



Western Water & Land, Inc.

June 18, 2014

Mr. Brandon Danforth
Environmental Specialist
WPX Energy Rocky Mountain LLC
1058 County Road 215
Parachute, Colorado 81635

RE: Nolte 14-44 Drill Pad Baseline Results Report, November 2013 and March 2014 Events

Dear Mr. Danforth,

Western Water & Land, Inc. (WWL) has completed baseline water quality sampling for the WPX Energy Rocky Mountain LLC (WPX) Nolte 14-44 Drill Pad in accordance with the Colorado Oil and Gas Conservation Commission (COGCC) Rule 609. The Nolte 14-44 Drill Pad is located in the SE $\frac{1}{4}$, SE $\frac{1}{4}$, Section 14, Township 7 South, Range 96 West, 6th PM.

In accordance with Rule 609, the baseline water quality evaluation considered all water sources (domestic wells or springs) within a 0.5-mile radius of the referenced drill pad (oil and gas location). A preliminary screening of the groundwater sources was completed to identify the sources that are potentially available for sampling pending the consent of the structure owners. Each potentially Available Water Source was then evaluated to identify the preferred sources for the baseline program. If the number of potentially available sources was four or less, all of the sources were included in the list of preferred sources. If more than four sources were potentially available, the sources were prioritized based on WWL's hydrologic expertise and in accordance with Rule 609. A complete description of the water source evaluation process and results are provided in the water source evaluation report (Nolte 14-44 Drill Pad Baseline Water Quality Evaluation, January 23, 2014).

This report summarizes the selection of sampling locations and associated field sampling activities, and the quality control and water chemistry results.

SAMPLING LOCATIONS AND FIELD ACTIVITIES

As described in the Nolte 14-44 Drill Pad Baseline Water Quality Evaluation, January 23, 2014, five potential sampling locations were identified for field sampling of water quality consistent with requirements of Rule 609. According to state records, the landowners, water well permit holders or water right holders were mailed access request letters by way of certified U.S. Postal Service mail. Four wells were identified as preferred sampling locations:

- Warren Well
- Taylor Pond-Well (Permit No. 67676-F)
- Water Well Permit No. 279296

- Water Well Permit No. 276703

After attempting to contact landowners, water well permit holders, and water right holders, sampling access was not acquired at the Warren Well, Taylor Pond-Well, or Water Well Permit No. 279296 within the 30-day response period. Access was previously granted for Water Well Permit No. 276703 during baseline water quality sampling for Drill Pad SG 44-23. WPX was granted permission to sample one alternative water source: Metcalf Pond Well (Permit No. 69030-F). The Metcalf Pond Well is a DWR-permitted well that is a former gravel pit. The pond is supplied by groundwater, and therefore qualifies for baseline sampling under Rule 609. While conducting field sampling, WWL retained access to Water Well Permit No. 279296.

Three samples were collected for the Nolte 14-44 Drill Pad. Sample Metcalf 69030-F was collected from Metcalf Pond Well (Permit No. 69030-F) and sample Metcalf 279296 was collected from Water Well Permit No. 279296 on March 18th, 2014; sample Palmer 276-703 was collected from Water Well Permit No. 276703 on November 20, 2013.

No landowners were present when sample Metcalf 69030-F was collected. The sample was collected from the northern bank of the Metcalf Pond Well. Mr. Carl Metcalf and Mrs. Tina Metcalf were present during the sampling of Water Well Permit No. 279296. Sample Metcalf 279296 was collected from a hydrant in front of the Metcalf's garage. There was no water treatment system in use before the sampling point.

Sample Palmer 276-703 was collected from a hose bib located near the well. WPX Land Representative, Mr. Gary Reed was present during sampling. This well produced rust-colored water and the well casing itself was rusty and deteriorating. The well was dewatered three times due to a slow rate of recovery. After dewatering the well for the third time the well was allowed to recover for 1.5 hours and then pumped at ≤ 1 gallon per minute (gpm) until three casing volumes were purged and then the sample was collected. Dissolved oxygen and turbidity measurements were outside of stabilization criteria noted in the WPX Sampling and Analysis Plan (SAP). There was no water treatment system in use before the sampling point.

See Figure 1 for the sampled locations. Photographs of the sampling sites are shown in Attachment A. Field monitoring forms are shown in Attachment B.

All sampling procedures followed protocols in the COGCC Model Sampling and Analysis Plan (SAP) as adapted by WPX. Sampling Method 1 for wells with pumps and effervescent samples, described in Version 1 of the COGCC Model SAP, was used to collect samples Metcalf 279296 and Palmer 276-703. Sampling Method 1 for springs and seeps, described in Version 1 of the COGCC Model SAP, was used to collect sample Metcalf 69030-F.

Sample Palmer 276-703 was carefully packed in plastic ice chests (coolers) with ice and shipped to the analytical laboratory (ALS Laboratory [ALS], Fort Collins, Colorado) by way of overnight courier (FedEx Ground[®]). Samples Metcalf 279296 and Metcalf 69030-F were relinquished to the analytical laboratory's (Accutest Mountain States [AMS], Wheat Ridge, Colorado) courier in Rifle, Colorado, who carefully packs them in coolers with ice for preservation and ships them to the analytical laboratory by way of private overnight courier.

QUALITY CONTROL

Quality control measures consisted of a review of field sampling procedures and the analytical laboratory quality control data. Laboratory quality control information was reviewed and checked for consistency in meeting acceptance criteria and the assignment of data qualifiers. In addition, WWL conducted quality control evaluations of cation-anion balance (CAB) and total dissolved solids (TDS) calculated versus measured ratio. WWL assigned additional qualifiers to analytical results as necessary.

Field Procedures

WWL conducted field sampling procedures in accordance with the WPX SAP and COGCC Model SAP. All samples were collected by direct filling methods; dissolved gas sampling for sample Metcalf 69030-F was conducted using Method 1 for springs and seeps, all other dissolved gas sampling was conducted using Method 1 for wells with pumps and effervescent samples. In accordance with the WPX SAP, three well volumes were purged in order to obtain a more representative sample from Water Well Permit No. 276703. During the sampling process the well was dewatered three times. All field parameters were stable with the exception of dissolved oxygen and turbidity at the time of sampling. No field procedure deviations occurred that were cause for data qualification.

COC

The chain-of-custody forms were reviewed for correct and complete sample IDs, requested analysis, and other pertinent information. The analytes requested on the COCs matched the requirements of Rule 609. DRO (diesel range organics) and GRO (gasoline range organics) were designated on the COCs in place of TPH, a required analysis for Rule 609. No other errors or quality control issues were observed, and no corrections were needed.

Sample Receipt

Sample Palmer 276-703 was received by ALS in one cooler within the temperature range criteria ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$). Custody seals were intact. No quality control issues were reported on the sample receipt form. No qualifiers were assigned to results based on sample receipt conditions.

Samples Metcalf 69030-F and Metcalf 279296 were received by AMS in two coolers within the temperature range criteria ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$). Custody seals were intact. No quality control issues were reported on the sample receipt form. No qualifiers were assigned to results based on sample receipt conditions.

Holding Times

Chloride and sulfate were analyzed outside of the analysis holding time for sample Palmer 276-703; WWL assigned an "H" qualifier to indicate the results are estimated. All other analyses were conducted within recommended holding times, with the exception of lab pH; WWL designated an "H" qualifier to indicate the results are estimated.

Analytical Methods

The analytical methods used by ALS were checked for consistency with the analytical schedule in the SAP. Analytical methods were found to be consistent with the following modifications: Total phosphorous was analyzed using Method 365.2. Gasoline Range Organics (TPH volatiles) were analyzed using Method SW8260_25 Revision C. Diesel Range Organics (TPH extractables) were analyzed according to SW846 8000C and 8015D.

The lab report summary lists the analytic method for total xylenes as Method SW8260_25 Revision C and the analytic method for total nitrate/nitrite as N as EPA 300.0; however, the results are simply calculated by summing the results of the individual isotopes.

