



Western Water & Land, Inc.

October 10, 2014

Mr. Michael Gardner  
Environmental Manager North West  
WPX Energy Rocky Mountain LLC  
1058 County Road 215  
Parachute, Colorado 81635

**RE: GM 13-33 Drill Pad Baseline Results Report, May 2014 Event**

Dear Mr. Gardner,

Western Water & Land, Inc. (WWL) has completed baseline water quality sampling for the WPX Energy Rocky Mountain LLC (WPX) GM 13-33 Drill Pad in accordance with the Colorado Oil and Gas Conservation Commission (COGCC) Rule 609. The GM 13-33 Drill Pad is located in the NW<sup>1</sup>/<sub>4</sub>, SW<sup>1</sup>/<sub>4</sub>, Section 33, Township 6 South, Range 96 West, 6<sup>th</sup> 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 (GM 13-33 Drill Pad Baseline Water Quality Evaluation, January 22, 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 GM 13-33 Drill Pad Baseline Water Quality Evaluation, January 22, 2014, three 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:

- Union 76 Water Well No. 6 (Permit No. 26068-F; well constructed)
- Union 76 Water Well No. 6A (Water Well Permit No. 26069-F; well constructed)

- Water Well Permit No. 77386-F (cross referenced to permit No. 51456-MH; well constructed)

After attempting to contact landowners, water well permit holders, and water right holders, sampling access was not acquired for Water Well Permit No. 77386-F; the well was considered unsuitable due to its use as a hydrocarbon recovery remediation well. WWL was granted access to Union 76 Water Well No. 6 (Permit No. 26068-F) and Union 76 Water Well No. 6A (Water Well Permit No. 26069-F).

One sample was collected for the GM 13-33 Drill Pad as shown in the table below.

| <b>Sampling Date</b> | <b>Well Identification or Permit No.</b> | <b>Sample Identification</b> | <b>COGCC Facility ID</b> |
|----------------------|--|------------------------------|--------------------------|
| 5/7/2014             | 26068-F                                  | Union No. 6-26068-F          | 753285                   |

WWL personnel located Union 76 Water Well No. 6 (Permit No. 26068-F) at the WPX man camp on May 7, 2014 on the basis of the DWR database location. Sample "Union No. 6-26068-F" was collected from a hosebib on a water storage tank; there were no available options to collect the sample before the water entered the storage tank. As a result, the well was not purged according to the COGCC SAP guidelines, and the sample may not be representative of formation groundwater due to potential degassing and settling during storage tank residence time. WPX Land Representative Mr. Gary Reed was present when the sample was collected.

WWL personnel located Union 76 Water Well No. 6A (Water Well Permit No. 26069-F) on September 8, 2014 but was unable to collect a sample due to lack of power to the pump. WPX Facilities Services Representative Jeramy Casteel was present for the sample attempt.

See Figure 1 for the sample location. Photographs of the sampling site 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 and modified by WPX with the exception of well purging procedures; there were no available options to purge the well and collect the sample before water entered a storage tank. Sampling Method 1 for wells with pumps and effervescent samples, described in Version 1 of the COGCC Model SAP, was used to collect the sample.

The sample was relinquished to the analytical laboratory's (Accutest Mountain States [AMS], Wheat Ridge, Colorado) courier in Rifle, Colorado, who carefully packs samples in coolers with ice for preservation and ships them to the analytical laboratory by way of private overnight courier.

## **QUALITY CONTROL SUMMARY**

WWL conducted a Tier 1 data validation quality control evaluation of the received analytical laboratory data report. Attachment C presents detailed information on the quality control evaluation for field sampling and laboratory analysis associated with the collected sample.

AMS reported that TPH-DRO was outside of control limits for matrix spike, matrix spike duplicate and duplicate relative percent difference (RPD). Some of these excursions are suspected to be the result of

matrix interference and non-homogeneity of the sample. Other laboratory control samples were within limits and therefore, the laboratory did not assign qualifiers to these analytical results.

AMS Laboratory assigned analytical results that were undetected with a “U” qualifier and “J” qualifier to results that were detected above the method detection limit but below the reporting limit 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 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.

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

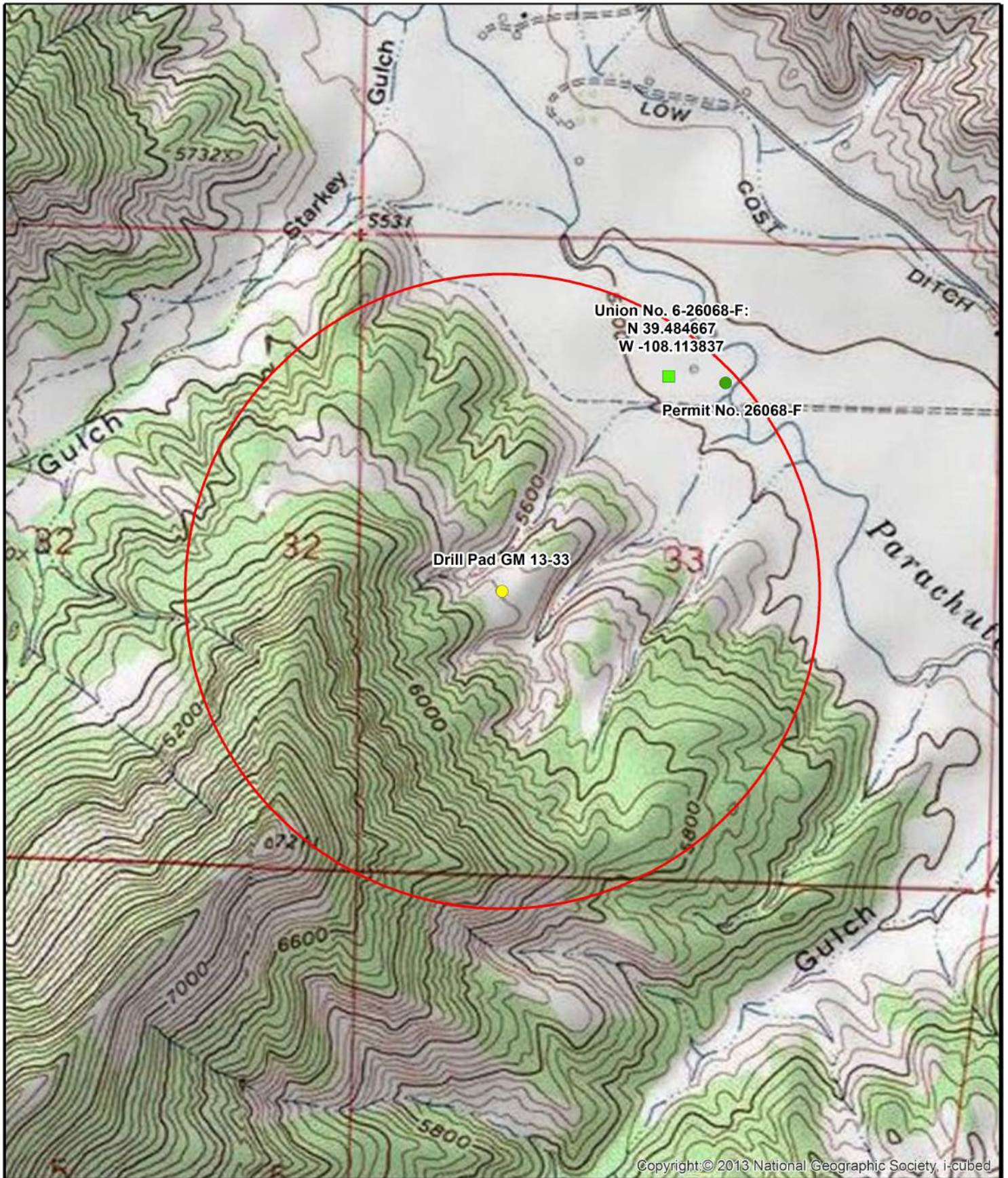
Sincerely,



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

## Attachments

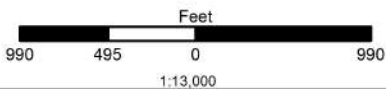
- Figure 1- Sampling Location Map
- Attachment A - Photographs
- Attachment B - Field Monitoring Forms
- Attachment C – Quality Control Evaluation
- Attachment D - Summary of Analytical Results
- Attachment E - Laboratory Analytical Summary Report



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**Legend**

- Sample Location(s)
- Drill Pad GM 13-33
- Decree
- 0.5-Mile Radius Evaluation Area
- Constructed well



**Figure 1: Drill Pad GM 13-33 Sampling Location Map  
COGCC Rule 609 Baseline Sampling  
NW1/4, SW1/4, S33, T6S, R96W, 6 PM**

Garfield County, Colorado

WPX Energy Rocky Mountain LLC

Basemap Source: Esri ArcGIS Online



Western Water & Land, Inc.  
Applications in Earth Science

**ATTACHMENT A**

**Photographs**



**Photo 1. Union 76 Water Well No. 6 Sampling Location (Union No. 6-26068-F); cistern**



**Photo 2. Union 76 Water Well No. 6 Sampling Location (Union No. 6-26068-F); cistern**



**Photo 3. Union 76 Water Well No. 6 (Union No. 6-26068-F)**

**ATTACHMENT B**

**Field Monitoring Forms**

# WPX BWQ Groundwater Monitoring Field Form

| Project Information      |   |                       |                           |
|--------------------------|---|-----------------------|---------------------------|
| Project:                 | WPX BWQ   | Sample Purpose:       | Baseline 609              |
| Site Name (Well Pad):    | GM 323-28                                       | Site API:             |                           |
| Station Name:            | Union 26068-F                                   | Sample Date:          | 5-7-14                    |
| COGCC Facility ID:       | 753825  | Start Time:           | 1020                      |
| Field Sample ID:         | Union No. 6 - 26068-F                           | End Time:             | 1200                      |
| Landowner Name:          | WPX Energy Rocky Mountain, LLC                  | Sample Time:          | 1130                      |
| Landowner Address:       | C/O Merit Advisors, PO Box 330, Gainesville, TX | Sample Team:          | SLK, NWS                  |
| Water Right/Well Owner:  | WPX Energy Rocky Mountain, LLC                  | Observer:             | SLK                       |
| Water Right/Well Permit: | 26068-F / Union No. 6 Water Well                | Field Signature/Date: | <i>[Signature]</i> 5-8-14 |
| Receipt Number:          | 0221184 No 6                                    |                       |                           |

| Station Information   |                 |   |   |
|---|-----------------|---|---|
| Station Description: Hose bib off irrigation tank at mancamp/yard             |                 |   |   |
| Approximate Distance to Well Pad: 2530 ft                                     |                 |   |   |
| Station Type: <u>Well</u> / Spring / Seep / Other:                            |                 | Water Use: Domestic / Irrigation / <u>Other</u> |   |
| Sampling Location: Kitchen Tap / Pipe / Well House / <u>Hose bib</u> / Other: |                 |   |   |
| GPS Location:   | Zone            | x -108.11884                                    | y 39.48467 z 5424                               |
| Total Depth (ft):   | <u>NS 88 90</u> | Static Depth to Water (ft):                     | 9.6 Well diameter (in): 8" from 53-73' + 73-78' |
| Purge Volume (gal):   | 211.5           | Total Volume Purged (gal):                      | 64.7 8 1/2" from +1-53' + 78-83'                |

| Weather Conditions |  |   |  |
|--------------------|--|---|--|
| Sky:               | <u>Clear / Scattered</u> / Cloudy / Overcast | Estimated Air Temp (deg F): 70                        |  |
| Precipitation:     | <u>None</u> / Light / Moderate / Heavy       | Precip Type: <u>None</u> / Rain / Sleet / Hail / Snow |  |
| Wind:              | Calm / Light / <u>Mod</u> / Strong           | Wind Speed/Direction: <u>NM</u>                       |  |

| Field Measurements  |            |                |      |  |                       |                      |                        |
|---|------------|----------------|------|--|-----------------------|----------------------|------------------------|
| Parameter   | Units      | Reading        | Time | Flag Code  | Instrument            | In-situ or Container | Comments               |
| Water Temp  | deg C      | 14.2           | 1153 |  | YSI pro               | container            |                        |
| pH  | s.u.       | 7.37           | ↓    |  | ↓                     | ↓                    |                        |
| Sp. Conductivity  | uS/cm      | 2369           |      |  |                       |                      |                        |
| Conductivity  | uS/cm      | 1879           |      |  |                       |                      |                        |
| DO Saturation   | %          | 29.0           |      |  |                       |                      |                        |
| DO  | mg/L       | 2.95           |      |  |                       |                      |                        |
| Baro Press  | mmHg       | 617.2          |      |  |                       |                      |                        |
| ORP   | RmV        | 86.8           |      |  |                       |                      |                        |
| Turbidity   | NTU        | 28.22          |      | AV   | MICROTRU              |                      | 28.0, 28.1, 28.0       |
| Discharge   | <u>gpm</u> | 1.2            | 1036 | VAR  | Seametrics Flow meter |                      | Gravity feed from tank |
| H2S   | mg/L       | <u>N/A/A/S</u> |      |  |                       |                      |                        |
| Color: Clear / White / Yellow / <u>Brown</u> / 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: <u>N/A</u> No. Filters used: <u>N/A</u>            |            |                |      |  |                       |                      |                        |

