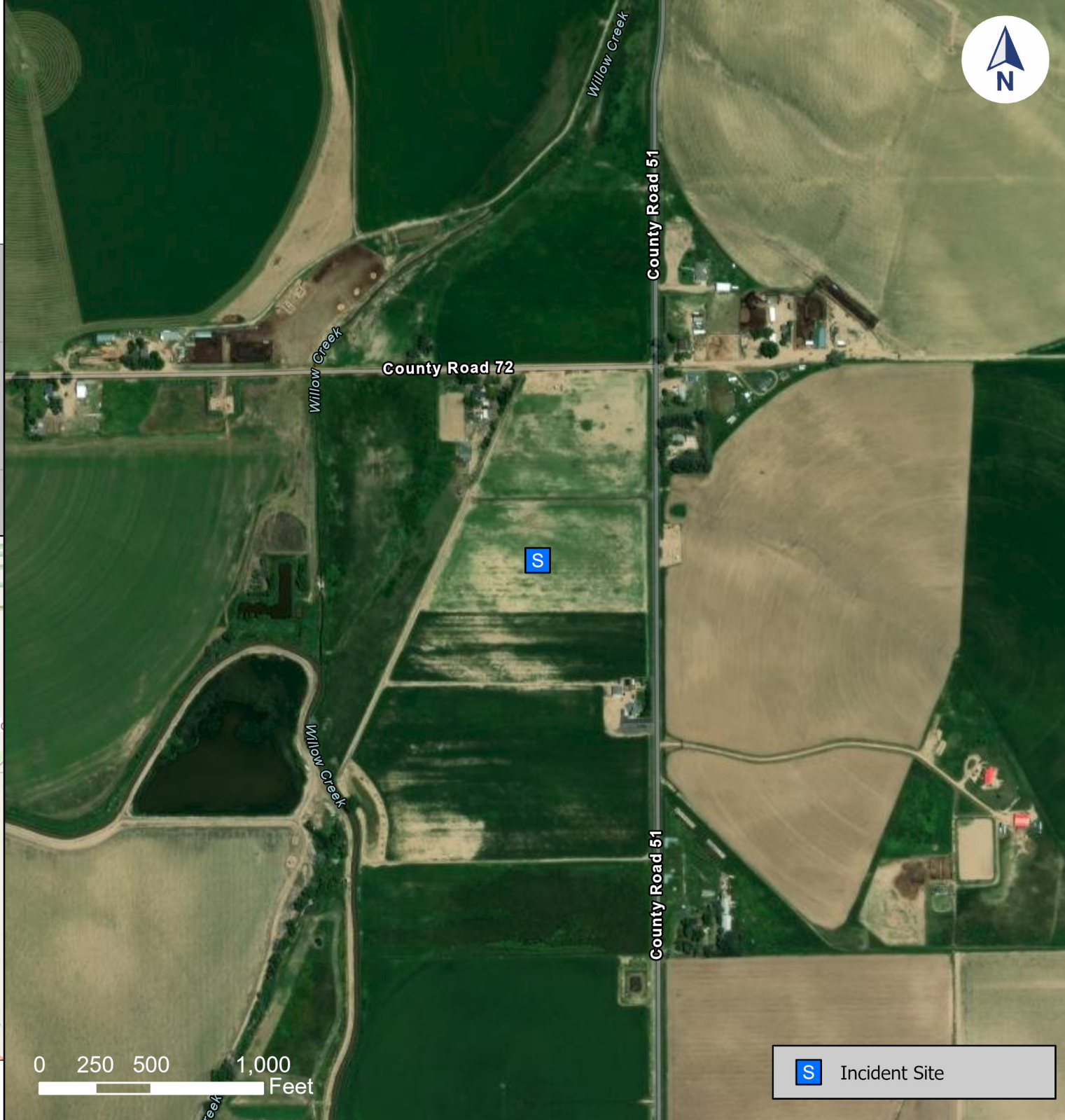
Incident Location

Galeton, CO | Weld County