The analytical methods used by AMS were checked for consistency with the analytical schedule in the SAP. Analytical methods were found to be consistent with the following modifications: Gasoline Range Organics (TPH volatiles) were analyzed using Method SW8260B. Diesel Range Organics (TPH extractables) were analyzed according to Method SW846-8015B.

Detection Limits

Detection limits provided with the analytical results were compared to the original quoted detection limits from the analytical laboratory. Detection limits were as quoted with no deviations observed except as applied to increased dilution factors.

ALS sample Palmer 276-703: all analyzed metals had dilution factors of 10; dilution factor of 5 was applied for bromide, fluoride, nitrate, and nitrite; and a dilution factor of 50 for chloride and sulfate. All other analytes had a dilution factor of 1. ALS reports sample results at the reporting limit (RL) as “undetected” or “U” rather than reporting results as less than the reporting or detection limit, e.g. < 0.05ug/L.

AMS sample Metcalf 279296: a dilution factor of 10 was applied for bromide, fluoride, nitrate, and nitrite; dilution factor of 2 for selenium; and a dilution factor of 200 for sulfate and chloride. AMS sample Metcalf 69030-F: a dilution factor of 10 was applied for chloride, bromide, fluoride, nitrate, and nitrite; dilution factor of 2 for selenium; and a dilution factor of 200 for sulfate. Nitrate and nitrite had elevated detection limits due to matrix interference. All other analytes had a dilution factor of 1. AMS reports sample results at the RL as “undetected” or “U” rather than reporting results as less than the reporting or detection limit, e.g. < 0.05µg/L.

Completeness

Data completeness is a measure of requested analysis and received results. The analytical constituents required under Rule 609 were compared to those requested and analyzed in the laboratory reports. Qualified data are included as analyzed data. No data were rejected for field or analytical reasons. WWL separately designated DRO (Diesel Range Organics) and GRO (Gasoline Range Organics) for the TPH analysis required in Rule 609. All requested analytical data matched the laboratory reported data results; data completeness is considered 100 percent.

Cation-Anion Balance

The cation-anion balance (CAB) calculates the total charge of positively charged ions and the total charge of the negatively charged ions. It is a measure of the quality of the analysis; if the charge is not balanced, an error may exist in the analysis. CAB percent difference calculations were performed for each sample; if the CAB exceeded $\pm 5\%$, i.e. less than 95% or greater than 105%, the analytical results data may be qualified as estimated.

ALS sample Palmer 276-703: after receiving original analytical results, WWL calculated the cation-anion balance (CAB) and found it to be out of acceptable range at 49%. An inquiry was made to ALS, who determined that the analyses for chloride and sulfate were taken from the wrong sample. Chloride and sulfate were reanalyzed for Palmer 276-703 on 1-16-14 and the results adjusted accordingly. The recalculated CAB met QC criteria.

In general, WWL will assign a qualifier (estimated result) for a CAB equal to or greater than plus or minus 10%, and may assign a qualifier for CAB percentages between plus or minus 5% and less than 10%. The final CAB calculations for the samples are as follows:

- Palmer 276-703: 0.432%

- Metcalf 279296: 4.797%
- Metcalf 69030-F: 2.992%

The analytical results for cations and anions for the samples were not qualified on the basis of the CAB. See Attachment C, Data Quality Review Sheets.

TDS

The ratio of laboratory-measured TDS versus calculated TDS were computed; sample ratios less than 0.80 and greater than 1.20 are cause for a review of major ion reporting errors.

In general, WWL will assign a qualifier (an estimated result) when TDS ratios are less than or equal to 0.5 and equal to or greater than 1.5, and may assign a qualifier for TDS ratios greater than 0.5 and less than 0.8 and greater than 1.2 and less than 1.5. The TDS calculations for samples are as follows:

- Palmer 276-703: 1.01
- Metcalf 279296: 1.02
- Metcalf 69030-F: 0.95

No sample results were rejected or qualified on the basis of the TDS acceptance criteria.

Field Duplicates

Field duplicates evaluate the precision of analytical results for field samples collected for a specific sampling event. Precision is measured by the calculation of the relative percent difference (RPD) using the analytical results from the original investigative sample and the duplicate sample. An RPD limit of 35% is used for the data qualification criterion. When the original sample has a detected concentration above the reporting limit (RL) and the concentration of the field duplicate is less than the RL, the calculation of a field duplicate RPD is not applied. For sample results less than 5 times the RL, the acceptance criteria is \pm RL.

No field duplicates were collected for this sampling event, therefore no field duplicate RPDs were calculated.

Trip Blanks

Trip blanks are analyte-free matrix (water in this case) samples supplied by the analytical laboratory that are shipped inside the sample shipping containers to and from the field investigation site. Field blanks test for potential contamination during shipping and sampling field procedures. For this project, field blanks are analyzed for volatiles only. There were no detections of volatiles (benzene, toluene, ethylbenzene, and xylenes; BTEX) in the analyzed trip blank samples. No data were qualified based on trip blank analytical results. Sample Palmer 276-703 did not have an associated trip blank.

Laboratory Quality Control

The analytical laboratory conducts an extensive quality control program and as part of the overall quality control process. The analytical laboratory quality control program includes the use of various laboratory quality control samples including but not limited to: method blanks (MB), laboratory control samples (LCS) and duplicates (LCSD), matrix spikes (MS) and duplicates (MSD), surrogates, initial calibration verification standards (ICVs), and continuing calibration verification standard (CCVs).

WWL verified that the lab performed and reported quality control data correctly. This included checking laboratory control samples data for meeting laboratory QC limits, acceptance criteria, and

recovery limits. QC limits associated with the relative percent difference (RPD) between duplicate samples typically range from a limit of 20% for metals and general or wet chemistry to 30% for organic analytes. Typical percent recovery acceptance limits are 80 to 120% for metals and wet chemistry and 70 to 130% for organics; some organic compounds may have much broader recovery limits.

All sampling event data packages showed that no laboratory control samples exceeded the QC limits or acceptance criteria without data qualification, and no recovery limits were exceeded. No qualifiers were assigned to the results.

Accuracy

Accuracy was evaluated as a percent recovery of an analyte in a reference standard or a spiked sample, e.g. matrix spike and matrix spike duplicate. In cases where percent recoveries exceeded the laboratory acceptance criteria, data would be qualified depending on whether the analyte was detected above the method detection limit (MDL) or not, if the recovery of the associated control sample was acceptable, or if the analyte concentration in the sample was disproportionate to the spike level and that the recovery of the associated control sample was acceptable. Note that the analytical laboratory may not have selected a sample from this field investigation for testing matrix quality control samples. In these cases, true matrix affects cannot be assessed and the resulting data should be considered as estimated. This will be noted in the DQR sheets (Attachment C), but the data will not be broadly qualified by WWL.

ALS did not select Palmer 276-703 matrix for testing matrix quality control samples. ALS selected a number of other samples for testing MS and MSD based on the analytical method being used. The MS and MSD recoveries met guidance criteria for precision and accuracy for all analytes.

AMS did not select Metcalf 69030-F or Metcalf 279296 matrix for testing matrix quality control samples. AMS selected a number of other samples for testing MS and MSD based on the analytical method being used. The MS and MSD recoveries met guidance criteria for precision and accuracy for all analytes.

No qualifiers were assigned to the results by the lab. WWL did not assign additional qualifiers to the analytical results.

Precision

Precision is the measurement of how closely replicate sample constituents agree and is not related to the true value (concentration). Precision is measured using RPD calculations for laboratory duplicate samples such as LCSD and MSD samples and any other duplicate samples generated by the laboratory. The RPDs were compared to the laboratory acceptance limit of 20% for metals and general or wet chemistry and 30% for organic analytes. RPDs were not used when the sample concentration was too low (< 10X MDL) for accurate evaluation. No qualifiers were assigned by the laboratory because of RPD values exceeding the laboratory acceptance criteria.

Data Quality Review Sheets are presented in Attachment C.