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:

Typically high iron contents. No way to get the sample before the tank (unless well is bailed)

Additional information:

1015': WL BTOC 9.60'  
 1036': discharge 1.2 gpm  
 Water gravity fed out of tank - discharge variable.  
 WL BTOC after sampling 9.60' - do not think that well pump turned on during purging/sampling.

| Calibration Information |           |       | Date: 5-7-14 |                            | Location: WWL office           |                                |                  |            |
|-------------------------|-----------|-------|--------------|----------------------------|--------------------------------|--------------------------------|------------------|------------|
| Instrument              | Parameter | Units | Time         | Calibration Standard Value | Calibration Standard Temp (°C) | Instrument Reading of Standard | Adjusted Reading | Comments   |
| YSI PRO                 | pH        | s.u.  | 0720         | 7.0                        | 22.9                           | 7.05                           |                  |            |
|                         | pH        | s.u.  | 0723         | 10.01                      | 22.9                           | 10.01                          |                  |            |
|                         | pH        | s.u.  | 0726         | 4.01                       | 22.7                           | 4.00                           | 4.01             |            |
|                         | SpC       | uS/cm | 0717         | 2070                       | 22.7                           | 2014                           | 2070             |            |
|                         | SpC       | uS/cm |              |                            |                                |                                |                  |            |
| ↓                       | DO        | %     | 0739         |                            | 22.2                           | 82.3                           |                  | 632.7 mmHg |
|                         | DO        | %     |              |                            |                                |                                |                  |            |
|                         | ORP       | RmV   |              |                            |                                |                                |                  |            |
| Micro TPW               | Turbidity | NTU   | 0731         |                            |                                |                                |                  |            |



**ATTACHMENT C**

**Data Quality Evaluation**

## **QUALITY CONTROL EVALUATION**

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 COGCC Model SAP as modified by WPX with the exception well purging procedures; standard well purging was not possible due to presence of a storage tank upstream of the sampling point and no other sampling points were available. All samples were collected by direct filling methods; dissolved gas sampling was done using Method 1 for wells with pumps and effervescent samples. 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 errors or pertinent information was observed, and no corrections were needed.

### **Sample Receipt**

Samples were received by AMS 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.

### **Holding Times**

Laboratory pH was analyzed out of holding time; WWL assigned an “H” qualifier to indicate the results are estimated. All other analyses were conducted within recommended holding times.

### **Analytical Methods**

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.

Sample Union No. 6-26068-F: A dilution factor of 50 was applied for sulfate; a dilution factor of 2 for bromide, chloride, fluoride, nitrate and nitrite, and selenium. All other analytes had a dilution factor of 1. Detection limits were elevated for nitrite, bromide, and nitrate due to matrix interference.

AMS reports samples at the detection limit as “undetected” or “U” rather than reporting results as less than the reporting or detection limit, e.g.  $< 0.05\mu\text{g/L}$ .

### **Completeness**

Data completeness is a measure of requested analysis and received results. The analytical constituents required under Rule 609 were compared to those 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.

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:

- Union No. 6-26068-F: 1.743%

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:

- Union No. 6-26068-F: 1.06

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, therefore no 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. Trip blanks test for potential contamination during shipping and sampling field procedures. For this project, trip blanks are analyzed for volatiles only. There were no detections of volatiles (benzene, toluene, ethylbenzene, and xylenes; BTEX) in the analyzed trip blank sample. No data were qualified based on trip blank analytical results.

### **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 without qualification. 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.

AMS did not select field investigation sample Union No. 6-26068-F for matrix testing quality control. AMS selected a number of other samples for all other MS and MSD based on the analytical methods being used. The MS and MSD recoveries met guidance criteria for precision and accuracy for all analytes with the exception of the following analytes:

| Analyte | MS Recovery (%) | MSD Recovery (%) | QC Limits (%) | Associated Sample   |
|---------|-----------------|------------------|---------------|---------------------|
| TPH-DRO | 46              | 24               | 33 - 130      | Union No. 6-26068-F |

The lab reported that the control limits for TPH-DRO may have been exceeded due to matrix interference. The blank spike (BS) QC results were within acceptable limits.

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.

All RPD results met acceptance criteria with the exception of the following:

| Analyte | MS and MSD RPD (%) | Lab Duplicate RPD (%) | RPD Limit (%) | Associated Sample   |
|---------|--------------------|-----------------------|---------------|---------------------|
| TPH-DRO | 64                 | N/A                   | 30            | Union No. 6-26068-F |

The MS and MSD RPD for TPH-DRO associated with sample Union No. 6-26068-F was outside of control limits (high 34%). The lab reported the reason as due to possible nonhomogeneity of the sample. The BS and MB results were within acceptable limits for TPH-DRO. No qualifiers were assigned by the laboratory because of RPD values exceeding the laboratory acceptance criteria.

Data Quality Review Sheets are presented within this Attachment.

## DATA QUALITY REVIEW SHEET

Facility ID: 753285  
 Station Name: Union 26068-F  
 Sample Date: 5/7/14  
 Field Sample ID: Union No. 6-26068-F

Project: WPX BWQ: GM 323-28  
 Lab Work Order: D57545  
 QA/QC Review Date: 6/3/14  
 Reviewer: JP

| Field Sampling Data Review   | Yes                                 | No                                  | N/A                      |
|--|-------------------------------------|-------------------------------------|--------------------------|
| 1. Well properly purged?   | <input type="checkbox"/>            | <input checked="" 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 type="checkbox"/>            | <input checked="" 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 type="checkbox"/>            | <input checked="" 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>         |                                     |                          |
|  |                                     |                                     |                          |

| Calculated Parameters              | Calculated Value | Lab Value | Ratio/Percent Difference | Acceptable Limit | Meets QC Criteria?                  |
|------------------------------------|------------------|-----------|--------------------------|------------------|-------------------------------------|
| Cation/Anion Balance, % (CAB)      | 1.747            | N/A       | N/A                      | ±5%              | <input checked="" type="checkbox"/> |
| Total Dissolved Solids, mg/L (TDS) | 1817             | 1720      | 1.06                     | 0.8 – 1.2        | <input checked="" type="checkbox"/> |
| Specific Conductance, µS/cm (SpC)  | 2567             | 2090      | 1.23                     | 0.8 – 1.2        | <input type="checkbox"/>            |

**Comments:**

Sample collected from large cistern; unable to drain cistern and purge well. Sample not representative of formation groundwater due to possible degassing and settling during cistern residence time. MSD recovery of DRO outside control limits (low 9%), probable cause matrix interference. RPD for MS and MSD of DRO outside control limits (high 34%), possible sample nonhomogeneity. Elevated detection limits for nitrite, bromide, and nitrate due to matrix interference. Lab qualified bromide with “J” to indicate result estimated, between MDL and RL. Lab pH analyzed outside of holding time; WWL qualified with “H” to indicate result estimated.

**ATTACHMENT D**

**Summary of Analytical Results**

| WPX BWQ: GM 13-33 Baseline Analytic Summary |                 |                      |        |                     |          |        |        |    |
|---|-----------------|----------------------|--------|---------------------|----------|--------|--------|----|
| Station Name                                |                 |                      |        | Union 26068-F       |          |        |        |    |
| Facility ID                                 |                 |                      |        | 753285              |          |        |        |    |
| Sample Date                                 |                 |                      |        | 5/7/2014 11:30      |          |        |        |    |
| Field Sample ID                             |                 |                      |        | UNION NO. 6-26068-F |          |        |        |    |
| Lab Sample ID                               |                 |                      |        | D57542-1            |          |        |        |    |
|   | Reporting Units | Analytic Method      | Result | Lab Qual            | WWL Qual | RL     | MDL    | DF |
| <b>Inorganics</b>                           |                 |                      |        |                     |          |        |        |    |
| Alkalinity AS CaCO3, Total                  | mg/l            | SM 2320B-2011        | 507    |                     |          | 5      | 2      | 1  |
| Alkalinity, Bicarbonate as CaCO3            | mg/l            | SM 2320B-2011        | 507    |                     |          | 5      | 2      | 1  |
| Alkalinity, Carbonate as CaCO3              | mg/l            | SM 2320B-2011        | 5      | U                   |          | 5      | 2      | 1  |
| Bromide                                     | mg/l            | EPA 300.0/SW846 9056 | 0.057  | J                   |          | 0.1    | 0.05   | 2  |
| Chloride                                    | mg/l            | EPA 300.0/SW846 9056 | 12.1   |                     |          | 1      | 0.8    | 2  |
| Fluoride                                    | mg/l            | EPA 300.0/SW846 9056 | 0.41   |                     |          | 0.2    | 0.1    | 2  |
| Nitrate as N                                | mg/l            | EPA 300.0/SW846 9056 | 0.02   | U                   |          | 0.02   | 0.012  | 2  |
| Nitrite as N                                | mg/l            | EPA 300.0/SW846 9056 | 0.008  | U                   |          | 0.008  | 0.006  | 2  |
| pH  | s.u.            | SM4500HB+-2011/9040C | 7.48   |                     | H        |        |        | 1  |
| Specific Conductivity                       | umhos/cm        | SM 2510B-2011        | 2090   |                     |          | 1      |        | 1  |
| Sulfate                                     | mg/l            | EPA 300.0/SW846 9056 | 778    |                     |          | 25     | 10     | 50 |
| Total Dissolved Solids                      | mg/l            | SM 2540C-2011        | 1720   |                     |          | 10     | 5      | 1  |
| Total Phosphorous                           | mg/l            | HACH8190/SM4500P-B/E | 0.017  |                     |          | 0.01   | 0.008  | 1  |
| <b>Dissolved Metals</b>                     |                 |                      |        |                     |          |        |        |    |
| Barium                                      | ug/l            | EPA 200.7            | 24.2   |                     |          | 10     | 1.4    | 1  |
| Boron                                       | ug/l            | EPA 200.7            | 149    |                     |          | 50     | 6.6    | 1  |
| Calcium                                     | ug/l            | EPA 200.7            | 131000 |                     |          | 400    | 66     | 1  |
| Iron  | ug/l            | EPA 200.7            | 21.2   |                     |          | 10     | 3.2    | 1  |
| Magnesium                                   | ug/l            | EPA 200.7            | 111000 |                     |          | 200    | 29     | 1  |
| Manganese                                   | ug/l            | EPA 200.7            | 90.2   |                     |          | 5      | 0.29   | 1  |
| Potassium                                   | ug/l            | EPA 200.7            | 3470   |                     |          | 1000   | 230    | 1  |
| Selenium                                    | ug/l            | EPA 200.8            | 0.8    | U                   |          | 0.8    | 0.42   | 2  |
| Sodium                                      | ug/l            | EPA 200.7            | 272000 |                     |          | 400    | 36     | 1  |
| Strontium                                   | ug/l            | EPA 200.7            | 2220   |                     |          | 5      | 0.12   | 1  |
| <b>Organics</b>                             |                 |                      |        |                     |          |        |        |    |
| Diesel Range Organics                       | mg/l            | SW846-8015B          | 0.19   | U                   |          | 0.19   | 0.17   | 1  |
| Gasoline Range Organics                     | ug/l            | SW846 8260B          | 200    | U                   |          | 200    |        | 1  |
| <b>VOCs</b>                                 |                 |                      |        |                     |          |        |        |    |
| Benzene                                     | ug/l            | SW846 8260B          | 1      | U                   |          | 1      | 0.25   | 1  |
| Ethylbenzene                                | ug/l            | SW846 8260B          | 2      | U                   |          | 2      | 0.31   | 1  |
| Toluene                                     | ug/l            | SW846 8260B          | 2      | U                   |          | 2      | 1      | 1  |
| Xylenes (Total)                             | ug/l            | SW846 8260B          | 3      | U                   |          | 3      | 1.5    | 1  |
| <b>Dissolved Gases</b>                      |                 |                      |        |                     |          |        |        |    |
| Ethane                                      | mg/l            | RSK175 MOD           | 0.0016 | U                   |          | 0.0016 | 0.0008 | 1  |
| Methane                                     | mg/l            | RSK175 MOD           | 0.0022 |                     |          | 0.0008 | 0.0004 | 1  |
| Propane                                     | mg/l            | RSK175 MOD           | 0.0022 | U                   |          | 0.0022 | 0.0011 | 1  |
| <b>Bacteria</b>                             |                 |                      |        |                     |          |        |        |    |
| Iron Related Bacteria                       | cfu/ml          | HACH IRB-BART        | 9000   |                     |          | 25     |        | 1  |
| Slime forming bacteria                      | cfu/ml          | HACH SLYM-BART       | 66500  |                     |          | 500    |        | 1  |
| Sulfate Reducing Bacteria                   | cfu/ml          | HACH SRB-BART        | 359000 |                     |          | 200    |        | 1  |