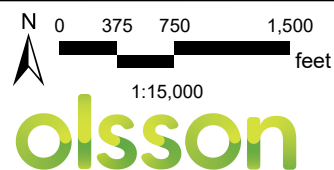
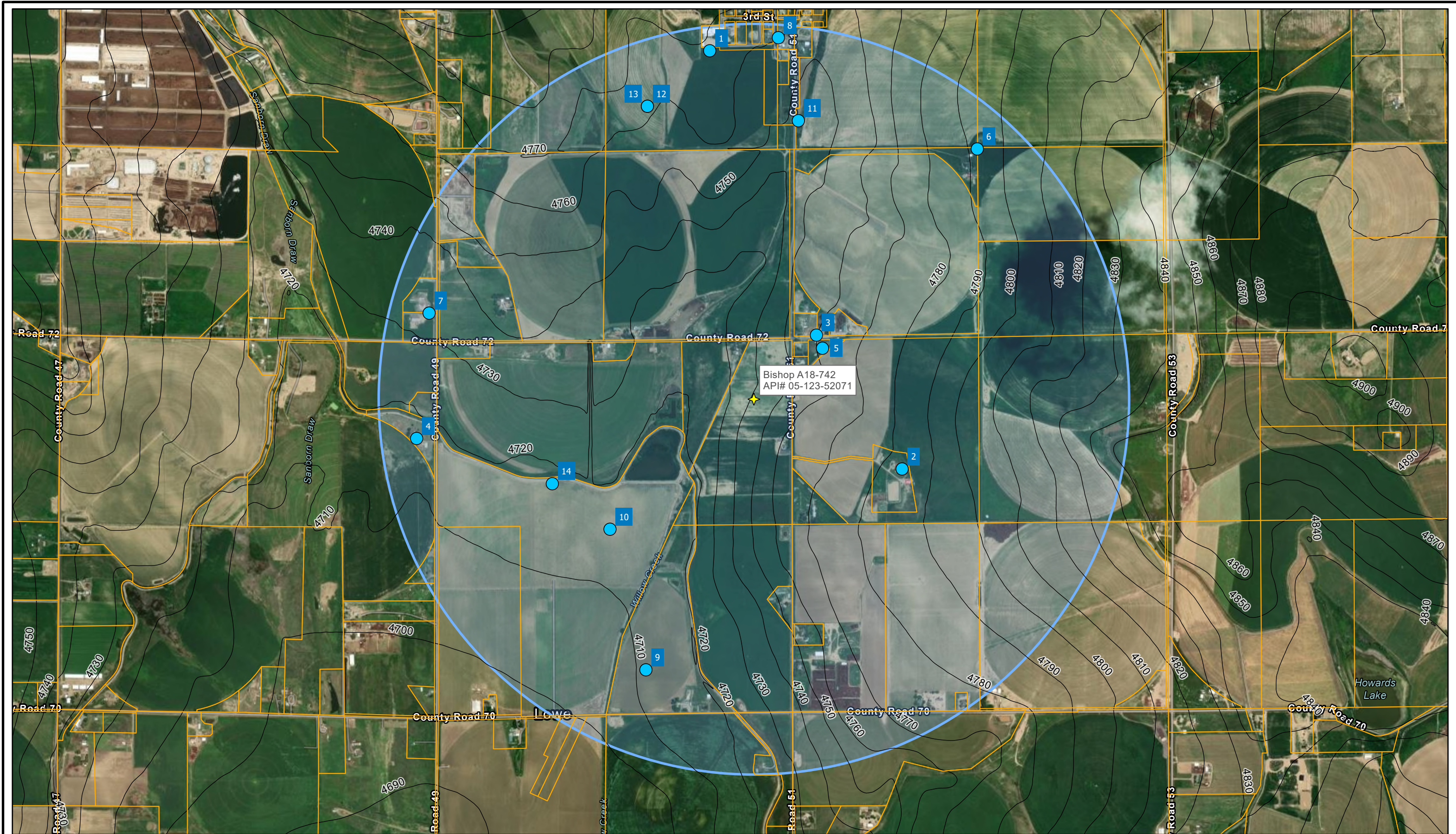
PROJ-054017