QC Summary

ALS and AMS Laboratories assigned analytical results that were undetected with a “U” qualifier. AMS assigned inorganic results that were detected below the reporting limit but above the method detection limit with a “B” qualifier and organic results with a “J” qualifier to indicate the result value is estimated. WWL assigned an “H” qualifier to results that exceeded analytical holding times to indicate the result value is estimated. See Attachment C and Attachment D for individual parameters that were qualified.

ANALYTICAL RESULTS

Laboratory analysis was performed by ALS Environmental (ALS), in Fort Collins, Colorado, and Accutest Mountain States Laboratory (AMS), in Wheat Ridge, Colorado in accordance with the analytical schedule described in Rule 609 with some deviations in analytical methods. The analytical methods used are considered valid and provide quality results. The analytical results are summarized in Attachment D; the data are qualified as indicated. The full laboratory analytical report is presented in Attachment E.

The analytical data indicate the samples from both the Palmer and Metcalf sources are sodium-sulfate type waters. Chloride, sulfate, and total dissolved solids concentrations exceed secondary state drinking water standards. No hydrocarbon constituents or dissolved gases were detected at concentrations that exceeded state drinking water standards or levels of concern under COGCC Rule 609.

If you have any questions or concerns, please contact me at (970) 242-0170.

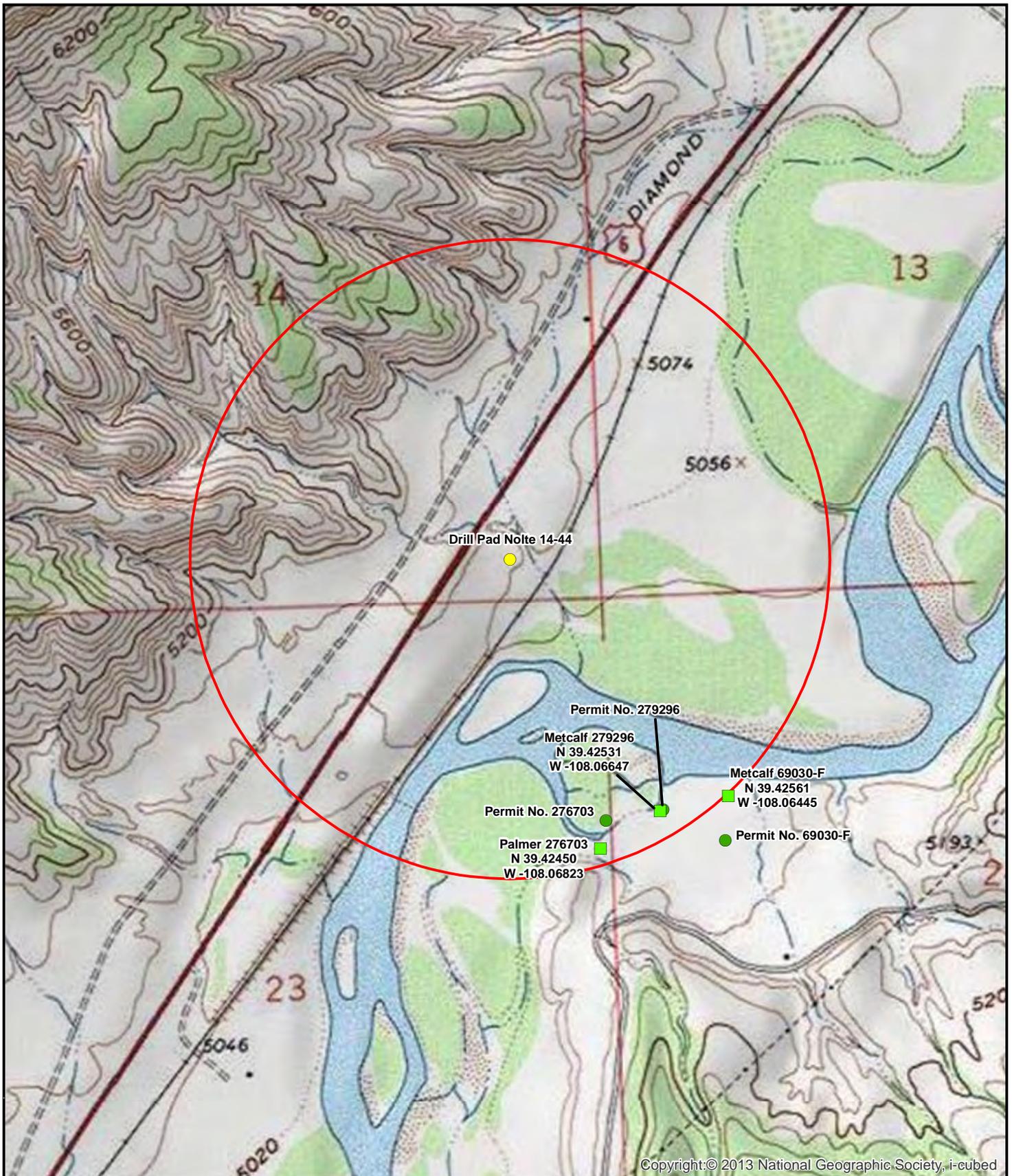
Sincerely,

A handwritten signature in black ink, appearing to read "Bruce D. Smith". The signature is fluid and cursive, with the first name "Bruce" being the most prominent.

Bruce D. Smith
Principal Hydrogeologist
WESTERN WATER & LAND, INC.

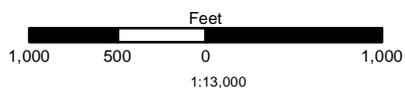
Attachments

- Figure 1- Sampling Location Map
- Attachment A - Photographs
- Attachment B - Field Monitoring Forms
- Attachment C - Data Quality Review Sheets
- Attachment D - Summary of Analytical Results
- Attachment E - Laboratory Analytical Summary Report



Legend

- Sample Location(s)
- Drill Pad Nolte 14-44
- Decree
- 0.5-Mile Radius Evaluation Area
- Constructed well



**Figure 1: Drill Pad Nolte 14-44 Sampling Locations
COGCC Rule 609 Baseline Sampling
SE1/4, SE1/4, S14, T7S, R96W, 6PM**

WPX Energy Rocky Mtn. LLC
Garfield County, Colorado



Western Water & Land, Inc.
Applications in Earth Science

Basemap Source: Bing Maps and Esri ArcGIS Online

ATTACHMENT A

Photographs



Photo 1. Metcalf Pond Sampling Location (Metcalf 69030-F)



Photo 2. Metcalf Pond Sampling Location (Metcalf 69030-F)



Photo 3. Water Well Permit No. 279296 Sampling Location (Metcalf 279296)



Photo 4. Water Well Permit No. 279296 Sampling Location (Metcalf 279296)



Photo 5. Water Well Permit No. 276703 Sampling Location (Palmer 276703)



Photo 6. Water Well Permit No. 276703 Sampling Location (Palmer 276703)



Photo 7. Water Well Permit No. 276703 Sampling Location (Palmer 276703), View Inside Rusted Well

ATTACHMENT B

Field Monitoring Forms

WPX BWQ Surface Water Monitoring Field Form

Project Information			
Project:	Noite 14-44 BWQ	Sample Purpose:	609 Baseline
Site Name (Well Pad):	Noite 14-44	Site API:	05-045-07482
Station Name:	Metcalf 69030-F	Sample Date:	3-18-14
COGCC Facility ID:	753175	Start Time:	1228
Field Sample ID:	Metcalf 69030-F	End Time:	1310
Landowner Name:	Lori Metcalf	Sample Time:	1230
Landowner Address:	5091 CR 300, Parachute, CO 81353	Sample Team:	NWS, SLK
Water Right/Well Owner:	Lori Metcalf + Carl M Metcalf II	Observer:	NWS
Water Right/Well Permit:	Metcalf Pond Well / 69030-F	Lead Signature/Date:	<i>[Signature]</i> 3-19-14

Station Information	
Station Description:	Bank of pond near property line fence
Approximate Distance to Well Pad:	2,660 FT
Station Type:	Stream / Spring / Seep / <u>Pond</u> / Lake / NPDES Outfall / Other:
Sampling Location:	<u>Bank</u> / Pipe / Wading / Boat / Bridge / Hose bib / Tank / Other:
Sampling Location Description:	Pool / Riffle / Eddy / Backwater / <u>Open</u> / Channel / Braided / Other:
Sampling Location Width:	~650 FT
Sampling Location Depth:	1 FT Pond ~ 12 FT at deepest point
GPS Location:	Zone x -108.06445 y 39.42561 z 5081

Weather Conditions	
Sky:	Clear / <u>Scattered</u> / Cloudy / Overcast
Precipitation:	<u>None</u> / Light / Moderate / Heavy
Wind:	Calm / <u>Light</u> / Mod / Strong
Estimated Air Temp (deg F):	45
Precip Type:	<u>None</u> / Rain / Sleet / Hail / Snow
Wind Speed/Direction:	NM

Field Measurements							
Parameter	Units	Reading	Time	Flag Code	Instrument	In-situ or Container	Comments
Water Temp	deg C	8.91	1254		YSI 556	Container	
pH	s.u.	8.90	↓		↓	↓	
Sp. Conductivity	uS/cm	5874	↓		↓	↓	
Conductivity	uS/cm	4060	↓		↓	↓	
DO Saturation	%	92.4	↓		↓	↓	
DO	mg/L	10.50	↓		↓	↓	
Baro Press	mmHg	630.2	↓		↓	↓	
ORP	RmV	218.2	↓		↓	↓	
Turbidity	NTU	5.71	↓	AV	Micro TPW	↓	7.07, 5.13, 4.93
Discharge		N/A					
H2S	mg/L	NM					

Color:	<u>Clear</u> / White / Yellow / Brown / Green / Blue / Other	<u>Light</u> / Med / Dark
Odor:	<u>None</u> / Mild / Mod / Strong	
Effervescence:	<u>None</u> / Mild / Mod / Strong	Bubbles: <u>None</u> / Low / Mod / High
Sediment:	<u>None</u> / Light / Mod / Heavy	VOA Headspace: <u>None</u> / ≤ Pea Size / ≥ Pea Size
Lab Analysis:	<u>Rule 609</u> / COA 9 / COA 22 / Other	
Field Filtered:	Yes / <u>No</u>	Filter Size: N/A No. Filters used: 0

Flag Codes: NM (not measured), E (estimated), N/A (not applicable), I (insufficient sample), Q (uncertain value), Y (calculated value), AV (averaged value), EC (exceeds calibration range), OT (other flag to be defined later), NS (not stabilized), VAR (variable)

WPX BWQ Surface Water Monitoring Field Form

Landowner Comments on water quality:

None

Additional information:

Sampled from bank near property line. A dog was getting in + out of the water near us during sampling. There is an automatic fish feeder on opposite bank.

Calibration info on MetcalP 274330 (NOLK 14-44)

Calibration Information			Date:		Location:			Adjusted Reading	Comments
Instrument	Parameter	Units	Time	Calibration Standard Value	Calibration Standard Temp (°C)	Instrument Reading of Standard			
	pH	s.u.							
	pH	s.u.							
	pH	s.u.							
	SpC	uS/cm							
	SpC	uS/cm							
	DO	%							
	DO	%							
	ORP	RmV							
	Turbidity	NTU							

WPX BWQ Groundwater Monitoring Field Form

Project Information			
Project:	North 1444 BWQ	Sample Purpose:	609 Baseline
Site Name (Well Pad):	North 1444	Site API:	05-045-07482
Station Name:	Metcalf 279296	Sample Date:	3-18-14
COGCC Facility ID:	752877	Start Time:	1320
Field Sample ID:	Metcalf 279296	End Time:	1600
Landowner Name:	Carl M Metcalf II	Sample Time:	1515
Landowner Address:	4827 CR 300, Parachute, CO 81635	Sample Team:	SLK, NWS
Water Right/Well Owner:	Carl M Metcalf II	Observer:	SLK
Water Right/Well Permit:	279296	Lead Signature/Date:	<i>[Signature]</i> 3-19-14
Receipt Number:	9503173		

Station Information			
Station Description: Hydrant front of house			
Approximate Distance to Well Pad: 2420 ft			
Station Type: <u>Well</u> / Spring / Seep / Other:		Water Use: <u>Domestic</u> / Irrigation /	
Sampling Location: Kitchen Tap / Pipe / Well House / Hose bib / Other: <u>Hydrant</u>			
GPS Location:	Zone	x 108.06647	y 39.42531 z 5033
Total Depth (ft):	55	Static Depth to Water (ft):	16 Well diameter (in): 0 to 40' = 7.0"
Purge Volume (gal):	66.5	Total Volume Purged (gal):	210 40 to 55' = 5.5"

Weather Conditions			
Sky:	Clear / <u>Scattered</u> / Cloudy / Overcast	Estimated Air Temp (deg F):	40
Precipitation:	None / <u>Light</u> / Moderate / Heavy	Precip Type: None / Rain / Sleet / Hail / <u>Snow</u>	
Wind:	Calm / Light / <u>Mod</u> / Strong	Wind Speed/Direction:	NM

Field Measurements							
Parameter	Units	Reading	Time	Flag Code	Instrument	In-situ or Container	Comments
Water Temp	deg C	12.05	1541		YSI 556	container	
pH	s.u.	7.64	↓		↓	↓	
Sp. Conductivity	uS/cm	5767					
Conductivity	uS/cm	4343					
DO Saturation	%	24.5					
DO	mg/L	2.45					
Baro Press	mmHg	678.6					
ORP	RmV	-102.4					
Turbidity	NTU	0.926		AV	microTRU		1.13, 0.83, 0.82
Discharge	gpm	12.63		VAR	5gal bucket		
H2S	mg/L	NM					
Color:	<u>Clear</u> / White / Yellow / Brown / Green / Blue / Other			<u>Light</u> / Med / Dark			
Odor:	<u>None</u> / Mild / Mod / Strong						
Effervescence:	<u>None</u> / Mild / Mod / Strong			Bubbles: <u>None</u> / Low / Mod / High			
Sediment:	<u>None</u> / Light / Mod / Heavy			VOA Headspace: <u>None</u> / ≤ Pea Size / ≥ Pea Size			
Lab Analysis:	<u>Rule 609</u> / COA 9 / COA 22 / Other						
Field Filtered:	<u>Yes</u> / No		Filter Size:	NA		No. Filters used:	NA

Flag Codes: NM (not measured), E (estimated), N/A (not applicable), I (insufficient sample), Q (uncertain value), Y (calculated value), AV (averaged value), EC (exceeds calibration range), OT (other flag to be defined later), NS (not stabilized), VAR (variable)

WPX BWQ Groundwater Monitoring Field Form

Landowner Comments on water quality:

Additional information:

Discharge = 3 gal / 14.25 sec. = 12.63 gpm
 No WL taken, static level from completion report used to calculate purge volume

Note: hand calculation for purge volume is incorrect, used a 'graph/cheat sheet' in the field and is the correct value. 3 casing volumes = 198.9 gal, total purged = 210 gal

Calibration info on metcal 274330 (NOIK 14-44)

Calibration Information			Date:		Location:			
Instrument	Parameter	Units	Time	Calibration Standard Value	Calibration Standard Temp (°C)	Instrument Reading of Standard	Adjusted Reading	Comments
	pH	s.u.						
	pH	s.u.						
	pH	s.u.						
	SpC	uS/cm						
	SpC	uS/cm						
	DO	%						
	DO	%						
	ORP	RmV						
	Turbidity	NTU						