| WPX BWQ: GM 13-33 Baseline Analytic Summary |                 |                 |                     |          |          |    |     |    |
|---|-----------------|-----------------|---------------------|----------|----------|----|-----|----|
| Station Name                                |                 |                 | Union 26068-F       |          |          |    |     |    |
| Facility ID                                 |                 |                 | 753285              |          |          |    |     |    |
| Sample Date                                 |                 |                 | 5/7/2014 11:30      |          |          |    |     |    |
| Field Sample ID                             |                 |                 | UNION NO. 6-26068-F |          |          |    |     |    |
| Lab Sample ID                               |                 |                 | D57542-1            |          |          |    |     |    |
|   | Reporting Units | Analytic Method | Result              | Lab Qual | WWL Qual | RL | MDL | DF |
| <b>Field_Parameters</b>                     |                 |                 |                     |          |          |    |     |    |
| Bubbles                                     | nu              | Field           | None                |          |          |    |     | 1  |
| Color                                       | nu              | Field           | L. Brown            |          |          |    |     | 1  |
| Conductivity, Field                         | uS/cm           | Field           | 1879                |          |          |    |     | 1  |
| Depth to Water                              | ft              | Field           | 90                  |          |          |    |     | 1  |
| Discharge, measured                         | gpm             | Field           | 1.2                 |          | VAR      |    |     | 1  |
| Dissolved Oxygen, Field                     | mg/l            | Field           | 2.95                |          |          |    |     | 1  |
| Dissolved Oxygen, Field,%                   | %               | Field           | 29                  |          |          |    |     | 1  |
| Effervescence                               | nu              | Field           | None                |          |          |    |     | 1  |
| Odor  | nu              | Field           | None                |          |          |    |     | 1  |
| ORP, field                                  | mv              | Field           | 86.8                |          |          |    |     | 1  |
| pH, Field                                   | s.u.            | Field           | 7.37                |          |          |    |     | 1  |
| Sediment                                    | nu              | Field           | None                |          |          |    |     | 1  |
| Specific Conductivity, Field                | uS/cm           | Field           | 2369                |          |          |    |     | 1  |
| Temperature, Water                          | Deg C           | Field           | 14.2                |          |          |    |     | 1  |
| Turbidity, field                            | NTUs            | Field           | 28.22               |          | AV       |    |     | 1  |
| VOA Headspace                               | nu              | Field           | None                |          |          |    |     | 1  |

Notes

- U = not detected at the reporting limit
- H = hold time exceeded
- J = result between RL and MDL, estimated
- AV = result averaged
- VAR = varies

| WPX BWQ: GM 13-13 Baseline Trip Blank |                 |                 |        |               |          |     |      |    |
|---------------------------------------|-----------------|-----------------|--------|---------------|----------|-----|------|----|
| Station Name                          |                 |                 |        | Trip Blank    |          |     |      |    |
| Facility ID                           |                 |                 |        | 753285        |          |     |      |    |
| Sample Date                           |                 |                 |        | 5/7/2014 0:00 |          |     |      |    |
| Field Sample ID                       |                 |                 |        | TRIP.BLANK    |          |     |      |    |
| Lab Sample ID                         |                 |                 |        | D57542-1      |          |     |      |    |
|                                       | Reporting Units | Analytic Method | Result | Lab Qual      | WWL Qual | RL  | MDL  | DF |
| <b>Organics</b>                       |                 |                 |        |               |          |     |      |    |
| Gasoline Range Organics               | ug/l            | SW846 8260B     | 200    | U             |          | 200 |      | 1  |
| <b>VOCs</b>                           |                 |                 |        |               |          |     |      |    |
| Benzene                               | ug/l            | SW846 8260B     | 1      | U             |          | 1   | 0.25 | 1  |
| Ethylbenzene                          | ug/l            | SW846 8260B     | 2      | U             |          | 2   | 0.31 | 1  |
| Toluene                               | ug/l            | SW846 8260B     | 2      | U             |          | 2   | 1    | 1  |
| Xylenes (Total)                       | ug/l            | SW846 8260B     | 3      | U             |          | 3   | 1.5  | 1  |

**ATTACHMENT E**

**Laboratory Analytical Summary Report**



05/21/14

**Technical Report for**

**WPX Energy Rocky Mountain, LLC**

**WWLCOGJ: GM 323-28 BWQ**

**Accutest Job Number: D57542**

**Sampling Date: 05/07/14**

**Report to:**

**Western Water and Land, Inc.  
743 Horizon Court Suite 330  
Grand Junction, CO 80506  
bsmith@westernwaterandland.com; jpahler@westernwaterandland.com  
ATTN: Bruce Smith**

**Total number of pages in report: 49**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

**Scott Heideman  
Laboratory Director**

**Client Service contact: Renea Jackson 303-425-6021**

Certifications: CO (CO00049), ID, NE (CO00049), ND (R-027), NJ (CO 0007), OK (D9942), UT (NELAP CO00049), TX (T104704511)

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Test results relate only to samples analyzed.

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### Sample Summary

WPX Energy Rocky Mountain, LLC

Job No: D57542

WWLCOGJ: GM 323-28 BWQ

| Sample Number | Collected Date | Time By | Received     | Matrix Code | Type                 | Client Sample ID    |
|---------------|----------------|---------|--------------|-------------|----------------------|---------------------|
| D57542-1      | 05/07/14       | 11:30   | NWS 05/08/14 | AQ          | Ground Water         | UNION NO. 6-26068-F |
| D57542-1F     | 05/07/14       | 11:30   | NWS 05/08/14 | AQ          | Groundwater Filtered | UNION NO. 6-26068-F |
| D57542-2      | 05/07/14       | 00:00   | NWS 05/08/14 | AQ          | Trip Blank Water     | TRIP BLANK          |

## CASE NARRATIVE / CONFORMANCE SUMMARY

**Client:** WPX Energy Rocky Mountain, LLC

**Job No** D57542

**Site:** WWLCOGJ: GM 323-28 BWQ

**Report Date** 5/21/2014 11:15:35 AM

On 05/08/2014, 1 sample(s), 1 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 2.1 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D57542 was assigned to the project. The lab sample ID, client sample ID, and date of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

### Volatiles by GCMS By Method SW846 8260B

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> V7V1448 |
|------------------|--------------------------|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D57587-5MS, D57582-10DUP were used as the QC samples indicated.
- D57582-10DUP: The pH of the sample aliquot for VOA analysis was >2 at time of analysis.
- D57542-2: The pH of the sample aliquot for VOA analysis was >2 at time of analysis.
- D57542-1: The pH of the sample aliquot for VOA analysis was >2 at time of analysis.

### Volatiles by GC By Method RSK175 MOD

|                  |                         |
|------------------|-------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> GFB508 |
|------------------|-------------------------|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D57479-1MS, D57479-1MSD were used as the QC samples indicated.
- D57542-1: Sample was not preserved to a pH < 2.

### Extractables by GC By Method SW846-8015B

|                  |                         |
|------------------|-------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> OP9893 |
|------------------|-------------------------|

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- Sample(s) D57451-13MS, D57451-13MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- The matrix spike duplicate (MSD) recovery(s) of TPH-DRO (C10-C28) are outside control limits. Probable cause due to matrix interference.
- The RPD(s) for the MS and MSD recoveries of TPH-DRO (C10-C28) are outside control limits for sample OP9893-MSD. High RPD due to possible sample nonhomogeneity.

### Metals By Method EPA 200.7

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> MP12880 |
|------------------|--------------------------|

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D57351-1FMS, D57351-1FMSD were used as the QC samples for the metals analysis.

## Metals By Method EPA 200.8

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> MP12878 |
|------------------|--------------------------|

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D57450-1FMS, D57450-1FMSD were used as the QC samples for the metals analysis.

## Wet Chemistry By Method EPA 300.0/SW846 9056

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> GP12530 |
|------------------|--------------------------|

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D57520-2MS, D57520-2MSD were used as the QC samples for the Bromide, Chloride, Fluoride, Nitrogen, Nitrate, Nitrogen, Nitrite, Sulfate, Bromide analysis.
- D57542-1 for Nitrogen, Nitrite: Elevated detection limit due to matrix interference.
- D57542-1 for Bromide: Elevated detection limit due to matrix interference.
- D57542-1 for Nitrogen, Nitrate: Elevated detection limit due to matrix interference.

## Wet Chemistry By Method HACH IRB-BART

|                  |                        |
|------------------|------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> MB365 |
|------------------|------------------------|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

## Wet Chemistry By Method HACH SLYM-BART

|                  |                        |
|------------------|------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> MB366 |
|------------------|------------------------|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

## Wet Chemistry By Method HACH SRB-BART

|                  |                        |
|------------------|------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> MB367 |
|------------------|------------------------|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

## Wet Chemistry By Method HACH8190/SM4500P-B/E

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> GP12573 |
|------------------|--------------------------|

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D57458-1DUP, D57458-1MS, D57458-1MSD were used as the QC samples for the Phosphorus, Total analysis.

### Wet Chemistry By Method SM 2320B-2011

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> GN24645 |
|------------------|--------------------------|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D57409-1MS, D57409-1MSD, D57430-4DUP were used as the QC samples for the Alkalinity, Total as CaCO<sub>3</sub> analysis.

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> GN24646 |
|------------------|--------------------------|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> GN24647 |
|------------------|--------------------------|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

### Wet Chemistry By Method SM 2510B-2011

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> GP12559 |
|------------------|--------------------------|

- Sample(s) D57452-1DUP were used as the QC samples for the Specific Conductivity analysis.

### Wet Chemistry By Method SM 2540C-2011

|                  |                          |
|------------------|--------------------------|
| <b>Matrix</b> AQ | <b>Batch ID:</b> GN24686 |
|------------------|--------------------------|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D57539-1DUP were used as the QC samples for the Solids, Total Dissolved analysis.

AMS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting AMS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

AMS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by AMS indicated via signature on the report cover.