Updated At: 4/8/2025 7:01 AM
Projection: WGS 1984 UTM Zone 13N



Attachment B: Initial Water Well Locations



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Groundwater Sampling
Bishop A18-742 Well
NENE S7 T6N R64W
Locations of Water Wells within 1 mile

- ★ Bishop A18-742 Oil & Gas Well
- 1 mile Radius from Bishop A18-742
- Constructed Water Wells

- Parcel Boundaries
- Elevation (feet)

Water well information is
derived from the Colorado
Department of Water
Resources (DWR) and
publicly available online
water well data.

Project No: 022-06245
Date: 04/14/2025
Drawn by: ND
Figure 1.1

	Applicant Name	Mailing Address	Permit	Receipt	S	T	R	1/4	1/4	Well Type	Installed	Depth	Aquifer	Status
1	EATON SCHOOL DISTRICT RE-2	35885 GRANDVIEW DR EATON CO 80615-5100	63594-F	0545824	6	6 N	64 W	NE	NE	Irrigation	2006-01-26	755	ALL UNNAMED AQUIFERS	Well Constructed
2	JOSEPH, DOUG	34825 COUNTY ROAD 51 EATON CO 80615-9527	272815-	3613327	8	6 N	64 W	NW	SE	Domestic	2009-02-26	400	ALL UNNAMED AQUIFERS	Well Constructed
3	CECIL, GLENN D & KIMBERLY S	35012 COUNTY ROAD 51 EATON CO 80615-9529	244844--A	0499687B	5	6 N	64 W	SW	SW	Domestic	2002-12-03	360	ALL UNNAMED AQUIFERS	Well Constructed
4	BARTELS, THOMAS J	34765 COUNTY ROAD 49 EATON CO 80615-9301	254883-	0518874	12	6 N	65 W	NE	NE	Domestic	2004-03-12	350	ALL UNNAMED AQUIFERS	Well Constructed
5	SCOTT, MICHELLE S	34998 COUNTY ROAD 51 EATON CO 80615-9527	251155-	0510499	8	6 N	64 W	NW	NW	Domestic	2002-07-09	340	LARAMIE FOX HILLS	Well Constructed
6	KAYSER, FRED & HEATHER	35486 COUNTY ROAD 51 EATON CO 80615-9529	372-WCB	C620372	5	6 N	64 W	SW	NE	Domestic	1953-11-10	297	ALL UNNAMED AQUIFERS	Well Constructed
7	1. SCHELLER, MICHAEL & KRISTEN 2. OLIVER, WALTER & ROWENA	1. 34679 COUNTY ROAD 45 EATON CO 80615-9210 2. 35079 COUNTY ROAD 49 EATON CO 80615	268643-	3602978	1	6 N	65 W	SE	SE	Domestic	2010-02-24	220	ALL UNNAMED AQUIFERS	Well Constructed
8	GARZA, RICARDO	PO BOX 326 GALETON CO 80622-0326	125155-	9066382	6	6 N	64 W	NE	NE	Domestic	1918-01-01	190	ALL UNNAMED AQUIFERS	Well Constructed
9	CARLSON, ROBERT & RUBY	1335 COLORADO PKWY EATON CO 80615-9097	2542-	9058918	7	6 N	64 W	SE	SW	Stock	1958-12-10	123	ALL UNNAMED AQUIFERS	Well Constructed
10	ECE LAND LLC	4627 W 20TH STREET RD STE A GREELEY CO 80634-3203	267-WCB	C620267	7	6 N	64 W	NE	SW	Domestic	1953-10-12	70	ALL UNNAMED AQUIFERS	Well Constructed
11	DUAL DOC FARMS LLC	619 NOE RD LARKSPUR CO 80118-6402	118571--A	0212589	5	6 N	64 W	NW	SW	Domestic	1981-03-26	51	ALL UNNAMED AQUIFERS	Well Constructed
12	EATON SCHOOL DISTRICT RE-2	35885 GRANDVIEW DR EATON CO 80615-5100	2929-	9058976	6	6 N	64 W	NE	SW	Domestic	1958-03-01	56	ALL UNNAMED AQUIFERS	Unknown
13	EATON SCHOOL DISTRICT RE-2	35885 GRANDVIEW DR EATON CO 80615-5100	2930-	9058977	6	6 N	64 W	NE	SW	Domestic	1958-03-01	50	ALL UNNAMED AQUIFERS	Unknown
14	ECE LAND LLC	4627 W 20TH STREET RD STE A GREELEY CO 80634-3203	14460-R	9061948	7	6 N	64 W	NW	SE	Irrigation	1960-04-25	40	ALL UNNAMED AQUIFERS	Unknown