WPX BWQ Groundwater Monitoring Field Form

Project Information			
Project:	Sh 44-23 BWQ	Sample Purpose:	Baseline 609
Site Name (Well Pad):	Sh 44-23	Site API:	05-C45-21686
Station Name:	PALMER 276703	Sample Date:	11/20/13
COGCC Facility ID:	752987	Start Time:	0920
Field Sample ID:	Palmer-276703	End Time:	1120
Landowner Name:	Michael Palmer	Sample Time:	1550
Landowner Address:	4735 CR 300, Parachute, CO	Sample Team:	SLG, NWS
Water Right/Well Owner:	Mike Palmer	Observer:	WWS SLG
Water Right/Well Permit:	276703	Lead Signature/Date:	[Signature] 11/22/13
Receipt Number:	9502967		

Station Information			
Station Description: hydrant next to shed on property, ~100' from house (hydrant)			
Approximate Distance to Well Pad: 2,100 FT			
Station Type: Well / Spring / Seep / Other:		Water Use: Domestic / Irrigation /	
Sampling Location: Kitchen Tap / Pipe / Well House / Hose bib / Other:			
GPS Location: Zone 12S x 0752365 y 43107989 z 5038'			
Total Depth (ft):	53	Static Depth to Water (ft):	9.15
		Well diameter (in):	5.5
Purge Volume (gal)	222 gallons (3 casing vols)		7" from 0-35 5.5" from 35-53

Weather Conditions			
Sky: Clear / Scattered / Cloudy / <u>Overcast</u>		Estimated Air Temp (deg F): 35°F	
Precipitation: <u>None</u> / Light / Moderate / Heavy		Precip Type: <u>None</u> / Rain / Sleet / Hail / Snow	
Wind: <u>Calm</u> / Light / Mod / Strong		Wind Speed/Direction: <u>Ø</u>	

Field Measurements							
Parameter	Units	Reading	Time	Flag Code	Instrument	In-situ or Container	Comments
Water Temp	deg C	13.91	1514		YSI 550	C	
pH	s.u.	7.49	↓		↓	↓	
Sp. Conductivity	uS/cm	4234					
Conductivity	uS/cm	3338					
DO Saturation	%	52.1					
DO	mg/L	5.27					
Baro Press	mmHg	1016.5					
ORP	RmV	-125.7					
Turbidity	NTU	17.15					
Discharge	GPM	15		VAR			see notes
H2S	mg/L	NM					

Color:	Clear / White / Yellow / <u>Brown</u> / Green / Blue / Other	Light / <u>Med</u> / Dark
Odor:	<u>None</u> / Mild / Mod / Strong	
Effervescence:	<u>None</u> / Mild / Mod / Strong	Bubbles: <u>None</u> / Low / Mod / High
Sediment:	<u>None</u> / Light / Mod / Heavy	VOA Headspace: <u>None</u> / ≤ Pea Size / ≥ Pea Size

Lab Analysis:	<u>Rule 609</u> / COA 9 / COA 22 / Other		
Field Filtered:	Yes / <u>No</u>	Filter Size: <u>N/A</u>	No. Filters used: <u>Ø</u>

Flag Codes: NM (not measured), J (estimated), N/A (not applicable), I (insufficient sample), Q (uncertain value), Y (calculated value), AV (averaged value), EC (exceeds calibration range), OT (other flag to be defined later), NS (not stabilized)

WPX BWQ Groundwater Monitoring Field Form

Landowner Comments on water quality:

Mentioned that he had the well tested 5 years ago — reported high levels of manganese + iron. Had a difficult time getting well cap off — was rusted on. Says he only comes here on the weekends.

Additional information:

0926 Discharge: 5 gal/18.8 sec
 0950 ~~1000~~ dewatered well, water level at 41.95'
 1022 Resume Purge — Mike Palmer left
 1030 dewatered well — water level at 46.22'
 1208 resume purge, water level at 71e'
 1300 dewatered well, water level below 47' at pump
 1435 resume Purge, water level 25.6'
 1510 water level at 39.51'

Discharge variable due to rapid dewatering, tried to purge + sample @ about 1gpm
 Gary Reed + Mike Palmer Present.

Calibration Information			Date: 11-20-13			Location: Office		
Instrument	Parameter	Units	Time	Calibration Standard Value	Calibration Standard Temp (°C)	Instrument Reading of Standard	Adjusted Reading	Comments
YSI 556	pH	s.u.	0619	7.00	22.10	7.08	7.00	
	pH	s.u.	0622	10.01	22.13	9.95	10.01	
	pH	s.u.	0625	4.01	22.15	3.95	4.00	
YSI 556	SpC	uS/cm	0616	2070	22.09	2091	2070	
	SpC	uS/cm						
YSI 556	DO	%	0634	638.0 mmHg	22.20	77.7	83.9	
	DO	%						
	ORP	RmV						
Micro TPW	Turbidity	NTU	0625					

WPX BWQ Groundwater Monitoring Field Form

Palmer 276703

Well Purging Information		
Date: 11/20/13	Purge Method: Parameters Stabilization / Submersible Pump	
Total Depth, ft (d _i): 53	Static Depth to Water, ft (d _w): 9.15	Sample/Set Depth (ft): 39.51
Casing Radius (in): 7.4 5.5" diameter	Casing Volume (ft ³): 92 gal	47'
Total Volume (gal or ft ³): 217 542 (74)		Total Volume x 3 (gal or ft ³): 651 (222)

1 ft³ = 7.48 gal

Bore Volume = $\pi r^2(d_i - d_w)$

$$\pi \cdot (\cancel{0.458}^2) (44) \cdot \frac{7.48 \text{ gal}}{1 \text{ ft}^3} = \frac{216.8}{54.2}$$

See back for complete calculations

Purge #	Time	Temp (deg C)	pH (s.u.)	SpC (uS/cm)	Cond (uS/cm)	DO (%)	DO (mg/L)	ORP (RmV)	Water Clarity (Poor/Mod/Good) or NTUs	Effervescence (None/Slight/Mod/Heavy)	Volume Purged (gal)	Cum Vol Purged (gal)
1	0930	12.58	8.19	3624	2763	11.1	1.15	-227.5	20.19	none	40	40
2	0935	12.10	7.99	3608	2755	9.2	0.95	-251.1	24.24	none	17.5	57.5
3	0940	12.72	7.84	3678	2817	7.16	0.79	-229.2	59.25	none	17.5	75
4	0945	12.35	7.47	3909	2965	25.5	2.7	-129.2	33.74	none	17.5	92.5
5	1024	12.50	7.57	4145	3154	34.9	3.67	-87.1	74.88	none	10	102.5
6	1209	13.45	7.46	4283	3339	65.1	6.60	-42.7	44.48	none	5	107.5
7	1214	12.16	7.48	4251	3244	61.3	6.43	-105.9	40.62	none	20	127.5
8	1219	12.32	7.48	4274	3240	20.4	2.13	-155.1	34.06	none	20	147.5
9	1226	12.38	7.45	4250	3226	27.5	2.89	-141.5	33.91	none	5	152.5
10	1232	12.33	7.54	4239	3217	54.7	5.76	-147.0	20.78	none	5	157.5
11	1237	12.33	7.48	4254	3226	23.7	2.50	-151.3	38.10	none	2.5	160
12	1242	12.50	7.46	4201	3200	28.5	2.98	-118.5	50.36	none	2.5	162.5
13	1248	12.38	7.50	4183	3176	58.2	6.14	-122.8	30.42	none	3	165.5
14	1253	14.36	7.47	4233	3373	66.1	6.65	-115.4	23.52	none	5	170.5
15	1442	12.86	7.41	4261	3273	53.7	5.57	-166.1	40.29	none	5	175.5
16	1451	12.41	7.41	4224	3209	57.6	6.07	-55.8	33.13	none	5	180.5
17	1459	12.30	7.42	4250	3219	52.7	5.57	-104.8	37.77	none	5	185.5
18	1509	12.40	7.40	4235	3217	34.3	3.61	-96.5	41.54	none	5	190.5
19	1517	12.26	7.43	4257	3222	13.6	1.44	-147.4	18.74	none	5	195.5
20	1522	12.39	7.42	4231	3212	32.9	3.50	-138.0	40.30	none	5	200.5
21	1527	12.46	7.42	4175	3175	38.4	4.03	-100.7	25.34	none	5	205.5
22	1533	12.18	7.45	4254	3212	6.3	0.66	-151.0	11.37	none	5	210.5
23	1540	12.29	7.42	4222	3197	8.7	0.91	-143.6	19.46	none	5	215.5
24	1547	12.08	7.49	4239	3193	32.6	3.46	-143.0	16.57	none	5	220.5
25	1555	12.23	7.46	4247	3211	16.4	1.72	-144.5	24.83	none	5	225.5

✓
✓
✓
✓
x
✓
x

<u>depths</u>	<u>well diameter</u>	
35 1-25	7"	$\pi (0.291)^2 (35)(7.48) = 70$ gallons
35 25-53	5.5"	$\pi (0.229)^2 (18)(7.48) = 22$ gallons
		52 gallons

52 gallons + 22 gallons = 74 @ water depth of 9'

92 gallons for entire casing

ATTACHMENT C

Data Quality Review Sheets

DATA QUALITY REVIEW SHEET

Facility ID: 753175
 Station Name: Metcalfe 69030-F
 Sample Date: 3/18/2014
 Field Sample ID: Metcalfe 69030-F

Project: WPX BWQ: Nolte 14-44
 Lab Work Order: D56061
 QA/QC Review Date: 5/15/2014
 Reviewer: S. Kipp

Field Sampling Data Review	Yes	No	N/A
1. Well properly purged?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Flow rate reduced prior to sampling?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Water quality parameters stable prior to sampling?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Field instruments calibrated properly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Sampling methods performed according to SAP procedures?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Procedures consistent with obtaining a representative sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lab Data Report Review			
7. Proper sample custody maintained until laboratory receipt?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Receipt form is without discrepancies? <i>If no, list in comments.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. All samples analyzed for the requested analyses?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Proper laboratory methods used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. All sample holding times met (other than lab pH)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Lab QA samples (e.g., matrix spikes and matrix spike duplicates) collected and analyzed according to lab method and results within method acceptance limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Was the field investigation sample matrix used by the lab for matrix QC for all analyses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Laboratory qualifiers for data (other than non-detect)? <i>List in comments.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15. Additional qualifiers assigned (other than pH)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Are corrective actions required? <i>If yes, list actions and dates to be completed by:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Corrective Action</i>	<i>Date to be completed</i>		
None			

Calculated Parameters	Calculated Value	Lab Value	Ratio/Percent Difference	Acceptable Limit	Meets QC Criteria?
Cation/Anion Balance, % (CAB)	2.992	N/A	N/A	±5%	<input checked="" type="checkbox"/>
Total Dissolved Solids, mg/L (TDS)	4513.3	4750	0.95	0.8 – 1.2	<input checked="" type="checkbox"/>
Specific Conductance, µS/cm (SpC)	7090	5330	1.33	0.8 – 1.2	<input type="checkbox"/>

Comments: pH analyzed out of analysis holding time, WWL qualified with "H"; result considered estimated. Specific Conductivity ratio slightly outside of QC criteria, but data not qualified.

DATA QUALITY REVIEW SHEET

Facility ID: 752877
 Station Name: Metcalfe 279296
 Sample Date: 3/18/2014
 Field Sample ID: Metcalfe 279296

Project: WPX BWQ: Nolte 14-44
 Lab Work Order: D56060
 QA/QC Review Date: 5/15/2014
 Reviewer: S. Kipp

Field Sampling Data Review	Yes	No	N/A
1. Well properly purged?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Flow rate reduced prior to sampling?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Water quality parameters stable prior to sampling?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Field instruments calibrated properly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Sampling methods performed according to SAP procedures?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Procedures consistent with obtaining a representative sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lab Data Report Review			
7. Proper sample custody maintained until laboratory receipt?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Receipt form is without discrepancies? <i>If no, list in comments.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. All samples analyzed for the requested analyses?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Proper laboratory methods used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. All sample holding times met (other than lab pH)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Lab QA samples (e.g., matrix spikes and matrix spike duplicates) collected and analyzed according to lab method and results within method acceptance limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Was the field investigation sample matrix used by the lab for matrix QC for all analyses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Laboratory qualifiers for data (other than non-detect)? <i>List in comments.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Additional qualifiers assigned (other than pH)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Are corrective actions required? <i>If yes, list actions and dates to be completed by:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Corrective Action</i>	<i>Date to be completed</i>		
None			

Calculated Parameters	Calculated Value	Lab Value	Ratio/Percent Difference	Acceptable Limit	Meets QC Criteria?
Cation/Anion Balance, % (CAB)	4.797	N/A	N/A	±5%	<input checked="" type="checkbox"/>
Total Dissolved Solids, mg/L (TDS)	4740.6	4650	1.02	0.8 – 1.2	<input checked="" type="checkbox"/>
Specific Conductance, µS/cm (SpC)	6940	5220	1.33	0.8 – 1.2	<input type="checkbox"/>

Comments: pH analyzed out of analysis holding time, WWL qualified with "H"; result considered estimated. 'B' qualifier for nitrogen, nitrate to indicate a result detected below the reporting limit but above the method detection limit. Specific Conductivity ratio slightly outside of QC criteria, but data not qualified.

DATA QUALITY REVIEW SHEET

Facility ID: 752987
 Station Name: Palmer 276703
 Sample Date: 11/20/13
 Field Sample ID: Palmer-276-703

Project: WPX BWQ: SG 44-23 (CTSY)
 Lab Work Order: 1311394
 QA/QC Review Date: 2/6/14
 Reviewer: J. Pahler

Field Sampling Data Review	Yes	No	N/A
1. Well properly purged?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Flow rate reduced prior to sampling?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Water quality parameters stable prior to sampling?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Field instruments calibrated properly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Sampling methods performed according to SAP procedures?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Procedures consistent with obtaining a representative sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lab Data Report Review			
7. Proper sample custody maintained until laboratory receipt?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Any discrepancies noted on the lab receipt form? <i>If yes, list in the comments section.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. All samples analyzed for the requested analyses?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Proper laboratory methods used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. All sample holding times met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Lab QA samples (e.g., matrix spikes and matrix spike duplicates) collected and analyzed according to lab method and results within method acceptance limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Was the field investigation sample matrix used by the lab for matrix QC for all analyses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Lab qualifiers for data (other than non-detect)? <i>List in comments.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Are corrective actions required? <i>If yes, please list actions and dates to be completed by:</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Corrective Action</i>	<i>Date to be completed</i>		
Inorganics resubmission due to high CAB	2/5/14		

Calculated Parameters	Calculated Value	Lab Value	Ratio/Percent Difference	Acceptable Limit	Meets QC Criteria?
Cation/Anion Balance, % (CAB)	0.432			±5%	<input checked="" type="checkbox"/>
Total Dissolved Solids, mg/L (TDS)	3318	3300	1.01	0.8 – 1.2	<input checked="" type="checkbox"/>
Specific Conductance, µS/cm (SpC)	4925	4290	1.15	0.8 – 1.2	<input checked="" type="checkbox"/>

Comments:

Field parameters stable after purging with the exception of dissolved oxygen and turbidity. Lab pH analyzed outside of analysis holding time; WWL assigned an "H" qualifier to indicate the results are estimated.

After receiving original analytical results, WWL calculated the cation-anion balance (CAB) and found it to be out of acceptable range at 49%. An inquiry was made to ALS, who determined that the analyses for chloride and sulfate were taken from the wrong sample. Chloride and sulfate were reanalyzed for Palmer-276-703 on 1-16-14 and the results adjusted accordingly. The recalculated CAB met QC criteria. Chloride and sulfate were analyzed outside of the analysis holding time and WWL assigned an "H" qualifier to indicate the results are estimated.