## Summary of Hits

**Job Number:** D57542  
**Account:** WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ  
**Collected:** 05/07/14



| Lab Sample ID | Client Sample ID | Result/<br>Qual | RL | MDL | Units | Method |
|---------------|------------------|-----------------|----|-----|-------|--------|
|---------------|------------------|-----------------|----|-----|-------|--------|

**D57542-1 UNION NO. 6-26068-F**

|  |         |         |         |          |                      |
|--|---------|---------|---------|----------|----------------------|
| Methane <sup>a</sup>                         | 0.0022  | 0.00080 | 0.00040 | mg/l     | RSK175 MOD           |
| Alkalinity, Bicarbonate as CaCO <sub>3</sub> | 507     | 5.0     | 2.0     | mg/l     | SM 2320B-2011        |
| Alkalinity, Total as CaCO <sub>3</sub>       | 507     | 5.0     | 2.0     | mg/l     | SM 2320B-2011        |
| Bromide <sup>b</sup>                         | 0.057 J | 0.10    | 0.050   | mg/l     | EPA 300.0/SW846 9056 |
| Chloride                                     | 12.1    | 1.0     | 0.80    | mg/l     | EPA 300.0/SW846 9056 |
| Fluoride                                     | 0.41    | 0.20    | 0.10    | mg/l     | EPA 300.0/SW846 9056 |
| Iron Reducing Bacteria                       | 9000    | 25      |         | CFU/ml   | HACH IRB-BART        |
| Phosphorus, Total                            | 0.017   | 0.010   | 0.0080  | mg/l     | HACH8190/SM4500P-B/E |
| Slime Forming Bacteria                       | 66500   | 500     |         | CFU/ml   | HACH SLYM-BART       |
| Solids, Total Dissolved                      | 1720    | 10      | 5.0     | mg/l     | SM 2540C-2011        |
| Specific Conductivity                        | 2090    | 1.0     |         | umhos/cm | SM 2510B-2011        |
| Sulfate                                      | 778     | 25      | 10      | mg/l     | EPA 300.0/SW846 9056 |
| Sulfate Reducing Bacteria                    | 359000  | 200     |         | CFU/ml   | HACH SRB-BART        |
| pH   | 7.48    |         |         | su       | SM4500HB+-2011/9040C |

**D57542-1F UNION NO. 6-26068-F**

|           |        |      |      |      |           |
|-----------|--------|------|------|------|-----------|
| Barium    | 24.2   | 10   | 1.4  | ug/l | EPA 200.7 |
| Boron     | 149    | 50   | 6.6  | ug/l | EPA 200.7 |
| Calcium   | 131000 | 400  | 66   | ug/l | EPA 200.7 |
| Iron      | 21.2   | 10   | 3.2  | ug/l | EPA 200.7 |
| Magnesium | 111000 | 200  | 29   | ug/l | EPA 200.7 |
| Manganese | 90.2   | 5.0  | 0.29 | ug/l | EPA 200.7 |
| Potassium | 3470   | 1000 | 230  | ug/l | EPA 200.7 |
| Sodium    | 272000 | 400  | 36   | ug/l | EPA 200.7 |
| Strontium | 2220   | 5.0  | 0.12 | ug/l | EPA 200.7 |

**D57542-2 TRIP BLANK**

No hits reported in this sample.

- (a) Sample was not preserved to a pH < 2.
- (b) Elevated detection limit due to matrix interference.



Sample Results

---

Report of Analysis

---

# Report of Analysis

|  |                                |
|--|--------------------------------|
| <b>Client Sample ID:</b> UNION NO. 6-26068-F | <b>Date Sampled:</b> 05/07/14  |
| <b>Lab Sample ID:</b> D57542-1               | <b>Date Received:</b> 05/08/14 |
| <b>Matrix:</b> AQ - Ground Water             | <b>Percent Solids:</b> n/a     |
| <b>Method:</b> SW846 8260B                   |                                |
| <b>Project:</b> WWLCOGJ: GM 323-28 BWQ       |                                |

| Run #               | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---------------------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 <sup>a</sup> | 7V26338.D | 1  | 05/08/14 | JL | n/a       | n/a        | V7V1448          |
| Run #2              |           |    |          |    |           |            |                  |

| Run #  | Purge Volume |
|--------|--------------|
| Run #1 | 5.0 ml       |
| Run #2 |              |

### Purgeable Aromatics+GRO

| CAS No.   | Compound         | Result | RL  | MDL  | Units | Q |
|-----------|------------------|--------|-----|------|-------|---|
| 71-43-2   | Benzene          | ND     | 1.0 | 0.25 | ug/l  |   |
| 108-88-3  | Toluene          | ND     | 2.0 | 1.0  | ug/l  |   |
| 100-41-4  | Ethylbenzene     | ND     | 2.0 | 0.31 | ug/l  |   |
| 1330-20-7 | Xylene (total)   | ND     | 3.0 | 1.5  | ug/l  |   |
|           | TPH-GRO (C6-C10) | ND     | 200 | 200  | ug/l  |   |

| CAS No.    | Surrogate Recoveries  | Run# 1 | Run# 2 | Limits  |
|------------|-----------------------|--------|--------|---------|
| 17060-07-0 | 1,2-Dichloroethane-D4 | 93%    |        | 62-130% |
| 2037-26-5  | Toluene-D8            | 96%    |        | 70-130% |
| 460-00-4   | 4-Bromofluorobenzene  | 95%    |        | 69-130% |

(a) The pH of the sample aliquot for VOA analysis was >2 at time of analysis.

ND = Not detected  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

MDL = Method Detection Limit  
 J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

4.1  
 4

## Report of Analysis

|                          |                        |                        |          |
|--------------------------|------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | UNION NO. 6-26068-F    | <b>Date Sampled:</b>   | 05/07/14 |
| <b>Lab Sample ID:</b>    | D57542-1               | <b>Date Received:</b>  | 05/08/14 |
| <b>Matrix:</b>           | AQ - Ground Water      | <b>Percent Solids:</b> | n/a      |
| <b>Method:</b>           | RSK175 MOD             |                        |          |
| <b>Project:</b>          | WWLCOGJ: GM 323-28 BWQ |                        |          |

| Run #               | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---------------------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 <sup>a</sup> | FB11119.D | 1  | 05/08/14 | JS | n/a       | n/a        | GFB508           |
| Run #2              |           |    |          |    |           |            |                  |

| Run #  | Initial Volume | Headspace Volume | Volume Injected | Temperature |
|--------|----------------|------------------|-----------------|-------------|
| Run #1 | 39.0 ml        | 4.0 ml           | 500 ul          | 20.0 Deg. C |
| Run #2 |                |                  |                 |             |

### Methane, Ethane and Propane

| CAS No. | Compound | Result | RL      | MDL     | Units | Q |
|---------|----------|--------|---------|---------|-------|---|
| 74-82-8 | Methane  | 0.0022 | 0.00080 | 0.00040 | mg/l  |   |
| 74-84-0 | Ethane   | ND     | 0.0016  | 0.00080 | mg/l  |   |
| 74-98-6 | Propane  | ND     | 0.0022  | 0.0011  | mg/l  |   |

(a) Sample was not preserved to a pH < 2.

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

4.1  
4

## Report of Analysis

|  |                                |
|--|--------------------------------|
| <b>Client Sample ID:</b> UNION NO. 6-26068-F | <b>Date Sampled:</b> 05/07/14  |
| <b>Lab Sample ID:</b> D57542-1               | <b>Date Received:</b> 05/08/14 |
| <b>Matrix:</b> AQ - Ground Water             | <b>Percent Solids:</b> n/a     |
| <b>Method:</b> SW846-8015B SW846 3510C       |                                |
| <b>Project:</b> WWLCOGJ: GM 323-28 BWQ       |                                |

| Run #  | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|--------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 | FD31288.D | 1  | 05/13/14 | JS | 05/13/14  | OP9893     | GFD1503          |
| Run #2 |           |    |          |    |           |            |                  |

| Run #  | Initial Volume | Final Volume |
|--------|----------------|--------------|
| Run #1 | 1060 ml        | 1.0 ml       |
| Run #2 |                |              |

| CAS No. | Compound             | Result | RL     | MDL     | Units | Q |
|---------|----------------------|--------|--------|---------|-------|---|
|         | TPH-DRO (C10-C28)    | ND     | 0.19   | 0.17    | mg/l  |   |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits  |       |   |
| 84-15-1 | o-Terphenyl          | 62%    |        | 10-130% |       |   |

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

4.1  
4

## Report of Analysis

|  |                                |
|--|--------------------------------|
| <b>Client Sample ID:</b> UNION NO. 6-26068-F | <b>Date Sampled:</b> 05/07/14  |
| <b>Lab Sample ID:</b> D57542-1               | <b>Date Received:</b> 05/08/14 |
| <b>Matrix:</b> AQ - Ground Water             | <b>Percent Solids:</b> n/a     |
| <b>Project:</b> WWLCOGJ: GM 323-28 BWQ       |                                |

## General Chemistry

| Analyte                        | Result   | RL     | MDL    | Units    | DF | Analyzed       | By | Method               |
|--------------------------------|----------|--------|--------|----------|----|----------------|----|----------------------|
| Alkalinity, Bicarbonate as CaC | 507      | 5.0    | 2.0    | mg/l     | 1  | 05/12/14       | JD | SM 2320B-2011        |
| Alkalinity, Carbonate          | 2.0 U    | 5.0    | 2.0    | mg/l     | 1  | 05/12/14       | JD | SM 2320B-2011        |
| Alkalinity, Total as CaCO3     | 507      | 5.0    | 2.0    | mg/l     | 1  | 05/12/14       | JD | SM 2320B-2011        |
| Bromide <sup>a</sup>           | 0.057 J  | 0.10   | 0.050  | mg/l     | 2  | 05/08/14 12:51 | SK | EPA 300.0/SW846 9056 |
| Chloride                       | 12.1     | 1.0    | 0.80   | mg/l     | 2  | 05/08/14 12:51 | SK | EPA 300.0/SW846 9056 |
| Fluoride                       | 0.41     | 0.20   | 0.10   | mg/l     | 2  | 05/08/14 12:51 | SK | EPA 300.0/SW846 9056 |
| Iron Reducing Bacteria         | 9000     | 25     |        | CFU/ml   | 1  | 05/13/14       | MM | HACH IRB-BART        |
| Nitrogen, Nitrate <sup>a</sup> | 0.012 U  | 0.020  | 0.012  | mg/l     | 2  | 05/08/14 12:51 | SK | EPA 300.0/SW846 9056 |
| Nitrogen, Nitrite <sup>a</sup> | 0.0060 U | 0.0080 | 0.0060 | mg/l     | 2  | 05/08/14 12:51 | SK | EPA 300.0/SW846 9056 |
| Phosphorus, Total              | 0.017    | 0.010  | 0.0080 | mg/l     | 1  | 05/14/14       | BF | HACH8190/SM4500P-B/E |
| Slime Forming Bacteria         | 66500    | 500    |        | CFU/ml   | 1  | 05/13/14       | MM | HACH SLYM-BART       |
| Solids, Total Dissolved        | 1720     | 10     | 5.0    | mg/l     | 1  | 05/14/14       | JD | SM 2540C-2011        |
| Specific Conductivity          | 2090     | 1.0    |        | umhos/cm | 1  | 05/13/14       | AK | SM 2510B-2011        |
| Sulfate                        | 778      | 25     | 10     | mg/l     | 50 | 05/08/14 18:45 | SK | EPA 300.0/SW846 9056 |
| Sulfate Reducing Bacteria      | 359000   | 200    |        | CFU/ml   | 1  | 05/13/14       | MM | HACH SRB-BART        |
| pH                             | 7.48     |        |        | su       | 1  | 05/08/14 14:55 | SK | SM4500HB+-2011/9040C |

(a) Elevated detection limit due to matrix interference.