N

03757501,500

feet

1:15,000

olsson

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Groundwater Sampling
Bishop/6N64W7C
NENE S7 T6N R64W
Locations of Water Wells within 1 mile

Water well information is
derived from the Colorado
Department of Water
Resources (DWR) and
publicly available online
water well data.

Project No: 022-06245
Date: 04/14/2025
Drawn by: ND
Figure 1.2

Attachment C: ECMC Rule 615

- e. **Bradenhead Testing.** An Operator of a CBM Well will comply with Rule 419, except as modified by this Rule 614.e. The appropriate regulatory agency will determine remedial requirements. The bradenhead testing requirement will not apply if the Operator demonstrates to the satisfaction of the Director annular cement coverage greater than 50 feet above the base of surface casing and zonal isolation is confirmed by reliable evidence such as a cement bond log or cementing ticket indicating that the height of cement coverage is 50 feet above the base of the surface casing, and zonal isolation is confirmed by two consecutive bradenhead tests that the Operator conducts at least 12 months apart. Before beginning a bradenhead test, the Operator will shut-in the bradenhead annulus for a minimum shut-in period of 7 days.

615. GROUNDWATER BASELINE SAMPLING AND MONITORING

a. Applicability and Effective Date.

- (1) This Rule applies to oil Wells, gas Wells (“Oil and Gas Wells”), Multi-Well Sites, and Class II UIC Wells for which a Form 2, or Form 4, Notice to Recomplete, is submitted or pending on or after January 15, 2021. Oil and Gas Wells, Multi-Well Sites, and Class II UIC Wells operating under a Form 2 approved prior to January 15, 2021, will continue to follow the sampling protocols required by their permits at the time that the Form 2 was approved.
- (2) Nothing in this Rule 615 is intended, and will not be construed, to preclude or limit the Director from requiring Groundwater sampling or monitoring at other Production Facilities consistent with other applicable Commission Rules, including but not limited to the oil and gas location assessment process, and other processes in place pursuant to the Commission’s 900 Series Rules (Form 15, Earthen Pit Report/Permit, Form 27, Site Investigation and Remediation Workplan, and Form 28, Centralized E&P Waste Management Facility Permit).
- (3) An Operator may elect, or the Director may require an Operator to install one or more Groundwater monitoring wells to satisfy, in full or in part, the requirements of Rule 615.b, but installation of monitoring wells is not required under this Rule 615.

b. Sampling Locations.