ATTACHMENT D

Summary of Analytical Results

WPX BWQ: Nolte 14-44 Analytic Summary

Station Name				Palmer 276703						Palmer 276703					
Facility ID				752987						752987					
Sample Date				11/20/2013 15:56						11/20/2013 15:56					
Field Sample ID				Palmer-276-703						Palmer-276-703					
Analytic Lab				ALS Laboratories (ALS)						ALS Laboratories (ALS)					
Lab Sample ID				1311394-1						1311394-1 Inorganics Resubmission					
	Reporting Units	ALS Analytic Method	AMS Analytic Method	Result	Lab Qual	WWL Qual	RL	MDL	DF	Result	Lab Qual	WWL Qual	RL	MDL	DF
Inorganics															
Alkalinity AS CaCO3, Total	mg/l	SM2320B	SM 2320B-2011	510			20		1	510			20		1
Alkalinity, Bicarbonate as CaCO3	mg/l	SM2320B	SM 2320B-2011	510			20		1	510			20		1
Alkalinity, Carbonate as CaCO3	mg/l	SM2320B	SM 2320B-2011	20	U		20		1	20	U		20		1
Bromide	mg/l	EPA300.0	EPA 300.0/SW846 9056	1	U		1	0.3	5	1	U		1	0.3	5
Chloride	mg/l	EPA300.0	EPA 300.0/SW846 9056	120			10	3	50	220 ⁴		H	10	3	50
Fluoride	mg/l	EPA300.0	EPA 300.0/SW846 9056	0.63			0.5	0.15	5	0.63			0.5	0.15	5
Nitrate as N	mg/l	EPA300.0	EPA 300.0/SW846 9056	1	U		1	0.3	5	1	U		1	0.3	5
Nitrate/Nitrite as N	mg/l	EPA300.0	NM	0.1	U		0.1		1	0.1	U		0.1		1
Nitrite as N	mg/l	EPA300.0	EPA 300.0/SW846 9056	0.5	U		0.5	0.15	5	0.5	U		0.5	0.15	5
pH	s.u.	SM4500-H	SM4500HB+-2011/9040C	7.73		H	0.1		1	7.73		H	0.1		1
Specific Conductivity	umhos/cm	SM2510B	SM 2510B-2011	4290			1		1	4290			1		1
Sulfate	mg/l	EPA300.0	EPA 300.0/SW846 9056	170			50	15	50	1600 ⁴		H	50	15	50
Total Dissolved Solids	mg/l	SM2540C	SM 2540C-2011	3300			80		1	3300			80		1
Total Phosphorous	mg/l	EPA365.2	HACH8190/SM4500P-B/E	0.05	U		0.05	0.015	1	0.05	U		0.05	0.015	1
Dissolved Metals															
Barium	ug/l	EPA200.8	EPA 200.7	28			1	0.3	10	28			1	0.3	10
Boron	ug/l	EPA200.8	EPA 200.7	280			50	15	10	280			50	15	10
Calcium	ug/l	EPA200.8	EPA 200.7	180000			1000	65	10	180000			1000	65	10
Iron	ug/l	EPA200.8	EPA 200.7	290			100	30	10	290			100	30	10
Magnesium	ug/l	EPA200.8	EPA 200.7	160000			100	30	10	160000			100	30	10
Manganese	ug/l	EPA200.8	EPA 200.7	350			2	0.6	10	350			2	0.6	10
Potassium	ug/l	EPA200.8	EPA 200.7	4200			1000	300	10	4200			1000	300	10
Selenium	ug/l	EPA200.8	EPA 200.8	1	U		1	0.5	10	1	U		1	0.5	10
Sodium	ug/l	EPA200.8	EPA 200.7	640000			1000	300	10	640000			1000	300	10
Strontium	ug/l	EPA200.8	EPA 200.7	2100			1	0.3	10	2100			1	0.3	10
Organics - Total Petroleum Hydrocarbons															
Diesel Range Organics	mg/l	SW8015M	SW846-8015B	0.47	U		0.47	0.14	1	0.47	U		0.47	0.14	1
Gasoline Range Organics	ug/l	SW8260_25	SW846 8260B	100	U		100	30	1	100	U		100	30	1
Dissolved Gases¹															
Ethane	ug/L	RSK175	RSK175 MOD	2	U		2	2	1	2	U		2	2	1
Methane	ug/L	RSK175	RSK175 MOD	24			1	1	1	24			1	1	1
Propane	ug/L	RSK175	RSK175 MOD	1	U		1	1	1	1	U		1	1	1
VOCs															
Benzene	ug/l	SW8260_25	SW846 8260B	1	U		1	0.3	1	1	U		1	0.3	1
Ethylbenzene	ug/l	SW8260_25	SW846 8260B	1	U		1	0.3	1	1	U		1	0.3	1
M+P-Xylene	ug/l	SW8260_25	NM	1	U		1	0.3	1	1	U		1	0.3	1
o-Xylene	ug/l	SW8260_25	NM	1	U		1	0.3	1	1	U		1	0.3	1
Toluene	ug/l	SW8260_25	SW846 8260B	1	U		1	0.3	1	1	U		1	0.3	1
Xylenes (Total)	ug/l	SW8260_25	SW846 8260B	1	U		1		1	1	U		1		1

WPX BWQ: Nolte 14-44 Analytic Summary

Station Name				Palmer 276703						Palmer 276703					
Facility ID				752987						752987					
Sample Date				11/20/2013 15:56						11/20/2013 15:56					
Field Sample ID				Palmer-276-703						Palmer-276-703					
Analytic Lab				ALS Laboratories (ALS)						ALS Laboratories (ALS)					
Lab Sample ID				1311394-1						1311394-1 Inorganics Resubmission					
	Reporting Units	ALS Analytic Method	AMS Analytic Method	Result	Lab Qual	WWL Qual	RL	MDL	DF	Result	Lab Qual	WWL Qual	RL	MDL	DF
Bacteria^{2,3}															
Iron Related Bacteria	cfu/ml	BART	HACH IRB-BART	1					1	1					1
Slime forming bacteria	cfu/ml	BART	HACH SLYM-BART	0	U				1	0	U				1
Sulfate Reducing Bacteria	cfu/ml	BART	HACH SRB-BART	1					1	1					1
Field Parameters															
Bubbles	nu	Field	Field	None					1	None					1
Color	nu	Field	Field	M. Brown					1	M. Brown					1
Conductivity, Field	uS/cm	Field	Field	3338					1	3338					1
Depth to Water	ft	Field	Field	9.15					1	9.15					1
Discharge, measured	gpm	Field	Field	15		VAR			1	15		VAR			1
Dissolved Oxygen, Field	mg/l	Field	Field	5.27					1	5.27					1
Dissolved Oxygen, Field,%	%	Field	Field	52.1					1	52.1					1
Effervescence	nu	Field	Field	None					1	None					1
Odor	nu	Field	Field	None					1	None					1
ORP, field	mv	Field	Field	-125.7					1	-125.7					1
pH, Field	s.u.	Field	Field	7.49					1	7.49					1
Purge Volume	gal	Field	Field	74					1	74					1
Sediment	nu	Field	Field	None					1	None					1
Specific Conductivity, Field	uS/cm	Field	Field	4236					1	4236					1
Temperature, Water	Deg C	Field	Field	13.91					1	13.91					1
Total Volume Purged	gal	Field	Field	222					1	222					1
Turbidity, field	NTUs	Field	Field	17.15					1	17.15					1
VOA Headspace	nu	Field	Field	None					1	None					1

Notes:

¹ AMS units converted from mg/L to ug/L

² A result of 1 indicates the presence of bacteria

³ AMS units for bacteria converted from cfu/ml to no units (detect or non-detect)