RL = Reporting Limit  
MDL = Method Detection Limit

U = Indicates a result < MDL  
J = Indicates a result >= MDL but < RL

## Report of Analysis

|   |   |
|---|---|
| <b>Client Sample ID:</b> UNION NO. 6-26068-F<br><b>Lab Sample ID:</b> D57542-1F<br><b>Matrix:</b> AQ - Groundwater Filtered<br><b>Project:</b> WWLCOGJ: GM 323-28 BWQ | <b>Date Sampled:</b> 05/07/14<br><b>Date Received:</b> 05/08/14<br><b>Percent Solids:</b> n/a |
|---|---|

**Dissolved Metals Analysis**

| Analyte   | Result | RL   | MDL  | Units | DF | Prep     | Analyzed By | Method                 | Prep Method            |
|-----------|--------|------|------|-------|----|----------|-------------|------------------------|------------------------|
| Barium    | 24.2   | 10   | 1.4  | ug/l  | 1  | 05/09/14 | 05/09/14 KV | EPA 200.7 <sup>1</sup> | EPA 200.7 <sup>4</sup> |
| Boron     | 149    | 50   | 6.6  | ug/l  | 1  | 05/09/14 | 05/09/14 KV | EPA 200.7 <sup>1</sup> | EPA 200.7 <sup>4</sup> |
| Calcium   | 131000 | 400  | 66   | ug/l  | 1  | 05/09/14 | 05/09/14 KV | EPA 200.7 <sup>1</sup> | EPA 200.7 <sup>4</sup> |
| Iron      | 21.2   | 10   | 3.2  | ug/l  | 1  | 05/09/14 | 05/09/14 KV | EPA 200.7 <sup>1</sup> | EPA 200.7 <sup>4</sup> |
| Magnesium | 111000 | 200  | 29   | ug/l  | 1  | 05/09/14 | 05/09/14 KV | EPA 200.7 <sup>1</sup> | EPA 200.7 <sup>4</sup> |
| Manganese | 90.2   | 5.0  | 0.29 | ug/l  | 1  | 05/09/14 | 05/09/14 KV | EPA 200.7 <sup>1</sup> | EPA 200.7 <sup>4</sup> |
| Potassium | 3470   | 1000 | 230  | ug/l  | 1  | 05/09/14 | 05/09/14 KV | EPA 200.7 <sup>1</sup> | EPA 200.7 <sup>4</sup> |
| Selenium  | 0.42 U | 0.80 | 0.42 | ug/l  | 2  | 05/09/14 | 05/20/14 NT | EPA 200.8 <sup>2</sup> | EPA 200.8 <sup>3</sup> |
| Sodium    | 272000 | 400  | 36   | ug/l  | 1  | 05/09/14 | 05/09/14 KV | EPA 200.7 <sup>1</sup> | EPA 200.7 <sup>4</sup> |
| Strontium | 2220   | 5.0  | 0.12 | ug/l  | 1  | 05/09/14 | 05/09/14 KV | EPA 200.7 <sup>1</sup> | EPA 200.7 <sup>4</sup> |

- (1) Instrument QC Batch: MA4747
- (2) Instrument QC Batch: MA4783
- (3) Prep QC Batch: MP12878
- (4) Prep QC Batch: MP12880

RL = Reporting Limit  
 MDL = Method Detection Limit

U = Indicates a result < MDL  
 J = Indicates a result >= MDL but < RL

4.2  
4

## Report of Analysis

|  |  |                                |
|--|--|--------------------------------|
| <b>Client Sample ID:</b> TRIP BLANK    |  | <b>Date Sampled:</b> 05/07/14  |
| <b>Lab Sample ID:</b> D57542-2         |  | <b>Date Received:</b> 05/08/14 |
| <b>Matrix:</b> AQ - Trip Blank Water   |  | <b>Percent Solids:</b> n/a     |
| <b>Method:</b> SW846 8260B             |  |                                |
| <b>Project:</b> WWLCOGJ: GM 323-28 BWQ |  |                                |

| Run #               | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---------------------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 <sup>a</sup> | 7V26339.D | 1  | 05/08/14 | JL | n/a       | n/a        | V7V1448          |
| Run #2              |           |    |          |    |           |            |                  |

| Run #  | Purge Volume |
|--------|--------------|
| Run #1 | 5.0 ml       |
| Run #2 |              |

**Purgeable Aromatics+GRO**

| CAS No.   | Compound         | Result | RL  | MDL  | Units | Q |
|-----------|------------------|--------|-----|------|-------|---|
| 71-43-2   | Benzene          | ND     | 1.0 | 0.25 | ug/l  |   |
| 108-88-3  | Toluene          | ND     | 2.0 | 1.0  | ug/l  |   |
| 100-41-4  | Ethylbenzene     | ND     | 2.0 | 0.31 | ug/l  |   |
| 1330-20-7 | Xylene (total)   | ND     | 3.0 | 1.5  | ug/l  |   |
|           | TPH-GRO (C6-C10) | ND     | 200 | 200  | ug/l  |   |

| CAS No.    | Surrogate Recoveries  | Run# 1 | Run# 2 | Limits  |
|------------|-----------------------|--------|--------|---------|
| 17060-07-0 | 1,2-Dichloroethane-D4 | 94%    |        | 62-130% |
| 2037-26-5  | Toluene-D8            | 96%    |        | 70-130% |
| 460-00-4   | 4-Bromofluorobenzene  | 93%    |        | 69-130% |

(a) The pH of the sample aliquot for VOA analysis was >2 at time of analysis.

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

4.3  
4

## Misc. Forms

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5

### Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody



## GC/MS Volatiles

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### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

## Method Blank Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample     | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|------------|-----------|----|----------|----|-----------|------------|------------------|
| V7V1448-MB | 7V26335.D | 1  | 05/08/14 | JL | n/a       | n/a        | V7V1448          |

The QC reported here applies to the following samples:

Method: SW846 8260B

D57542-1, D57542-2

| CAS No.   | Compound         | Result | RL  | MDL  | Units | Q |
|-----------|------------------|--------|-----|------|-------|---|
| 71-43-2   | Benzene          | ND     | 1.0 | 0.25 | ug/l  |   |
| 100-41-4  | Ethylbenzene     | ND     | 2.0 | 0.31 | ug/l  |   |
| 108-88-3  | Toluene          | ND     | 2.0 | 1.0  | ug/l  |   |
| 1330-20-7 | Xylene (total)   | ND     | 3.0 | 1.5  | ug/l  |   |
|           | TPH-GRO (C6-C10) | ND     | 200 | 200  | ug/l  |   |

| CAS No.    | Surrogate Recoveries  | Limits      |
|------------|-----------------------|-------------|
| 17060-07-0 | 1,2-Dichloroethane-D4 | 98% 62-130% |
| 2037-26-5  | Toluene-D8            | 93% 70-130% |
| 460-00-4   | 4-Bromofluorobenzene  | 97% 69-130% |

# Blank Spike Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample     | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|------------|-----------|----|----------|----|-----------|------------|------------------|
| V7V1448-BS | 7V26336.D | 1  | 05/08/14 | JL | n/a       | n/a        | V7V1448          |

The QC reported here applies to the following samples:

Method: SW846 8260B

D57542-1, D57542-2

| CAS No.   | Compound       | Spike<br>ug/l | BSP<br>ug/l | BSP<br>% | Limits |
|-----------|----------------|---------------|-------------|----------|--------|
| 71-43-2   | Benzene        | 50            | 52.4        | 105      | 70-130 |
| 100-41-4  | Ethylbenzene   | 50            | 50.8        | 102      | 70-130 |
| 108-88-3  | Toluene        | 50            | 48.9        | 98       | 70-130 |
| 1330-20-7 | Xylene (total) | 150           | 153         | 102      | 70-130 |

| CAS No.    | Surrogate Recoveries  | BSP  | Limits  |
|------------|-----------------------|------|---------|
| 17060-07-0 | 1,2-Dichloroethane-D4 | 97%  | 62-130% |
| 2037-26-5  | Toluene-D8            | 93%  | 70-130% |
| 460-00-4   | 4-Bromofluorobenzene  | 104% | 69-130% |

\* = Outside of Control Limits.

# Blank Spike Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample     | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|------------|-----------|----|----------|----|-----------|------------|------------------|
| V7V1448-BS | 7V26337.D | 1  | 05/08/14 | JL | n/a       | n/a        | V7V1448          |

The QC reported here applies to the following samples:

Method: SW846 8260B

D57542-1, D57542-2

| CAS No. | Compound         | Spike<br>ug/l | BSP<br>ug/l | BSP<br>% | Limits |
|---------|------------------|---------------|-------------|----------|--------|
|         | TPH-GRO (C6-C10) | 2200          | 1840        | 84       | 39-144 |

| CAS No.    | Surrogate Recoveries  | BSP  | Limits  |
|------------|-----------------------|------|---------|
| 17060-07-0 | 1,2-Dichloroethane-D4 | 91%  | 62-130% |
| 2037-26-5  | Toluene-D8            | 94%  | 70-130% |
| 460-00-4   | 4-Bromofluorobenzene  | 100% | 69-130% |

\* = Outside of Control Limits.

# Matrix Spike Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample     | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|------------|-----------|----|----------|----|-----------|------------|------------------|
| D57587-5MS | 7V26351.D | 5  | 05/08/14 | JL | n/a       | n/a        | V7V1448          |
| D57587-5   | 7V26350.D | 5  | 05/08/14 | JL | n/a       | n/a        | V7V1448          |

The QC reported here applies to the following samples:

Method: SW846 8260B

D57542-1, D57542-2

| CAS No.   | Compound       | D57587-5<br>ug/l | Spike<br>Q | ug/l | MS<br>ug/l | MS<br>% | Limits |
|-----------|----------------|------------------|------------|------|------------|---------|--------|
| 71-43-2   | Benzene        | 605              | 250        | 904  | 120        | 62-130  |        |
| 100-41-4  | Ethylbenzene   | 66.7             | 250        | 333  | 107        | 63-130  |        |
| 108-88-3  | Toluene        | 28.4             | 250        | 283  | 102        | 60-130  |        |
| 1330-20-7 | Xylene (total) | 131              | 750        | 923  | 106        | 67-130  |        |

| CAS No.    | Surrogate Recoveries  | MS   | D57587-5 | Limits  |
|------------|-----------------------|------|----------|---------|
| 17060-07-0 | 1,2-Dichloroethane-D4 | 95%  | 94%      | 62-130% |
| 2037-26-5  | Toluene-D8            | 92%  | 95%      | 70-130% |
| 460-00-4   | 4-Bromofluorobenzene  | 102% | 98%      | 69-130% |

\* = Outside of Control Limits.

# Matrix Spike Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample     | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|------------|-----------|----|----------|----|-----------|------------|------------------|
| D57587-5MS | 7V26352.D | 5  | 05/08/14 | JL | n/a       | n/a        | V7V1448          |
| D57587-5   | 7V26350.D | 5  | 05/08/14 | JL | n/a       | n/a        | V7V1448          |

The QC reported here applies to the following samples:

Method: SW846 8260B

D57542-1, D57542-2

| CAS No. | Compound         | D57587-5<br>ug/l | Spike<br>Q | MS<br>ug/l | MS<br>% | Limits |
|---------|------------------|------------------|------------|------------|---------|--------|
|         | TPH-GRO (C6-C10) | 2170             | 11000      | 11700      | 87      | 19-168 |

| CAS No.    | Surrogate Recoveries  | MS   | D57587-5 | Limits  |
|------------|-----------------------|------|----------|---------|
| 17060-07-0 | 1,2-Dichloroethane-D4 | 90%  | 94%      | 62-130% |
| 2037-26-5  | Toluene-D8            | 96%  | 95%      | 70-130% |
| 460-00-4   | 4-Bromofluorobenzene  | 102% | 98%      | 69-130% |

\* = Outside of Control Limits.

