

**BEFORE THE OIL AND GAS CONSERVATION COMMISSION OF THE
STATE OF COLORADO**

IN THE MATTER OF REQUEST BY GARY)	CAUSE NO. 407
OHLSON AND KARY TYKESON-OHLSON FOR)	
COMMISSION REVIEW OF DIRECTOR)	ORDER NO. 407_{xxxx}
DECISION ON COMPLAINT NO. 200444693)	

PETITION FOR REVIEW

Mr. Gary Ohlson and Mrs. Kari Tykeson-Olson (the “Ohlsons”), by and through their attorneys Glade Voogt Lord & Smith, P.C., hereby submit their Petition for Review of the Director’s decision not to issue an NOAV on Complaint #200444693.¹

INTRODUCTION

On November 21, 2017, the Ohlsons filed Complaint #200444693 (the “2017 Complaint”) regarding the presence of benzene in their family’s drinking water well (the “Water Well”) located at their residence, 36105 East 124th Avenue, Adams County, Colorado (“Ohlson Property”).

The 2017 Complaint was the third complaint by the Ohlsons regarding their property. In 2006, they filed Complaint #200095139 (the “2006 Complaint”) regarding the presence of toluene and total volatile hydrocarbons (TVH) in the Water Well. In 2014, they filed Complaint #200412560 (the “2014 Complaint”) regarding benzene in the Water Well and subsidence from a plugged oil well (UPRR No. 23 Pan Am B1) under their horse corral.²

Despite more than a decade of complaints about the Water Well’s contamination by carcinogens common to oil and gas activity, the presence of oil and gas activity in the vicinity, and the presence of an abandoned oil well approximately 100 feet from the Water Well, the Director closed the 2017 Complaint in less than 30 days without substantial investigation. The Director did not locate the plugged and abandoned well. The Director did not conduct a single shallow soil or groundwater test. Further, the Director did not provide a substantive response to the detailed technical analysis of the Water Well contamination in a November 7, 2017, report from Hirsch Gibney, Inc. (“Hirsch Gibney”). **Exhibit 1, Hirsch Gibney Report.**

The Ohlsons respectfully submit that the investigation to date is incomplete and the decision to close the investigation without any subsurface investigation is clearly erroneous. The Commission should remand the 2017 Complaint to the Director for further investigation and proceedings. The COGCC staff should investigate to locate the abandoned oil well and to

¹ In its February 16, 2018, Order, the Commission ordered that the Ohlsons have leave to file this Petition for Review.

² In the December 15, 2017, letter closing the 2017 Complaint, the COGCC states that it reviewed the prior related complaints before closing the 2017 Complaint. These complaints and the related documents are part of the record for this Petition for Review.

conduct the minimal subsurface investigation required to determine the source of contamination in the Water Well, as set forth in Part IV below. Alternatively, the Ohlsons request a continuance of the Petition for Review hearing to allow the Director to conduct this limited subsurface investigation pursuant to Rule 522.

BACKGROUND³

- 1970 The UPRR No. 23 Pan Am B1 ("Pan Am B1") was drilled somewhere in the vicinity of the Ohlsons' horse corral and approximately 100 feet from their Water Well. **Exhibit 2, October 13, 2006 Letter, p. 5.** The associated former tank battery and likely wooden produced water vessel for Pan Am B1 was located within 100 to 150 feet of Water Well. **Exhibit 3, September 27, 2007 Letter.**
- 1977 A Producer's Certificate of Clearance and Authorization to Transport Oil or Gas from a Well was filed by Amoco for Pan Am B1.
- 1978 The Pan Am B1 was plugged and abandoned in August 1978.
- 1978 The UPRR23 Pan Am B2 ("Pan Am B2") was drilled to the southeast and hydraulically upgradient from the Ohlson Property. The associated tank battery and former wooden produced water vessel for Pan Am B2 is located hydraulically upgradient from the Ohlson Property.
- 2004 The Ohlsons purchased the Ohlson Property to build a residence. They lacked knowledge of Pan Am B1 when they made the purchase and built their residence.
- 2006 The Ohlsons abandoned a poor producing water well on Ohlson Property (driller reportedly closed well before starting to drill current water well).
- 2006 The Ohlsons completed drilling of new Water Well on July 27, 2006, and during drilling the driller encountered "black oily water" in borehole at depths approximately 240 feet below ground surface. **Exhibit 4, Well Report and Exhibit 2, p. 5-6.** The driller collected and held samples. The Ohlsons first learned of Pan Am B1 on their property at this point.
- 2006 The COGCC sampled the Ohlsons new water well on September 25, 2006. The COGCC also collected black oily water sample from driller for analyses. The Water Well samples were analyzed for inorganics and organics. The results demonstrated presence of toluene (31 µg/L) and TVH (38 µg/L). The driller's sample was outside holding time (i.e., we might expect a higher result were sample to have been analyzed within holding time) and laboratory analyses identified TVH (1,800 µg/L) in sample collected from borehole during the drilling of new Water Well. The sample was not analyzed for benzene,

³ In the interest of brevity, we recite only the events that are most relevant to this Petition for Review. Please see Mr. Hirsch's comprehensive history of the investigation to date at **Exhibit 1.**

toluene, ethylbenzene, or xylenes. TVH was documented to be present in groundwater before Ohlsons move onto property. **Exhibit 2.**

- 2006 COGCC began investigation into 2006 Complaint to “investigate if oil & gas activities in your area have impacted your well.” **Exhibit 2., p. 1.**
- 2006 COGCC stated that it is likely that the oil in the Water Well is due to an oil and gas spill and a limited subsurface investigation using a hollow-stem auger capable of drilling to 200 feet below the surface is necessary. **Exhibit 2, p. 5-6.** COGCC did not conduct this investigation.
- 2006 The Ohlsons first moved into a new residence on the Ohlson Property after the new Water Well was completed.
- 2007 COGCC conducted first magnetometer survey of the Ohlson Property but did not locate Pan Am B1. COGCC again suggested that they would like to conduct a limited subsurface soil sampling investigation, but did not conduct that investigation. **Exhibit 3.**
- 2008 COGCC conducted surface casing check of Pan Am B1 approximately 30 years after the well had been plugged and abandoned and notes the well is “leaking P&A”. **Exhibit 5, Surface Casing Check.**
- 2008 COGCC encountered stained soils in second attempt to locate Pan Am B1 but did not take any samples for analyses. **Exhibit 6, May 16, 2008, Letter.**
- 2014 Benzene was found in the Ohlsons’ Water Well and stock tank. **Exhibit 7, November 3, 2014, Letter, p. 4.**
- 2015 COGCC staff and BP appeared to coordinate to point the investigation “away from oil & gas.” **Exhibits 8 and 9, Email.**
- 2015 Benzene was found again in the Water Well above risk-based levels. COGCC and BP agree that samples collected from the Water Well and analyzed for caffeine, demonstrate a contaminant pathway between the shallow water bearing zone and the Upper Arapahoe aquifer, but nonetheless suggested that the Ohlsons somehow caused the benzene contamination of their drinking water. **Exhibit 10, March 3, 2015, Letter.**
- 2015 COGCC again attempted to locate Pan Am B1 near the Water Well and again encountered stained soils. Although COGCC again chose not to test the stained soils and did not locate the oil well, it closed the complaint without a determination of the source of the benzene. **Exhibit 11, October 15, 2015, Letter.**
- 2017 The Ohlsons’ filed their 2017 Complaint with the support of the Hirsch Gibney Report.
- 2017 COGCC summarily closed the 2017 Complaint with no additional investigation. **Exhibit 12, December 15, 2017, Letter.**

LEGAL STANDARD

Under Rule 522.b.(6)C.(i), if the Complainant shows the Director's failure to issue an NOAV was clearly erroneous, the Commission may remand for further proceedings, set the matter for an Order Finding Violation Hearing, or order other relief it deems just. Clearly erroneous means "the findings of fact are unsupported by substantial evidence in the record considered as a whole." *In re Estate of Schumacher*, 253 P.3d 1280, 1282 (Colo. App. 2011).

In addition, a Petition for Review hearing can be continued based on compelling evidence that COGCC should conduct additional investigation. Rule 522.b.(5)A.

ARGUMENT

I. The Substantial Evidence Required to Support a COGCC Decision

The Act directs COGCC to ensure that the development of Colorado oil and gas resources is balanced with the protection of public health, safety, welfare, and the environment.

COGCC's obligation to determine if oil and gas activities have impacted the Water Well was further emphasized in Executive Order D 2013-004:

- As we move forward in developing energy, we ought to insist on the strictest and most effective environmental safeguards.
- In order to carry out the provisions of and fulfill its responsibilities under the Act, and to foster public trust that oil and gas operations in Colorado are conducted in a manner that is protective of public health, safety, and welfare, the Commission must enforce its rules and assess penalties so as to strongly deter violations and encourage cooperative compliance response if and when violations occur.

Pursuant to their statutory and regulatory obligations, COGCC staff has asserted in writing that COGCC must determine whether the Water Well has been contaminated by oil and gas activities.

In an October 13, 2006, letter to the Ohlsons, COGCC asserted that "[t]he purpose of water sampling was to evaluate overall water quality for your well water and investigate if oil and gas activities in your area have impacted your well." **Exhibit 2.** COGCC addressed the plugged and abandoned Pan Am B1 well and agreed that it was "likely that the oil observed in drilling your second water well could be due to an old spill or release from the production equipment associated with the old oil & gas well." **Id. p. 5.** To address these possible oil and gas impacts, COGCC agreed that it should conduct a limited subsurface investigation by using a drilling rig capable of depths of 200 feet. **Id.**

In April 2007, a COGCC contractor attempted to find Pan Am B1 and associated flow lines to the former tank battery on the Ohlson Property by using a magnetometer. Although COGCC did not locate Pan Am B1, COGCC again agreed that a subsurface investigation down to 150 feet was necessary. **Exhibit 3.**

On May 16, 2008, the COGCC again stated that “[t]he purpose of this water sampling was to determine if natural gas drilling and production activities in your area might have impacted your well water.” **Exhibit 6.**

It is clear by the COGCC’s own statements that the “substantial evidence” required to support a finding regarding the contaminated Water Well, includes, at a minimum, data from a subsurface investigation and analysis of the Pan Am B1 well. Failure to perform these actions results in mere speculation, which cannot be the basis of a COGCC decision under Rule 522.b.(2).⁴

II. The Director’s Order did not Support Its Findings with the Required Substantial Evidence

Despite COGCC’s recognition in writing on multiple occasions between 2006 and 2008 that a subsurface investigation was necessary, there is no evidence in the record that COGCC conducted a single soil or groundwater test.

Instead COGCC speculates that the presence of benzene and toluene in the Water Well is a result of the Ohlsons’ discharges to their leach field. **Exhibit 10.** Yet, COGCC has not identified any product that the Ohlsons use that contains these carcinogens and the Ohlsons deny using any product containing benzene or toluene. COGCC’s factually unsupported statement is belied by the fact that the Water Well tested positive for TVH and toluene prior to the Ohlsons moving into their newly constructed residence in 2006 and using their leach field. It is also belied by positive benzene test results over risk-based action levels in 2014 and 2015 (when complaint closed). Significantly, these levels appear to be increasing. **Exhibit 13, Water Well Contaminant Table.**

Correspondence between COGCC and the operator indicates that COGCC may have avoided the collection of data through a subsurface investigation, which would have been necessary to support its decision. A March 3, 2015, email string between COGCC staff and BP, COGCC staff informs the BP representative that caffeine from the leach field on the Ohlson Property has reached the Arapahoe aquifer and the Water Well. The BP representative suggests that COGCC only sample the Water Well one additional time and allow the samples to be sent to a special industry lab “that will point us away from oil and gas.” COGCC staff responds they are “glad to assist [BP] in any way.” **Exhibit 8.**

Throughout 2015, COGCC continued to coordinate the investigation with BP and its representatives until closing the investigation without any additional testing in an October 15, 2015, letter to the Ohlsons. **Exhibits 9 and 11.** In comparison, there are only limited communications between COGCC and the Ohlsons in the record during this timeframe.

The October 15, 2015, closure letter recognized that COGCC had again failed to locate Pan Am B1 using ground penetrating radar but again had encountered black staining in soils in

⁴ Rule 522.b.(2) requires “reasonable cause.”

their excavations. However, COGCC took no soil or shallow groundwater samples of this likely oil and gas impact within feet of the Ohlsons' well, and no PID measurements were noted.

Exhibit 11. They also failed to conduct any subsurface investigation related to the 2017 Complaint. COGCC closed the 2017 Complaint within 30 days of its filing. **Exhibit 12.**

It is not surprising that COGCC did not find an oil and gas impact, because it did not perform the minimum subsurface investigation necessary to rule out such an impact or to make a determination, let alone a determination supported by substantial evidence. The decision to close the 2017 Complaint is clearly erroneous and this matter should be remanded for further investigation under 522b.(4)A or pursuant to the Ohlsons' request for further investigation under 522b.(5)B.

III. Evidence Indicates a Significant Likelihood of Oil and Gas Impact

A pathway for oil and gas contamination from the shallow water bearing zone to the Water Well has been established by COGCC. It was established by COGCC with the positive test for caffeine in the Water Well in March of 2015. **Exhibit 10.** BP does not dispute this connection. **Exhibit 8.**

Given the documented connection between the shallow water bearing zone and the Water Well, all activities associated with Pan Am B1 are likely source(s) of the contamination. **Exhibit 1.** Pan Am B1 is estimated to be approximately 100 feet from the Water Well. And, indeed, the Water Well has been impacted with typical oil and gas contaminants: benzene, toluene, and TVH. The backfill around former Pan Am B1 facilities appear to have caused substantial subsidence in the Ohlsons' horse corral. COGCC discovered oil staining during its attempts to find Pan Am B1 and the flowlines to the former tank battery in both 2008 and 2015. And, a 2008 Surface Casing Check inspection of Pan Am B 1 noted the well as a "leaking P&A." **Exhibit 5.**

In addition to Pan Am B1, oil and gas activity has been present in and around the Ohlson Property for almost 50 years. There are multiple known oil and gas facilities hydraulically upgradient of the Ohlsons' property that could be potentially impacting the Water Well. *See Exhibit 14, Potential Source Map.*

Although benzene alone can indicate the leading edge of a plume, COGCC has implied that benzene without the other benzene, toluene, ethylbenzene and xylenes (BTEX) constituents suggests that oil and gas activities cannot be responsible for the contamination of the Ohlson drinking water.

There are, however, two obvious potential sources for the benzene in the Ohlson Drinking Water Well in addition to the as yet unlocated Pan Am B1 that COGCC has not eliminated: a) constant and steady leakage from a 40-year old Partially Buried 1,000-gallon Wooden Vessel used to store produced water from a production well (Pan Am B2) located hydraulically upgradient from the Ohlson well, which was discovered and removed in 2015 after releases spanning 30-40 years; and b) Produced Water leakage from Unlined Pits (pre-regulation) used to construct Pan Am B1 and/or a Partially Buried Wooden Vessel supporting Pan Am B1 and located within 100-150 feet of the Water Well.

Pan Am B2 Produced Water. On May 13, 2015, Mr. Bob Chesson received a Remediation Summary Report detailing the removal of the partially buried 1,000-gallon produced water vessel and excavation of contaminated soil related to oil well Pan Am B2. The tank battery for Pan Am B2 is located approximately 4,200 feet hydraulically upgradient from the Water Well. **Exhibit 15, 2015 Pan Am B2 Remediation Report.** At the time of receipt, Mr. Chesson was conducting the investigation into the Ohlsons' second complaint and corresponding regularly with BP representatives responsible for Pan Am B1.

In 1978, the Pan Am B2 facility was originally constructed with a partially buried 1,000-gallon wooden produced water vessel. The COGCC Scout Card for Pan Am B2 indicates a 24-hour test on the well, showing it produced approximately 28 gallons of produced water per day.⁵ Given its wooden construction it has likely been faulty for at least 30 years. Therefore, it would have released over 300,000 gallons of produced water to the shallow water bearing zone.

After the release was discovered, Kauffman's contractors excavated an area roughly sixty (60) feet wide by forty-two (42) feet long to a depth of sixteen (16) feet. This demonstrates the area served for percolation of the produced water into the shallow water bearing zone. Given its hydraulic upgradient location relative to the Ohlson Property and Water Well and the documented connection (caffeine) between the shallow water bearing zone and the Arapahoe Aquifer, this too is a likely source of the contamination of the Ohlsons' drinking water, which COGCC has made no attempt to assess or eliminate. **Exhibit 16, Diagrams.**

Pan Am B1 Produced Water. COGCC notes that it found the former tank battery site for Pan Am B1 located on the Ohlson Property only 100 to 150 feet south of the Ohlson Drinking Water Well. In addition, the pit used to contain drilling fluids during construction of Pan Am B1 was likely unlined (pre-regulation). Given that Pan Am B2 was constructed in 1978 under the direction of Amoco, with a tank battery and partially buried wooden produced water storage vessel which was known to have leaked, it is reasonable to assume that Amoco used similar tank battery and produced water construction techniques eight (8) years earlier for construction of Pan Am B1 on the Ohlson property. Given its proximity to the Water Well these former facilities are also likely sources of the contamination discovered in the Ohlson Water Well. **Exhibit 1.**

In light of the significant evidence indicating the presence of oil and gas impacts, the Commission should either remand the matter to the Director for further investigation or continue the hearing for additional investigation as set forth below.

IV. Minimal Subsurface Investigation Required to Determine the Source of Water Well Contamination.

Pursuant to the November 7, 2017 Hirsch Gibney Report, the Commissioners should remand this matter to COGCC staff to perform the following minimal subsurface investigation under 522b.(4)A. or (5)A.:

⁵ For reference purposes the Scout Card for Pan Am B1, indicated that it produced 7,920 gallons/day of produced water.

1. Locate Pan Am B1, drilled in 1970 and located less than 100 feet from the Water Well.
2. Locate the site of the former tank battery and suspected wooden produced water vessel for Pan Am B1 (see No. 6 below). Pan Am B1 was drilled eight years before Pan Am B2. The produced water vessel for Pan Am B1 in 1970 is likely to have been constructed of similar materials in a similar manner as the partially buried, wooden produced water vessel used for Pan Am B2.
3. Drill, develop and sample at least three groundwater monitoring wells completed in the shallow water bearing zone, with two of the monitoring wells situated hydraulically upgradient (southeast) of the Water Well and one monitoring well situated hydraulically downgradient (northwest) from the Water Well. Professionally survey the top of casing in each monitoring well. These monitoring wells will be used to: collect depth to water measurements; determine shallow groundwater flow direction in the shallow water bearing zone; to collect groundwater samples to be analyzed for the same suite of inorganics and organics (and methyl tert butyl ether [MtBE]) as sample collected from Water Well by COGCC on September 25, 2006; to use the results to identify the locations where benzene, toluene, ethylbenzene, total xylenes, MtBE and TVH (petroleum hydrocarbons) are present; and to assess the magnitude of concentrations of petroleum hydrocarbons in each location. This information can be used to begin to assess or refute the potential source(s) of toluene, benzene and TVH detected in the Water Well.
4. If petroleum hydrocarbons are present in the shallow water bearing zone, repeat No. 3 (above), in the underlying Denver aquifer.
5. Sample the Water Well for the same suite of inorganics and organics (and MtBE) as sample collected from Water Well by COGCC on September 25, 2006.
6. Sample the produced water from existing production well Pan Am B2 drilled in 1978 and located southeast and hydraulically upgradient of the Water Well. The former partially buried, 1,000-gallon wooden vessel used to store produced water from Pan Am B2 has been shown to have leaked (K.P. Kauffman Company 2015). Based on the materials used to construct the vessel, and the exposure of those materials to freeze/thaw conditions over a 40-year period, the calculated produced water production from the 24-hour well test conducted on this well on October 5, 1978 (Scout Card for Pan Am B2), this vessel may have lost more than 300,000 gallons of produced water to the shallow water bearing zone before it was removed and replaced in 2015. The samples of produced water should be analyzed for the same suite of inorganics and organics (and MtBE) as sample collected from Ohlson Water Well by COGCC on September 25, 2006.

Exhibit 17, Maps of Suggested Minimal Remediation.

Conclusion

The Director's decision to close the investigation and not to issue an NOAV was not supported by substantial evidence in the record. Based on the COGCC's own analysis, COGCC did not conduct the soil and groundwater investigation necessary to determine the source of the contamination in the Water Well. Further, COGCC did not consider the detailed technical analysis of the likely sources of contamination provided by Hirsch Gibney. Under the circumstances, COGCC did not perform the minimum investigation necessary to evaluate the oil and gas impacts on the Water Well as required by the Act and applicable regulations.

Because the Director's decision – issued only thirty days after the 2017 Complaint was filed -- was not based on substantial evidence, it was clearly erroneous. Therefore, pursuant to Rule 522.b.(6)C.(i), the Commission should remand to the Director for further proceedings and investigation consistent with Part IV of this Petition for Review. Alternatively, the Commission should continue the hearing for this Petition for Review and perform the investigation set forth in Part IV based on compelling evidence provided herein and pursuant to Rule 522.b.(5)A.

Respectfully submitted this February 26, 2018,

GLADE VOOGT LORD & SMITH, P.C.



Eric J. Voogt, #34718
1800 Gaylord St.
Denver, Colorado 80206
303.861.5300
evoogt@gvlslaw.com



November 7, 2017

Robert H. Chesson
Colorado Oil and Gas Conservation Commission
Department of Natural Resources
1120 Lincoln Street, Suite 801
Denver, Colorado 80203

Re: Petition to Re-Open Complaint No. 200412560, Ohlson Water Well Permit No. 269807 in the SW ¼ of NW ¼, Section 33, Township 1 South, Range 64 West of the Sixth Principal Meridian and 1855 Baseline, at 36104 East 124th Avenue, Hudson, Adams County, Colorado.
Hirsch★Gibney Project No. 0018-0001

Mr. Chesson:

Hirsch★Gibney, Inc. (Hirsch★Gibney) has conducted an independent pro-bono review of available Colorado Oil and Gas Conservation Commission (COGCC) files and Division of Water Resources (DWR) permits regarding contaminants in domestic water well (Permit No. 269807) for Gary and Kari Ohlson at 36104 East 124th Avenue, Hudson, Weld County, Colorado (the Site). The documents we have reviewed are listed in the reference section.

We would like to direct you to selected documents and issues identified in the Summary section that support our statements below.

COGCC maintains that the petroleum constituents present in groundwater from the Ohlsons' domestic water well are associated with normal homeowner activities (2015f). Hirsch★Gibney believes instead that past investigations conducted by COGCC have been too limited and therefore unsuccessful in ruling out impacts from former on-site oil and gas well UPRR 23 Pan Am B 1 or historical oil and gas exploration and production activities in the neighborhood.

The oil and gas well was drilled and constructed in an era when pits used for containing drilling fluids, liquid hydrocarbons, and produced water were unlined (COGCC 1971b). Well logs generated from water-well drilling activities on the property demonstrate that soils immediately below ground surface are composed of sands (DWR 2006; Permit No. 269807). These soils provided ample opportunity for fluids generated from oil and gas well drilling and fluid management to percolate downward into the shallow water-bearing zone beneath this property. This concept also applies to other oil and gas wells drilled in the same era in this neighborhood.

For example, the levels of total dissolved solids, chloride, iron, magnesium, potassium and sodium in samples of produced water from nearby oil wells UPRR 23 Pan Am B 2 (COGCC 1979) and Wenzel-Hosmer 4-4 (COGCC 1976), are one to two orders of magnitude higher than samples collected from the Ohlson well. These two oil wells are located hydraulically up- and crossgradient in the shallow water bearing zone from the Ohlson property. Because these oil wells were completed in the same era as UPRR 23 Pan Am B 1, we would expect that produced water generated from these wells might have a similar quality. Although none of these produced water samples were analyzed for petroleum hydrocarbons, we would expect low concentrations of one or more of the following constituents, benzene, toluene, ethylbenzene, and xylenes, for no other reason than that the produced water was in

residence with petroleum derived from the wells. The presence of these constituents at these concentrations suggests that oil and gas drilling and production activities may have contributed to the detection of petroleum constituents in the shallow water-bearing zone in this neighborhood.

Although it is acknowledged that a portion of the petroleum hydrocarbons released to underlying soils would sorb to soil and eventually biodegrade, the dissolved-phase petroleum constituents in solution would continue their path downward under a constant head (fluids in unlined pits). This contribution of fluids to the subsurface is evidenced by the difference in the average specific conductance, benzene and toluene, from samples collected from the Ohlson well (Permit No. 269807) and the average specific conductance, benzene and toluene from four other water wells drilled in the Arapahoe aquifer in Adams County (USGS 2015b).

Although COGCC has been unable to identify the location for the former UPRR 23 Pan Am B 1, we know that the well was drilled, constructed, and operated on the property, along with retaining pits, a tank battery, and fluid treating equipment (COGCC 2008b), over an eight-year period. This provided ample opportunity for the day-to-day drilling/construction and production activities to result in petroleum spills or leakage from retaining pits, tank batteries et al. It has been reported by COGCC (2015f) that this well is located within an approximately 200-foot radius of the existing domestic water well drilled on the property.

COGCC has suggested that the presence of low levels of benzene and toluene are associated with the homeowners' discharges to their leach field. This rationale does not explain why the average levels of specific conductance, benzene and toluene from the Ohlson well were higher than those in other wells completed in the Arapahoe aquifer in Adams County (USGS 2014b).

The Ohlsons moved into their trailer on their land after Johns Drilling had completed the domestic well in Aug-2006 (personal communication with Gary Ohlson 2017). Total volatile hydrocarbons were detected in the oily water sample from the well **before** the Ohlsons moved onto the land. Therefore, COGCC's suggestion (2015f) that petroleum hydrocarbons detected in samples collected from their well were self-inflicted (e.g., discharge to leach field) ignores the potential contribution of petroleum constituents from the nearby historic production activities.

COGCC's investigations on the Ohlson property have included conducting expensive and exotic tests. The investigations include comparing analytical results from water samples and crude oil; analyzing groundwater for tritium, carbon 14, caffeine, and optical brighteners; and further evaluation of bacterial growth in their water well. However, on several occasions during trenching assessment activities intended to find the wellhead for UPRR 23 Pan Am B 1, COGCC vendors' uncovered stained soil, but did not collect soil samples for analyses (e.g., LT Environmental 2015b).

On two occasions, COGCC (2006 and 2007) stated that they would conduct a subsurface soil investigation, using a drilling rig capable of reaching depths 150-200 fbgs. Hirsch★Gibney has seen no evidence that these investigations ever happened.

Finally, although COGCC (2015b) demonstrated a link (i.e., caffeine) between the shallow water bearing zone beneath the Ohlson property and deeper groundwater derived from their domestic well in the Arapahoe aquifer, COGCC's suggestion that the presence of benzene in the Ohlsons' domestic water

well was self-inflicted is a leap based on little to no evidence gathered during unfinished investigations on the property.

In the nine years of investigations conducted by COGCC on the property, not a single investigation was conducted to assess shallow groundwater beneath the property where one would anticipate any release from oil and gas operations to manifest itself. Meanwhile, concentrations of benzene and methane in groundwater samples collected from the Ohlsons domestic water well appear to be increasing over time (see table), suggesting that the migration of contaminants is ongoing.

It has been our experience that a shallow groundwater investigation is sometimes the easiest way to assess the presence and extent of sources in soil and groundwater. Our goal is to encourage COGCC to re-open Complaint No. 200412560 and conduct the necessary assessment activities to:

- ★ assess shallow groundwater investigations near the wellhead for the former oil well, near the leach field, and in locations hydraulically up- and downgradient of the water well and leach field
- ★ if detected, conduct additional assessment to determine the lateral and longitudinal extent of petroleum hydrocarbons in shallow groundwater that could be associated with former on-site exploration and production activities
- ★ assess shallow groundwater investigations to determine whether petroleum-impacted groundwater is flowing onto the property
- ★ use the results of the assessment activities to try and identify potential hot spots that could be the source(s) of petroleum hydrocarbons in shallow groundwater
- ★ identify the wellhead for UPRR 23 Pan Am B 1, inspect the wellhead and adjacent subsurface soils, and collect and analyze soil samples regardless of PID readings
- ★ construct a conceptual site model for the shallow water-bearing zone beneath the Site/neighborhood

Thank you very much for your timely acknowledgment of and reply to this letter.

Sincerely

Hirsch★Gibney, Inc.

A handwritten signature in blue ink, appearing to read 'Richard J. Hirsch', with a long horizontal line extending to the right.

Richard J. Hirsch, PHG
Principal Hydrogeologist

SUMMARY OF PUBLICLY AVAILABLE INFORMATION FOR THE OHLSON PROPERTY

We would like to offer the following observations, generally in chronological order, from available documents we reviewed and from other publicly available documents used for comparison:

- ☆ According to the COGCC Scout Card for UPRR 23 Pan Am B 1 well, drilling started 26-Nov-1970 and was completed 04-Feb-1971. The well was drilled to 8,065 feet below ground surface (fbgs) and completed in the Muddy D. It is unclear from the Well Completion or Recompletion Report and Log (WCRRL; COGCC 1971a) for this well what volumes of drilling fluids and produced water were generated during the approximately 70-day period that this well was drilled and constructed. However, following construction, field crews tested the well and calculated that the well would produce approximately 6,050 gallons of produced water in a 24-hour period. **Because in the era in which this well was drilled, the management of drilling fluids and produced water was not as rigorous as it is today, we would expect these fluids to be lost through the floor of the retaining pits to the underlying shallow water bearing zone.** Finally, this well was designated as Temporarily Shut In on the WCRRL, with a reference to Cause No. 229, Order No. 229-1 entered 9/15/70 (Stand up 80-acre spacing). We are not sure, but this would appear to mean that the well location did not meet spacing criteria between other oil wells completed in this formation.
- ☆ COGCC Rules and Regulations, Rules of Practice and Procedure and Oil and Gas Conservation Act (1971b, Effective 01-Jul-1973), Rule 325, allowed “storage of oil or any other produced liquid hydrocarbon substance in earthen pits or reservoirs; Rule 328 (a) “except for temporary storage and disposal of substances produced in the initial completion and testing of wells drilled for oil and/or gas, no retaining pit shall be constructed without a permit from this Commission.” Based on these regulations, we would presume that in this era all wells drilled in this neighborhood would be allowed the exemption for permitting during “initial completion and testing of wells.” This means that in each location we have potential flux of hydrocarbons and produced water into the shallow water-bearing zone. Rule 328 required an application (Form 15) for a permit for a retaining pit after 01-Aug-1971. Hirsch☆Gibney was unable to find an example of a completed Form 15 application or approval in COGCC Scout Card files or attached documents for any of the oil and gas wells drilled in the 1970s and 1980s near the Site (cogcc.state.co.us). **For this reason, it is reasonable to assume that each of these wells, including UPRR 23 Pan Am B 1, could have acted as a source of petroleum hydrocarbons and produced water flux into the shallow water-bearing zone.**
- ☆ COGCC (1977) receives a Producers Certificate of Clearance and Authorization to Transport Oil or Gas from a Well for UPRR 23 Pan Am B 1. Hand-written notes on the certificate indicated that “H. Morrell contacted Larry Smith for fm 10” and learned that the well “produced 102 bbls oil and 550 MCF gas in May 1977.” In 2006, COGCC (2006) indicated to the Ohlsons that this well was a poor producer and had been abandoned. If this well was unproductive (COGCC 2006) and reportedly Temporarily Shut In, it is unclear why would Amoco apply for authorization to transport oil from this well? **Was this well temporarily producing oil and gas and likely producing water?**

- ★ COGCC (1979) receives Sundry Notice from Amoco reporting on abandonment of UPRR 23 Pan Am "B" in 1978.
- ★ Review of documents within Scout Cards for various oil and gas wells drilled in the neighborhood between 1990-2015, located hydraulically up- and/or crossgradient from the Site revealed evidence of inspections, and violations associated with inspections, noting surface spills, spills near wellhead, oil covered pits, oily weeds, accumulation of oil in retaining pits, casing leaks, a release from a tank battery, et al between 1990-2015. It is unclear how long these conditions persisted in each case before COGCC personnel were able to identify and issue warnings or violations, and the owner or operator of these wells responded to remedy the condition. **Regardless, it is reasonable to assume that each of these spills could have acted as a source of petroleum hydrocarbons leaching into the underlying shallow water-bearing zone.** Please note that Hirsch★Gibney was unable to find an example of a similar COGCC warnings or violations issued for oil and gas wells drilled near the Site in the 1970s and 1980s and issued in that era (cogcc.state.co.us). **This likely demonstrates COGCC may not have had the staff available to conduct regular oversight of well sites in the 1970s and 1980s, or perhaps may not have had a chance to note inappropriate field conditions, such as spills, and may not have documented and acted upon to prevent these conditions from impacting shallow groundwater beneath the neighborhood.**
- ★ Most domestic water well owners in this neighborhood have drilled and completed their wells in the Denver formation or Arapahoe hard rock aquifer formations beneath their properties. However, lithologic information derived from the water well logs (Permit No. 252321 and Permit No. 269807) for domestic wells drilled on the property indicate coarse-grained soils immediately beneath ground surface, and a shallower water-bearing zone above the Denver aquifer is likely present at depths less than 75 fbgs (DWR 2005 and 2006). **The presence of coarse-grained soils in the vadose zone allows for percolation of fluids, such as produced water and petroleum liquids, into the shallow water-bearing zone.**
- ★ A domestic water well (Permit No. 252321) was drilled on the Site and a completed water well construction and test report received by the Department of Water Resources (DWR) on 02-Dec-2005. The well was reportedly completed on 14-Nov-2005 and drilled to 723 fbgs and completed in the Lower Arapahoe formation (DWR 2017). When completed, the static water level in the well was present under confined conditions at 181 fbgs. The flow rate from this well, when outfitted with a pump, was reported to be approximately 0.14 gallons per minute (GPM; personal communication from Gary Ohlson 2017). It is our understanding that the productivity of the well was too low, so the Ohlsons engaged Mike Johns of Johns Drilling Inc. (Johns Drilling) to close the well. Unfortunately, Johns Drilling never filed the requisite paperwork (Form GWS-09) with DWR to document closure. We understand that the Ohlsons did not witness the closure. Therefore, we cannot confirm that proper closure of this domestic water well rules out this former well as a potential conduit between water-bearing zones. **Regardless, we suspect that contaminants released to the shallow water bearing zone are responsible.**
- ★ Johns Drilling drilled and completed a second domestic water well (Permit No. 269807) on the Site on 27-Jul-2006 and a GWS-31 completed water well construction and test report was received by the DWR on 02-Dec-2005. The well was drilled and constructed to a depth of 520

fbgs. This well was reportedly drilled adjacent to the first domestic water well location because the pump house and piping had already been constructed for the first well (personal communication with Gary Ohlson, 2017). On July 26, 2006, during drilling activities Johns Drilling reportedly observed and collected a sample of “oily water” (COGCC 2006) from the well after cementing surface casing to 240 fbgs. It should be noted that the well construction and test report for this well, reports a “sand coal, blue shale” at 220-250 fbgs. **This is important, because we believe that this may have been the source of the black, oily water. In other words, this very well may have been pulverized coal associated with a layer of coal ground up by the rotary auger of the drilling rig and confused as potential crude oil.**

- ☆ According to the information we have reviewed, COGCC appears to have collected and analyzed nine groundwater samples from the Ohlson well (Permit No. 269807) and/or various taps served by the well using various labs and methods. We have compiled almost all of that data, excluding the oily water sample, the crude oil, and select exotic tests (e.g., caffeine) in the attached table and have summarized some but not all of the results in the following bullets.
- ☆ It is our understanding (according to COGCC chronology [COGCC 2015d]) that Johns Drilling provided the sample of oily water collected from the Ohlsons’ domestic well to COGCC on 26-Sep-2006 and COGCC dropped the sample at Evergreen Analytical Laboratory (Evergreen) for analysis. **This was approximately two months after the sample was collected; therefore, one might expect select compounds had the opportunity to volatilize and biodegrade, reducing the levels detected in the sample. In our opinion, this sample is therefore not representative of the water as produced from the well on 26-July-2006.** On 03-Oct-2006 Evergreen reported that the sample contained 230 mg/L of diesel, 180 mg/L of motor oil, and 1.8 mg/L of total volatile hydrocarbons (TVH). The analytical results from this water sample were eventually compared to crude oil analyses (COGCC 2010) from nearby oil wells in the neighborhood. Hirsch☆Gibney suspects that the oily water retrieved from the well was composed primarily of pulverized coal in suspension, associated with the drilling activities, and that Evergreen’s results were a false-positive for the diesel and motor oil associated with the coal in the water sample (EPA 1996; “Compounds that are chemically similar to petroleum hydrocarbons may cause a positive test [false positive] for Total Petroleum Hydrocarbons.”). **The source for the TVH is very likely the same source as the gasoline range organics (GRO) detected in the first formal sample collected from the domestic well in Sep-2006 (see next bullet).**
- ☆ On 26-Sep-2006, Severn Trent Laboratories (2006) received and subsequently analyzed the first groundwater sample collected by COGCC from the domestic water well (Well Permit No. 269807) for a suite of analyses. Samples were submitted with a Chain of Custody (COC) to be analyzed for total metals, general chemistry, benzene, toluene, ethylbenzene and total xylenes, MtBE, methane, diesel range organics (DRO), and GRO. On 10-Oct-2006 Severn Trent reports results for general chemistry, metals and toluene (31 micrograms/liter [µg/L]) and GRO (38 µg/L) in sample. No benzene (<0.5 µg/L), ethylbenzene (<0.5 µg/L), xylenes (<0.5 µg/L), MtBE (<5 µg/L), or DRO (<250 µg/L) were detected. This was the first of five samples from the well that were collected and analyzed for methane, general chemistry, and metals besides petroleum hydrocarbons (see table).

- ☆ COGCC relayed results to the Ohlsons (COGCC 2006) for first domestic water well sample and provided potential explanations for the water quality and detections of petroleum, indicating that the toluene and GRO may have been associated with water well construction activities (unlikely since MtBE was not detected), and/or although their records show that UPRR 23 Pan Am B-1 was a poor producer, “it is likely that the oil observed in drilling your second water well could be due to an old spill or release from the production equipment associated with the old oil and gas well.” In Oct-2006, COGCC proposed conducting a limited subsurface soil investigation using a hollow-stem auger drilling rig capable of drilling to 200 fbg. **Hirsch☆Gibney has not seen evidence that this proposed investigation occurred.**
- ☆ COGCC (COGCC 2007) relayed results to the Ohlsons from the first geophysical (magnetometer) survey and shallow trenching assessment on the Site, conducted by Cordilleran Compliance Services, intended to assess the presence of remnant piping associated with the former oil well (UPRR 23 Pan Am B 1). COGCC reports that staff used old aerial photography to identify the approximate location of the former tank battery and fluid treating equipment for UPRR 23 Pan Am B-1. COGCC (2006) reported that this well was abandoned in 1978 because it was nonproductive. If the well was nonproductive, why would it have a tank battery and fluid treating equipment? After summarizing the results from an unsuccessful attempt to find the wellhead for the former oil well and almost one year after promising to conduct a subsurface soil investigation, COGCC suggests that “because the source of the crude oil observed during the drilling of your water well has not yet been identified, the COGCC would like to further investigate the source of the oil by conducting a limited subsurface soil sampling....” **This was the second time that COGCC proposed to drill and sample soils, they had instructed the driller to be prepared to drill to 150 feet, and communicated to the Ohlsons that the approval for the work (purchase order) was in process and was expected to be initiated in Oct-2007. Hirsch☆Gibney has not seen evidence that this proposed investigation occurred.**
- ☆ COGCC (2008a) conducted a Surface Casing Check inspection for UPRR 23 Pan Am B 1, noted on the form as having a surface casing set to 212 fbg (into Denver aquifer; DWR) and **suggesting the well is a “leaking P&A.”**
- ☆ COGCC (COGCC 2008b) prepared a letter and relayed results from the second trenching assessment overseen by Leppert Associates (Leppert 2008) to evaluate subsurface soils near the suspected wellhead location for UPRR 23 PAN AM B 1. **The wellhead was not unearthed, but evidence of a former well pad including stained soils, trash, and concrete residue was encountered. Although stained soils were witnessed, no soil samples were collected for analyses.** Leppert did collect a groundwater sample from the Ohlson domestic water well for a suite of analyses including general chemistry, metals, methane, BTEX and MtBE, and volatile organic compounds. Again, no MtBE was detected (<5 µg/L), but toluene was detected at 1.6 µg/L. Methane was detected for the first time at 8.7 µg/L (see table).
- ☆ COGCC (2010) sent a letter to the Ohlsons relaying the results from the analyses of crude oil samples collected for analysis (lab results not appended; reportedly analyzed by TestAmerica) from three nearby production wells completed in the same formation (Muddy D) as UPRR 23 Pan Am B 1. These results were compared to the analytical results for the oily water sample collected by Johns Drilling from domestic water well (Permit No. 269807) at the depth interval

coinciding with the “sand coal.” The results demonstrated that the oily water bore no similarity to the crude oil samples because these are two different types of samples and comparing results is like comparing apples to oranges.

- ☆ In this same letter, COGCC (2010) dismissed Mr. Ohlson’s contention that a release noted from a Noble Energy tank battery in Apr-2010 had migrated in the subsurface onto the Ohlson property, resulting in impact to shallow groundwater (this is the first time COGCC acknowledged shallow groundwater). The release was reported to have required removal of almost 20,000 cubic yards of petroleum-impacted soils from an area 240 feet long by 85 feet wide by 20 feet deep. The release occurred from Wailes 41-33 #1X tank battery. COGCC provided a hand-drawn cross-section (with a 1,250-foot horizontal to 38-foot vertical scale [33-fold exaggeration]) that illustrated the difference in elevation between the tank battery and the Site with a creek in between. While the distance is great and one might consider the creek a hydraulic divide, **COGCC provided no evidence that it is; and if not, they provided no argument why a release from that tank battery to the underlying shallow water-bearing zone could not migrate toward the Ohlsons’ property. Did Noble Energy provide evidence to COGCC that they had also assessed shallow groundwater beneath that tank battery to determine whether the release had impacted the saturated zone?**
- ☆ Topography (Google Earth 2017) suggests that shallow groundwater beneath the Ohlson property and neighborhood would flow north-northwest parallel and toward nearby drainages. If the creeks are connected to shallow groundwater and run perennially, this might explain why the release from the Noble Energy tank battery would not be expected to reach the Site. Based on COGCC website information, **UPRR 23 Pan Am B 1, and another seven or eight oil/gas wells are or were situated on or hydraulically upgradient of the Ohlson property, and produced water and historic management of well drilling and production fluids from these wells could be sources of petroleum constituents in the shallow water-bearing zone.**
- ☆ COGCC (2014a) sent a letter to the Ohlsons relaying results from domestic water well sampling for volatile organic compounds. COGCC provided results and reported standards for municipal public drinking water supplies **but also reported that people often use and consume groundwater from private wells that exceed those standards. Why would COGCC want to minimize the notion of consuming benzene in groundwater above EPA risk-based standards for drinking water?** COGCC reported that they had sampled the well on 01-Oct-2014, with split samples (OHLSON-1) of the well water sent to two labs which reported results for benzene of 9.2 (ALS Environmental) and 6.8 µg/L (TestAmerica), respectively. They also sampled water from inside the house (OHLSON-2) and reported <1 µg/L. Finally, COGCC reported that another sample was collected from a stock tank on 16-Oct-2014 with a result of 4.3 µg/L for dissolved phase benzene. Samples were not analyzed for methane.
- ☆ In an email thread COGCC (2015a), presumably before they completed and sent their letter (COGCC 2015b), asked a representative of British Petroleum (BP; presumed to be responsible for former UPRR 23 Pan Am B 1) how to explain the presence of caffeine in samples collected from the domestic water well (Permit No. 269807). BP replied “we continue to sample and present the findings only, without presenting any conclusion to the source until we can do our field work. I want to talk to our laboratories that conduct fingerprint analysis and find out if during

your next sampling we could take a replicate and send it to a different lab to see if they can determine an oil and gas characteristic in the GC analyses.” In another e-mail from BP (same date) “...I get the connection based on caffeine results, just want to see if we can find a GC signature for the benzene that would point us away from oil and gas.” **It is unclear why COGCC is asking a regulated entity, whose predecessors could ultimately be found responsible, how to communicate results from an investigation COGCC was conducting?**

- ★ COGCC (2015b) sent a letter to the Ohlsons relaying results from domestic water well sampling and a robust suite of analyses for samples collected Jan-2015. The samples were reportedly collected by COGCC. Benzene (9.4 µg/L) and methane (77 µg/L; highest to date) are present in the sample. The report also included results for more exotic tests for tritium, optical brighteners, carbon 14, and caffeine. **The samples analyzed for caffeine (1.9 nanograms/liter) revealed the presence of this human-caused constituent in groundwater of the Arapahoe formation (Permit No. 269807), demonstrating that “young recharge” from a shallower water-bearing zone (perhaps from the on-site leach field) has made its way to a deeper hard rock formation.** In its letter, COGCC indicates that this suggests self-contamination as the cause for benzene in the Ohlsons well and refers the Ohlsons to TriCounty Health Department. **This statement was inappropriate given the incomplete nature of the investigations.**
- ★ COGCC (2015f) sent a letter to the Ohlsons relaying LT Environmental (2015b) report and summarizing the results of a geophysical (ground penetrating radar [GPR]) survey and excavation activities east of the horse corral on Sep-2015 to identify the location of the wellhead for UPRR 23 Pan Am B 1. **COGCC summarized LTE findings and indicated they have not found the former oil/gas wellhead.** LTE reportedly encountered black staining in soils in Excavation No. 2, but no odor or PID measurements were noted. **LTE did not collect samples of stained soils for analyses, which we would presume to have been deposited about 46 years ago when the well was drilled (i.e., volatiles long gone).** LTE (2015b) reports they indicated that the GPR was appropriate for sensing location of the former wellhead, but the corral fence affected the survey grid lines results because it lent itself to discontinuous survey areas and suggested a larger survey and removal of corral fence for success. COGCC also appended analytical results for water well sample collected by LTE to report without discussion. Benzene (10 µg/L; matched highest measured to date) and toluene (8 µg/L) in sample. **COGCC ended the letter by indicating that they have not found the former oil/gas wellhead, have found no wrongdoing on the part of previous production activities, and have closed the complaint.**
- ★ In the early 2000s, the United States Geological Survey (USGS) did a comprehensive sampling of groundwater from the Denver Basin from all bedrock aquifers. In 2014, the USGS (2014a) published a document entitled Quality of Groundwater in the Denver Basin Aquifer System, Colorado, 2003-5. The report provides analytical results for groundwater samples collected from four domestic water wells completed in the Arapahoe formation in Adams County, Colorado. Realizing that concentrations of the various USGS constituents represent dissolved constituents and COGCC’s data is reported as totals, Hirsch★Gibney averaged the data regardless, for reference. The only data able to be directly compared are specific conductivity (Ohlsons results 77% higher) benzene (355% higher), toluene (100% higher) and GRO (100% higher). It is our opinion that these results demonstrate an effect from the oil and gas exploration and

production activities on the shallow water-bearing zone, and in the case of the Ohlsons' well, deeper groundwater in this part of Adams County.

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Table 1: Summary of Analytical Results (ug/L and mg/L) of Ohlson Water Well (Permit No. 269807), USGS Arapahoe Aquifer Wells in Adams County and Produced Water from Nearby Oil Wells, 36104 East 124th Avenue, Hudson, Adams County, Colorado. Hirsch★Gibney Project No. 0118-0001

Sampling Point

Sampler

Date Sampled

Date Analyzed

Laboratory

Lab ID No.

Method

pH

TDS
mg/L

Spec. Cond
umhos/cm

Bromide
mg/L

Chloride
mg/L

Flouride
mg/L

Nitrate
mg/L

Nitrite
mg/L

Sulfate
mg/L

Alkalinity
mg/L

BC Alkalinity
mg/L

C Alkalinity
mg/L

Barium
µg/L

Calcium
µg/L

Iron
µg/L

Magnesium
µg/L

Manganese
µg/L

Potassium
µg/L

Sodium
µg/L

Selenium
µg/L

GRO
µg/L

Benzene
µg/L

Toluene
µg/L

EthylB
µg/L

Xylenes
µg/L

Methane
µg/L

GENERAL CHEMISTRY

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

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METALS - TOTAL

unfiltered

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TVH, Aromatics and Gas

unfiltered

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Ohlson Water Well

COGCC

25-Sep-06

26-27-Sep-06

Severn Trent

D61260286-001

8260/8270/various

9

740

1,200

0.44

46

0.72

<0.50

<0.50

350

130

120

11

19

9,900

380

900

18

<3,000

260,000

<15

38

<0.5

31

<0.5

<0.5

<0.5

<5

Ohlson 1

Leppert

18-Mar-08

26-30-Mar-08

Test America

D8C180299-001

8260/8270/various

8.6

770

1,300

0.46

50

0.67

<0.10

<0.10

410

150

150

<5

18

10,000

170

1,000

22

<3,000

250,000

<15

na

<1

1.6

<1

<2

<2

8.7

Ohlson 1

Terracon

27-Sep-10

2-5-Oct-10

Test America

280-7778-1

various

8.75

820

1,300

0.49

48

0.63

<0.019

<0.019

430

130

120

6.6

21

13,000

280

1,100

43

2,200

290,000

6.3

na

<0.5

<0.5

<0.5

<0.5

12

Ohlson-1

Terracon

5-Sep-14

8-15-Sep-14

Test America

280-59666-1

8260/8270/various

nm

870

nm

0.51

50

0.58

<0.10

<0.10

500

120

120

<5

18

12,000

180

1,200

30

<3,000

270,000

<15

na

9.1

<1

<1

<2

<2

54

Ohlson-1

Terracon

1-Oct-14

2-Oct-14

ALS Lab Group

1410032-1

8260

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na

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<2

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Ohlson-2

Terracon

1-Oct-14

2-Oct-14

ALS Lab Group

1410032-2

8260

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na

<1

<1

<1

<2

<2

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(inside house)

Ohlson-1

COGCC

1-Oct-14

6-Oct-14

Test America

280-60645-1

8260

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na

6.8

<1

<1

<2

<2

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(tap in house?)

Ohlson-2

COGCC

1-Oct-14

6-Oct-14

Test America

280-60645-2

8260

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na

<1

<1

<1

<2

<2

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Ohlson Stock

COGCC

16-Oct-14

22-Oct-14

Test America

280-61329-1

8260

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na

4.3

<1

<1

<2

<2

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Ohlson-2nd

COGCC

10-Nov-14

12-Nov-14

Test America

280-62375-1

8260

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na

7.2

<1

<1

<2

<2

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Ohlson Well

COGCC

13-Jan-15

14-15-Jan-15

Test America

280-64325-1

8260/8270/various

8.73

850

1,100

0.53

50

0.73

<0.10

<0.10

460

130

120

6.8

21

14,000

170

1,400

37

<3000

300,000

<15

na

9.4

<1

<1

<2

<2

77

Ohlson House

COGCC

13-Jan-15

14-Jan-15

Test America

280-64325-2

8260

Chlorform reported at 1.9 ug/L

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na

10

8

<1

<3

<3

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Ohlson

COGCC

9-Sep-15

22-Sep-15

Test America

280-73997-1

8260

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na

10

8

<1

<3

<3

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USGS Arapahoe

DENV-134

USGS

ADAMS

not available

not available

not available

8.51

286

431

0.06

3

2

33.6

199

234

35.36

5,950

10.23

892

23.861

1,173

102,500

<0.4

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

DENV-166

USGS

ADAMS

not available

not available

not available

8.34

314

512

0.12

6

1

82.6

160

190

36.388

14,230

6.849

1,961

29.809

1,771

94,600

<0.4

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

DENV-170

USGS

ADAMS

not available

not available

not available

8.57

1,022

1,246

1

40

1

554.4

119

142

10.842

25,510

16.26

2,063

72.318

2,267

330,100

<0.4

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

DENV-175

USGS

ADAMS

not available

not available

not available

8.66

365

576

0.06

4

4

0.1

301

359

20.03

1,862

5.731

205

4.127

786

134,700

0.24

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

unfiltered

Produced Water

UPRR 23 PAN AM B 2

KP Kauffman

1-Nov-79

Industrial Labs

451668

collected from Pit

presumed unfiltered

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WENZEL-HOSMER 4-4

KP Kauffman

18-Mar-76

Halliburton Serv

451606

np

24,820

14,843

105

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<0.1

644,000

223

123,000

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8,882,000

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Ohlson average values----->>>

8.77

810

1225

0.49

49

0.67

430

132

126

19

11,780

236

1,120

28

2,839

274,000

6.3

38

8

14

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38

Average concs Arapahoe Adams----->>>

8.52

497

691

0.19

13

2

168

195

231

26

11,888

10

1,280

33

1,499

165,475

0.06

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Average concs two nearby oil wells----->>>

24,820

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66

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225

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355,000

223

104,500

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94,000

16,441,000

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Notes

"--" - not analyzed

nm - not measured

np - not provided

UPRR 23 PAN AM B 2 - located southeast and presumed hydraulically upgradient location in shalow water bearing zone from Ohlson property

WENZEL-HOSMER 4-4 - located south and presumed hydraulic up- and crosssgradient location in shallow water-bearing zone from Ohlson property

USGS data collected 2003-05 and abstracted from USGS 2014b

Not all metals analyzed are listed in table from 2006 through 2015 - see lab sheets for additional detail

Cannot directly compare general chemistry and metals for COGCC results (totals) to USGS results (filtered)

DENV-134 - 16.8 miles southeast of Ohlsons

DENV-166 - 7 miles east-southeast of Ohlsons

DENV-170 - 1.34 miles south-southwest - same neighborhood

DENV-175 - 15.93 miles west-northwest of Ohlsons



DEPARTMENT OF NATURAL RESOURCES
Bill Owens, Governor
1120 Lincoln St., Suite 801
Denver, CO 80203
Phone: (303) 894-2100
FAX: (303) 894-2109
www.oil-gas.state.co.us

Complaint #200095139

October 13, 2006

704700

Mr. Gary Ohlson
1025 South Miller Ave. #107
Brighton, Colorado 80601

RE: Water Quality Analytical Results for Your Water Well
Section 33 – Township 1 South – Range 64 West; Well Permit No. 269807
Adams County, Colorado; Complaint No. 200095139

Dear Mr. Ohlson:

On September 25, 2006 the Colorado Oil and Gas Conservation Commission (COGCC) sampled your water well and submitted the samples for laboratory analysis. **The purpose of this water sampling was to evaluate overall water quality for your well water and investigate if oil & gas activities in your area have impacted your well.** The water samples were submitted to Severn Trent Laboratories, Inc. (STL) in Arvada, Colorado, for analysis of inorganic chemical constituents, organic compounds associated with petroleum hydrocarbons, methane gas, and pH. Copies of the laboratory analytical reports are enclosed.