⁴ Reanalyzed 1/16/2014

U = not detected at the reporting limit

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VAR = variable

NA = not applicable

WPX BWQ: Nolte 14-44 Analytic Summary				Metcalf 279296 752877 3/18/2014 15:15 METCALF 279296 Accutest (AMS) D56060-1						Metcalf 69030-F 753175 3/18/2014 12:30 METCALF 69030-F Accutest (AMS) D56061-2					
Station Name															
Facility ID															
Sample Date															
Field Sample ID															
Analytic Lab															
Lab Sample ID															
	Reporting Units	ALS Analytic Method	AMS Analytic Method	Result	Lab Qual	WWL Qual	RL	MDL	DF	Result	Lab Qual	WWL Qual	RL	MDL	DF
Inorganics															
Alkalinity AS CaCO3, Total	mg/l	SM2320B	SM 2320B-2011	767			5	2	1	755			5	2	1
Alkalinity, Bicarbonate as CaCO3	mg/l	SM2320B	SM 2320B-2011	767			5	2	1	541			5	2	1
Alkalinity, Carbonate as CaCO3	mg/l	SM2320B	SM 2320B-2011	5	U		5	2	1	215			5	2	1
Bromide	mg/l	EPA300.0	EPA 300.0/SW846 9056	1.3			0.5	0.25	10	1.2			0.5	0.25	10
Chloride	mg/l	EPA300.0	EPA 300.0/SW846 9056	342			100	40	200	280			5	2	10
Fluoride	mg/l	EPA300.0	EPA 300.0/SW846 9056	1.4			1	0.5	10	1.4			1	0.5	10
Nitrate as N	mg/l	EPA300.0	EPA 300.0/SW846 9056	0.072	B		0.1	0.06	10	0.1	U		0.1	0.06	10
Nitrate/Nitrite as N	mg/l	EPA300.0	NM	NM						NM					
Nitrite as N	mg/l	EPA300.0	EPA 300.0/SW846 9056	0.04	U		0.04	0.03	10	0.04	U		0.04	0.03	10
pH	s.u.	SM4500-H	SM4500HB+-2011/9040C	7.71		H			1	9.02		H			1
Specific Conductivity	umhos/cm	SM2510B	SM 2510B-2011	5220			1		1	5330			1		1
Sulfate	mg/l	EPA300.0	EPA 300.0/SW846 9056	2380			100	40	200	2470			100	40	200
Total Dissolved Solids	mg/l	SM2540C	SM 2540C-2011	4650			10	5	1	4750			10	5	1
Total Phosphorous	mg/l	EPA365.2	HACH8190/SM4500P-B/E	0.01	U		0.01	0.008	1	0.01	U		0.01	0.008	1
Dissolved Metals															
Barium	ug/l	EPA200.8	EPA 200.7	71.8			10		1	10	U		10		1
Boron	ug/l	EPA200.8	EPA 200.7	514			50		1	661			50		1
Calcium	ug/l	EPA200.8	EPA 200.7	68200			400		1	24100			400		1
Iron	ug/l	EPA200.8	EPA 200.7	44.2			10		1	10	U		10		1
Magnesium	ug/l	EPA200.8	EPA 200.7	338000			200		1	336000			200		1
Manganese	ug/l	EPA200.8	EPA 200.7	180			5		1	5	U		5		1
Potassium	ug/l	EPA200.8	EPA 200.7	7180			1000		1	9440			1000		1
Selenium	ug/l	EPA200.8	EPA 200.8	0.84			0.8		2	1			0.8		2
Sodium	ug/l	EPA200.8	EPA 200.7	835000			400		1	851000			400		1
Strontium	ug/l	EPA200.8	EPA 200.7	1420			5		1	406			5		1
Organics - Total Petroleum Hydrocarbons															
Diesel Range Organics	mg/l	SW8015M	SW846-8015B	0.19	U		0.19	0.17	1	0.19	U		0.19	0.17	1
Gasoline Range Organics	ug/l	SW8260_25	SW846 8260B	200	U		200		1	200	U		200		1
Dissolved Gases¹															
Ethane	ug/L	RSK175	RSK175 MOD	1.6	U		1.6	0.8	1	1.6	U		1.6	0.8	1
Methane	ug/L	RSK175	RSK175 MOD	14			0.8	0.4	1	0.7	J		0.8	0.4	1
Propane	ug/L	RSK175	RSK175 MOD	2.2	U		2.2	1.1	1	2.2	U		2.2	1.1	1
VOCs															
Benzene	ug/l	SW8260_25	SW846 8260B	1	U		1	0.25	1	1	U		1	0.25	1
Ethylbenzene	ug/l	SW8260_25	SW846 8260B	2	U		2	0.25	1	2	U		2	0.25	1
M+P-Xylene	ug/l	SW8260_25	NM	NM						NM					
o-Xylene	ug/l	SW8260_25	NM	NM						NM					
Toluene	ug/l	SW8260_25	SW846 8260B	2	U		2	1	1	2	U		2	1	1
Xylenes (Total)	ug/l	SW8260_25	SW846 8260B	3	U		3	2	1	3	U		3	2	1

WPX BWQ: Nolte 14-44 Analytic Summary				Metcalf 279296						Metcalf 69030-F					
Station Name				752877						753175					
Facility ID				3/18/2014 15:15						3/18/2014 12:30					
Sample Date				METCALF 279296						METCALF 69030-F					
Field Sample ID				Accutest (AMS)						Accutest (AMS)					
Analytic Lab				D56060-1						D56061-2					
Lab Sample ID															
	Reporting Units	ALS Analytic Method	AMS Analytic Method	Result	Lab Qual	WWL Qual	RL	MDL	DF	Result	Lab Qual	WWL Qual	RL	MDL	DF
Bacteria^{2,3}															
Iron Related Bacteria	cfu/ml	BART	HACH IRB-BART	1					1	1					1
Slime forming bacteria	cfu/ml	BART	HACH SLYM-BART	1					1	1					1
Sulfate Reducing Bacteria	cfu/ml	BART	HACH SRB-BART	1					1	1					1
Field Parameters															
Bubbles	nu	Field	Field	None					1	None					1
Color	nu	Field	Field	Clear					1	Clear					1
Conductivity, Field	uS/cm	Field	Field	4343					1	4060					1
Depth to Water	ft	Field	Field	16					1	NA					1
Discharge, measured	gpm	Field	Field	12.63		VAR			1	NA					1
Dissolved Oxygen, Field	mg/l	Field	Field	2.65					1	10.5					1
Dissolved Oxygen, Field,%	%	Field	Field	24.5					1	92.4					1
Effervescence	nu	Field	Field	None					1	None					1
Odor	nu	Field	Field	None					1	None					1
ORP, field	mv	Field	Field	-102.4					1	218.2					1
pH, Field	s.u.	Field	Field	7.64					1	8.9					1
Purge Volume	gal	Field	Field	66.5						NA					1
Sediment	nu	Field	Field	None					1	None					1
Specific Conductivity, Field	uS/cm	Field	Field	5767					1	5874					1
Temperature, Water	Deg C	Field	Field	12.05					1	8.91					1
Total Volume Purged	gal	Field	Field	210						NA					1
Turbidity, field	NTUs	Field	Field	0.926		AV			1	5.71		AV			1
VOA Headspace	nu	Field	Field	None					1	None					1

Notes:

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WPX BWQ: Nolte 14-44 Analytic Summary

Station Name			Trip Blank 752877 3/18/2014 0:00 TRIP.BLANK Accutest (AMS) D56060-2						Trip Blank 753175 3/18/2014 0:00 TRIP.BLANK Accutest (AMS) D56061-3					
Facility ID														
Sample Date														
Field Sample ID														
Analytic Lab														
Lab Sample ID														
	Reporting Units	AMS Analytic Method	Result	Lab Qual	WWL Qual	RL	MDL	DF	Result	Lab Qual	WWL Qual	RL	MDL	DF
Organics - Total Petroleum Hydrocarbons														
Diesel Range Organics	mg/l	SW846-8015B												
Gasoline Range Organics	ug/l	SW846 8260B	200	U		200		1	200	U		200		1
VOCs														
Benzene	ug/l	SW846 8260B	1	U		1	0.25	1	1	U		1	0.25	1
Ethylbenzene	ug/l	SW846 8260B	2	U		2	0.25	1	2	U		2	0.25	1
Toluene	ug/l	SW846 8260B	2	U		2	1	1	2	U		2	1	1
Xylenes (Total)	ug/l	SW846 8260B	3	U		3	2	1	3	U		3	2	1

Notes:

U = not detected at the reporting limit