# Duplicate Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample                    | File ID   | DF  | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---------------------------|-----------|-----|----------|----|-----------|------------|------------------|
| D57582-10DUP <sup>a</sup> | 7V26345.D | 100 | 05/08/14 | JL | n/a       | n/a        | V7V1448          |
| D57582-10 <sup>a</sup>    | 7V26344.D | 100 | 05/08/14 | JL | n/a       | n/a        | V7V1448          |

The QC reported here applies to the following samples:

Method: SW846 8260B

D57542-1, D57542-2

| CAS No.   | Compound         | D57582-10<br>ug/l | DUP<br>Q | DUP<br>ug/l | Q | RPD | Limits |
|-----------|------------------|-------------------|----------|-------------|---|-----|--------|
| 71-43-2   | Benzene          | 11700             |          | 11500       |   | 2   | 30     |
| 100-41-4  | Ethylbenzene     | 3470              |          | 3420        |   | 1   | 30     |
| 108-88-3  | Toluene          | 3050              |          | 2950        |   | 3   | 30     |
| 1330-20-7 | Xylene (total)   | 12400             |          | 12100       |   | 2   | 30     |
|           | TPH-GRO (C6-C10) | 65100             |          | 61900       |   | 5   | 30     |

| CAS No.    | Surrogate Recoveries  | DUP | D57582-10 | Limits  |
|------------|-----------------------|-----|-----------|---------|
| 17060-07-0 | 1,2-Dichloroethane-D4 | 91% | 94%       | 62-130% |
| 2037-26-5  | Toluene-D8            | 95% | 94%       | 70-130% |
| 460-00-4   | 4-Bromofluorobenzene  | 98% | 98%       | 69-130% |

(a) The pH of the sample aliquot for VOA analysis was >2 at time of analysis.

\* = Outside of Control Limits.

## GC Volatiles

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## QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

# Method Blank Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample    | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|-----------|-----------|----|----------|----|-----------|------------|------------------|
| GFB508-MB | FB11108.D | 1  | 05/08/14 | JS | n/a       | n/a        | GFB508           |

The QC reported here applies to the following samples:

Method: RSK175 MOD

D57542-1

| CAS No. | Compound | Result | RL      | MDL     | Units | Q |
|---------|----------|--------|---------|---------|-------|---|
| 74-82-8 | Methane  | ND     | 0.00080 | 0.00040 | mg/l  |   |
| 74-84-0 | Ethane   | ND     | 0.0016  | 0.00080 | mg/l  |   |
| 74-98-6 | Propane  | ND     | 0.0022  | 0.0011  | mg/l  |   |

7.1.1

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# Blank Spike Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample    | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|-----------|-----------|----|----------|----|-----------|------------|------------------|
| GFB508-BS | FB11109.D | 10 | 05/08/14 | JS | n/a       | n/a        | GFB508           |

The QC reported here applies to the following samples:

Method: RSK175 MOD

D57542-1

| CAS No. | Compound | Spike<br>mg/l | BSP<br>mg/l | BSP<br>% | Limits |
|---------|----------|---------------|-------------|----------|--------|
| 74-82-8 | Methane  | 0.51          | 0.608       | 119      | 70-130 |
| 74-84-0 | Ethane   | 0.956         | 1.04        | 109      | 70-130 |
| 74-98-6 | Propane  | 1.4           | 1.52        | 108      | 67-130 |

\* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample      | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|-------------|-----------|----|----------|----|-----------|------------|------------------|
| D57479-1MS  | FB11111.D | 10 | 05/08/14 | JS | n/a       | n/a        | GFB508           |
| D57479-1MSD | FB11112.D | 10 | 05/08/14 | JS | n/a       | n/a        | GFB508           |
| D57479-1    | FB11110.D | 1  | 05/08/14 | JS | n/a       | n/a        | GFB508           |

The QC reported here applies to the following samples:

Method: RSK175 MOD

D57542-1

| CAS No. | Compound | D57479-1<br>mg/l | Spike<br>Q<br>mg/l | MS<br>mg/l | MS<br>% | Spike<br>mg/l | MSD<br>mg/l | MSD<br>% | RPD | Limits<br>Rec/RPD |
|---------|----------|------------------|--------------------|------------|---------|---------------|-------------|----------|-----|-------------------|
| 74-82-8 | Methane  | 0.00040          | 0.51               | 0.512      | 100     | 0.51          | 0.511       | 100      | 0   | 51-155/30         |
| 74-84-0 | Ethane   | ND               | 0.956              | 0.893      | 93      | 0.956         | 0.897       | 94       | 0   | 58-130/30         |
| 74-98-6 | Propane  | ND               | 1.4                | 1.33       | 95      | 1.4           | 1.35        | 96       | 1   | 46-130/30         |

\* = Outside of Control Limits.

7.3.1  
 7

## GC Semi-volatiles

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### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

## Method Blank Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample    | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|-----------|-----------|----|----------|----|-----------|------------|------------------|
| OP9893-MB | FD31266.D | 1  | 05/13/14 | JS | 05/13/14  | OP9893     | GFD1503          |

The QC reported here applies to the following samples:

Method: SW846-8015B

D57542-1

| CAS No. | Compound          | Result | RL   | MDL  | Units | Q |
|---------|-------------------|--------|------|------|-------|---|
|         | TPH-DRO (C10-C28) | ND     | 0.20 | 0.18 | mg/l  |   |

| CAS No. | Surrogate Recoveries | Limits      |
|---------|----------------------|-------------|
| 84-15-1 | o-Terphenyl          | 50% 10-130% |

# Blank Spike Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample    | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|-----------|-----------|----|----------|----|-----------|------------|------------------|
| OP9893-BS | FD31268.D | 1  | 05/13/14 | JS | 05/13/14  | OP9893     | GFD1503          |

The QC reported here applies to the following samples:

Method: SW846-8015B

D57542-1

| CAS No. | Compound          | Spike mg/l | BSP mg/l | BSP % | Limits |
|---------|-------------------|------------|----------|-------|--------|
|         | TPH-DRO (C10-C28) | 5          | 1.67     | 33    | 33-130 |

| CAS No. | Surrogate Recoveries | BSP | Limits  |
|---------|----------------------|-----|---------|
| 84-15-1 | o-Terphenyl          | 46% | 10-130% |

8.2.1

8

\* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary

**Job Number:** D57542  
**Account:** WILLCOP WPX Energy Rocky Mountain, LLC  
**Project:** WWLCOGJ: GM 323-28 BWQ

| Sample     | File ID   | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|------------|-----------|----|----------|----|-----------|------------|------------------|
| OP9893-MS  | FD31270.D | 1  | 05/13/14 | JS | 05/13/14  | OP9893     | GFD1503          |
| OP9893-MSD | FD31272.D | 1  | 05/13/14 | JS | 05/13/14  | OP9893     | GFD1503          |
| D57451-13  | FD31274.D | 1  | 05/13/14 | JS | 05/13/14  | OP9893     | GFD1503          |

The QC reported here applies to the following samples:

Method: SW846-8015B

D57542-1

| CAS No. | Compound          | D57451-13<br>mg/l | Spike<br>Q<br>mg/l | MS<br>mg/l | MS<br>% | Spike<br>mg/l | MSD<br>mg/l | MSD<br>% | RPD   | Limits<br>Rec/RPD |
|---------|-------------------|-------------------|--------------------|------------|---------|---------------|-------------|----------|-------|-------------------|
|         | TPH-DRO (C10-C28) | ND                | 5                  | 2.32       | 46      | 5             | 1.20        | 24* a    | 64* b | 33-130/30         |

| CAS No. | Surrogate Recoveries | MS  | MSD | D57451-13 | Limits  |
|---------|----------------------|-----|-----|-----------|---------|
| 84-15-1 | o-Terphenyl          | 67% | 31% | 46%       | 10-130% |

(a) Outside control limits due to possible matrix interference.

(b) High RPD due to possible sample nonhomogeneity.

\* = Outside of Control Limits.

## Metals Analysis

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### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

QC Batch ID: MP12878  
Matrix Type: AQUEOUS

Methods: EPA 200.8  
Units: ug/l

Prep Date: 05/09/14

| Metal      | RL   | IDL   | MDL  | MB<br>raw | final |
|------------|------|-------|------|-----------|-------|
| Aluminum   | 50   | 1.1   | 2    |           |       |
| Antimony   | 0.40 | .0022 | .011 |           |       |
| Arsenic    | 0.20 | .017  | .044 |           |       |
| Barium     | 2.0  | .016  | .079 |           |       |
| Beryllium  | 0.20 | .016  | .069 |           |       |
| Boron      | 40   | .49   | 2.1  |           |       |
| Cadmium    | 0.10 | .036  | .042 |           |       |
| Calcium    | 400  | 5.6   | 12   |           |       |
| Chromium   | 2.0  | .053  | .053 |           |       |
| Cobalt     | 0.20 | .0049 | .015 |           |       |
| Copper     | 2.0  | .06   | .13  |           |       |
| Iron       | 10   | 3.5   | 4.6  |           |       |
| Lead       | 0.50 | .0079 | .008 |           |       |
| Magnesium  | 100  | 1.3   | 1.3  |           |       |
| Manganese  | 1.0  | .12   | .13  |           |       |
| Molybdenum | 1.0  | .049  | .029 |           |       |
| Nickel     | 2.0  | .0088 | .027 |           |       |
| Phosphorus | 60   | 2.6   | 4.3  |           |       |
| Potassium  | 200  | 2.9   | 2.9  |           |       |
| Selenium   | 0.40 | .06   | .21  | 0.059     | <0.40 |
| Silver     | 0.10 | .0019 | .008 |           |       |
| Sodium     | 500  | 4.9   | 4.9  |           |       |
| Strontium  | 20   | .01   | .015 |           |       |
| Thallium   | 0.20 | .0024 | .005 |           |       |
| Tin        | 10   | .063  | 1.3  |           |       |
| Titanium   | 2.0  | .059  | .092 |           |       |
| Uranium    | 0.20 | .0017 | .002 |           |       |
| Vanadium   | 1.0  | .037  | .2   |           |       |
| Zinc       | 10   | .21   | .96  |           |       |

Associated samples MP12878: D57542-1F

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

9.1.1  
9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D57542  
 Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
 Project: WWLCOGJ: GM 323-28 BWQ

QC Batch ID: MP12878  
 Matrix Type: AQUEOUS

Methods: EPA 200.8  
 Units: ug/l

Prep Date: 05/09/14

| Metal      | D57450-1F<br>Original MS | SpikeLot<br>ICPAL2 | % Rec | QC<br>Limits |
|------------|--------------------------|--------------------|-------|--------------|
| Aluminum   |                          |                    |       |              |
| Antimony   |                          |                    |       |              |
| Arsenic    | anr                      |                    |       |              |
| Barium     |                          |                    |       |              |
| Beryllium  |                          |                    |       |              |
| Boron      |                          |                    |       |              |
| Cadmium    | anr                      |                    |       |              |
| Calcium    |                          |                    |       |              |
| Chromium   | anr                      |                    |       |              |
| Cobalt     |                          |                    |       |              |
| Copper     | anr                      |                    |       |              |
| Iron       | anr                      |                    |       |              |
| Lead       | anr                      |                    |       |              |
| Magnesium  |                          |                    |       |              |
| Manganese  | anr                      |                    |       |              |
| Molybdenum |                          |                    |       |              |
| Nickel     | anr                      |                    |       |              |
| Phosphorus |                          |                    |       |              |
| Potassium  |                          |                    |       |              |
| Selenium   | 0.36                     | 205                | 200   | 102.3 70-130 |
| Silver     | anr                      |                    |       |              |
| Sodium     |                          |                    |       |              |
| Strontium  |                          |                    |       |              |
| Thallium   |                          |                    |       |              |
| Tin        |                          |                    |       |              |
| Titanium   |                          |                    |       |              |
| Uranium    |                          |                    |       |              |
| Vanadium   |                          |                    |       |              |
| Zinc       | anr                      |                    |       |              |

Associated samples MP12878: D57542-1F

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

9.1.2  
 9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D57542  
 Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
 Project: WWLCOGJ: GM 323-28 BWQ