This letter summarizes the analytical laboratory results of the water samples collected from your well on September 25, 2006. The Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and Environment (CDPHE) has established drinking water standards for the protection of human health. The analytical results from the water samples from your wells have been compared to applicable ground water and/or drinking water standards and are summarized below. Please keep in mind that these water standards were established for public drinking water supplies. Often people use and consume ground water from private wells that can exceed these standards.

COMPARISON OF INORGANIC ANALYTICAL RESULTS TO STANDARDS
(Please see enclosed STL Report)

- **Total Dissolved Solids (TDS):** CDPHE has established a TDS standard for human drinking water of 500 milligrams per liter (mg/l). The standard is called the secondary maximum contaminant level (SMCL) and is based on the aesthetic quality of the water (such as taste and odor) and is intended as a guideline for public water supply systems and is not an enforceable standard. Although CDPHE does not have an agricultural standard for TDS, other agencies recommend concentrations below 2,000 mg/l for irrigation, and below 5,000 mg/l for most livestock watering. TDS concentrations are related to the presence of naturally occurring

elements and chemical compounds such as chloride, sodium, potassium, calcium, magnesium, and sulfate.

TDS was detected in the water sample from your water well at a concentration of 740 mg/l, which is greater than the CDPHE (SMCL) water standard, below than the recommended maximum concentration for irrigation, and below the recommended maximum concentration for most livestock watering.

- Sodium (Na): Although CDPHE does not have a standard for sodium, people on salt restricted diets should be aware of the Na concentration in the water they drink. A concentration of drinking water with a concentration of sodium less than 20 mg/l is recommended by some for people on salt restricted diets or for people suffering from hypertension or heart disease. Sodium occurs naturally in the ground water in many areas at concentrations that exceed the recommended level.

Sodium was detected in the water sample from your well at a concentration of 260 mg/l, which is greater than the recommended level for people on salt restricted diets.

- Chloride (Cl): The CDPHE chloride standard (SMCL) for drinking water is 250 mg/l. Chloride concentrations in excess of 250 mg/l usually produce a noticeable taste in drinking water.

Chloride was detected in the water sample from your water well at a concentration of 46 mg/l, which is below the CDPHE (SMCL) water standard.

- Sulfate (SO₄): The CDPHE sulfate standard for drinking water is 250 mg/l (SMCL). Although CDPHE does not have an agricultural standard for sulfate, other agencies recommend a concentration below 1,500 mg/l for livestock watering. Waters containing high concentrations of sulfate, typically caused by the leaching of natural deposits of magnesium sulfate (Epsom salts) or sodium sulfate (Glauber's salt), may be undesirable because of their laxative effects. Sulfate occurs naturally in the ground water in many areas in Colorado at concentrations that exceed the drinking water standard.

Sulfate was detected in the water sample from your water well at a concentration of 350 mg/l, which is greater than the CDPHE SMCL water standard and below the recommended concentration for livestock watering.

- Total Nitrate (NO₃) + Nitrite (NO₂) as Nitrogen (N): The CDPHE total nitrate (NO₃) + nitrite (NO₂) as nitrogen (N) for standard for human drinking water is 10 mg/l. Nitrate and nitrite are common contaminants in ground water from agricultural sources, such as fertilizer and animal, including human, wastes. They are known to cause infant cyanosis or "blue baby disease" in humans and, at concentrations greater than 100 mg/l as nitrogen (N), may be dangerous to livestock. High concentrations of nitrate and nitrite in ground water are known to occur in agricultural areas in Colorado.

Total nitrate/nitrite, as N was not detected in the sample from your well.

- Iron (Fe): The CDPHE standard for human drinking water for iron is 0.3 mg/l (SMCL). Small amounts of iron are common in ground water. Iron may produce a brownish-red color in laundered clothing, can leave reddish stains on fixtures, and impart a metallic taste to beverages and food made with it. After a period of time iron deposits can build up in pressure tanks, water heaters, and pipelines, reducing the effective flow rate and efficiency of the water supply.

Iron was detected in the water sample from your well at a concentration of 0.38 mg/l, which is slightly above the CDPHE SMCL.

- Selenium (Se): The CDPHE selenium standard for human drinking water is 0.05 mg/l and the agricultural standard is 0.02 mg/l. Excessive selenium (Se) (concentrations greater than 0.05 mg/l) can cause loss of hair and/or fingernails as well as adverse effects on the central nervous system. Selenium (Se) occurs naturally in the ground water in many areas of Colorado at concentrations that exceed the drinking water standard.

Selenium was not detected in the water sample from your well.

- Fluoride (F): CDPHE has established a fluoride (F) standard for human drinking water is 4.0 mg/l. Where fluoride concentrations are in the range of 0.7 mg/l to 1.2 mg/l, health benefits such as reduced dental decay have been observed. Consumption of fluoride at concentrations of greater than 2.0 mg/l can result in mottling of teeth. Consumption of fluoride at concentrations greater than 4.0 mg/l can increase the risk of skeletal fluorosis or other adverse health effects.

Fluoride was detected in the water sample from your well at a concentration of 0.72 mg/l, which less than the CDPHE drinking water standard.

- Calcium (Ca), Potassium (K), Bromide (Br), Magnesium (Mg), Bicarbonate (HCO_3) and Carbonate (CO_3) were also tested for in your water. There are no standards from CDPHE for these parameters. In addition, the COGCC also collected samples for metals and the Table 1 (attached) presents the analytical laboratory results. Please note that Primary standard (P) is the CDPHE Human Health Standard and the Secondary standard (S) is the CDPHE secondary maximum contaminant level (SMCL).

Table 1
OHLSON WATER WELL

METAL/INORGANIC	September 25, 2006 Sample Concentration (in Milligrams per liter [mg/l])	CDPHE Water Quality Standard (P – Primary S-Secondary)
Arsenic (Ar)	ND	0.05 (P)
Barium (Ba)	0.019	2.0 (P)
Cadmium (Cd)	ND	0.005 (P)
Chromium (Cr)	ND	0.1 (P)
Lead (Pb)	ND	0.05 (P)
Manganese (Mn)	0.018	0.05 (S)
Potassium (K)	ND	NS
Magnesium (Mg)	0.9	NS
Bromide (Br)	0.71	NS
Calcium (Ca)	9.9	NS
pH	9.0 pH units	NS

NS -- no standard

ND – not detected in the sample

CDPHE – Colorado Department of Public Health and Environment

ORGANIC COMPOUNDS ASSOCIATED WITH PETROLEUM HYDROCARBONS
(please see enclosed STL METHOD E 602/SW 8021B, BTEX DATA REPORT)

- Benzene: CDPHE's basic ground water standard for benzene is 5 micrograms per liter (µg/l). **Benzene was not detected in the sample from your water well.**
- Toluene: CDPHE's basic ground water standard for toluene is 1,000 µg/l. **Toluene was detected at a concentration of 31 µg/l in the sample from your water well.**
- Ethylbenzene: CDPHE's basic ground water standard for ethylbenzene is 680 µg/l. **Ethylbenzene was not detected in the sample from your water well.**
- Total Xylenes (sum of m,p, and o-xylene): CDPHE's basic ground water standard for total xylenes is 10,000 µg/l. **Total xylenes were not detected in the sample from your water well.**

As part of the sampling investigation an analysis for gasoline range organics (GRO) was also conducted which yielded a concentration of 38 µg/l (there are no drinking water or health standards for GRO). Because the GRO analysis spans part of the same organic compound range as toluene and because the GRO concentration is in the same range as the toluene detection (31 µg/l), I believe this GRO detection is also recording the toluene occurrence.

When observed in a water impact from petroleum hydrocarbons, toluene is often at high concentrations and rarely occurs by itself. Toluene in crude oils and natural gases usually occurs with the other aromatic organic compounds (benzene, ethylbenzene, and xylenes) and it is very unlikely that the sole occurrence of toluene indicates a petroleum impact.

Although toluene is found as a component in crude oils and natural gas, it also is a widely used industrial chemical and is commonly used in paints, lubricants, pipe "dope", and glues. Because your water well is a new, and because it is likely that Johns Drilling used pipe "dope" and/or glue during the drilling and construction of your well, I believe that the toluene (and GRO) observed in your well water is some residual from this type of use and not due to an oil & gas impact. The toluene concentration of 31 µg/l in the sample from your water well is significantly below the CDPHE water standard of 1,000 µg/l.

METHANE GAS CONCENTRATION

- Methane was not detected in the sample from your water well.

OIL COMPOSITION DETERMINATION RESULTS

(See attached Evergreen Analytical Laboratory report)

During the drilling of your water well, Johns Drilling observed an "oil" like material prior to resuming well drill after cementing 240 feet of surface casing. A sample of the "oily water" was collected and I submitted this sample to Evergreen Analytical Laboratory (Evergreen) for a determination of fuel identification (Fuel ID). Carl Smits, Technical Director of Chemical Analysis for Evergreen, evaluated the sample for evidence of crude oil and refined products (fuels or lubrication oils) and determined that the "oil" like material resembled a crude petroleum and not a refined product. A copy of the Evergreen report is attached.

CONCLUSION

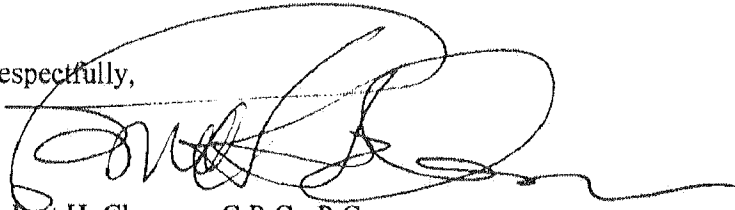
Water Well Water Quality - There are no indications of any oil & gas related impact to your water well water quality. Because your water well exceeded the health advisory for individuals on salt restricted diets for sodium (Na), the CDPHE public drinking water supply standards (SMCL) for sulfate (SO₄), and the CDPHE SMCL for sulfate (SO₄) and iron (Fe), and because you or your livestock and/or pets drink your water, you may wish to discuss the possible health effects of continued consumption with your physician and/or veterinarian.

Oil Observed During Water Well Drilling - As we discussed on September 28, 2006, your existing water well and the dry well drilled earlier this year, are both approximately 100 feet north of a former oil & gas well (UPRR 23 Pan Am B-1 [API 05-001-06230] drilled by the Amoco Production Company in 1970. This well was plugged & abandoned (P&Aed) and the well site reclaimed in 1978. The COGCC's well records show that this well was a poor producer; however, it is likely that the oil observed in drilling your second water well could be due to an old spill or

release from the production equipment associated with the old oil & gas well. The COGCC would like to further investigate this possibility by conducting a limited subsurface soil sampling by hollow-stem auger drilling and soil sampling. The hollow-stem drilling rig is a small, truck mounted rig, smaller than a water well drilling rig, and is capable of drilling depths exceeding 200 feet, if necessary. I believe that any residual surface spill of oil would be present within the upper 25- to 30-feet of the subsurface and this sampling investigation would likely only take 1- to 2-days. I will be in contact with you in the very near future to arrange permission and arrange at convenient time to conduct this sampling.

If you have any questions or would like to discuss these matters further, please contact me at the COGCC in Denver via e-mail (robert.chesson@state.co.us) or by phone at 303-894-2100, extension 112.

Respectfully,

A handwritten signature in black ink, appearing to read 'Robert H. Chesson', written over a horizontal line.

Robert H. Chesson, C.P.G., P.G.
Environmental Protection Specialist

Enclosures

cc: Brian Macke – COGCC w/o enclosures
Debbie Baldwin – COGCC w/o enclosures
Randall Ferguson – COGCC w/o enclosures
Jim Precup – COGCC w/o enclosures



DEPARTMENT OF NATURAL RESOURCES

Bill Ritter, Jr., Governor
1120 Lincoln St. Suite 801
Denver, CO 80203
Phone: (303) 894-2100
FAX: (303) 894-2109
www.cogcc.state.co.us

Complaint # 200095139

September 27, 2007

Mr. Gary Ohlson
1025 South Miller Ave. #107
Brighton, Colorado 80601

RE: Status of Complaint Investigation
Complaint No. 200095139, Adams County

Dear Mr. Ohlson:

In April 2007 Cordilleran Compliance Services, Inc. (CCS) conducted a subsurface investigation on your property by digging two trenches with a back-hoe (one approximately north-south and one trench approximately east-west. These trenches were dug in an attempt to uncover possible in place abandoned flowlines which the COGCC thought might have been left when the Amoco Production Company abandoned the UPRR 23 Pan Am B-1 [API 05-001-06230] in 1978.

Although a magnetometer survey to identify the locations of the possible flowlines did not indicate any significant metal anomalies in the subsurface, the COGCC staff using old aerial black and white photographs, was able to identify the approximate location of the former tank battery and fluid treating equipment (approximately 100- to 150-feet south of your water well).

The results of the trenching; however, did not uncover any evidence of any remaining piping (usually found within 10 feet of the surface) which indicates that Amoco removed the underground flowlines when they removed the surface equipment. I have attached two photographs taken during the trenching.

Because the source of the crude oil observed during the drilling of your water well has not yet been identified, the COGCC would like to further investigate the source of the oil by conducting a limited subsurface soil sampling by hollow-stem auger drilling and soil sampling. The hollow-stem drilling rig is a small, truck mounted rig, smaller than a water well drilling rig, and is capable of drilling depths exceeding 200 feet, if necessary. I believe that any residual surface spill of oil should be present within the upper 25- to 30-feet of the subsurface; however, I am instructing the contractor to plan for drilling to a depth of up to 150 feet below the ground surface. I believe that this investigation would likely only take 1- to 2-days. I currently have a scope of work to a contractor and am waiting for their costs prior to arranging a purchase order (PO) for the work from the procurement office with the Department of Natural Resources. I anticipate having the cost estimate by the first of October and a PO to conduct the work later that month. Any work on our property will be coordinated with you prior commencing any subsurface work.

If you have any questions or would like to discuss these matters further, please contact me at the COGCC in Denver via e-mail (robert.chesson@state.co.us) or by phone at 303-894-2100, extension 112.

Respectfully,

A handwritten signature in black ink, appearing to be 'R. Chesson', written over a horizontal line.

Robert H. Chesson, C.P.G., P.G.
Environmental Protection Specialist

Enclosures

cc: Brian Macke – COGCC w/o enclosures
Debbie Baldwin – COGCC w/o enclosures
Randall Ferguson – COGCC w/o enclosures
Jim Precup – COGCC w/o enclosures

FORM NO. GWS-31 10/94	WELL CONSTRUCTION AND TEST REPORT STATE OF COLORADO, OFFICE OF THE STATE ENGINEER	For Office Use only <div style="text-align: center; border: 1px solid black; padding: 5px;"> RECEIVED </div> <div style="text-align: center; margin-top: 20px;"> SEP 05 2006 </div> <div style="text-align: center; margin-top: 20px;"> WATER RESOURCES STATE ENGINEER COLO. </div>																																							
1. WELL PERMIT NUMBER <u>269807</u>																																									
2. OWNER NAME(S) <u>Gary Ohlson</u> Mailing Address <u>1025 South Miller Avenue # 107</u> City, St Zip <u>Brighton, Co. 80601</u> Phone (<u>303</u>) <u>638-</u> <u>8604</u>																																									
3. WELL LOCATION AS DRILLED: <u>SW</u> 1/4 <u>NW</u> 1/4, Sec. <u>33</u> Twp. <u>1</u> <u>S</u> , Range <u>64</u> <u>W</u> DISTANCES FROM SEC. LINES: <u>1849</u> ft. from <u>N</u> Sec. line. and <u>623</u> ft. from <u>W</u> Sec. line. OR <small>(north or south) (east or west)</small> SUBDIVISION: _____ LOT _____ BLOCK _____ FILING(UNIT) _____ STREET ADDRESS AT WELL LOCATION: <u>GPS: 13 537393 E 4419240 N</u>																																									
4. GROUND SURFACE ELEVATION _____ ft. DRILLING METHOD <u>Rotary</u> DATE COMPLETED <u>7-27-06</u> TOTAL DEPTH <u>520</u> ft. DEPTH COMPLETED <u>520</u> ft.																																									
5. GEOLOGIC LOG: <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Depth</th> <th>Description of Material (Type, Size, Color, Water Location)</th> </tr> </thead> <tbody> <tr><td>0-42</td><td>Brown sand</td></tr> <tr><td>42-47</td><td>Brown sandy clay</td></tr> <tr><td>47-49</td><td>Sandstone</td></tr> <tr><td>49-59</td><td>Brown shale</td></tr> <tr><td>59-67</td><td>Blue shale</td></tr> <tr><td>67-69</td><td>Brownsand/blue shale</td></tr> <tr><td>69-70</td><td>sandstone</td></tr> <tr><td>70-80</td><td>Brown sand</td></tr> <tr><td>80-100</td><td>sandstone/layers of brown shale</td></tr> <tr><td>100-120</td><td>blue shale/sandstone/blue shale</td></tr> <tr><td>120-220</td><td>Blue shale</td></tr> <tr><td>220-250</td><td>sand coal, blue shale</td></tr> <tr><td>250-280</td><td>sand</td></tr> <tr><td>280-330</td><td>Blue shale</td></tr> <tr><td>330-510</td><td>blue sand Water</td></tr> <tr><td>510-520</td><td>Blue sand</td></tr> </tbody> </table>	Depth	Description of Material (Type, Size, Color, Water Location)	0-42	Brown sand	42-47	Brown sandy clay	47-49	Sandstone	49-59	Brown shale	59-67	Blue shale	67-69	Brownsand/blue shale	69-70	sandstone	70-80	Brown sand	80-100	sandstone/layers of brown shale	100-120	blue shale/sandstone/blue shale	120-220	Blue shale	220-250	sand coal, blue shale	250-280	sand	280-330	Blue shale	330-510	blue sand Water	510-520	Blue sand	6. HOLE DIAM. (in.) From (ft) To (ft) <table border="1" style="width:100%; border-collapse: collapse;"> <tbody> <tr><td>8 3/4</td><td>0</td><td>243</td></tr> <tr><td>6 1/4</td><td>243</td><td>520</td></tr> </tbody> </table>	8 3/4	0	243	6 1/4	243	520
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8 3/4	0	243																																							
6 1/4	243	520																																							
REMARKS: <u>5% bentonite, 2% calcium chloride</u> <u>added to cement</u>	7. PLAIN CASING <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>OD (in)</th> <th>Kind</th> <th>Wall Size</th> <th>From(ft)</th> <th>To(ft)</th> </tr> </thead> <tbody> <tr><td>6 5/8</td><td>Steel</td><td>.188</td><td>+1</td><td>243</td></tr> <tr><td>4 1/2</td><td>Steel</td><td>.188</td><td>27</td><td>360</td></tr> <tr><td>4 1/2</td><td>Steel</td><td>.188</td><td>360</td><td>520</td></tr> </tbody> </table> PERF. CASING: Screen Slot Size: <u>3/16"</u> plasma cuts		OD (in)	Kind	Wall Size	From(ft)	To(ft)	6 5/8	Steel	.188	+1	243	4 1/2	Steel	.188	27	360	4 1/2	Steel	.188	360	520																			
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4 1/2	Steel	.188	360	520																																					
	8. FILTER PACK: Material <u>N/A</u> Size _____ Interval _____	9. PACKER PLACEMENT: Type <u>cement basket</u> placed at _____ Depth <u>360'</u>																																							
	10. GROUTING RECORD: <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Material</th> <th>Amount</th> <th>Density</th> <th>Interval</th> <th>Placement</th> </tr> </thead> <tbody> <tr> <td>cement</td> <td>34bags</td> <td>7gal/bag</td> <td>0-360</td> <td>Pump</td> </tr> <tr> <td>cement</td> <td>410 gals</td> <td></td> <td></td> <td></td> </tr> <tr> <td>cement</td> <td>200gals</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>17bags</td> <td>7gal/bag</td> <td>60-360</td> <td>Pump</td> </tr> </tbody> </table>		Material	Amount	Density	Interval	Placement	cement	34bags	7gal/bag	0-360	Pump	cement	410 gals				cement	200gals					17bags	7gal/bag	60-360	Pump														
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11. DISINFECTION: Type <u>Granular Chlorine</u> Amt. Used <u>4cups</u> dissolved in <u>5 gallons</u> of																																									
12. WELL TEST DATA: <input type="checkbox"/> Check box if Test Data is submitted on Form No. GWS-39 Supplemental Well Test TESTING METHOD <u>Air</u> Static Level <u>328'</u> ft. Date/Time measured <u>7-27-06 11:00am</u> , Production Rate <u>20</u> gpm. Pumping level <u>Jetting</u> ft. Date/Time measured _____, Test length (hrs.) <u>3</u> hrs. Remarks <u>at 520'</u>																																									
13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104 (13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.] CONTRACTOR <u>Johns Drilling Inc.</u> Phone <u>(303) 655-1759</u> Lic. No <u>827</u> Mailing Address <u>Box 639 Henderson, Co. 80640</u> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:40%;">Name/Title (Please type or print) <u>Lloyd John</u> Owner/President</td> <td style="width:40%;">Signature </td> <td style="width:20%;">Date <u>7-28-06</u></td> </tr> </table>			Name/Title (Please type or print) <u>Lloyd John</u> Owner/President	Signature 	Date <u>7-28-06</u>																																				
Name/Title (Please type or print) <u>Lloyd John</u> Owner/President	Signature 	Date <u>7-28-06</u>																																							

001-06230



SB5OUT1

LOCATION: SW1/4 OF NW1/4 OF SEC. 33, T 1S., R.64W. (1964 NSL, 660 WSL)

Ground Elevation: 5269

Number of Acres: 80

AQUIFER	ELEVATION		NET SAND	DEPTH TO		ANNUAL APPROP A-F	STATUS
	BOT	TOP		BOT	TOP		
UPPER DAWSON	----	----	----	----	----	----	----
LOWER DAWSON	----	----	----	----	----	----	----
DENVER	4996	5132	79.8	273	137	10.86	NNT
UPPER ARAPAHOE	4739	4947	77.1	530	322	10.48	NNT
LOWER ARAPAHOE	4399	4664	99.6	870	605	13.54	NT
LARAMIE-FOX HILLS	3769	4031	161.7	1500	1238	19.40	NT

note: E indicates location is at aquifer boundary and values may be more approximate.

Elevation of the bottom and the depth to the bottom of the Upper Arapahoe are approximate and should be checked against DENVER BASIN ATLAS NO. 3

SURFACE CASING CHECK

Well Name UPRR 23 PAN AM B #1

☐ New Drill
 ☐ Refiling
 ☐ Deepen
 ☐ Re-Enter
 ☐ Recomplete and Operate
 ☐ Plug and Abandon
 ☐ Casing Repair
 ☐ Disposal
 ☒ LEAKING PFA

SB5 Base of Fox Hills 1500' ABOVE - SAY 1530' ON LOGCheyenne Basin Map Base of Fox Hills NAFox Hills Protection Area 5% Rule 8065 (5%) = 404'Deepest Water Well w/in 1 Mile(s) 760' - LOWER ARAPAHOE

Operator-Proposed Surface Casing Depth _____

Actual Surface Casing Depth 212'

Change Permit Surface Casing Depth from _____ to _____

OK on ☐ this well's or ☐ offset well's induction log at _____

NB-CD BUFFER TOWNSHIP.
 IF RE-ENTERED, REQUIRE
 PLUG ABOVE NBRR.

**Colorado
Oil & Gas Conservation Commission**

COGCC Results
Selected Items Report

Oil and Gas Wells Selected <i>COMPLETIONS ≤ 1.0 MILE :</i>						
Filter Results by Formation Include				Filter <i>DSND, JSND</i>		
WELL DESCRIPTION		LOCATION		WELL INFORMATION		
Facilities Selected						
FACILITY DESCRIPTION		LOCATION		PIT INFORMATION		
				Type	Unlined	Status
Water Wells Selected From Map						
Filter Results by Depth Greater than <i>200</i>				Filter		
WELL DESCRIPTION		LOCATION		WELL INFORMATION		
				Depth	Top Perf	Bottom Perf
Receipt=0530298 Permit=0259921-- STRAIT JANELLE		NESE 28 1S-64W		435	275	415 KA
Receipt=0446729 Permit=0218695-- CIMYOTT MARGARET J <i>LOWER ARAPAHOE</i>		NESE 29 1S-64W		<i>760</i>	520	760 LKA
Receipt=0495417, Permit=0244247-- BRITTON JAMES V & SHARON A		NENE 33 1S-64W		400	300	400 UKA
Receipt=0492132, Permit=0242015-- BROGDON DAVID & KELLY		NENE 33 1S-64W		400	280	400 UKA
Receipt=0519810, Permit=0255213-- GRANDSTAFF KERRY R & TAMMY L		SENE 33 1S-64W		420	300	420 KA
Receipt=0501803, Permit=0245962-- PENCIL BECKY		SWNE 33 1S-64W		480	280	480 UKA
Receipt=0503322, Permit=0247294-- WERNER VAN P		SENE 33 1S-64W		535	325	535 UKA
Receipt=0507066, Permit=0252321-- OHLSON GARY <i>LOWER ARAPAHOE</i>		SWNW 33 1S-64W		723	583	723 LKA
Receipt=0399015, Permit=0195159-- VILLALOBOS ELPIDIO		NENE 4 2S-64W		320	180	320 TKD
Receipt=0427474, Permit=0214757-- VILLALOBOS ELPIDIO		NENE 4 2S-64W		320	220	320 GW
Receipt=0439805, Permit=0215656-- HOSMER HAROLD W		NENE 4 2S-64W		240	160	240 TKD
Receipt=0445032, Permit=0218108-- GUTIERREZ HUGO		NENE 4 2S-64W		270	110	270 TKD
Receipt=0434155, Permit=0212797-- BEAUCHAMP GAYLE LYNNE		NENE 4 2S-64W		540	340	540 UKA
Receipt=0381615A, Permit=0185715-- SPENCER L GARY		SWNW 4 2S-64W		560	360	560 KA
Receipt=9003955, Permit=0050947-- PRINCE CATHERINE		SWNW 4 2S-64W		300	195	300 GW
Receipt=0429915 Permit=0210963-- DESHAZER MARGARET J		SENE 5 2S-64W		460	300	460 UKA

SCHLUMBERGER INDUCTION ELECTRICAL LOG



00953568

COUNTY ADAMS
FIELD or JAMBOREE
LOCATION SEC. 33-1S-64W
WELL UPRR NO. 23 PAN AMERICAN "B" 1
COMPANY PAN AMERICAN

COMPANY PAN AMERICAN PETROLEUM CORPORATION
WELL UPRR NO. 23 PAN AMERICAN "B" 1
FIELD JAMBOREE 001-06230
COUNTY ADAMS STATE COLORADO
LOCATION SW NW 5
Sec. 33 Twp. 1S Rge. 64W

Other Services:
FDC/GR
SNP/GR

Permanent Datum: G.L., Elev. 5269
Log Measured From K.B., 10 Ft. Above Perm. Datum
Drilling Measured From K.B.

Elev.: K.B. 5279
D.F. ---
G.L. 5269

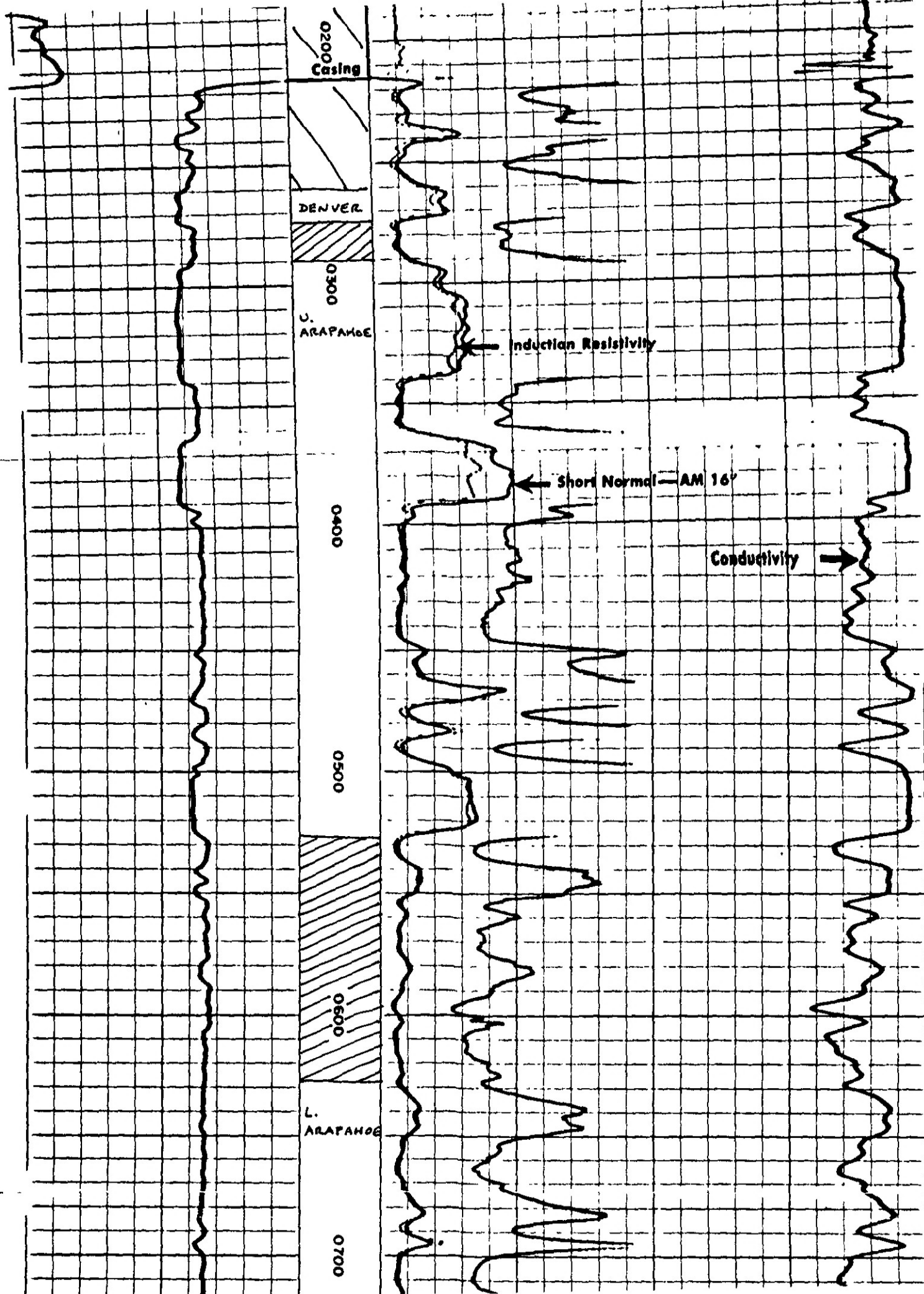
RECEIVED

Date 12-7-70
Run No. ONE JUL 13 1973
Depth—Driller 8065
Depth—Logger 8065
Btm. Log Interval 8064
Top Log Interval 215
Casing—Driller 8-5/8@ 211
Casing—Logger 215
Bit Size 7-7/8
Type Fluid in Hole GM
Dens. Visc. 10.1 100
pH Fluid Loss 8.0 8.6 ml
Source of Sample FLOW LINE
R_m @ Meas. Temp 3.40 @ 70 °F
R_{mt} @ Meas. Temp 3.64 @ 65 °F
R_{mc} @ Meas. Temp --- @ --- °F
Source R_{mt} R_{mc} M ---
R_m @ BHT 1.36 @ 175 °F
Time Since Circ. 2.5 HOURS
Max. Rec Temp. 175 °F
Equip. Location 4530 FM
Recorded By LEBACK, STOWELL
Witnessed By ADAMS MC MILLIAN

The well name, location and borehole reference data were furnished by the customer

REMARKS

Changes in Mud Type or Additional Samples				Scale Changes			
Date	Sample No.	Depth—Driller	Type Fluid in Hole	Type Log	Depth	Scale Up Hole	Scale Down Hole
Dens.	Visc.	ph	Fluid Loss				
Source of Sample							
R _m @ Meas. Temp				Run No.	Tool Type	Tool Position	Other
R _{mt} @ Meas. Temp							
R _{mc} @ Meas. Temp							
Source R _{mt} R _{mc}							
R _m @ BHT							
R _{mt} @ BHT							
R _{mc} @ BHT							
Run No.: ONE				C.D.: NOT USED			
S.O.: ZERO							
Equip. PANEL No.: TRP 589 N							
Used: CART. No.: IRC 520 F							



L.
ΑΙΓΑΡΑΝΟΣ

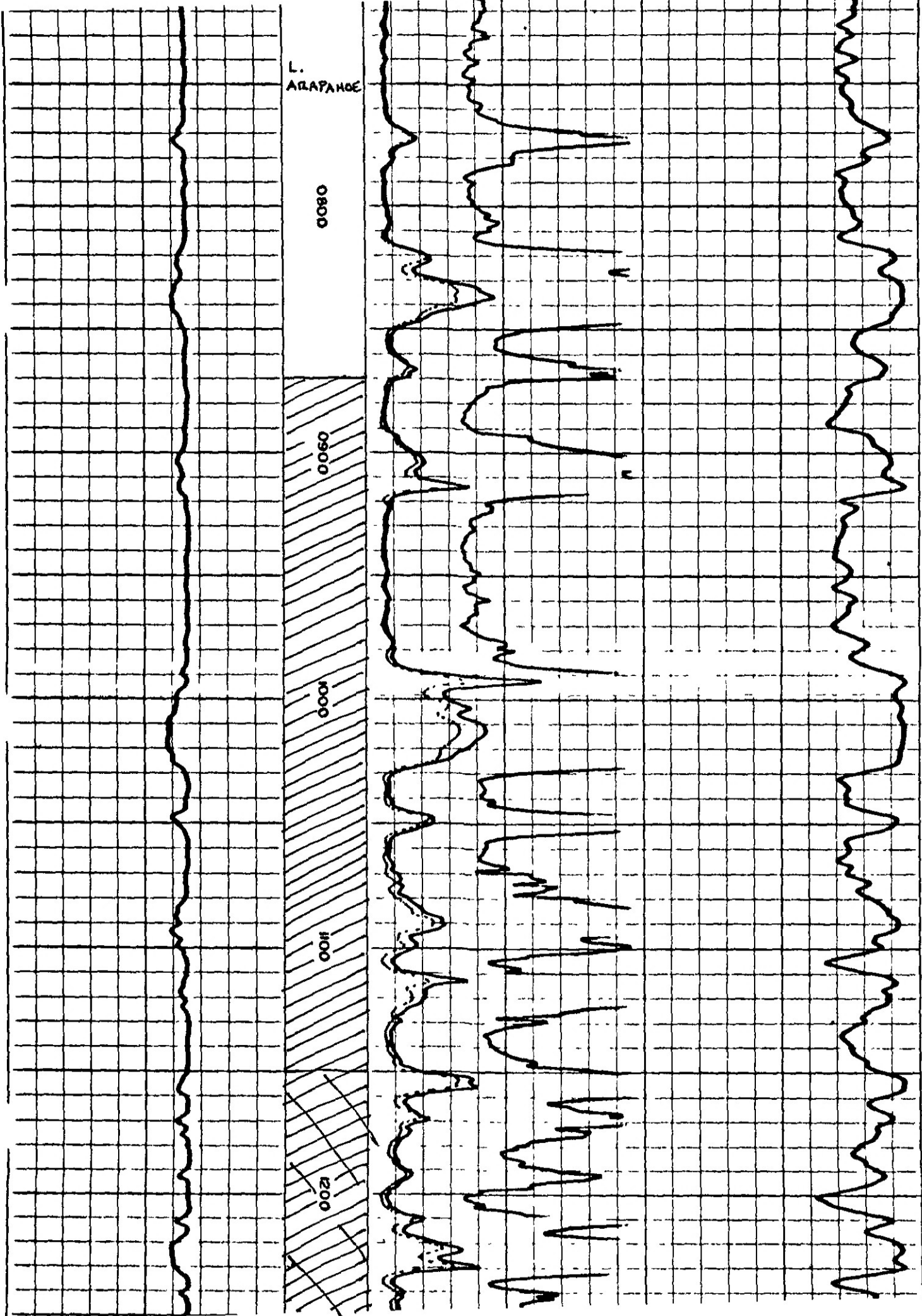
0800

0060

0000

0000

0020



Fax
HILLS

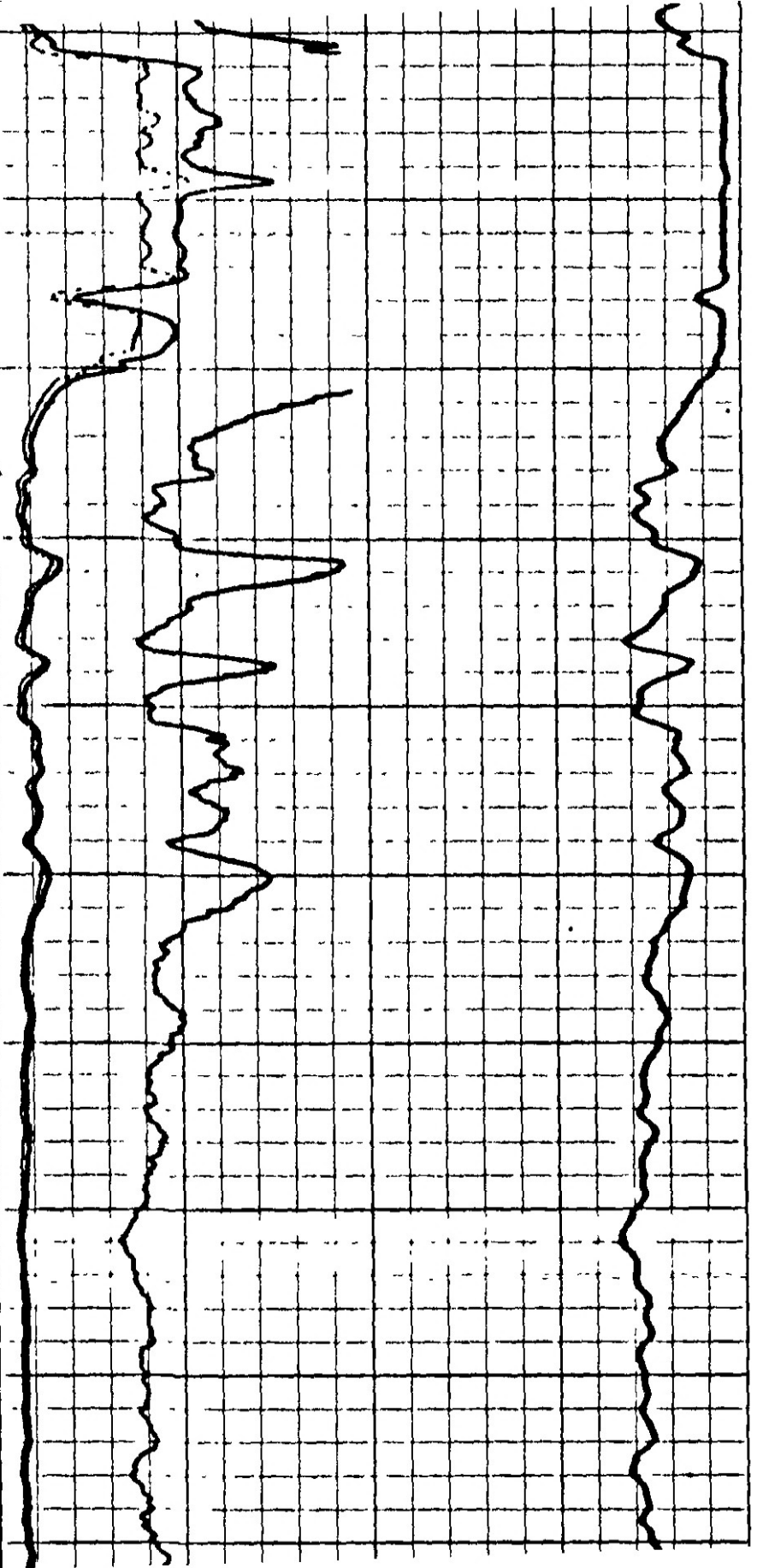
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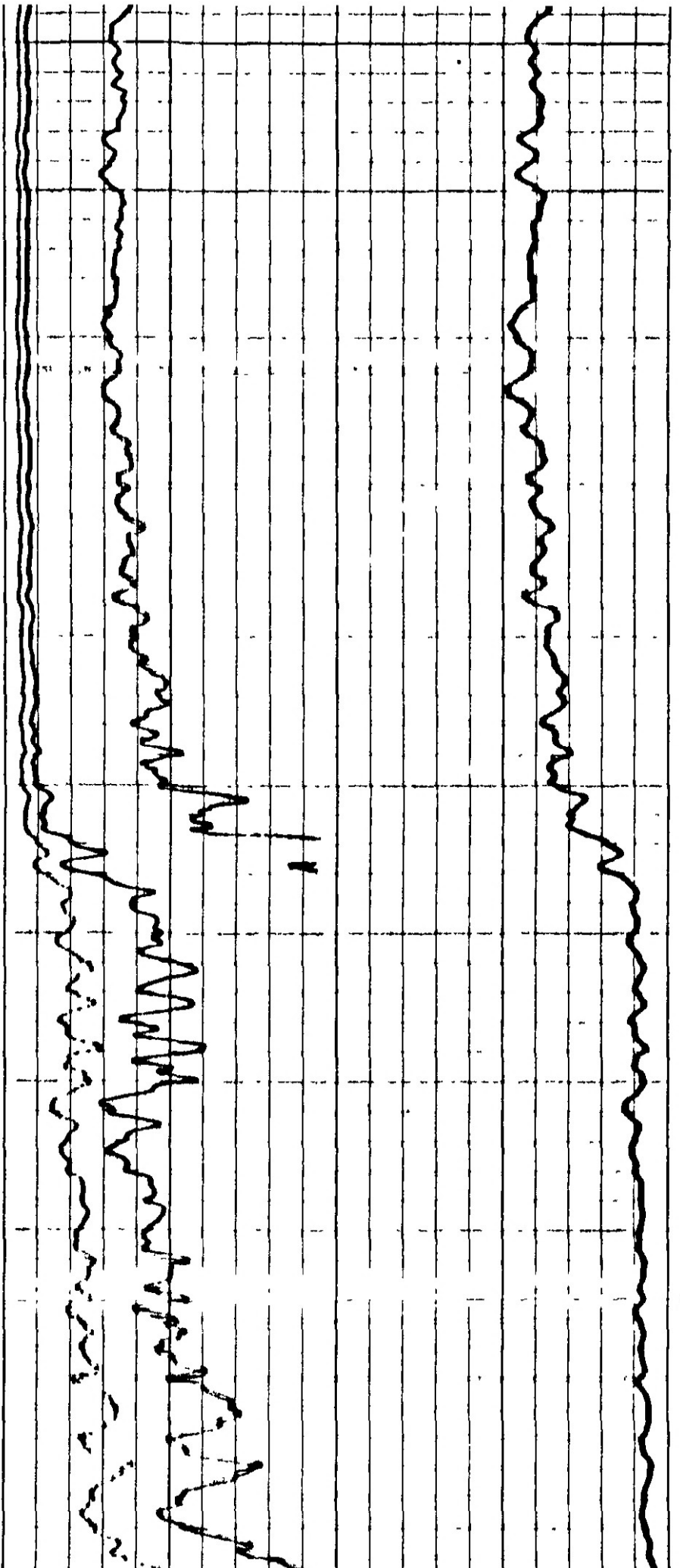
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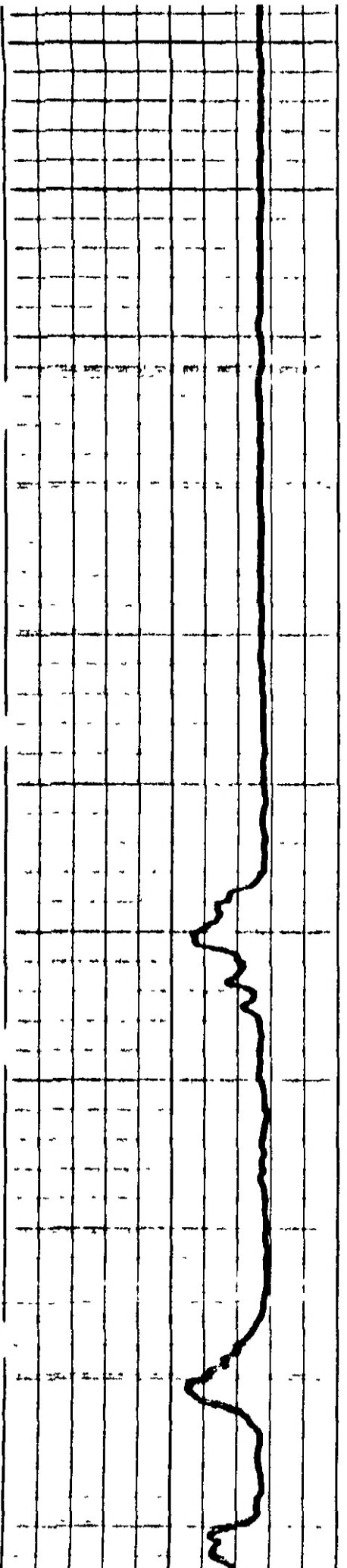
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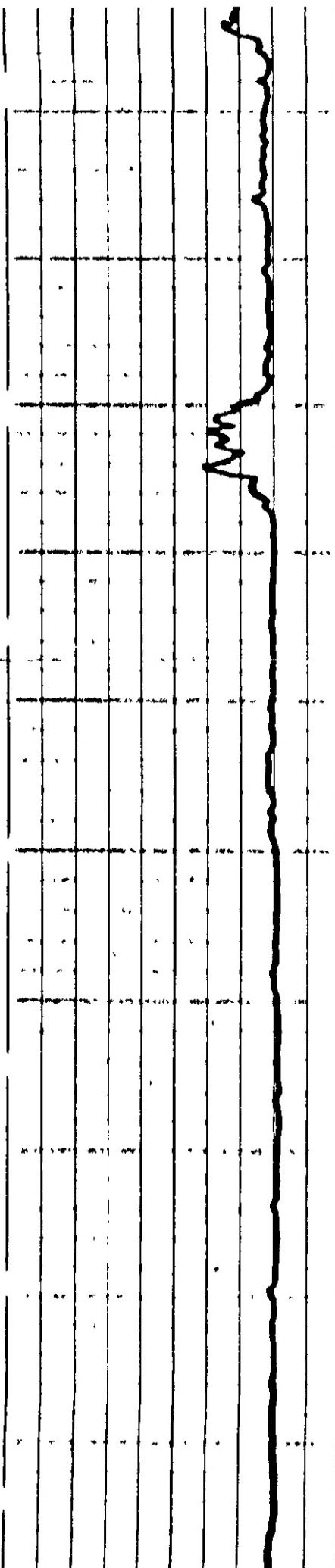
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6800 6900 7000 7100 7200 7300





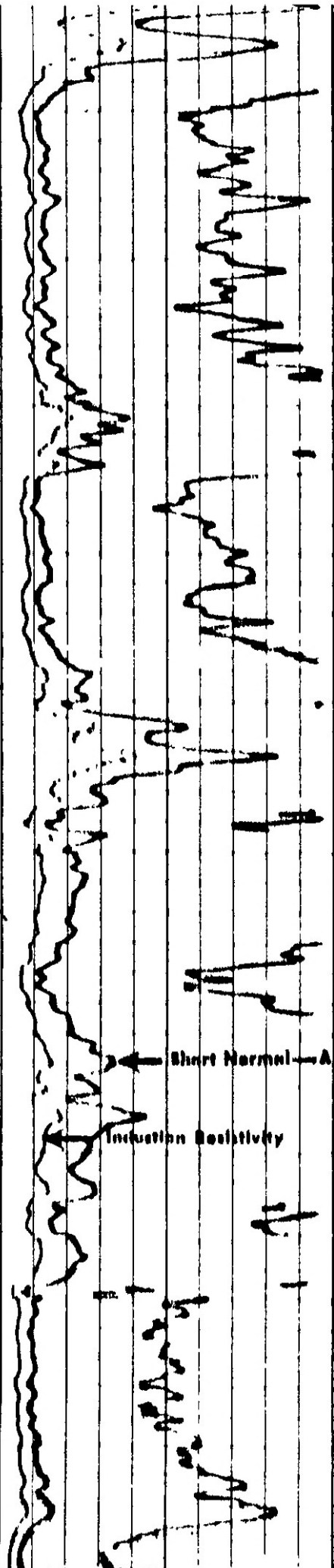
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7500

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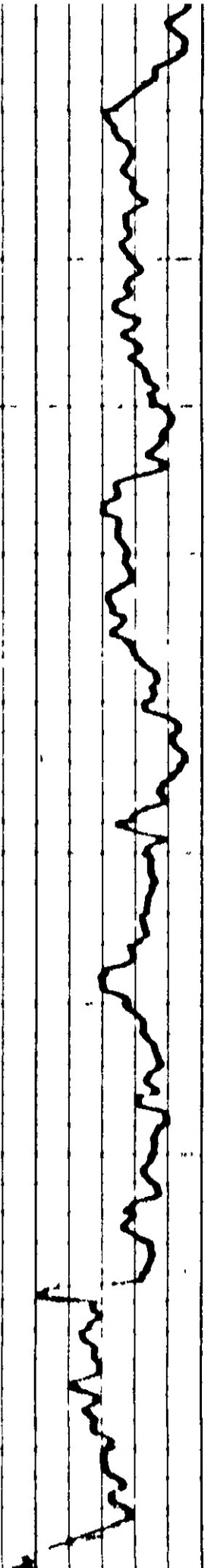
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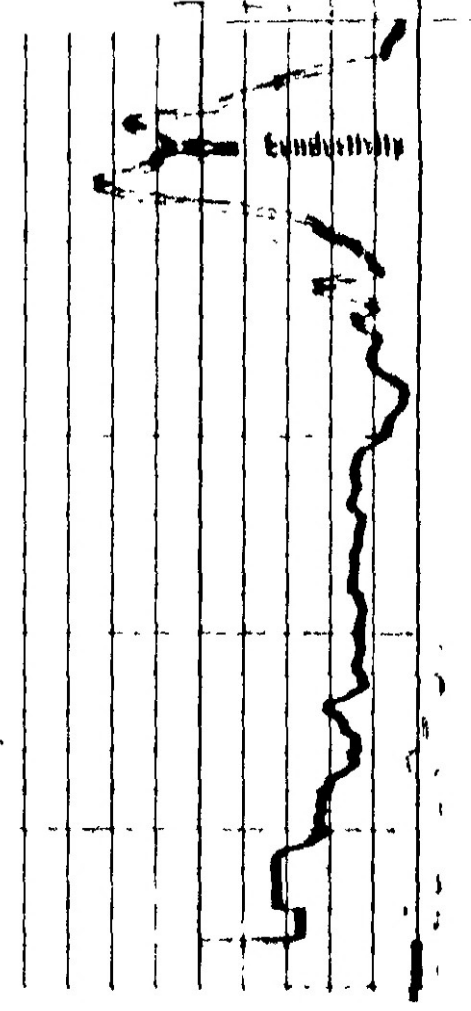
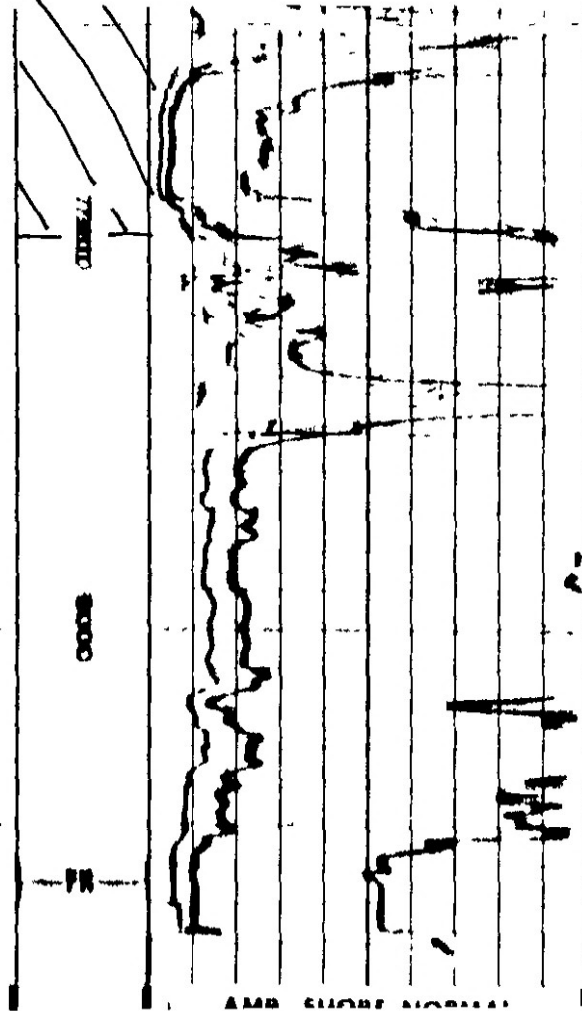
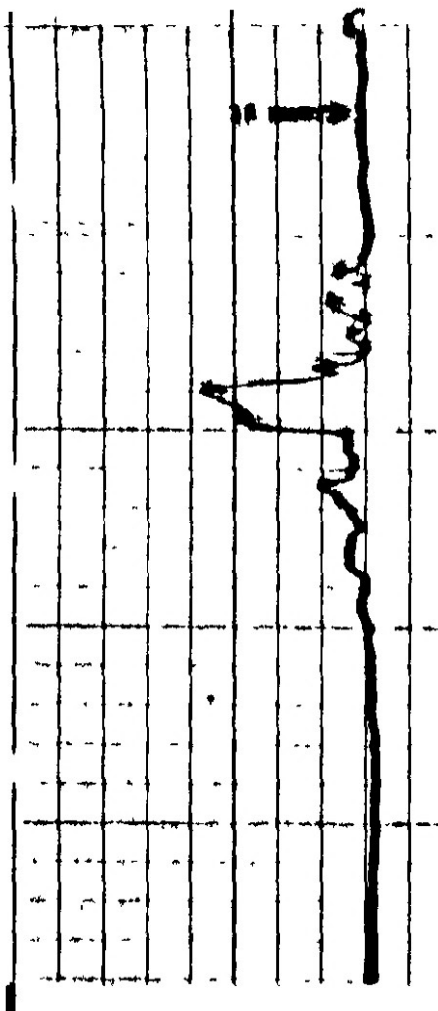
7800



Short Normal - AM 10"

Induction Reactivity







DEPARTMENT OF NATURAL RESOURCES

Bill Ritter, Jr., Governor
1120 Lincoln St., Suite 801
Denver, CO 80203
Phone: (303) 894-2100
FAX: (303) 894-2109
www.cogcc.state.co.us

May 16, 2008

Mr. Gary Ohlson
36105 124th Avenue
Brighton, Colorado 80601

RE: Water Quality Analytical Results for Your Water Well (Permit No. 269807) and Investigation Status
Section 33 – Township 1 South – Range 64 West
Adams County, Colorado; Complaint No. 200095139

Dear Mr. Ohlson:

On March 18, 2008, Mary Johnson of Leppert Associates, Inc., of Golden, Colorado (Leppert) under direction of the Colorado Oil and Gas Conservation Commission (COGCC) sampled your water well and submitted these samples for laboratory analysis. Ms. Johnson collected the samples during our field investigation to uncover the wellhead for the abandoned **UPRR Pan AM B#1 oil and gas production well located on your property**. I have attached a letter report from Leppert that discusses the field investigation findings.

The purpose of this water sampling was to determine if natural gas drilling and production activities in your area might have impacted your well water. As you are aware, the COGCC has previously sampled your water well (September 25, 2006). This letter summarizes the analytical laboratory results of the most recent sampling (March 18, 2008) with the previous sample results. The water sample was submitted to Test America, Inc. (TA) in Arvada, Colorado, for analysis of inorganic chemical constituents, organic compounds associated with petroleum hydrocarbons, methane gas, and pH. A copy of the TA laboratory analytical report is enclosed.

The Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and Environment (CDPHE) has established drinking water standards for the protection of human health. The analytical results from the water samples from your well have been compared to applicable ground water and/or drinking water standards and are summarized below. **Please keep in mind that these water standards were established for public drinking water supplies. Often people use and consume ground water from private wells that can exceed these standards.**

COMPARISON OF INORGANIC ANALYTICAL RESULTS TO STANDARDS
(Please see enclosed STL Report Laboratory Report)

- **Total Dissolved Solids (TDS):** CDPHE has established a TDS standard for human drinking water of 500 milligrams per liter (mg/l). The standard is called the secondary maximum contaminant level (SMCL) and is based on the aesthetic quality of the water (such as taste and

DEPARTMENT OF NATURAL RESOURCES: Harris Sherman, Executive Director

COGCC COMMISSION: Richard Alward - Thomas L. Compton - Mark Cutright - Michael Dowling - Joshua B. Epel - Kimberlee Gerhardt - Trési Houpt - Jim Martin - Harris Sherman
COGCC STAFF: David Neslin, Acting Director - Debbie Baldwin, Environmental Manager - Patricia C. Beaver, Hearings Manager - David K. Dillon, Engineering Manager

odor) and is intended as a guideline for public water supply systems and is not an enforceable standard. Although CDPHE does not have an agricultural standard for TDS, other agencies recommend concentrations below 2,000 mg/l for irrigation, and below 5,000 mg/l for most livestock watering. TDS concentrations are related to the presence of naturally occurring elements and chemical compounds such as chloride, sodium, potassium, calcium, magnesium, and sulfate.

TDS was detected in the water samples from your well at concentrations of 770 mg/l, which is above the CDPHE SMCL, below the recommended maximum concentration for irrigation, and below the recommended maximum concentration for most livestock watering. The previous concentration of TDS in your well was 740 mg/l (September 2006).

- Sodium (Na): Although CDPHE does not have a standard for sodium, people on salt restricted diets should be aware of the Na concentration in the water they drink. A concentration of drinking water with a concentration of sodium less than 20 mg/l is recommended by some for people on salt restricted diets or for people suffering from hypertension or heart disease. Sodium occurs naturally in the ground water in many areas at concentrations that exceed the recommended level.

Sodium was detected in the water sample from your well at a concentration of 250 mg/l, which is greater than the recommended level for people of salt restricted diets. The previous concentration of sodium in your well was 260 mg/l (September 2006).

- Fluoride (F): CDPHE has established a fluoride (F) standard for human drinking water is 4.0 mg/l. Where fluoride concentrations are in the range of 0.7 mg/l to 1.2 mg/l, health benefits such as reduced dental decay have been observed. Consumption of fluoride at concentrations of greater than 2.0 mg/l can result in mottling of teeth. Consumption of fluoride at concentrations greater than 4.0 mg/l can increase the risk of skeletal fluorosis or other adverse health effects.

Fluoride was detected in the water sample from your well at a concentration of 0.67 mg/l, which is below the CDPHE drinking water standard. The previous concentration of fluoride in your well was 0.72 mg/l (September 2006).

- Chloride (Cl): The CDPHE chloride standard (SMCL) for drinking water is 250 mg/l. Chloride concentrations in excess of 250 mg/l usually produce a noticeable taste in drinking water.

Chloride was detected in the water sample from your well at a concentration of 50 mg/l, which is below the CDPHE SMCL drinking water standard. The previous concentration of chloride in your well was 46 mg/l (September 2006).

- **Sulfate (SO_4):** The CDPHE sulfate standard for drinking water is 250 mg/l (SMCL). Although CDPHE does not have an agricultural standard for sulfate, other agencies recommend a concentration below 1,500 mg/l for livestock watering. Waters containing high concentrations of sulfate, typically caused by the leaching of natural deposits of magnesium sulfate (Epsom salts) or sodium sulfate (Glauber's salt), may be undesirable because of their laxative effects. Sulfate occurs naturally in the ground water in many areas in Colorado at concentrations that exceed the drinking water standard.

Sulfate was detected in the water sample from your well at a concentration of 410 mg/l, which is above the CDPHE SMCL water standard and below the recommended concentration for livestock watering. The previous concentration of sulfate in your well was 350 mg/l (September 2006).

- **Total Nitrate (NO_3) + Nitrite (NO_2) as Nitrogen (N):** The CDPHE total nitrate (NO_3) + nitrite (NO_2) as nitrogen (N) for standard for human drinking water is 10 mg/l. Nitrate and nitrite are common contaminants in ground water from agricultural sources, such as fertilizer and animal, including human, wastes. They are known to cause infant cyanosis or "blue baby disease" in humans and, at concentrations greater than 100 mg/l as nitrogen (N), may be dangerous to livestock. High concentrations of nitrate and nitrite in ground water are known to occur in agricultural areas in Colorado.

Total nitrate/nitrite, as N was not detected in the water sample from your well in this or the previous sampling.

- **Selenium (Se):** The CDPHE selenium standard for human drinking water is 0.05 mg/l and the agricultural standard is 0.02 mg/l. Excessive selenium (Se) (concentrations greater than 0.05 mg/l) can cause loss of hair and/or fingernails as well as adverse effects on the central nervous system. Selenium (Se) occurs naturally in the ground water in many areas of Colorado at concentrations that exceed the drinking water standard.

Selenium was not detected in the water sample from your well in this or the previous sampling.

Calcium (Ca), Potassium (K), Magnesium (Mg), Bicarbonate (HCO_3) and Carbonate (CO_3) were also tested for in your water. There are no standards from CDPHE for these parameters. In addition, the COGCC also collected samples for metals and the Table 1 (attached) presents the analytical laboratory results. Please note that Primary standard (P) is the CDPHE Human Health Standard and the Secondary standard (S) is the CDPHE secondary maximum contaminant level (SMCL).

Table 1
OHLSON WATER WELL

METAL / INORGANIC	3/18/2008 Sample Concentration (in Milligrams per liter [mg/l])	9/25/2006 Sample Concentration (in mg/l)	CDPHE Water Quality Standard (P – Primary S-Secondary) (in mg/l)
Barium (Ba)	0.018	0.019	2.0 (P)
Calcium (Ca)	10	9.9	NS
Iron (Fe)	0.17	0.38	0.3 (S)
Manganese (Mn)	0.022	0.018	0.05 (S)
Magnesium (Mg)	1.0	0.9	NS
pH	8.6 pH units	9 pH units	NS

NS – no standard

ND – not detected in the sample

CDPHE – Colorado Department of Public Health and Environment

ORGANIC COMPOUNDS ASSOCIATED WITH PETROLEUM HYDROCARBONS

(please see enclosed STL METHOD E 602/SW 8021B, BTEX DATA REPORT)

- Benzene: CDPHE's basic ground water standard for benzene is 5 micrograms per liter ($\mu\text{g/l}$). **Benzene was not detected in the samples from your water well for this or the previous sampling.**
- Toluene: CDPHE's basic ground water standard for toluene is 1,000 $\mu\text{g/l}$. **Toluene was detected in the sample at a concentration of 1.6 $\mu\text{g/l}$ from your water well, which does not exceed the ground water standard. The previous sampling (September 2006) had a toluene concentration of 31 $\mu\text{g/l}$.** There has been a dramatic decrease in the concentration of toluene in your well water since 2006, which I believe demonstrates my earlier conclusion that the presence of toluene in your water well is due to introduction by the drilling of toluene containing materials during the original drilling and installation of your well and not due to any impact from oil & gas production wells in your area.
- Ethylbenzene: CDPHE's basic ground water standard for ethylbenzene is 680 $\mu\text{g/l}$. **Ethylbenzene was not detected in the sample from your water well for this or the previous sampling.**
- Total Xylenes (sum of m,p, and o-xylene): CDPHE's basic ground water standard for total xylenes is 10,000 $\mu\text{g/l}$. **Total xylenes were not detected in the samples from your water well for this or the previous sampling.**

METHANE GAS CONCENTRATION

- **Methane was detected in the sample from your water well at a concentration of 0.0087 mg/l. Methane was not detected in the sample collected in 2006.**

Methane gas alone is physiologically inert and non-toxic to humans. Normal breath exhalation contains 1 to 99 ppm of methane (parts per million [ppm] is the same units as mg/l). The presence of methane in drinking water does not present a known health hazard to humans or other animals via ingestion; however, methane in domestic water supplies can be associated with undesirable and potentially serious side effects. Methane gas dissolved in water “exsolves” when exposed to the atmosphere and dissipates rapidly because it is lighter than air. This is often responsible for the “fizzing” observed in water wells that may contain methane gas. If the methane occurs at a high enough concentration and if it is allowed to accumulate in a confined space, such as a well pit, crawl space, closet, etc., an explosion hazard can be established. In addition, if methane concentrations in well water are high, then pockets of free gas form within the water and cause the well pump to cavitate and no longer bring water to the surface.

Methane gas is common in water wells in Colorado. It occurs naturally and the source of the methane is commonly from one or more of the sources listed below.

1. Methane is commonly found as a gas in coal or black shale seams in the subsurface.
2. Methane is commonly found as a byproduct of the decay of organic matter and the presence of bacteria in water wells can provide the conditions favorable for the production of methane either from the activity or decay of bacteria.

As the result of extensive testing for methane gas in water wells throughout Colorado, concentrations of methane gas below 1 mg/l are considered harmless, with concern for possible hazards from the methane increasing at concentration levels in well water at 7 mg/l and higher

CONCLUSION

Water Well Water Quality – As with the September 2006 sampling results, there are no indications of any oil & gas related impact to your water well water quality observed in the most recent March 2008 sample. Because your water well exceeded the health advisory for individuals on salt restricted diets for sodium (Na) and the CDPHE public drinking water supply standards (SMCL) for sulfate (SO₄) and total dissolved solids (TDS), and because you or your livestock and/or pets drink your water, you may wish to discuss the possible health effects of continued consumption with your physician and/or veterinarian

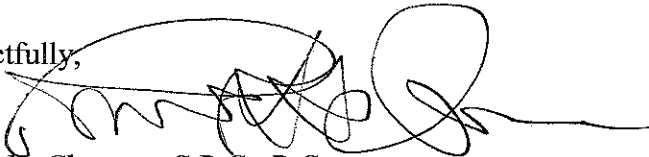
Wellhead Excavation – As you are aware, the effort to uncover the former UPRR Pan AM B#1 wellhead was not successful. It appears that the location of the wellhead is in the approximate area previously identified by our well records and substantiated by evidence of the well drilling (dried drilling mud and cement residue); however, we could not pinpoint the exact location. After

substantial excavation did not uncover the wellhead, I elected to cease further digging and disruption in the area until additional verification of the wellhead location could be conducted. The excavation pit was immediately backfilled and compacted to minimize land disruption.

I am in the process of obtaining a geophysical contractor to conduct a more sophisticated survey in the area to pinpoint the wellhead location for excavation and inspection. As with the earlier work, I anticipate the actual survey and excavation to only take a few hours total. The geophysical survey involves walking several handheld instruments over the ground to collect the information and a few office days to conduct a data review to determine the wellhead location. The excavation will likely only take a few hours including any necessary utility locates. It is my hope to be able to conduct this work within the next 30 days.

If you have any questions or would like to discuss these matters further, please contact me at the COGCC in Denver via e-mail (robert.chesson@state.co.us) or by phone at 303-894-2100, extension 112.

Respectfully,

A handwritten signature in black ink, appearing to read 'Robert H. Chesson', with a large, stylized flourish extending to the right.

Robert H. Chesson, C.P.G., P.G.
Environmental Protection Specialist

Enclosures

cc: Debbie Baldwin – COGCC w/o enclosures
Randall Ferguson– COGCC w/o enclosures

TestAmerica

Invoice

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002

Tel: (303) 421-6611
Fax: (303) 431-7171

REMIT TO: TESTAMERICA LABORATORIES, INC.
Dept 2314
P.O. Box 122314
Dallas, TX 75312-2314

Bill To: Accounts Payable
Colorado Oil&Gas Conservation Commission
1120 Lincoln St.
Suite 801
Denver, CO 80203

Number	28011439	Date	04 APR 08
TA Project Number	D8C180299	Customer Number	01355607
Terms	NET 30 DAYS		

Customer Contact
SAMPLE RECEIVING DATE : 3/18/08
REPORT DATE : 4/04/08
Bob Chesson

Colorado Oil&Gas Conservation Commission
1120 Lincoln St.
Suite 801
Denver, CO 80203

Line No.	Qty.	Matrix Code	Analysis Description	Unit Price	Extended Price
1		WATER	WATER, 200.7, Metals (7)	56.00	56.00
1		WATER	WATER, 6010B, Metals (7)	56.00	56.00
1		WATER	WATER, 120.1, Conductance	12.00	12.00
1		WATER	WATER, 150.1, pH	10.00	10.00
1		WATER	WATER, 160.1, TDS	16.00	16.00
1		WATER	WATER, 353.2, Nitrate-Nitrite	25.00	25.00
1		WATER	WATER, 300.0A, Chloride	16.00	16.00
1		WATER	WATER, 300.0A, Sulfate	16.00	16.00
1		WATER	WATER, 300.0A, Fluoride	16.00	16.00
1		WATER	WATER, 300.0A, Bromide	16.00	16.00
1		WATER	WATER, 310.1, Alkalinity, Total	15.00	15.00
1		WATER	WATER, 8260B, BTEX+MTBE (Unpreserved)	90.00	90.00
1		WATER	WATER, RSK-175, Methane (Unpreserved)	75.00	75.00

P.O. OE PHA 08000000020
OHLSON PROPERTY, ADAMS County, CO

COMPLAINT #

#200095139

OHLSON WATER WELL
ADAMS COUNTY

I HEREBY CERTIFY THAT I HAVE RECEIVED THE
ARTICLES LISTED ABOVE, THAT I HAVE CAREFULLY
INSPECTED, WEIGHED, COUNTED OR MEASURED THE
COMMODITIES AND FOUND THEM IN GOOD CONDITION
AND COMPLYING WITH THE SPECIFICATIONS OR THAT
THE SERVICES WERE SATISFACTORY, EXCEPT AS NOTED.

SIGNATURE

DATE

4/14/08

NOTE: Applicable samples will be stored at no extra charge for a period of 30 days following the final report. Samples will be properly disposed of after 30 days, unless notified otherwise in writing.

Please reference Invoice number when remitting.

Customer P.O. Number / Contact Number / Reference

P.O. OE PHA 08000000020//OHLSON PROPERTY, ADAMS CI

Patrick J. McEntee

ORIGINAL

Sub Total
Tax
Total

419.00

RECEIVED

APR 08 2008

COGCC

ANALYTICAL REPORT

Project: Ohlson Property, Adams County, CO

Lot #: D8C180299

Bob Chesson

Colorado Oil & Gas Conservation Commission
1120 Lincoln St.
Suite 801
Denver, CO 80203

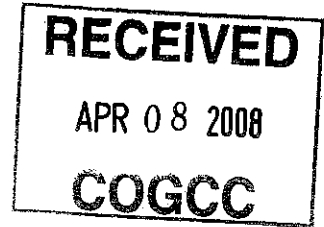


Patrick J. McEntee
Project Manager

April 4, 2008

Table of Contents

Standard Deliverables



Report Contents

Total Number of Pages

Standard Deliverables

The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.

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- **Table of Contents**
- **Case Narrative**
- **Executive Summary – Detection Highlights**
- **Methods Summary**
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- **Analytical Results**
- **QC Data Association Summary**
- **QC Evaluation and/or Data Reports**
- **Chain-of-Custody**

Case Narrative

The results included in this report have been reviewed for compliance with TestAmerica Laboratories, Inc. Quality Assurance/Quality Control (QA/QC) plan. The test results relate only to the samples in this report and meet all requirements of NELAC with any exceptions noted below.

Dilution factors and footnotes have been provided to assist in the interpretation of the results. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interferences or analytes present at concentrations above the linear calibration curve, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica Laboratories, Inc. utilizes USEPA approved methods in all analytical work. The sample presented in this report was analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. A summary of quality control parameters is provided below.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Quality Control Summary for Lot D8C180299

Sample Receiving

TestAmerica Denver received one aqueous sample under chain of custody on March 18, 2008.

The sample was received at a temperature of 2.3°C and without ice.

All sample containers were received intact.

GC/MS Volatiles, Method SW846 8260B

MS/MSD analyses were performed on a sample from another client and/or lot and were in control.

Dissolved Methane Analysis by GC, Method RSK SOP-175

MS/MSD analyses could not be performed for the batch due to insufficient sample volume submitted. Method precision and accuracy have been verified by the acceptable LCS/LCSD analysis data.

Total Metals Analysis, Method MCAWW 200.7/6010B

Method 6010B MS/MSD analyses were performed on a sample from another client and/or lot and were not in control. The acceptable LCS analysis data indicated that the analytical system was operating within control; therefore, corrective action is deemed unnecessary. The Serial dilution performed on this sample indicates that physical and chemical interferences are present for iron in analytical batch 8082114. Results in the analytical report have been flagged with an "L".

General Chemistry

Nitrate MS/MSD analyses were performed on a sample from another client and/or lot. The MS exhibited spike compound recoveries outside the QC limits. Method precision and accuracy have been verified by the acceptable LCS/LCSD analysis data; therefore, corrective action is deemed unnecessary.

EXECUTIVE SUMMARY - Detection Highlights

D8C180299

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
OHLSON 1 03/18/08 10:06 001				
Methane	8.7	5.0	ug/L	RSK SOP-175
Barium	18	10	ug/L	MCAWW 200.7
Manganese	22	10	ug/L	MCAWW 200.7
Iron	170 L	100	ug/L	SW846 6010B
Calcium	10000	200	ug/L	SW846 6010B
Magnesium	1000	200	ug/L	SW846 6010B
Sodium	250000	1000	ug/L	SW846 6010B
Toluene	1.6	1.0	ug/L	SW846 8260B
Specific Conductance	1300	2.0	umhos/cm	MCAWW 120.1
pH	8.6	0.10	No Units	MCAWW 150.1
Total Dissolved Solids	770	10	mg/L	MCAWW 160.1
Chloride	50	3.0	mg/L	MCAWW 300.0A
Sulfate	410 Q	50	mg/L	MCAWW 300.0A
Fluoride	0.67	0.50	mg/L	MCAWW 300.0A
Bromide	0.46	0.20	mg/L	MCAWW 300.0A
Bicarbonate, as CaCO3	150	5.0	mg/L	MCAWW 310.1
Total Alkalinity	150	5.0	mg/L	MCAWW 310.1

METHODS SUMMARY

D8C180299

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
pH (Electrometric)	MCAWW 150.1	MCAWW 150.1
Alkalinity	MCAWW 310.1	MCAWW 310.1
Bicarbonate Alkalinity	MCAWW 310.1	MCAWW 310.1
Bromide	MCAWW 300.0A	MCAWW 300.0A
Carbonate Alkalinity	MCAWW 310.1	MCAWW 310.1
Chloride	MCAWW 300.0A	MCAWW 300.0A
Dissolved Gasses in Water	RSK SOP-175	
Filterable Residue (TDS)	MCAWW 160.1	MCAWW 160.1
Fluoride	MCAWW 300.0A	MCAWW 300.0A
Inductively Coupled Plasma (ICP) Metals	MCAWW 200.7	MCAWW 200.7
Inductively Coupled Plasma (ICP) Metals	SW846 6010B	SW846 3005A
Nitrate-Nitrite	MCAWW 353.2	MCAWW 353.2
Specific Conductance	MCAWW 120.1	MCAWW 120.1
Sulfate	MCAWW 300.0A	MCAWW 300.0A
Volatile Organics by GC/MS	SW846 8260B	SW846 5030B

References:

- MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.
- RSK Sample Prep and Calculations for Dissolved Gas Analysis in Water Samples Using a GC Headspace Equilibration Technique, RSKSOP-175, REV. 0, 8/11/94, USEPA Research Lab
- SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

METHOD / ANALYST SUMMARY

D8C180299

ANALYTICAL METHOD	ANALYST	ANALYST ID
MCAWW 120.1	Keri Dwire	008821
MCAWW 150.1	Sarah Lambert	005039
MCAWW 160.1	ReAnna Davis	002266
MCAWW 200.7	David Wells	5099
MCAWW 300.0A	Eva Jonska-Muteba	004988
MCAWW 300.0A	Eva Jonska-Muteba	4988
MCAWW 300.0A	Ewa Kudla	001167
MCAWW 310.1	Keri Dwire	008821
MCAWW 353.2	Kevin Bloom	006134
RSK SOP-175	Adam Pavlakovich	003128
SW846 6010B	Lynn-Anne Trudell	006645
SW846 8260B	Greg Meier	006004

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes",
EPA-600/4-79-020, March 1983 and subsequent revisions.

RSK Sample Prep and Calculations for Dissolved Gas Analysis
in Water Samples Using a GC Headspace Equilibration
Technique, RSKSOP-175, REV. 0, 8/11/94, USEPA Research Lab

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical
Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

D8C180299

WO #	SAMPLE#	CLIENT	SAMPLE ID	SAMPLED DATE	SAMP TIME
KJTEV	001	OHLSON	1	03/18/08	10:06

NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Colorado Oil&Gas Conservation Commission

Client Sample ID: OHLSON 1

GC/MS Volatiles

Lot-Sample #....: D8C180299-001 **Work Order #....:** KJTEV1AM **Matrix.....:** WATER
Date Sampled....: 03/18/08 10:06 **Date Received...:** 03/18/08
Prep Date.....: 03/25/08 **Analysis Date...:** 03/25/08
Prep Batch #....: 8086265 **Analysis Time...:** 12:06
Dilution Factor: 1

Method.....: SW846 8260B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.0	ug/L
Ethylbenzene	ND	1.0	ug/L
Methyl tert-butyl ether	ND	5.0	ug/L
Toluene	1.6	1.0	ug/L
Xylenes (total)	ND	2.0	ug/L

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Dibromofluoromethane	108	(79 - 119)
1,2-Dichloroethane-d4	106	(65 - 126)
4-Bromofluorobenzene	102	(75 - 115)
Toluene-d8	101	(78 - 118)

Data File: /chem/R1.i/032508.b/r3149.d
Report Date: 26-Mar-2008 06:18

Page 1

TestAmerica-Denver

VOLATILE REPORT SW-846

Data file : /chem/R1.i/032508.b/r3149.d
Lab Smp Id: KJTEVIAM Client Smp ID: OHLSON 1
Inj Date : 25-MAR-2008 12:06
Operator : meierg Inst ID: R1.i
Smp Info : KJTEVIAM,,D8C180299-01 PH=7
Misc Info :
Comment :
Method : /chem/R1.i/032508.b/8260B-H2O.m
Meth Date : 26-Mar-2008 06:17 meierg Quant Type: ISTD
Cal Date : 06-MAR-2008 11:21 Cal File: r2572.d
Als bottle: 2
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: qk-01.sub
Target Version: 3.50
Processing Host: densvr05

Concentration Formula: Amt * DF * Vp/Vs * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Vp	20.00000	Purge Volume (mL)
Vs	20.00000	Sample Volume purged (mL)

Am 3/26

Cpnd Variable

Local Compound Variable

Compounds	QUANT SIG						CONCENTRATIONS	
		MASS	RT	EXP RT	REL RT	RESPONSE	ON-COLUMN (ug/L)	FINAL (ug/L)
* 57 Fluorobenzene	96		7.810	7.817	(1.000)	953630	10.0000	
* 82 Chlorobenzene-d5	119		10.074	10.074	(1.000)	164404	10.0000	
* 107 1,4-Dichlorobenzene-d4	152		11.922	11.922	(1.000)	235775	10.0000	(Q)
\$ 46 Dibromofluoromethane	111		7.252	7.259	(0.928)	185767	10.7604	10.7604
\$ 52 1,2-Dichloroethane-d4	65		7.545	7.545	(0.966)	135033	10.5583	10.5582
\$ 70 Toluene-d8	98		8.992	8.992	(0.893)	820697	10.0697	10.0697
\$ 93 Bromofluorobenzene	95		10.940	10.940	(1.086)	222470	10.2050	10.2050
M 1 1,2-Dichloroethene (total)	96		Compound Not Detected.					
M 2 Xylene (total)	106		Compound Not Detected.					
3 dichlorodifluoromethane	85		Compound Not Detected.					
4 Dichlorotetrafluoroethane	85		Compound Not Detected.					
5 Chloromethane	50		Compound Not Detected.					
6 Vinyl Chloride	62		Compound Not Detected.					
7 Ethylene Oxide	43		Compound Not Detected.					
8 Bromomethane	94		Compound Not Detected.					

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS	
						ON-COLUMN (ug/L)	FINAL (ug/L)
9 Chloroethane	64				Compound Not Detected.		
10 Dichlorofluoromethane	67				Compound Not Detected.		
11 Trichlorofluoromethane	101				Compound Not Detected.		
12 Ethanol	45				Compound Not Detected.		
13 1,2-dichloro-1,1,2-trifluoro	117				Compound Not Detected.		
14 Ethyl Ether	59				Compound Not Detected.		
15 2,2-dichloro-1,1,1-trifluoro	83				Compound Not Detected.		
16 Acrolein	56				Compound Not Detected.		
17 Acetone	43				Compound Not Detected.		
18 Trichlorotrifluoroethane	151				Compound Not Detected.		
19 2-propanol	45				Compound Not Detected.		
20 1,1-Dichloroethene	96				Compound Not Detected.		
21 Iodomethane	142				Compound Not Detected.		
22 Acetonitrile	41				Compound Not Detected.		
23 Methyl Acetate	43				Compound Not Detected.		
25 Carbon Disulfide	76				Compound Not Detected.		
24 Allyl Chloride	41				Compound Not Detected.		
26 tert-Butyl alcohol	59				Compound Not Detected.		
27 Methylene Chloride	84				Compound Not Detected.		
28 Acrylonitrile	53				Compound Not Detected.		
29 Methyl t-butyl ether	73				Compound Not Detected.		
30 trans-1,2-Dichloroethene	96				Compound Not Detected.		
31 Hexane	57				Compound Not Detected.		
32 Vinyl acetate	43				Compound Not Detected.		
33 Isopropyl ether	87				Compound Not Detected.		
34 1,1-Dichloroethane	63				Compound Not Detected.		
35 Chloroprene	53				Compound Not Detected.		
36 ETBE	59				Compound Not Detected.		
38 2-Butanone	43				Compound Not Detected.		
37 Ethyl Acetate	43				Compound Not Detected.		
40 cis-1,2-Dichloroethene	96				Compound Not Detected.		
39 Propionitrile	54				Compound Not Detected.		
41 2,2-Dichloropropane	77				Compound Not Detected.		
42 Methacrylonitrile	41				Compound Not Detected.		
43 Bromochloromethane	128				Compound Not Detected.		
44 Chloroform	83				Compound Not Detected.		
45 Tetrahydrofuran	42				Compound Not Detected.		
48 1,1,1-Trichloroethane	97				Compound Not Detected.		
47 Isobutanol	41				Compound Not Detected.		
49 Cyclohexane	56				Compound Not Detected.		
50 1,1-Dichloropropene	75				Compound Not Detected.		
51 Carbon Tetrachloride	117				Compound Not Detected.		
53 1,2-Dichloroethane	62				Compound Not Detected.		
55 Benzene	78				Compound Not Detected.		
54 TAME	73				Compound Not Detected.		
56 n-Butanol	56				Compound Not Detected.		
58 Trichloroethene	130				Compound Not Detected.		

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS	
						ON-COLUMN (ug/L)	FINAL (ug/L)
=====	=====	==	=====	=====	=====	=====	=====
59 2-Pentanone	43				Compound Not Detected.		
60 Methyl Methacrylate	100				Compound Not Detected.		
61 1,2-Dichloropropane	63				Compound Not Detected.		
62 Methyl Cyclohexane	55				Compound Not Detected.		
63 1,4-Dioxane	88				Compound Not Detected.		
64 Dibromomethane	93				Compound Not Detected.		
65 Bromodichloromethane	83				Compound Not Detected.		
66 2-nitropropane	41				Compound Not Detected.		
67 2-Chloroethyl vinyl ether	63				Compound Not Detected.		
68 cis-1,3-Dichloropropene	75				Compound Not Detected.		
69 4-Methyl-2-pentanone	43				Compound Not Detected.		
71 Toluene	91	9.042	9.042	(0.898)	186699	1.64718	1.64718
73 trans-1,3-Dichloropropene	75				Compound Not Detected.		
72 Ethyl methacrylate	69				Compound Not Detected.		
74 1,1,2-Trichloroethane	97				Compound Not Detected.		
75 2-Hexanone	43				Compound Not Detected.		
76 1,3-Dichloropropane	76				Compound Not Detected.		
77 Tetrachloroethene	164				Compound Not Detected.		
78 Dibromochloromethane	129				Compound Not Detected.		
79 Tetrahydrothiophene	60				Compound Not Detected.		
80 1,2-Dibromoethane	107				Compound Not Detected.		
81 1-Chlorohexane	91				Compound Not Detected.		
83 Chlorobenzene	112				Compound Not Detected.		
84 1,1,1,2-Tetrachloroethane	131				Compound Not Detected.		
85 Ethylbenzene	106				Compound Not Detected.		
86 m and p-Xylene	106				Compound Not Detected.		
87 o-Xylene	106				Compound Not Detected.		
88 Styrene	104				Compound Not Detected.		
89 Bromoform	173				Compound Not Detected.		
90 isopropyl benzene	105				Compound Not Detected.		
91 cis-1,4-dichloro-2-butene	53				Compound Not Detected.		
92 Cyclohexanone	55				Compound Not Detected.		
94 1,1,2,2-Tetrachloroethane	83				Compound Not Detected.		
95 t-1,4-Dichloro-2-butene	53				Compound Not Detected.		
96 1,2,3-Trichloropropane	110				Compound Not Detected.		
97 Bromobenzene	156				Compound Not Detected.		
98 n-Propylbenzene	120				Compound Not Detected.		
99 2-Chlorotoluene	126				Compound Not Detected.		
100 1,3,5-Trimethylbenzene	105				Compound Not Detected.		
101 4-Chlorotoluene	126				Compound Not Detected.		
102 tert-Butylbenzene	119				Compound Not Detected.		
103 1,2,4-Trimethylbenzene	105				Compound Not Detected.		
104 sec-Butylbenzene	134				Compound Not Detected.		
105 4-Isopropyltoluene	119				Compound Not Detected.		
106 m-Dichlorobenzene	146				Compound Not Detected.		
108 p-dichlorobenzene	146				Compound Not Detected.		
109 1,2,3-Trimethylbenzene	105				Compound Not Detected.		

Compounds	QUANT SIG	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS	
						ON-COLUMN	FINAL
	MASS					(ug/L)	(ug/L)
=====	=====	==	=====	=====	=====	=====	=====
110 n-Butylbenzene	91				Compound Not Detected.		
111 o-Dichlorobenzene	146				Compound Not Detected.		
112 1,2-Dibromo-3-chloropropane	157				Compound Not Detected.		
113 1,2,4-Trichlorobenzene	180				Compound Not Detected.		
114 Hexachlorobutadiene	225				Compound Not Detected.		
115 Naphthalene	128				Compound Not Detected.		
116 1,2,3-Trichlorobenzene	180				Compound Not Detected.		

QC Flag Legend

Q - Qualifier signal failed the ratio test.

Data File: /chem/R1.i/032508.b/r3149.d
Report Date: 26-Mar-2008 06:18

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TestAmerica-Denver

VOLATILE REPORT SW-846

Data file : /chem/R1.i/032508.b/r3149.d
Lab Smp Id: KJTEV1AM Client Smp ID: OHLSON 1
Inj Date : 25-MAR-2008 12:06
Operator : meierg Inst ID: R1.i
Smp Info : KJTEV1AM,,D8C180299-01 PH=7
Misc Info :
Comment :
Method : /chem/R1.i/032508.b/8260B-H2O.m
Meth Date : 26-Mar-2008 06:17 meierg Quant Type: ISTD
Cal Date : 06-MAR-2008 11:21 Cal File: r2572.d
Als bottle: 2
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: qk-01.sub
Target Version: 3.50
Processing Host: densvr05

- NO TENTATIVELY IDENTIFIED COMPOUNDS -

Data File: /chem/R1.i/032508.b/r3149.d
Report Date: 26-Mar-2008 06:18

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TestAmerica-Denver

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: R1.i
Lab File ID: r3149.d
Lab Smp Id: KJTEV1AM
Analysis Type: VOA
Quant Type: ISTD
Operator: meierg
Method File: /chem/R1.i/032508.b/8260B-H2O.m
Misc Info:

Calibration Date: 25-MAR-2008
Calibration Time: 07:32
Client Smp ID: OHLSON 1
Level: LOW
Sample Type: WATER

Test Mode:
Use Last Continuing Calibrator.

COMPOUND	STANDARD	AREA LIMIT		SAMPLE	%DIFF
		LOWER	UPPER		
57 Fluorobenzene	866901	433450	1733802	953630	10.00
82 Chlorobenzene-d5	164444	82222	328888	164404	-0.02
107 1,4-Dichlorobenze	249150	124575	498300	235775	-5.37

COMPOUND	STANDARD	RT LIMIT		SAMPLE	%DIFF
		LOWER	UPPER		
57 Fluorobenzene	7.82	7.32	8.32	7.81	-0.09
82 Chlorobenzene-d5	10.07	9.57	10.57	10.07	0.00
107 1,4-Dichlorobenze	11.92	11.42	12.42	11.92	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Data File: /chem/R1.i/032508.b/r3149.d
Report Date: 26-Mar-2008 06:18

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TestAmerica-Denver

RECOVERY REPORT

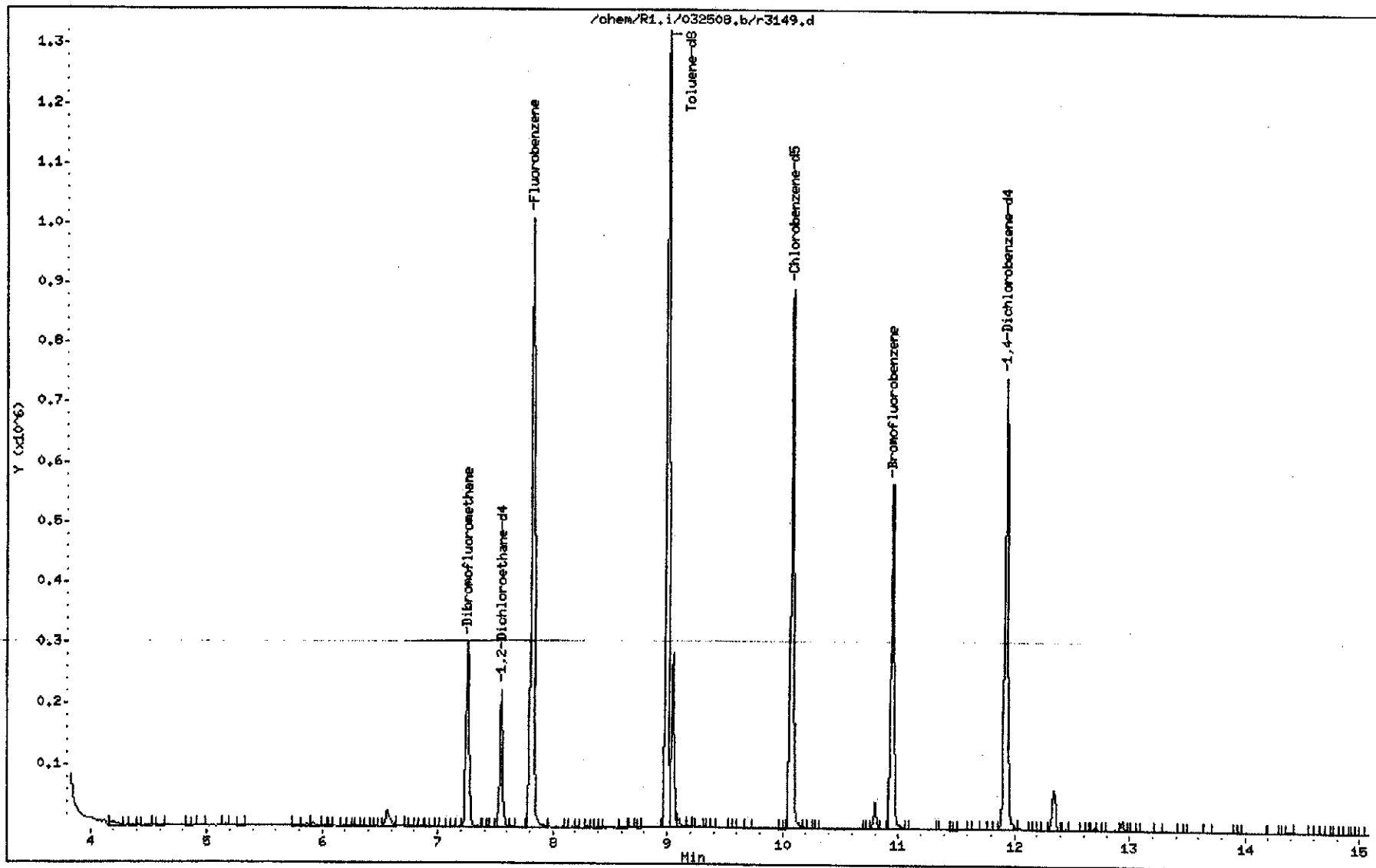
Client Name: Colorado Oil&Gas Con18-MAR-2008 00:00 Client SDG: D8C180299
Sample Matrix: LIQUID Fraction: VOA
Lab Smp Id: KJTEVIAM Client Smp ID: OHLSON 1
Level: LOW Operator: meierg
Data Type: MS DATA SampleType: SAMPLE
SpikeList File: qk-01.spk Quant Type: ISTD
Sublist File: qk-01.sub
Method File: /chem/R1.i/032508.b/8260B-H2O.m
Misc Info:

SURROGATE COMPOUND		CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
\$	46 Dibromofluorometha	10.0000	10.7604	107.60	79-119
\$	52 1,2-Dichloroethane	10.0000	10.5582	105.58	65-126
\$	70 Toluene-d8	10.0000	10.0697	100.70	78-118
\$	93 Bromofluorobenzene	10.0000	10.2050	102.05	75-115

Data File: /chem/R1.i/032508.b/r3149.d
Date: 25-MAR-2008 12:06
Client ID: OHLSON 1
Sample Info: KJTEV1AH,,D9C180299-01 PH=7
Column phase: DB624

Instrument: R1.i
Operator: meieng
Column diameter: 0.53

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Data File: /chem/R1.i/032508.b/r3149.d

Page 9

Date : 25-MAR-2008 12:06

Client ID: OHLSON 1

Instrument: R1.i

Sample Info: KJTEV1AH, D8C180299-01 PH=7

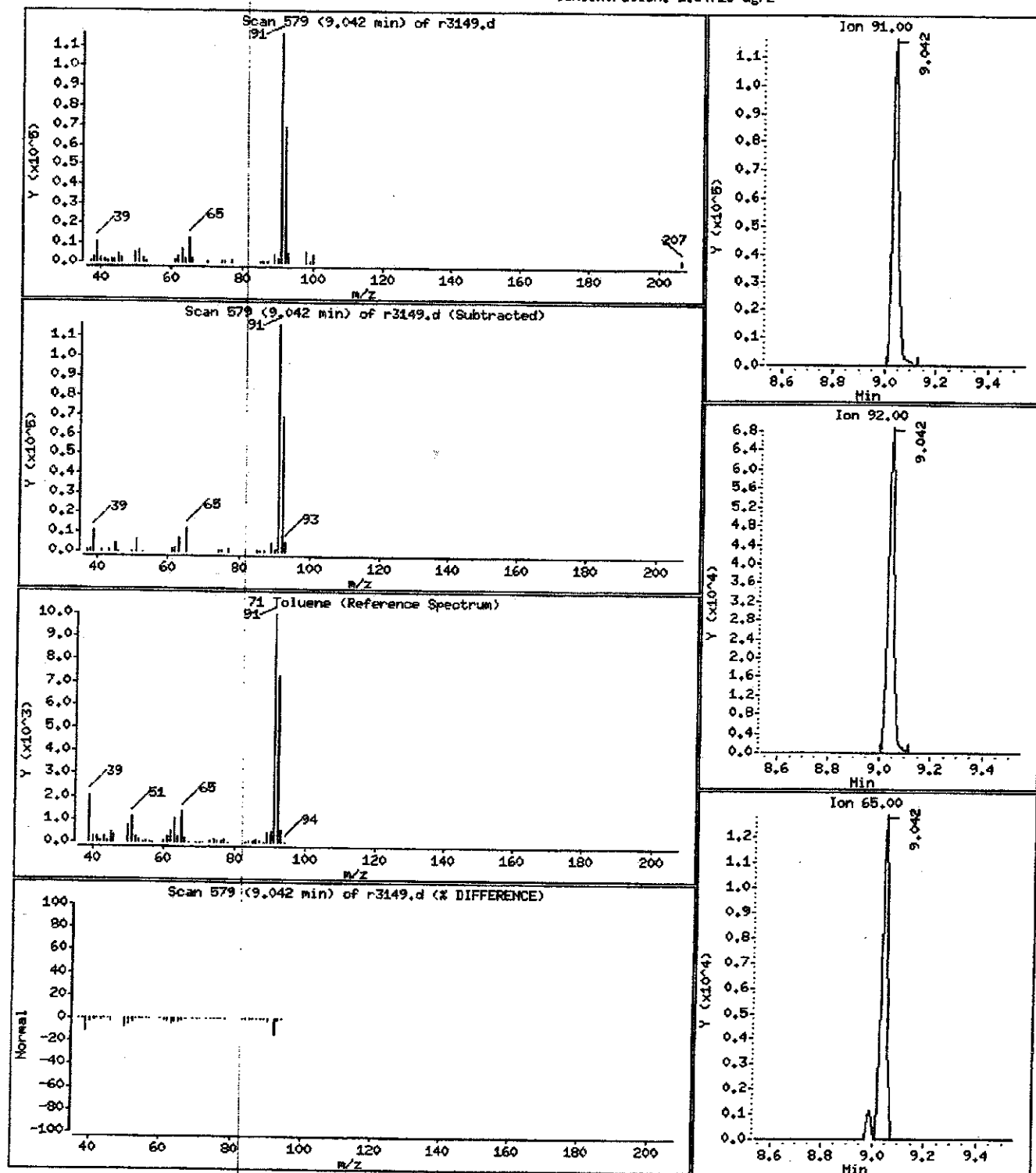
Operator: meierg

Column phase: DB624

Column diameter: 0.53

71 Toluene

Concentration: 1.64718 ug/L



Colorado Oil&Gas Conservation Commission

Client Sample ID: OHLSON 1

GC Volatiles

Lot-Sample #....: D8C180299-001 Work Order #....: KJTEV1AN Matrix.....: WATER
Date Sampled....: 03/18/08 10:06 Date Received...: 03/18/08
Prep Date.....: 03/19/08 Analysis Date...: 03/19/08
Prep Batch #....: 8080307 Analysis Time...: 14:26
Dilution Factor: 1
Method.....: RSK SOP-175

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Methane	8.7	5.0	ug/L

Data File: /chem/GC_J.i/J031908-1.b/018f1801.d
Report Date: 20-Mar-2008 12:54

Page 1

STL-Denver

SW846 8015 mod.

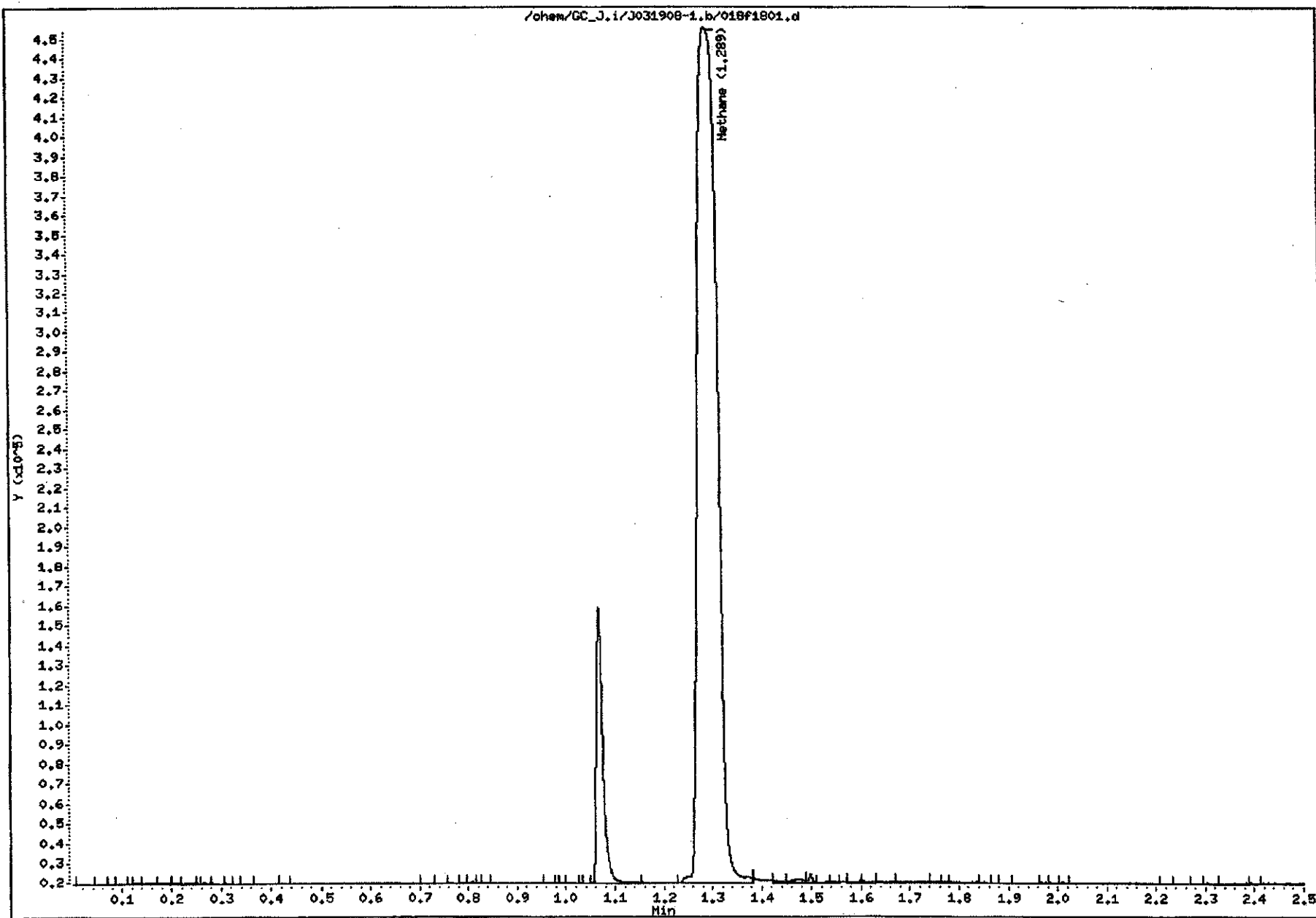
Data file : /chem/GC_J.i/J031908-1.b/018f1801.d
Lab Smp Id: KJTEV1AN Client Smp ID: OHLSON 1
Inj Date : 19-MAR-2008 14:26
Operator : AP/MD Inst ID: GC_J.i
Smp Info : KJTEV1AN,299-1
Misc Info : ICAL 11-MAY-2007
Comment : DEN-GC-0025
Method : /chem/GC_J.i/J031908-1.b/RSK-1_7PT.m
Meth Date : 20-Mar-2008 12:53 kellisom Quant Type: ESTD
Cal Date : 11-MAY-2007 11:49 Cal File: 009f0901.d
Als bottle: 18
Dil Factor: 1.00000
Integrator: Falcon Compound Sublist: RSK175.01.sub
Target Version: 3.50
Processing Host: chemsv04

Concentration Formula: Amt * DF * 1 * CpndVariable

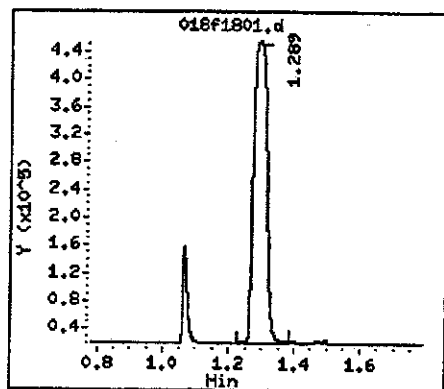
Cpnd Variable Local Compound Variable

Compounds	CONCENTRATIONS					
	RT	EXP RT	DLT RT	RESPONSE	ON-COLUMN (ug/L)	FINAL (ug/L)
1 Methane	1.289	1.286	0.003	1209349	8.67080	8.671
2 Ethene				Compound Not Detected.		
3 Ethane				Compound Not Detected.		
4 Acetylene				Compound Not Detected.		

U
3/21/08



1 Methane



Colorado Oil&Gas Conservation Commission

Client Sample ID: OHLSON 1

TOTAL Metals

Lot-Sample #....: D8C180299-001

Matrix.....: WATER

Date Sampled...: 03/18/08 10:06 Date Received...: 03/18/08

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #....: 8082114						
Iron	170 L	100	ug/L	SW846 6010B	03/27-03/30/08	KJTEV1AT
		Dilution Factor: 1		Analysis Time...: 14:55		
Potassium	ND	3000	ug/L	SW846 6010B	03/27-03/30/08	KJTEV1AU
		Dilution Factor: 1		Analysis Time...: 14:55		
Calcium	10000	200	ug/L	SW846 6010B	03/27-03/30/08	KJTEV1AR
		Dilution Factor: 1		Analysis Time...: 14:55		
Magnesium	1000	200	ug/L	SW846 6010B	03/27-03/30/08	KJTEV1AV
		Dilution Factor: 1		Analysis Time...: 14:55		
Sodium	250000	1000	ug/L	SW846 6010B	03/27-03/30/08	KJTEV1AQ
		Dilution Factor: 1		Analysis Time...: 14:55		
Prep Batch #....: 8085101						
Arsenic	ND	15	ug/L	MCAWW 200.7	03/26/08	KJTEV1AX
		Dilution Factor: 1		Analysis Time...: 15:12		
Barium	18	10	ug/L	MCAWW 200.7	03/26/08	KJTEV1A0
		Dilution Factor: 1		Analysis Time...: 15:12		
Cadmium	ND	5.0	ug/L	MCAWW 200.7	03/26/08	KJTEV1A2
		Dilution Factor: 1		Analysis Time...: 15:12		
Chromium	ND	10	ug/L	MCAWW 200.7	03/26/08	KJTEV1A3
		Dilution Factor: 1		Analysis Time...: 15:12		
Manganese	22	10	ug/L	MCAWW 200.7	03/26/08	KJTEV1A7
		Dilution Factor: 1		Analysis Time...: 15:12		
Lead	ND	9.0	ug/L	MCAWW 200.7	03/26/08	KJTEV1A9
		Dilution Factor: 1		Analysis Time...: 15:12		
Selenium	ND	15	ug/L	MCAWW 200.7	03/26/08	KJTEV1CA
		Dilution Factor: 1		Analysis Time...: 15:12		

NOTE(S) :

L Serial dilution of a digestate in the analytical batch indicates that physical and chemical interferences are present.

Colorado Oil&Gas Conservation Commission

Client Sample ID: OHLSON 1

General Chemistry

Lot-Sample #....: D8C180299-001 **Work Order #....:** KJTEV **Matrix.....:** WATER
Date Sampled....: 03/18/08 10:06 **Date Received...:** 03/18/08

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	8.6	0.10	No Units	MCAWW 150.1	03/19/08	8079472
		Dilution Factor: 1		Analysis Time...: 11:45		
Bicarbonate, as CaCO ₃	150	5.0	mg/L	MCAWW 310.1	03/26/08	8086547
		Dilution Factor: 1		Analysis Time...: 18:00		
Bromide	0.46	0.20	mg/L	MCAWW 300.0A	03/27-03/28/08	8088350
		Dilution Factor: 1		Analysis Time...: 09:17		
Carbonate, as CaCO ₃	ND	5.0	mg/L	MCAWW 310.1	03/26/08	8086549
		Dilution Factor: 1		Analysis Time...: 18:00		
Chloride	50	3.0	mg/L	MCAWW 300.0A	03/27-03/28/08	8088348
		Dilution Factor: 1		Analysis Time...: 09:17		
Fluoride	0.67	0.50	mg/L	MCAWW 300.0A	03/27-03/28/08	8088351
		Dilution Factor: 1		Analysis Time...: 09:17		
Nitrate-Nitrite	ND	0.10	mg/L	MCAWW 353.2	04/01/08	8093359
		Dilution Factor: 1		Analysis Time...: 12:30		
Specific Conductance	1300	2.0	umhos/cm	MCAWW 120.1	04/01/08	8093014
		Dilution Factor: 1		Analysis Time...: 19:00		
Sulfate	410 Q	50	mg/L	MCAWW 300.0A	03/27-03/28/08	8088349
		Dilution Factor: 10		Analysis Time...: 11:10		
Total Alkalinity	150	5.0	mg/L	MCAWW 310.1	03/26/08	8086546
		Dilution Factor: 1		Analysis Time...: 18:00		
Total Dissolved Solids	770	10	mg/L	MCAWW 160.1	03/19/08	8079464
		Dilution Factor: 1		Analysis Time...: 17:45		

NOTE(S):

RL Reporting Limit

Q Elevated reporting limit. The reporting limit is elevated due to high analyte levels.

QC DATA ASSOCIATION SUMMARY

D8C180299

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	WATER	MCAWW 120.1		8093014	8093266
	WATER	MCAWW 150.1		8079472	8080073
	WATER	MCAWW 160.1		8079464	8084252
	WATER	MCAWW 200.7		8085101	8085051
	WATER	MCAWW 310.1		8086549	
	WATER	MCAWW 353.2		8093359	8093194
	WATER	MCAWW 300.0A		8088348	8088131
	WATER	MCAWW 300.0A		8088349	8088129
	WATER	MCAWW 300.0A		8088351	8088132
	WATER	MCAWW 300.0A		8088350	8092059
	WATER	SW846 6010B		8082114	8082054
	WATER	SW846 8260B		8086265	8086141
	WATER	MCAWW 310.1		8086547	
	WATER	MCAWW 310.1		8086546	8087136
	WATER	RSK SOP-175		8080307	

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #....: D8C180299
MB Lot-Sample #: D8C260000-265

Work Order #....: KJ7121AA

Matrix.....: WATER

Analysis Date...: 03/25/08
Dilution Factor: 1

Prep Date.....: 03/25/08

Prep Batch #....: 8086265

Analysis Time...: 08:11

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Benzene	ND	1.0	ug/L	SW846 8260B
Ethylbenzene	ND	1.0	ug/L	SW846 8260B
Methyl tert-butyl ether	ND	5.0	ug/L	SW846 8260B
Toluene	ND	1.0	ug/L	SW846 8260B
Xylenes (total)	ND	2.0	ug/L	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	106	(79 - 119)
1,2-Dichloroethane-d4	102	(65 - 126)
4-Bromofluorobenzene	104	(75 - 115)
Toluene-d8	98	(78 - 118)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #....: D8C180299 Work Order #....: KJ7121AC Matrix.....: WATER
 LCS Lot-Sample#: D8C260000-265
 Prep Date.....: 03/25/08 Analysis Date...: 03/25/08
 Prep Batch #....: 8086265 Analysis Time...: 08:41
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>
Benzene	87	(77 - 118)	SW846 8260B
Ethylbenzene	84	(78 - 118)	SW846 8260B
Toluene	84	(73 - 120)	SW846 8260B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Dibromofluoromethane	107	(79 - 119)
1,2-Dichloroethane-d4	102	(65 - 126)
4-Bromofluorobenzene	103	(75 - 115)
Toluene-d8	98	(78 - 118)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #....: D8C180299 Work Order #....: KJ7121AC Matrix.....: WATER
 LCS Lot-Sample#: D8C260000-265
 Prep Date.....: 03/25/08 Analysis Date...: 03/25/08
 Prep Batch #....: 8086265 Analysis Time...: 08:41
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>METHOD</u>
Benzene	5.00	4.34	ug/L	87	SW846 8260B
Ethylbenzene	5.00	4.22	ug/L	84	SW846 8260B
Toluene	5.00	4.22	ug/L	84	SW846 8260B

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Dibromofluoromethane	107	(79 - 119)
1,2-Dichloroethane-d4	102	(65 - 126)
4-Bromofluorobenzene	103	(75 - 115)
Toluene-d8	98	(78 - 118)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #....: D8C180299 Work Order #....: KJRD41AP-MS Matrix.....: WATER
 MS Lot-Sample #: D8C180168-004 KJRD41AQ-MSD
 Date Sampled....: 03/05/08 15:03 Date Received...: 03/18/08
 Prep Date.....: 03/25/08 Analysis Date...: 03/25/08
 Prep Batch #....: 8086265 Analysis Time...: 11:27
 Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Benzene	82	(77 - 118)			SW846 8260B
	90	(77 - 118)	9.6	(0-20)	SW846 8260B
Ethylbenzene	79	(78 - 118)			SW846 8260B
	87	(78 - 118)	9.7	(0-26)	SW846 8260B
Toluene	76	(73 - 120)			SW846 8260B
	87	(73 - 120)	14	(0-20)	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	112	(79 - 119)
	113	(79 - 119)
1,2-Dichloroethane-d4	115	(65 - 126)
	113	(65 - 126)
4-Bromofluorobenzene	113	(75 - 115)
	107	(75 - 115)
Toluene-d8	95	(78 - 118)
	97	(78 - 118)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

MATRIX SPIKE SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #....: D8C180299 Work Order #....: KJRD41AP-MS Matrix.....: WATER
 MS Lot-Sample #: D8C180168-004 KJRD41AQ-MSD
 Date Sampled....: 03/05/08 15:03 Date Received...: 03/18/08
 Prep Date.....: 03/25/08 Analysis Date...: 03/25/08
 Prep Batch #....: 8086265 Analysis Time...: 11:27
 Dilution Factor: 1

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD
Benzene	ND	5.00	4.10	ug/L	82		SW846 8260B
	ND	5.00	4.51	ug/L	90	9.6	SW846 8260B
Ethylbenzene	ND	5.00	3.96	ug/L	79		SW846 8260B
	ND	5.00	4.37	ug/L	87	9.7	SW846 8260B
Toluene	ND	5.00	3.78	ug/L	76		SW846 8260B
	ND	5.00	4.33	ug/L	87	14	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	112	(79 - 119)
	113	(79 - 119)
1,2-Dichloroethane-d4	115	(65 - 126)
	113	(65 - 126)
4-Bromofluorobenzene	113	(75 - 115)
	107	(75 - 115)
Toluene-d8	95	(78 - 118)
	97	(78 - 118)

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

METHOD BLANK REPORT

GC Volatiles

Client Lot #....: D8C180299
MB Lot-Sample #: D8C200000-307

Work Order #....: KJXTT1AA

Matrix.....: WATER

Analysis Date...: 03/19/08
Dilution Factor: 1

Prep Date.....: 03/19/08
Prep Batch #....: 8080307

Analysis Time...: 13:27

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
Methane	ND	5.0	ug/L	RSK SOP-175

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: D8C180299 Work Order #....: KJXTT1AC-LCS Matrix.....: WATER
 LCS Lot-Sample#: D8C200000-307 KJXTT1AD-LCSD
 Prep Date.....: 03/19/08 Analysis Date...: 03/19/08
 Prep Batch #....: 8080307 Analysis Time...: 13:17
 Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Methane	94	(75 - 125)			RSK SOP-175
	98	(75 - 125)	4.7	(0-20)	RSK SOP-175

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

GC Volatiles

Client Lot #....: D8C180299 Work Order #....: KJXTT1AC-LCS Matrix.....: WATER
 LCS Lot-Sample#: D8C200000-307 KJXTT1AD-LCSD
 Prep Date.....: 03/19/08 Analysis Date...: 03/19/08
 Prep Batch #....: 8080307 Analysis Time...: 13:17
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE</u>	<u>MEASURED</u>	<u>PERCENT</u>	<u>RPD</u>	<u>METHOD</u>
	<u>AMOUNT</u>	<u>AMOUNT</u>	<u>RECOVERY</u>		
Methane	73.0	68.4	94		RSK SOP-175
	73.0	71.7	98	4.7	RSK SOP-175

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: D8C180299

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: D8C220000-114 Prep Batch #....: 8082114						
Iron	ND	100	ug/L	SW846 6010B	03/27-03/30/08	KJ3PT1AG
		Dilution Factor: 1				
		Analysis Time...: 14:42				
Potassium	ND	3000	ug/L	SW846 6010B	03/27-03/30/08	KJ3PT1AH
		Dilution Factor: 1				
		Analysis Time...: 14:42				
Calcium	ND	200	ug/L	SW846 6010B	03/27-03/30/08	KJ3PT1AC
		Dilution Factor: 1				
		Analysis Time...: 14:42				
Magnesium	ND	200	ug/L	SW846 6010B	03/27-03/30/08	KJ3PT1AJ
		Dilution Factor: 1				
		Analysis Time...: 14:42				
Sodium	ND	1000	ug/L	SW846 6010B	03/27-03/30/08	KJ3PT1AL
		Dilution Factor: 1				
		Analysis Time...: 14:42				
MB Lot-Sample #: D8C250000-101 Prep Batch #....: 8085101						
Arsenic	ND	15	ug/L	MCAWW 200.7	03/26/08	KJ4671AD
		Dilution Factor: 1				
		Analysis Time...: 14:38				
Barium	ND	10	ug/L	MCAWW 200.7	03/26/08	KJ4671AE
		Dilution Factor: 1				
		Analysis Time...: 14:38				
Cadmium	ND	5.0	ug/L	MCAWW 200.7	03/26/08	KJ4671AF
		Dilution Factor: 1				
		Analysis Time...: 14:38				
Chromium	ND	10	ug/L	MCAWW 200.7	03/26/08	KJ4671AG
		Dilution Factor: 1				
		Analysis Time...: 14:38				
Lead	ND	9.0	ug/L	MCAWW 200.7	03/26/08	KJ4671AL
		Dilution Factor: 1				
		Analysis Time...: 14:38				

(Continued on next page)

METHOD BLANK REPORT**TOTAL Metals**

Client Lot #...: D8C180299

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Manganese	ND	10	ug/L	MCAWW 200.7	03/26/08	KJ4671AJ
		Dilution Factor: 1				
		Analysis Time...: 14:38				
Selenium	ND	15	ug/L	MCAWW 200.7	03/26/08	KJ4671AM
		Dilution Factor: 1				
		Analysis Time...: 14:38				

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #....: D8C180299

Matrix.....: WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: D8C220000-114 Prep Batch #....: 8082114					
Iron	99	(89 - 115)	SW846 6010B	03/27-03/30/08	KJ3PT1A6
		Dilution Factor: 1		Analysis Time...: 14:46	
Potassium	104	(89 - 114)	SW846 6010B	03/27-03/30/08	KJ3PT1A7
		Dilution Factor: 1		Analysis Time...: 14:46	
Calcium	100	(90 - 111)	SW846 6010B	03/27-03/30/08	KJ3PT1A2
		Dilution Factor: 1		Analysis Time...: 14:46	
Magnesium	99	(90 - 113)	SW846 6010B	03/27-03/30/08	KJ3PT1A8
		Dilution Factor: 1		Analysis Time...: 14:46	
Sodium	105	(90 - 115)	SW846 6010B	03/27-03/30/08	KJ3PT1CA
		Dilution Factor: 1		Analysis Time...: 14:46	
LCS Lot-Sample#: D8C250000-101 Prep Batch #....: 8085101					
Arsenic	98	(88 - 110)	MCAWW 200.7	03/26/08	KJ4671AR
		Dilution Factor: 1		Analysis Time...: 14:43	
Barium	107	(90 - 112)	MCAWW 200.7	03/26/08	KJ4671AT
		Dilution Factor: 1		Analysis Time...: 14:43	
Cadmium	100	(88 - 111)	MCAWW 200.7	03/26/08	KJ4671AU
		Dilution Factor: 1		Analysis Time...: 14:43	
Chromium	102	(90 - 113)	MCAWW 200.7	03/26/08	KJ4671AV
		Dilution Factor: 1		Analysis Time...: 14:43	
Manganese	103	(90 - 110)	MCAWW 200.7	03/26/08	KJ4671AX
		Dilution Factor: 1		Analysis Time...: 14:43	
Lead	98	(89 - 110)	MCAWW 200.7	03/26/08	KJ4671A1
		Dilution Factor: 1		Analysis Time...: 14:43	
Selenium	97	(85 - 112)	MCAWW 200.7	03/26/08	KJ4671A2
		Dilution Factor: 1		Analysis Time...: 14:43	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #....: D8C180299

Matrix.....: WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: D8C220000-114 Prep Batch #....: 8082114							
Iron	1000	990	ug/L	99	SW846 6010B	03/27-03/30/08	KJ3PT1A6
			Dilution Factor: 1		Analysis Time...: 14:46		
Potassium	50000	52000	ug/L	104	SW846 6010B	03/27-03/30/08	KJ3PT1A7
			Dilution Factor: 1		Analysis Time...: 14:46		
Calcium	50000	50000	ug/L	100	SW846 6010B	03/27-03/30/08	KJ3PT1A2
			Dilution Factor: 1		Analysis Time...: 14:46		
Magnesium	50000	49300	ug/L	99	SW846 6010B	03/27-03/30/08	KJ3PT1A8
			Dilution Factor: 1		Analysis Time...: 14:46		
Sodium	50000	52400	ug/L	105	SW846 6010B	03/27-03/30/08	KJ3PT1CA
			Dilution Factor: 1		Analysis Time...: 14:46		
LCS Lot-Sample#: D8C250000-101 Prep Batch #....: 8085101							
Arsenic	1000	982	ug/L	98	MCAWW 200.7	03/26/08	KJ4671AR
			Dilution Factor: 1		Analysis Time...: 14:43		
Barium	2000	2140	ug/L	107	MCAWW 200.7	03/26/08	KJ4671AT
			Dilution Factor: 1		Analysis Time...: 14:43		
Cadmium	100	99.7	ug/L	100	MCAWW 200.7	03/26/08	KJ4671AU
			Dilution Factor: 1		Analysis Time...: 14:43		
Chromium	200	205	ug/L	102	MCAWW 200.7	03/26/08	KJ4671AV
			Dilution Factor: 1		Analysis Time...: 14:43		
Manganese	500	515	ug/L	103	MCAWW 200.7	03/26/08	KJ4671AX
			Dilution Factor: 1		Analysis Time...: 14:43		
Lead	500	492	ug/L	98	MCAWW 200.7	03/26/08	KJ4671A1
			Dilution Factor: 1		Analysis Time...: 14:43		
Selenium	2000	1930	ug/L	97	MCAWW 200.7	03/26/08	KJ4671A2
			Dilution Factor: 1		Analysis Time...: 14:43		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: D8C180299

Matrix.....: WATER

Date Sampled...: 03/17/08 08:10 Date Received...: 03/19/08

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD LIMITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: D8C190165-002 Prep Batch #...: 8082114						
Iron	117	(52 - 155)		SW846 6010B	03/27-03/30/08	KJT631CW
	120	(52 - 155) 1.1	(0-25)	SW846 6010B	03/27-03/30/08	KJT631CX
		Dilution Factor: 1				
		Analysis Time...: 15:18				
Potassium	110	(76 - 132)		SW846 6010B	03/27-03/30/08	KJT631C0
	116	(76 - 132) 3.9	(0-25)	SW846 6010B	03/27-03/30/08	KJT631C1
		Dilution Factor: 1				
		Analysis Time...: 15:18				
Calcium	83	(48 - 153)		SW846 6010B	03/27-03/30/08	KJT631CM
	89	(48 - 153) 2.3	(0-25)	SW846 6010B	03/27-03/30/08	KJT631CN
		Dilution Factor: 1				
		Analysis Time...: 15:18				
Magnesium	85	(62 - 146)		SW846 6010B	03/27-03/30/08	KJT631C2
	89	(62 - 146) 1.8	(0-25)	SW846 6010B	03/27-03/30/08	KJT631C3
		Dilution Factor: 1				
		Analysis Time...: 15:18				
Sodium	NC,MSB	(70 - 203)		SW846 6010B	03/27-03/30/08	KJT631C6
	NC,MSB	(70 - 203)	(0-40)	SW846 6010B	03/27-03/30/08	KJT631C7
		Dilution Factor: 1				
		Analysis Time...: 15:18				

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

NC The recovery and/or RPD were not calculated.

MSB The recovery and RPD were not calculated because the sample amount was greater than four times the spike amount.

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: D8C180299

Matrix.....: WATER

Date Sampled...: 03/17/08 08:10 Date Received...: 03/19/08

PARAMETER	AMOUNT	SAMPLE SPIKE AMT	MEASRD AMOUNT	UNITS	PERCENT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
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MS Lot-Sample #: D8C190165-002 Prep Batch #...: 8082114

Iron

2000	1000	3170	ug/L	117			SW846 6010B	03/27-03/30/08	KJT631CW
2000	1000	3200	ug/L	120	1.1		SW846 6010B	03/27-03/30/08	KJT631CX
Dilution Factor: 1									
Analysis Time...: 15:18									

Potassium

17000	50000	71900	ug/L	110			SW846 6010B	03/27-03/30/08	KJT631C0
17000	50000	74800	ug/L	116	3.9		SW846 6010B	03/27-03/30/08	KJT631C1
Dilution Factor: 1									
Analysis Time...: 15:18									

Calcium

100000	50000	142000	ug/L	83			SW846 6010B	03/27-03/30/08	KJT631CM
100000	50000	145000	ug/L	89	2.3		SW846 6010B	03/27-03/30/08	KJT631CN
Dilution Factor: 1									
Analysis Time...: 15:18									

Magnesium

74000	50000	117000	ug/L	85			SW846 6010B	03/27-03/30/08	KJT631C2
74000	50000	119000	ug/L	89	1.8		SW846 6010B	03/27-03/30/08	KJT631C3
Dilution Factor: 1									
Analysis Time...: 15:18									

Sodium

27000000	50000	2640000	ug/L				SW846 6010B	03/27-03/30/08	KJT631C6
Qualifiers: NC,MSB									
27000000	50000	2710000	ug/L				SW846 6010B	03/27-03/30/08	KJT631C7
Qualifiers: NC,MSB									
Dilution Factor: 1									
Analysis Time...: 15:18									

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

NC The recovery and/or RPD were not calculated.

MSB The recovery and RPD were not calculated because the sample amount was greater than four times the spike amount.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #....: D8C180299

Matrix.....: WATER

Date Sampled....: 03/18/08 12:45 Date Received...: 03/19/08

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD LIMITS	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: D8C190224-001 Prep Batch #....: 8085101						
Arsenic	97	(88 - 110)		MCAWW 200.7	03/26/08	KJVK71A1
	98	(88 - 110) 0.96	(0-20)	MCAWW 200.7	03/26/08	KJVK71A2
		Dilution Factor: 1				
		Analysis Time...: 15:42				
Barium	105	(90 - 112)		MCAWW 200.7	03/26/08	KJVK71A3
	107	(90 - 112) 1.3	(0-20)	MCAWW 200.7	03/26/08	KJVK71A4
		Dilution Factor: 1				
		Analysis Time...: 15:42				
Cadmium	98	(88 - 111)		MCAWW 200.7	03/26/08	KJVK71A5
	99	(88 - 111) 1.4	(0-20)	MCAWW 200.7	03/26/08	KJVK71A6
		Dilution Factor: 1				
		Analysis Time...: 15:42				
Chromium	100	(90 - 113)		MCAWW 200.7	03/26/08	KJVK71A7
	102	(90 - 113) 1.5	(0-20)	MCAWW 200.7	03/26/08	KJVK71A8
		Dilution Factor: 1				
		Analysis Time...: 15:42				
Lead	98	(89 - 110)		MCAWW 200.7	03/26/08	KJVK71CG
	98	(89 - 110) 0.95	(0-20)	MCAWW 200.7	03/26/08	KJVK71CH
		Dilution Factor: 1				
		Analysis Time...: 15:42				
Manganese	101	(90 - 110)		MCAWW 200.7	03/26/08	KJVK71CC
	103	(90 - 110) 1.4	(0-20)	MCAWW 200.7	03/26/08	KJVK71CD
		Dilution Factor: 1				
		Analysis Time...: 15:42				
Selenium	96	(85 - 112)		MCAWW 200.7	03/26/08	KJVK71CJ
	97	(85 - 112) 1.0	(0-20)	MCAWW 200.7	03/26/08	KJVK71CK
		Dilution Factor: 1				
		Analysis Time...: 15:42				

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #....: D8C180299

Matrix.....: WATER

Date Sampled...: 03/18/08 12:45 Date Received...: 03/19/08

PARAMETER	AMOUNT	SAMPLE SPIKE AMT	MEASRD AMOUNT	UNITS	PERCENT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
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MS Lot-Sample #: D8C190224-001 Prep Batch #....: 8085101

Arsenic

ND	1000	973	ug/L	97			MCAWW 200.7	03/26/08	KJVK71A1
ND	1000	982	ug/L	98	0.96		MCAWW 200.7	03/26/08	KJVK71A2
Dilution Factor: 1									
Analysis Time...: 15:42									

Barium

16	2000	2120	ug/L	105			MCAWW 200.7	03/26/08	KJVK71A3
16	2000	2150	ug/L	107	1.3		MCAWW 200.7	03/26/08	KJVK71A4
Dilution Factor: 1									
Analysis Time...: 15:42									

Cadmium

ND	100	98.0	ug/L	98			MCAWW 200.7	03/26/08	KJVK71A5
ND	100	99.5	ug/L	99	1.4		MCAWW 200.7	03/26/08	KJVK71A6
Dilution Factor: 1									
Analysis Time...: 15:42									

Chromium

ND	200	203	ug/L	100			MCAWW 200.7	03/26/08	KJVK71A7
ND	200	206	ug/L	102	1.5		MCAWW 200.7	03/26/08	KJVK71A8
Dilution Factor: 1									
Analysis Time...: 15:42									

Lead

ND	500	488	ug/L	98			MCAWW 200.7	03/26/08	KJVK71CG
ND	500	492	ug/L	98	0.95		MCAWW 200.7	03/26/08	KJVK71CH
Dilution Factor: 1									
Analysis Time...: 15:42									

Manganese

29	500	535	ug/L	101			MCAWW 200.7	03/26/08	KJVK71CC
29	500	542	ug/L	103	1.4		MCAWW 200.7	03/26/08	KJVK71CD
Dilution Factor: 1									
Analysis Time...: 15:42									

Selenium

ND	2000	1910	ug/L	96			MCAWW 200.7	03/26/08	KJVK71CJ
ND	2000	1930	ug/L	97	1.0		MCAWW 200.7	03/26/08	KJVK71CK
Dilution Factor: 1									
Analysis Time...: 15:42									

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #....: D8C180299

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Bicarbonate, as CaCO3	ND	Work Order #: KKAJT1AA 5.0	mg/L	MB Lot-Sample #: D8C260000-547 MCAWW 310.1	03/26/08	8086547
		Dilution Factor: 1				
		Analysis Time...: 18:00				
Bromide	ND	Work Order #: KKEQF1AA 0.20	mg/L	MB Lot-Sample #: D8C280000-350 MCAWW 300.0A	03/27/08	8088350
		Dilution Factor: 1				
		Analysis Time...: 21:34				
Carbonate, as CaCO3	ND	Work Order #: KKAJ31AA 5.0	mg/L	MB Lot-Sample #: D8C260000-549 MCAWW 310.1	03/26/08	8086549
		Dilution Factor: 1				
		Analysis Time...: 18:00				
Chloride	ND	Work Order #: KKEP81AA 3.0	mg/L	MB Lot-Sample #: D8C280000-348 MCAWW 300.0A	03/27/08	8088348
		Dilution Factor: 1				
		Analysis Time...: 21:34				
Fluoride	ND	Work Order #: KKEP41AA 0.50	mg/L	MB Lot-Sample #: D8C280000-351 MCAWW 300.0A	03/27/08	8088351
		Dilution Factor: 1				
		Analysis Time...: 21:34				
Nitrate-Nitrite	ND	Work Order #: KKLDM1AA 0.10	mg/L	MB Lot-Sample #: D8D020000-359 MCAWW 353.2	04/01/08	8093359
		Dilution Factor: 1				
		Analysis Time...: 12:30				
Specific Conductance	ND	Work Order #: KKL391AA 2.0	umhos/cm	MB Lot-Sample #: D8D020000-014 MCAWW 120.1	04/01/08	8093014
		Dilution Factor: 1				
		Analysis Time...: 19:00				
Sulfate	ND	Work Order #: KKEQQ1AA 5.0	mg/L	MB Lot-Sample #: D8C280000-349 MCAWW 300.0A	03/27/08	8088349
		Dilution Factor: 1				
		Analysis Time...: 21:34				
Total Alkalinity	ND	Work Order #: KKAJP1AA 5.0	mg/L	MB Lot-Sample #: D8C260000-546 MCAWW 310.1	03/26/08	8086546
		Dilution Factor: 1				
		Analysis Time...: 18:00				

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METHOD BLANK REPORT

General Chemistry

Client Lot #....: D8C180299

Matrix.....: WATER

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Total Dissolved Solids		Work Order #: KJ4X31AA		MB Lot-Sample #: D8C190000-464		
	ND	10	mg/L	MCAWW 160.1	03/19/08	8079464
		Dilution Factor: 1				
		Analysis Time...: 17:45				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Lot-Sample #....: D8C180299

Matrix.....: WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	LIMITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH		WO#:KJWXV1AA-LCS/KJWXV1AC-LCSD LCS Lot-Sample#: D8C190000-472					
	100	(97 - 102)			MCAWW 150.1	03/19/08	8079472
	100	(97 - 102)	0.0	(0-5.0)	MCAWW 150.1	03/19/08	8079472
		Dilution Factor: 1		Analysis Time...: 16:00			
Bromide		WO#:KKEQF1AC-LCS/KKEQF1AD-LCSD LCS Lot-Sample#: D8C280000-350					
	99	(90 - 110)			MCAWW 300.0A	03/27/08	8088350
	100	(90 - 110)	0.57	(0-10)	MCAWW 300.0A	03/27/08	8088350
		Dilution Factor: 1		Analysis Time...: 21:19			
Chloride		WO#:KKEP81AC-LCS/KKEP81AD-LCSD LCS Lot-Sample#: D8C280000-348					
	102	(90 - 110)			MCAWW 300.0A	03/27/08	8088348
	102	(90 - 110)	0.34	(0-10)	MCAWW 300.0A	03/27/08	8088348
		Dilution Factor: 1		Analysis Time...: 21:19			
Fluoride		WO#:KKEP41AC-LCS/KKEP41AD-LCSD LCS Lot-Sample#: D8C280000-351					
	100	(90 - 110)			MCAWW 300.0A	03/27/08	8088351
	100	(90 - 110)	0.42	(0-10)	MCAWW 300.0A	03/27/08	8088351
		Dilution Factor: 1		Analysis Time...: 21:19			
Nitrate-Nitrite		WO#:KKLDM1AC-LCS/KKLD1AD-LCSD LCS Lot-Sample#: D8D020000-359					
	104	(90 - 112)			MCAWW 353.2	04/01/08	8093359
	104	(90 - 112)	0.0	(0-10)	MCAWW 353.2	04/01/08	8093359
		Dilution Factor: 1		Analysis Time...: 12:30			
Specific Conductance		WO#:KKL391AC-LCS/KKL391AD-LCSD LCS Lot-Sample#: D8D020000-014					
	94	(90 - 110)			MCAWW 120.1	04/01/08	8093014
	97	(90 - 110)	3.0	(0-10)	MCAWW 120.1	04/01/08	8093014
		Dilution Factor: 1		Analysis Time...: 19:00			
Sulfate		WO#:KKEQQ1AC-LCS/KKEQQ1AD-LCSD LCS Lot-Sample#: D8C280000-349					
	102	(90 - 110)			MCAWW 300.0A	03/27/08	8088349
	102	(90 - 110)	0.25	(0-10)	MCAWW 300.0A	03/27/08	8088349
		Dilution Factor: 1		Analysis Time...: 21:19			
Total Alkalinity		WO#:KKAJP1AC-LCS/KKAJP1AD-LCSD LCS Lot-Sample#: D8C260000-546					
	100	(90 - 110)			MCAWW 310.1	03/26/08	8086546
	96	(90 - 110)	5.1	(0-10)	MCAWW 310.1	03/26/08	8086546
		Dilution Factor: 1		Analysis Time...: 18:00			

(Continued on next page)

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Lot-Sample #...: D8C180299

Matrix.....: WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD LIMITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Total Dissolved Solids		WO#:KJ4X31AC-LCS/KJ4X31AD-LCSD			LCS Lot-Sample#: D8C190000-464	
	98	(86 - 106)		MCAWW 160.1	03/19/08	8079464
	97	(86 - 106)	1.8 (0-20)	MCAWW 160.1	03/19/08	8079464
		Dilution Factor: 1		Analysis Time...: 17:45		

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

General Chemistry

Matrix.....: WATER

(Continued on next page)

LABORATORY CONTROL SAMPLE DATA REPORT

General Chemistry

Lot-Sample #....: D8C180299

Matrix.....: WATER

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCNT</u> <u>RECVRY</u>	<u>RPD</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Total Dissolved								
Solids								
	500	492	mg/L	98		MCAWW 160.1	03/19/08	8079464
	500	483	mg/L	97	1.8	MCAWW 160.1	03/19/08	8079464

WO#:KJ4X31AC-LCS/KJ4X31AD-LCSD LCS Lot-Sample#: D8C190000-464

Dilution Factor: 1 Analysis Time...: 17:45

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #....: D8C180299

Matrix.....: WATER

Date Sampled...: 03/19/08 09:10 Date Received...: 03/19/08

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Bromide			WO#:		KKE151AC-MS/KKE151AD-MSD MS Lot-Sample #:	D8C100217-005	
	106	(80 - 120)			MCAWW 300.0A	03/27/08	8088350
	103	(80 - 120)	3.4	(0-20)	MCAWW 300.0A	03/27/08	8088350
			Dilution Factor: 1				
			Analysis Time...: 22:22				
Chloride			WO#:		KJAWM1AM-MS/KJAWM1AN-MSD MS Lot-Sample #:	D8C100215-002	
	112	(85 - 115)			MCAWW 300.0A	03/27/08	8088201
	110	(85 - 115)	1.9	(0-20)	MCAWW 300.0A	03/27/08	8088201
			Dilution Factor: 1				
			Analysis Time...: 19:59				
Fluoride			WO#:		KJWHK1AM-MS/KJWHK1AN-MSD MS Lot-Sample #:	D8C190331-002	
	96	(64 - 161)			MCAWW 300.0A	03/27/08	8088204
	93	(64 - 161)	2.8	(0-32)	MCAWW 300.0A	03/27/08	8088204
			Dilution Factor: 1				
			Analysis Time...: 22:22				
Nitrate-Nitrite			WO#:		KJR8V1AE-MS/KJR8V1AF-MSD MS Lot-Sample #:	D8C180277-005	
	71 N	(72 - 113)			MCAWW 353.2	04/01/08	8093359
	72	(72 - 113)	2.0	(0-17)	MCAWW 353.2	04/01/08	8093359
			Dilution Factor: 1				
			Analysis Time...: 12:30				
Sulfate			WO#:		KJAWM1AJ-MS/KJAWM1AK-MSD MS Lot-Sample #:	D8C100215-002	
	109	(85 - 115)			MCAWW 300.0A	03/27/08	8088202
	106	(85 - 115)	2.1	(0-20)	MCAWW 300.0A	03/27/08	8088202
			Dilution Factor: 1				
			Analysis Time...: 19:59				
Sulfate			WO#:		KKHMGIAC-MS/KKHMGIAD-MSD MS Lot-Sample #:	D8C100217-006	
	109	(85 - 115)			MCAWW 300.0A	03/27/08	8088345
	106	(85 - 115)	2.1	(0-20)	MCAWW 300.0A	03/27/08	8088345
			Dilution Factor: 1				
			Analysis Time...: 19:59				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

MATRIX SPIKE SAMPLE DATA REPORT

General Chemistry

Client Lot #....: D8C180299

Matrix.....: WATER

Date Sampled...: 03/19/08 09:10 Date Received...: 03/19/08

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Bromide									
WO#: KKE151AC-MS/KKE151AD-MSD MS Lot-Sample #: D8C100217-005									
	0.33	5.00	5.65	mg/L	106		MCAWW 300.0A	03/27/08	8088350
	0.33	5.00	5.46	mg/L	103	3.4	MCAWW 300.0A	03/27/08	8088350
Dilution Factor: 1									
Analysis Time...: 22:22									
Chloride									
WO#: KJAWM1AM-MS/KJAWM1AN-MSD MS Lot-Sample #: D8C100215-002									
	6.3	25.0	34.3	mg/L	112		MCAWW 300.0A	03/27/08	8088201
	6.3	25.0	33.7	mg/L	110	1.9	MCAWW 300.0A	03/27/08	8088201
Dilution Factor: 1									
Analysis Time...: 19:59									
Fluoride									
WO#: KJWHK1AM-MS/KJWHK1AN-MSD MS Lot-Sample #: D8C190331-002									
	0.75	5.00	5.54	mg/L	96		MCAWW 300.0A	03/27/08	8088204
	0.75	5.00	5.38	mg/L	93	2.8	MCAWW 300.0A	03/27/08	8088204
Dilution Factor: 1									
Analysis Time...: 22:22									
Nitrate-Nitrite									
WO#: KJR8V1AE-MS/KJR8V1AF-MSD MS Lot-Sample #: D8C180277-005									
	0.41	4.00	3.24 N	mg/L	71		MCAWW 353.2	04/01/08	8093359
	0.41	4.00	3.30	mg/L	72	2.0	MCAWW 353.2	04/01/08	8093359
Dilution Factor: 1									
Analysis Time...: 12:30									
Sulfate									
WO#: KJAWM1AJ-MS/KJAWM1AK-MSD MS Lot-Sample #: D8C100215-002									
	2.2	25.0	29.4	mg/L	109		MCAWW 300.0A	03/27/08	8088202
	2.2	25.0	28.8	mg/L	106	2.1	MCAWW 300.0A	03/27/08	8088202
Dilution Factor: 1									
Analysis Time...: 19:59									
Sulfate									
WO#: KKHMG1AC-MS/KKHMG1AD-MSD MS Lot-Sample #: D8C100217-006									
	2.2	25.0	29.4	mg/L	109		MCAWW 300.0A	03/27/08	8088345
	2.2	25.0	28.8	mg/L	106	2.1	MCAWW 300.0A	03/27/08	8088345
Dilution Factor: 1									
Analysis Time...: 19:59									

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: D8C180299

Work Order #....: KJMCQ-SMP
KJMCQ-DUP

Matrix.....: WATER

Date Sampled....: 03/13/08 12:35 Date Received...: 03/14/08

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Total Dissolved						SD Lot-Sample #: D8C140277-003		
Solids	170	180	mg/L	2.9	(0-20)	MCAWW 160.1	03/19/08	8079464
			Dilution Factor: 1		Analysis Time...: 17:45			

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: D8C180299

Work Order #....: KJTEV-SMP
KJTEV-DUP

Matrix.....: WATER

Date Sampled....: 03/18/08 10:06 Date Received...: 03/18/08

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Total Dissolved Solids	770	760	mg/L	1.4	(0-20)	MCAWW 160.1	03/19/08	8079464
Dilution Factor: 1						Analysis Time...: 17:45		
SD Lot-Sample #: D8C180299-001								

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: D8C180299

Work Order #....: KJT5M-SMP
KJT5M-DUP

Matrix.....: WATER

Date Sampled....: 03/17/08 09:00 Date Received...: 03/19/08

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
pH	8.0	8.0	No Units	0.13	(0-5.0)	MCAWW 150.1	SD Lot-Sample #: D8C190162-001 03/19/08	8079472
				Dilution Factor: 1	Analysis Time...: 14:40			

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: D8C180299

Work Order #....: KJXHG-SMP
KJXHG-DUP

Matrix.....: WATER

Date Sampled....: 03/17/08 13:20 **Date Received...:** 03/20/08

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE</u> <u>RESULT</u>	<u>UNITS</u>	<u>RPD</u> <u>RPD</u>	<u>RPD</u> <u>LIMIT</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Total Alkalinity	230	230	mg/L	0.43	(0-10)	SD Lot-Sample #: D8C200196-001 MCAWW 310.1	03/26/08	8086546
			Dilution Factor: 1			Analysis Time...: 18:00		

General Chemistry

Matrix.....: WATER

Date Sampled...: 03/07/08 09:45 **Date Received...:** 03/10/08

52.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: D8C180299

Work Order #...: KKHMG-SMP

Matrix.....: WATER

KKHMG-DUP

Date Sampled...: 03/07/08 12:01

Date Received...: 03/10/08

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE</u> <u>RESULT</u>	<u>UNITS</u>	<u>RPD</u> <u>RPD</u>	<u>RPD</u> <u>LIMIT</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Sulfate	2.2	2.4	mg/L	6.2	(0-20)	SD Lot-Sample #: D8C100217-006 MCAWW 300.0A	03/27-03/28/08	8088345
			Dilution Factor: 1			Analysis Time...: 19:44		

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: D8C180299

Work Order #....: KJ8LN-SMP

Matrix.....: WATER

KJ8LN-DUP

Date Sampled....: 03/25/08 18:30

Date Received...: 03/26/08

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Specific Conductance	600	610	umhos/cm	0.82	(0-10)	MCAWW 120.1	04/01/08	8093014
				Dilution Factor: 1	Analysis Time...: 19:00			

Chain of Custody Record

4124 (0807)

KB 3/18/08
Temperature on Receipt 2.3°C IRA
Drinking Water? Yes ☒ No ☐

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Client <u>Coace / Bob Chesson</u>		Project Manager <u>Mary Johnson - Heppert Assoc.</u>		Date <u>3/18/08</u>	Chain of Custody Number <u>409531</u>
Address <u>1120 Lincoln Ste 801</u>		Telephone Number (Area Code)/Fax Number <u>303-507-6233 / 303-216-1419</u>		Lab Number	Page <u>1</u> of <u>1</u>

City <u>Denver</u>	State <u>CO</u>	Zip Code <u>80203</u>	Site Contact <u>Pat McAtee</u>	Lab Contact <u>Pat McAtee</u>	Analysis (Attach list if more space is needed)
Project Name and Location (State) <u>Ohlson Property, Adams Cty CO</u>			Carrier/Waybill Number		
Contract/Purchase Order/Quote No.					

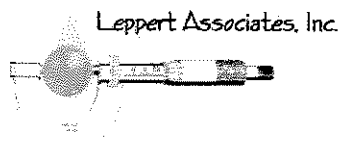
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix				Preservatives							PH, 100	Nitrite	Total N	RSK- BTEX 98																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Possible Hazard Identification	Sample Disposal	(A fee may be assessed if samples are retained longer than 1 month)
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown	<input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Turn Around Time Required	QC Requirements (Specify)	
<input type="checkbox"/> 24 Hours <input type="checkbox"/> 48 Hours <input checked="" type="checkbox"/> 7 Days <input type="checkbox"/> 14 Days <input type="checkbox"/> 21 Days <input type="checkbox"/> Other _____		

1. Relinquished By <u>Mary Johnson</u>	Date <u>3/18/08</u>	Time <u>2:05</u>	1. Received By <u>Pat McAtee</u>	Date <u>3/18/08</u>	Time <u>1615</u>
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy



1422 Washington Avenue
Golden, Colorado 80401
Phone: (303)-216-2428
Fax: (303)-216-1419

May 6, 2008

Mr. Bob Chesson
Colorado Oil and Gas Conservation Commission
1120 Lincoln Street, Suite 801
Denver, CO 80203

Re: Site Investigation, COGCC Complaint Investigation #200095139, Ohlson Property

LA Project Number 85

Dear Mr. Chesson,

Attached is a brief summary documenting the excavation and ground water sampling work conducted at the Ohlson property on March 8th and March 18th, 2008. I have reviewed the analytical results from the 3/18/08 sampling event and compared them to earlier results. Generally the results are consistent with your earlier sampling event in September 2006.

I plotted the pit corner GPS location you had emailed me. As you will see it plotted almost directly over the location the COGIS database has for the abandoned production well UPRR Pan Am B#1. Your GPS accuracy is probably superior to any measurements recorded in the 1970s but it appears that we were in the general proximity of the wellhead.

If you have any questions, please feel free to contact me at (303)-216-2428 (211). As always it is a pleasure to work with you.

Best Regards,

Mary Mast Johnson
Senior Hydrogeologist / Project Manager
Leppert Associates

Privileged and Confidential

**Field Investigation Report
Ohlson Property
COGCC Complaint Investigation #200095139**

PRELIMINARY SITE MEETING, MARCH 8, 2008

Leppert Associates (LA) was retained by the Colorado Oil and Gas Commission (COGCC) to perform a site investigation at the Ohlson property. The purpose of the investigation was to identify potential sources for the occurrence of crude oil detected in the domestic water well during July 2006. Prior to the onset of field operations, a preliminary site meeting was proposed to allow all parties to convene at the site to review the specific water well drilling details and subsequently plan the field investigation. The initial site visit was conducted on March 8, 2008. In attendance for the initial site visit were: Mr. Bob Chesson of the COGCC; Mr. Michael Johns, former driller with Johns Drilling Inc.; Mr. Gary Ohlson the current property owner; and Ms. Mary Johnson of Leppert Associates.

In October, 2007 during a telephone conversation Mr. Johns had expressed knowledge of buried piping at the site thought possibly to be the source of crude oil detected during drilling operations in July, 2006. During the initial site meeting on March 8, 2008 Mr. Johns did not recall encountering buried piping during the drilling process, but indicated approximate areas where pits were dug during water well drilling. Mr. Johns reported excavating several pits for drilling fluids during water well installation, at depths to approximately ten feet below ground surface (BGS). Mr. Johns recalled digging pits adjacent to the current pump house in the generalized directions of east, south, and southwest. Figure 1 provides a schematic illustration of the site conditions during March 2008 and the general area surrounding the pump house.

Historical site data suggest that a tank battery was once located southwest of the water well. Based upon the information provided by Mr. Johns, it is unlikely that any buried flow lines from the former tank battery remain in the vicinity of the water well as they would have been encountered during the excavation of pits.

In an effort to locate the source of the crude oil, it was determined that excavation would proceed in the vicinity of the abandoned production well UPRR Pan Am B#1. Well records indicated a location to the east of the current horse corral less than 100 feet from the water well. The precise location of the production well was unknown as the well was abandoned and subsequently covered by several feet of backfill.

As part of the field investigation, water samples would be collected from the Ohlson water well. Results from the water sampling would be submitted for laboratory analysis to ensure that there were no further impacts to the water by crude oil.

FIELD INVESTIGATION

Excavation

On March 18, 2008 the field investigation was initiated in an effort to determine the source of crude oil at the site. Field personnel included: Mr. Dave Colburn, the backhoe operator from DC Services; Mr. Stacy Swingle, representing the former well operator Amoco; Mr. Bob Chesson of the COGCC; and Mary Johnson from Leppert Associates. Prior to excavation an area utility locate was completed.

Figure 1 illustrates the approximate area of the excavation. The specific location of the excavation was recorded using GPS and is plotted using an aerial photograph and the additional GPS location for the water well (Figure 2). Excavation of the area reached depths of approximately six to seven feet BGS. Soil samples and excavation walls were periodically inspected for signs of hydrocarbon staining. Zones of stained soils were identified which suggested the area was the location for mud pits used during drilling. During the excavation plugging and abandoning (P&A) cement was identified by Mr. Swingle. Evidence of former oil field operations suggested that the abandoned well location was probably nearby though it was not encountered during the excavation. The excavation did not demonstrate any possible source for hydrocarbon contamination in the soil or ground water. Immediately following the pit inspection, the excavation was backfilled and soils were compacted by DC Services.

Water Well Sampling

Water samples were collected from the spigot (see Figure 1) as part of the field investigation. The flow rate from the well was estimated to be approximately 10 gallons per minute (gpm). Field parameters were monitored and sampling was initiated once readings were stable. Specific well sampling details were recorded and are provided in the attached *Field Sampling Form*. Samples were placed in an iced cooler and subsequently delivered to Test America Laboratories in Arvada, Colorado. Table 1 provides a list of analytes and results from the March 18, 2008 sampling event. Sample results from a September, 2006 sampling collection event are included in Table 1 (Analytical Results from the Ohlson Water Well) as a basis for comparison.

A review of the two data sets demonstrate consistent results in barium, manganese, calcium, magnesium, sodium, chloride, sulfate, and fluoride. Arsenic, cadmium, chromium, lead, selenium, and nitrate-nitrite concentrations remained below the detection limits. The more recent sample exhibited a slight decrease in iron concentration as compared to the concentration recorded from the September 2006 sample.

Benzene, ethylbenzene, and xylene concentrations also remained undetected. The toluene concentration was less by more than one order of magnitude from the earlier sample report. During the initial site meeting Mr. Johns reported using glue containing hydrocarbon compounds as part of the well construction. Water usage from the well averages approximately 600 gallons per week according to property owner, Mr. Ohlson. It is possible that based upon the relatively low toluene concentration reflected in the March 2008 sample, in addition to the significant concentration decrease since September 2006, that the well construction is the source of this compound.

Methyl tert-butyl ether (MTBE) was not detected in the March 2008 water sample. The March 2008 sample did exhibit a methane concentration of 8.7ug/l. The reported methane concentration does not pose a risk to the property owners. Methane was not detected in the water samples collected on September 25, 2006.

Dissolved concentrations of sulfate (SO_4) continue to exceed the Colorado Department of Public Health and Environment (CDPHE) standard for drinking water. Iron (Fe)

concentrations have dropped since the 2006 sampling event and are now within the acceptable CDPHE range for drinking water. Sodium concentrations remain in exceedence of the 20mg/l recommended for persons on salt restricted diets. There continue to be no indications of impacts to the Ohlson water well as a result of oil and gas operations.

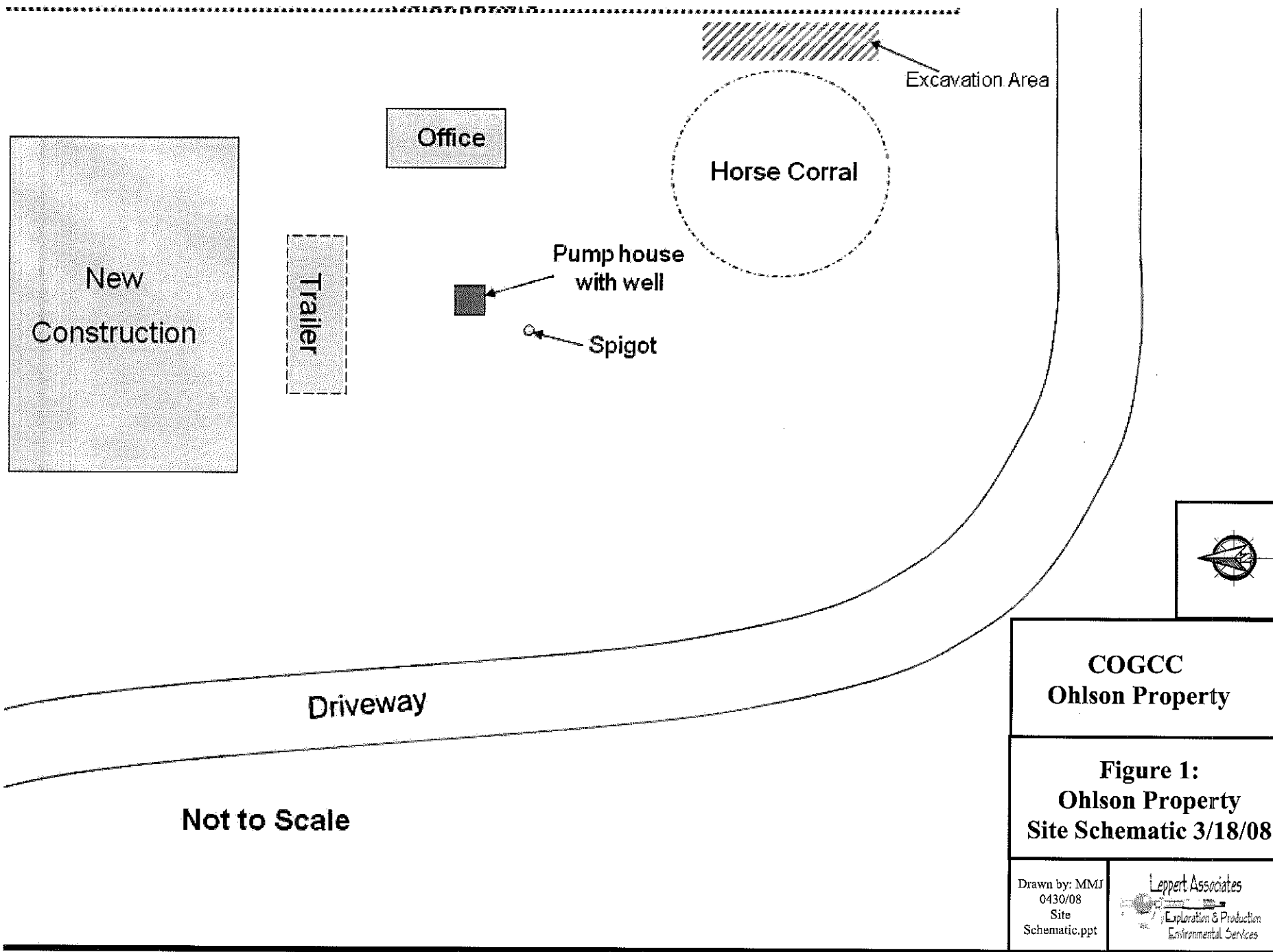
Table 1: Analytical results from Ohlson Water Well.