Initial baseline samples and subsequent monitoring samples will be collected from all Available Water Sources, up to a maximum of 4, within a 1/2 mile radius of a proposed Oil and Gas Well, Multi-Well Site, or Class II UIC Well. If more than 4 Available Water Sources are present within a 1/2 mile radius of a proposed Oil and Gas Well, Multi-Well Site, or Class II UIC Well, the Operator will select the 4 sampling locations based on the following criteria:

- (1) **Proximity.** Available Water Sources closest to the proposed Oil and Gas Well, Multi-Well Site, or Class II UIC Well are required.
- (2) **Type of Water Source.** Well-maintained domestic water wells are required over other Available Water Sources.
- (3) **Orientation of Sampling Locations.** To the extent Groundwater flow direction is known or reasonably can be inferred, sample locations from both down-gradient and up-gradient are preferred over cross-gradient locations. Where Groundwater flow direction is uncertain, sample locations should be chosen in a radial pattern from a proposed Oil and Gas Well, Multi-Well Site, or Class II UIC Well.
- (4) **Multiple Identified Aquifers Available.** Where multiple defined Aquifers are present, sampling the deepest and shallowest identified Aquifers is required.
- (5) **Condition of Water Source.** An Operator is not required to sample Water Sources that are determined to be improperly maintained, nonoperational, or have other physical impediments to sampling that would not allow for a representative sample to be safely collected or would require specialized sampling equipment (e.g., Shut-In Wells, wells with confined space issues, wells with no tap or pump, non-functioning wells, intermittent springs).

c. Inability to Locate an Available Water Source. Prior to spudding, an Operator may request an exception from the requirements of this Rule 615 by filing a Form 4 for the Director's review and approval if:

- (1) No Available Water Sources are located within 1/2 mile of a proposed Oil and Gas Well, Multi-Well Site, or Class II UIC Well;
- (2) The only Available Water Sources are determined to be unsuitable pursuant to Rule 615.b.(5). An Operator seeking an exception on this ground will document the condition of the Available Water Sources it has deemed unsuitable; or
- (3) The owners of all Water Sources suitable for testing under this Rule refuse to grant access despite an Operator's reasonable, good faith efforts to obtain consent to conduct sampling. An Operator seeking an exception pursuant to this Rule 615.c.(3) will document the efforts used to obtain access from the owners of suitable Water Sources.
- (4) If the Director takes no action on the Form 4 within 10 business days of receipt, the requested exception from the requirements of this Rule 615.c will be deemed approved.

d. Timing of Sampling.

- (1) Initial sampling will be conducted within 12 months prior to setting conductor pipe in a Well or if no conductor is present prior to spudding the first Well on a Multi-Well Site, or commencement of drilling a Class II UIC Well.
- (2) **Subsequent Monitoring.** One subsequent sampling event will be conducted at the initial sample locations between 6 and 12 months, and a second subsequent sampling event will be conducted between 60 and 72 months following completion of the Well or Class II UIC Well, or the last Well on a Multi-Well Site. Additional subsequent samples will be collected every 5 years (57 to 63 month interval) for the life of the Well. A post abandonment sample will be collected 6 to 12 months after the Oil and Gas Well has been Plugged and Abandoned. Wells that are drilled and abandoned without ever producing hydrocarbons are exempt from subsequent monitoring sampling under this Rule 615.d.(2).
- (3) **Previously Sampled Water Sources.** In lieu of conducting the initial sampling required pursuant to Rule 615.d.(1), or the second subsequent sampling event required pursuant to Rule 615.d.(2), an Operator may rely on water sampling analytical results obtained from an Available Water Source within the sampling area provided:
 - A. The previous water sample was obtained within the 18 months preceding the initial sampling event required pursuant to Rule 615.d.(1), or any subsequent sampling event required pursuant to Rule 615.d.(2);
 - B. The sampling procedures, including the constituents sampled for, and the analytical procedures used for the previous water sample were substantially similar to those required pursuant to Rules 615.e.(1) & (2), below; and
 - C. The Director timely received the analytical data from the previous sampling event.
- (4) The Director may require additional sampling at any time as a result of information indicating a potential change in or impact to groundwater.

e. Sampling Procedures and Analysis.

- (1) Sampling and analysis will be conducted in conformance with an accepted industry standard pursuant to Rule 913.b.(2). A model Sampling and Analysis Plan (“COGCC Model SAP”) will be posted on the Commission’s website, and will be updated periodically to remain current with evolving industry standards. Sampling and analysis conducted in conformance with the COGCC Model SAP will be deemed to satisfy the requirements of this Rule 615.e.(1). Upon request, an Operator will provide its sampling protocol to the Director.
- (2) The analyses for samples collected as required by Rule 615 will include:

 - A. pH;
 - B. Specific conductance;
 - C. Total dissolved solids (“TDS”);
 - D. Dissolved gases (methane, ethane, and propane);
 - E. Alkalinity (total, bicarbonate, and carbonate as CaCO_3);
 - F. Major anions (bromide, chloride, fluoride, sulfate, nitrate and nitrite as N, and phosphorus);
 - G. Major cations (calcium, iron, magnesium, manganese, potassium, and sodium);
 - H. Other elements (barium, boron, selenium, and strontium);
 - I. Presence of bacteria (iron related, sulfate reducing, and slime forming);
 - J. Total petroleum hydrocarbons (“TPH”) as total volatile hydrocarbons (C_6 to C_{10}) and total extractable hydrocarbons (C_{10} to C_{36}); and
 - K. BTEX compounds (benzene, toluene, ethylbenzene, and xylenes (“BTEX”)).
- (3) Field observations such as odor, water color, sediment, bubbles, and effervescence as well as the presence or absence of H_2S gas will be documented. The location of the sampled Water Sources will be surveyed pursuant to Rule 216.
- (4) **Dissolved Gas Detections.** If a free or dissolved gas (methane, ethane, or propane) concentration greater than 1.0 milligram per liter (“mg/l”) is detected in a water sample, gas compositional analysis and stable isotope analysis of the gas will be performed to determine gas type.

 - A. The compositional analysis should include:

 - i. hydrogen;
 - ii. argon;
 - iii. oxygen;
 - iv. carbon dioxide;
 - v. nitrogen;
 - vi. methane (C_1);

- vii. ethane (C₂);
- viii. ethene (C₂H₄);
- ix. propane (nC₃);
- x. isobutane (iC₄);
- xi. butane (nC₄);
- xii. isopentane (iC₅);
- xiii. pentane (nC₅);
- xiv. hexanes +;
- xv. Specific gravity; and
- xvi. British Thermal Units (BTU).

B. Stable isotope analyses should include:

- i. delta D of C₁;
- ii. delta 13C of C₁;
- iii. delta 13C of C₂;
- iv. delta 13C of C₃;
- v. delta 13C of iC₄ (if available);
- vi. delta 13C of nC₄ (if available);
- vii. delta 13C of iC₅ (if available);
- viii. delta 13C of nC₅ (if available); and
- ix. delta 13C of CO₂.

C. The Operator will notify the Director by submitting a Form 42, Field Operations Notice – Water Sample Reporting, with a copy sent to the owner of the water well immediately if:

- i. The test results indicated thermogenic or a mixture of thermogenic and biogenic gas;
- ii. The methane concentration increases by more than 5.0 mg/l between sampling periods; or
- iii. The methane concentration is detected at or above 10 mg/l.

D. The Operator will notify the Director immediately by Form 42 – Water Sample Report and provide a copy of the Form 42 – Water Sample Report and the test results to the water well owner, if BTEX compounds or TPH are detected in a water sample.

- f. Sampling Results.** Copies of all final laboratory analytical results will be provided to the Director and the water well owner or landowner within 3 months of collecting the samples. The analytical results including PDF of lab results, the surveyed sample Water Source locations, and the field observations will be submitted to the Director in an electronic data deliverable format approved by the Director along with a PDF of the lab report via Form 43.
- (1)** The Director will make such analytical results publicly available by posting on the Commission's website or through another means announced to the public.
- g.** Upon request, the Director will also make the analytical results and surveyed Water Source locations available to the Local Government of the jurisdiction in which the groundwater samples were collected, in the same electronic data deliverable format.