QC Batch ID: MP12878  
 Matrix Type: AQUEOUS

Methods: EPA 200.8  
 Units: ug/l

Prep Date: 05/09/14

| Metal      | D57450-1F<br>Original MSD | SpikeLot<br>ICPAL2 | % Rec | MSD<br>RPD | QC<br>Limit |    |
|------------|---------------------------|--------------------|-------|------------|-------------|----|
| Aluminum   |                           |                    |       |            |             |    |
| Antimony   |                           |                    |       |            |             |    |
| Arsenic    | anr                       |                    |       |            |             |    |
| Barium     |                           |                    |       |            |             |    |
| Beryllium  |                           |                    |       |            |             |    |
| Boron      |                           |                    |       |            |             |    |
| Cadmium    | anr                       |                    |       |            |             |    |
| Calcium    |                           |                    |       |            |             |    |
| Chromium   | anr                       |                    |       |            |             |    |
| Cobalt     |                           |                    |       |            |             |    |
| Copper     | anr                       |                    |       |            |             |    |
| Iron       | anr                       |                    |       |            |             |    |
| Lead       | anr                       |                    |       |            |             |    |
| Magnesium  |                           |                    |       |            |             |    |
| Manganese  | anr                       |                    |       |            |             |    |
| Molybdenum |                           |                    |       |            |             |    |
| Nickel     | anr                       |                    |       |            |             |    |
| Phosphorus |                           |                    |       |            |             |    |
| Potassium  |                           |                    |       |            |             |    |
| Selenium   | 0.36                      | 198                | 200   | 98.8       | 14.6        | 20 |
| Silver     | anr                       |                    |       |            |             |    |
| Sodium     |                           |                    |       |            |             |    |
| Strontium  |                           |                    |       |            |             |    |
| Thallium   |                           |                    |       |            |             |    |
| Tin        |                           |                    |       |            |             |    |
| Titanium   |                           |                    |       |            |             |    |
| Uranium    |                           |                    |       |            |             |    |
| Vanadium   |                           |                    |       |            |             |    |
| Zinc       | anr                       |                    |       |            |             |    |

Associated samples MP12878: D57542-1F

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

9.1.2  
 9

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D57542  
 Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
 Project: WWLCOGJ: GM 323-28 BWQ

QC Batch ID: MP12878  
 Matrix Type: AQUEOUS

Methods: EPA 200.8  
 Units: ug/l

Prep Date: 05/09/14

| Metal      | BSP Result | Spikelot ICPALL2 | % Rec | QC Limits |
|------------|------------|------------------|-------|-----------|
| Aluminum   |            |                  |       |           |
| Antimony   |            |                  |       |           |
| Arsenic    | anr        |                  |       |           |
| Barium     |            |                  |       |           |
| Beryllium  |            |                  |       |           |
| Boron      |            |                  |       |           |
| Cadmium    | anr        |                  |       |           |
| Calcium    |            |                  |       |           |
| Chromium   | anr        |                  |       |           |
| Cobalt     |            |                  |       |           |
| Copper     | anr        |                  |       |           |
| Iron       | anr        |                  |       |           |
| Lead       | anr        |                  |       |           |
| Magnesium  |            |                  |       |           |
| Manganese  | anr        |                  |       |           |
| Molybdenum |            |                  |       |           |
| Nickel     | anr        |                  |       |           |
| Phosphorus |            |                  |       |           |
| Potassium  |            |                  |       |           |
| Selenium   | 214        | 200              | 107.0 | 85-115    |
| Silver     | anr        |                  |       |           |
| Sodium     |            |                  |       |           |
| Strontium  |            |                  |       |           |
| Thallium   |            |                  |       |           |
| Tin        |            |                  |       |           |
| Titanium   |            |                  |       |           |
| Uranium    |            |                  |       |           |
| Vanadium   |            |                  |       |           |
| Zinc       | anr        |                  |       |           |

Associated samples MP12878: D57542-1F

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

9.1.3  
 9

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

QC Batch ID: MP12880  
Matrix Type: AQUEOUS

Methods: EPA 200.7  
Units: ug/l

Prep Date: 05/09/14

| Metal      | RL   | IDL | MDL | MB<br>raw | final |
|------------|------|-----|-----|-----------|-------|
| Aluminum   | 100  | 8.6 | 11  |           |       |
| Antimony   | 30   | 3.2 | 21  |           |       |
| Arsenic    | 25   | 5.2 | 9   |           |       |
| Barium     | 10   | 1.4 | 1.4 | 0.10      | <10   |
| Beryllium  | 10   | .8  | 1.7 |           |       |
| Boron      | 50   | 6.7 | 6.6 | 0.20      | <50   |
| Cadmium    | 10   | .4  | .36 |           |       |
| Calcium    | 400  | 2.2 | 66  | 12.4      | <400  |
| Chromium   | 10   | .4  | 1.4 |           |       |
| Cobalt     | 5.0  | .4  | .51 |           |       |
| Copper     | 10   | 1.2 | 1.5 |           |       |
| Iron       | 10   | 2.2 | 3.2 | 3.3       | <10   |
| Lead       | 50   | 3.6 | 4.1 |           |       |
| Lithium    | 5.0  | 1.9 | 1.9 |           |       |
| Magnesium  | 200  | 14  | 29  | 2.8       | <200  |
| Manganese  | 5.0  | .01 | .29 | 0.0       | <5.0  |
| Molybdenum | 10   | .8  | 1.1 |           |       |
| Nickel     | 30   | .9  | .87 |           |       |
| Phosphorus | 100  | 15  | 24  |           |       |
| Potassium  | 1000 | 130 | 230 | 2.4       | <1000 |
| Selenium   | 50   | 8.8 | 9.3 |           |       |
| Silicon    | 50   | 5.2 | 5.6 |           |       |
| Silver     | 30   | .4  | .4  |           |       |
| Sodium     | 400  | 4.9 | 36  | 29.0      | <400  |
| Strontium  | 5.0  | .01 | .12 | 0.10      | <5.0  |
| Thallium   | 10   | 2.9 | 4.9 |           |       |
| Tin        | 50   | 13  | 13  |           |       |
| Titanium   | 10   | .15 | .43 |           |       |
| Uranium    | 50   | 3.7 | 3.9 |           |       |
| Vanadium   | 10   | .4  | .39 |           |       |
| Zinc       | 30   | .6  | 1.9 |           |       |

Associated samples MP12880: D57542-1F

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

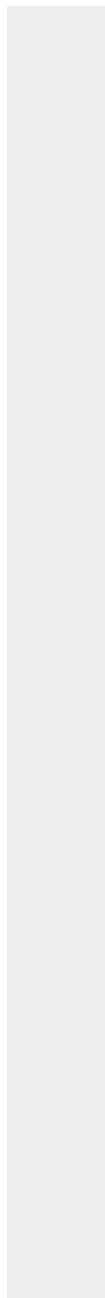
QC Batch ID: MP12880  
Matrix Type: AQUEOUS

Methods: EPA 200.7  
Units: ug/l

Prep Date: 05/09/14

| Metal | RL | IDL | MDL | MB<br>raw | final |
|-------|----|-----|-----|-----------|-------|
|-------|----|-----|-----|-----------|-------|

(anr) Analyte not requested



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D57542  
 Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
 Project: WWLCOGJ: GM 323-28 BWQ

QC Batch ID: MP12880  
 Matrix Type: AQUEOUS

Methods: EPA 200.7  
 Units: ug/l

Prep Date: 05/09/14

| Metal      | D57351-1F<br>Original MS |       | SpikeLot<br>ICPAL2 | % Rec | QC<br>Limits |
|------------|--------------------------|-------|--------------------|-------|--------------|
| Aluminum   |                          |       |                    |       |              |
| Antimony   |                          |       |                    |       |              |
| Arsenic    |                          |       |                    |       |              |
| Barium     | 62.2                     | 2090  | 2000               | 101.4 | 70-130       |
| Beryllium  |                          |       |                    |       |              |
| Boron      | 20.9                     | 1080  | 1000               | 105.9 | 70-130       |
| Cadmium    |                          |       |                    |       |              |
| Calcium    | 39100                    | 62100 | 25000              | 92.0  | 70-130       |
| Chromium   |                          |       |                    |       |              |
| Cobalt     |                          |       |                    |       |              |
| Copper     |                          |       |                    |       |              |
| Iron       | 14.5                     | 4950  | 5000               | 98.7  | 70-130       |
| Lead       |                          |       |                    |       |              |
| Lithium    |                          |       |                    |       |              |
| Magnesium  | 9590                     | 34200 | 25000              | 98.4  | 70-130       |
| Manganese  | 0.60                     | 490   | 500                | 97.9  | 70-130       |
| Molybdenum |                          |       |                    |       |              |
| Nickel     |                          |       |                    |       |              |
| Phosphorus |                          |       |                    |       |              |
| Potassium  | 1650                     | 27300 | 25000              | 102.6 | 70-130       |
| Selenium   |                          |       |                    |       |              |
| Silicon    |                          |       |                    |       |              |
| Silver     |                          |       |                    |       |              |
| Sodium     | 47600                    | 71900 | 25000              | 97.2  | 70-130       |
| Strontium  | 593                      | 1080  | 500                | 97.4  | 70-130       |
| Thallium   |                          |       |                    |       |              |
| Tin        |                          |       |                    |       |              |
| Titanium   |                          |       |                    |       |              |
| Uranium    |                          |       |                    |       |              |
| Vanadium   |                          |       |                    |       |              |
| Zinc       |                          |       |                    |       |              |

Associated samples MP12880: D57542-1F

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits

9.2.2  
 9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

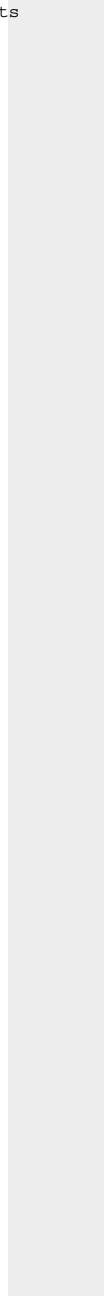
QC Batch ID: MP12880  
Matrix Type: AQUEOUS

Methods: EPA 200.7  
Units: ug/l

Prep Date: 05/09/14

| Metal | D57351-1F<br>Original MS | SpikeLot<br>ICPAL2 | % Rec | QC<br>Limits |
|-------|--------------------------|--------------------|-------|--------------|
|-------|--------------------------|--------------------|-------|--------------|

(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested



9.2.2  
9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D57542  
 Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
 Project: WWLCOGJ: GM 323-28 BWQ

QC Batch ID: MP12880  
 Matrix Type: AQUEOUS

Methods: EPA 200.7  
 Units: ug/l

Prep Date: 05/09/14

| Metal      | D57351-1F<br>Original MSD |       | SpikeLot<br>ICPAL2 % Rec |       | MSD<br>RPD | QC<br>Limit |
|------------|---------------------------|-------|--------------------------|-------|------------|-------------|
| Aluminum   |                           |       |                          |       |            |             |
| Antimony   |                           |       |                          |       |            |             |
| Arsenic    |                           |       |                          |       |            |             |
| Barium     | 62.2                      | 2160  | 2000                     | 104.9 | 3.3        | 20          |
| Beryllium  |                           |       |                          |       |            |             |
| Boron      | 20.9                      | 1100  | 1000                     | 107.9 | 1.8        | 20          |
| Cadmium    |                           |       |                          |       |            |             |
| Calcium    | 39100                     | 63400 | 25000                    | 97.2  | 2.1        | 20          |
| Chromium   |                           |       |                          |       |            |             |
| Cobalt     |                           |       |                          |       |            |             |
| Copper     |                           |       |                          |       |            |             |
| Iron       | 14.5                      | 5090  | 5000                     | 101.5 | 2.8        | 20          |
| Lead       |                           |       |                          |       |            |             |
| Lithium    |                           |       |                          |       |            |             |
| Magnesium  | 9590                      | 35000 | 25000                    | 101.6 | 2.3        | 20          |
| Manganese  | 0.60                      | 497   | 500                      | 99.3  | 1.4        | 20          |
| Molybdenum |                           |       |                          |       |            |             |
| Nickel     |                           |       |                          |       |            |             |
| Phosphorus |                           |       |                          |       |            |             |
| Potassium  | 1650                      | 28100 | 25000                    | 105.8 | 2.9        | 20          |
| Selenium   |                           |       |                          |       |            |             |
| Silicon    |                           |       |                          |       |            |             |
| Silver     |                           |       |                          |       |            |             |
| Sodium     | 47600                     | 74500 | 25000                    | 107.6 | 3.6        | 20          |
| Strontium  | 593                       | 1120  | 500                      | 105.4 | 3.6        | 20          |
| Thallium   |                           |       |                          |       |            |             |
| Tin        |                           |       |                          |       |            |             |
| Titanium   |                           |       |                          |       |            |             |
| Uranium    |                           |       |                          |       |            |             |
| Vanadium   |                           |       |                          |       |            |             |
| Zinc       |                           |       |                          |       |            |             |