Analyte	Units	Results 3/18/08	Results 9/25/06
Methane	ug/L	8.7	ND
Arsenic	ug/L	ND	ND
Barium	ug/L	18	19
Cadmium	ug/L	ND	ND
Chromium	ug/L	ND	ND
Lead	ug/L	ND	ND
Manganese	ug/L	22	18
Selenium	ug/L	ND	ND
Calcium	ug/L	10000	9900
Iron	ug/L	170	380
Magnesium	ug/L	1000	900
Potassium	ug/L	ND	ND
Sodium	ug/L	250000	260000
Benzene	ug/L	ND	ND
Ethylbenzene	ug/L	ND	ND
Methyl tert-butyl ether	ug/L	ND	NS
Toluene	ug/L	1.6	31
Xylenes (total)	ug/L	ND	ND
Specific Conductance	umhos/cm	1300	NS
pH	No Units	8.6	9
Total Dissolved Solids	mg/L	770	740
Chloride	mg/L	50	46
Sulfate	mg/L	410	350
Bromide	mg/L	0.46	0.71
Fluoride	mg/L	0.67	0.72
Total Alkalinity	mg/L	150	NS
Bicarbonate, as CaCO3	mg/L	150	NS
Carbonate, as CaCO3	mg/L	ND	NS
Nitrate-Nitrite	mg/L	ND	ND

NOTES:

NS = Not sampled

ND = Not detected above detection limit

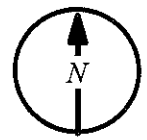




what is year of this
aerial photo?

Legend

Scale:



- Section Boundaries
- Excavation Pit Location
- Abandoned Well Location:
API# 05-001-06230
UPRR 23 PAN AM B#1
- Oil and gas wells
- Roads
- *36105 E 124th Ave, Hudson, CO 80642

**COGCC
Ohlson Property**

**Figure 2:
COGCC Ohlson
Property Locations**

Drawn by: **GGU**
4/30/08
Ohlson
Locations.lpk



SAMPLING AND WELL STABILIZATION FORM

Leppert Associates, Inc.



Project Name: COGCC Complaint Investigation #200095139				Well ID: Ohlson	
Name of Well Owner: Gary Ohlson			Well Location: Northwest of horse corral, west of small building		
Well Type: Spigot					
Measuring Point (MP) Location: Same					
Well Depth (below MP): NA			Sampling Date: 3/18/2008		
Depth to Groundwater (below MP): NA			Sample ID #: Ohlson 1		
Casing Diameter: NA			Arrival at Well Time (military): 9:25		
Method of Well Development:			Weather: Clear, cool		
Bailer <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Tap <input checked="" type="checkbox"/>			LEL Methane Well Headspace Measurement by Explosimeter: 0%		
Centrifugal Pump <input type="checkbox"/> Other <input type="checkbox"/>			Immiscible Layer Present? None		
Sampling Collection Method:			VOA Sample Collection Time: 9:40		
Bailer <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Tap <input checked="" type="checkbox"/> Other <input type="checkbox"/>			Sample Appearance: Clear, no effervescence apparent		
Bailer Type: Teflon <input type="checkbox"/> PVC <input type="checkbox"/> ABS Plastic <input type="checkbox"/> Stainless Steele <input type="checkbox"/> HDPE <input type="checkbox"/>					
Well Integrity: Barriers in Place <input type="checkbox"/> Cap Stable <input type="checkbox"/> Protective Casing Intact <input checked="" type="checkbox"/>					
FIELD MEASUREMENTS					
Purge Volumes: One Well Volume:		Number of Well Volumes Purged:		Well Purged Dry? No	
Time (military)	pH (units)	Specific Conductivity (ms)	Temperature (Celsius)	Cumulative Volume of Water Removed from Well (gallons)	Notes:
9:25	NA	1080	22.7	20	
9:30	NA	1100	14.0	70	
9:35	NA	1090	14.6	120	
9:40	NA	1070	13.6	170	
ADDITIONAL COMMENTS:					
Water Color:			Presence of Odors: No		
Water Clarity: Clear			Bacterial Fouling: No		
Effervescence: No			Produced Sediments: None		
OTHER COMMENTS:					
10 gpm fixed pumping rate					
pH meter battery dead					
Comments may continue on back →					
Form Completed by: MMJ			Witnessed by:		



COLORADO
Oil & Gas Conservation
Commission

Department of Natural Resources

1120 Lincoln Street, Suite 801
Denver, CO 80203

November 3, 2014

Gary Ohlson
36105 E. 124th Avenue
Hudson, CO 80642

RE: Water Well Sampling Request Report
Complaint No. 200412560
Division of Water Resources Well Permit No. 269807
SWNW Section 33 – Township 1 South – Range 64 West
Adams County, Colorado

Mr. Ohlson:

On September 5, 2014, Terracon Consultants, under the direction of the Colorado Oil and Gas Conservation Commission (COGCC), sampled your water well to assess the quality of groundwater drawn from your domestic well. The water sample was analyzed for general organic and inorganic constituents, and dissolved methane. This letter summarizes the water quality results. As you are aware, the COGCC has sample your water well on three previous occasions; September 2006, March 2008, and September 2010, and this letter compares these three previous sample results with the recent September 2014 results (Table 1).

FIELD TESTING

The water sample was collected from a spigot in your yard adjacent to your work shop building. The three previous samples were collected from the yard hydrant adjacent to your water well. The pump on your well was started at 10:20 a.m. allowed to run for approximately 10 minutes with approximately 120 gallons of water purged prior to sampling. The sample was collected in laboratory certified containers, labeled, placed on ice in a cooler, and delivered to Test America Laboratories in Arvada, Colorado with a chain-of-custody form. Samples were also collected for bacterial reactivity tests.

DISCUSSION OF ANALYTICAL RESULTS

The Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and Environment (CDPHE) established "Domestic Use – Quality" Human Health and Secondary

P 303.894.2100 F 303.894.2109 www.colorado.gov/cogcc

Commissioners: Thomas L. Compton - Chairman, Richard Alward, John H. Benton, DeAnn Craig,
James W. Hawkins, Tommy Holton, Andrew L. Spielman, Mike King, Dr. Larry Wolk

John W. Hickenlooper, Governor | Mike King, Executive Director, DNR | Matthew J. Lepore, Director



000599

Drinking Water Standards in Regulation 41 "The Basic Standards for Groundwater" (5CCR 1002-41). It is important to note that these standards were established for municipal public drinking water supplies, and that people often use and consume groundwater from private wells that exceeds these standards. The COGCC is an implementing agency of the groundwater standards for impacts associated with oil and gas exploration and production activities.

Analytical data for the sample from your water well was compared to the CDPHE Human Health and Secondary Drinking Water Standards in the Table 1. Table 1 also summarizes the sample results from your water well for the samples collected in 2006, 2008, and 2010. The complete laboratory analytical report as well as the benzene resampling results are provided as Attachment 2.

INORGANIC ANALYTICAL RESULTS

The following inorganic elements were detected at levels exceeding the CDPHE Secondary Drinking Water Standards in the sample from your water well.

- **Sulfate** was detected in the sample from your domestic well at a concentration of 500 mg/l. The previous sample results were 350 Q mg/l (2006), 410 Q mg/l (2008), and 430 mg/l (2010). The Q qualifier denotes an elevated reporting limit due to high analyte concentration.

The CDPHE domestic water supply drinking water standard for sulfate (SO_4) is 250 mg/l. Although CDPHE does not have an agricultural standard for sulfate, other agencies recommend a concentration below 1,500 mg/l for livestock watering. Waters containing high concentrations of sulfate, typically caused by the leaching of natural deposits of magnesium sulfate (Epsom salts) or sodium sulfate (Glauber's salt), may be undesirable because of their laxative effects.

- **Total Dissolved Solids (TDS)** was detected in the sample from your domestic well at a concentration of 870 mg/l. The previous sample results were 740 mg/l (2006), 770 mg/l (2008), and 820 mg/l (2010).

CDPHE has established a TDS standard for human drinking water of 500 mg/l. The standard is called the secondary maximum contaminant level (SMCL) and is based on the aesthetic quality of the water (such as taste and odor) and is intended as a guideline for public water supply systems and is not an enforceable standard. Although CDPHE does not have an agricultural standard for TDS, other agencies recommend concentrations below 1,500 mg/l for irrigation, and below 5,000 mg/l for most livestock watering. TDS concentrations are related to the presence of naturally occurring elements and chemical compounds, such as chloride, sodium, potassium, calcium, magnesium, and sulfate.

- **Manganese (Mn)** was detected in the sample from your water well at a concentration of 1.2 mg/l. The previous sample results were 0.018 mg/l (2006), 0.022 mg/l (2008), and 0.043 mg/l (2010).

CDPHE has established a Mn standard for human drinking water of 0.05 mg/l. The standard is a SMCL based on the aesthetic quality of the water (such as taste and odor) and is intended as a

guideline for public water supply systems and is not an enforceable standard. Manganese can produce a brownish color in laundered clothing, may leave dark stains on water fixtures, and affect the taste of beverages (metallic taste) made with the water.

The sample from your well was also analyzed for calcium, magnesium, potassium, sodium bromide, and alkalinity content, specific conductivity and sodium adsorption ratio. There are no CDPHE drinking water standards for these parameters; a sodium concentration of 20 milligrams per liter is often recommended by some physicians for patients on salt restricted diets or those suffering from hypertension or heart disease.

METHANE GAS ANALYSIS

Dissolved methane was detected in the sample from your domestic water well at a concentration of 0.054 mg/l. The previous sample results were not detected (2006), 0.087 mg/l (2008), and 0.012 mg/l (2010).

Methane gas alone is physiologically inert and non-toxic to humans. Normal breath exhalation contains methane at a ratio of 1 to 99 parts per million. Based on the results of extensive testing for methane gas in water wells throughout Colorado, concentrations of methane gas below 1 mg/l are considered harmless, with concern for possible hazards from the methane increasing at concentrations in well waters at or exceeding 7 mg/l. The presence of methane in drinking water does not present a known health hazard to humans or other animals via ingestion; however, methane in domestic water supplies can be associated with undesirable and potentially serious side effects. Methane gas dissolved in water "exsolves" when exposed to the atmosphere and dissipates rapidly because it is lighter than air. This is often responsible for the "fizzing" observed in water wells that contain methane gas. If the methane occurs at a high enough concentration and if it is allowed to accumulate in a confined space, such as a well pit, crawl space, closet, etc., an explosion hazard can be established. In addition, if methane concentrations in well water are high, bubbles of free gas form within the water and cause the well pump to cavitate and no longer bring water to the surface. Methane gas occurs naturally and is common in water wells in Colorado. Methane is commonly found as a gas in coal or black shale seams in the subsurface. Methane is also often found as a byproduct of the decay of organic matter, and the presence of bacteria in water wells can provide favorable conditions for the production of methane (either from the activity or decay of bacteria).

BACTERIAL ANALYSIS (please see the accompanying report)

- **Iron-Related Bacteria (IRB)** was detected in the water sample collected from your domestic water well.

Although not harmful, iron-related bacteria can become a nuisance by plugging the well pump, causing red staining on plumbing fixtures and laundered clothing, building up red, slimy accumulations on any surface the water touches, and causing what appears to be a sheen on standing water. Signs that may indicate an iron bacteria problem include yellowish, red or orange colored water, rusty deposits in toilet tanks and strange smells resembling fuel oil, cucumbers or

sewage. Sometimes the odor will be apparent in only the morning, or after other extended periods of non-use.

- **Sulfate-Reducing Bacteria (SRB)** was detected at a low population in the water sample collected from your domestic water well.

Sulfate reducing bacteria are serious nuisance organisms in water as they can cause severe taste and odor problems. These bacteria reduce sulfate that occurs naturally in the water and generate hydrogen sulfide (H₂S) gas as they grow. The hydrogen sulfide (H₂S) gas is a nuisance because it smells like rotten eggs, initiates corrosion on metal surfaces, and reacts with dissolved metals such as iron to generate black sulfide deposits.

- **Slime Forming Bacteria (SLYM)** was detected at a low in the water sample collected from your domestic water well.

Although not usually harmful, Slime Forming Bacteria can become a nuisance by plugging well pumps and causing slimy accumulations on plumbing fixtures and standing water. These bacteria are often gelatinous in nature and may range in color from white, to red, to black. As slime bacteria mats grow, they create an environment in which complex associations of other strains of bacteria can develop.

VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS

A target list of 126 volatile and semi-volatile organic compounds was used during analysis of water from your well. **Benzene** detected above the method detection limit in the sample from your well at a concentration of 0.0091 mg/l. This concentration exceeds the CDPHE human health standard of 0.005 mg/l. Benzene was not detected in any of the previous samplings of your water well.

Because of the detection, the COGCC conducted a resampling of your well to determine if the benzene present was possibly due laboratory contamination and also to evaluate the quality of water in your house system. Your well and water from your house system was sampled on October 1, 2014. Samples from this sampling were sent to two separate laboratories. Both laboratories reported benzene in the sample from your well (0.0092- and 0.0068-mg/l). These sample results verified the initial sample results from your untreated well water was real and not due to laboratory contamination. Both laboratories reported **no detections** in the samples from your house water system verifying that your water treatment system is effective in removing benzene from your domestic water supply. The analytical reports refer to your water well sample as OHLSON-1 and your house water system sample as OHLSON-2.

On October 16, 2014 the COGCC collected a sample of water from a recently filled stock tank at your property. The analytical results from this sample (OHLSON STOCK) shows benzene at a concentration of 0.0043 mg/l, which is below the CDPHE human health standard.

As we have discussed both on the phone and at your property, the presence of benzene without other volatile compounds (specifically ethyl benzene, xylenes, toluene, and naphthalene) is very unusual if the benzene present is due to crude oil production or to a fuel spill. Benzene found alone is more diagnostic of an industrial use, in that benzene can be found in products such as glues, paints, waxes, and detergents and is also used in the manufacture of other chemicals and products such as plastics, lubricants, dyes, drugs, and pesticides. Small amounts of benzene could be released from any of these products. At this time, I have no explanation for the benzene present in your water well. Nevertheless, the COGCC would like to continue to collect samples for benzene from your water well over the next several months to monitor any changes in your water well water quality starting with a resampling in Early January 2015. I will be in contact with you prior to the January sampling.

CONCLUSIONS

The concentration of total dissolved solids (TDS), sulfate (SO_4), and manganese (Mn) detected in your well water were above the drinking water standards (Secondary Maximum Contaminate Level [SMCL] established by the Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and the Environment. The SMCLs are based on the aesthetic quality of the water (such as taste and odor) and is not an enforceable standard. The presence of iron reducing bacteria (IRB), sulfate reducing bacteria (SRB), and slime forming bacteria (SLYM) in your well indicates that well disinfection may improve your overall water quality.

I have enclosed a copy of a general information pamphlet entitled *How Well Do You Know Your Water Well*, which includes a simple well disinfection procedure to help control nuisance bacteria, which as we previously discussed, may help to improve your general well water quality. In addition, the National Groundwater Association has sponsored a website (<http://www.wellowner.org/>) with resources and information for water well owners.

The COGCC maintains a water quality database where the results from your water well sample are recorded.

If you have any questions or would like to discuss these matters further, please contact me at 303-894-2100 Extension 5112 or by email at robert.chesson@state.co.us.

Sincerely,

Colorado Oil and Gas Conservation Commission

Robert H. Chesson

Digitally signed by Robert H. Chesson
DN: cn=Robert H. Chesson, o=Colorado Oil and Gas
Conservation Commission, ou,
email=robert.chesson@state.co.us, c=US
Date: 2014.11.03 15:34:55 -0700

Robert H. Chesson, CPG
Environmental Protection Specialist – Northeast Colorado

000603

Ohlson Water Well
Complaint No. 200412560
November 3, 2014
Page 6

Enclosures: Attachment 1 Analytical Summary Table
Attachment 2 Laboratory Analytical Report
Attachment 3 BART Results

cc: John Axelson, COGCC
Greg Deranleau, COGCC

ATTACHMENT 1

**Draft Table
Ohlson Water Well
Analytical Summary**

Parameter	Water Well Samples				Unit	CDPHE Standards	
	Sample Date	Sample Date	Sample Date	Sample Date			
	09/25/2006	03/18/2008	09/27/2010	09/05/14			
	Result	Result	Result	Result		Domestic	Agriculture
Benzene	ND	ND	ND	0.0091	mg/l	0.005	0.005
Ethylbenzene	ND	ND	ND	ND	mg/l	0.7	0.7
Toluene	0.031	0.0016	ND	ND	mg/l	0.56	0.56
Total Xylenes	ND	ND	ND	ND	mg/l	1.4	1.4
Arsenic	ND	ND	ND	ND	mg/l	0.05	0.1
Barium	0.019	0.018	0.021	0.018	mg/l	2.0	
Calcium	9.9	10	130	120	mg/l	NS	
Chromium	ND	ND	ND	ND	mg/l	0.1	0.1
Iron	0.38	0.170 L	0.28 B	0.18	mg/l	0.3	5
Lead	ND	ND	ND	ND	mg/l	0.05	0.1
Magnesium	0.9	1	1.1	0.57	mg/l	NS	
Manganese	0.018	0.022	0.043	1.2	mg/l	0.05	0.2
Potassium	ND	ND	2.2 J	ND	mg/l	NS	
Selenium	ND	ND	0.063 J	ND	mg/l	0.05	0.02
Sodium	260	250	290	270	mg/l	NS	
Chloride	46	50	48	50	mg/l	250	NS
Nitrite	ND	NA	NA	NA	mg/l	1.0	10
Nitrate	ND	NA	NA	NA	mg/l	10.0	100
Total Nitrite/Nitrate	NA	ND	ND	ND	mg/l	10.0	100
Fluoride	0.72	0.67	0.63	0.58	mg/l	4.0	NS
Total Dissolved Solids	740	770	820	870	mg/l	500	*1500
pH	9	8.6	8.75	NA	No units	6.5 - 8.5	6.5 - 8.5
Sulfate	350 Q	410 Q	430	500	mg/l	250	
Bromide	0.44	0.46	0.49	0.51	mg/l	NS	
Total Alkalinity	130	150	130	120	mg/l	NS	
Bicarbonate	120	150	120	120	mg/l	NS	
Carbonate	11	ND	6.6	ND	mg/l	NS	
Conductivity	1200	1300	1300	NA	mmhos/cm	NS	
Methane	ND	0.087	0.012	0.054	mg/l	NS	

Notes

CDPHE	Colorado Department of Public Health and the Environment.
Domestic	Standards for Domestic Water Supply, Human Health and Drinking Water Standards.
Agriculture	* Standards for agriculture compiled from CDPHE and other of sources.
mg/l	Milligrams per liter (equals parts per million).
CDPHE Standards	Water Quality Control Commission 5 CCR 1002-41, Regulation No. 41 - The Basic Standards For Groundwater.
mmhos/cm	millimhos per centimeer
NA	Not analyzed.
ND	Not detected.
NS	No Standard.
**	Health Advisory.
	Human health standard.
	Secondary standard.

000606

From: Birkbeck, Douglas <DOUGLAS.BIRKBECK@bp.com>
Sent: Tuesday, March 03, 2015 3:10 PM
To: Robert Chesson - DNR
Subject: RE: Summary letter for the January 13, 2015 COGCC sampling of your water well

OK. Thanks

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Robert Chesson - DNR [<mailto:Robert.Chesson@state.co.us>]
Sent: Tuesday, March 03, 2015 4:08 PM
To: Birkbeck, Douglas
Subject: RE: Summary letter for the January 13, 2015 COGCC sampling of your water well

Doug, We will be glad to assist you in any way.

Bob

From: Birkbeck, Douglas [<mailto:DOUGLAS.BIRKBECK@bp.com>]
Sent: Tuesday, March 03, 2015 3:02 PM
To: Robert Chesson - DNR
Cc: John Axelson - DNR
Subject: RE: Summary letter for the January 13, 2015 COGCC sampling of your water well

Bob: I get the connection based on caffeine result, just want to see if we can find a GC signature for the benzene that would point us away from oil and gas. I would only suggest sampling one more time to send samples to another lab for the analysis I have described. Will keep you posted as I discuss with my resources.

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Robert Chesson - DNR [<mailto:Robert.Chesson@state.co.us>]
Sent: Tuesday, March 03, 2015 3:56 PM
To: Birkbeck, Douglas
Cc: John Axelson - DNR
Subject: RE: Summary letter for the January 13, 2015 COGCC sampling of your water well

Hi Doug - I agree but unless you have another explanation as to why his well water is positive for caffeine without a surface water-water connection I have no other explanation other than he has a problem with water well isolation from surface issues. At present the COGCC is not entirely sure if we will be resampling Mr. Ohlson's water well based on the recent results. The benzene occurrence by itself just does not look like any type of an oil & gas impact. I previous looked at trying to conduct

000175

some isotopic work on the benzene, but the concentration is so low (~9 ug/l) it was beyond any commercial lab service. Perhaps your shop has other resources.

Thanks for the advice.

Bob

Robert H. Chesson
NE Colorado Environmental Protection Specialist



P 303.894.2100 x5112 | F 303.894.2109
1120 Lincoln Street, Suite 801, Denver, CO 80203
Robert.Chesson@state.co.us | www.colorado.gov/cogcc

From: Birkbeck, Douglas [mailto:DOUGLAS.BIRKBECK@bp.com]
Sent: Tuesday, March 03, 2015 2:40 PM
To: Robert Chesson - DNR
Subject: RE: Summary letter for the January 13, 2015 COGCC sampling of your water well

Bob: I read through your letter and Mr. Ohlson's email response. Although you indicated in your letter that the complaint is open until such time BP can conduct their investigation, it appears Mr. Ohlson is agitated by the continued presence of benzene in the water, assuming it has come from previous oil and gas operations.

I would suggest we continue to sample but present the findings only, without presenting any conclusion to the source until we can do our field work. I also want to talk with our laboratories that conduct fingerprint analysis and find out if during your next sampling we could take a replicate and send it to a different lab to see if they can determine an oil and gas characteristic in the GC analyses.

Your thoughts....

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Robert Chesson - DNR [mailto:Robert.Chesson@state.co.us]
Sent: Tuesday, March 03, 2015 2:50 PM
To: Gary Ohlson; Gohlson@hotmail.com
Cc: Greg Deranleau - DNR; John Axelson - DNR; Birkbeck, Douglas
Subject: Summary letter for the January 13, 2015 COGCC sampling of your water well

Gary,

Please see attached. A hard copy is in the mail.

000176

Bob

Robert H. Chesson
NE Colorado Environmental Protection Specialist



P 303.894.2100 x5112 | F 303.894.2109
1120 Lincoln Street, Suite 801, Denver, CO 80203
Robert.Chesson@state.co.us | www.colorado.gov/cogcc

000177

From: Birkbeck, Douglas <DOUGLAS.BIRKBECK@bp.com>
Sent: Monday, June 08, 2015 1:33 PM
To: Jenkins - DNR, Steve
Subject: RE: Ohlson Sink Hole Issue

Steve: Did you ever send me documentation indicating AMOCO (BP) had a drilling permit and well on the Ohlson Property. I went through the CD you provided but could not find a well permit in the files. Thanks

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Jenkins - DNR, Steve [<mailto:steve.jenkins@state.co.us>]
Sent: Monday, June 08, 2015 10:34 AM
To: Birkbeck, Douglas
Subject: Re: Ohlson Sink Hole Issue

Thanks Doug, I appreciate our efforts. I am not going to double up on the telephone conversations with them at this point.
Steve

On Mon, Jun 8, 2015 at 9:29 AM, Birkbeck, Douglas <DOUGLAS.BIRKBECK@bp.com> wrote:
Steve: I spoke to Mr. Ohlson and his wife this last Saturday. I explained to them that the Remediation Management Group within BP that is addressing his issue has gone through a reorganization and that there is new management that needs to get briefed on his situation. I explained that I would be having those debriefing meetings this week and would call them (The Ohlson's) back end of this week. However, I also expressed that I may only be able to get their issue reviewed for designing an investigation scope of work and the work may have to be completed in 2016. Mrs. Ohlson in particular was not in favor of that timing, so I expressed that I would have the necessary management conversations expressing the need to complete an investigation of site ASAP and get back to them once I knew our position.

Mr. Ohlson indicated that they have consulted with an expert that has indicated the benzene may be from BP's well and insistent that is our issue. I deferred the benzene issue, by indicating that first we wanted to understand the source of the erosion on the property and that may or may not lead to the source of the benzene.

I will update you later this week after I meet with our leadership team.

Regards,

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Jenkins - DNR, Steve [<mailto:steve.jenkins@state.co.us>]

000344

Sent: Monday, June 08, 2015 9:29 AM
To: Birkbeck, Douglas
Subject: Fwd: Ohlson Sink Hole Issue

Good morning Doug:

Mr. Ohlson is starting to call and leave daily voicemails on Bob Chessons' phone, Bob would like for me to call Mr. Ohlson back before he escalates his impatience to a higher level, but I wanted to touch base with you first to see if you have had any progress on your end?

Please let me know when you get a chance, so I can call Mr. Ohlson back.

Thanks and have a great day,
Steve

----- Forwarded message -----

From: **Jenkins - DNR, Steve** <steve.jenkins@state.co.us>
Date: Wed, Jun 3, 2015 at 9:22 AM
Subject: Ohlson Sink Hole Issue
To: Doug Birkbeck <DOUGLAS.BIRKBECK@bp.com>

Good morning Doug:

Bob Chesson just forwarded a voicemail to me from Mr. Ohlson, he is inquiring as to the status of our proposed investigation into his sink hole, which apparently has not turned into a "30' long trend" in their corral.

So, I just thought I would touch base with you for an update.

Thanks, and have a great day,
Steve

--

Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



COLORADO
Oil & Gas Conservation
Commission
Department of Natural Resources

P [303.894.2100](tel:303.894.2100) x5104 | F [303.894.2109](tel:303.894.2109) |

1120 Lincoln Street, Suite 801, Denver, CO 80203

Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

--

Stephen C. Jenkins, P.E., C.P.E.S.C.

000345

North Central Area Engineer



COLORADO
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P [303.894.2100](tel:303.894.2100) x5104 | F [303.894.2109](tel:303.894.2109) |

1120 Lincoln Street, Suite 801, Denver, CO 80203

Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

000346

From: Jenkins - DNR, Steve <steve.jenkins@state.co.us>
Sent: Monday, June 08, 2015 2:26 PM
To: Doug Birkbeck
Subject: Fwd: Ohlson

Doug:
Above is a copy of the scout card for the well on Mr. Ohlson's property. If you need anything else please let me know.
Steve

----- Forwarded message -----

From: Robert Chesson - DNR <Robert.Chesson@state.co.us>
Date: Mon, Jun 8, 2015 at 2:21 PM
Subject: Ohlson
To: Steve Jenkins - DNR <steve.jenkins@state.co.us>

000199

COGIS - WELL Information

Scout Card

Surface Location Data for API # 05-001-06230

Status: PA 9/19/1978

Well Name/No: UPRR 23 PAN AM B #1 (click well name for production)
 Operator: AMOCO PRODUCTION CO. - 2500
 Status Date: 9/19/1978 Federal or State Lease #:
 County: ADAMS #001 Location: SWNW 33 1S 64W 6 PM
 Field: JAMBOREE - #40590 Elevation: 5,269 ft.
 Planned Location 1964 FNL 660 FWL Lat/Long: 39.922021/-104.562291 Lat/Long Calculated From Footages

Wellbore Data for Sidetrack #00

Status: PA 9/19/1978

Spud Date: 11/26/1970 Spud Date is: ACTUAL
Wellbore Permit
 Permit #: 19700658 Expiration Date: 11/25/1971
 Prop Depth/Form: 8050 Surface Mineral Owner Same: N
 Mineral Owner: FEE Surface Owner:
 Unit: Unit Number:
 Formation and Spacing: Code: MDDYD , Formation: MUDDY D , Order: 0 , Unit Acreage: 80, Drill Unit: S2NW

Wellbore Completed

Completion Date: 2/4/1971
 Measured TD: 8065 Measured PB depth: 8017
 True Vertical TD: 8065 True Vertical PB depth:
 Log Types: IES, NEUTRON POROSITY, COMPENSATED FORMATION
 Casing: String Type: SURF , Hole Size: 12.25, Size: 8.625, Top: 0, Depth: 212, Weight: 24
 Cement: Sacks: 165, Top: 0, Bottom: , Method Grade:
 Casing: String Type: 1ST , Hole Size: 7.875, Size: 5.5, Top: 0, Depth: 8063, Weight: 14 x 15.5
 Cement: Sacks: 200, Top: 0, Bottom: , Method Grade:

Formation	Log Top	Log Bottom	Cored	DSTs
MUDDY D	7842			
MUDDY J	7892			

Completed information for formation MDDYD

Status: AB 9/19/1978

1st Production Date: N/A Choke Size: 0.000
 Status Date: 9/19/1978 Open Hole Completion:
 Commingled: Production Method:
 Formation Name: MUDDY D Status: AB
Formation Treatment
 Treatment Date: 2/4/1971
 Treatment summary: SEE SCANNED DOCUMENT #00304384
 Tubing Size: 2.875 Tubing Setting Depth: 7753
 Tubing Packer Depth: Tubing Multiple Packer:

Robert H. Chesson
 NE Colorado Environmental Protection Specialist

000200



COLORADO
Oil & Gas Conservation
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Department of Natural Resources

P 303.894.2100 x5112 | F 303.894.2109
1120 Lincoln Street, Suite 801, Denver, CO 80203
Robert.Chesson@state.co.us | www.colorado.gov/cogcc

--

Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



COLORADO
Oil & Gas Conservation
Commission
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P 303.894.2100 x5104 | F 303.894.2109 |
1120 Lincoln Street, Suite 801, Denver, CO 80203
Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

000201

From: Jenkins - DNR, Steve <steve.jenkins@state.co.us>
Sent: Tuesday, June 09, 2015 8:22 AM
To: Birkbeck, Douglas
Subject: Re: Ohlson

Doug:

If you go to the COGCC web site and click on the Maps, then zoom to the well API, or section 33, 1S, 64W, and turn on the Aerial Photos, and the well API no.s, you should see the well and the Ohlson property. I am at home today, but if you cant get this to work shoot me an email and I can call you and walk you through it.
Steve

On Tue, Jun 9, 2015 at 7:13 AM, Birkbeck, Douglas <DOUGLAS.BIRKBECK@bp.com> wrote:

Steve: Do you have the topo map (Quadrangle showing the Ohlson Property)? We pulled up an air photo from 1975 and it only shows a well location in the quarter section next to the Ohlson Property. Just trying to verify the well location. Please advise. Thanks

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Jenkins - DNR, Steve [mailto:steve.jenkins@state.co.us]
Sent: Monday, June 08, 2015 3:26 PM
To: Birkbeck, Douglas
Subject: Fwd: Ohlson

Doug:

Above is a copy of the scout card for the well on Mr. Ohlson's property. If you need anything else please let me know.
Steve

----- Forwarded message -----

From: **Robert Chesson - DNR** <Robert.Chesson@state.co.us>
Date: Mon, Jun 8, 2015 at 2:21 PM
Subject: Ohlson
To: Steve Jenkins - DNR <steve.jenkins@state.co.us>

000322

COGIS - WELL Information

Scout Card Related Insp 1 Mile MIT NOAV GIS Doc Review COA Wellbore Orders

Surface Location Data for API # 05-001-06230

Status: PA 9/19/1978

Well Name/No: UPRR 23 PAN AM B #1 (click well name for production)
 Operator: AMOCO PRODUCTION CO. - 2500
 Status Date: 9/19/1978 Federal or State Lease #:
 County: ADAMS #001 Location: SWNW 33 1S 64W 6 PM
 Field: JAMBOREE - #40590 Elevation: 5,269 ft.
 Planned Location 1964 FNL 660 FWL Lat/Long: 39.922021/-104.562291 Lat/Long Calculated From Footages

Wellbore Data for Sidetrack #00

Status: PA 9/19/1978

Spud Date: 11/26/1970 Spud Date is: ACTUAL

Wellbore Permit

Permit #: 19700658 Expiration Date: 11/25/1971
 Prop Depth/Form: 8050 Surface Mineral Owner Same: N
 Mineral Owner: FEE Surface Owner:
 Unit: Unit Number:
 Formation and Spacing: Code: MDDYD , Formation: MUDDY D , Order: 0 , Unit Acreage: 80, Drill Unit: S2NW

Wellbore Completed

Completion Date: 2/4/1971
 Measured TD: 8065 Measured PB depth: 8017
 True Vertical TD: 8065 True Vertical PB depth:
 Log Types: IES, NEUTRON POROSITY, COMPENSATED FORMATION
 Casing: String Type: SURF , Hole Size: 12.25, Size: 8.625, Top: 0, Depth: 212, Weight: 24
 Cement: Sacks: 165, Top: 0, Bottom: , Method Grade:
 Casing: String Type: 1ST , Hole Size: 7.875, Size: 5.5, Top: 0, Depth: 8063, Weight: 14 x 15.5
 Cement: Sacks: 200, Top: 0, Bottom: , Method Grade:

Formation	Log Top	Log Bottom	Cored	DSTs
MUDDY D	7842			
MUDDY J	7892			

Completed information for formation MDDYD

Status: AB 9/19/1978

1st Production Date: N/A Choke Size: 0.000
 Status Date: 9/19/1978 Open Hole Completion:
 Commingled: Production Method:
 Formation Name: MUDDY D Status: AB
 Formation Treatment
 Treatment Date: 2/4/1971
 Treatment summary: SEE SCANNED DOCUMENT #00304384
 Tubing Size: 2.875 Tubing Setting Depth: 7753
 Tubing Packer Depth: Tubing Multiple Packer:

Robert H. Chesson
 NE Colorado Environmental Protection Specialist

000323



COLORADO
Oil & Gas Conservation
Commission
Department of Natural Resources

P 303.894.2100 x5112 | F 303.894.2109
1120 Lincoln Street, Suite 801, Denver, CO 80203
Robert.Chesson@state.co.us | www.colorado.gov/cogcc

--

Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



COLORADO
Oil & Gas Conservation
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P 303.894.2100 x5104 | F 303.894.2109 |
1120 Lincoln Street, Suite 801, Denver, CO 80203
Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

--

Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



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Department of Natural Resources

000324

P 303.894.2100 x5104 | F 303.894.2109 |

1120 Lincoln Street, Suite 801, Denver, CO 80203

Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

000325

file:///P:/Files/RC%20Unit/COGCC%20CORA/Denver%207%20Request%20-%20Ohlson%20Benzene/COGCC%20Email%20Search%20Result/Narrow_steve.jenkins/Re%20Ohlson(7).htm[7/6/2017 1:12:00 PM]

From: Jenkins - DNR, Steve <steve.jenkins@state.co.us>
Sent: Tuesday, June 16, 2015 8:33 AM
To: Robert Chesson - DNR
Subject: Fwd: Ohlson

Bob:
FYI.
Steve

----- Forwarded message -----

From: Birkbeck, Douglas <DOUGLAS.BIRKBECK@bp.com>
Date: Fri, Jun 12, 2015 at 2:23 PM
Subject: RE: Ohlson
To: "Jenkins - DNR, Steve" <steve.jenkins@state.co.us>

Steve: Based on recent conversations with the Ohlson's and conversations with BP management we have decided to have the Ohlson matter go through a legal review to determine our appropriate response. I have conveyed the same to the Ohlson's as of today. However, I will be asked what is the driver behind any response or action from BP. Is it fair to say that this is a complaint by the landowner based on the possible presence of a former Amoco well bore location, erosional trench on the property and the recent discovery of benzene in the landowner's water well. Please advise.

I will need a couple of items: I need the initial date that the COGCC was contacted by the Ohlson's regarding the erosion and/or the discovery of benzene and the subsequent dates that the COGCC visited with the Ohlson's (excluding my visit with you all) and excluding the water sampling dates which I also have. I need to begin the put together a chronological history of events for our legal team.

I will also be pulling together the well data (spud date, fracking, etc) to send to legal.

I will keep you informed as this progresses.

Thank you.

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Jenkins - DNR, Steve [mailto:steve.jenkins@state.co.us]
Sent: Tuesday, June 09, 2015 9:22 AM
To: Birkbeck, Douglas
Subject: Re: Ohlson

Doug:
If you go to the COGCC web site and click on the Maps, then zoom to the well API, or section 33, 1S, 64W, and turn on the Aerial Photos, and the well API no.s, you should see the well and the Ohlson property. I am at home today, but if you cant get this to work shoot me an email and I can call you and walk you through it.
Steve

000209

On Tue, Jun 9, 2015 at 7:13 AM, Birkbeck, Douglas <DOUGLAS.BIRKBECK@bp.com> wrote:

Steve: Do you have the topo map (Quadrangle showing the Ohlson Property)? We pulled up an air photo from 1975 and it only shows a well location in the quarter section next to the Ohlson Property. Just trying to verify the well location. Please advise. Thanks

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Jenkins - DNR, Steve [<mailto:steve.jenkins@state.co.us>]

Sent: Monday, June 08, 2015 3:26 PM

To: Birkbeck, Douglas

Subject: Fwd: Ohlson

Doug:

Above is a copy of the scout card for the well on Mr. Ohlson's property. If you need anything else please let me know.

Steve

----- Forwarded message -----

From: Robert Chesson - DNR <Robert.Chesson@state.co.us>

Date: Mon, Jun 8, 2015 at 2:21 PM

Subject: Ohlson

To: Steve Jenkins - DNR <steve.jenkins@state.co.us>

000210

COGIS - WELL Information

Scout Card Related Insp 1 Mile MIT NOAV GIS Doc Review COA Wellbore Orders

Surface Location Data for API # 05-001-06230

Status: PA 9/19/1978

Well Name/No: UPRR 23 PAN AM B #1 (click well name for production)
 Operator: AMOCO PRODUCTION CO. - 2500
 Status Date: 9/19/1978 Federal or State Lease #:
 County: ADAMS #001 Location: SWNW 33 1S 64W 6 PM
 Field: JAMBOREE - #40590 Elevation: 5,269 ft.
 Planned Location 1964 FNL 660 FWL Lat/Long: 39.922021/-104.562291 Lat/Long Calculated From Footages

Wellbore Data for Sidetrack #00

Status: PA 9/19/1978

Spud Date: 11/26/1970 Spud Date is: ACTUAL
Wellbore Permit
 Permit #: 19700658 Expiration Date: 11/25/1971
 Prop Depth/Form: 8050 Surface Mineral Owner Same: N
 Mineral Owner: FEE Surface Owner:
 Unit: Unit Number:
 Formation and Spacing: Code: MDDYD , Formation: MUDDY D , Order: 0 , Unit Acreage: 80, Drill Unit: S2NW

Wellbore Completed

Completion Date: 2/4/1971
 Measured TD: 8065 Measured PB depth: 8017
 True Vertical TD: 8065 True Vertical PB depth:
 Log Types: IES, NEUTRON POROSITY, COMPENSATED FORMATION
 Casing: String Type: SURF , Hole Size: 12.25, Size: 8.625, Top: 0, Depth: 212, Weight: 24
 Cement: Sacks: 165, Top: 0, Bottom: , Method Grade:
 Casing: String Type: 1ST , Hole Size: 7.875, Size: 5.5, Top: 0, Depth: 8063, Weight: 14 x 15.5
 Cement: Sacks: 200, Top: 0, Bottom: , Method Grade:

Formation	Log Top	Log Bottom	Cored	DSTs
MUDDY D	7842			
MUDDY J	7892			

Completed information for formation MDDYD

Status: AB 9/19/1978

1st Production Date: N/A Choke Size: 0.000
 Status Date: 9/19/1978 Open Hole Completion:
 Commingled: Production Method:
 Formation Name: MUDDY D Status: AB
Formation Treatment
 Treatment Date: 2/4/1971
 Treatment summary: SEE SCANNED DOCUMENT #00304384
 Tubing Size: 2.875 Tubing Setting Depth: 7753
 Tubing Packer Depth: Tubing Multiple Packer:

Robert H. Chesson
 NE Colorado Environmental Protection Specialist

000211



P 303.894.2100 x5112 | F 303.894.2109
1120 Lincoln Street, Suite 801, Denver, CO 80203
Robert.Chesson@state.co.us | www.colorado.gov/cogcc

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Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



P 303.894.2100 x5104 | F 303.894.2109 |
1120 Lincoln Street, Suite 801, Denver, CO 80203
Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

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Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



000212

P 303.894.2100 x5104 | F 303.894.2109 |

1120 Lincoln Street, Suite 801, Denver, CO 80203

Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

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Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



P 303.894.2100 x5104 | F 303.894.2109 |

1120 Lincoln Street, Suite 801, Denver, CO 80203

Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

000213

From: Jenkins - DNR, Steve <steve.jenkins@state.co.us>
Sent: Thursday, September 17, 2015 9:52 AM
To: Birkbeck, Douglas
Subject: Re: Abandoned Well and subsidence in Horse Corral

I just checked with Bob Chesson, and he said PID meters were used, and that he has used a PID meter every time he has been out there with on indications of gasses.

Steve

On Thu, Sep 17, 2015 at 9:13 AM, Birkbeck, Douglas <DOUGLAS.BIRKBECK@bp.com> wrote:
Steve: Just to clarify, did you all use a PID or FID regarding the meters?

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Jenkins - DNR, Steve [mailto:steve.jenkins@state.co.us]
Sent: Wednesday, September 16, 2015 1:25 PM

To: Birkbeck, Douglas
Subject: Re: Abandoned Well and subsidence in Horse Corral

There was some slight staining, but no hydrocarbon reading with the meters when placed close to the staining. We did not mark the edges with GPS, but LT has some very good drawings and we all took a bunch of photos. Nowhere, in any of the trenches or holes were we able to pick up any indication of hydrocarbons, with the meters.

On Wed, Sep 16, 2015 at 12:20 PM, Birkbeck, Douglas <DOUGLAS.BIRKBECK@bp.com> wrote:
Steve: With regard to the old pit sides and bottom, any evidence of total petroleum hydrocarbon staining? Did you mark with GPS the location of the former pit?

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Jenkins - DNR, Steve [mailto:steve.jenkins@state.co.us]
Sent: Wednesday, September 16, 2015 1:17 PM
To: Birkbeck, Douglas
Subject: Re: Abandoned Well and subsidence in Horse Corral

Hi Doug:

I have not gotten the report from Lt yet, but we got the trench excavated and backfilled, GPR'd the corral, and to the south, it looked like a crime scene out there, with trenches and holes here and there. Everywhere the GPR folks thought they had something we dug up old scrap metal. Long story, short, we did not find the well. We did find what appeared to be some old pit sides and bottoms, but no well.

000280

I imagine that Gary will be contacting you since we were not successful in locating the old well..... Robert Chesson came out too, and took one last water sample.

I will send you a copy of the report when I get it.
Thanks and have a great day,
Steve

On Wed, Sep 16, 2015 at 11:53 AM, Birkbeck, Douglas <DOUGLAS.BIRKBECK@bp.com> wrote:
Steve: Any status on the work by LT Environmental?

Douglas Birkbeck, PG
Strategy Manager
BP Remediation Management
201 Helios Way, Room 6.376C
Houston, TX 77079
(713) 323-4145 Office
(404) 216-6825 Cell

From: Jenkins - DNR, Steve [<mailto:steve.jenkins@state.co.us>]
Sent: Tuesday, August 25, 2015 9:57 AM
To: gohlson@telepacific.com
Cc: Robert Chesson - DNR; Birkbeck, Douglas
Subject: Abandoned Well and subsidence in Horse Corral

Good morning Mr. Ohlson:

I am contacting you to inform you that we have contracted with LT Environmental to perform some ground penetrating radar in the area of your existing horse exercising corral, and to locate the old plugged and abandoned well head. We would like to perform this work on the 9th and 10th of September. Once the well head is located we will attach a steel post which will be back filled in place to mark the location of the plugged and abandoned well. Depending upon what is found with the ground penetrating radar, within your corral area, we will evaluate any subsurface material found by the radar, and back fill and compact the excavation with material suitable for a horse corral.

Please let me know if this is acceptable to you,
Thank you , and have a great day,
Steve

--

Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



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Oil & Gas Conservation
Commission

Department of Natural Resources

P [303.894.2100](tel:303.894.2100) x5104 | F [303.894.2109](tel:303.894.2109) |

1120 Lincoln Street, Suite 801, Denver, CO 80203

000281

Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

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Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



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Department of Natural Resources

P [303.894.2100](tel:303.894.2100) x5104 | F [303.894.2109](tel:303.894.2109) |

1120 Lincoln Street, Suite 801, Denver, CO 80203

Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

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Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



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P [303.894.2100](tel:303.894.2100) x5104 | F [303.894.2109](tel:303.894.2109) |

1120 Lincoln Street, Suite 801, Denver, CO 80203

Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

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Stephen C. Jenkins, P.E., C.P.E.S.C.

North Central Area Engineer



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Department of Natural Resources

P 303.894.2100 x5104 | F 303.894.2109 |

1120 Lincoln Street, Suite 801, Denver, CO 80203

Steve.Jenkins@state.co.us | www.colorado.gov/cogcc

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Department of Natural Resources

1120 Lincoln Street, Suite 801
Denver, CO 80203

March 3, 2015

Gary Ohlson
36105 E. 124th Avenue
Hudson, CO 80642

RE: Water Well Sampling Request Report
Complaint No. 200412560
Division of Water Resources Well Permit No. 269807
SWNW Section 33 – Township 1 South – Range 64 West
Adams County, Colorado

Mr. Ohlson:

On January 13, 2015 the Colorado Oil and Gas Conservation Commission (COGCC) sampled your water well. The water sample was analyzed for general organic and inorganic constituents. Additionally a sample was also collected from your kitchen sink. This letter summarizes the water quality results.

As you are aware, the COGCC has sampled your water well on four previous occasions; September 2006, March 2008, September 2010, and September 2014, and this letter compares these four previous sample results with the recent January 2015 results (Table 1).

FIELD TESTING

The water sample was collected from the yard hydrant adjacent to your water well and before any water system treatment. The pump on your well was started at approximately 10:20 a.m. allowed to run for approximately 10 minutes. Approximately 50 gallons of water purged prior to sampling. The sample was collected in laboratory certified containers, labeled, placed on ice in a cooler, and delivered to Test America Laboratories in Arvada, Colorado with a chain-of-custody form. Four additional samples were collected for tritium, carbon-14, optical brighteners, and caffeine. Those samples were labeled and shipped to Isotech Laboratories, Inc Champaign, IL (the tritium and carbon-14 analyses) and ALS Environmental Laboratory in Kelso, WA for the optical brighteners and caffeine analyses. These additional tests were collected to help identify the possible source of the benzene in your water well.

P 303.894.2100 F 303.894.2109 www.colorado.gov/cogcc

Commissioners: Thomas L. Compton - Chairman, Richard Alward, John H. Benton, DeAnn Craig,
James W. Hawkins, Tommy Holton, Andrew L. Spielman, Mike King, Dr. Larry Wolk
John W. Hickenlooper, Governor | Mike King, Executive Director, DNR | Matthew J. Lepore, Director



DISCUSSION OF ANALYTICAL RESULTS

The Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and Environment (CDPHE) established "Domestic Use – Quality" Human Health and Secondary Drinking Water Standards in Regulation 41 "The Basic Standards for Groundwater" (5CCR 1002-41). It is important to note that these standards were established for **municipal public drinking water supplies**, and that people often use and consume groundwater from private wells that exceeds these standards. The COGCC is an implementing agency of the groundwater standards for impacts associated with oil and gas exploration and production activities.

Analytical data for the sample from your water well was compared to the CDPHE Human Health and Secondary Drinking Water Standards in the Table 1. Table 1 summarizes the sample results from your water well for the samples collected in 2006, 2008, 2010, 2014, and 2015. The complete laboratory analytical report as well as the sampling results for your kitchen sink is provided as Attachment 2.

INORGANIC ANALYTICAL RESULTS

The following inorganic elements were detected at levels exceeding the CDPHE Secondary Drinking Water Standards in the sample from your water well.

- **Sulfate** was detected in the sample from your domestic well at a concentration of 460 mg/l. The previous sample results were 350 Q mg/l (2006), 410 Q mg/l (2008), 430 mg/l (2010), and 500 mg/l (2014). The Q qualifier denotes an elevated reporting limit due to high analyte concentration.

The CDPHE domestic water supply drinking water standard for sulfate (SO_4) is 250 mg/l. Although CDPHE does not have an agricultural standard for sulfate, other agencies recommend a concentration below 1,500 mg/l for livestock watering. Waters containing high concentrations of sulfate, typically caused by the leaching of natural deposits of magnesium sulfate (Epsom salts) or sodium sulfate (Glauber's salt), may be undesirable because of their laxative effects.

- **Total Dissolved Solids (TDS)** was detected in the sample from your domestic well at a concentration of 850 mg/l. The previous sample results were 740 mg/l (2006), 770 mg/l (2008), 820 mg/l (2010), 870 mg/l (2014), and 879 mg/l (2013).

CDPHE has established a TDS standard for human drinking water of 500 mg/l. The standard is called the secondary maximum contaminant level (SMCL) and is based on the aesthetic quality of the water (such as taste and odor) and is intended as a guideline for public water supply systems and is not an enforceable standard. Although CDPHE does not have an agricultural standard for TDS, other agencies recommend concentrations below 1,500 mg/l for irrigation, and below 5,000 mg/l for most livestock watering. TDS concentrations are related to the presence of naturally occurring elements and chemical compounds, such as chloride, sodium, potassium, calcium, magnesium, and sulfate.

The sample from your well was also analyzed for calcium, magnesium, potassium, sodium bromide, and alkalinity content, specific conductivity and sodium adsorption ratio. There are no CDPHE drinking water standards for these parameters; a sodium concentration of 20 milligrams per liter is often recommended by some physicians for patients on salt restricted diets or those suffering from hypertension or heart disease.

METHANE GAS ANALYSIS

Dissolved methane was detected in the sample from your domestic water well at a concentration of 0.077 mg/l. The previous sample results were not detected (2006), 0.087 mg/l (2008), 0.012 mg/l (2010), and 0.054 mg/l (2014).

Methane gas alone is physiologically inert and non-toxic to humans. Based on the results of extensive testing for methane gas in water wells throughout Colorado, concentrations of methane gas below 1 mg/l are considered harmless, with concern for possible hazards from the methane increasing at concentrations in well waters at or exceeding 7 mg/l.

VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS

A target list of 126 volatile and semi-volatile organic compounds was used during analysis of water from your well. **Benzene detected above the method detection limit in the sample from your well at a concentration of 0.0094 mg/l.** This concentration exceeds the CDPHE human health standard of 0.005 mg/l. Benzene was previously detected at 0.0091 mg/l in the September 5, 2014 sample of your water well.

A separate sample was collected from your home (kitchen sink). Chloroform was detected at 0.0019 mg/l. The EPA/CDPHE standard for trihalomethanes in public drinking water (such as chloroform) is 0.080 mg/l and your house water sample is well below the standard. Previous samples (2014) had no detections. Very low concentrations of trihalomethanes are common by-products of raw water disinfectants from chlorination which you have previously noted you have conducted on your well.

As we have discussed previously, the presence of benzene without other volatile compounds (specifically ethyl benzene, xylenes, toluene, and naphthalene) is very unusual if the benzene present is due to a crude oil spill. Benzene found alone is more diagnostic of an industrial use, in that benzene can be found in products such as glues, paints, waxes, and detergents and is also used in the manufacture of other chemicals and products such as plastics, lubricants, dyes, drugs, and pesticides. Small amounts of benzene could be released into the environment from any of these products.

ADDITIONAL SAMPLING

To assist in identifying where the benzene in your water well may be originating, the COGCC collected additional diagnostic samples to evaluate the isolation of your water zone in your

water well from the surface and to try to identify if there could be a surface source for the benzene. Samples were collected for the following:

- Tritium, optical brighteners, carbon-14, and caffeine.

The purpose and results of these samples are discussed below.

Tritium – Tritium (^3H) is a radioactive isotope of hydrogen that is produced naturally at low concentrations in the upper atmosphere via cosmic-ray bombardment. Tritium in water is incorporated in water molecules. Tritium was produced at high levels in the 1950s and 1960s due to atmospheric thermonuclear bomb testing resulting in what is called “bomb water” (concentration peaking in 1963 [USGS, 2014]). Tritium decays with a half-life of 12.3 years so that “old” water should have little or no tritium present. The presence of ^3H in groundwater is considered evidence of recent or “young” water recharge for that aquifer. The COGCC collected a tritium sample during the January 13, 2015 sampling. Tritium was not detected in that sample (detection limit 1 tritium units [TU]).

Optical Brighteners – Optical brighteners are synthetic compounds that are added to soaps and detergents (laundry soaps) as whitening agents, although not all soaps and detergents contain these compounds. They have been in use since the 1960s and their presence can be used to determine the presence of waste-water, especially waste-water from laundry operations. The presence of optical brighteners is also sometimes used to evaluate septic impacts on waters. Optical brighteners were not detected in the January 13, 2015 sample.

Carbon-14 – Carbon-14 (^{14}C) is a radioactive isotope produced by cosmic-ray interaction with nitrogen in the atmosphere. This carbon isotope occurs naturally in small amounts in atmospheric carbon dioxide and is introduced into groundwater through plant and bacteria growth and decay. ^{14}C decays with a half-life of 5,730 years (USGS, 1992). Carbon-14 is measured in percent modern carbon (pmC) and the results can be used to estimate groundwater ages up to about 30,000 years before present (BP) (USGS, 2014; USGS, 1992). Carbon-14 was detected at an activity of 1.6 pmC in the January 13, 2015 sample.

Caffeine – Caffeine is used as an indicator of domestic waste water (septic systems) due to its anthropogenic origin. Caffeine is present in large amounts in coffee and other beverages and, although the bulk of caffeine ingested is metabolized, up to 3 percent of ingested caffeine is excreted unmetabolized in urine (Seiler, et al, 1999). A household can produce significant amounts of caffeine in waste water through both septic flow and through the disposal of unconsumed coffee, tea, or soft drinks into the household waste system. Caffeine was detected at a concentration of 1.9 nanograms per liter (ng/l) in the January 13, 2015 sample.

DISCUSSION

Studies conducted by the United States Geological Survey (USGS) on the ages of groundwater in the Denver Basin shows the Arapahoe aquifer water has an age greater than 30,000 years BP (USGS, 2014). Because this age exceeds the resolution of ^{14}C for age dating (no percent modern carbon present), there should be no modern carbon detectable in your water well unless there is recent water mixing with the Arapahoe aquifer water at the location of your water well. The September 13, 2015 sample from your water well had 1.6 pmC which indicates the presence of young water in your water well. Additionally, the presence of caffeine in the samples from your water well provides evidence to the existence of a connection from the ground surface to the depth of your water well and indicates that that connection may be allowing household waste-water to enter the well.

Earlier you had provided me with the location and dimensions of your septic leach field (see Figure 1). Based on your provided location, the horizontal separation from your septic leach field and your existing and older water wells is approximately 100 feet, which is the minimum separation under TriCounty Health's code requirements for household septic systems. However, considering the flat nature of the ground from your leach field to your water well bores and the lack of a preferred direction of drainage for your septic leach field as the result to flat ground surface, it is possible that septic flow from your system has migrated over time in the shallow subsurface into the area occupied by the water well. At that point any lack of surface isolation of the old and/or new water well may have provided a pathway for this effluent to the depth of your water well intake. Any disposed of fluids into the septic system or spillage of fluids in or around your leach field could become entrained in this waste-water plume and found in samples from the water well. This could be the mechanism for the occurrence of the benzene observed in the water well samples.

CONCLUSIONS

The concentration of total dissolved solids (TDS) and sulfate (SO_4) detected in your well water were above the drinking water standards (Secondary Maximum Contaminate Level [SMCL] established by the Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and the Environment. The SMCLs are based on the aesthetic quality of the water (such as taste and odor) and is not an enforceable standard.

As in the earlier (9/5/2014) sampling, benzene above the State of Colorado water quality standard was observed in this sampling event (at a similar concentration [0.0091mg/l and 0.0094 mg/l]). Based on the results of the investigative sampling, there is the likelihood that the source of the benzene in your well water may be related to household wastewater disposal or spillage in or around your septic system. There is no evidence that the occurrence of the benzene in your water well is due to oil & gas activity in your area or on your property. Because of the possibility that your water well may have fluid from your septic system entering

your water system, you may wish to contact Hope Dalton (TriCounty Health Department) for advice on having your well sampled and analyzed for coliform bacteria. The main number for TriCounty Health is 303-220-9200 and Ms. Dalton's phone number is 720-200-1583.

At this time your complaint remains active pending the BP work (investigation and excavation in the area of your corral). The COGCC may conduct additional well testing based on further investigation findings.

The COGCC maintains a water quality database where the results from your water well sample are recorded.

If you have any questions or would like to discuss these matters further, please contact me at 303-894-2100 Extension 5112 or by email at robert.chesson@state.co.us.

Respectfully,

Colorado Oil and Gas Conservation Commission

**Robert H.
Chesson**

Digitally signed by Robert H. Chesson
DN: cn=Robert H. Chesson, o=Colorado
Oil and Gas Conservation Commission,
ou, email=robert.chesson@state.co.us,
c=US
Date: 2015.03.03 12:30:08 -07'00'

Robert H. Chesson

Environmental Protection Specialist – Northeast Colorado

Enclosures: Attachment 1 Analytical Summary Table
Attachment 2 Laboratory Analytical Reports
Attachment 3 Figure 1

cc: John Axelson, COGCC
Greg Deranleau, COGCC
Douglas Birkbeck, BP America

REFERENCES

Seiler, R.L., Zaugg, S.D., Thomas, J.M., and Howcroft, D.L., 1999, *Caffeine and Pharmaceuticals as Indicators of Waste Water Contamination in Wells, Ground Water*, Vol. 37, No.3, pg 405 – 410.

United States Geological Survey (USGS), 1994, *Study and Interpretation of the Chemical Characteristics of Natural Water*, Water-Supply Paper 2254, Third Edition.

USGS, 2014, *Quality of Groundwater in the Denver Basin Aquifer System, Colorado 2003-5*, Scientific Investigations Report 2014-5051.

Ohlson Water Well
Complaint No. 200412560
March 3, 2015
Page 7

APPACHMENT 1

Table 1
Ohlson Water Well
Analytical Summary

Parameter	Water Well Samples						CDPHE Standards	
	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date			
	09/25/2006	03/18/2008	09/27/2010	09/05/14	01/13/15			
	Result	Result	Result	Result	Result	Unit	Domestic	Agriculture
Benzene	ND	ND	ND	0.0091	0.0094	mg/l	0.005	0.005
Ethylbenzene	ND	ND	ND	ND	ND	mg/l	0.7	0.7
Toluene	0.031	0.0016	ND	ND	ND	mg/l	0.56	0.56
Total Xylenes	ND	ND	ND	ND	ND	mg/l	1.4	1.4
Arsenic	ND	ND	ND	ND	ND	mg/l	0.05	0.1
Barium	0.019	0.018	0.021	0.018	0.021	mg/l	2.0	
Calcium	9.9	10	130	120	140	mg/l	NS	
Chromium	ND	ND	ND	ND	ND	mg/l	0.1	0.1
Iron	0.38	0.170 L	0.28 B	0.18	0.17	mg/l	0.3	5
Lead	ND	ND	ND	ND	ND	mg/l	0.05	0.1
Magnesium	0.9	1	1.1	0.57	1.4	mg/l	NS	
Manganese	0.018	0.022	0.043	1.2	0.037	mg/l	0.05	0.2
Potassium	ND	ND	2.2 J	ND	ND	mg/l	NS	
Selenium	ND	ND	0.063 J	ND	ND	mg/l	0.05	0.02
Sodium	260	250	290	270	300	mg/l	NS	
Chloride	46	50	48	50	50	mg/l	250	NS
Nitrite	ND	NA	NA	NA	NA	mg/l	1.0	10
Nitrate	ND	NA	NA	NA	NA	mg/l	10.0	100
Total Nitrite/Nitrate	NA	ND	ND	ND	ND	mg/l	10.0	100
Fluoride	0.72	0.67	0.63	0.58	0.73	mg/l	4.0	NS
Total Dissolved Solids	740	770	820	870	850	mg/l	500	*1,500
pH	9	8.6	8.75	NA	8.73	No units	6.5 - 8.5	6.5 - 8.5
Sulfate	350 Q	410 Q	430	500	460	mg/l	250	
Bromide	0.44	0.46	0.49	0.51	0.53	mg/l	NS	
Total Alkalinity	130	150	130	120	130	mg/l	NS	
Bicarbonate	120	150	120	120	120	mg/l	NS	
Carbonate	11	ND	6.6	ND	6.8	mg/l	NS	
Conductivity	1,200	1,300	1,300	NA	1,100	umhos/cm	NS	
Methane	ND	0.087	0.012	0.054	0.077	mg/l	NS	
Optical Brightener 220	NA	NA	NA	NA	ND	ug/l	NS	
Caffeine	NA	NA	NA	NA	2.00	ng/l	NS	
Tritium (H ³)	NA	NA	NA	NA	ND	TU	NS	
¹⁴ C	NA	NA	NA	NA	1.6	PMC	NS	
Del D of water	NA	NA	NA	NA	-116.1	per mil	NS	
Del ¹⁸ O of water	NA	NA	NA	NA	-15.22	per mil	NS	
Del ¹³ C of water	NA	NA	NA	NA	-13.50	per mil	NS	

Notes

CDPHE	Colorado Department of Public Health and the Environment.
Domestic	Standards for Domestic Water Supply, Human Health and Drinking Water Standards.
Agriculture	* Standards for agriculture compiled from CDPHE and other of sources.
mg/l	Milligrams per liter (equals parts per million).
CDPHE Standards	Water Quality Control Commission 5 CCR 1002-41, Regulation No. 41 - The Basic Standards For Ground
umhos/cm	micromhos per centimeter
ng/l	nanograms per liter
PMC	Percent Modern Carbon
TU	Tritium Units
NA	Not analyzed.
ND	Not detected.
NS	No Standard.
**	Health Advisory.
	Human health standard.
	Secondary standard.

Ohlson Water Well
Complaint No. 200412560
March 3, 2015
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ATTACHMENT 2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Tel: (303)736-0100

TestAmerica Job ID: 280-64325-1
Client Project/Site: COGCC - Ohlson Water Well

For:
Colorado Oil&Gas Conservation Commission
1120 Lincoln St.
Suite 801
Denver, Colorado 80203

Attn: Ms. Angie Gipson

Donna Rydberg

Authorized for release by:
1/22/2015 8:14:15 PM

Donna Rydberg, Senior Project Manager
(303)736-0192
donna.rydberg@testamericainc.com

The test results in this report meet all 2003 NELAP and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Job ID: 280-64325-1

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE

Client: Colorado Oil&Gas Conservation Commission

Project: COGCC - Ohlson Water Well

Report Number: 280-64325-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 1/13/2015 at 1:09 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.3°C.

One of six 40mL vials submitted for sample OHLSON WELL contained an air bubble greater than 6mm in diameter. Sufficient volume remained to proceed with the requested analysis. The client was notified on 1/13/2015.

A sample ID discrepancy was noted between the information listed on the chain-of-custody and the sample container labels. The chain-of-custody lists the sample ID as OHLSON WELL, while the container labels list the sample ID as OHLSON. The laboratory was able to determine the identity of the sample by comparing the sample collection time on the COC with the sample collection time on the sample container labels. The sample ID was logged as OHLSON WELL, per the information on the chain-of-custody. The client was notified on 1/13/2015.

Sample OHLSON WELL (280-64325-1) was received with insufficient preservation for NOXT analysis. The laboratory will adjust the pH of the sample and proceed with the analysis. The client was notified on 1/13/2015.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Sample OHLSON WELL (280-64325-1) was analyzed for volatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8260B.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS (GC-MS)

Sample OHLSON WELL (280-64325-1) was analyzed for semivolatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8270C.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED GASES

Sample OHLSON WELL (280-64325-1) was analyzed for dissolved gases in accordance with RSK_175.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL METALS

Case Narrative

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Job ID: 280-64325-1 (Continued)

Laboratory: TestAmerica Denver (Continued)

Sample OHLSON WELL (280-64325-1) was analyzed for total metals in accordance with EPA SW-846 Method 6010B.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY

Sample OHLSON WELL (280-64325-1) was analyzed for Alkalinity in accordance with SM20 2320B.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SPECIFIC CONDUCTIVITY

Sample OHLSON WELL (280-64325-1) was analyzed for specific conductivity in accordance with SM20 2510B.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL DISSOLVED SOLIDS

Sample OHLSON WELL (280-64325-1) was analyzed for total dissolved solids in accordance with SM20 2540C.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS (28 DAYS)

Sample OHLSON WELL (280-64325-1) was analyzed for anions (28 days) in accordance with EPA Method 300.0.

Sample OHLSON WELL (280-64325-1) required a 5X dilution prior to analysis for Sulfate. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

NITRATE-NITRITE AS NITROGEN

Sample OHLSON WELL (280-64325-1) was analyzed for nitrate-nitrite as nitrogen in accordance with EPA Method 353.2.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CATION ANION BALANCE

Sample OHLSON WELL (280-64325-1) was analyzed for Cation Anion Balance in accordance with Cation Anion Balance.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CORROSIVITY (PH)

Sample OHLSON WELL (280-64325-1) was analyzed for corrosivity (pH) in accordance with SM20 4500 H+ B.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Client Sample ID: OHLSON WELL

Lab Sample ID: 280-64325-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Benzene	9.4		1.0	ug/L	1		8260B	Total/NA
Methane	77		5.0	ug/L	1		RSK-175	Total/NA
Barium	21		10	ug/L	1		6010B	Total/NA
Calcium	14000		200	ug/L	1		6010B	Total/NA
Iron	170		100	ug/L	1		6010B	Total/NA
Magnesium	1400		200	ug/L	1		6010B	Total/NA
Manganese	37		10	ug/L	1		6010B	Total/NA
Sodium	300000		1000	ug/L	1		6010B	Total/NA
Bromide	0.53		0.20	mg/L	1		300.0	Total/NA
Chloride	50		3.0	mg/L	1		300.0	Total/NA
Fluoride	0.73		0.50	mg/L	1		300.0	Total/NA
Sulfate	460		25	mg/L	5		300.0	Total/NA
Total Anions	14			meq/L	1		SM 1030F	Total/NA
Total Cations	14			meq/L	1		SM 1030F	Total/NA
Percent Difference	0.90			%	1		SM 1030F	Total/NA
Anion/Cation Balance	0.90			%	1		SM 1030F	Total/NA
Alkalinity	130		5.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	120		5.0	mg/L	1		SM 2320B	Total/NA
Carbonate Alkalinity as CaCO3	6.8		5.0	mg/L	1		SM 2320B	Total/NA
Specific Conductance	1100		2.0	umhos/cm	1		SM 2510B	Total/NA
Total Dissolved Solids	850		10	mg/L	1		SM 2540C	Total/NA
pH adj. to 25 deg C	8.73	HF	0.100	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Method Summary

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL DEN
RSK-175	Dissolved Gases (GC)	RSK	TAL DEN
6010B	Metals (ICP)	SW846	TAL DEN
300.0	Anions, Ion Chromatography	MCAWW	TAL DEN
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL DEN
SM 1030F	Cation Anion Balance	SM	TAL DEN
SM 2320B	Alkalinity	SM	TAL DEN
SM 2510B	Conductivity, Specific Conductance	SM	TAL DEN
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL DEN
SM 4500 H+ B	pH	SM	TAL DEN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-64325-1	OHLSON WELL	Water	01/13/15 10:30	01/13/15 13:09



Client Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: OHLSON WELL

Date Collected: 01/13/15 10:30

Date Received: 01/13/15 13:09

Lab Sample ID: 280-64325-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		10	ug/L			01/14/15 11:38	1
Benzene	9.4		1.0	ug/L			01/14/15 11:38	1
Bromoform	ND		1.0	ug/L			01/14/15 11:38	1
Bromomethane	ND		2.0	ug/L			01/14/15 11:38	1
2-Butanone (MEK)	ND		6.0	ug/L			01/14/15 11:38	1
Carbon disulfide	ND		2.0	ug/L			01/14/15 11:38	1
Carbon tetrachloride	ND		1.0	ug/L			01/14/15 11:38	1
Chlorobenzene	ND		1.0	ug/L			01/14/15 11:38	1
Chlorobromomethane	ND		1.0	ug/L			01/14/15 11:38	1
Chlorodibromomethane	ND		1.0	ug/L			01/14/15 11:38	1
Chloroethane	ND		2.0	ug/L			01/14/15 11:38	1
Chloroform	ND		1.0	ug/L			01/14/15 11:38	1
Chloromethane	ND		2.0	ug/L			01/14/15 11:38	1
cis-1,2-Dichloroethene	ND		1.0	ug/L			01/14/15 11:38	1
cis-1,3-Dichloropropene	ND		1.0	ug/L			01/14/15 11:38	1
Cyclohexane	ND		2.0	ug/L			01/14/15 11:38	1
Cyclohexanone	ND		100	ug/L			01/14/15 11:38	1
1,2-Dibromo-3-Chloropropane	ND		5.0	ug/L			01/14/15 11:38	1
1,2-Dibromoethane	ND		1.0	ug/L			01/14/15 11:38	1
1,2-Dichlorobenzene	ND		1.0	ug/L			01/14/15 11:38	1
1,3-Dichlorobenzene	ND		1.0	ug/L			01/14/15 11:38	1
1,4-Dichlorobenzene	ND		1.0	ug/L			01/14/15 11:38	1
Dichlorobromomethane	ND		1.0	ug/L			01/14/15 11:38	1
Dichlorodifluoromethane	ND		2.0	ug/L			01/14/15 11:38	1
1,1-Dichloroethane	ND		1.0	ug/L			01/14/15 11:38	1
1,2-Dichloroethane	ND		1.0	ug/L			01/14/15 11:38	1
1,1-Dichloroethene	ND		1.0	ug/L			01/14/15 11:38	1
1,2-Dichloropropane	ND		1.0	ug/L			01/14/15 11:38	1
1,4-Dioxane	ND		200	ug/L			01/14/15 11:38	1
Ethanol	ND		300	ug/L			01/14/15 11:38	1
Ethylbenzene	ND		1.0	ug/L			01/14/15 11:38	1
Ethyl-t-butyl ether (ETBE)	ND		5.0	ug/L			01/14/15 11:38	1
2-Hexanone	ND		5.0	ug/L			01/14/15 11:38	1
Isobutanol	ND		110	ug/L			01/14/15 11:38	1
Isopropanol	ND		40	ug/L			01/14/15 11:38	1
Isopropylbenzene	ND		1.0	ug/L			01/14/15 11:38	1
Methyl acetate	ND		5.0	ug/L			01/14/15 11:38	1
Methylcyclohexane	ND		1.0	ug/L			01/14/15 11:38	1
Methylene Chloride	ND		2.0	ug/L			01/14/15 11:38	1
4-Methyl-2-pentanone (MIBK)	ND		5.0	ug/L			01/14/15 11:38	1
Methyl-t-Butyl Ether (MTBE)	ND		5.0	ug/L			01/14/15 11:38	1
m-Xylene & p-Xylene	ND		2.0	ug/L			01/14/15 11:38	1
n-Butanol	ND		60	ug/L			01/14/15 11:38	1
o-Xylene	ND		1.0	ug/L			01/14/15 11:38	1
Styrene	ND		1.0	ug/L			01/14/15 11:38	1
Tert-amyl-methyl ether (TAME)	ND		5.0	ug/L			01/14/15 11:38	1
tert-Butyl alcohol (TBA)	ND		50	ug/L			01/14/15 11:38	1
1,1,2,2-Tetrachloroethane	ND		1.0	ug/L			01/14/15 11:38	1
Tetrachloroethene	ND		1.0	ug/L			01/14/15 11:38	1

TestAmerica Denver

Client Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: OHLSON WELL

Date Collected: 01/13/15 10:30

Date Received: 01/13/15 13:09

Lab Sample ID: 280-64325-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	ND		1.0	ug/L			01/14/15 11:38	1
trans-1,2-Dichloroethene	ND		1.0	ug/L			01/14/15 11:38	1
trans-1,3-Dichloropropene	ND		3.0	ug/L			01/14/15 11:38	1
1,2,3-Trichlorobenzene	ND		1.0	ug/L			01/14/15 11:38	1
1,2,4-Trichlorobenzene	ND		1.0	ug/L			01/14/15 11:38	1
1,1,1-Trichloroethane	ND		1.0	ug/L			01/14/15 11:38	1
1,1,2-Trichloroethane	ND		1.0	ug/L			01/14/15 11:38	1
Trichloroethene	ND		1.0	ug/L			01/14/15 11:38	1
Trichlorofluoromethane	ND		2.0	ug/L			01/14/15 11:38	1
1,1,2-Trichlorotrifluoroethane	ND		3.0	ug/L			01/14/15 11:38	1
Vinyl chloride	ND		1.0	ug/L			01/14/15 11:38	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		78 - 120				01/14/15 11:38	1
Dibromofluoromethane (Surr)	111		77 - 120				01/14/15 11:38	1
1,2-Dichloroethane-d4 (Surr)	115		70 - 127				01/14/15 11:38	1
Toluene-d8 (Surr)	93		80 - 125				01/14/15 11:38	1

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Client Sample ID: OHLSON WELL

Date Collected: 01/13/15 10:30

Date Received: 01/13/15 13:09

Lab Sample ID: 280-64325-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
1,4-Dichlorobenzene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
2,2'-oxybis[1-chloropropane]	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2,4,5-Trichlorophenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2,4,6-Trichlorophenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2,4-Dichlorophenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2,4-Dimethylphenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2,4-Dinitrophenol	ND		29	ug/L		01/15/15 16:20	01/20/15 14:50	1
2,4-Dinitrotoluene	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2,6-Dinitrotoluene	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2-Chloronaphthalene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
2-Chlorophenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2-Methylnaphthalene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
2-Methylphenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2-Nitroaniline	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
2-Nitrophenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
3 & 4 Methylphenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
3,3'-Dichlorobenzidine	ND		48	ug/L		01/15/15 16:20	01/20/15 14:50	1
3-Nitroaniline	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
4,6-Dinitro-2-methylphenol	ND		48	ug/L		01/15/15 16:20	01/20/15 14:50	1
4-Bromophenyl phenyl ether	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
4-Chloro-3-methylphenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
4-Chloroaniline	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
4-Chlorophenyl phenyl ether	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
4-Nitroaniline	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
4-Nitrophenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1

TestAmerica Denver

Client Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: OHLSON WELL

Date Collected: 01/13/15 10:30

Date Received: 01/13/15 13:09

Lab Sample ID: 280-64325-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Acenaphthylene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Acetophenone	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Anthracene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Atrazine	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Benzidine	ND		96	ug/L		01/15/15 16:20	01/20/15 14:50	1
Benzo[a]anthracene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Benzo[a]pyrene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Benzo[b]fluoranthene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Benzo[g,h,i]perylene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Benzo[k]fluoranthene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Bis(2-chloroethoxy)methane	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Bis(2-chloroethyl)ether	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Bis(2-ethylhexyl) phthalate	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Butyl benzyl phthalate	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Caprolactam	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Carbazole	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Chrysene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Cresols, Total	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Dibenz(a,h)anthracene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Dibenzofuran	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Diethyl phthalate	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Dimethyl phthalate	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Di-n-butyl phthalate	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Di-n-octyl phthalate	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Fluoranthene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Fluorene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Hexachlorobenzene	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Hexachlorobutadiene	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Hexachlorocyclopentadiene	ND		48	ug/L		01/15/15 16:20	01/20/15 14:50	1
Hexachloroethane	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Indeno[1,2,3-cd]pyrene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Naphthalene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Nitrobenzene	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
N-Nitrosodi-n-propylamine	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
n-Nitrosodiphenylamine(as diphenylamine)	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Pentachlorophenol	ND		48	ug/L		01/15/15 16:20	01/20/15 14:50	1
Phenanthrene	ND		3.9	ug/L		01/15/15 16:20	01/20/15 14:50	1
Phenol	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1
Pyrene	ND		9.6	ug/L		01/15/15 16:20	01/20/15 14:50	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol	78		48 - 135	01/15/15 16:20	01/20/15 14:50	1
2-Fluorobiphenyl	79		48 - 135	01/15/15 16:20	01/20/15 14:50	1
2-Fluorophenol	73		41 - 135	01/15/15 16:20	01/20/15 14:50	1
Nitrobenzene-d5	78		42 - 135	01/15/15 16:20	01/20/15 14:50	1
Phenol-d5	78		46 - 135	01/15/15 16:20	01/20/15 14:50	1
Terphenyl-d14	81		20 - 135	01/15/15 16:20	01/20/15 14:50	1

TestAmerica Denver

Client Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: RSK-175 - Dissolved Gases (GC)

Client Sample ID: OHLSON WELL

Date Collected: 01/13/15 10:30

Date Received: 01/13/15 13:09

Lab Sample ID: 280-64325-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	77		5.0	ug/L			01/13/15 22:57	1

Method: 6010B - Metals (ICP)

Client Sample ID: OHLSON WELL

Date Collected: 01/13/15 10:30

Date Received: 01/13/15 13:09

Lab Sample ID: 280-64325-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		15	ug/L		01/14/15 14:45	01/15/15 12:29	1
Barium	21		10	ug/L		01/14/15 14:45	01/15/15 12:29	1
Calcium	14000		200	ug/L		01/14/15 14:45	01/15/15 12:29	1
Chromium	ND		10	ug/L		01/14/15 14:45	01/15/15 12:29	1
Iron	170		100	ug/L		01/14/15 14:45	01/15/15 12:29	1
Lead	ND		9.0	ug/L		01/14/15 14:45	01/15/15 12:29	1
Magnesium	1400		200	ug/L		01/14/15 14:45	01/15/15 12:29	1
Manganese	37		10	ug/L		01/14/15 14:45	01/15/15 12:29	1
Potassium	ND		3000	ug/L		01/14/15 14:45	01/15/15 12:29	1
Selenium	ND		15	ug/L		01/14/15 14:45	01/15/15 12:29	1
Sodium	300000		1000	ug/L		01/14/15 14:45	01/15/15 12:29	1

General Chemistry

Client Sample ID: OHLSON WELL

Date Collected: 01/13/15 10:30

Date Received: 01/13/15 13:09

Lab Sample ID: 280-64325-1

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	0.53		0.20	mg/L			01/13/15 23:23	1
Chloride	50		3.0	mg/L			01/13/15 23:23	1
Fluoride	0.73		0.50	mg/L			01/13/15 23:23	1
Sulfate	460		25	mg/L			01/13/15 23:41	5
Nitrate Nitrite as N	ND		0.10	mg/L			01/14/15 12:20	1
Total Anions	14			meq/L			01/20/15 08:49	1
Total Cations	14			meq/L			01/20/15 08:49	1
Percent Difference	0.90			%			01/20/15 08:49	1
Anion/Cation Balance	0.90			%			01/20/15 08:49	1
Alkalinity	130		5.0	mg/L			01/15/15 18:48	1
Bicarbonate Alkalinity as CaCO3	120		5.0	mg/L			01/15/15 18:48	1
Carbonate Alkalinity as CaCO3	6.8		5.0	mg/L			01/15/15 18:48	1
Hydroxide Alkalinity	ND		5.0	mg/L			01/15/15 18:48	1
Specific Conductance	1100		2.0	umhos/cm			01/15/15 19:28	1
Total Dissolved Solids	850		10	mg/L			01/14/15 13:44	1
pH adj. to 25 deg C	8.73	HF	0.100	SU			01/14/15 12:56	1

TestAmerica Denver

Surrogate Summary

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		BFB (78-120)	DBFM (77-120)	12DCE (70-127)	TOL (80-125)
280-64325-1	OHLSON WELL	92	111	115	93
LCS 280-260094/4	Lab Control Sample	92	107	110	95
MB 280-260094/5	Method Blank	94	111	112	97

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
12DCE = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)					
		TBP (48-135)	FBP (48-135)	2FP (41-135)	NBZ (42-135)	PHL (46-135)	TPH (20-135)
280-64325-1	OHLSON WELL	78	79	73	78	78	81
LCS 280-260407/2-A	Lab Control Sample	86	82	83	85	84	80
LCSD 280-260407/3-A	Lab Control Sample Dup	88	82	86	85	88	83
MB 280-260407/1-A	Method Blank	74	77	60	78	64	79

Surrogate Legend

TBP = 2,4,6-Tribromophenol
FBP = 2-Fluorobiphenyl
2FP = 2-Fluorophenol
NBZ = Nitrobenzene-d5
PHL = Phenol-d5
TPH = Terphenyl-d14

TestAmerica Denver

QC Association Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

GC/MS VOA

Analysis Batch: 260094

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	8260B	
LCS 280-260094/4	Lab Control Sample	Total/NA	Water	8260B	
MB 280-260094/5	Method Blank	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 260407

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	3520C	
LCS 280-260407/2-A	Lab Control Sample	Total/NA	Water	3520C	
LCSD 280-260407/3-A	Lab Control Sample Dup	Total/NA	Water	3520C	
MB 280-260407/1-A	Method Blank	Total/NA	Water	3520C	

Analysis Batch: 260921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	8270C	260407
LCS 280-260407/2-A	Lab Control Sample	Total/NA	Water	8270C	260407
LCSD 280-260407/3-A	Lab Control Sample Dup	Total/NA	Water	8270C	260407
MB 280-260407/1-A	Method Blank	Total/NA	Water	8270C	260407

GC VOA

Analysis Batch: 260068

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	RSK-175	
LCS 280-260068/2	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 280-260068/3	Lab Control Sample Dup	Total/NA	Water	RSK-175	
MB 280-260068/4	Method Blank	Total/NA	Water	RSK-175	

Metals

Prep Batch: 260057

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	3010A	
280-64325-1 MS	OHLSON WELL	Total/NA	Water	3010A	
280-64325-1 MSD	OHLSON WELL	Total/NA	Water	3010A	
LCS 280-260057/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 280-260057/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 260485

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	6010B	260057
280-64325-1 MS	OHLSON WELL	Total/NA	Water	6010B	260057
280-64325-1 MSD	OHLSON WELL	Total/NA	Water	6010B	260057
LCS 280-260057/2-A	Lab Control Sample	Total/NA	Water	6010B	260057
MB 280-260057/1-A	Method Blank	Total/NA	Water	6010B	260057

TestAmerica Denver

QC Association Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

General Chemistry

Analysis Batch: 259984

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	300.0	
280-64325-1	OHLSON WELL	Total/NA	Water	300.0	
LCS 280-259984/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-259984/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-259984/6	Method Blank	Total/NA	Water	300.0	
MRL 280-259984/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 260175

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	SM 4500 H+ B	
LCS 280-260175/4	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSD 280-260175/5	Lab Control Sample Dup	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 260183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	SM 2540C	
280-64325-1 DU	OHLSON WELL	Total/NA	Water	SM 2540C	
LCS 280-260183/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 280-260183/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
MB 280-260183/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 260301

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	353.2	
LCS 280-260301/19	Lab Control Sample	Total/NA	Water	353.2	
LCS 280-260301/58	Lab Control Sample	Total/NA	Water	353.2	
LCSD 280-260301/20	Lab Control Sample Dup	Total/NA	Water	353.2	
LCSD 280-260301/59	Lab Control Sample Dup	Total/NA	Water	353.2	
MB 280-260301/21	Method Blank	Total/NA	Water	353.2	
MB 280-260301/60	Method Blank	Total/NA	Water	353.2	
MRL 280-260301/18	Lab Control Sample	Total/NA	Water	353.2	

Analysis Batch: 260392

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 280-260392/4	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSD 280-260392/5	Lab Control Sample Dup	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 260453

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	SM 2510B	
LCS 280-260453/30	Lab Control Sample	Total/NA	Water	SM 2510B	
LCSD 280-260453/31	Lab Control Sample Dup	Total/NA	Water	SM 2510B	
MB 280-260453/32	Method Blank	Total/NA	Water	SM 2510B	

Analysis Batch: 260503

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	SM 2320B	
LCS 280-260503/31	Lab Control Sample	Total/NA	Water	SM 2320B	
LCS 280-260503/4	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 280-260503/32	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
LCSD 280-260503/5	Lab Control Sample Dup	Total/NA	Water	SM 2320B	

TestAmerica Denver

QC Association Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

General Chemistry (Continued)

Analysis Batch: 260503 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 280-260503/33	Method Blank	Total/NA	Water	SM 2320B	
MB 280-260503/6	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 260890

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-1	OHLSON WELL	Total/NA	Water	SM 1030F	
MB 280-260890/1	Method Blank	Total/NA	Water	SM 1030F	

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 280-260094/5

Matrix: Water

Analysis Batch: 260094

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		10	ug/L			01/14/15 08:12	1
Benzene	ND		1.0	ug/L			01/14/15 08:12	1
Bromoform	ND		1.0	ug/L			01/14/15 08:12	1
Bromomethane	ND		2.0	ug/L			01/14/15 08:12	1
2-Butanone (MEK)	ND		6.0	ug/L			01/14/15 08:12	1
Carbon disulfide	ND		2.0	ug/L			01/14/15 08:12	1
Carbon tetrachloride	ND		1.0	ug/L			01/14/15 08:12	1
Chlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
Chlorobromomethane	ND		1.0	ug/L			01/14/15 08:12	1
Chlorodibromomethane	ND		1.0	ug/L			01/14/15 08:12	1
Chloroethane	ND		2.0	ug/L			01/14/15 08:12	1
Chloroform	ND		1.0	ug/L			01/14/15 08:12	1
Chloromethane	ND		2.0	ug/L			01/14/15 08:12	1
cis-1,2-Dichloroethene	ND		1.0	ug/L			01/14/15 08:12	1
cis-1,3-Dichloropropene	ND		1.0	ug/L			01/14/15 08:12	1
Cyclohexane	ND		2.0	ug/L			01/14/15 08:12	1
Cyclohexanone	ND		100	ug/L			01/14/15 08:12	1
1,2-Dibromo-3-Chloropropane	ND		5.0	ug/L			01/14/15 08:12	1
1,2-Dibromoethane	ND		1.0	ug/L			01/14/15 08:12	1
1,2-Dichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,3-Dichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,4-Dichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
Dichlorobromomethane	ND		1.0	ug/L			01/14/15 08:12	1
Dichlorodifluoromethane	ND		2.0	ug/L			01/14/15 08:12	1
1,1-Dichloroethane	ND		1.0	ug/L			01/14/15 08:12	1
1,2-Dichloroethane	ND		1.0	ug/L			01/14/15 08:12	1
1,1-Dichloroethene	ND		1.0	ug/L			01/14/15 08:12	1
1,2-Dichloropropane	ND		1.0	ug/L			01/14/15 08:12	1
1,4-Dioxane	ND		200	ug/L			01/14/15 08:12	1
Ethanol	ND		300	ug/L			01/14/15 08:12	1
Ethylbenzene	ND		1.0	ug/L			01/14/15 08:12	1
Ethyl-t-butyl ether (ETBE)	ND		5.0	ug/L			01/14/15 08:12	1
2-Hexanone	ND		5.0	ug/L			01/14/15 08:12	1
Isobutanol	ND		110	ug/L			01/14/15 08:12	1
Isopropanol	ND		40	ug/L			01/14/15 08:12	1
Isopropylbenzene	ND		1.0	ug/L			01/14/15 08:12	1
Methyl acetate	ND		5.0	ug/L			01/14/15 08:12	1
Methylcyclohexane	ND		1.0	ug/L			01/14/15 08:12	1
Methylene Chloride	ND		2.0	ug/L			01/14/15 08:12	1
4-Methyl-2-pentanone (MIBK)	ND		5.0	ug/L			01/14/15 08:12	1
Methyl-t-Butyl Ether (MTBE)	ND		5.0	ug/L			01/14/15 08:12	1
m-Xylene & p-Xylene	ND		2.0	ug/L			01/14/15 08:12	1
n-Butanol	ND		60	ug/L			01/14/15 08:12	1
o-Xylene	ND		1.0	ug/L			01/14/15 08:12	1
Styrene	ND		1.0	ug/L			01/14/15 08:12	1
Tert-amyl-methyl ether (TAME)	ND		5.0	ug/L			01/14/15 08:12	1
tert-Butyl alcohol (TBA)	ND		50	ug/L			01/14/15 08:12	1
1,1,2,2-Tetrachloroethane	ND		1.0	ug/L			01/14/15 08:12	1

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 280-260094/5				Client Sample ID: Method Blank				
Matrix: Water				Prep Type: Total/NA				
Analysis Batch: 260094								
Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	ND		1.0	ug/L			01/14/15 08:12	1
Toluene	ND		1.0	ug/L			01/14/15 08:12	1
trans-1,2-Dichloroethene	ND		1.0	ug/L			01/14/15 08:12	1
trans-1,3-Dichloropropene	ND		3.0	ug/L			01/14/15 08:12	1
1,2,3-Trichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,2,4-Trichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,1,1-Trichloroethane	ND		1.0	ug/L			01/14/15 08:12	1
1,1,2-Trichloroethane	ND		1.0	ug/L			01/14/15 08:12	1
Trichloroethene	ND		1.0	ug/L			01/14/15 08:12	1
Trichlorofluoromethane	ND		2.0	ug/L			01/14/15 08:12	1
1,1,2-Trichlorotrifluoroethane	ND		3.0	ug/L			01/14/15 08:12	1
Vinyl chloride	ND		1.0	ug/L			01/14/15 08:12	1
Surrogate	MB %Recovery	MB Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		78 - 120				01/14/15 08:12	1
Dibromofluoromethane (Surr)	111		77 - 120				01/14/15 08:12	1
1,2-Dichloroethane-d4 (Surr)	112		70 - 127				01/14/15 08:12	1
Toluene-d8 (Surr)	97		80 - 125				01/14/15 08:12	1

Lab Sample ID: LCS 280-260094/4				Client Sample ID: Lab Control Sample			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 260094							
Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Acetone	20.0	15.9		ug/L		79	39 - 156
Benzene	5.00	5.02		ug/L		100	65 - 135
Bromoform	5.00	4.48		ug/L		90	62 - 135
Bromomethane	5.00	4.17		ug/L		83	45 - 135
2-Butanone (MEK)	20.0	16.0		ug/L		80	44 - 177
Carbon disulfide	5.00	5.64		ug/L		113	55 - 143
Carbon tetrachloride	5.00	5.63		ug/L		113	65 - 135
Chlorobenzene	5.00	4.82		ug/L		96	65 - 135
Chlorobromomethane	5.00	5.22		ug/L		104	65 - 135
Chlorodibromomethane	5.00	4.76		ug/L		95	65 - 135
Chloroethane	5.00	4.03		ug/L		81	46 - 136
Chloroform	5.00	5.32		ug/L		106	65 - 135
Chloromethane	5.00	4.17		ug/L		83	34 - 145
cis-1,2-Dichloroethene	5.00	5.16		ug/L		103	65 - 135
cis-1,3-Dichloropropene	5.00	4.52		ug/L		90	65 - 135
1,2-Dibromo-3-Chloropropane	5.00	4.16	J	ug/L		83	57 - 135
1,2-Dibromoethane	5.00	4.64		ug/L		93	65 - 135
1,2-Dichlorobenzene	5.00	4.82		ug/L		96	65 - 135
1,3-Dichlorobenzene	5.00	4.89		ug/L		98	65 - 135
1,4-Dichlorobenzene	5.00	4.89		ug/L		98	65 - 135
Dichlorobromomethane	5.00	4.95		ug/L		99	65 - 135
Dichlorodifluoromethane	5.00	4.81		ug/L		96	43 - 142
1,1-Dichloroethane	5.00	5.23		ug/L		105	65 - 135
1,2-Dichloroethane	5.00	5.27		ug/L		105	65 - 135

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 280-260094/4

Matrix: Water

Analysis Batch: 260094

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	5.00	5.55		ug/L		111	65 - 136
1,2-Dichloropropane	5.00	4.73		ug/L		95	64 - 135
Ethylbenzene	5.00	4.71		ug/L		94	65 - 135
2-Hexanone	20.0	12.9		ug/L		65	57 - 139
Isopropylbenzene	5.00	4.90		ug/L		98	65 - 135
Methylene Chloride	5.00	5.02		ug/L		100	54 - 141
4-Methyl-2-pentanone (MIBK)	20.0	14.4		ug/L		72	60 - 150
Methyl-t-Butyl Ether (MTBE)	5.00	4.68	J	ug/L		94	54 - 135
m-Xylene & p-Xylene	5.00	4.67		ug/L		93	65 - 135
o-Xylene	5.00	4.74		ug/L		95	65 - 135
Styrene	5.00	4.49		ug/L		90	65 - 135
1,1,2,2-Tetrachloroethane	5.00	4.35		ug/L		87	58 - 135
Tetrachloroethene	5.00	5.08		ug/L		102	65 - 135
Toluene	5.00	5.30		ug/L		106	65 - 135
trans-1,2-Dichloroethene	5.00	5.46		ug/L		109	65 - 135
trans-1,3-Dichloropropene	5.00	5.40		ug/L		108	65 - 135
1,2,3-Trichlorobenzene	5.00	4.74		ug/L		95	60 - 135
1,2,4-Trichlorobenzene	5.00	4.81		ug/L		96	58 - 135
1,1,1-Trichloroethane	5.00	5.50		ug/L		110	65 - 135
1,1,2-Trichloroethane	5.00	5.01		ug/L		100	64 - 135
Trichloroethene	5.00	5.23		ug/L		105	65 - 135
Trichlorofluoromethane	5.00	4.83		ug/L		97	53 - 137
Vinyl chloride	5.00	4.22		ug/L		84	40 - 137

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	92		78 - 120
Dibromofluoromethane (Surr)	107		77 - 120
1,2-Dichloroethane-d4 (Surr)	110		70 - 127
Toluene-d8 (Surr)	95		80 - 125

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 280-260407/1-A

Matrix: Water

Analysis Batch: 260921

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 260407

Analyte	MB MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
1,2,4-Trichlorobenzene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
1,4-Dichlorobenzene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
2,2'-oxybis[1-chloropropane]	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2,4,5-Trichlorophenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2,4,6-Trichlorophenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2,4-Dichlorophenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2,4-Dimethylphenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2,4-Dinitrophenol	ND		30	ug/L		01/15/15 16:20	01/20/15 12:51	1
2,4-Dinitrotoluene	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2,6-Dinitrotoluene	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2-Chloronaphthalene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 280-260407/1-A

Matrix: Water

Analysis Batch: 260921

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 260407

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chlorophenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2-Methylnaphthalene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
2-Methylphenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2-Nitroaniline	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
2-Nitrophenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
3 & 4 Methylphenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
3,3'-Dichlorobenzidine	ND		50	ug/L		01/15/15 16:20	01/20/15 12:51	1
3-Nitroaniline	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
4,6-Dinitro-2-methylphenol	ND		50	ug/L		01/15/15 16:20	01/20/15 12:51	1
4-Bromophenyl phenyl ether	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
4-Chloro-3-methylphenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
4-Chloroaniline	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
4-Chlorophenyl phenyl ether	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
4-Nitroaniline	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
4-Nitrophenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Acenaphthene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Acenaphthylene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Acetophenone	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Anthracene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Atrazine	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Benzidine	ND		100	ug/L		01/15/15 16:20	01/20/15 12:51	1
Benzo[a]anthracene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Benzo[a]pyrene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Benzo[b]fluoranthene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Benzo[g,h,i]perylene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Benzo[k]fluoranthene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Bis(2-chloroethoxy)methane	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Bis(2-chloroethyl)ether	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Bis(2-ethylhexyl) phthalate	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Butyl benzyl phthalate	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Caprolactam	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Carbazole	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Chrysene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Cresols, Total	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Dibenz(a,h)anthracene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Dibenzofuran	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Diethyl phthalate	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Dimethyl phthalate	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Di-n-butyl phthalate	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Di-n-octyl phthalate	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Fluoranthene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Fluorene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Hexachlorobenzene	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Hexachlorobutadiene	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Hexachlorocyclopentadiene	ND		50	ug/L		01/15/15 16:20	01/20/15 12:51	1
Hexachloroethane	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Indeno[1,2,3-cd]pyrene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Naphthalene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 280-260407/1-A

Matrix: Water

Analysis Batch: 260921

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 260407

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrobenzene	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
N-Nitrosodi-n-propylamine	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
n-Nitrosodiphenylamine(as diphenylamine)	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Pentachlorophenol	ND		50	ug/L		01/15/15 16:20	01/20/15 12:51	1
Phenanthrene	ND		4.0	ug/L		01/15/15 16:20	01/20/15 12:51	1
Phenol	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1
Pyrene	ND		10	ug/L		01/15/15 16:20	01/20/15 12:51	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol	74		48 - 135	01/15/15 16:20	01/20/15 12:51	1
2-Fluorobiphenyl	77		48 - 135	01/15/15 16:20	01/20/15 12:51	1
2-Fluorophenol	60		41 - 135	01/15/15 16:20	01/20/15 12:51	1
Nitrobenzene-d5	78		42 - 135	01/15/15 16:20	01/20/15 12:51	1
Phenol-d5	64		46 - 135	01/15/15 16:20	01/20/15 12:51	1
Terphenyl-d14	79		20 - 135	01/15/15 16:20	01/20/15 12:51	1

Lab Sample ID: LCS 280-260407/2-A

Matrix: Water

Analysis Batch: 260921

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 260407

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	80.0	62.4		ug/L		78	44 - 135
1,4-Dichlorobenzene	80.0	61.0		ug/L		76	40 - 135
2,4,5-Trichlorophenol	80.0	71.6		ug/L		90	64 - 135
2,4,6-Trichlorophenol	80.0	70.2		ug/L		88	62 - 135
2,4-Dinitrotoluene	80.0	72.5		ug/L		91	65 - 135
2-Chlorophenol	80.0	70.3		ug/L		88	58 - 135
2-Methylnaphthalene	80.0	67.1		ug/L		84	56 - 135
2-Methylphenol	80.0	67.3		ug/L		84	62 - 135
4-Chloro-3-methylphenol	80.0	71.9		ug/L		90	65 - 135
4-Nitrophenol	160	148		ug/L		92	56 - 135
Acenaphthene	80.0	68.6		ug/L		86	61 - 135
Anthracene	80.0	67.3		ug/L		84	65 - 135
Carbazole	80.0	70.1		ug/L		88	65 - 135
N-Nitrosodi-n-propylamine	80.0	70.4		ug/L		88	65 - 135
Pentachlorophenol	160	120		ug/L		75	52 - 135
Phenol	80.0	68.3		ug/L		85	61 - 135
Pyrene	80.0	70.2		ug/L		88	65 - 135

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2,4,6-Tribromophenol	86		48 - 135
2-Fluorobiphenyl	82		48 - 135
2-Fluorophenol	83		41 - 135
Nitrobenzene-d5	85		42 - 135
Phenol-d5	84		46 - 135
Terphenyl-d14	80		20 - 135

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 280-260407/3-A
Matrix: Water
Analysis Batch: 260921

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 260407

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene	80.0	56.2		ug/L		70	44 - 135	10	42
1,4-Dichlorobenzene	80.0	56.0		ug/L		70	40 - 135	8	50
2,4,5-Trichlorophenol	80.0	74.4		ug/L		93	64 - 135	4	30
2,4,6-Trichlorophenol	80.0	73.1		ug/L		91	62 - 135	4	30
2,4-Dinitrotoluene	80.0	75.2		ug/L		94	65 - 135	4	32
2-Chlorophenol	80.0	72.5		ug/L		91	58 - 135	3	46
2-Methylnaphthalene	80.0	61.0		ug/L		76	56 - 135	10	32
2-Methylphenol	80.0	72.1		ug/L		90	62 - 135	7	40
4-Chloro-3-methylphenol	80.0	72.7		ug/L		91	65 - 135	1	30
4-Nitrophenol	160	154		ug/L		96	56 - 135	4	50
Acenaphthene	80.0	66.3		ug/L		83	61 - 135	3	30
Anthracene	80.0	68.4		ug/L		85	65 - 135	2	30
Carbazole	80.0	72.0		ug/L		90	65 - 135	3	30
N-Nitrosodi-n-propylamine	80.0	75.3		ug/L		94	65 - 135	7	30
Pentachlorophenol	160	124		ug/L		77	52 - 135	3	30
Phenol	80.0	73.3		ug/L		92	61 - 135	7	37
Pyrene	80.0	71.7		ug/L		90	65 - 135	2	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
2,4,6-Tribromophenol	88		48 - 135
2-Fluorobiphenyl	82		48 - 135
2-Fluorophenol	86		41 - 135
Nitrobenzene-d5	85		42 - 135
Phenol-d5	88		46 - 135
Terphenyl-d14	83		20 - 135

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 280-260068/4
Matrix: Water
Analysis Batch: 260068

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	ug/L			01/13/15 20:02	1

Lab Sample ID: LCS 280-260068/2
Matrix: Water
Analysis Batch: 260068

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	146	133		ug/L		91	75 - 125

Lab Sample ID: LCSD 280-260068/3
Matrix: Water
Analysis Batch: 260068

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	146	145		ug/L		99	75 - 125	9	20

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 280-260057/1-A

Matrix: Water

Analysis Batch: 260485

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 260057

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		15	ug/L		01/14/15 14:45	01/15/15 12:24	1
Barium	ND		10	ug/L		01/14/15 14:45	01/15/15 12:24	1
Calcium	ND		200	ug/L		01/14/15 14:45	01/15/15 12:24	1
Chromium	ND		10	ug/L		01/14/15 14:45	01/15/15 12:24	1
Iron	ND		100	ug/L		01/14/15 14:45	01/15/15 12:24	1
Lead	ND		9.0	ug/L		01/14/15 14:45	01/15/15 12:24	1
Magnesium	ND		200	ug/L		01/14/15 14:45	01/15/15 12:24	1
Manganese	ND		10	ug/L		01/14/15 14:45	01/15/15 12:24	1
Potassium	ND		3000	ug/L		01/14/15 14:45	01/15/15 12:24	1
Selenium	ND		15	ug/L		01/14/15 14:45	01/15/15 12:24	1
Sodium	ND		1000	ug/L		01/14/15 14:45	01/15/15 12:24	1

Lab Sample ID: LCS 280-260057/2-A

Matrix: Water

Analysis Batch: 260485

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 260057

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	984		ug/L		98	88 - 110
Barium	2000	1960		ug/L		98	90 - 112
Calcium	50000	48700		ug/L		97	90 - 111
Chromium	200	201		ug/L		101	90 - 113
Iron	1000	981		ug/L		98	89 - 115
Lead	500	504		ug/L		101	89 - 110
Magnesium	50000	49300		ug/L		99	90 - 113
Manganese	500	490		ug/L		98	90 - 110
Potassium	50000	49800		ug/L		100	89 - 114
Selenium	2000	2010		ug/L		101	85 - 112
Sodium	50000	51300		ug/L		103	90 - 115

Lab Sample ID: 280-64325-1 MS

Matrix: Water

Analysis Batch: 260485

Client Sample ID: OHLSON WELL

Prep Type: Total/NA

Prep Batch: 260057

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	ND		1000	1030		ug/L		103	84 - 124
Barium	21		2000	2040		ug/L		101	85 - 120
Calcium	14000		50000	64300		ug/L		101	48 - 153
Chromium	ND		200	201		ug/L		100	73 - 135
Iron	170		1000	1200		ug/L		102	52 - 155
Lead	ND		500	496		ug/L		99	89 - 121
Magnesium	1400		50000	51400		ug/L		100	62 - 146
Manganese	37		500	540		ug/L		101	79 - 121
Potassium	ND		50000	53400		ug/L		103	76 - 132
Selenium	ND		2000	2080		ug/L		104	71 - 140
Sodium	300000		50000	356000	4	ug/L		119	70 - 203

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 280-64325-1 MSD

Matrix: Water

Analysis Batch: 260485

Client Sample ID: OHLSON WELL

Prep Type: Total/NA

Prep Batch: 260057

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	ND		1000	1030		ug/L		103	84 - 124	1	20
Barium	21		2000	2040		ug/L		101	85 - 120	0	20
Calcium	14000		50000	64000		ug/L		100	48 - 153	1	20
Chromium	ND		200	203		ug/L		101	73 - 135	1	20
Iron	170		1000	1200		ug/L		103	52 - 155	0	20
Lead	ND		500	500		ug/L		100	89 - 121	1	20
Magnesium	1400		50000	51500		ug/L		100	62 - 146	0	20
Manganese	37		500	543		ug/L		101	79 - 121	0	20
Potassium	ND		50000	53300		ug/L		103	76 - 132	0	20
Selenium	ND		2000	2070		ug/L		104	71 - 140	0	20
Sodium	300000		50000	355000	4	ug/L		117	70 - 203	0	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 280-259984/6

Matrix: Water

Analysis Batch: 259984

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Bromide	ND		0.20	mg/L			01/13/15 13:11	1
Chloride	ND		3.0	mg/L			01/13/15 13:11	1
Fluoride	ND		0.50	mg/L			01/13/15 13:11	1
Sulfate	ND		5.0	mg/L			01/13/15 13:11	1

Lab Sample ID: LCS 280-259984/4

Matrix: Water

Analysis Batch: 259984

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromide	5.00	4.89		mg/L		98	90 - 110
Chloride	100	94.4		mg/L		94	90 - 110
Fluoride	5.00	5.04		mg/L		101	90 - 110
Sulfate	100	96.0		mg/L		96	90 - 110

Lab Sample ID: LCSD 280-259984/5

Matrix: Water

Analysis Batch: 259984

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromide	5.00	4.89		mg/L		98	90 - 110	0	10
Chloride	100	94.4		mg/L		94	90 - 110	0	10
Fluoride	5.00	5.06		mg/L		101	90 - 110	0	10
Sulfate	100	95.7		mg/L		96	90 - 110	0	10

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MRL 280-259984/3

Matrix: Water

Analysis Batch: 259984

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Bromide	0.200	0.230		mg/L		115	50 - 150
Chloride	2.50	ND		mg/L		99	50 - 150
Fluoride	0.200	ND		mg/L		91	50 - 150
Sulfate	2.50	ND		mg/L		99	50 - 150

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 280-260301/21

Matrix: Water

Analysis Batch: 260301

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	ND		0.10	mg/L			01/14/15 10:34	1

Lab Sample ID: MB 280-260301/60

Matrix: Water

Analysis Batch: 260301

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	ND		0.10	mg/L			01/14/15 11:52	1

Lab Sample ID: LCS 280-260301/19

Matrix: Water

Analysis Batch: 260301

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	5.00	5.25		mg/L		105	90 - 110

Lab Sample ID: LCS 280-260301/58

Matrix: Water

Analysis Batch: 260301

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	5.00	5.17		mg/L		103	90 - 110

Lab Sample ID: LCSD 280-260301/20

Matrix: Water

Analysis Batch: 260301

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	5.00	5.22		mg/L		104	90 - 110	1	10

Lab Sample ID: LCSD 280-260301/59

Matrix: Water

Analysis Batch: 260301

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	5.00	5.23		mg/L		105	90 - 110	1	10

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: MRL 280-260301/18				Client Sample ID: Lab Control Sample			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 260301							
Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.100	ND		mg/L		66	50 - 150

Method: SM 1030F - Cation Anion Balance

Lab Sample ID: MB 280-260890/1					Client Sample ID: Method Blank			
Matrix: Water					Prep Type: Total/NA			
Analysis Batch: 260890								
	MB	MB						
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Anions	0.000			meq/L			01/20/15 08:49	1
Total Cations	0.000			meq/L			01/20/15 08:49	1
Percent Difference	0.000			%			01/20/15 08:49	1
Anion/Cation Balance	0.000			%			01/20/15 08:49	1

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 280-260503/33					Client Sample ID: Method Blank			
Matrix: Water					Prep Type: Total/NA			
Analysis Batch: 260503								
	MB	MB						
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	ND		5.0	mg/L			01/15/15 18:23	1
Bicarbonate Alkalinity as CaCO3	ND		5.0	mg/L			01/15/15 18:23	1
Carbonate Alkalinity as CaCO3	ND		5.0	mg/L			01/15/15 18:23	1
Hydroxide Alkalinity	ND		5.0	mg/L			01/15/15 18:23	

Lab Sample ID: MB 280-260503/6				Client Sample ID: Method Blank				
Matrix: Water				Prep Type: Total/NA				
Analysis Batch: 260503								
	MB	MB						
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	ND		5.0	mg/L			01/15/15 16:08	1
Bicarbonate Alkalinity as CaCO3	ND		5.0	mg/L			01/15/15 16:08	1
Carbonate Alkalinity as CaCO3	ND		5.0	mg/L			01/15/15 16:08	1
Hydroxide Alkalinity	ND		5.0	mg/L			01/15/15 16:08	1

Lab Sample ID: LCS 280-260503/31				Client Sample ID: Lab Control Sample			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 260503							
Analyte	Spike Added	LCS LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	202		mg/L		101	90 - 110

Lab Sample ID: LCS 280-260503/4				Client Sample ID: Lab Control Sample			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 260503							
Analyte	Spike Added	LCS LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	202		mg/L		101	90 - 110

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Lab Sample ID: LCSD 280-260503/32

Matrix: Water

Analysis Batch: 260503

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity	200	202		mg/L		101	90 - 110	0	10

Lab Sample ID: LCSD 280-260503/5

Matrix: Water

Analysis Batch: 260503

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity	200	201		mg/L		101	90 - 110	0	10

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 280-260453/32

Matrix: Water

Analysis Batch: 260453

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		2.0	umhos/cm			01/15/15 19:28	1

Lab Sample ID: LCS 280-260453/30

Matrix: Water

Analysis Batch: 260453

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	1410	1280		umhos/cm		91	90 - 110

Lab Sample ID: LCSD 280-260453/31

Matrix: Water

Analysis Batch: 260453

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Specific Conductance	1410	1280		umhos/cm		91	90 - 110	0	10

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 280-260183/1

Matrix: Water

Analysis Batch: 260183

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	mg/L			01/14/15 13:44	1

Lab Sample ID: LCS 280-260183/2

Matrix: Water

Analysis Batch: 260183

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	501	485		mg/L		97	86 - 110

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCSD 280-260183/3
Matrix: Water
Analysis Batch: 260183

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	501	479		mg/L		96	86 - 110	1	20

Lab Sample ID: 280-64325-1 DU
Matrix: Water
Analysis Batch: 260183

Client Sample ID: OHLSON WELL
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	850		868		mg/L		2	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 280-260175/4
Matrix: Water
Analysis Batch: 260175

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	7.00	6.980		SU		100	99 - 101

Lab Sample ID: LCSD 280-260175/5
Matrix: Water
Analysis Batch: 260175

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
pH adj. to 25 deg C	7.00	6.980		SU		100	99 - 101	0	5

Lab Sample ID: LCS 280-260392/4
Matrix: Water
Analysis Batch: 260392

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	7.00	6.990		SU		100	99 - 101

Lab Sample ID: LCSD 280-260392/5
Matrix: Water
Analysis Batch: 260392

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
pH adj. to 25 deg C	7.00	7.030		SU		100	99 - 101	1	5

TestAmerica Denver

Lab Chronicle

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson Water Well

TestAmerica Job ID: 280-64325-1

Client Sample ID: OHLSON WELL

Lab Sample ID: 280-64325-1

Date Collected: 01/13/15 10:30

Matrix: Water

Date Received: 01/13/15 13:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	260094	01/14/15 11:38	DPI	TAL DEN
Total/NA	Prep	3520C			1037.8 mL	1 mL	260407	01/15/15 16:20	GLK	TAL DEN
Total/NA	Analysis	8270C		1	1037.8 mL	1 mL	260921	01/20/15 14:50	DKK	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	260068	01/13/15 22:57	MPS	TAL DEN
Total/NA	Prep	3010A			50 mL	50 mL	260057	01/14/15 14:45	MLS	TAL DEN
Total/NA	Analysis	6010B		1	50 mL	50 mL	260485	01/15/15 12:29	CRR	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	259984	01/13/15 23:23	TLP	TAL DEN
Total/NA	Analysis	300.0		5	5 mL	5 mL	259984	01/13/15 23:41	TLP	TAL DEN
Total/NA	Analysis	353.2		1			260301	01/14/15 12:20	ELJ	TAL DEN
Total/NA	Analysis	SM 1030F		1			260890	01/20/15 08:49	RKS	TAL DEN
Total/NA	Analysis	SM 2320B		1			260503	01/15/15 18:48	CCJ	TAL DEN
Total/NA	Analysis	SM 2510B		1		25 mL	260453	01/15/15 19:28	MRB	TAL DEN
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	260183	01/14/15 13:44	SVC	TAL DEN
Total/NA	Analysis	SM 4500 H+ B		1			260175	01/14/15 12:56	NAS	TAL DEN

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

TestAmerica Denver

Login Sample Receipt Checklist

Client: Colorado Oil&Gas Conservation Commision

Job Number: 280-64325-1

Login Number: 64325

List Source: TestAmerica Denver

List Number: 1

Creator: Orfield, Tayler C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	REFER TO CUR
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	False	REFER TO CUR
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Denver

4955 Yarrow Street

Arvada, CO 80002

Tel: (303)736-0100

TestAmerica Job ID: 280-64325-2

Client Project/Site: COGCC - Ohlson House

For:


Colorado Oil&Gas Conservation Commission

1120 Lincoln St.

Suite 801

Denver, Colorado 80203

Attn: Ms. Angie Gipson



Authorized for release by:

1/15/2015 1:29:52 PM

Donna Rydberg, Senior Project Manager

(303)736-0192

donna.rydberg@testamericainc.com

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The test results in this report meet all 2003 NELAP and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Job ID: 280-64325-2

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE

Client: Colorado Oil&Gas Conservation Commission

Project: COGCC - Ohlson House

Report Number: 280-64325-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 1/13/2015 at 1:09 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.3°C.

This report contains the result for OHLSON HOUSE as a rush TAT was requested on this sample. The OHLSON WELL sample will be reported under a separate job (280-64325-1).

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Sample OHLSON HOUSE (280-64325-2) was analyzed for volatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8260B.

The MSD spike recoveries and RPD values for Hexachlorobutadiene and n-Butylbenzene were outside the recovery criteria in batch 260094, performed on sample OHLSON HOUSE (280-64325-2). The associated MS was in control. The associated LCS was in control and provides evidence that operating procedures were in control.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery exceeds the control limits
F2	MS/MSD RPD exceeds control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
■	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Client Sample ID: OHLSON HOUSE

Lab Sample ID: 280-64325-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	1.9		1.0	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Method Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-64325-2	OHLSON HOUSE	Water	01/13/15 10:50	01/13/15 13:09



Client Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: OHLSON HOUSE

Lab Sample ID: 280-64325-2

Date Collected: 01/13/15 10:50

Matrix: Water

Date Received: 01/13/15 13:09

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		1.0	ug/L			01/14/15 16:23	1
1,1,1-Trichloroethane	ND		1.0	ug/L			01/14/15 16:23	1
1,1,2,2-Tetrachloroethane	ND		1.0	ug/L			01/14/15 16:23	1
1,1,2-Trichloroethane	ND		1.0	ug/L			01/14/15 16:23	1
1,1-Dichloroethane	ND		1.0	ug/L			01/14/15 16:23	1
1,1-Dichloroethene	ND		1.0	ug/L			01/14/15 16:23	1
1,1-Dichloropropene	ND		1.0	ug/L			01/14/15 16:23	1
1,2,3-Trichlorobenzene	ND		1.0	ug/L			01/14/15 16:23	1
1,2,3-Trichloropropane	ND		2.5	ug/L			01/14/15 16:23	1
1,2,4-Trichlorobenzene	ND		1.0	ug/L			01/14/15 16:23	1
1,2,4-Trimethylbenzene	ND		1.0	ug/L			01/14/15 16:23	1
1,2-Dibromo-3-Chloropropane	ND		5.0	ug/L			01/14/15 16:23	1
1,2-Dibromoethane	ND		1.0	ug/L			01/14/15 16:23	1
1,2-Dichlorobenzene	ND		1.0	ug/L			01/14/15 16:23	1
1,2-Dichloroethane	ND		1.0	ug/L			01/14/15 16:23	1
1,2-Dichloroethene, Total	ND		1.0	ug/L			01/14/15 16:23	1
1,2-Dichloropropane	ND		1.0	ug/L			01/14/15 16:23	1
1,3,5-Trimethylbenzene	ND		1.0	ug/L			01/14/15 16:23	1
1,3-Dichlorobenzene	ND		1.0	ug/L			01/14/15 16:23	1
1,3-Dichloropropane	ND		1.0	ug/L			01/14/15 16:23	1
1,4-Dichlorobenzene	ND		1.0	ug/L			01/14/15 16:23	1
2,2-Dichloropropane	ND		1.0	ug/L			01/14/15 16:23	1
2-Butanone (MEK)	ND		6.0	ug/L			01/14/15 16:23	1
2-Chlorotoluene	ND		1.0	ug/L			01/14/15 16:23	1
2-Hexanone	ND		5.0	ug/L			01/14/15 16:23	1
4-Chlorotoluene	ND		1.0	ug/L			01/14/15 16:23	1
4-Isopropyltoluene	ND		1.0	ug/L			01/14/15 16:23	1
4-Methyl-2-pentanone (MIBK)	ND		5.0	ug/L			01/14/15 16:23	1
Acetone	ND		10	ug/L			01/14/15 16:23	1
Benzene	ND		1.0	ug/L			01/14/15 16:23	1
Bromobenzene	ND		1.0	ug/L			01/14/15 16:23	1
Bromoform	ND		1.0	ug/L			01/14/15 16:23	1
Bromomethane	ND		2.0	ug/L			01/14/15 16:23	1
Carbon tetrachloride	ND		1.0	ug/L			01/14/15 16:23	1
Chlorobenzene	ND		1.0	ug/L			01/14/15 16:23	1
Chlorobromomethane	ND		1.0	ug/L			01/14/15 16:23	1
Chlorodibromomethane	ND		1.0	ug/L			01/14/15 16:23	1
Chloroethane	ND		2.0	ug/L			01/14/15 16:23	1
Chloroform	1.9		1.0	ug/L			01/14/15 16:23	1
Chloromethane	ND		2.0	ug/L			01/14/15 16:23	1
cis-1,2-Dichloroethene	ND		1.0	ug/L			01/14/15 16:23	1
cis-1,3-Dichloropropene	ND		1.0	ug/L			01/14/15 16:23	1
Dibromomethane	ND		1.0	ug/L			01/14/15 16:23	1
Dichlorobromomethane	ND		1.0	ug/L			01/14/15 16:23	1
Dichlorodifluoromethane	ND		2.0	ug/L			01/14/15 16:23	1
Ethylbenzene	ND		1.0	ug/L			01/14/15 16:23	1
Hexachlorobutadiene	ND		1.0	ug/L			01/14/15 16:23	1
Isopropylbenzene	ND		1.0	ug/L			01/14/15 16:23	1
Methyl tert-butyl ether	ND		5.0	ug/L			01/14/15 16:23	1

TestAmerica Denver

Client Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: OHLSON HOUSE

Date Collected: 01/13/15 10:50

Date Received: 01/13/15 13:09

Lab Sample ID: 280-64325-2

Matrix: Water

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	ND		2.0	ug/L			01/14/15 16:23	1
m-Xylene & p-Xylene	ND		2.0	ug/L			01/14/15 16:23	1
Naphthalene	ND		1.0	ug/L			01/14/15 16:23	1
n-Butylbenzene	ND		1.0	ug/L			01/14/15 16:23	1
N-Propylbenzene	ND		1.0	ug/L			01/14/15 16:23	1
o-Xylene	ND		1.0	ug/L			01/14/15 16:23	1
sec-Butylbenzene	ND		1.0	ug/L			01/14/15 16:23	1
Styrene	ND		1.0	ug/L			01/14/15 16:23	1
tert-Butylbenzene	ND		1.0	ug/L			01/14/15 16:23	1
Tetrachloroethene	ND		1.0	ug/L			01/14/15 16:23	1
Toluene	ND		1.0	ug/L			01/14/15 16:23	1
trans-1,2-Dichloroethene	ND		1.0	ug/L			01/14/15 16:23	1
trans-1,3-Dichloropropene	ND		3.0	ug/L			01/14/15 16:23	1
Trichloroethene	ND		1.0	ug/L			01/14/15 16:23	1
Trichlorofluoromethane	ND		2.0	ug/L			01/14/15 16:23	1
Vinyl chloride	ND		1.0	ug/L			01/14/15 16:23	1
Xylenes, Total	ND		2.0	ug/L			01/14/15 16:23	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	117		70 - 127		01/14/15 16:23	1
4-Bromofluorobenzene (Surr)	90		78 - 120		01/14/15 16:23	1
Dibromofluoromethane (Surr)	115		77 - 120		01/14/15 16:23	1
Toluene-d8 (Surr)	94		80 - 125		01/14/15 16:23	1

TestAmerica Denver

Surrogate Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		12DCE (70-127)	BFB (78-120)	DBFM (77-120)	TOL (80-125)
280-64325-2	OHLSON HOUSE	117	90	115	94
280-64325-2 MS	OHLSON HOUSE	117	87	111	89
280-64325-2 MSD	OHLSON HOUSE	116	83	110	86
LCS 280-260094/4	Lab Control Sample	110	92	107	95
MB 280-260094/5	Method Blank	112	94	111	97

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

TOL = Toluene-d8 (Surr)

QC Association Summary

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

GC/MS VOA

Analysis Batch: 260094

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-64325-2	OHLSON HOUSE	Total/NA	Water	8260B	
280-64325-2 MS	OHLSON HOUSE	Total/NA	Water	8260B	
280-64325-2 MSD	OHLSON HOUSE	Total/NA	Water	8260B	
LCS 280-260094/4	Lab Control Sample	Total/NA	Water	8260B	
MB 280-260094/5	Method Blank	Total/NA	Water	8260B	

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 280-260094/5

Matrix: Water

Analysis Batch: 260094

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	Result	MB MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		1.0	ug/L			01/14/15 08:12	1
1,1,1-Trichloroethane	ND		1.0	ug/L			01/14/15 08:12	1
1,1,2,2-Tetrachloroethane	ND		1.0	ug/L			01/14/15 08:12	1
1,1,2-Trichloroethane	ND		1.0	ug/L			01/14/15 08:12	1
1,1-Dichloroethane	ND		1.0	ug/L			01/14/15 08:12	1
1,1-Dichloroethene	ND		1.0	ug/L			01/14/15 08:12	1
1,1-Dichloropropene	ND		1.0	ug/L			01/14/15 08:12	1
1,2,3-Trichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,2,3-Trichloropropane	ND		2.5	ug/L			01/14/15 08:12	1
1,2,4-Trichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,2,4-Trimethylbenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,2-Dibromo-3-Chloropropane	ND		5.0	ug/L			01/14/15 08:12	1
1,2-Dibromoethane	ND		1.0	ug/L			01/14/15 08:12	1
1,2-Dichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,2-Dichloroethane	ND		1.0	ug/L			01/14/15 08:12	1
1,2-Dichloroethene, Total	ND		2.2	ug/L			01/14/15 08:12	1
1,2-Dichloropropane	ND		1.0	ug/L			01/14/15 08:12	1
1,3,5-Trimethylbenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,3-Dichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
1,3-Dichloropropane	ND		1.0	ug/L			01/14/15 08:12	1
1,4-Dichlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
2,2-Dichloropropane	ND		1.0	ug/L			01/14/15 08:12	1
2-Butanone (MEK)	ND		6.0	ug/L			01/14/15 08:12	1
2-Chlorotoluene	ND		1.0	ug/L			01/14/15 08:12	1
2-Hexanone	ND		5.0	ug/L			01/14/15 08:12	1
4-Chlorotoluene	ND		1.0	ug/L			01/14/15 08:12	1
4-Isopropyltoluene	ND		1.0	ug/L			01/14/15 08:12	1
4-Methyl-2-pentanone (MIBK)	ND		5.0	ug/L			01/14/15 08:12	1
Acetone	ND		10	ug/L			01/14/15 08:12	1
Benzene	ND		1.0	ug/L			01/14/15 08:12	1
Bromobenzene	ND		1.0	ug/L			01/14/15 08:12	1
Bromoform	ND		1.0	ug/L			01/14/15 08:12	1
Bromomethane	ND		2.0	ug/L			01/14/15 08:12	1
Carbon tetrachloride	ND		1.0	ug/L			01/14/15 08:12	1
Chlorobenzene	ND		1.0	ug/L			01/14/15 08:12	1
Chlorobromomethane	ND		1.0	ug/L			01/14/15 08:12	1
Chlorodibromomethane	ND		1.0	ug/L			01/14/15 08:12	1
Chloroethane	ND		2.0	ug/L			01/14/15 08:12	1
Chloroform	ND		1.0	ug/L			01/14/15 08:12	1
Chloromethane	ND		2.0	ug/L			01/14/15 08:12	1
cis-1,2-Dichloroethene	ND		1.0	ug/L			01/14/15 08:12	1
cis-1,3-Dichloropropene	ND		1.0	ug/L			01/14/15 08:12	1
Dibromomethane	ND		1.0	ug/L			01/14/15 08:12	1
Dichlorobromomethane	ND		1.0	ug/L			01/14/15 08:12	1
Dichlorodifluoromethane	ND		2.0	ug/L			01/14/15 08:12	1
Ethylbenzene	ND		1.0	ug/L			01/14/15 08:12	1
Hexachlorobutadiene	ND		1.0	ug/L			01/14/15 08:12	1
Isopropylbenzene	ND		1.0	ug/L			01/14/15 08:12	1

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 280-260094/5

Matrix: Water

Analysis Batch: 260094

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Methyl tert-butyl ether	ND		5.0	ug/L			01/14/15 08:12	1
Methylene Chloride	ND		2.0	ug/L			01/14/15 08:12	1
m-Xylene & p-Xylene	ND		2.0	ug/L			01/14/15 08:12	1
Naphthalene	ND		1.0	ug/L			01/14/15 08:12	1
n-Butylbenzene	ND		1.0	ug/L			01/14/15 08:12	1
N-Propylbenzene	ND		1.0	ug/L			01/14/15 08:12	1
o-Xylene	ND		1.0	ug/L			01/14/15 08:12	1
sec-Butylbenzene	ND		1.0	ug/L			01/14/15 08:12	1
Styrene	ND		1.0	ug/L			01/14/15 08:12	1
tert-Butylbenzene	ND		1.0	ug/L			01/14/15 08:12	1
Tetrachloroethene	ND		1.0	ug/L			01/14/15 08:12	1
Toluene	ND		1.0	ug/L			01/14/15 08:12	1
trans-1,2-Dichloroethene	ND		1.0	ug/L			01/14/15 08:12	1
trans-1,3-Dichloropropene	ND		3.0	ug/L			01/14/15 08:12	1
Trichloroethene	ND		1.0	ug/L			01/14/15 08:12	1
Trichlorofluoromethane	ND		2.0	ug/L			01/14/15 08:12	1
Vinyl chloride	ND		1.0	ug/L			01/14/15 08:12	1
Xylenes, Total	ND		2.2	ug/L			01/14/15 08:12	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	112		70 - 127		01/14/15 08:12	1
4-Bromofluorobenzene (Surr)	94		78 - 120		01/14/15 08:12	1
Dibromofluoromethane (Surr)	111		77 - 120		01/14/15 08:12	1
Toluene-d8 (Surr)	97		80 - 125		01/14/15 08:12	1

Lab Sample ID: LCS 280-260094/4

Matrix: Water

Analysis Batch: 260094

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	5.00	4.74		ug/L		95	65 - 135
1,1,1-Trichloroethane	5.00	5.50		ug/L		110	65 - 135
1,1,2,2-Tetrachloroethane	5.00	4.35		ug/L		87	58 - 135
1,1,2-Trichloroethane	5.00	5.01		ug/L		100	64 - 135
1,1-Dichloroethane	5.00	5.23		ug/L		105	65 - 135
1,1-Dichloroethene	5.00	5.55		ug/L		111	65 - 136
1,1-Dichloropropene	5.00	5.54		ug/L		111	65 - 135
1,2,3-Trichlorobenzene	5.00	4.74		ug/L		95	60 - 135
1,2,3-Trichloropropane	5.00	4.65		ug/L		93	65 - 135
1,2,4-Trichlorobenzene	5.00	4.81		ug/L		96	58 - 135
1,2,4-Trimethylbenzene	5.00	4.79		ug/L		96	65 - 135
1,2-Dibromo-3-Chloropropane	5.00	4.16	J	ug/L		83	57 - 135
1,2-Dibromoethane	5.00	4.64		ug/L		93	65 - 135
1,2-Dichlorobenzene	5.00	4.82		ug/L		96	65 - 135
1,2-Dichloroethane	5.00	5.27		ug/L		105	65 - 135
1,2-Dichloroethene, Total	10.0	10.6		ug/L		106	65 - 135
1,2-Dichloropropane	5.00	4.73		ug/L		95	64 - 135
1,3,5-Trimethylbenzene	5.00	4.91		ug/L		98	65 - 135

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 280-260094/4

Matrix: Water

Analysis Batch: 260094

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,3-Dichlorobenzene	5.00	4.89		ug/L		98	65 - 135
1,3-Dichloropropane	5.00	4.43		ug/L		89	64 - 135
1,4-Dichlorobenzene	5.00	4.89		ug/L		98	65 - 135
2,2-Dichloropropane	5.00	5.51		ug/L		110	65 - 135
2-Butanone (MEK)	20.0	16.0		ug/L		80	44 - 177
2-Chlorotoluene	5.00	4.89		ug/L		98	65 - 135
2-Hexanone	20.0	12.9		ug/L		65	57 - 139
4-Chlorotoluene	5.00	4.79		ug/L		96	65 - 135
4-Isopropyltoluene	5.00	4.93		ug/L		99	65 - 135
4-Methyl-2-pentanone (MIBK)	20.0	14.4		ug/L		72	60 - 150
Acetone	20.0	15.9		ug/L		79	39 - 156
Benzene	5.00	5.02		ug/L		100	65 - 135
Bromobenzene	5.00	4.95		ug/L		99	65 - 135
Bromoform	5.00	4.48		ug/L		90	62 - 135
Bromomethane	5.00	4.17		ug/L		83	45 - 135
Carbon tetrachloride	5.00	5.63		ug/L		113	65 - 135
Chlorobenzene	5.00	4.82		ug/L		96	65 - 135
Chlorobromomethane	5.00	5.22		ug/L		104	65 - 135
Chlorodibromomethane	5.00	4.76		ug/L		95	65 - 135
Chloroethane	5.00	4.03		ug/L		81	46 - 136
Chloroform	5.00	5.32		ug/L		106	65 - 135
Chloromethane	5.00	4.17		ug/L		83	34 - 145
cis-1,2-Dichloroethene	5.00	5.16		ug/L		103	65 - 135
cis-1,3-Dichloropropene	5.00	4.52		ug/L		90	65 - 135
Dibromomethane	5.00	5.05		ug/L		101	65 - 135
Dichlorobromomethane	5.00	4.95		ug/L		99	65 - 135
Dichlorodifluoromethane	5.00	4.81		ug/L		96	43 - 142
Ethylbenzene	5.00	4.71		ug/L		94	65 - 135
Hexachlorobutadiene	5.00	5.25		ug/L		105	65 - 135
Isopropylbenzene	5.00	4.90		ug/L		98	65 - 135
Methyl tert-butyl ether	5.00	4.68	J	ug/L		94	54 - 135
Methylene Chloride	5.00	5.02		ug/L		100	54 - 141
m-Xylene & p-Xylene	5.00	4.67		ug/L		93	65 - 135
Naphthalene	5.00	4.04		ug/L		81	42 - 135
n-Butylbenzene	5.00	4.76		ug/L		95	64 - 135
N-Propylbenzene	5.00	4.74		ug/L		95	65 - 135
o-Xylene	5.00	4.74		ug/L		95	65 - 135
sec-Butylbenzene	5.00	4.80		ug/L		96	64 - 135
Styrene	5.00	4.49		ug/L		90	65 - 135
tert-Butylbenzene	5.00	4.81		ug/L		96	65 - 135
Tetrachloroethene	5.00	5.08		ug/L		102	65 - 135
Toluene	5.00	5.30		ug/L		106	65 - 135
trans-1,2-Dichloroethene	5.00	5.46		ug/L		109	65 - 135
trans-1,3-Dichloropropene	5.00	5.40		ug/L		108	65 - 135
Trichloroethene	5.00	5.23		ug/L		105	65 - 135
Trichlorofluoromethane	5.00	4.83		ug/L		97	53 - 137
Vinyl chloride	5.00	4.22		ug/L		84	40 - 137
Xylenes, Total	10.0	9.41		ug/L		94	65 - 135

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 280-260094/4

Matrix: Water

Analysis Batch: 260094

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	110		70 - 127
4-Bromofluorobenzene (Surr)	92		78 - 120
Dibromofluoromethane (Surr)	107		77 - 120
Toluene-d8 (Surr)	95		80 - 125

Lab Sample ID: 280-64325-2 MS

Matrix: Water

Analysis Batch: 260094

Client Sample ID: OHLSON HOUSE

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	ND		5.00	4.87		ug/L		97	65 - 135
1,1,1-Trichloroethane	ND		5.00	5.38		ug/L		108	65 - 135
1,1,2,2-Tetrachloroethane	ND		5.00	4.35		ug/L		87	58 - 135
1,1,2-Trichloroethane	ND		5.00	5.06		ug/L		101	64 - 135
1,1-Dichloroethane	ND		5.00	5.27		ug/L		105	65 - 135
1,1-Dichloroethene	ND		5.00	5.17		ug/L		103	65 - 136
1,1-Dichloropropene	ND		5.00	5.22		ug/L		104	65 - 135
1,2,3-Trichlorobenzene	ND		5.00	4.59		ug/L		92	60 - 135
1,2,3-Trichloropropane	ND		5.00	4.93		ug/L		99	65 - 135
1,2,4-Trichlorobenzene	ND		5.00	4.48		ug/L		90	58 - 135
1,2,4-Trimethylbenzene	ND		5.00	4.26		ug/L		85	65 - 135
1,2-Dibromo-3-Chloropropane	ND		5.00	ND		ug/L		89	57 - 135
1,2-Dibromoethane	ND		5.00	4.73		ug/L		95	65 - 135
1,2-Dichlorobenzene	ND		5.00	4.67		ug/L		93	65 - 135
1,2-Dichloroethane	ND		5.00	5.61		ug/L		112	65 - 135
1,2-Dichloroethene, Total	ND		10.0	10.5		ug/L		105	65 - 135
1,2-Dichloropropane	ND		5.00	4.80		ug/L		96	64 - 135
1,3,5-Trimethylbenzene	ND		5.00	4.20		ug/L		84	65 - 135
1,3-Dichlorobenzene	ND		5.00	4.49		ug/L		90	65 - 135
1,3-Dichloropropane	ND		5.00	4.46		ug/L		89	64 - 135
1,4-Dichlorobenzene	ND		5.00	4.54		ug/L		91	65 - 135
2,2-Dichloropropane	ND		5.00	4.86		ug/L		97	65 - 135
2-Butanone (MEK)	ND		20.0	16.4		ug/L		82	44 - 177
2-Chlorotoluene	ND		5.00	4.36		ug/L		87	65 - 135
2-Hexanone	ND		20.0	14.7		ug/L		73	57 - 139
4-Chlorotoluene	ND		5.00	4.32		ug/L		86	65 - 135
4-Isopropyltoluene	ND		5.00	4.03		ug/L		81	65 - 135
4-Methyl-2-pentanone (MIBK)	ND		20.0	16.2		ug/L		81	60 - 150
Acetone	ND		20.0	17.3		ug/L		86	39 - 156
Benzene	ND		5.00	5.00		ug/L		100	65 - 135
Bromobenzene	ND		5.00	4.71		ug/L		94	65 - 135
Bromoform	ND		5.00	4.92		ug/L		98	62 - 135
Bromomethane	ND		5.00	4.00		ug/L		80	45 - 135
Carbon tetrachloride	ND		5.00	5.33		ug/L		107	65 - 135
Chlorobenzene	ND		5.00	4.66		ug/L		93	65 - 135
Chlorobromomethane	ND		5.00	5.54		ug/L		111	65 - 135
Chlorodibromomethane	ND		5.00	5.04		ug/L		101	65 - 135
Chloroethane	ND		5.00	3.89		ug/L		78	46 - 136

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-64325-2 MS				Client Sample ID: OHLSON HOUSE						
Matrix: Water				Prep Type: Total/NA						
Analysis Batch: 260094										
Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	
Chloroform	1.9		5.00	7.17		ug/L		105	65 - 135	
Chloromethane	ND		5.00	3.95		ug/L		79	34 - 145	
cis-1,2-Dichloroethene	ND		5.00	5.16		ug/L		103	65 - 135	
cis-1,3-Dichloropropene	ND		5.00	4.44		ug/L		89	65 - 135	
Dibromomethane	ND		5.00	5.38		ug/L		108	65 - 135	
Dichlorobromomethane	ND		5.00	5.24		ug/L		105	65 - 135	
Dichlorodifluoromethane	ND		5.00	4.45		ug/L		89	43 - 142	
Ethylbenzene	ND		5.00	4.29		ug/L		86	65 - 135	
Hexachlorobutadiene	ND		5.00	4.05		ug/L		81	65 - 135	
Isopropylbenzene	ND		5.00	4.15		ug/L		83	65 - 135	
Methyl tert-butyl ether	ND		5.00	5.10		ug/L		102	54 - 135	
Methylene Chloride	ND		5.00	4.87		ug/L		72	54 - 141	
m-Xylene & p-Xylene	ND		5.00	4.24		ug/L		85	65 - 135	
Naphthalene	ND		5.00	4.18		ug/L		84	42 - 135	
n-Butylbenzene	ND		5.00	3.73		ug/L		75	64 - 135	
N-Propylbenzene	ND		5.00	4.03		ug/L		81	65 - 135	
o-Xylene	ND		5.00	4.40		ug/L		88	65 - 135	
sec-Butylbenzene	ND		5.00	3.90		ug/L		78	64 - 135	
Styrene	ND		5.00	4.38		ug/L		88	65 - 135	
tert-Butylbenzene	ND		5.00	4.10		ug/L		82	65 - 135	
Tetrachloroethene	ND		5.00	4.49		ug/L		90	65 - 135	
Toluene	ND		5.00	4.99		ug/L		100	65 - 135	
trans-1,2-Dichloroethene	ND		5.00	5.35		ug/L		107	65 - 135	
trans-1,3-Dichloropropene	ND		5.00	5.46		ug/L		109	65 - 135	
Trichloroethene	ND		5.00	5.12		ug/L		102	65 - 135	
Trichlorofluoromethane	ND		5.00	4.53		ug/L		91	53 - 137	
Vinyl chloride	ND		5.00	3.85		ug/L		77	40 - 137	
Xylenes, Total	ND		10.0	8.64		ug/L		86	65 - 135	
MS MS										
Surrogate	%Recovery	Qualifier	Limits							
1,2-Dichloroethane-d4 (Surr)	117		70 - 127							
4-Bromofluorobenzene (Surr)	87		78 - 120							
Dibromofluoromethane (Surr)	111		77 - 120							
Toluene-d8 (Surr)	89		80 - 125							

Lab Sample ID: 280-64325-2 MSD				Client Sample ID: OHLSON HOUSE						
Matrix: Water				Prep Type: Total/NA						
Analysis Batch: 260094										
Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD Limit
1,1,1,2-Tetrachloroethane	ND		5.00	5.06		ug/L		101	65 - 135	4 20
1,1,1-Trichloroethane	ND		5.00	5.26		ug/L		105	65 - 135	2 20
1,1,2,2-Tetrachloroethane	ND		5.00	4.47		ug/L		89	58 - 135	3 20
1,1,2-Trichloroethane	ND		5.00	5.46		ug/L		109	64 - 135	8 27
1,1-Dichloroethane	ND		5.00	5.33		ug/L		107	65 - 135	1 21
1,1-Dichloroethene	ND		5.00	5.08		ug/L		102	65 - 136	2 20
1,1-Dichloropropene	ND		5.00	5.05		ug/L		101	65 - 135	3 21
1,2,3-Trichlorobenzene	ND		5.00	4.64		ug/L		93	60 - 135	1 36

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-64325-2 MSD

Matrix: Water

Analysis Batch: 260094

Client Sample ID: OHLSON HOUSE

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,3-Trichloropropane	ND		5.00	5.35		ug/L		107	65 - 135	8	23
1,2,4-Trichlorobenzene	ND		5.00	4.41		ug/L		88	58 - 135	1	25
1,2,4-Trimethylbenzene	ND		5.00	4.02		ug/L		80	65 - 135	6	20
1,2-Dibromo-3-Chloropropane	ND		5.00	ND		ug/L		99	57 - 135	11	22
1,2-Dibromoethane	ND		5.00	5.05		ug/L		101	65 - 135	7	27
1,2-Dichlorobenzene	ND		5.00	4.64		ug/L		93	65 - 135	1	20
1,2-Dichloroethane	ND		5.00	5.86		ug/L		117	65 - 135	4	20
1,2-Dichloroethene, Total	ND		10.0	10.6		ug/L		106	65 - 135	1	20
1,2-Dichloropropane	ND		5.00	4.89		ug/L		98	64 - 135	2	20
1,3,5-Trimethylbenzene	ND		5.00	3.90		ug/L		78	65 - 135	7	20
1,3-Dichlorobenzene	ND		5.00	4.38		ug/L		88	65 - 135	3	20
1,3-Dichloropropane	ND		5.00	4.73		ug/L		95	64 - 135	6	20
1,4-Dichlorobenzene	ND		5.00	4.50		ug/L		90	65 - 135	1	23
2,2-Dichloropropane	ND		5.00	4.84		ug/L		97	65 - 135	0	20
2-Butanone (MEK)	ND		20.0	18.9		ug/L		95	44 - 177	14	32
2-Chlorotoluene	ND		5.00	4.17		ug/L		83	65 - 135	5	20
2-Hexanone	ND		20.0	15.6		ug/L		78	57 - 139	6	25
4-Chlorotoluene	ND		5.00	4.17		ug/L		83	65 - 135	4	20
4-Isopropyltoluene	ND		5.00	3.38		ug/L		68	65 - 135	17	20
4-Methyl-2-pentanone (MIBK)	ND		20.0	17.5		ug/L		87	60 - 150	8	22
Acetone	ND		20.0	17.7		ug/L		88	39 - 156	2	23
Benzene	ND		5.00	5.08		ug/L		102	65 - 135	2	20
Bromobenzene	ND		5.00	4.76		ug/L		95	65 - 135	1	26
Bromoform	ND		5.00	4.95		ug/L		99	62 - 135	1	27
Bromomethane	ND		5.00	4.38		ug/L		88	45 - 135	9	33
Carbon tetrachloride	ND		5.00	5.12		ug/L		102	65 - 135	4	21
Chlorobenzene	ND		5.00	4.68		ug/L		94	65 - 135	0	20
Chlorobromomethane	ND		5.00	5.82		ug/L		116	65 - 135	5	29
Chlorodibromomethane	ND		5.00	5.13		ug/L		103	65 - 135	2	20
Chloroethane	ND		5.00	4.17		ug/L		83	46 - 136	7	25
Chloroform	1.9		5.00	7.27		ug/L		107	65 - 135	1	20
Chloromethane	ND		5.00	4.20		ug/L		84	34 - 145	6	24
cis-1,2-Dichloroethene	ND		5.00	5.32		ug/L		106	65 - 135	3	20
cis-1,3-Dichloropropene	ND		5.00	4.70		ug/L		94	65 - 135	6	26
Dibromomethane	ND		5.00	5.66		ug/L		113	65 - 135	5	26
Dichlorobromomethane	ND		5.00	5.48		ug/L		110	65 - 135	5	20
Dichlorodifluoromethane	ND		5.00	3.81		ug/L		76	43 - 142	15	30
Ethylbenzene	ND		5.00	4.13		ug/L		83	65 - 135	4	20
Hexachlorobutadiene	ND		5.00	3.08	F1 F2	ug/L		62	65 - 135	27	25
Isopropylbenzene	ND		5.00	3.84		ug/L		77	65 - 135	8	20
Methyl tert-butyl ether	ND		5.00	5.50		ug/L		110	54 - 135	7	21
Methylene Chloride	ND		5.00	5.22		ug/L		78	54 - 141	7	26
m-Xylene & p-Xylene	ND		5.00	4.05		ug/L		81	65 - 135	5	20
Naphthalene	ND		5.00	4.28		ug/L		86	42 - 135	2	23
n-Butylbenzene	ND		5.00	2.97	F1 F2	ug/L		59	64 - 135	23	21
N-Propylbenzene	ND		5.00	3.52		ug/L		70	65 - 135	14	20
o-Xylene	ND		5.00	4.41		ug/L		88	65 - 135	0	20
sec-Butylbenzene	ND		5.00	3.27		ug/L		65	64 - 135	18	21

TestAmerica Denver

QC Sample Results

Client: Colorado Oil&Gas Conservation Commission
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-64325-2 MSD

Matrix: Water

Analysis Batch: 260094

Client Sample ID: OHLSON HOUSE

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Styrene	ND		5.00	4.34		ug/L		87	65 - 135	1	26
tert-Butylbenzene	ND		5.00	3.62		ug/L		72	65 - 135	12	21
Tetrachloroethene	ND		5.00	4.17		ug/L		83	65 - 135	7	20
Toluene	ND		5.00	5.02		ug/L		100	65 - 135	1	20
trans-1,2-Dichloroethene	ND		5.00	5.29		ug/L		106	65 - 135	1	24
trans-1,3-Dichloropropene	ND		5.00	5.71		ug/L		114	65 - 135	5	26
Trichloroethene	ND		5.00	5.14		ug/L		103	65 - 135	0	20
Trichlorofluoromethane	ND		5.00	4.30		ug/L		86	53 - 137	5	27
Vinyl chloride	ND		5.00	3.97		ug/L		79	40 - 137	3	24
Xylenes, Total	ND		10.0	8.46		ug/L		85	65 - 135	2	20
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
1,2-Dichloroethane-d4 (Surr)	116		70 - 127								
4-Bromofluorobenzene (Surr)	83		78 - 120								
Dibromofluoromethane (Surr)	110		77 - 120								
Toluene-d8 (Surr)	86		80 - 125								

TestAmerica Denver

Lab Chronicle

Client: Colorado Oil&Gas Conservation Commision
Project/Site: COGCC - Ohlson House

TestAmerica Job ID: 280-64325-2

Client Sample ID: OHLSON HOUSE

Lab Sample ID: 280-64325-2

Date Collected: 01/13/15 10:50

Matrix: Water

Date Received: 01/13/15 13:09

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	260094	01/14/15 16:23	DPI	TAL DEN

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Login Sample Receipt Checklist

Client: Colorado Oil&Gas Conservation Commission

Job Number: 280-64325-2

Login Number: 64325

List Source: TestAmerica Denver

List Number: 1

Creator: Orfield, Tayler C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	REFER TO CUR
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	False	REFER TO CUR
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

4955 Yarrow Street

Arvada, CO 80002

phone 303.736.0100 fax 303.431.7171



280-64325 Chain of Custody

3.8 to 5 R-5
1/13/15 transfer by 1d
Chain of Custody Record

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

[illegible]



ANALYSIS REPORT

Lab #: 484211 Job #: 27845 IS-75502 Co. Job#:
Sample Name: Ohlson Water Well (1ltr) Co. Lab#:
Company: Colorado Oil & Gas Conservation
API/Well:
Container: Amber Bottle
Field/Site Name: Ohlson Water Well
Location:
Formation/Depth:
Sampling Point:
Date Sampled: 1/13/2015 Date Received: 1/15/2015 Date Reported: 2/02/2015

δD of water	-----	na
$\delta^{18}O$ of water	-----	na
Tritium content of water	-----	< 1.00 TU
$\delta^{13}C$ of DIC	-----	na
^{14}C content of DIC	-----	na
$\delta^{15}N$ of nitrate	-----	na
$\delta^{18}O$ of nitrate	-----	na
$\delta^{34}S$ of sulfate	-----	na
$\delta^{18}O$ of sulfate	-----	na

Remarks:



ANALYSIS REPORT

Lab #: 484097 Job #: 27837 IS-75502 Co. Job#:
Sample Name: Ohlson Co. Lab#:
Company: Colorado Oil & Gas Conservation
API/Well:
Container: 60ml Bottle
Field/Site Name: Ohlson
Location:
Formation/Depth:
Sampling Point:
Date Sampled: 1/13/2015 Date Received: 1/14/2015 Date Reported: 2/12/2015

δD of water	-----	-116.1 ‰ relative to VSMOW
$\delta^{18}O$ of water	-----	-15.22 ‰ relative to VSMOW
Tritium content of water	-----	na
$\delta^{13}C$ of DIC	-----	-13.5 ‰ relative to VPDB
^{14}C content of DIC	-----	1.6 ± 0.1 percent modern carbon
$\delta^{15}N$ of nitrate	-----	na
$\delta^{18}O$ of nitrate	-----	na
$\delta^{34}S$ of sulfate	-----	na
$\delta^{18}O$ of sulfate	-----	na

Remarks:



ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T: 1-360-577-7222
F: 1-360-636-1068
www.alsglobal.com

February 17, 2015

Analytical Report for Service Request No: K1500344

Robert Chesson
Colorado Department of Natural Resources, Oil and Gas Conser
1120 Lincoln Street
Denver, CO 80203

RE: OHLSON/200412560

Dear Robert:

Enclosed are the results of the sample(s) submitted to our laboratory on January 14, 2015. For your reference, these analyses have been assigned our service request number **K1500344**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3375. You may also contact me via email at Janet.Malloch@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Janet Malloch
Project Manager

Page 1 of 10

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

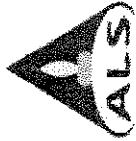
- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjllabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdwl/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon - DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



CHAIN OF CUSTODY

54915



001

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Page 1 of 1

SR# 600344
COC Set 1 of 1
COC#

Project Name CHLSON Project Number 200412560
Project Manager BOB CHESSON
Company COG C C
Address 1120 LINCOLN ST #201 DENVER CO
Phone # 3-894-2100 email BOB.CHESSON@COGCC.COM
Sampler Signature [Signature] Sampler Printed Name BOB CHESSON

CLIENT SAMPLE ID	LABID	SAMPLING Date Time	Matrix	NUMBER OF CONTAINERS										Remarks
				7D	999D	None / MISC PHCI	MSA / Ster EDC Lo PH	1	2	3	4	5	6	
1. <u>CHLSON</u>		<u>1/13/15 10:30 AM</u>	<u>2 X</u>											
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Report Requirements I. Routine Report: Method Blank, Surrogate, as required <input checked="" type="checkbox"/> II. Report Dup., MS, MSD as required <input checked="" type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input checked="" type="checkbox"/> V. EDD <input checked="" type="checkbox"/>	Invoice Information P.O.# _____ Bill To: <u>SAME</u> Turnaround Requirements 4 hr. <input type="checkbox"/> 5 Day <input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> Requested Report Date _____	Relinquished By: Signature <u>[Signature]</u> Printed Name <u>Robert Chesson</u> Firm <u>COGCC</u> Date/Time <u>1/13/15</u>	Received By: Signature _____ Printed Name _____ Firm _____ Date/Time _____
---	---	--	---

Relinquished By: Signature <u>[Signature]</u> Printed Name <u>Les Kennedy</u> Firm <u>ALS</u> Date/Time <u>1/14/15 0950</u>	Received By: Signature _____ Printed Name _____ Firm _____ Date/Time _____
--	---

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Special Instructions/Comments: *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)

PC Janet

Cooler Receipt and Preservation Form

Client / Project: State of Colorado Service Request K15 00344Received: 1/14/15 Opened: 1/14/15 By: UM Unloaded: 1/14/15 By: UM

1. Samples were received via? Mail Fed Ex UPS DHL PDX Courier Hand Delivered
2. Samples were received in: (circle) Cooler Box Envelope Other NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? 1 front 1 Back
- If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
0.2	0.3	5.9	6.0	10.1	355	54915	7725 44 27 2587	

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head- space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Colorado Department of Natural Resources
Project: OHLSON/200412560
Sample Matrix: Ground water

Service Request: K1500344
Date Collected: 01/13/2015
Date Received: 01/14/2015

Optical Brightener 220

Sample Name: OHLSON
Lab Code: K1500344-001
Extraction Method: METHOD
Analysis Method: HPLC-UV-OB

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Optical Brightener 220	ND U	200	1	02/11/15	02/11/15	KWG1501195	

Comments:

Analytical Results

Client: Colorado Department of Natural Resources
Project: OHLSON/200412560
Sample Matrix: Ground water

Service Request: K1500344
Date Collected: NA
Date Received: NA

Optical Brightener 220

Sample Name: Method Blank
Lab Code: KWG1501195-7
Extraction Method: METHOD
Analysis Method: HPLC-UV-OB

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Optical Brightener 220	ND U	200	1	02/11/15	02/11/15	KWG1501195	

Comments:

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Colorado Department of Natural Resources
Project: OHLSON/200412560
Sample Matrix: Ground Water
Sample Name: OHLSON
Lab Code: K1500344-001

Service Request: K1500344
Date Collected: 01/13/15 10:30
Date Received: 01/14/15 09:50

Units: ng/L
Basis: NA

Steroids and Endocrine Disrupting Compounds

Analysis Method: 1694
Prep Method: Method

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Caffeine	2.0	1.9	1	01/24/15 00:09	1/19/15	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Caffeine-trimethyl-13C3	128	46 - 161	01/24/15 00:09	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Colorado Department of Natural Resources
Project: OHLSON/200412560
Sample Matrix: Ground Water
Sample Name: Method Blank
Lab Code: KQ1500437-03

Service Request: K1500344
Date Collected: NA
Date Received: NA
Units: ng/L
Basis: NA

Steroids and Endocrine Disrupting Compounds

Analysis Method: 1694
Prep Method: Method

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Caffeine	ND U	2.0	1	01/23/15 11:18	1/19/15	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Caffeine-trimethyl-13C3	91	46 - 161	01/23/15 11:18	

Ohlson Water Well
Complaint No. 200412560
March 3, 2015
Page 9

ATTACHMENT 3



October 15, 2015

Gary Ohlson
36105 E. 124th Avenue
Hudson, CO 80642

RE: Ground Penetrating Radar Survey, Magnetometer Survey, and Excavations
Well Investigation Report
Complaint No. 200412560
SWNW Section 33 – Township 1 South – Range 64 West
Adams County, Colorado

Mr. Ohlson:

On September 9, 2015 LT Environmental, Inc., (LTE) under the direction of the Colorado Oil and Gas Conservation Commission (COGCC) conducted a Ground-Penetrating Radar (GPR) survey and exploratory excavations at your property. This survey and exploratory excavations were conducted in response to your complaint that a linear ground subsidence area (see Figure 1) in your horse corral was due to ground subsidence at or adjacent to the former UPRR Pan Am B#1 well (API 05-001-06230), now plugged & abandoned. The location of the former O&G well, based on well records, is in the vicinity of your horse corral; although south of the corral footprint (Figure 2).

LTE enlisted the assistance of PinPoint, L.L.C. (PinPoint) to conduct the GPR survey which used a GSSI SIR-3000 system with a 400 MHz dipole antenna. A discussion of the GPR operation and ability to detect subsurface anomalies is provided in the summary report *Ground-Penetrating Radar Survey and Exploratory Excavations, Ohlson Property, Hudson, Adams County, Colorado*; LT Environmental, Inc., September 22, 2015.



A copy of the report is provided as Attachment 1. The following is a brief summary of the investigation findings.

GPR AND MAGNETOMETER SURVEY FINDINGS

PinPoint investigated 4 grids (Figure 3). Grid 1 was located due east of the horse corral in an area previously partially investigated by the COGCC in 2008 (*Site Investigation, COGCC Complaint #200095139, Ohlson Property: Leppert Associates, Inc., May 6, 2008*) and shown on Figure 3.

Grid 1 survey provided PinPoint with site calibration of the GPR instrument. No anomalies identifiable as metallic were observed in the Grid 1 survey area.

Grid 2 was located in the area south of the horse corral where existing well records place the location of the former oil & gas well. Several metallic anomalies were identified and excavations (2, 3, and 5) were dug to approximately a 5 foot depth below the ground surface. Metal was found in each of the excavations (metal – cathode protection strap, nail and small metal plate, small section of metal pipe).

Grid 3 was located in your horse corral directly south of the ground subsidence area and adjacent to your southern corral fence. Two anomalies were recorded and excavations 7 and 8 were dug to approximately a 4 foot depth below the ground surface. The excavation at anomaly 7 found no metal and excavation 8 yielded some metal debris.

Grid 4 was located over the central and northern part of your horse corral due north of the ground subsidence area. One GPR anomaly was observed and the subsequent

excavation yielded a gallon sized metal can. No other GPR anomalies were observed in Grid 4.

LTE also conducted two excavations unrelated to the GPR survey; one excavation was completed along the alignment of the ground subsidence within the horse corral (excavation 1 on Figure 3) and the other, excavation 4, completed in an area where the magnetometer detected a possible metal anomaly (Figure 3).

Excavation 1. The excavation along the subsidence area uncovered no direct cause for the subsidence. Some minor metal debris (trash) was uncovered. The ground subsidence is located only in the upper few feet (around 2 feet or shallower) of the corral and appears to be minor ground settling perhaps related to site construction.

Excavation 4. Excavation 4 was dug based on a magnetometer anomaly. No metal was uncovered and the excavation appeared to be undisturbed soils.

LTE and the COGCC did not detect the presence of any methane or other gases while completing the investigation and excavation activities.

WATER WELL SAMPLING

On September 9, 2015 the COGCC collected a sample from your water well submitted the sample to Test America Laboratories in Arvada, Colorado (Test America). The sample was analyzed for volatile organic compounds (VOCs) via US EPA method 8260B. A copy of the analytical laboratory report is attached (Attachment B)

As you are aware, the COGCC has sampled your water well on five previous occasions; September 2006, March 2008, September 2010, September 2014, and January 2015. The

results from the five previous sampling events and the September 2015 are shown on Table 1 (Attachment C).

DISCUSSION OF ANALYTICAL RESULTS

The Water Quality Control Commission (WQCC) of the Colorado Department of Public Health and Environment (CDPHE) established “Domestic Use – Quality” Human Health and Secondary Drinking Water Standards in Regulation 41 “The Basic Standards for Groundwater” (5CCR 1002-41). It is important to note that these standards were established for **municipal public drinking water supplies**, and that people often use and consume groundwater from private wells that exceeds these standards.

VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS

A target list of 60 volatile organic compounds was used during analysis of water from your well. **Benzene** detected above the method detection limit in the sample from your well at a concentration of 0.010 mg/l. This concentration exceeds the CDPHE human health standard of **0.005 mg/l**. Benzene was previously detected at 0.0091 mg/l (September 5, 2014) and 0.0094 mg/l (January 13, 2015) in samples of your water well. Toluene was detected at a concentration of 0.008 mg/l in the September 9, 2015 sample. The CDPHE human health standard for toluene is **0.56 mg/l**.

CONCLUSIONS

Subsidence Investigation

Based on the investigation findings, the minor ground subsidence in your horse corral does not appear to be related to the former UPRR Pan Am B#1 well (API 05-001-06230). Over-excavation of the area uncovered no underlying cause for the subsidence which was found to be limited to the upper few feet of soil. It is possible that the subsidence is related to minor ground subsidence from naturally occurring conditions or site construction.

GPR and Magnetometer Survey

The GPR survey did uncover some minor metal debris, however, the former UPRR Pan Am B#1 well location was not found. LTE suggests that the configuration of the metal horse corral which resulted in discontinuous survey areas, along with subsurface metals debris possible reasons for not locating the former well location. Based on the extent of the surveys and excavations, the location of the former well is unlikely to be within the footprint of your horse corral.

Water Well Sampling

As in the earlier (9/5/2014 and 1/13/2015) samplings, benzene above the State of Colorado water quality standard was observed in this sampling event (at similar concentrations [0.0091 mg/l, 0.0094 mg/l, and 0.010 mg/l]). In an earlier letter (March 3, 2015), you were informed that investigation samples from your water well showed evidence that your water well is not isolated from surface water infiltration and any actions (such as spills, etc.) near your water well could introduce undesirable

compounds into your water system. There is no evidence that the occurrence of the benzene in your water well is due to oil & gas activity in your area or on your property.

The COGCC maintains a water quality database where the results from your water well sample are recorded.

The COGCC did not identify any issues related to the former UPRR Pan Am B#1 well at your horse corral during the investigation and, therefore, has determined that no violations occurred related to your complaint. Accordingly, the COGCC has closed the complaint and will not issue a notice of alleged violation (NOAV) related to this complaint.

As a complainant, you have the right to file an application requesting an Order Finding Violation (OFV) before the full Commission, per Rules 522.a.(4) and 503.b.(4). You also have the right to make a public comment at a Commission hearing. A schedule of Commission hearings is located at <http://cogcc.state.co.us/Hearings/Hearings.html>.

If you have any questions related to filing an application or making a public comment at a Commission hearing, please contact the Hearings Manager at 303-894-2100.

Respectfully,

Colorado Oil and Gas Conservation Commission

Ohlson
Complaint No. 200412560
October 15, 2015
Page 7

Robert H. Chesson
Environmental Protection Specialist – Northeast Colorado

Enclosures: Attachment 1 LTE Summary Report
Attachment 2 Laboratory Analytical Reports
Attachment 3 Analytical Summary Table

cc: John Axelson, COGCC w/o Attachment 2
Greg Deranleau, COGCC w/o Attachment 2
Steve Jenkins, COGCC w/o Attachment 2
Douglas Birkbeck, BP America

FIGURES



Figure 1 : Subsidence area in corral prior to excavation. View west.

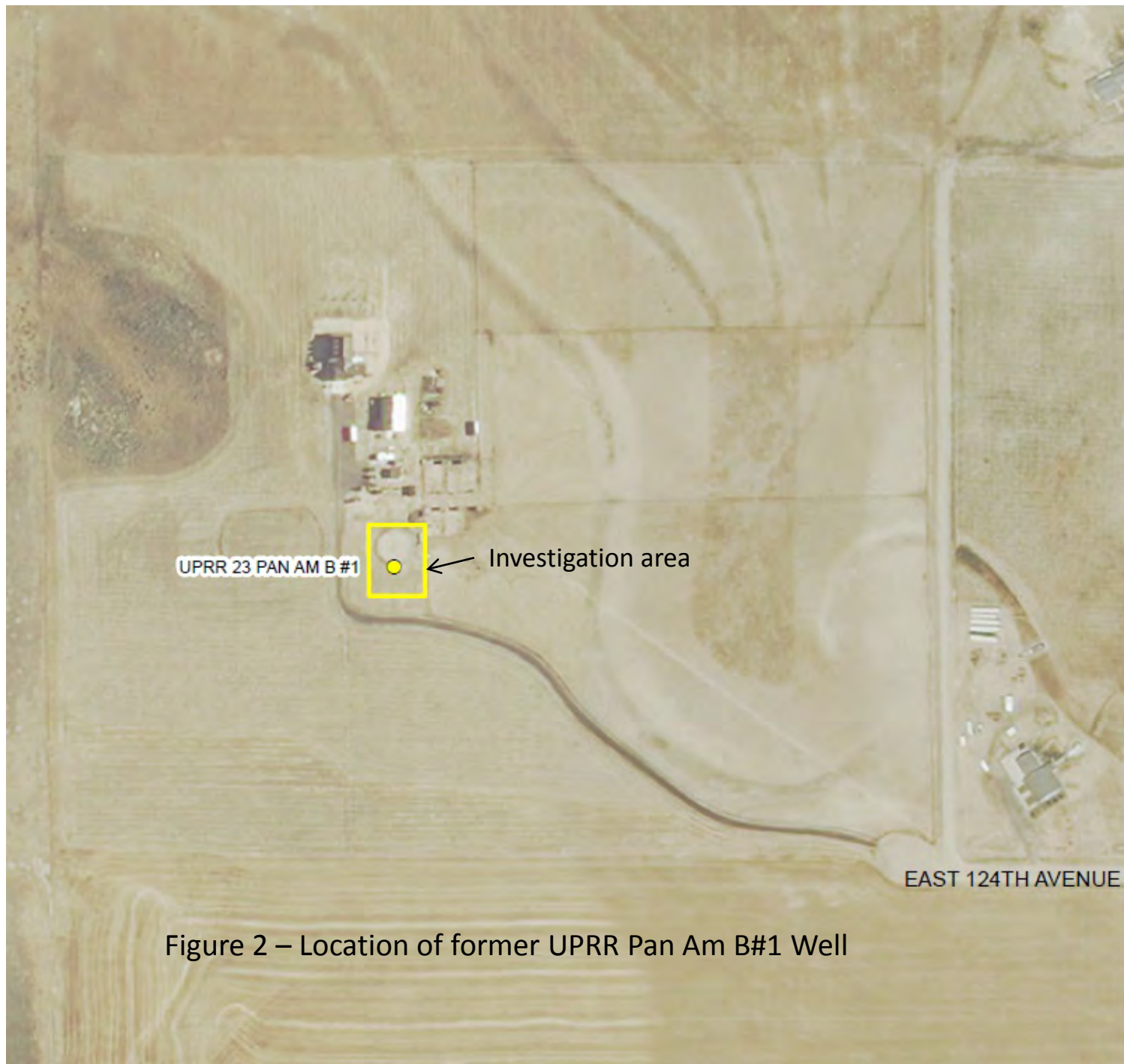
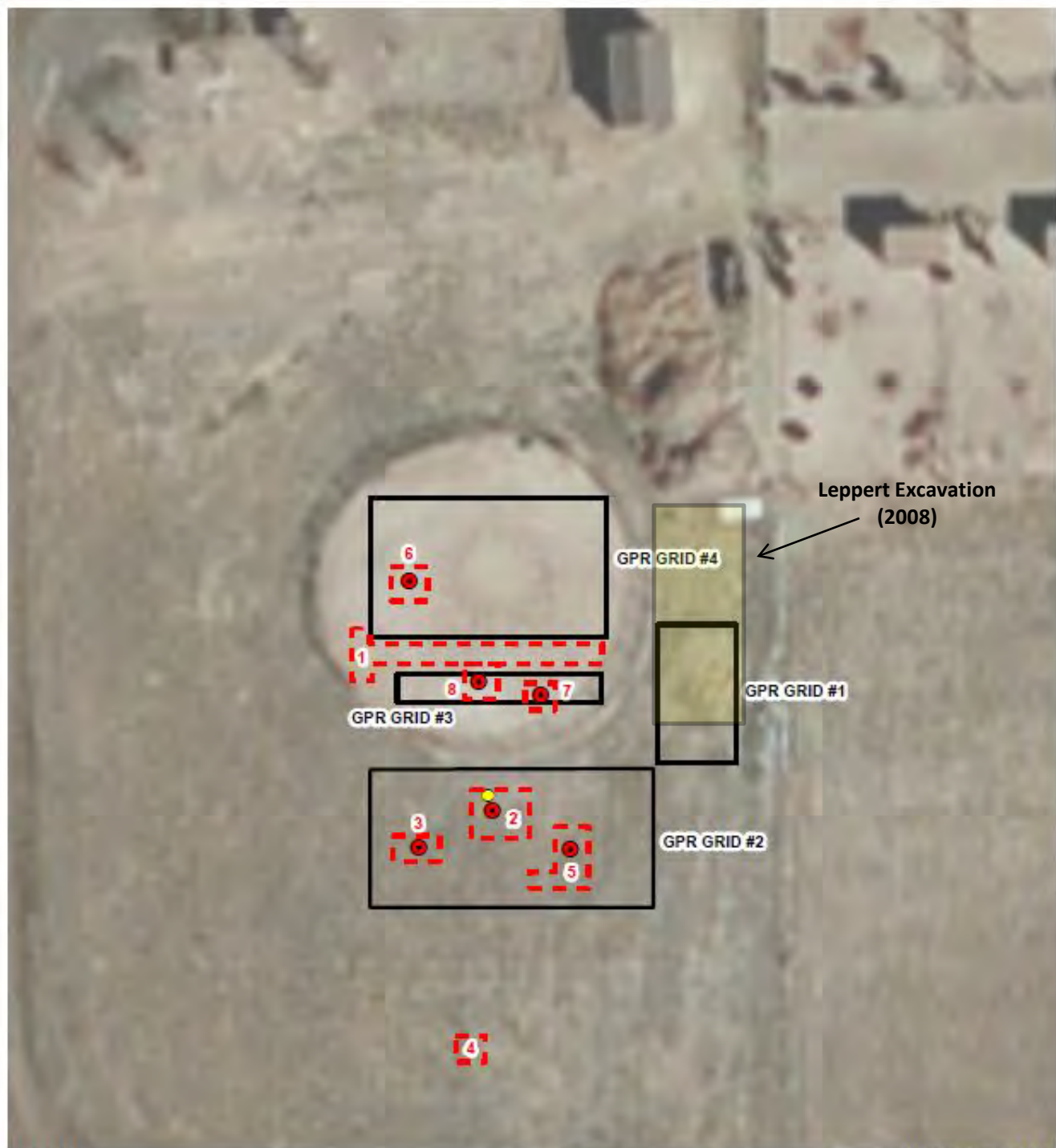


Figure 2 – Location of former UPRR Pan Am B#1 Well



LEGEND

- HISTORIC SURVEY LOCATION OF PLUGGED AND ABANDONED WELLHEAD (UPRR 23 PAN AM B #1)
- GPR ANOMOLY DETECTED
- APPROXIMATE GPR SURVEY AREA
- APPROXIMATE EXPLORATORY EXCAVATION AREA (NUMBERED IN ORDER COMPLETED)

GPR: GROUND-PENETRATING RADAR

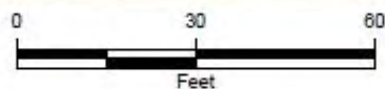


IMAGE COURTESY OF ESRI



Figure 3

GPR SURVEY AND EXPLORATORY
EXCAVATION AREAS
OHLSON PROPERTY
36105 EAST 124TH AVENUE
ADAMS COUNTY, COLORADO
COLORADO OIL AND GAS CONSERVATION COMMISSION

Modified from
LTE 2015

December 15, 2017

Mr. Gary Ohlson
36105 E. 124th Ave.
Hudson, CO 80642

Re: COGCC Complaint #200444693 - Final Resolution

Dear Mr. Ohlson,

The Colorado Oil & Gas Conservation Commission (COGCC) received Complaint #200444693 from you on November 21, 2017, regarding water quality and the presence of benzene in groundwater drawn from your water well.

COGCC staff has reviewed the prior complaints (#200095139 filed in 2006 and #200412560 filed in 2014) and the final resolutions for each complaint. In addition, staff has reviewed the November 7, 2017, letter from Hirsch-Gibney, LLC. Based on review of this information, COGCC has determined there is no basis for additional investigation and has closed the current complaint. Further, COGCC has reviewed the records for the plugged and abandoned well on your property and does not find any information that indicates the well was operated or plugged in violation of applicable rules at the time. As you know, COGCC has conducted multiple investigations at your property looking for the former wellhead, remnant facilities, or latent contamination; in those investigations, COGCC has found no evidence that would support further action.

Although you already use a water treatment system to remove benzene and other potential contaminants from the groundwater, if you have additional concerns regarding water quality, you may wish to contact the Colorado Department of Public Health and Environment - Water Quality Control Division; contact information was previously provided.

At the conclusion of your previous complaint #20412560, your rights as a complainant included a 28-day period in which you could petition the Commission to review the staff determination. That right was not exercised and COGCC considers this matter



Mr. Gary Ohlson
December 15, 2017
Page 2

resolved. If, through your own investigation, you find evidence that oil and gas facilities were improperly managed or closed in violation of applicable rules at the time, resulting in impacts to soil or groundwater resources, COGCC may reconsider the need for additional investigation.

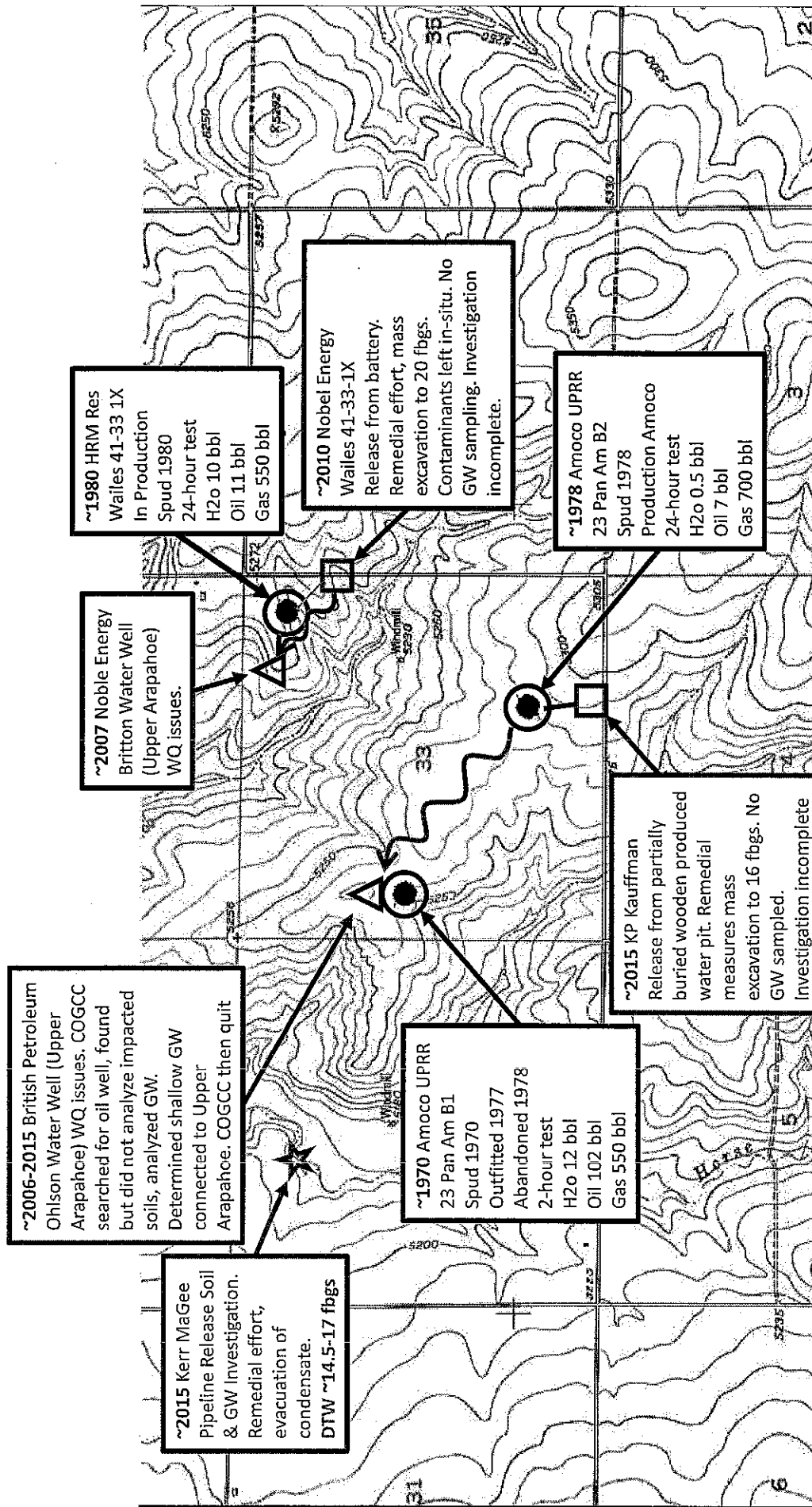
Sincerely,

John Axelson, P.G.
East Environmental Supervisor

Cc. Matthew J. Lepore - COGCC Director
Greg Deranleau - COGCC Environmental Manager
Julie Prine - COGCC Hearings Manager

Table 1: Summary of Analytical Results (ug/L and mg/L) of Ohlson Water Well (Permit No. 269807), USGS Arapahoe Aquifer Wells in Adams County and Produced Water from Nearby Oil Wells, 36104 East 124th Avenue, Hudson, Adams County, Colorado. Hirsch★Gibney Project No. 0118-0001

Sampling Point	Sampler	Date Sampled	Date Analyzed	Laboratory	Lab ID No.	Method	pH	TDS mg/L	spec. Cond umhos/cm	Bromide mg/L	Chloride mg/L	Flouride mg/L	Nitrate mg/L	Nitrite mg/L	Sulfate mg/L	AlkalinityBC mg/L	AlkalinityC mg/L	Alkalinity mg/L	Barium µg/L	Calcium µg/L	Iron µg/L	Magnesium µg/L	Manganese µg/L	Potassium µg/L	Sodium µg/L	Selenium µg/L	GRO µg/L	Benzene µg/L	Toluene µg/L	EthylB µg/L	Xylenes µg/L	Methane µg/L	Date		
																																		GENERAL CHEMISTRY	
Ohlson Water Well	COGCC	25-Sep-06	26-27-Sep-06	Severn Trent	D6I260286-001	8260/8270/various	9	740	1,200	0.44	46	0.72	<0.50	<0.50	350	130	120	11	19	9,900	380	900	18	<3,000	unfiltered 260,000	unfiltered <15	unfiltered 38	unfiltered <0.5	unfiltered 31	unfiltered <0.5	unfiltered <0.5	<5			
Ohlson 1	Leppert	18-Mar-08	26-30-Mar-08	Test America	D8C180299-001	8260/8270/various	8.6	770	1,300	0.46	50	0.67	<0.10	<0.10	410	150	150	<5	18	10,000	170	1,000	22	<3,000	250,000	<15	na	<1	1.6	<1	<2	8.7			
Ohlson 1	Terracon	27-Sep-10	2-5-Oct-10	Test America	280-7778-1	various	8.75	820	1,300	0.49	48	0.63	<0.019	<0.019	430	130	120	6.6	21	13,000	280	1,100	43	2,200	290,000	6.3	na	<0.5	<0.5	<0.5	<0.5	12			
Ohlson-1	Terracon	5-Sep-14	8-15-Sep-14	Test America	280-59666-1	8260/8270/various	nm	870	nm	0.51	50	0.58	<0.10	<0.10	500	120	120	<5	18	12,000	180	1,200	30	<3,000	270,000	<15	na	9.1	<1	<1	<2	54			
Ohlson-1	Terracon	1-Oct-14	2-Oct-14	ALS Lab Group	1410032-1	8260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	9.2	<1	<1	<1	<2	--			
Ohlson-2	Terracon	1-Oct-14	2-Oct-14	ALS Lab Group	1410032-2	8260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	<1	<1	<1	<2	--				
(inside house)																																			
Ohlson-1	COGCC	1-Oct-14	6-Oct-14	Test America	280-60645-1	8260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	6.8	<1	<1	<2	--				
Ohlson-2	COGCC	1-Oct-14	6-Oct-14	Test America	280-60645-2	8260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	<1	<1	<1	<2	--				
(tap in house?)																																			
Ohlson Stock	COGCC	16-Oct-14	22-Oct-14	Test America	280-61329-1	8260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	4.3	<1	<1	<2	--				
Ohlson-2nd	COGCC	10-Nov-14	12-Nov-14	Test America	280-62375-1	8260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	7.2	<1	<1	<2	--				
Ohlson Well	COGCC	13-Jan-15	14-15-Jan-15	Test America	280-64325-1	8260/8270/various	8.73	850	1,100	0.53	50	0.73	<0.10	<0.10	460	130	120	6.8	21	14,000	170	1,400	37	<3000	300,000	<15	na	9.4	<1	<1	<2	77			
Ohlson House	COGCC	13-Jan-15	14-Jan-15	Test America	280-64325-2	8260	Chlorform reported at 1.9 ug/L					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1	<1	<1	<2	--				
Ohlson	COGCC	9-Sep-15	22-Sep-15	Test America	280-73997-1	8260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	10	8	<1	<3	--				
USGS Arapahoe								filtered	unfiltered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	filtered	unfiltered	unfiltered	unfiltered	unfiltered	unfiltered	unfiltered	unfiltered			
DENV-134	USGS	ADAMS	not available	not available	not available		8.51	286	431	0.06	3	2			33.6	199	234		35.36	5,950	10.23	892	23.861	1,173	102,500	<0.4		<0.021	0.08	<0.03	<0.038	--			
DENV-166	USGS	ADAMS	not available	not available	not available		8.34	314	512	0.12	6	1			82.6	160	190		36.388	14,230	6.849	1,961	29.809	1,771	94,600	<0.4	0.03034	<0.02	<0.03	<0.038	--				
DENV-170	USGS	ADAMS	not available	not available	not available		8.57	1,022	1,246	1	40	1			554.4	119	142		10.842	25,510	16.26	2,063	72.318	2,267	330,100	<0.4		<0.021	<0.02	<0.03	<0.038	--			
DENV-175	USGS	ADAMS	not available	not available	not available		8.66	365	576	0.06	4	4			0.1	301	359		20.03	1,862	5.731	205	4.127	786	134,700	0.24		<0.021	<0.02	<0.03	<0.038	--			
Produced Water							presumed unfiltered																												
UPRR 23 PAN AM B 2	KP Kauffman	1-Nov-79		Industrial Labs	451668	collected from Pit		--			1,900				13		225	nd		33,000	na	43,000	--	94,000	12,000,000			--	--	--	--	--			
WENZEL-HOSMER 4-4	KP Kauffman	18-Mar-76		Halliburton Serv	451606	np		24,820			14,843				105		--	<0.1		644,000	223	123,000	--	--	8,882,000			--	--	--	--	--			
Ohlson average values-----> >>							8.77	810	1225	0.49	49	0.67			430	132	126		19	11,780	236	1,120	28	2,839	274,000	6.3	38	8	14			38			
Average concs Arapahoe Adams----->>>							8.52	497	691	0.19	13	2			168	195	231		26	11,888	10	1,280	33	1,499	165,475	0.06	--	--	--	--	--	--			
Average concs two nearby oil wells----->>>								24,820			9,322				66		225			355,000	223	104,500		94,000	16,441,000		--	--	--	--	--	--			
Notes																																			
"--" - not analyzed																																			
nm - not measured																																			
np - not provided																																			
UPRR 23 PAN AM B 2 - located southeast and presumed hydraulically upgradient location in shalow water bearing zone from Ohlson property																																			
WENZEL-HOSMER 4-4 - located south and presumed hydraulic up- and crossgradient location in shallow water-bearing zone from Ohlson property																																			
USGS data collected 2003-05 and abstracted from USGS 2014b																																			
Not all metals analyzed are listed in table from 2006 through 2015 - see lab sheets for additional detail																																			
Cannot directly compare general chemistry and metals for COGCC results (totals) to USGS results (filtered)																																			





K.P. KAUFFMAN COMPANY, INC.

WORLD TRADE CENTER
1675 BROADWAY, 28TH FLOOR
DENVER, COLORADO 80202-4628
TELEPHONE (303) 825-4822
FACSIMILE (303) 825-4825
www.kpk.com

May 13, 2015

Mr. Bob Chesson
Colorado Oil and Gas Conservation Commission
1120 Lincoln Street, Suite 801
Denver, CO 80203

Re: Remediation Summary and Request for "No Further Action" Status
Remediation of UPRR 23 Pan Am B #2 Partially Buried Produced Water Vessel
Facility No.: 113344; Adams County, Colorado
05-001-07317 33-1S-64W
Remediation 8787

Dear Mr. Chesson:

K.P. Kauffman Company, Inc. (KPK) is respectfully submitting a summary of the remediation work performed to permanently remove the partially buried produced water vessel (Facility ID No. 113344) from the UPRR 23 Pan Am B #2 facility. Attached is a full report detailing the removal of the partially buried produced water vessel, excavation of contaminated soil, soil sampling process, and the analyses of the soil samples.

Due to the attainment of soil cleanup standards achieved at the UPRR 23 Pan Am B #2 facility, KPK respectfully requests a "No Further Action" status for this facility. All further reclamation activities at the UPRR 23 Pan Am B #2 facility will be compliant with Colorado Oil and Gas Conservation Commission 1000 Series Reclamation Regulations, which have been further detailed in the attached report.

Please do not hesitate contacting me if you require any further information at (303) 825-4822 or at slaramesa@kpk.com

Respectfully,

Susana Lara-Mesa
VP of Engineering

1. INTRODUCTION

The UPRR 23 Pan Am B #2 facility (facility) was originally constructed with a partially buried wooden produced water vessel. The facility is located 1.68 miles east of the intersection of Imboden Road and East 120th Avenue, in Adams County, Colorado. Due to the age and construction material of the partially buried produced water vessel, K. P. Kauffman Company, Inc. (KPK) decided it necessary to properly remove it and route all production liquids to the one (1) 300 barrel (bbl) above ground steel storage tank at the facility. Excavation to remove the partially buried produced water vessel began on November 15, 2014. A remediation plan provided in Form 27 was submitted to the Colorado Oil and Gas Conservation Commission (COGCC) on December 3, 2014, providing notification of the excavation plans and the discovery of volatile organic compounds (VOCs) in the soil under the partially buried produced water vessel, indicating a historical release of produced water. Following further investigation of the contaminated soil it was concluded that more than one (1) bbl of produced water had been released over time from the partially buried produced water vessel. The historical release was reported to the COGCC on January 29, 2015 via Form 19 (Document No. 400783833).

Excavation of the removed partially buried produced water vessel was completed on April 29, 2015, to a depth of sixteen (16) feet (ft.) where clean soil was detected using a field photoionization detector (PID). A total of five (5) soil samples were collected from the excavation area on May 1, 2015, and delivered to Accutest Laboratories (Accutest). The results of the laboratory analyses indicated analyzed compounds were either not detected or had concentrations below COGCC cleanup standards specified in Table 910-1.

2. FIELD ACTIVITIES

2.1 Excavation

The initial excavation of contaminated soil created an area of approximately forty-five (45) feet (ft.) wide, thirty (30) ft. long, and twelve (12) ft. deep (See Appendix A). The walls of the initial excavation area were scanned using a PID and showed various levels of VOCs, indicating that the contaminated soil had not been fully removed. Before further excavation of contaminated soil continued, a direct push drill rig (Geoprobe) was used at the facility to define the extent of contaminated soil (See Appendix A). Once the extent of the produced water release was delineated, excavation resumed. The final excavation was completed on April 29, 2015, to a

depth where clean soil was detected with a PID. At the conclusion of the excavation process, KPK had removed enough soil to create an excavation area roughly sixty (60) ft. wide, forty-two (42) ft. long, and twelve (16) ft. deep (See Appendix A).

KPK removed 430 yards of contaminated soil from location and hauled it to a certified disposal facility in accordance with COGCC Rule 907. Soil manifests for the contaminated soil have been included in Appendix D.

2.2 Soil Sampling

In accordance with COGCC Rule 910.b.(3).B, five (5) soil samples (Accutest Job No. 70290) were collected from the partially buried produced water tank excavation area on May 1, 2015. The soil samples were collected at a depth of sixteen (16) ft. below ground surface (BGS). The excavation area and soil sample locations have been illustrated in Appendix A. The soil samples were handled with nitrile gloves, placed in a sanitary sample container, and properly labeled with sample number and location of sample collection. The samples did not exhibit any staining or discoloration. A PID was used to measure VOCs for each soil sample collected. Readings from the PID indicated a small presence of VOCs in only one of the soil samples, Sample No. 1 (ACCUTEST Sample ID D70290-1). The PID reading was 0.1 ppm.

Top soil was present in the excavation from the surface to a depth of one (1) foot BGS. The top soil was underlain by sand and gravel. Groundwater was not encountered during the excavation or the sampling process.

2.3 Analytical Results

The collected soil samples were placed in a cooler with ice and delivered to Accutest under chain-of-custody documentation the same day of sampling, May 1, 2015. Per COGCC Rule 910.b.(3).C, all soil samples were analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX), Total Petroleum Hydrocarbons (TPH) – Diesel (DRO), Gasoline Range Organics (GRO), Electrical Conductivity (EC), Specific Gravity (SG), Sodium Adsorption Ratio (SAR), and pH.

The laboratory results indicated soil samples collected from the excavation area were either not detected or below the COGCC reporting limit based on parameters established in Table 910-1 for BTEX, TPH (GRO), TPH (DRO), EC, SG, SAR, and pH. The only concentration of TPH (DRO) compounds were found in Accutest Sample ID D70290-1, at a concentration level of 64.0 mg/kg,

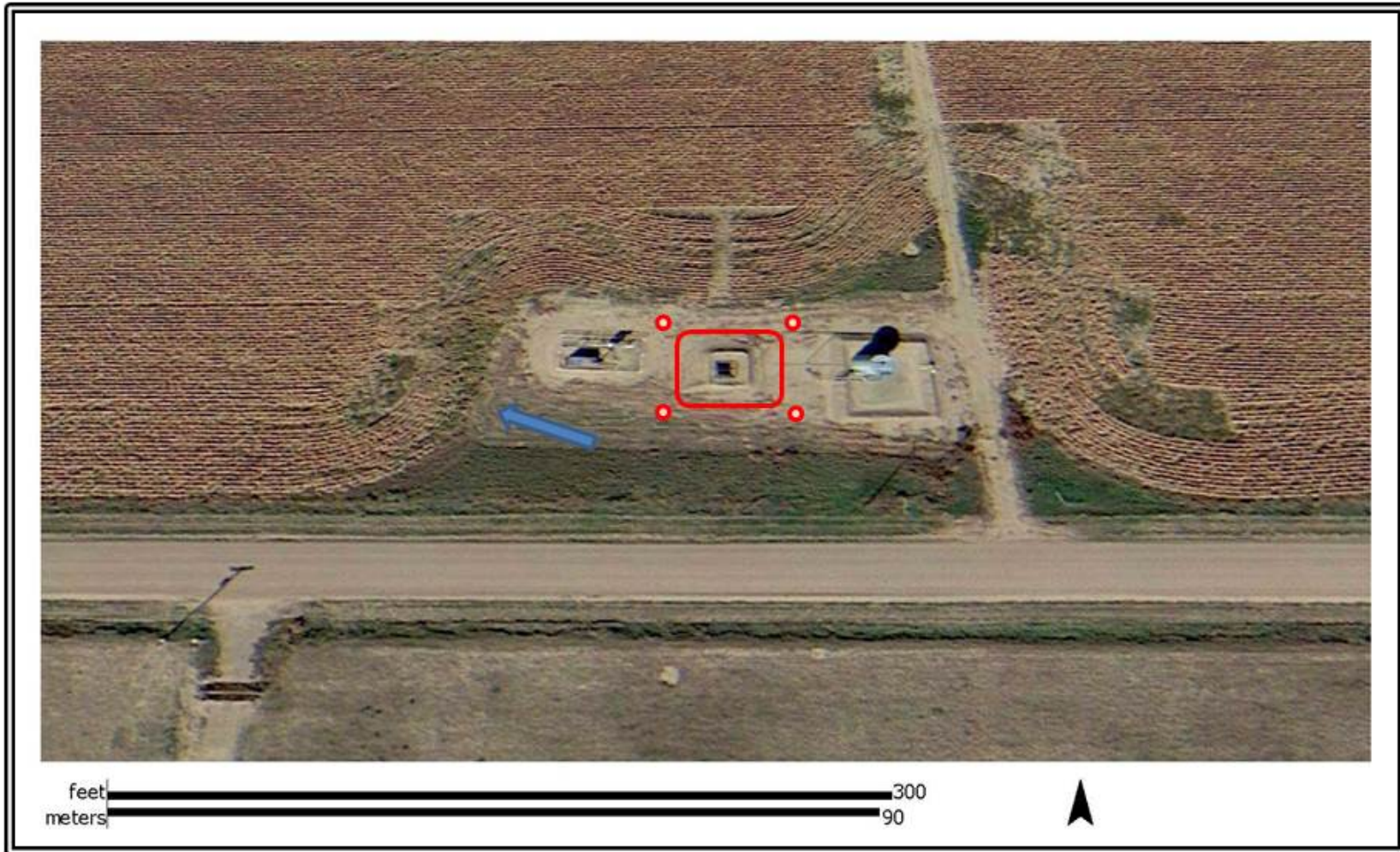
which is consistent with the sample producing the a field PID reading. The laboratory results have been summarized in Appendix B. The laboratory analytical reports and chain-of-custody forms provided by ACCUTEST are included in Appendix C.

3. CONCLUSIONS AND RECOMMENDATIONS

The excavation reached a depth that produced clean readings using a field PID. Five (5) soil samples were collected from various locations within the excavation area. No staining or discoloration was observed in any of the soil or in the samples collected from within the excavation area. All five (5) soil samples were analyzed for BTEX, TPH (GRO and DRO), EC, SG, SAR, and pH. The laboratory results indicate that BTEX and TPH (GRO) was not detected in the collected soil samples and TPH (DRO) was only found in one (1) sample with a measured concentration of 64.0 mg/kg. EC, SG, SAR, and pH measurements from all samples analyzed were below the COGCC cleanup standards specified in Table 910-1.

Based on the analytical results, additional work at the property is not warranted at this time. KPK will fill the excavation area with clean fill dirt and properly re-contour and re-vegetate the area to its natural state pending the COGCC's approval of this NFA request.

Appendix A: Location Maps



UPRR 23 PAN AM B #2 – Geoprobe Sampling Locations

K.P. Kauffman Company, Inc.


Location Drawing


Lat: 39.91344° Long: -104.55185°

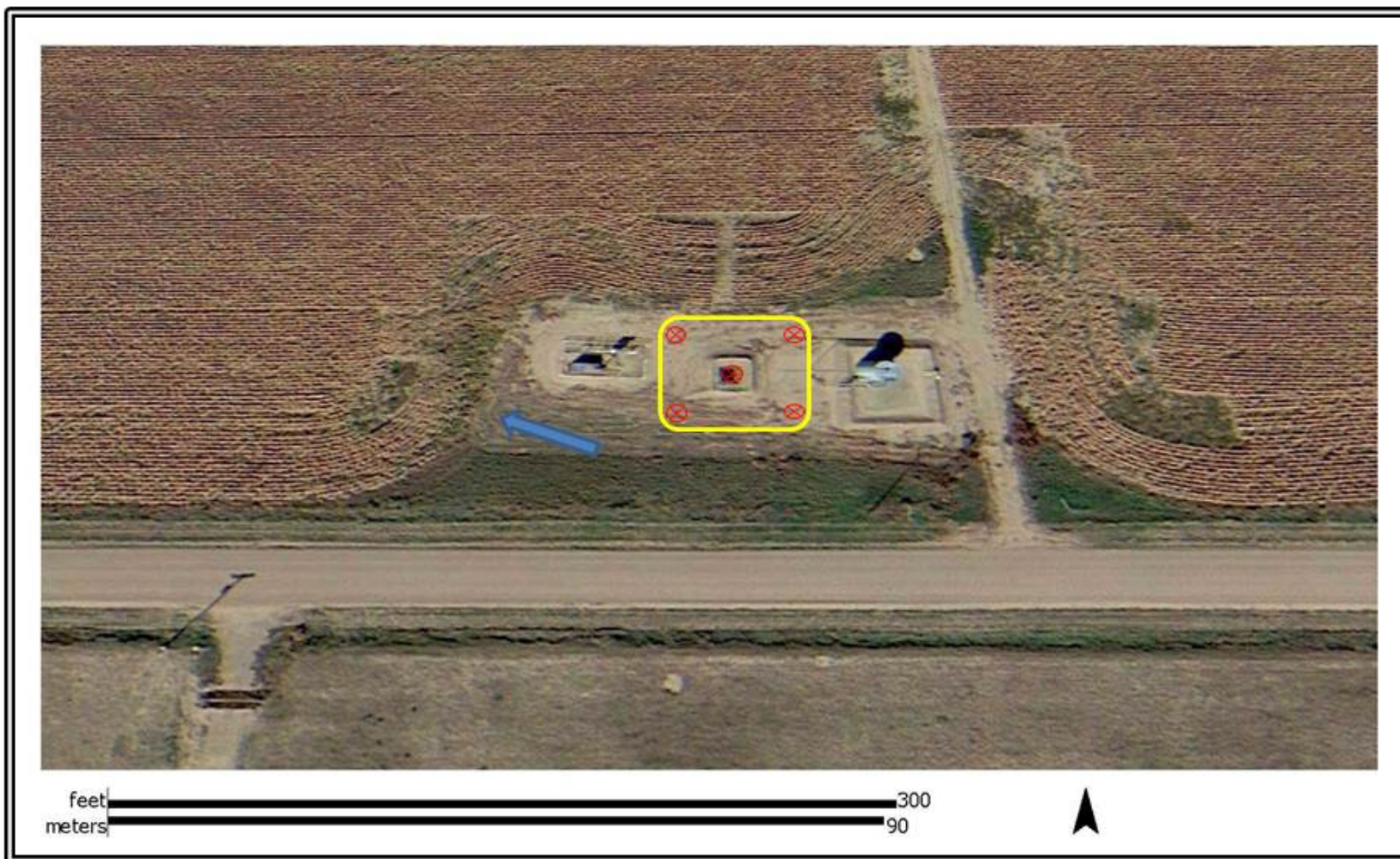
SWSE Sec 33 T1S R64W

Adams County, Colorado

 Approximate Limits of Initial Excavation (45' x 30' x 12')

 Geoprobe Sampling Locations

 Direction of Fluid Flow



UPRR 23 PAN AM B #2 – Soil Sampling Locations

K.P. Kauffman Company, Inc.

Location Drawing

Lat: 39.91344° Long: -104.55185°

SWSE Sec 33 T1S R64W

Adams County, Colorado



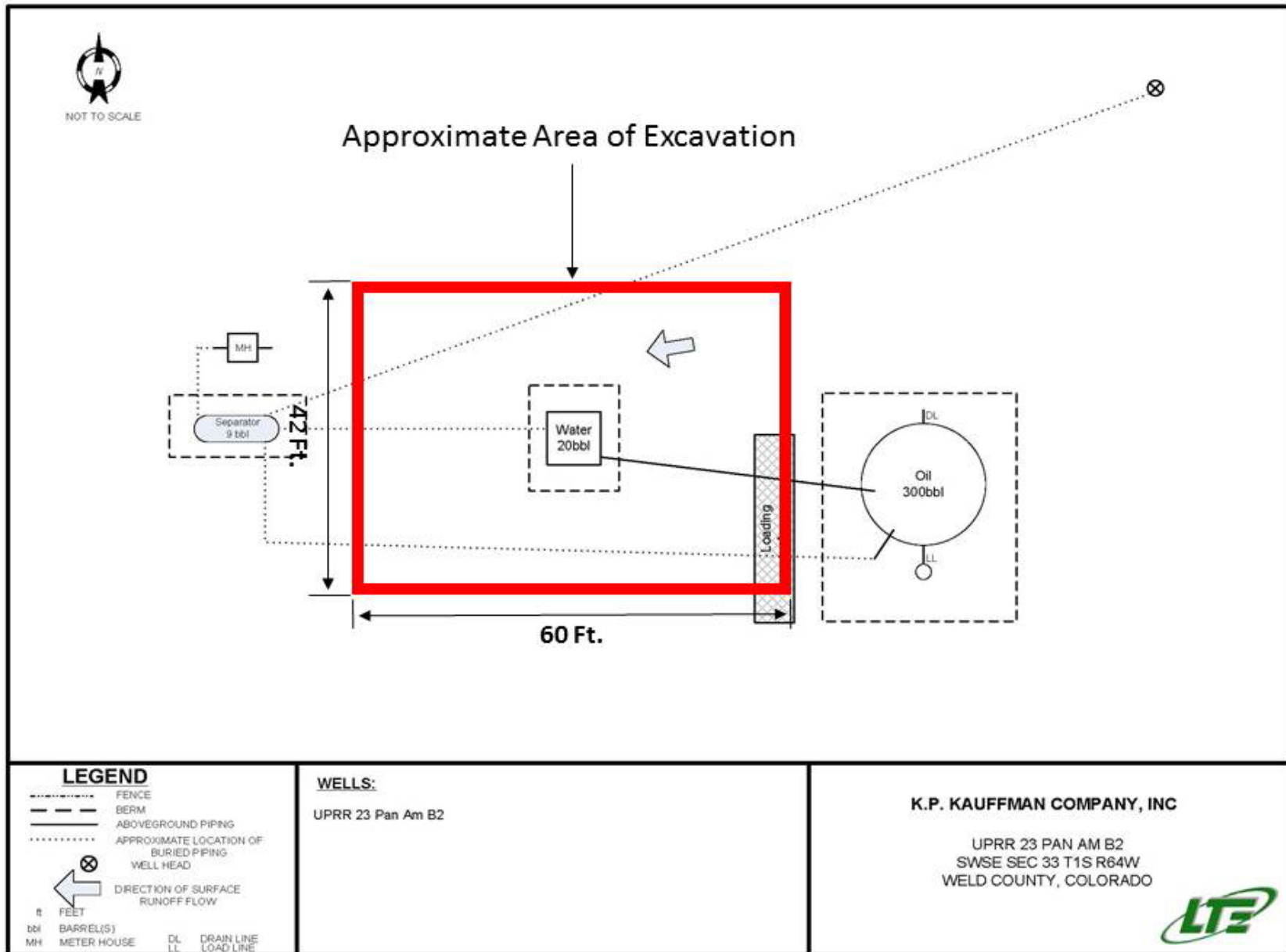
Approximate Limits of Final Excavation (60' x 42' x 16')



Approximate Soil Sampling Locations



Direction of Fluid Flow



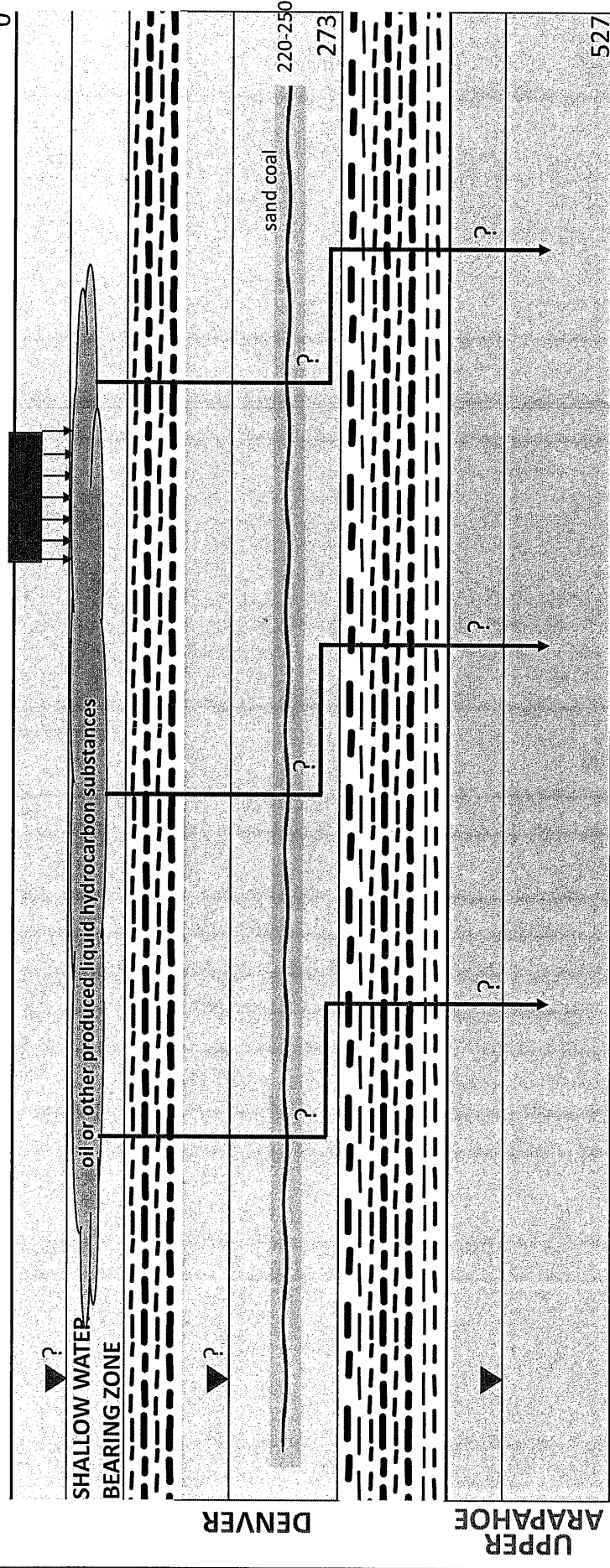
Appendix B: Comparison of Results with Table 910-1 Standards

Doc. No. (400783833)

2015 Release Reported From Partially Buried Wooden 1,100-Gallon Produced Water Vessel Hydraulically Upgradient of Ohlsons Former Amoco UPRR Pan Am 23 B#2

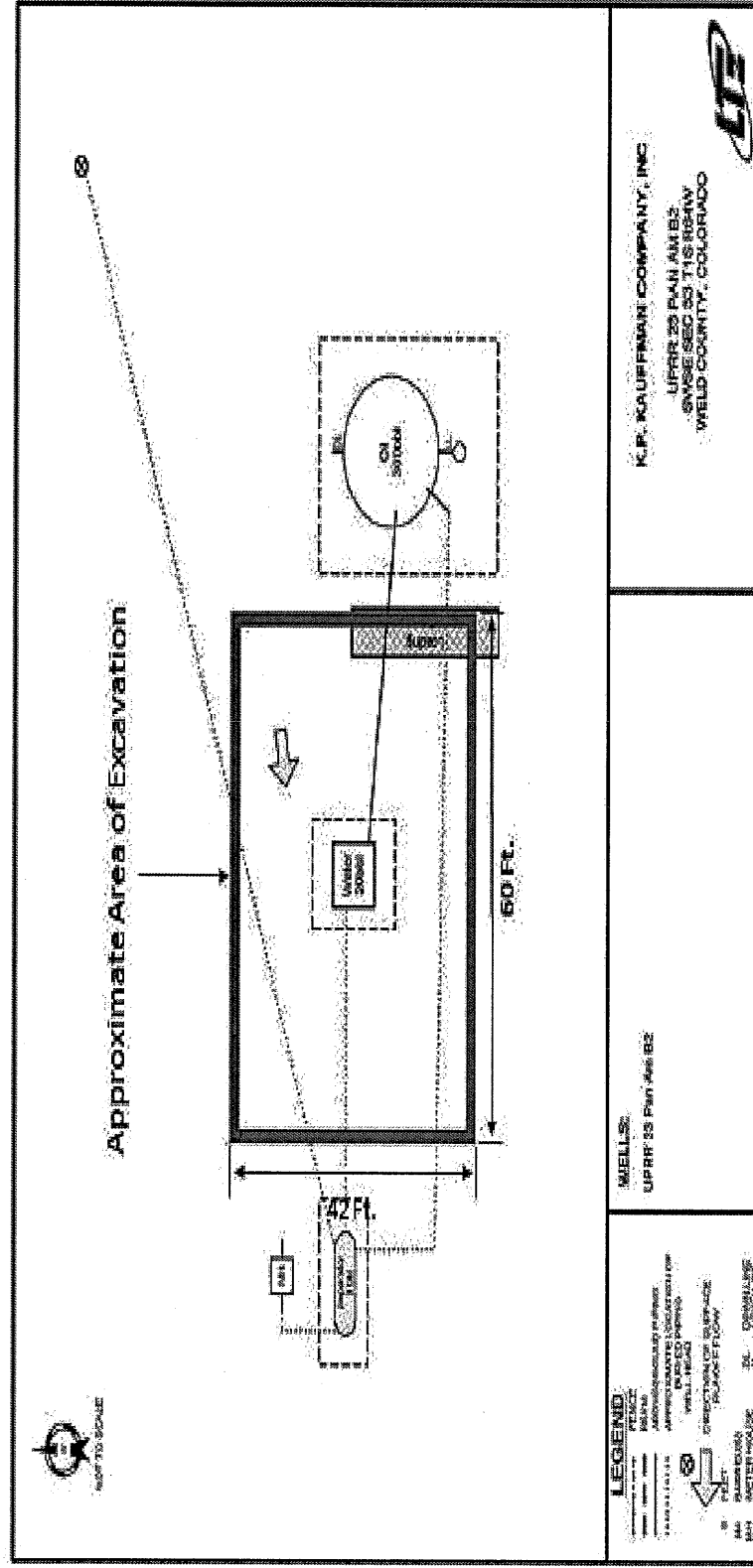
← Northwest Shallow Groundwater Flow Towards Ohlsons

Well test indicated 28 gallons/day produced water
 Presume faulty for 30 out of 40 years
 30 years of losses over 300,000 gallons lost to subsurface



DWR – Denver (139 - 273 fbg) Upper Arapahoe (320 - 527 fbg)

Mass Excavation of Rotten Wooden Produced Storage Vessel
UPRR Pan An 23 B#2



Proposed Shallow Monitoring Well Locations

- Legend**
- E 124th Ave
 - Feature 1
 - Untitled Path

MW-03
Ohlsons
MW-02
MW-01




E 124th Ave



1000 ft

Ohlson Property vs. UPRR Pan Am B2

Legend

-  E 124th Ave
-  Feature 1
-  Untitled Path

E 128th Ave

Ohlsons

UPRR Pan Am B#1 -unknown

E 124th Ave

E 124th Ave

UPRR Pan Am B#2

KP Kaufmann

Cavanaugh Rd

27



2000 ft

Google Earth

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