Associated samples MP12880: D57542-1F

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits

9.2.2  
 9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

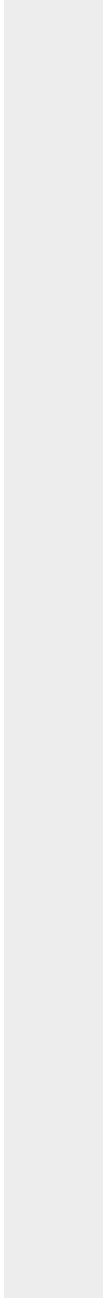
QC Batch ID: MP12880  
Matrix Type: AQUEOUS

Methods: EPA 200.7  
Units: ug/l

Prep Date: 05/09/14

| Metal | D57351-1F<br>Original MSD | SpikeLot<br>ICPAL2 | % Rec | MSD<br>RPD | QC<br>Limit |
|-------|---------------------------|--------------------|-------|------------|-------------|
|-------|---------------------------|--------------------|-------|------------|-------------|

(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested



9.2.2  
9

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D57542  
 Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
 Project: WWLCOGJ: GM 323-28 BWQ

QC Batch ID: MP12880  
 Matrix Type: AQUEOUS

Methods: EPA 200.7  
 Units: ug/l

Prep Date: 05/09/14

| Metal      | BSP Result | Spikelot ICPALL2 | % Rec | QC Limits |
|------------|------------|------------------|-------|-----------|
| Aluminum   |            |                  |       |           |
| Antimony   |            |                  |       |           |
| Arsenic    |            |                  |       |           |
| Barium     | 2060       | 2000             | 103.0 | 85-115    |
| Beryllium  |            |                  |       |           |
| Boron      | 1060       | 1000             | 106.0 | 85-115    |
| Cadmium    |            |                  |       |           |
| Calcium    | 25200      | 25000            | 100.8 | 85-115    |
| Chromium   |            |                  |       |           |
| Cobalt     |            |                  |       |           |
| Copper     |            |                  |       |           |
| Iron       | 5000       | 5000             | 100.0 | 85-115    |
| Lead       |            |                  |       |           |
| Lithium    |            |                  |       |           |
| Magnesium  | 25300      | 25000            | 101.2 | 85-115    |
| Manganese  | 504        | 500              | 100.8 | 85-115    |
| Molybdenum |            |                  |       |           |
| Nickel     |            |                  |       |           |
| Phosphorus |            |                  |       |           |
| Potassium  | 26000      | 25000            | 104.0 | 85-115    |
| Selenium   |            |                  |       |           |
| Silicon    |            |                  |       |           |
| Silver     |            |                  |       |           |
| Sodium     | 25900      | 25000            | 103.6 | 85-115    |
| Strontium  | 507        | 500              | 101.4 | 85-115    |
| Thallium   |            |                  |       |           |
| Tin        |            |                  |       |           |
| Titanium   |            |                  |       |           |
| Uranium    |            |                  |       |           |
| Vanadium   |            |                  |       |           |
| Zinc       |            |                  |       |           |

Associated samples MP12880: D57542-1F

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits

9.2.3  
 9

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

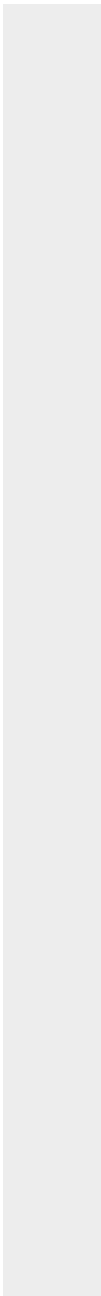
QC Batch ID: MP12880  
Matrix Type: AQUEOUS

Methods: EPA 200.7  
Units: ug/l

Prep Date: 05/09/14

| Metal | BSP<br>Result | Spikelot<br>ICPALL2 | % Rec | QC<br>Limits |
|-------|---------------|---------------------|-------|--------------|
|-------|---------------|---------------------|-------|--------------|

(anr) Analyte not requested



9.2.3  
9

## General Chemistry

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### QC Data Summaries

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Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

| Analyte                        | Batch ID        | RL     | MB Result | Units    | Spike Amount | BSP Result | BSP %Recov | QC Limits   |
|--------------------------------|-----------------|--------|-----------|----------|--------------|------------|------------|-------------|
| Alkalinity, Bicarbonate as CaC | GN24646         | 5.0    | 2.5       | mg/l     | 100          | 100        | 100.3      | 90-110%     |
| Alkalinity, Carbonate          | GN24647         | 5.0    | 0.0       | mg/l     | 100          | 100        | 100.3      | 80-120%     |
| Alkalinity, Total as CaCO3     | GN24645         | 5.0    | 2.5       | mg/l     | 100          | 100        | 100.3      | 90-110%     |
| Bromide                        | GP12530/GN24617 | 0.050  | 0.0       | mg/l     | 0.5          | 0.511      | 102.2      | 90-110%     |
| Chloride                       | GP12530/GN24617 | 0.50   | 0.0       | mg/l     | 5            | 4.74       | 94.8       | 90-110%     |
| Fluoride                       | GP12530/GN24617 | 0.10   | 0.0       | mg/l     | 1            | 1.03       | 103.0      | 90-110%     |
| Iron Reducing Bacteria         | MB365           | 25     | <25       | CFU/ml   |              |            |            |             |
| Nitrogen, Nitrate              | GP12530/GN24617 | 0.010  | 0.0       | mg/l     | 0.1          | 0.103      | 103.0      | 90-110%     |
| Nitrogen, Nitrite              | GP12530/GN24617 | 0.0040 | 0.0       | mg/l     | 0.05         | 0.0520     | 104.0      | 90-110%     |
| Phosphorus, Total              | GP12573/GN24694 | 0.010  | 0.0       | mg/l     | 0.38         | 0.37       | 97.1       | 80-120%     |
| Slime Forming Bacteria         | MB366           | 500    | <500      | CFU/ml   |              |            |            |             |
| Solids, Total Dissolved        | GN24686         | 10     | 0.0       | mg/l     | 400          | 399        | 99.8       | 90-110%     |
| Specific Conductivity          | GP12559/GN24682 |        |           | umhos/cm | 101          | 101        | 101.0      | 90-110%     |
| Sulfate                        | GP12530/GN24617 | 0.50   | 0.0       | mg/l     | 5            | 4.93       | 98.6       | 90-110%     |
| Sulfate Reducing Bacteria      | MB367           | 200    | <200      | CFU/ml   |              |            |            |             |
| pH                             | GN24623         |        |           | su       | 8.00         | 7.99       | 99.9       | 99.3-100.7% |

Associated Samples:

Batch MB365: D57542-1  
Batch MB366: D57542-1  
Batch MB367: D57542-1  
Batch GN24623: D57542-1  
Batch GN24645: D57542-1  
Batch GN24646: D57542-1  
Batch GN24647: D57542-1  
Batch GN24686: D57542-1  
Batch GP12530: D57542-1  
Batch GP12559: D57542-1  
Batch GP12573: D57542-1

(\* ) Outside of QC limits

10.1  
10

DUPLICATE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

| Analyte                    | Batch ID        | QC Sample | Units    | Original Result | DUP Result | RPD  | QC Limits |
|----------------------------|-----------------|-----------|----------|-----------------|------------|------|-----------|
| Alkalinity, Total as CaCO3 | GN24645         | D57430-4  | mg/l     | 501             | 503        | 0.4  | 0-20%     |
| Phosphorus, Total          | GP12573/GN24694 | D57458-1  | mg/l     | 0.017           | 0.019      | 11.1 | 0-20%     |
| Solids, Total Dissolved    | GN24686         | D57539-1  | mg/l     | 250             | 258        | 3.1  | 0-20%     |
| Specific Conductivity      | GP12559/GN24682 | D57452-1  | umhos/cm | 1150            | 1140       | 0.7  | 0-20%     |

Associated Samples:

Batch GN24645: D57542-1

Batch GN24686: D57542-1

Batch GP12559: D57542-1

Batch GP12573: D57542-1

(\*) Outside of QC limits

10.2  
10

MATRIX SPIKE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

| Analyte                    | Batch ID        | QC Sample | Units | Original Result | Spike Amount | MS Result | %Rec  | QC Limits |
|----------------------------|-----------------|-----------|-------|-----------------|--------------|-----------|-------|-----------|
| Alkalinity, Total as CaCO3 | GN24645         | D57409-1  | mg/l  | 961             | 100          | 380       | 88.4  | 80-120%   |
| Bromide                    | GP12530/GN24617 | D57520-2  | mg/l  | 0.0             | 0.5          | 0.52      | 104.0 | 80-120%   |
| Chloride                   | GP12530/GN24617 | D57520-2  | mg/l  | 1.5             | 5            | 6.3       | 96.0  | 80-120%   |
| Fluoride                   | GP12530/GN24617 | D57520-2  | mg/l  | 0.15            | 1            | 1.2       | 105.0 | 80-120%   |
| Nitrogen, Nitrate          | GP12530/GN24617 | D57520-2  | mg/l  | 0.044           | 0.1          | 0.15      | 106.0 | 80-120%   |
| Nitrogen, Nitrite          | GP12530/GN24617 | D57520-2  | mg/l  | 0.0             | 0.05         | 0.053     | 106.0 | 80-120%   |
| Phosphorus, Total          | GP12573/GN24694 | D57458-1  | mg/l  | 0.017           | 0.40         | 0.43      | 103.3 | 80-120%   |
| Sulfate                    | GP12530/GN24617 | D57520-2  | mg/l  | 8.1             | 5            | 13.2      | 102.0 | 80-120%   |

Associated Samples:

Batch GN24645: D57542-1

Batch GP12530: D57542-1

Batch GP12573: D57542-1

(\*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

MATRIX SPIKE DUPLICATE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D57542  
Account: WILLCOP - WPX Energy Rocky Mountain, LLC  
Project: WWLCOGJ: GM 323-28 BWQ

| Analyte                    | Batch ID        | QC Sample | Units | Original Result | Spike Amount | MSD Result | RPD | QC Limit |
|----------------------------|-----------------|-----------|-------|-----------------|--------------|------------|-----|----------|
| Alkalinity, Total as CaCO3 | GN24645         | D57409-1  | mg/l  | 961             | 100          | 381        | 0.2 | 20%      |
| Bromide                    | GP12530/GN24617 | D57520-2  | mg/l  | 0.0             | 0.5          | 0.52       | 0.0 | 20%      |
| Chloride                   | GP12530/GN24617 | D57520-2  | mg/l  | 1.5             | 5            | 6.3        | 0.0 | 20%      |
| Fluoride                   | GP12530/GN24617 | D57520-2  | mg/l  | 0.15            | 1            | 1.2        | 0.0 | 20%      |
| Nitrogen, Nitrate          | GP12530/GN24617 | D57520-2  | mg/l  | 0.044           | 0.1          | 0.15       | 0.0 | 20%      |
| Nitrogen, Nitrite          | GP12530/GN24617 | D57520-2  | mg/l  | 0.0             | 0.05         | 0.053      | 0.0 | 20%      |
| Phosphorus, Total          | GP12573/GN24694 | D57458-1  | mg/l  | 0.017           | 0.40         | 0.430      | 0.0 | 20%      |
| Sulfate                    | GP12530/GN24617 | D57520-2  | mg/l  | 8.1             | 5            | 13.2       | 0.0 | 20%      |

Associated Samples:

Batch GN24645: D57542-1

Batch GP12530: D57542-1

Batch GP12573: D57542-1

(\*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits