Comprehensive Investigation Report

Rose Rock Hudson Station
NE 90th Avenue South of Hudson Road
Stafford County, Kansas

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# Table of Contents

1.0 EXECUTIVE SUMMARY ........................................................................... 1

2.0 INTRODUCTION .................................................................................... 1

  2.1 Site Background ............................................................................... 1

  2.2 Purpose ........................................................................................... 2

3.0 HISTORY AND ENVIRONMENTAL SETTING ........................................ 2

  3.1 Site History ..................................................................................... 2

  3.2 Site Environmental Setting .............................................................. 3

  3.3 Human Health and Environmental Receptors .................................. 3

4.0 HISTORICAL INVESTIGATIONS .......................................................... 5

5.0 CI FIELD PROTOCOLS AND SCOPE OF WORK ................................ 6

  5.1 Soil Sampling .................................................................................. 6

  5.2 Groundwater Sampling .................................................................. 7

  5.3 Quality Assurance Samples ............................................................ 8

6.0 INVESTIGATION RESULTS ................................................................. 8

  6.1 Soil Sample Results ........................................................................ 8

    6.1.1 Field-Screening ....................................................................... 8

    6.1.2 LRH ....................................................................................... 9

    6.1.3 MRH .................................................................................... 9

    6.1.4 HRH .................................................................................... 9

  6.2 Groundwater Sample Results ......................................................... 9

    6.2.1 LRH ..................................................................................... 9

    6.2.2 MRH .................................................................................. 10

    6.2.3 HRH .................................................................................. 10

  6.3 Data Quality Assessment ............................................................... 10

7.0 NATURE AND EXTENT OF CONTAMINATION ................................... 11

8.0 CONTAMINANT FATE AND TRANSPORT ........................................ 12

9.0 PRELIMINARY SCREENING OF REMEDIAL ACTIONS ..................... 13

10.0 CONCLUSION AND RECOMMENDATIONS ..................................... 14

  10.1 Comprehensive Investigation Conclusions .................................... 14

  10.2 Recommendations for Future Actions .......................................... 14
FIGURES
Figure 1A  Topographic Map
Figure 1B  Aerial Photograph Map
Figure 2  Site Aerial Photograph Map
Figure 3  Sample Locations & Site Features Map
Figure 4  Soil TPH Concentration Map
Figure 5  Groundwater TRP Concentration Map
Figure 6  Groundwater Flow Map

TABLES
Table 1  Sampling Program Summary
Table 2  Well Construction Detail & Groundwater Level Data
Table 3  Soil Sample Analytical Results
Table 4  Groundwater & Water Sample Analytical Results

APPENDICES
Appendix A  Photographs
Appendix B  Water Well Records
Appendix C  Probe / Well / Field Logs & WWC-5 Forms
Appendix D  Laboratory Report
Appendix E  Survey Report
1.0 EXECUTIVE SUMMARY

The site is a crude oil gathering and storage facility in rural Stafford County, Kansas, currently operated by Rose Rock Midstream Crude, L.P. (Rose Rock). Approximately 50 barrels of crude oil were released at the site in 2007. This release was remediated by landfarming impacted soil onsite. In 2009, a Kansas Department of Health and Environment (KDHE) site inspection found indications of possible prior releases and incomplete remediation of the 2007 release. A Preliminary Investigation (PI) in 2011 identified local impact to soil by Total Petroleum Hydrocarbons (TPH) exceeding Tier 2 Risk-based Standards for Kansas levels (RSKs). The KDHE's analysis of split PI samples indicated that groundwater was also impacted by TPH. A Comprehensive Investigation (CI) was conducted in 2017, which included analysis of soil and groundwater samples for TPH as low-range, mid-range, and high-range hydrocarbons (LRH, MRH, HRH). CI results indicate that soil (principally in the landfarm area) is impacted by MRH at concentrations exceeding the RSK for residential groundwater protection, and that groundwater is impacted by MRH (possibly sourced from the landfarm) at concentrations exceeding the RSK for residential groundwater. However, LRH, MRH, and HRH concentrations in soil and groundwater are below non-residential RSKs. Based on the low concentration and limited extent of residual contamination, and current and likely future non-residential use of the site and the adjacent down-gradient property, it is recommended that the site be considered eligible for reclassification with "resolved" status.

2.0 INTRODUCTION

2.1 Site Background

The site is an approximate 13.1-acre property in the W ½ NW ¼ of Section 31, Township 22 South, Range 11 West of the Sixth Principal Meridian, in Stafford County, Kansas, approximately four miles east-southeast of the town of Hudson, on the east side of NE 90th Avenue, approximately 0.2 mile south of Hudson Road. Figure 1A shows the site location on the United States Geological Survey (USGS) Hudson SE, Kansas 7.5 Minute Series Topographic Quadrangle Map. Figure 1B depicts the site and surrounding area on a color aerial photograph. Figure 2 is a color Site Aerial Photograph Map.

The site is developed with a crude oil gathering and storage facility operated by Rose Rock. Figure 3 is a Site Features Map. The facility includes one 55,000 barrel (bbl) floating-roof
crude oil aboveground storage tank (AST), two 20,000 bbl floating-roof crude oil ASTs, seven smaller ASTs (four 400 bbl ASTs operated by MV Purchasing, two 400 bbl ASTs operated by Rose Rock Field Services, and one 500 bbl AST operated by Blueknight Energy Partners [BKEP]), several storage buildings, and above-ground piping and metering equipment. Most of the area surrounding the site is treeless rangeland, with scattered crop fields, rural residences, and farm buildings. The area east of the site is an oil field with a number of producing oil wells and tank batteries.

A crude oil release occurred at the site in 2007. Impacts to soil and groundwater attributable to this release (and possibly also to historical releases) were investigated in 2011, but with inconclusive results regarding the extent and magnitude of impacts to soil and groundwater. Additional historical information is provided in Sections 3.0 and 4.0.

2.2 Purpose

The purpose of this report is to describe and document the Comprehensive Investigation (CI) conducted at the site in 2017 by Terracon Consultants, Inc. (Terracon) on behalf of Rose Rock. The purpose of the CI was to assess the extent and magnitude of impacts to site soil and groundwater by total petroleum hydrocarbons (TPH) so that appropriate future actions might be recommended.

3.0 HISTORY AND ENVIRONMENTAL SETTING

3.1 Site History

The site facility was reportedly constructed in 1934, and has had several owners and operators prior to Rose Rock, including Skelly Oil Company (later part of Getty Oil Company), Texaco, Equilon, SemGroup, and SemCrude, L.P. As will be discussed in greater detail in Section 4.0, a crude oil release occurred onsite in 2007. This release was reported to the KDHE, and remedial action was taken. However, a site visit by the KDHE in 2009 found indications of prior crude oil releases and incomplete remediation of the 2007 release.

To address these concerns, SemCrude, L.P. (SemCrude) entered into a Consent Agreement with the KDHE in 2010, and conducted a KDHE Preliminary Investigation (PI) in 2011. The PI identified areas of near-surface soil impact by Total Petroleum Hydrocarbons Gasoline-range Organics and Diesel-range Organics (TPH GRO and DRO). TPH GRO and TPH DRO concentrations in soil locally exceeded KDHE Tier 2 Risk-based Standards for Kansas (RSKs) for residential scenarios. The PI did not identify impact to shallow groundwater. However, the KDHE’s analysis of split PI groundwater samples indicated impact to shallow groundwater by both TPH GRO and TPH DRO.
Due in part to the discrepancy in split PI sample results, the KDHE requested additional site investigation. As successor to SemCrude L.P., Rose Rock elected to conduct a Comprehensive Investigation (CI) under the KDHE State Cooperative Program. Terracon Consultants, Inc. (Terracon) prepared a CI Work Plan on behalf of Rose Rock dated December 7, 2016, which was approved by the KDHE by letter dated April 6, 2016. The CI was conducted by Terracon in February 2017.

3.2 Site Environmental Setting

All of Stafford County lies within the Great Bend Prairie subdivision of the Great Plains Physiographic Province. The Great Bend Prairie is an alluvial plain, covered by sand and locally molded by wind into dune topography. The Great Bend Prairie is, in general, poorly drained; precipitation tends to collect in numerous small basins, where it evaporates or percolates into the ground.

As shown in Figure 1, the site is situated on an alluvial plain of low topographic relief, which is drained by small intermittent streams and dotted by low mounds and shallow depressions (dune topography). The surface of the alluvial plain slopes gently south-southeast toward Rattlesnake Creek, about 0.5 mile south of the site. Rattlesnake Creek meanders east-northeast and discharges to Little Salt Marsh, about four miles east of the site.

The site area is underlain by Pleistocene to Recent-age alluvial deposits consisting generally of unconsolidated, interbedded lenses of gravel, sand, silt and clay. Shallow groundwater in the site area is generally about 10 feet or less below ground surface (bgs). Previous site investigations and logs of water wells onsite and near the site indicate that the uppermost part of the shallow aquifer in the site area is a thin layer of sand overlying an approximate 30 feet-thick clay layer, which is underlain by sand and gravel. Overall shallow groundwater flow direction in the site area is reported to be eastward, following the course of Rattlesnake Creek.

The Pleistocene to Recent-age alluvial deposits directly overlie Permian-age bedrock, which does not crop out in Stafford County. Based on a few deep borehole penetrations near the site and outcrops in nearby counties, Permian-age bedrock (not identifiable to formation) likely consists of red silty shale, siltstone and sandstone, and may include layers of salt, gypsum, anhydrite, limestone, and dolomite. Depth to bedrock beneath the site is likely greater than 100 feet based on logs of deep borings located within a few miles of the site. Permian-age bedrock reportedly yields little to no water to wells in Stafford County.

3.3 Human Health and Environmental Receptors

To identify possible receptors for site contaminants, Terracon observed the site and surrounding area during CI field activities, reviewed Google Earth aerial photographs of the
Comprehensive Investigation Report
Rose Rock Hudson Station n Stafford County, Kansas
October 26, 2017 n Terracon Project No. 01167141

site and surrounding area, and reviewed Kansas Geological Survey (KGS) records of registered water wells reportedly located within a one-mile radius of the site.

Terracon's field observations indicate that the site is non-residential. Public access is restricted by fencing and locked gates. The site has one water supply well owned by Rose Rock. The well has no dedicated pump and is not currently utilized by Rose Rock or others. Properties adjoining the site to the east, south, and west are rangeland without obvious inhabited structures. The north-adjacent property appears to include a rural residence. Photographs of the site and adjoining properties are included in Appendix A.

Google Earth aerial photographs dated 1991 to 2015 show that the site and surrounding area have changed little over the last 26 years. Figure 2B shows land use and other features within an approximate one-mile radius of the site. As shown in Figure 2B, the site surroundings are rural, with extensive areas of open rangeland crossed by small meandering drainages. Within the one-mile radius area, there are a few areas that appear to be utilized at times as crop fields, and three apparent homesites or farm building sites. The nearest apparent homesite adjoins the site on the north. The only other apparent residential properties are approximately 0.5 mile northwest and 0.5 mile north of the site. A large part of the southeastern half of the one-mile radius area is an oil field with at least 22 pumping units and 13 batteries of oilfield storage tanks readily identifiable in aerial photographs.

A review of KGS online water well records identified records of 26 registered water wells with KGS-plotted locations within a one-mile radius of the site. These wells are shown in Figure 1B at the approximate locations plotted by the KGS online interactive mapping system. Copies of KGS well records for these wells are included in Appendix B. The identified wells are categorized as follows:

- 13 oilfield water supply wells
- 1 water supply well owned by Rose Rock (located onsite)
- 3 monitoring wells owned by Magellan Midstream Partners
- 1 irrigation well
- 6 stock wells
- 2 domestic wells

The two domestic wells are plotted by the KGS approximately 0.5 mile to almost one mile northwest (up-gradient) of the site. One of these wells ("Danny Gatton") appears to be connected with a homesite or farm building site, while the other ("Jim Logue") is plotted about 0.5 mile from the nearest obvious building. The wells plotted generally down-gradient from the site are stock wells and oilfield water supply wells. Oilfield water supply wells are generally temporary, though some of the identified wells are reported as jointly owned by oil companies and local landowners, and may have been preserved for later use as stock wells. The nearest
stock wells generally down-gradient from the site are more than 0.5 mile from the site as plotted by the KGS.

The onsite water supply well record indicates that this well is screened from 50 to 70 feet bgs, with a bentonite grout seal to 20 feet bgs. The grout seal extends 8 feet into a 31 feet-thick clay layer, which isolates the well’s screened interval from the uppermost part of the shallow aquifer.

### 4.0 HISTORICAL INVESTIGATIONS

A Phase I Environmental Site Assessment (ESA) of the site was conducted by HBC Engineering, Inc. (HBC) in 2001. The Phase I ESA found minor surficial oil staining onsite (reportedly connected with daily operations), and an area of the site which may have been used historically to landfarm tank bottoms.

On April 12, 2007, an estimated 50 bbl of crude oil were released onto the ground surface onsite due to a piping failure. Part of the oil ran onto rangeland east of the site. The apparent offsite extent of the release (based on a June 2008 aerial photograph) is shown in Figure 3. Impacted soil was landfarmed onsite (the reported landfarm location is shown in Figure 3), and the file for the April 2007 release was “closed” by the KDHE on July 16, 2008.

On October 7, 2009, KDHE representatives conducted a site visit, and noted oil-stained soil and possible indications of landfarming onsite prior to the 2007 release. SemCrude entered into a Consent Agreement with the KDHE in September 2010. A PI was conducted on October 5, 2011, by Southwest Geoscience, which prepared a Preliminary Investigation Report dated November 23, 2011. The PI included nine direct-push probes (TSW-1 through TSW-9), surface and sub-surface soil sampling, field-screening of soil samples using a photoionization detector (PID), laboratory analysis of one soil sample from each probe, and laboratory analysis of four surface soil samples. Temporary shallow monitoring wells were also installed and later plugged. The soil probe and groundwater samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), TPH GRO, and TPH DRO. Three surface soil samples were also analyzed for these parameters. The fourth surface soil sample was analyzed for mercury.

PI laboratory analyses did not identify BTEX constituents or mercury at concentrations above laboratory reporting limits. TPH GRO and TPH DRO were reported in the soil sample collected from TSW-4. The TPH GRO concentration reported for this sample (282 milligrams per kilogram [mg/kg]) exceeded KDHE Tier 2 RSKs then in effect for the soil and groundwater protection pathways in residential scenarios. The TPH DRO concentration (2,840 mg/kg) exceeded the soil pathway RSK for residential scenarios, but did not exceed non-residential RSKs. TPH DRO was detected in the three surface soil samples analyzed, at concentrations that ranged from 5,100 mg/kg to 12,500 mg/kg. These concentrations exceeded residential
soil RSKs. TPH GRO was detected at a low concentration (30.1 mg/kg, below RSKs) in one of the two surface soil samples collected in the landfarm area. Analysis of groundwater samples did not find BTEX, TPH GRO, or TPH DRO at concentrations above laboratory reporting limits.

The KDHE noted in a letter dated January 11, 2012, that its analyses of split PI groundwater samples yielded different results from those reported by HBC. TPH DRO was reported by KDHE at a concentration of 720 micrograms per liter (µg/L) in the split TSW-4 groundwater sample, and TPH DRO was reported at a concentration of 560 µg/L in the split TSW-8 groundwater sample. TPH GRO was detected in the split TWS-4 groundwater sample at concentration of 150 µg/L. A split TSW-4 soil sample also yielded a higher TPH GRO result. Due in part to these discrepancies, the KDHE requested additional investigation. An Interim Measures Work Plan was prepared for the site, which was to have included additional remediation of the 2007 release area. The Interim Measure was planned for 2014, but was not implemented.

5.0 CI FIELD PROTOCOLS AND SCOPE OF WORK

5.1 Soil Sampling

The CI included collection of soil cores using a direct-push probe (Geoprobe) machine and dual-tube sampling methodology. Soil cores were collected at 10 locations (P-1 through P-10) from ground surface to the top of the saturated zone. Table 1 summarizes the soil samples collected, field-screened and analyzed.

As shown in Figure 3, several CI soil probes were located in the same general areas sampled during the PI in 2011, but others were located in areas not previously investigated. No significant deviations from KDHE-approved planned soil probe locations were necessary.

Each soil core was logged for texture, color, and visual and olfactory indications of impact by an experienced field geologist. Probe logs field logs are provided in Appendix C. Discrete soil samples were collected for field-screening and laboratory analysis from 0 to 2 feet bgs at each location. At half of the locations (P-4, P-7, P-8, P-9, and P-10), the unsaturated zone was sufficiently thick to allow collection of a second discrete soil sample, from 2 to 4 feet bgs. At the remaining locations, the depth to very moist or groundwater-saturated materials was less than 4 feet, and only one soil sample was collected.

Part of each soil sample was field-screened for volatile organic compound (VOC) vapors using a Rae Systems MiniRAE LITE PID with 10.6 electron-volt (eV) lamp. The remaining part of each soil sample was placed into labeled, laboratory-provided glassware for offsite laboratory analysis of low-range, mid-range, and high-range hydrocarbons (LRH, MRH, and HRH) per Kansas Modified Test Methods 8260 and 8015. LRH, MRH, and HRH are the TPH fractions.
recognized under KDHE Policy #BER-041 published September 1, 2015. LRH is the general equivalent of TPH GRO, while the MRH and HRH fractions were formerly reported as part of TPH DRO. One additional sample was collected from the P-8 (2 to 4 feet) sample for "blind" duplicate laboratory analysis. Soil samples were shipped on ice under chain-of-custody procedures to the Pace Analytical Services, Inc. (Pace) laboratory in Lenexa, Kansas for analysis.

5.2 Groundwater Sampling

The CI included collection of groundwater samples from five new monitoring wells (MW-1 through MW-5) and collection of one groundwater sample from Rose Rock's onsite water supply well. Table 1 summarizes the groundwater samples collected and analyzed. The locations of the monitoring wells and the site water supply well are shown in Figure 3.

As shown in Figure 3, the five monitoring well locations coincide with soil probe locations P-4, P-5, P-6, P-7, and P-8. The monitoring wells were installed using a direct-push probe machine equipped with 4 ¼ inch inside diameter (8 ¼ inch outside diameter) hollow-stem augers (HSA). At each location, HSA fitted with a bottom plug were used to over-drill the soil probe to a depth of approximately 13 feet. Auger cuttings were not sampled while over-drilling soil probes.

Monitoring well construction details and the Water Well Completion Records (Forms WWC-5) are included in Appendix C. Water well construction details are summarized in Table 2. To construct each monitoring well, 10 feet of 2-inch diameter 0.01-inch machine-slotted PVC screen with a bottom point and 2-inch diameter PVC riser were emplaced in the HSA, and 10/20 grade silica sand was emplaced around the screen while gradually withdrawing the HSA. Sand was added to cover the screen, and a seal of hydrated bentonite chips (about 1.7 feet thick) was added on top of the sand. Construction of wells with less than 20 feet of grout, or with grout less than 5 feet into the first clay or shale layer, is permitted by the KDHE without written waiver of K.A.R. 28-30-6 (b), where compliance cannot be achieved due to a shallow water table.

MW-1, MW-3, MW-4, and MW-5 were each completed approximately flush to grade with 7-inch diameter cast iron manholes with 10-inch deep steel skirts set in approximate two-feet square concrete pads. Each of these monitoring wells is located in an area that does or may receive traffic. At-grade surface completions in trafficked areas are currently permitted by the KDHE without written waiver of K.A.R. 28-30-6 (s). MW-2, located inside a storage tank containment area, was completed in compliance with K.A.R. 28-30-6 (s) with a 4-inch square above-grade steel protector with lockable hinged cap, set in a two-feet square concrete pad.

Each newly installed monitoring well was developed by purging at least five well volumes using an electric submersible pump, while surging the pump to promote removal of fines.
Purge volumes are summarized in Table 2. Purged groundwater was filtered through granular activated carbon (GAC) prior to discharge to the ground surface onsite.

Following well development, groundwater samples were collected from each monitoring well using dedicated plastic bailers. The samples were placed in labeled, laboratory-provided glassware for offsite laboratory analysis of LRH, MRH, and HRH. One additional groundwater sample was collected from MW-5 sample for “blind” duplicate laboratory analysis.

The site water supply well was sampled from the approximate screen-midpoint using a 4-inch diameter HydraSleeve no-purge sampler. Use of the HydraSleeve sampler was a KDHE-approved deviation from the sampling methodology included in the Comprehensive Investigation Work Plan. The deviation was allowed as a means of collecting a groundwater sample while minimizing the volume of waste groundwater generated.

Groundwater samples were shipped with a laboratory-provided Trip Blank on ice under chain-of-custody procedures to the Pace laboratory in Lenexa, Kansas for analysis.

5.3 Quality Assurance Samples

One soil sampling equipment rinsate (Rinsate 1) was collected on the first day of the field investigation, and one groundwater sampling equipment rinsate (Rinsate 2) was collected on the second day of the field investigation. Equipment rinsate samples were collected by pouring bottled spring water or distilled water over items of cleaned sampling equipment. One laboratory provided water matrix Trip Blank was present in the sample cooler containing water samples during and after the field investigation. The equipment rinsate samples and Trip Blank were submitted with the other CI samples to Pace for analysis of LRH, MRH, and HRH.

6.0 INVESTIGATION RESULTS

6.1 Soil Sample Results

A copy of the laboratory report is included in Appendix D. Table 2 summarizes soil sample field-screening and laboratory analytical data. Field-screening data are also included in the Probe Logs in Appendix C.

6.1.1 Field-Screening

PID readings were generally 0.0 part per million (ppm). Soil samples from P-4 and P-10 yielded PID readings <1 ppm; PID readings ≤1 ppm are often a result of the instrument’s response to sample moisture. The single soil sample that yielded a PID reading elevated
significantly above 1 ppm was the P-8 (2 to 4 feet) sample (102.6 ppm). P-8 was located in or near the historical landfarm area, as its extent has been indicated in prior reports.

6.1.2 LRH

LRH was not detected in the soil samples at concentrations above laboratory reporting limits.

6.1.3 MRH

MRH was detected at low concentrations (11.1 mg/kg to 16.5 mg/kg) in two soil samples, from P-6 and P-7, and at higher concentrations (42.6 mg/kg to 192 mg/kg) in four soil samples, from P-8 and P-10. As shown in Figure 4, the area of elevated MRH concentrations in soil generally coincides with the historical landfarm area, and with an area southeast of the landfarm along the east-central margin of the site. The three soil samples (including the “blind” duplicate sample) from P-8 each had MRH concentrations that exceeded the Tier 2 RSK for the soil-to-groundwater protection pathway in residential scenarios (50 mg/kg). The duplicate sample result for the P-8 (2 to 4 feet) interval also exceeded the non-residential soil-to-groundwater protection RSK (150 mg/kg). However, the residential soil pathway RSK (250 mg/kg) was not exceeded.

6.1.4 HRH

HRH was widely detected in soil samples, at concentrations that ranged from 9.9 mg/kg to 765 mg/kg. Residential RSKs for HRH were not exceeded. The highest HRH concentrations were for samples collected from P-4, P-6, P-8, and P-10. The areas of elevated HRH concentrations are similar to the areas of elevated MRH concentrations (see Figure 4).

6.2 Groundwater Sample Results

A copy of the laboratory report is included in Appendix D. Table 4 summarizes the groundwater sample laboratory analytical data, as well as the equipment rinsate and Trip Blank analytical data.

6.2.1 LRH

LRH was detected in groundwater at a single location, MW-1, at a concentration of 0.13 milligram per liter (mg/L). The Tier 2 RSK for LRH in groundwater in residential scenarios (0.35 mg/L) was not exceeded.
6.2.2 MRH

MRH was detected in groundwater samples collected from four locations, at concentrations ranging from 0.084 mg/L to 0.21 mg/L. The Tier 2 RSK for MRH in groundwater in residential scenarios (0.15 mg/L) was exceeded in the sample from MW-4 (0.20 mg/L) and in the two samples (primary and “blind” duplicate) collected from MW-5 (0.21 mg/L and 0.19 mg/L, respectively). The MRH RSK for groundwater in non-residential scenarios (0.4 mg/L) was not exceeded. As shown in Figure 5, the area of elevated MRH concentrations in shallow groundwater is directly south-southeast of the historical landfarm area.

6.2.3 HRH

HRH was detected in the primary groundwater sample from MW-5 at a concentration of 0.24 mg/L, slightly above the laboratory reporting limit (0.19 mg/L), but was not detected in the MW-5 “blind” duplicate sample. The HRH concentration reported for the primary MW-5 sample is considerably less than the Tier 2 RSK for HRH in residential scenarios (1 mg/L).

6.3 Data Quality Assessment

To assess laboratory analytical data quality, Terracon reviewed sample chain-of-custody documentation, Pace’s sample receipt documentation and quality control data (see laboratory report, Appendix D), results of laboratory Trip Blank analysis, equipment rinsate sample analyses, and “blind” duplicate sample analyses.

The chain-of-custody document shows that the CI samples were released from Terracon’s custody on February 22, 2017. The chain-of-custody document and Pace’s Sample Condition Upon Receipt document show that the samples were delivered to Pace’s Lenexa, Kansas laboratory by Pace’s overland courier on February 22, in two coolers, on ice, with intact custody seals. Cooler temperatures (corrected) were within Pace’s 0° to 6° Celsius acceptable temperature range. A laboratory Trip Blank was noted to have been shipped with water-matrix volatile organic analysis (VOA) vials. Sample conformance issues were not identified by Pace. The samples were analyzed within prescribed holding times.

Pace analyzed one to two Method Blanks, Laboratory Control Samples (LCS), LCS Duplicates (LCDS), Matrix Spike (MS) and Matrix Spike Duplicates (MSD) for each matrix and analytical method, and also spiked each sample with one or more TPH surrogate chemicals. LRH, MRH, and HRH were not detected in the Method Blanks. LRH, MRH, and HRH recoveries for LCS were within quality control limits. Relative Percent Difference (RPD) between LCS and LCSD results were within quality control limits. Recoveries of MRH and HRH in one water matrix MS (prepared from the Duplicate 1 sample) exceeded quality control limits; however, recoveries of MRH and HRH in the MSD were within acceptable limits. The RPD for HRH between the MS and MSD exceeded quality control limits. Pace “flagged” these data and the Duplicate 1
sample data with data qualifiers. MRH / HRH surrogate recoveries for the MW-1, MW-2, and MW-3 groundwater samples were less than the quality control lower limit. Pace flagged the results for these samples with a data qualifier, noting that the results were due to matrix interference.

LRH, MRH, and HRH were not detected in the Trip Blank or in the two equipment rinsate samples at concentrations above laboratory reporting limits.

The results of analysis of the "blind" duplicate soil sample (P-8, 2 to 4 feet, see Table 3) were identical for LRH (not detected above reporting limits of 25.8 mg/kg to 26.9 mg/kg). However, the primary sample / duplicate soil sample results for MRH and HRH were dissimilar. The RPD between the MRH results was 70%, while the RPD between HRH results was 46%. The Quality Assurance Project plan (QAPP) RPD goal for soil matrix samples (30%) was not achieved for MRH or HRH.

The results of analysis of the "blind" duplicate groundwater sample (MW-5 / Duplicate 1, see Table 4) were identical for LRH (not detected above reporting limit of 0.05 mg/L) and similar for MRH (10% RPD). HRH was detected in the MW-5 sample at 0.24 mg/L, while HRH was not detected in Duplicate 1 above a reporting limit of 0.19 mg/L (RPD >23%). The QAPP RPD goal for water matrix samples (20%) was achieved for LRH and MRH, but slightly exceeded for HRH.

The laboratory data quality is acceptable, though some analytical imprecision (likely due to soil inhomogeneity) is suggested for MRH and HRH soil data.

### 7.0 NATURE AND EXTENT OF CONTAMINATION

Based on the CI results, LRH is not a significant contaminant in site soil or groundwater. LRH was not detected in the CI soil samples above reporting limits, and was detected in a single groundwater sample at a concentration less than the residential RSK.

MRH was detected in soil at three locations: one in or near the historical landfarm area, and two south-southeast of the landfarm area. The highest MRH soil concentrations were for samples collected at P-8 / MW-5, in or near the landfarm area. Soil-to-groundwater protection pathway RSKs for MRH were exceeded at P-8 / MW-5. MRH was also the most widely identified groundwater contaminant. MRH concentrations in groundwater appear to be highest immediately south-southeast of the landfarm area. The highest MRH concentrations in groundwater (0.20 mg/L to 0.21 mg/L) exceed the MRH RSK for residential scenarios (0.15 mg/L) but are about half the MRH RSK for non-residential scenarios (0.4 mg/L).
HRH is broadly distributed in site soil, but at concentrations significantly less than residential RSKs. HRH was detected in a single groundwater sample (from MW-8, in or near the landfarm area), at a concentration significantly less than the residential RSK.

### 8.0 CONTAMINANT FATE AND TRANSPORT

The contaminants of concern are the TPH fractions LRH, MRH, and HRH. Evaluation of fate and transport of these contaminants at the site is based on readily available site historical and physical setting information, TPH fate and transport information included in the United States Agency for Toxic Substances and Disease Registry (ASTDR) *Toxicological Profile for Total Petroleum Hydrocarbons* (1999), CI results, and other information sources as cited.

Per ASTDR, bulk oil products (including crude oil) released to the environment infiltrate soil through gravitational movement and capillary action. Rates of infiltration vary with product composition and viscosity, soil texture, soil moisture, topography, vegetation, and other factors. The sandy texture of site soil and flatness of the local terrain are factors that would likely tend to promote bulk oil infiltration of soil, while the generally viscous character of crude oil (relative to refined petroleum products) would likely tend to retard infiltration.

Individual hydrocarbons also separate from bulk oil products in soil. Separated hydrocarbons may volatilize, dissolve in soil water, or sorb to soil particles. Light hydrocarbons (including LRH and MRH) volatilize, while heavy hydrocarbons (including HRH) do not. Volatilization rates vary with factors such as soil temperature, soil texture, soil moisture, wind, and solar radiation. The sandy texture of site soil and openness of the site to wind and sun are factors that would likely tend to promote volatilization. General non-detection of LRH in site soil may be due to volatilization, or may reflect a low initial LRH concentration in the crude oil released at the site.

Hydrocarbon solubility in soil water generally decreases with increasing molecular weight, while soil sorption potential increases with increasing molecular weight. Light hydrocarbons (LRH and MRH) are expected to more readily dissolve in soil water, while heavy hydrocarbons (HRH) are expected to sorb to soil particles. The sandy texture of site soils and shallow depth to groundwater are factors that would likely tend to promote migration of LRH and MRH to groundwater. While LRH migration to groundwater does not appear to have been significant at the site (perhaps due to volatilization, low initial concentration, or a combination of factors), MRH has evidently migrated to groundwater. HRH appears to have generally remained immobilized in the unsaturated zone.

Hydrocarbons in soil are also subject to natural degradation by soil microbes. Some hydrocarbons (especially light hydrocarbons) are more readily degraded by soil microbes than others. Microbial degradation rates are also affected by factors such as soil oxygen, soil pH, soil moisture, soil temperature, soil nutrient concentrations, and hydrocarbon volume relative...
to soil volume. Microbial degradation is generally most effective in well-oxygenated, moist (but not excessively moist) soil with near-neutral pH, at temperatures between 18° and 30° Celsius (64° to 86° Fahrenheit), and hydrocarbon saturation <1%. The sandy texture of site soil, near neutral soil pH, and climate of Stafford County (United States Department of Agriculture Soil Survey of Stafford County, Kansas, 1978) are factors that would appear likely to promote microbial degradation of hydrocarbons. Actual effects of microbial degradation of TPH in site soil are difficult to gauge due to lack of historical data and due to the recent change in TPH analytical methodologies. However, near-surface soil samples collected from the landfarm area for the CI are characterized by MRH plus HRH concentrations <900 mg/kg, while TPH DRO concentrations of soil samples collected from the landfarm area for the PI in 2011 were >5,000 mg/kg (>80% reduction, assuming general equivalency of MRH plus HRH to TPH DRO). This change may be attributable in part to microbial degradation.

Hydrocarbons dissolved in groundwater would be expected to be transported with gravitational mass movement of groundwater. To determine local groundwater flow direction, Terracon retained a Kansas-licensed land surveyor to survey the casings of the five newly installed site monitoring wells. A copy of the survey report is included in Appendix E. Well casing elevations and groundwater elevations are shown in Table 2. Figure 6 is a groundwater flow map. As shown in Figure 6, groundwater flow across the site is south-southeast to southeast, toward Rattlesnake Creek and roughly normal to the local topographic slope (see Figure 1A). As shown in Figure 5, the distribution of MRH in groundwater beneath the site is consistent with migration of MRH with groundwater from a source area located at the historical landfarm.

Hydrocarbons dissolved in and migrating with groundwater are expected to become more attenuated with distance from the source, and to become more attenuated over time as hydrocarbons at the source are depleted through volatilization, migration to groundwater, and microbial degradation. As shown in Figure 5, MRH has (over the last decade) apparently migrated approximately 1,000 feet from its apparent source (the landfarm) before attenuating to concentrations approaching laboratory reporting limits. MRH apparently attenuates to concentrations less than the residential RSK within approximately 500 feet of the source area. This likely represents the maximum extent to which groundwater impacts associated with the landfarm area are likely to be observed in future.

9.0 PRELIMINARY SCREENING OF REMEDIAL ACTIONS

Of the contaminants of concern, only MRH was identified in soil or in groundwater at concentrations exceeding Tier 2 RSKs for residential scenarios. With the exception of one MRH soil result (which was not confirmed by duplicate sample analysis), Tier 2 RSKs for non-residential scenarios were not exceeded. Source area soil TPH concentrations appear to have decreased significantly since 2011. The site water supply well (which is not a drinking water source) is not impacted, and is not likely to become impacted due to its construction detail.
The site MRH groundwater plume does not appear to extend far offsite, and there also appear to be no groundwater receptors in the path of the plume. Given these findings, and given the current and likely future non-residential use of the site, screening of remedial actions is not necessary.

10.0 CONCLUSION AND RECOMMENDATIONS

10.1 Comprehensive Investigation Conclusions

Terracon concludes the following on the basis of the CI results:

- Site soil is impacted by TPH, principally as the MRH and HRH fractions, mainly in the historical landfarm area.
- Site groundwater is impacted by TPH, principally as the MRH fraction. The historical landfarm area is a likely source for this impact.
- TPH concentrations in soil and groundwater at the site do not generally exceed KDHE Tier 2 RSKs for non-residential scenarios, and therefore do not present a significant risk to human health under current and likely future site conditions.
- TPH in the historical landfarm area has apparently undergone significant natural degradation since 2011, and should continue to degrade without further active remediation efforts.

10.2 Recommendations for Future Actions

Based on the conclusions outlined in Section 10.1 and review of KDHE Policy #BER-RS-024 (Site Closure in the State Cooperative Program, February 2015) Terracon recommends that the site be considered eligible for conditional closure on entry of the site into the KDHE Environmental Use Control (EUC) Program.
### FIGURES

| Figure 1A | Topographic Map |
| Figure 1B | Aerial Photograph Map |
| Figure 2  | Site Aerial Photograph Map |
| Figure 3  | Sample Locations & Site Features Map |
| Figure 4  | Soil TPH Concentration Map |
| Figure 5  | Groundwater TRP Concentration Map |
| Figure 6  | Groundwater Flow Map |
Registered Water Well Location (per KGS, not verified).
Reported well use and owner name are given.
- Oilfield pumping unit.
- Farmsite, oilfield storage tank battery, or other feature (as labeled).
Google Earth aerial photograph, dated June 19, 2015 (converted to grayscale)

Project No.: 01167141
Project Manager: Montgomery
Project Reviewer: Lamp
Drawn by: Montgomery
Date: 09/25/2017

MAP SCALE
1 INCH = 150 FEET

SAMPLE LOCATIONS & SITE FEATURES MAP
ROSE ROCK HUDSON STATION
NE 90th Ave. South of Hudson Rd.
Stafford County, Kansas
316-262-0171

1 Terracon
1815 S. Eisenhower St.
Wichita, Kansas

2007 RELEASE AREA
(BASED ON JUNE 2008 AERIAL PHOTO)
Google Earth aerial photograph, dated June 19, 2015 (converted to grayscale)


Benchmark Elev.: 1817.03 feet

Site benchmark is red-capped rebar 2 feet southeast of center line of MW-1

Surveyed August 3, 2017 by Garber Surveying Service, PA., Kansas License No. 683

ELEVATIONS

<table>
<thead>
<tr>
<th>MW-1</th>
<th>MW-2</th>
<th>MW-3</th>
<th>MW-4</th>
<th>MW-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1813.79</td>
<td>1814.07</td>
<td>1814.04</td>
<td>1814.42</td>
<td>1814.69</td>
</tr>
</tbody>
</table>

Casings:

- Casings Elev.
- Ground Elev.
- MW-1 = 1816.88
- MW-2 = 1819.74
- MW-3 = 1817.94
- MW-4 = 1817.96
- MW-5 = 1818.40

Benchmark Elev. = 1817.03 feet

Surveyed August 3, 2017 by Garber Surveying Service, PA., Kansas License No. 683
TABLES

Table 1  Sampling Program Summary
Table 2  Well Construction Detail & Groundwater Level Data
Table 3  Soil Sample Analytical Results
Table 4  Groundwater & Water Sample Analytical Results
<table>
<thead>
<tr>
<th>SAMPLE LOCATION</th>
<th>DATE</th>
<th>SAMPLE ID</th>
<th>SAMPLE MATRIX</th>
<th>SAMPLE ANALYSES</th>
<th>NUMBER OF SAMPLES COLLECTED</th>
<th>NUMBER OF SAMPLES FIELD-SCREENED</th>
<th>NUMBER OF SAMPLES ANALYZED</th>
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<tr>
<td>P-1</td>
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<td>P-1</td>
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<td>Soil = 1</td>
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<td></td>
<td></td>
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</tr>
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<td>(0-2 feet)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-3</td>
<td>2/20/2017</td>
<td>P-3</td>
<td>Soil</td>
<td>LRI, MRR, HRR</td>
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<td>Groundwater / Water = 0</td>
<td>Soil = 1</td>
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<td>(0-2 feet)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4 / NW-1</td>
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<td>Groundwater / Water = 1</td>
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<td></td>
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<td>P-5 / NW-2</td>
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<td>2/20/2017</td>
<td>NW-2</td>
<td>Groundwater</td>
<td>LRI, MRR, HRR</td>
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<td></td>
<td></td>
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<td>P-6 / NW-3</td>
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<td>P-7</td>
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<td>NW-3</td>
<td>Soil</td>
<td>LRI, MRR, HRR</td>
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<td>P-7 / NW-4</td>
<td>2/20/2017</td>
<td>P-8</td>
<td>Soil</td>
<td>LRI, MRR, HRR</td>
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<td>Groundwater / Water = 1</td>
<td>Soil = 1</td>
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<tr>
<td></td>
<td>2/20/2017</td>
<td>NW-4</td>
<td>Soil</td>
<td>LRI, MRR, HRR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-8 / NW-5</td>
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<td>P-9</td>
<td>Soil</td>
<td>LRI, MRR, HRR</td>
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<td>NW-5</td>
<td>Soil</td>
<td>LRI, MRR, HRR</td>
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<td></td>
<td>NW-5</td>
<td>Soil</td>
<td>LRI, MRR, HRR</td>
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<td>Site Water Well</td>
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<td>Water</td>
<td>Groundwater</td>
<td>LRI, MRR, HRR</td>
<td>Soil = 0</td>
<td>Groundwater / Water = 1</td>
<td>Soil = 0</td>
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<td>2/20/2017</td>
<td>Water</td>
<td>Groundwater</td>
<td>LRI, MRR, HRR</td>
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Total Soil = 16
Total Groundwater / Water = 10
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<tr>
<th>WELL ID</th>
<th>WELL CONSTRUCTION DATE</th>
<th>PLS2 LOCATION</th>
<th>SURFACE COMPLETION DETAIL</th>
<th>WELL CONSTRUCTION MATERIALS DETAIL</th>
<th>TOP OF CASING ELEVATION (feet)</th>
<th>STATIC WATER LEVEL (feet below top of casing)</th>
<th>GROUNDWATER ELEVATION (in feet above mean sea level)</th>
<th>WELL DEPTH (feet below top of casing)</th>
<th>SCREEN LENGTH (feet)</th>
<th>WATER COLUMN HEIGHT (feet)</th>
<th>CALCULATED FIVE WELL VOLUMES (gallons)</th>
<th>WELL DEVELOPMENT VOLUME (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN-1</td>
<td>2/21/2017</td>
<td>Sec. 31 T 22 R 11 W</td>
<td>Flush to Grade</td>
<td>2&quot; PVC Riser, 2&quot; PVC 0.01&quot; Slot Screen, PVC Bottom Point, 10/20 Silica Sand Filter Pack, Bentonite Chip Grout Seal</td>
<td>1816.86</td>
<td>5.09</td>
<td>1813.79</td>
<td>13.12</td>
<td>10</td>
<td>10.55</td>
<td>42.6</td>
<td>55*</td>
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<td>MN-2</td>
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<td>Sec. 31 T 22 R 11 W</td>
<td>Above Grade (3.1)</td>
<td>4&quot; Square Steel Protector with Hinged Lockable Lid, 2&quot; PVC Riser, 2&quot; PVC 0.01&quot; Slot Screen, PVC Bottom Point, 10/20 Silica Sand Filter Pack, Bentonite Chip Grout Seal</td>
<td>1819.74</td>
<td>5.87</td>
<td>1814.07</td>
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<td>10</td>
<td>10.54</td>
<td>44.8</td>
<td>55*</td>
</tr>
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<td>MN-3</td>
<td>2/21/2017</td>
<td>Sec. 31 T 22 R 11 W</td>
<td>Flush to Grade</td>
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<td>1817.94</td>
<td>3.90</td>
<td>1814.04</td>
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<td>8.89</td>
<td>37.6</td>
<td>55</td>
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<td>MN-4</td>
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<td>Sec. 31 T 22 R 11 W</td>
<td>Flush to Grade</td>
<td>2&quot; PVC Riser, 2&quot; PVC 0.01&quot; Slot Screen, PVC Bottom Point, 10/20 Silica Sand Filter Pack, Bentonite Chip Grout Seal</td>
<td>1818.04</td>
<td>3.54</td>
<td>1814.42</td>
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<td>Site Water Well</td>
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<td>71</td>
<td>20.67</td>
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*Purge volume estimated by field personnel.

**Latitude and longitude estimated; coordinates provided on WWC-5 form indicate a location approximately 110 feet east of actual location.
### TABLE 3: SOIL SAMPLE ANALYTICAL RESULTS

<table>
<thead>
<tr>
<th>SAMPLE ID</th>
<th>DATE</th>
<th>PID FIELD-SCREENING RESULTS (ppm)</th>
<th>TOTAL PETROLEUM HYDROCARBON RANGES (mg/kg)</th>
<th>LOW-RANGE HYDROCARBONS (LRH)</th>
<th>MID-RANGE HYDROCARBONS (MRH)</th>
<th>HIGH-RANGE HYDROCARBONS (HRH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1 (0-2 feet)</td>
<td>2/20/2017</td>
<td>0.0</td>
<td>&lt;23.0</td>
<td>&lt;6.9</td>
<td>&lt;9.2</td>
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<tr>
<td>P-2 (0-2 feet)</td>
<td>2/20/2017</td>
<td>0.0</td>
<td>&lt;22.2</td>
<td>&lt;7.1</td>
<td>9.8 (8.4)</td>
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<tr>
<td>P-3 (0-2 feet)</td>
<td>2/20/2017</td>
<td>0.0</td>
<td>&lt;27.3</td>
<td>&lt;6.3</td>
<td>152 (8.4)</td>
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</tr>
<tr>
<td>P-4 (0-2 feet)</td>
<td>2/20/2017</td>
<td>0.7</td>
<td>&lt;26.3</td>
<td>9.6</td>
<td>14.8 (9.4)</td>
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</tr>
<tr>
<td>P-5 (0-2 feet)</td>
<td>2/20/2017</td>
<td>0.0</td>
<td>&lt;23.7</td>
<td>&lt;6.6</td>
<td>50 (8.7)</td>
<td></td>
</tr>
<tr>
<td>P-6 (0-2 feet)</td>
<td>2/20/2017</td>
<td>0.0</td>
<td>&lt;24.6</td>
<td>11.1 (6.4)</td>
<td>271 (8.4)</td>
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<tr>
<td>P-7 (0-2 feet)</td>
<td>2/20/2017</td>
<td>0.0</td>
<td>&lt;26.6</td>
<td>&lt;6.1</td>
<td>147 (8.2)</td>
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<tr>
<td>P-7 (0-2 feet)</td>
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<td>0.0</td>
<td>&lt;29.0</td>
<td>16.5 (6.4)</td>
<td>334 (8.5)</td>
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<tr>
<td>P-8 (0-2 feet)</td>
<td>2/20/2017</td>
<td>0.0</td>
<td>&lt;26.3</td>
<td>97.1 (8.3)</td>
<td>765 (8.4)</td>
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<td>P-8 (2-4 feet)</td>
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<td>102.6</td>
<td>&lt;25.8</td>
<td>92.4 (6.7)</td>
<td>206 (8.9)</td>
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<tr>
<td>Duplicate 2</td>
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<td>&lt;26.3</td>
<td>192 (6.6)</td>
<td>332 (8.8)</td>
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</tr>
<tr>
<td>P-8 (0-2 feet)</td>
<td>2/20/2017</td>
<td>0.0</td>
<td>&lt;27.7</td>
<td>&lt;8.4</td>
<td>23.1 (6.8)</td>
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<td>P-9 (0-2 feet)</td>
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<td>P-10 (0-2 feet)</td>
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<td>P-10 (0-4 feet)</td>
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<td>48.7</td>
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**KDHE TIER 2 RSKs**

<table>
<thead>
<tr>
<th></th>
<th>LRH</th>
<th>MRH</th>
<th>HRH</th>
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<tbody>
<tr>
<td>Residential</td>
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<tr>
<td>Soil</td>
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<td>250</td>
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<td>Soil-to-Groundwater</td>
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<td>6,000</td>
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<tr>
<td>Non-Residential</td>
<td>950</td>
<td>350</td>
<td>27,500</td>
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<tr>
<td>Soil</td>
<td>150</td>
<td>150</td>
<td>13,000</td>
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</tbody>
</table>

KDHE Tier 2 RSK = Kansas Department of Health and Environment Tier 2 Risk-based Standards for Kansas - Policy #BER-041, September 1, 2015

mg/kg = milligrams per kilogram

ppm = parts per million

<23.0 (gray shading) = Not detected above laboratory reporting limit of 23.0 mg/kg

152 (8.4) = Detected concentration in mg/kg (laboratory reporting limit in parentheses)

97.1 (8.3) = Detected concentration exceeds a KDHE Tier 2 RSK
## TABLE 4: GROUNDWATER / WATER SAMPLE ANALYTICAL RESULTS

<table>
<thead>
<tr>
<th>SAMPLE ID</th>
<th>DATE</th>
<th>TOTAL PETROLEUM HYDROCARBON FRACTIONS (mg/L)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>LOW-RANGE HYDROCARBONS (LRH)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MID-RANGE HYDROCARBONS (MRH)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIGH-RANGE HYDROCARBONS (HRH)</td>
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<td>Kansas Modified Method 8260</td>
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<tr>
<td></td>
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<td></td>
<td>Kansas Modified Method 8015</td>
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<tr>
<td>MW-1</td>
<td>2/21/2017</td>
<td>0.13 (0.05)</td>
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<td></td>
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<td>0.093 (0.06)</td>
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<td></td>
<td>&lt;0.06</td>
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<tr>
<td></td>
<td></td>
<td>&lt;0.2</td>
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<td>MW-3</td>
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<td>0.084 (0.061)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>MW-4</td>
<td>2/21/2017</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.20 (0.059)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>MW-5</td>
<td>2/21/2017</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.21 (0.058)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.24 (0.19)</td>
</tr>
<tr>
<td>Duplicate</td>
<td>2/21/2017</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.19 (0.058)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.19</td>
</tr>
<tr>
<td>Onsite Water Well</td>
<td>2/21/2017</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>Rinsate 1</td>
<td>2/20/2017</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.058</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.19</td>
</tr>
<tr>
<td>Rinsate 2</td>
<td>2/21/2017</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.059</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>Trip Blank</td>
<td></td>
<td>&lt;0.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.2</td>
</tr>
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</table>

**KDHE TIER 2 RSKs**

<table>
<thead>
<tr>
<th></th>
<th>LRH</th>
<th>MRH</th>
<th>HRH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>0.35</td>
<td>0.15</td>
<td>1</td>
</tr>
<tr>
<td>Non-Residential</td>
<td>0.50</td>
<td>0.4</td>
<td>2.5</td>
</tr>
</tbody>
</table>

KDHE Tier 2 RSK = Kansas Department of Health and Environment Tier 2 Risk-based Standards for Kansas - Policy #BER-041, September 1, 2015

mg/L = milligrams per liter

<0.05 (gray shading) = Not detected above laboratory reporting limit of 0.05 mg/L
0.13 (0.05) = Detected concentration in mg/L (laboratory reporting limit in parentheses)
0.20 (0.059) = Detected concentration exceeds a KDHE Tier 2 RSK
APPENDIX A
Photographs
Rose Rock Midstream Crude, L.P.
Hudson Station • Stafford County, Kansas
Photo Date: February 21, 2017 • Terracon Project No. 01167141

Photo #1  Looking north from top of AST containment, near east site boundary.

Photo #2  Looking northeast from near east site boundary over adjacent open rangeland.

Photo #3  View of floating-roof crude oil ASTs, looking northwest from near east site boundary.

Photo #4  View across the south part of the site, showing pump house, storage building, and water tank.

Photo #5  Looking southeast near east site boundary over adjacent open rangeland.

Photo #6  MW-1, looking east.

Reliable • Responsive • Resourceful
Rose Rock Midstream Crude, L.P.
Hudson Station  ■ Stafford County, Kansas
Photo Date: February 21, 2017 ■ Terracon Project No. 01167141

Photo #7  MW-2, looking east.
Photo #8  Installation of MW-3.
Photo #9  MW-3, looking east.
Photo #10  MW-4, looking southeast.
Photo #11  MW-5, looking west.
Photo #12  Site water supply well (at center-left), looking west.

Reliable ■ Responsive ■ Resourceful
**WATER WELL RECORD**

**Form WWC-5**

**Division of Water Resources**

<table>
<thead>
<tr>
<th>Section Number</th>
<th>Township No.</th>
<th>Range Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>T 22 S</td>
<td>R 12 E W</td>
</tr>
</tbody>
</table>

**Global Positioning System (GPS) information:**

- **Latitude:** __________
- **Longitude:** __________
- **Elevation:** __________

**Collection Method:**

- [ ] Digital Map/Photo
- [ ] Topographic Map
- [ ] Land Survey

**Instruction:** Use typewriter or ball point pen. Please fill in blanks and check the correct answers and write your name. Make three copies under the business name of __________ by (signature) __________

**INSTRUCTIONS: Use typewriter or ball point pen. **PLEASE PRINT CLEARLY.** Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5524. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.

**KSA 82a-1212**

**Check:** [ ] White Copy, [ ] Blue Copy, [ ] Pink Copy

---

<table>
<thead>
<tr>
<th>1 LOCATION OF WATER WELL:</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>County: Stafford</td>
<td></td>
</tr>
<tr>
<td>Street/Rural Address of Well Location:</td>
<td></td>
</tr>
<tr>
<td>If unknown, distance &amp; direction from nearest town or intersection:</td>
<td></td>
</tr>
<tr>
<td>If at owner's address, check here:</td>
<td></td>
</tr>
<tr>
<td>4E of Hudson, KS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2 WATER WELL OWNER:</th>
<th>Andrea L. Bartlett</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR#, Street Address, Box #:</td>
<td>929 NW 40th Ave.</td>
</tr>
<tr>
<td>City, State, ZIP Code:</td>
<td>St. John, KS 67576</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 LOCATE WELL WITH AN <em>X</em> IN SECTION BOX:</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td>NW</td>
</tr>
<tr>
<td>W</td>
</tr>
<tr>
<td>S</td>
</tr>
<tr>
<td>E</td>
</tr>
</tbody>
</table>

4 DEPTH OF COMPLETED WELL: 80 ft.

- Depth(s) Groundwater Encountered: (1) __________ ft. (2) __________ ft. (3) __________ ft.
- Well's Static Water Level: __________ ft. below land surface measured on mo/day/yr. 09/12/12.
- Pump test data: Well water was __________ ft. after __________ hours pumping __________ gpm.
- EST. YIELD: __________ gpm. Well water was __________ ft. after __________ hours pumping __________ gpm.
- Bore Hole Diameter in. to __________ ft. and in. to __________ ft.
- Well Water to be Used As: [ ] Public water supply [ ] Geothermal [ ] Injection well
- Domestic [ ] Feedlot [ ] Oil field water supply [ ] Dewatering [ ] Other (Specify below)
- Irrigation [ ] Industrial [ ] Domestic-lawn & garden [ ] Monitoring well
- Medical [ ] stock
- Was a chemical/bacteriological sample submitted to Department? [ ] Yes [ ] No
- If yes, mo/day/yr sample was submitted __________.
- Water well disinfected? [ ] Yes [ ] No

5 TYPE OF CASING USED: [ ] Steel [ ] PVC [ ] Other

- Casing Joints: [ ] Glued [ ] Clamp [ ] Welded [ ] Threaded
- Casing diameter in. to __________ ft. Diameter in. to __________ ft.
- Casing height above land surface in. to __________ ft.

- Type of Screen or Perforation Material: [ ] Steel [ ] Stainless Steel [ ] PVC [ ] Other (Specify)
- Screen or Perforation Openings are: [ ] Continuous slot [ ] Mill slot [ ] Gauze wrapped [ ] Torch cut [ ] Drilled holes [ ] None (open hole)
- Screen-Perforated Intervals: From __________ ft. to __________ ft. From __________ ft. to __________ ft.
- Gravel pack Intervals: From __________ ft. to __________ ft. From __________ ft. to __________ ft.

6 GROUT MATERIAL: [ ] Neat cement [ ] Cement grout [ ] Bentonite [ ] Other

- Grout Intervals: From __________ ft. to __________ ft. From __________ ft. to __________ ft. From __________ ft. to __________ ft.
- What is the nearest source of possible contamination? [ ] Septic tank [ ] Lateral lines [ ] Pit privy [ ] Livestock pens [ ] Insecticide storage [ ] Other (Specify below)
- Sewer lines [ ] Cesspool [ ] Sewage lagoon [ ] Fuel storage [ ] Abandoned water well [ ] None - in pasture
- What is the direction from well? __________

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was [ ] constructed, [ ] reconstructed, or [ ] plugged under my jurisdiction and was completed on (mo/day/year) 09/12/12 and this record is true to the best of my knowledge and belief.

- Kansas Water Well Contractor's License No. 166
- This Water Well Record was completed on (mo/day/year) 09/14/12
- Under the business name of Kelly's Water Well Service, Inc.

**INSTRUCTIONS:** Use typewriter or ball point pen. **PLEASE PRINT CLEARLY.** Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5524. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.
LOCATION OF WATER WELL: STAFFORD

WATER WELL OWNER: DUKE DRILLING CO.

LOCATION OF WATER WELL:

WELL'S STATIC WATER LEVEL:

Pump test data: Well was... hours pumping...

Bore Hole Diameter:

WELL WATER TO BE USED AS:

Was a chemical/bacteriological sample submitted to Department? Yes No

If yes, mo/day/yr sample was submitted

Water Well Disinfected? Yes No

CASING JOINTS: Glued x Clamped

PE OF SCREEN OR PERFORATION MATERIAL:

PERFORATION OPENINGS ARE:

PERFORATED INTERVALS:

GRAVEL PACK INTERVALS:

GROUT MATERIAL:

ROM TO LITHOLOGIC LOG FROM TO PLUGGING INTERVALS

CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This well was (g) constructed, (r) reconstructed, or (p) plugged under my jurisdiction and was completed on (mo/day/year) 8-27-90...

Send three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-7320. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.
**LOCATION OF WATER WELL:**

- **County:** STAFFORD
- **Section Number:** 30
- **Township Number:** T 22
- **Range Number:** R 11
- **Elevation:**
  - Depth(s) Groundwater Encountered:
    - 1 ft.
    - 2 ft.
    - 3 ft.
  - Well's Static Water Level:
    - 7 ft. below land surface measured on mo/day/yr.
  - Pump test data:
    - Well water was 1 ft. after hours pumping.
  - Est. Yield:
    - gpm.
  - Bore Hole Diameter:
    - 9 in. to ft.
    - in. to ft.
  - Well Water to Be Used As:
    - Domestic
    - Irrigation
    - Public water supply
    - Feedlot
    - Industrial
    - Air conditioning
    - Lawn and garden only
    - Oil field water supply
    - Dewatering
    - Injection well
    - Monitoring well

**LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:**

- N
- W
- SW
- E
- SE

**TYPE OF BLANK CASING USED:**

- Steel
- PVC
- RMP (SR)
- ABS
- Steel
- PVC
- RMP (SR)
- ABS

**GRAVEL PACK INTERVALS:**

- From 20 ft. to 64 ft.
- From 64 ft. to ft.
- From ft. to ft.
- From ft. to ft.
- From ft. to ft.
- From ft. to ft.

**LITHOLOGIC LOG:**

- TOP SOIL
- CLAY
- GRAVEL

**LOCATION OF WATER WELL:**

- **Owner:** DUKE DRILLING CO.
- **Address:** P.O. BOX 823
- **City:** GREAT BEND, KS. 67530

**LOCATOR OR LANDOWNER'S CERTIFICATION:**

- This water well was (X) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 9-3-90.
- Kansas Water Well Contractor's License No. 462-8.
- This Water Well Record was completed on (mo/day/yr) 11-9-90.

**INSTRUCTIONS:**

- Use typewriter or ball point pen.
- Please print clearly. Please print in all blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-7320. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.
**FISHER, TIM - STOCK**

### WATER WELL RECORD

**Location of Water Well:**
- County: Stafford
- Street/Rural Address of Well Location: 1 South, 3 3/4 East of Hudson

**Water Well Owner:**
- Tim Fisher
- RR# Street Address, Box #: 387 S US Hwy 281
- City, State, ZIP Code: St. John, KS 67576

**Locate Well with an "X" in Section Box:**

#### 4 Depth of Completed Well
- Depth(s) Groundwater Encountered:
  - 1 ft.
  - 2 ft.
  - 3 ft.
- Well’s Static Water Level:
  - 6 ft. below land surface measured on mo/day/yr.: 10-10-15
- Pump Test data:
  - Well water was...
  - gpm
- Est. Yield:
  - N/A gpm
- Well Water to be Used As:
  - Domestic
  - Industrial
  - Domestic-lawn & garden
  - Irrigation
  - Dewatering
  - Other (Specify below)
  - Stock

**Was a chemical/bacteriological sample submitted to Department?**
- Yes
- No

**Water well disinfected?**
- Yes
- No

#### 5 Type of Casing Used:
- Steel
- PVC
- Other

**Casing Joints:**
- Glued
- Clamp
- Welded
- Threaded

**Casing Diameter:**
- 5 in. to 27 in.
- Diameter in. to...

**Casing Height above land surface:**
- 18 in. to...

**Type of Screen or Perforation Material:**
- Steel
- Stainless Steel
- PVC
- Other (Specify)
- Brass
- Galvanized Steel
- None used (open hole)

**Screen or Perforation Openings Are:**
- Continuous slot
- Mill slot
- Gauze wrapped
- Torch cut
- Drilled holes
- None (open hole)

**Screen-Perforated Intervals:**
- From...
- To...

**Gravel Pack Intervals:**
- From...
- To...

**6 Grout Material:**
- Neat cement
- Cement grout
- Bentonite
- Other

**Grout Intervals:**
- From...
- To...

### From | To
--- | ---
0 | 6
6 | 10
10 | 27

**Lithologic Log**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Sandy top soil &amp; clay</td>
</tr>
<tr>
<td>6</td>
<td>Sand &amp; gravel- small</td>
</tr>
<tr>
<td>10</td>
<td>Tan &amp; sandy tan clay</td>
</tr>
</tbody>
</table>

**7 Contractor’s or Landowner’s Certification:**
- This water well was... constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo/day/year): 10-20-15... and this record is true to the best of my knowledge and belief.
- Kansas Water Well Contractor’s License No.: 134...
- This Water Well Record was completed on (mo/day/year): 11-16-15...
- Under the business name of: Rosencrantz- Bemis Ent Inc...
- By (signature):

**Instructions:**
- Use typewriter or ball point pen.
- Please press firmly and print clearly.
- Please fill in blanks and check the correct answers.
- Send one copy to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367.
- Telephone 785-296-5524.
- Send one copy to WATER WELL OWNER and retain one for your records.
- Include fee of $5.00 for each constructed well.

KSA 82a-1212

---

Global Positioning System (GPS) Information:
- Latitude: 38.08657
- Longitude: 99.58847
- Datum: NAD 83
- Collection Method:
  - GPS unit (Make/Model:)
  - Digital Map/Photo
  - Topographic Map
  - Land Survey
  - Est. Accuracy:
    - <3 m
    - 3-5 m
    - 5-15 m
    - >15 m

---

Division of Water Resources App. No. 36

---

Section Number 36
Township No. T 22 S
Range Number R 12 W
### Water Well Record

#### General Information

**Location of Oatton Well:** Stafford

#### Well Information

**Type:** Domestic

**Screened Interval:**

<table>
<thead>
<tr>
<th>Section</th>
<th>T</th>
<th>R</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW 1/4</td>
<td>8</td>
<td>6</td>
<td>Stafford</td>
</tr>
</tbody>
</table>

**Well Water Source:** Public water supply

**Depth to Water:** 30 feet

**Well Water to Be Used As:** Domestic (1) & garden (2)

**Contaminant Sample:** No

**Distance from Water Main:** Not applicable

**Screen Material:** Grout

**Grout Material:** Not specified

**Injection Water:** City water

**Injection Method:** Not specified

**Infiltration Time:** Not applicable

**Monitoring Well:** Yes

**Chemical/Geotechnical Sample:** No

**Monitoring Well Description:**

- **Location:** Stafford
- **Distance:** Not applicable
- **Type:** Domestic

**Gatton, Danny - Domestic**

---

**Kansas Geological Survey**

Comments to webadmin@kgs.ku.edu

URL: http://www.kgs.ku.edu/Magellan/WaterWell/index.html

Display Programs Updated July 2, 2014

Data added continuously.
<table>
<thead>
<tr>
<th>1. Location of well:</th>
<th>County</th>
<th>Fraction</th>
<th>Section number</th>
<th>Township number</th>
<th>Range number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stafford</td>
<td>sw 1/4 SW 1/4 SE 1/4</td>
<td>25 I 22</td>
<td>S 12 W</td>
<td>E/W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Distance and direction from nearest town or city:</th>
<th>Street address of well location if in city:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4e</td>
<td>Hudson, Ks.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Owner of well:</th>
<th>Orlin Heyen</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.R. or street:</td>
<td>R3 Stafford, Ks.</td>
</tr>
<tr>
<td>City, state, zip code:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Locate with &quot;X&quot; in section below:</th>
<th>Sketch map:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>5. Type and color of material</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Soil - Clay</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Sandy Clay</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Sand fine</td>
<td>25</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Bore hole dia.</th>
<th>Depth</th>
<th>Completion date</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 in.</td>
<td>50 ft.</td>
<td>11-16-77</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.</th>
<th>Cable tool</th>
<th>Rotary</th>
<th>Driven</th>
<th>Bored</th>
<th>Reverse rotary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Domestic</td>
<td>Public</td>
<td>Industry</td>
<td>Stock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Irrigation</td>
<td>Air conditioning</td>
<td>Oil field water</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. Use:</th>
<th>Domestic</th>
<th>Public</th>
<th>Industry</th>
<th>Stock</th>
<th>Irrigation</th>
<th>Air conditioning</th>
<th>Oil field water</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. Coating:</th>
<th>Material</th>
<th>Height</th>
<th>Above ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threaded</td>
<td>Welded</td>
<td>Surface</td>
<td></td>
</tr>
<tr>
<td>PVC</td>
<td>Weight</td>
<td>lbs/ft.</td>
<td></td>
</tr>
<tr>
<td>Dia.</td>
<td>16 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>30 ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall Thickness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dia.</td>
<td>in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth gauge</td>
<td>No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5/16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10. Screen:</th>
<th>Manufacturer's name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Soil - Clay</td>
<td>0</td>
</tr>
<tr>
<td>Sandy Clay</td>
<td>15</td>
</tr>
<tr>
<td>Sand fine</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. Static water level:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 ft. below land surface</td>
<td>11-16-77</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12. Pumping level below land surfaces:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 ft. after 4 hrs. pumping</td>
<td>150 g.p.m.</td>
</tr>
<tr>
<td>40 ft. after 4 hrs. pumping</td>
<td>150 g.p.m.</td>
</tr>
<tr>
<td>Estimated maximum yield</td>
<td>150 g.p.m.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13. Water sample submitted:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14. Well head completion:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 inches above grade</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15. Well grouted?</th>
<th>X</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>16. Nearest source of possible contamination:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>Type</td>
</tr>
<tr>
<td>280 ft.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>17. Pump:</th>
<th>Not installed</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>18. Elevation:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topography:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hill</td>
<td></td>
</tr>
<tr>
<td>Slope</td>
<td></td>
</tr>
<tr>
<td>X Upland</td>
<td></td>
</tr>
<tr>
<td>Valley</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remarks:</th>
<th>Kelly Waterwell Service</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Great Bend, KS</td>
</tr>
<tr>
<td></td>
<td>License No.</td>
</tr>
<tr>
<td></td>
<td>Signed: Kelly Price</td>
</tr>
<tr>
<td></td>
<td>Date: 8-13</td>
</tr>
</tbody>
</table>

Forward the white, blue and pink copies to the Department of Health and Environment Form WWV-5
**Hornbaker, Gary - Stock**

**WATER WELL RECORD**  
**Form WWC-5**  
**KSA 82a-1212**  
**ID No.**

1. **LOCATION OF WATER WELL:**  
   - County: Stafford  
   - Fraction: NW ¼ NW ¼ NE ¼  
   - Section Number: T 23 S  
   - Township Number: R 11  
   - Range Number:  

   Distance and direction from nearest town or city street address of well if located within city?

2. **WATER WELL OWNER:**  
   - Gary Hornbaker  
   - RR#, St. Address, Box #: 1488 NE 70th St  
   - City, State, Zip Code: Stafford, KS 67578  

   Board of Agriculture, Division of Water Resources  
   - Application Number:  

3. **LOCATE WELL'S LOCATION WITH AN 'X' IN SECTION BOX:**  
   - Depth(s) Groundwater Encountered:  
     - ft.  
   - Well's Static Water Level:  
     - ft. below land surface measured on mo/day/yr.  
   - Pump test data:  
     - Well was  
     - ft. after hours pumping.  
   - Est. Yield:  
     - gpm:  
   - Well to be used as:  
     - Water Well Disinfected?  
     - No  

   Water Well Disinfected?  
   - Yes  
   - No  

4. **TYPE OF BLANK CASING USED:**  
   - Steel  
   - 3 RMP (SR)  
   - 4 ABS  
   - Wrought iron  
   - Concrete tile  
   - Asbestos-Cement  
   - Other (describe below)  

   Casing join:  
   - Glued  
   - Taped  
   - Threaded  

   Blank casing diameter:  
   - in. to  

5. **TYPE OF SCREEN OR PERFORATION MATERIAL:**  
   - Steel  
   - Stainless Steel  
   - Galvanized Steel  
   - Fiberglass  
   - Concrete tile  
   - RMP (SR)  
   - ABS  
   - Other (describe below)  

   Screen or perforation openings are:  
   - Guazed wrapped  
   - Saw cut  
   - Wire wrapped  
   - Drilled holes  
   - Torch cut  
   - Other (describe)  

   Screen-perforated intervals:  
   - From  
   - To  

6. **GROUT MATERIAL:**  
   - Neat cement  
   - Cement grout  
   - Bentonite  
   - Other  

   Grout Intervals:  
   - From  
   - To  

   What is the nearest source of possible contamination:  
   - Septic tank  
   - Lateral lines  
   - Cess pool  
   - Sewage lagoon  
   - Pit privy  
   - Fuel storage  
   - Fertilizer storage  
   - Livestock pens  
   - Abandoned water well  
   - Oil well/Gas well  
   - Other (describe below)  

   How many feet?

7. **CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:**  
   - This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo/day/year).  
   - and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No.  

   Water Well Record was completed on (mo/day/year).  

   Received by:  

   BUREAU OF WATER

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS SPACE AND PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one to WATER WELL OWNER and retain one for your records. Fee of $5.00 for each constructed well.
**WATER WELL RECORD**

**1 LOCATION OF WATER WELL:**
- County: Stafford
- Section Number: 31
- Township Number: T 22 S
- Range Number: R 11 W
- Location of water well: NE ¼ NE ¼ SW ¼

Distance and direction from nearest town or city street address of well if located within city?

**2 WATER WELL OWNER:** LaVetta Oil & Gas
- RR#, St. Address, Box #: P.O. Box 760
- City, State, ZIP Code: Middleburg, VA 20118

**3 LOCATE WELL’S LOCATION WITH AN “X” IN SECTION BOX:**

**4 DEPTH OF COMPLETED WELL:**

Depth(s) of groundwater encountered:
- (1) ft.
- (2) ft.
- (3) ft.

Well’s static water level:
- 2 ft. below land surface measured on 10-24-07.

Pump test data:
- Well water was ft. after hours pumping.
- Est. Yield (gpm):...gpm

Well water to be used as:
- 2 Injection well
- 8 Air conditioning
- 11 Injection well
- 1 Domestic
- 3 Feedlot
- 6 Oil field water supply
- 9 Dewatering
- 12 Other

**5 TYPE OF CASING USED:**
- 5 Wrought Iron
- 8 Concrete tile
- 1 Steel
- 3 RMP (SR)
- 6 Asbestos-Cement
- 2 PVC
- 4 ABS
- 7 Fiberglass

**6 GROUT MATERIAL:**
- 1 Neat cement
- 2 Cement grout
- 3 Bentonite
- 4 Other

**5 CONTRACTOR’S OR LANDOWNER’S CERTIFICATION:**
This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 10-24-07...and this record is true to the best of my knowledge and belief.

Kansas Water Well Contractor’s License No.: This Water Well Record was completed on (mo/day/year)...

**INSTRUCTIONS:** Use typewriter or ball point pen. Please press firmly and print clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one to WATER WELL OWNER and retain one for your records. Fee of $5.00 for each constructed well. Visit us at \( \text{http://www.kdheks.gov/watervell/index.html}. \)

KSA 82a-1212
**WATER WELL RECORD**

**Division of Water Resources; App. No. 20080052**

1. **LOCATION OF WATER WELL:**
   - County: Stafford
   - Fraction: NW ¼ NE ¼ SE ¼
   - Location: 4 3/4 East, 1/8 South of Hudson

2. **WATER WELL OWNER:**
   - LaVeta Oil & Gas
   - RR#, St. Address, Box #: P.O. Box 780
   - City, State, ZIP Code: Middleburg, Va. 20118

3. **LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:**
   - Depth(s) Groundwater Encountered:
     - (1) ft. (2) ft. (3) ft.
   - Well's Static Water Level: X 2 ft. below land surface measured on mo/day/yr 2-7-08
   - Pump test data: Well water was... ft. after... hours pumping... gpm
   - Est. Yield N/A:... gpm; Well water was... ft. after... hours pumping... gpm
   - Well Water to be Used As:
     - 5 Public water supply
     - 8 Air conditioning
     - 11 Injection well
     - 1 Domestic
     - 3 Feedlot
     - 6 Oil field water supply
     - 9 Dewatering
     - 12 Other (Specify below)
   - Water well disinfected? Yes  No
   - Sample was submitted? Yes  No

4. **DEPTH OF COMPLETED WELL:**
   - Depth(s) of completed well:
     - (1) ft. (2) ft. (3) ft.
   - Well's static water level... ft. below land surface measured on mo/day/yr...

5. **TYPE OF CASING USED:**
   - 1 Steel
   - 2 PVC
   - 3 RMP (SR)
   - 4 ABS
   - 5 Wrought Iron
   - 6 Asbestos-Cement
   - 7 Fiberglass
   - 8 Concrete tile
   - 9 Other (Specify below)
   - 11 Other (Specify)
   - 12 None used (open hole)

6. **GROUT MATERIAL:**
   - 1 Neat cement
   - 2 Cement grout
   - 3 Bentonite
   - 4 Other (Specify below)

7. **CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:**
   - This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 2-7-08 and this record is true to the best of my knowledge and belief.
   - Kansas Water Well Contractor's License No. 134
   - This Water Well Record was completed on (mo/day/year) 2-11-08
   - under the business name of Rosencrantz - Bemis by (signature)

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one to WATER WELL OWNER and retain one for your records. Fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.

KSA 82a-1212
**WATER WELL RECORD**

**Form WWC-5**

<table>
<thead>
<tr>
<th>1 LOCATION OF WATER WELL:</th>
<th>County: Stafford</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street/Rural Address of Well Location; if unknown, distance &amp; direction from nearest town or intersection: If at owner's address, check here □.</td>
<td>4 1/2 East of Hudson</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2 WATER WELL OWNER:</th>
<th>LaVetta Oil &amp; Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR4, Street Address, Box #:</td>
<td>P.O. Box 780</td>
</tr>
<tr>
<td>City, State, ZIP Code:</td>
<td>Middleburg, Va 20118</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 LOCATE WELL WITH AN &quot;X&quot; IN SECTION BOX:</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**4 DEPTH OF COMPLETED WELL**: 63 ft.

- Depth(s) Groundwater Encountered: (1) 63 ft., (2) 63 ft., (3) ft.
- WELL'S STATIC WATER LEVEL: 63 ft. below land surface measured on mo/day/yr 8/24/11.
- Pump test data: Well water was ... ft. after ... hours pumping ... gpm
- EST. YIELD: N/A ... gpm. Well water was ... ft. after ... hours pumping ... gpm
- Bore Hole Diameter: (1) ... in. to ... ft., (2) ... in. to ... ft., (3) ... in. to ... ft.
- WELL WATER TO BE USED AS: □ Public water supply □ Geothermal □ Injection well □ Domestic □ Feedlot □ Oil field water supply □ Dewatering □ Other (Specify below)
- Irrigation □ Industrial □ Domestic-lawn & garden □ Monitoring well

-Was a chemical/bacteriological sample submitted to Department? □ Yes □ No

If yes, mo/day/yr sample was submitted...

Water well disinfected? □ Yes □ No

**5 TYPE OF CASING USED:** □ Steel □ PVC □ Other ...

- Casing joints: □ Glued □ Clamped □ Welded □ Threaded
- Casing diameter: ... in. to ... ft., Diameter ... in. to ... ft., Diameter ... in. to ... ft.
- Casing height above land surface: ... in., Height ... lbs./ft., Wall thickness or gauge No...

**6 GROUT MATERIAL:** □ Neat cement □ Cement grout □ Bentonite □ Other...

- Grout Intervals: From ... ft. to ... ft., From ... ft. to ... ft., From ... ft. to ... ft.

**6 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:** This water well was □ constructed, □ reconstructed, or □ plugged under my jurisdiction and was completed on (mo/day/year) 8/24/11, and this record is true to the best of my knowledge and belief.

Kansas Water Well Contractor's License No. 134... This Water Well Record was completed on (mo/day/year) 8/24/11 under the business name of ... Beth, by (signature). 

**INSTRUCTIONS:** Fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Phone 785-296-5522. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdhked.gov/waterwell/index.html.

**PROPERTY INFORMATION:**

- **LITHOLOGIC LOG**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>LITHOLOGIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>Sandy top soil</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>Sandy clay gray</td>
</tr>
<tr>
<td>18</td>
<td>59</td>
<td>Fine sand &amp; small gravel</td>
</tr>
<tr>
<td>59</td>
<td>63</td>
<td>Sandy tan &amp; gray clay</td>
</tr>
</tbody>
</table>

**PLUGGING INTERVALS**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>LITHO. LOG (cont.)</th>
</tr>
</thead>
</table>

**Check:** □ White Copy, □ Blue Copy, □ Pink Copy
**WATER WELL RECORD**

**Form WWC-5**

**Division of Water Resources; App. No.***

<table>
<thead>
<tr>
<th>1</th>
<th>LOCATION OF WATER WELL:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraction</td>
<td>Section Number</td>
</tr>
<tr>
<td>County: Stafford</td>
<td>31</td>
</tr>
</tbody>
</table>

**Distance and direction from nearest town or city street address of well if located within city?**

4 3/4 East of Hudson

**2 WATER WELL OWNER:**

LaVetta Oil/ June Heyen  
RR# St. Address, Box #: P.O. Box 760 / P.O. Box 97  
City, State, ZIP Code: Middleburg, Va 20115/Monter, ks 67862

**3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:**

<table>
<thead>
<tr>
<th>N</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>- NW - NE -</td>
<td>E</td>
</tr>
<tr>
<td>- SW - SE -</td>
<td></td>
</tr>
</tbody>
</table>

**4 DEPTH OF COMPLETED WELL:**

(Water well) ft.

**5 TYPE OF CASING USED:**

<table>
<thead>
<tr>
<th>5</th>
<th>Wrought Iron</th>
<th>Concrete tile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steel</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>PVC</td>
<td>4</td>
</tr>
</tbody>
</table>


Casing height above land surface: ft., Weight: lbs./ft.

**TYPE OF SCREEN OR PERFORATION MATERIAL:**

<table>
<thead>
<tr>
<th>5</th>
<th>Steel</th>
<th>Stainless Steel</th>
<th>Fiber glass</th>
<th>PVC</th>
<th>ABS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steel</td>
<td>3 Stainless Steel</td>
<td>5</td>
<td>Fiber glass</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Brass</td>
<td>4 Galvanized Steel</td>
<td>6</td>
<td>Concrete tile</td>
<td>8 RMP (SR)</td>
</tr>
<tr>
<td>3</td>
<td>None used (open hole)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SCREEN-PERFORATED INTERVALS:** From ft. to ft. From ft. to ft.

**GRAVEL PACK INTERVALS:** From ft. to ft. From ft. to ft.

**6 GROUT MATERIAL:**

<table>
<thead>
<tr>
<th>6</th>
<th>Neat cement</th>
<th>Cement grout</th>
<th>Bentonite</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Neat cement</td>
<td>2</td>
<td>Cement grout</td>
</tr>
<tr>
<td>4</td>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Grout Intervals:** From ft. to ft. From ft. to ft. From ft. to ft.

**7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:**

This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) ..10-5-07.. and this record is true to the best of my knowledge and belief.

Ks Water Well Contractor's License No. 134  
This Water Well Record was completed on (mo/day/year) ..10-18-07.. under the business name of Rosencrantz- Bemis  
by (signature) _______________

**INSTRUCTIONS:** Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one to WATER WELL OWNER and retain one for your records. Fee of $5.00 for each constructed well. Visit us at http://www.kdheks.gov/waterwell/index.html.

KSA 82a-1212
ASSIGNMENT OF WATER WELL TO LANDOWNER

PERMIT NO.: SFWW 4621

This agreement between LaVeta Oil P.O. Box 780, Middleburg, Va. 20118
and June Heyen P.O. Box 97, Mantorville, KS 67862

-certifies that said Landowner hereby accepts the water well drilled as a temporary source
of water for an oil well drilled for Operator located approximately NW-NE
in Section 31, Township 22S, Range 11W of Stafford County, Kansas. Landowner hereby agrees that said water well will be for domestic use
only and when no longer needed, agrees to plug the water well in accordance with the
State Regulation KAR 28-30-7.

Signed this 21 day of Sept., 2011

OPERATOR: La Veta Oil

LANDOWNER:

By: [Signature]

Agent
LAVETA OIL & MILLER, STEVE - OIL FIELD WATER SUPPLY

WATER WELL RECORD Form WWC-5 Division of Water Resources; App. No. 20063878

1 LOCATION OF WATER WELL:
- County: Stafford
- Distance and direction from nearest town or city street address of well if located within city: 4 3/4 east of Hudson, Ks.

2 WATER WELL OWNER:
- Name: Lavetta Oil / Steve Miller
- RR#, St. Address, Box #: P.O. Box 780 RR 2 Box 37
- City, State, ZIP Code: Middleburg, VA 20118 andtett, KS. 67-w--)Data

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:

4 DEPTH OF COMPLETED WELL: 80 ft.

5 TYPE OF CASING USED:
- 1 Steel
- 3 RMP (SR)
- 5 Fiberglass
- 8 Concrete tile
- 6 Asbestos-Cement
- Other (specify below)

6 GROUT MATERIAL:
- 1 Neat cement
- 2 Cement grout
- 3 Bentonite
- 4 Other

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:
- Kansas Water Well Contractor's License No. 334
- This Water Well Record was completed on (mo/day/year) 10-20-06 under the business name of Pa 3a... by (signature)...

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one to WATER WELL OWNER and retain one for your records. Fee of $5.00 for each constructed well. Visit us at http://www.kdhe.state.ks.us/geo/waterwells.
**LAVETA OIL & MILLER, STEVE - OIL FIELD WATER SUPPLY**

**WATER WELL RECORD**  
**Form WWC-5**

<table>
<thead>
<tr>
<th>Section Number</th>
<th>Township Number</th>
<th>Range Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>T 22 S</td>
<td>R 11 E</td>
</tr>
</tbody>
</table>

**Global Positioning Systems** (decimal degrees, min. of 4 digits)
- Latitude: 
- Longitude: 
- Datum: 
- Data Collection Method: 

**1 LOCATION OF WATER WELL:**
- County: Stafford
- Distance and direction from nearest town or city street address of well if located within city: 4 3/4 East of Hudson

**2 WATER WELL OWNER:** LAVETA Oil & Gas / Steve Miller  
- RR#, St. Address, Box #: P.O. Box 760 / Rt 2 Box 37  
- City, State, ZIP Code: Middleburg, Va 20118 / Bement, Ke 67523

**WATER WELL RECORD 	 Form WWC-5**

**SFWW3459 20070150**

**Division of Water Resources; App. No.**

**WELL'S LOCATION**
- **WELL'S LOCATION**
  - County: Stafford
  - **Fraction**
    - SW ¼
    - SE ¼
    - NE ¼
  - **Section Number:** 30
  - **Township Number:** T 22
  - **Range Number:** R 11

**LOCATION OF WATER WELL:**
- **County:** Stafford
- **Fraction**
  - SW ¼
  - SE ¼
  - NE ¼
- **Section Number:** 30
- **Township Number:** T 22
- **Range Number:** R 11

**3 LOCATE WELL’S LOCATION WITH AN “X” IN SECTION BOX:**

**4 DEPTH OF COMPLETED WELL:**
- **Depth(s) Groundwater Encountered:**
  - (1) ft.
  - (2) ft.
  - (3) ft.

**WELL'S STATIC WATER LEVEL:**
- **5 ft.** below land surface measured on mo/day/yr...

**PUMP TEST DATA:**
- **Well water was**
- **gpm** after 

**ELEVATION:**
- **Datum:**
- **Data Collection Method:**

**WELL'S STATIC WATER LEVEL**
- **5 ft.** below land surface measured on mo/day/yr...

**PUMP TEST DATA:**
- **Well water was**
- **gpm** after 

**WELL WATER TO BE USED AS:**
- **Public water supply**
- **Air conditioning**
- **Injection well**
- **Irrigation**
- **Industrial**
- **Dewatering**
- **Other (Specify below)**
- **Domestic**
- **Feedlot**
- **Oil field water supply**
- **Dewatering**
- **Other (Specify below)**
- **Public water supply**
- **Air conditioning**
- **Injection well**
- **Irrigation**
- **Industrial**
- **Dewatering**
- **Other (Specify below)**

**Was a chemical/bacteriological sample submitted to Department?**
- **Yes**
- **No**

**WELL WATER DISINFECTED?**
- **Yes**
- **No**

**5 TYPE OF CASING USED:**
- **Wrought Iron**
- **Concrete tile**
- **Steel**
- **Asbestos-Cement**
- **Fiberglass**
- **ABS**
- **PVC**
- **Galvanized Steel**
- **Concrete tile**
- **RM (SR)**
- **Fiberglass**
- **PVC**
- **ABS**
- **RMP (SR)**
- **Asbestos-Cement**
- **Fiberglass**
- **PVC**
- **ABS**
- **RMP (SR)**
- **Asbestos-Cement**

**6 GROUT MATERIAL:**
- **1 Neat cement**
- **2 Cement grout**
- **3 Bentonite**
- **4 Other (Specify)**

**SCREEN-PERFORATED INTERVALS:**
- **From**
- **To**

**7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:**
- This water well was (1) **constructed**, (2) **reconstructed, or** (3) **plugged**
- under my jurisdiction and was completed on (mo/day/year) 
- and this record is true to the best of my knowledge and belief.
- Kansas Water Well Contractor's License No. 
- This Water Well Record was completed on (mo/day/year) .

**INSTRUCTIONS:** Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one to WATER WELL OWNER and retain one for your records. Fee of $5.00 for each constructed well.
### Logue, Jim - Domestic

**WATER WELL DATABASE QUERY**

**LOGUE, JIM**

**WATER WELL DATABASE**

**WATER WELL RECORD**

<table>
<thead>
<tr>
<th>Location of Water Well</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Depth</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>AQUIFER</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>GRAVEL</td>
<td>72</td>
<td></td>
</tr>
</tbody>
</table>

**Location and description from nearest town or city street address of well if located within city.**

**WATER WELL OWNER**

**Logue, Jim**

**Address**

**Oval**

**Stafford, KS** 67578

**Locate well in section box.**

**Section Number**

**Elevation**

**Well Static Water Level**

**Well Water to be Used As**

**Type of Blank Casing Used**

**Type of Screen or Perforation Material**

**Type of Screen or Perforation OPENINGS ARE**

**Screen or Percutrated INTERVALS**

**Gravel Pack Intervals**

**Ground Material**

**Lithological Log**

**PLOTTING INTERVALS**

**Comments to webadmin@kgs.ku.edu**

**URL: http://www.kgs.ku.edu/Magellan/WaterWell/index.html**

**DisplayPrograir Updated July 2, 2014**

**Data added continuously.**
**MAGELLAN MIDSTREAM PARTNERS - MONITORING**

---

### WATER WELL RECORD

**Form WWC-5**

<table>
<thead>
<tr>
<th>Section Number</th>
<th>Township No.</th>
<th>Range Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T 23</td>
<td>S 12</td>
</tr>
</tbody>
</table>

#### 1 LOCATION OF WATER WELL:
- **County:** Stafford
- **Street/Rural Address of Well Location:** From nearest town or intersection: If at owner's address, check here:
- **North of Stafford, KS on N. Stafford Road for 7 mi., west 1 mi., 1/2 mi. north**

#### 2 WATER WELL OWNER:
- **RR#, Street Address, Box #:** One Williams Center, MD 27
- **City, State, ZIP Code:** Tulsa, Ok. 74172

#### 3 LOCATE WELL WITH AN "X" IN SECTION BOX:

<table>
<thead>
<tr>
<th>W</th>
<th>NW</th>
<th>NE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4 DEPTH OF COMPLETED WELL:
- **Depth(s) Groundwater Encountered:**
  - 1 ft. to 6 ft.
  - 6 ft. to 18 ft.
- **Well's Static Water Level:**
  - ft. below land surface measured on mo/day/yr:
  - ft. after hours pumping:
  - gpm

#### 5 TYPE OF CASING USED:
- **Casing diameter and in. to ft.:**
  - 2 in. to 8 in.
- **Casing height above land surface:**
  - 36 ft.
- **Weight lbs./ft.**
  - Wall thickness or gauge No.

#### 6 SCREEN OR PERFORATION MATERIAL:
- **Type of Screen or Perforation Material:**
  - Steel
  - Stainless Steel
  - Brass
  - Galvanized Steel
  - None used (open hole)

#### 7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:
- **Kansas Water Well Contractor's License No.**
- **Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367.**

---

**INSTRUCTIONS:** Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks and check the correct answers. Send one copy to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367.

---

**KSA 82a-1212**
### Water Well Record

**1 Location of Water Well:**
- **County:** Stafford
- **Street/Rural Address of Well Location:** If unknown, distance & direction from nearest town or intersection: If at owner's address, check here.
- **North of Stafford, KS on N. Stafford Road for 7 mi., west 1 mi., 1/2 mi. north**

**2 Water Well Owner:**
- **Magellan Midstream Partners**
- **RR#, Street Address, Box #:** One Williams Center, MD 27
- **City, State, ZIP Code:** Tulsa, Ok. 74172

**3 Locate Well with an "X" in Section Box:**

<table>
<thead>
<tr>
<th>Section Number</th>
<th>Township No.</th>
<th>Range Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T 23</td>
<td>S R 12</td>
</tr>
</tbody>
</table>

**Global Positioning System (GPS) Information:**
- **Latitude:** (in decimal degrees)
- **Longitude:** (in decimal degrees)
- ** Datum:** WGS 84, NAD 83, NAD 27
- **Elevation:**
- **Collection Method:**
- **Instructions:** Use typewriter or ball point pen. Please fill in blanks and check the correct answers. Send one copy to Kansas Water Well Contractor's License No. 604. This Water Well Record was completed on (mo/day/year) 1/23/14. Topeka, Kansas 66612-1367.
- **Telephone:** 785-296-5524. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at [http://www.kdheks.gov/waterwell/index.html](http://www.kdheks.gov/waterwell/index.html).
## WATER WELL RECORD

### 1 LOCATION OF WATER WELL:
- **County:** Stafford
- **Street/Rural Address of Well Location:** If unknown, distance & direction from nearest town or intersection: If at owner's address, check here. North of Stafford, Ks. on N. Stafford Road for 7 mi., west 1 mi., 1/2 mi. north
- **Water Well Owner:** Magellan Midstream Partners
  - **RR#:** Box #: One Williams Center, MD 27
  - **City, State, ZIP Code:** Tulsa, Ok. 741172

### 4 DEPTH OF COMPLETED WELL
- **Depth(s) Groundwater Encountered:** From...
- **Well's Static Water Level:** ft. below land surface measured on mo/day/yr...
- **EST. YIELD:** gpm. Well water was...
- **Bore Hole Diameter:** in. to...
- **WELL WATER TO BE USED AS:**
  - [ ] Public water supply
  - [ ] Geothermal
  - [ ] Injection well
  - [ ] Oil field water supply
  - [ ] Dewatering
  - [ ] Other (Specify below)
- **Irrigation**
- **Domestic**
- **Livestock-lawn & garden**
- **Monitoring well**
- **Was a chemical/bacteriological sample submitted to Department?**
  - [ ] Yes
  - [ ] No
- **Water well disinfected?**
  - [ ] Yes
  - [ ] No

### 5 TYPE OF CASING USED:
- **Casing diameter:** in. to...
- **Casing height above land surface:** in.
- **Weight:** lbs./ft. Wall thickness or gauge No....
- **Type of Screen or Perforation Material:**
  - [ ] Steel
  - [ ] Stainless Steel
  - [ ] PVC
  - [ ] Galvanized Steel
  - [ ] None used (open hole)
- **Screen or Perforation Openings Are:**
  - [ ] Continuous slot
  - [ ] Mill slot
  - [ ] Gauze wrapped
  - [ ] Torch cut
  - [ ] Drilled holes
  - [ ] None (open hole)
- **Screen-Perforated Intervals:** From...
- **Gravel Pack Intervals:** From...

### 6 GROUT MATERIAL:
- **Grout Intervals:** From...
- **What is the nearest source of possible contamination:**
  - [ ] Septic tank
  - [ ] Lateral line
  - [ ] Pit privy
  - [ ] Livestock pen
  - [ ] Insecticide storage
  - [ ] Other (Specify below)
- **Direction from well:**

### LITHOLOGIC LOG
<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>DISTANCE FROM WELL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.5</td>
<td>silt, yellow brown, damp, sandy</td>
</tr>
<tr>
<td>1.5</td>
<td>6</td>
<td>sand, brown to yellow brown, very fine, moist, silty</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>sand, very fine to med., wet, petroleum odor</td>
</tr>
<tr>
<td>10</td>
<td>16</td>
<td>clay, gray to dark gray, fine to medium, saturated, petroleum odor</td>
</tr>
<tr>
<td>16</td>
<td>18</td>
<td>clay, dark gray, firm, moist, silty petroleum odor</td>
</tr>
</tbody>
</table>

### CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:
This water well was [ ] constructed, [ ] reconstructed, or [ ] plugged under my jurisdiction and was completed on (mo/day/year) ... and this record is true to the best of my knowledge and belief.

KSA 82a-1212
**LOCATION OF WELL**

**County:** Stafford  
**Fraction:** 1/4 SE 1/4 NE 1/4  
**Section:** 6  
**Township Number:** T 23  
**Range Number:** R 11 W  
**E/W:**

Distance and direction from nearest town or city?  
**Street address of well if located within city:** 8 N, 1 3/14 E of Stafford, Kansas

**WATER WELL OWNER:** Merckel Drilling  
**Box:** 1362  
**City, State, ZIP Code:** Great Bend, Kansas 67530  
**Board of Agriculture, Division of Water Resources**  
**Application Number:** Unknown

**DEPTH OF COMPLETED WELL**

- **Bore Hole Diameter:** 8 in. to 78 ft. and 78 in. to 8 ft.
- **Well Water to be used as:**
  - 5 Public water supply  
  - 8 Air conditioning  
  - 11 Injection well  
  - 12 Other (Specify below)

**Well's static water level:** 8 ft. below land surface measured on 11 month 21 day 1979 year

**Pump Test Data**

- **Well water was:** ft. after 8 hours pumping gpm
- **Well water was:** ft. after 8 hours pumping gpm

**TYPE OF BLANK CASING USED:**

- **5 Wrought iron**  
- **6 Asbestos-Cement**  
- **9 Other (Specify below)**

**Blank casing diam:** in. to 58 ft. Dia in. to ft. Dia

**Casing height above land surface:** 12 in., weight 2.8 lbs/ft. Wall thickness or gauge No. 10 Sch. 40

**TYPE OF SCREEN OR PERFORATION MATERIAL:**

- **5 Wrought iron**  
- **6 Asbestos-Cement**  
- **9 Other (Specify below)**

**Screen or perforation openings are:**

- **5 Gauzed wrapped**  
- **8 Saw cut**  
- **11 None (open hole)**

**Screen-Perforation Dia:** in. to ft. Dia

**Screen-Perforated Intervals:**

- From 58 ft. to 78 ft.  
- From 78 ft. to 78 ft.

**Gravel Pack Intervals:**

- From 78 ft. to 78 ft.
- From 78 ft. to 78 ft.

**GROUT MATERIAL:**

- **1 Neat cement**  
- **2 Cement grout**  
- **3 Bentonite**  
- **4 Other**

**Grouted intervals:** From 0 ft. to 10 ft. From 10 ft. to 

**What is the nearest source of possible contamination:**

- **5 Septic tank**  
- **6 Cess pool**  
- **7 Sewage lagoon**  
- **8 Feed yard**  
- **9 Livestock pens**  
- **10 Fuel storage**  
- **11 Fertilizer storage**  
- **12 Insecticide storage**  
- **13 Irrigation**  
- **14 Abandoned water well**

**Direction from well source:** East  
**How many feet:** 60

**Was a chemical/bacteriological sample submitted to Department?** Yes

**If yes, date sample was submitted:** month year  
**Pump installed?** Yes

**If yes, name of Pump Manufacturer:**  
**Model No.** HP

**Depth of Pump Intake:** ft.  
**Pumps Capacity rated at:** gal/min

**Type of pump:**  
- **1 Submersible**  
- **2 Turbine**  
- **3 Jet**  
- **4 Centrifugal**  
- **5 Reciprocating**  
- **6 Other**

**CONTRACTOR'S OR LANDOWNER'S CERTIFICATION**

This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on November 21 1979

**and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 166

This Water Well Record was completed on March 3 1980 under the business name of Kelly's Water Well Service

**LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:**

- **0 58 Clays**
- **58 78 Sand and gravel**

**ELEVATION:** Unknown

**Depth(s) Groundwater Encountered:** ft.  
**(Use a second sheet if needed)**

**INSTRUCTIONS:** Use typewriter or ball point pen, please press firmly and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Division of Environment, Water Well Contractors, Topeka, KS 66620. Send one to WATER WELL OWNER and retain one for your records.
WATER WELL RECORD  	 Form WWC-5

**1 LOCATION OF WATER WELL:**

- **County:** Stafford
- **Street/Rural Address of Well Location:** If unknown, distance & direction from nearest town or intersection: If at owner's address, check here.
- **4th & Stafford Blktop 3N 1E 1/4S ESR behind oil tanks**

**2 WATER WELL OWNER:** Rose Rock Midstream
- **RR#, Street Address, Box #:** 598 W. Arthur
- **City, State, ZIP Code:** Stafford, Kansas 67578

**3 LOCATE WELL WITH AN "X" IN SECTION BOX:**

<table>
<thead>
<tr>
<th>N</th>
<th>NW</th>
<th>NE</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SW</td>
<td>SE</td>
<td>S</td>
</tr>
</tbody>
</table>

**4 DEPTH OF COMPLETED WELL:**

- **Depth(s) Groundwater Encountered:** From (1) ft. to (2) ft., From (3) ft. to 
- **Well's Static Water Level:** 5 ft. below land surface measured on (mo/day/yr) 12/11/13
- **Pump test data:** Well water was at ft. after _hours pumping, gpm
- **Bore Hole Diameter:** in. to ft.
- **Well Water to be Used As:** [ ] Public water supply [ ] Geothermal [ ] Injection well [ ] Domestic [ ] Industrial [ ] Dewatering [ ] Other (Specify below)
- **Was a chemical/bacteriological sample submitted to Department?** [ ] Yes [ ] No

**5 TYPE OF CASING USED:**

- [ ] Steel [ ] PVC [ ] Other

**CASING JOINTS:** [ ] Glued [ ] Clamped [ ] Welded [ ] Threaded

**Casing diameter:** in. to ft., Diameter in. to ft.

**Casing height above land surface:** ft., Weight lbs./ft., Wall thickness or gauge No.

**TYPE OF SCREEN OR PERFORATION MATERIAL:**

- [ ] Steel [ ] Stainless Steel [ ] PVC
- [ ] Brass [ ] Galvanized Steel [ ] None used (open hole)

**SCREEN OR PERFORATION OPENINGS ARE:**

- [ ] Continuous slot [ ] Mill slot [ ] Gauze wrapped [ ] Torch cut [ ] Drilled holes [ ] None (open hole)
- [ ] Louvered shutter [ ] Key punched [ ] Wire wrapped [ ] Saw cut [ ] Other (specify)

**SCREEN-PERFORATED INTERVALS:**

- From ft. to ft., From ft. to ft., From ft. to ft.

**GRAVEL PACK INTERVALS:**

- From ft. to ft., From ft. to ft., From ft. to ft.

**6 GROUT MATERIAL:**

- [ ] Neat cement [ ] Cement grout [ ] Bentonite [ ] Other

**Grout Intervals:** From ft. to ft., From ft. to ft., From ft. to ft.

**What is the nearest source of possible contamination:**

- [ ] Septic tank [ ] Lateral lines [ ] Pit privy [ ] Livestock pens [ ] Insecticide storage [ ] Other (specify below)
- [ ] Sewer lines [ ] Septic tank [ ] Seepage pit [ ] Fuel storage [ ] Abandoned water well [ ] Oil pipeline
- [ ] Watertight sewer lines [ ] Cesspool [ ] Sewage lagoon [ ] Abandoned oil well [ ] Feeding yard [ ] Other (specify below)
- [ ] Watertight lateral lines [ ] Sewage lagoon [ ] Feedyard [ ] Fertilizer storage [ ] Oil well/gas well [ ] Other (specify below)

**Direction from well West:** Distance from well ft.

**LITHOLOGIC LOG:**

- **FROM:**
  - 0 3 Top soil
  - 3 6 Tan clay
  - 6 12 Med.-fine sand
  - 12 43 Tan clay-sandy
  - 43 70 Fine-sandy

**FROM TO LITHO. LOG (cont.) OR PLUGGING INTERVALS:**

**7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:**

- This water well was [ ] constructed, [ ] reconstructed, or [ ] plugged under my jurisdiction and was completed on (mo/day/yr) 12/11/13, and this record is true to the best of my knowledge and belief.

- Kansas Water Well Contractor's License No. 134. This Water Well Record was completed on (mo/day/yr) 1/8/2014, under the business name of . Rosenkrantz-Bennis Ent.

- By (signature) [ ]

**INSTRUCTIONS:** Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367.

- Telephone 785-296-5524. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.ksdeks.gov/waterwell/index.html.

- Check: [ ] White Copy [ ] Blue Copy [ ] Pink Copy
WATER WELL RECORD

1 LOCATION OF WATER WELL:
   County: Stafford  
   Street/Rural Address of Well Location; if unknown, distance & direction from nearest town or intersection: If at owner's address, check here [ ]  
   3 1/4 East of Hudson

2 WATER WELL OWNER: Dennis Siefkes  
   RR#, Street Address, Box #: 714 NE 160th Street  
   City, State, ZIP Code: Hudson, KS 67545

3 LOCATE WELL WITH AN "X" IN SECTION BOX:

4 DEPTH OF COMPLETED WELL:
   Depth(s) Groundwater Encountered: (1) ft.; (2) ft.; (3) ft.  
   WELL'S STATIC WATER LEVEL: ft. below land surface measured on mo/day/yr: 4-18-11  
   Pump test data: Well water was pumped for hours at a rate of gpm  
   EST. YIELD, N/A: gpm. Well water was pumped for hours at a rate of gpm  
   Bore Hole Diameter: in. to in.  
   WELL WATER TO BE USED AS: Yes [ ] Public water supply [ ] Geothermal [ ] Injection well
   [ ] Domestic [ ] Feedlot [ ] Oil field water supply [ ] Dewatering [ ] Other (Specify below)  
   [ ] Irrigation [ ] Industrial [ ] Domestic-lawn & garden [ ] Monitoring well [ ] Stock
   Was a chemical/bacteriological sample submitted to Department? Yes [ ] No  
   If yes, mo/day/yr sample was submitted: 
   Water well disinfected? Yes [ ] No

5 TYPE OF CASING USED: [ ] Steel [ ] PVC [ ] Other
   CASING JOINTS: [ ] Glued [ ] Clamped [ ] Welded [ ] Threaded
   Casing diameter: in. to in. ft. Diameter in. to ft.  
   Casing height above land surface: in. to ft.  
   SQR: lbs./ft., Wall thickness or gauge No.

6 SCREEN OR PERFORATION MATERIAL:
   [ ] Steel [ ] Stainless Steel [ ] PVC [ ] Other (Specify)
   SCREEN OR PERFORATION OPENINGS ARE:
   [ ] Continuous slot [ ] Mill slot [ ] Gauze wrapped [ ] Torch cut [ ] Drilled holes [ ] None (open hole)
   SCREEN-PERFORATED INTERVALS:
   From ft. to ft. From ft. to ft. From ft. to ft.
   [ ] Louvered shutter [ ] Key punched [ ] Wire wrapped [ ] Saw cut [ ] Other (specify)

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was [ ] constructed, [ ] reconstructed, or [ ] plugged under my jurisdiction and was completed on (mo/day/year): 4-18-11, and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No.: 334...
   This Water Well Record was completed on (mo/day/year): 4-18-11, under the business name of... (signature)

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Telephone 785-296-5522. Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www.kdhks.gov/waterwell/index.html

KSA 82a-1212

Check: [ ] White Copy, [ ] Blue Copy, [ ] Pink Copy
SLAWSON DRILLING - OIL FIELD WATER SUPPLY

LOCATION OF WATER WELL:
FRAC. NE 1/4 SE 1/4 NE 1/4
Section Number 36 Township Number T 22 S Range Number R 12 E/W

County: Stafford
WATER WELL OWNER: Slawson Drilling
City, State, ZIP Code: Great Bend, KS 67530

Distance and direction from nearest town or city street address of well if located within city?

4 east 3/4 south of Hudson

WATER WELL LOCATION WITH AN "X" IN SECTION BOX:

LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:

4 DEPTH OF COMPLETED WELL.... 110 .... ft.

WELL'S STATIC WATER LEVEL.... 12 .... ft. below land surface measured on mo/day/yr 6-23-81

Pump test data: Well water was .... ft. after hours pumping . gpm

WELL WATER TO BE USED AS:
1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering
2 Irrigation 4 Industrial 7 Lawn and garden only 10 Observation well

Was a chemical/bacteriological sample submitted to Department? Yes .... No .... X ...

LOCATION OF WATER WELL:
Fraction

INSTRUCTIONS: Use typewriter or ball point pen, PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Division of Environment, Environmental Geology Section, Topeka, KS 66620. Send one to WATER WELL OWNER and retain one for your records.

Sewer lines 5 Cass pool 8 Sewage lagoon 7 Pit privy 1 Oil field water supply
2 Septic tank 4 Lateral lines 7 Septic tank 12 Fertilizer storage
1 Septic tank 4 Lateral lines 7 Septic tank 12 Fertilizer storage
3 Bentonite 5 Continuous slot 8 Steel 10 Asbestos-cement
1 Septic tank 4 Lateral lines 7 Septic tank 12 Fertilizer storage
4 Other (specify below)

GROUT MATERIAL:
0 Neat cement 2 Cement grout 3 Bentonite 4 Other

Depth(s) Groundwater Encountered: 1.... .ft. 2.... ft. 3.... ft.

Bore Hole Diameter: 11.... in. to 90.... ft., Dia.... in. to .... ft., Dia.... in. to .... ft.
<table>
<thead>
<tr>
<th>Section Number</th>
<th>Township Number</th>
<th>Range Number</th>
<th>Location of Well</th>
<th>Zip Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>22</td>
<td>81</td>
<td>Stafford, KS</td>
<td>67530</td>
</tr>
</tbody>
</table>

**WATER WELL OWNER:**

- Slawson Drilling
- Box 140
- Topeka, KS 66620

**Model No. HP Volts:**

- B11-266

**Application Number:**

- TR1-266

**Water Well Contractor:**

- Board of Agriculture, Division of Water Resources
- Kansas Department of Health and Environment, Division of Environment

**WATER WELL INFORMATION:**

- Depth of completed well: 100 ft.
- Bore hole diameter: 4 in.
- Water well to be used as: 5 (Public water supply)
- Depth to water: 10 ft.
- Test data:
  - Wet water: 0.80 in.
  - Water level: 0.80 in.

**GROUT MATERIAL:**

- Neat cement
- Cement grout

**GROUTING:**

- Grouted wrapped
- Concreting

**Casing Dia.:**

- 8 in.

**Type of Blank Casing Used:**

- PVC
- Steel

**Casing Dia. Weight:**

- 20 gpm

**Lateral lines:**

- 3

**Abandoned water well:**

- Yes

**Oil field water supply:**

- Yes

**Public water supply:**

- No

**Industrial:**

- No

**Insecticide storage:**

- No

**Drilled holes:**

- 7

**Drilled holes weight:**

- 20 gpm

**Other (Specify below):**

- None used

**Screen or perforation material:**

- PVC
- RMP (SR)
- Asbestos-cement
- Other (specify below)

**Screening:**

- Yes

**Water table:**

- 10 ft.

**Perforated intervals:**

- From 10 to 0 ft.
- From 0 to 10 ft.
- From 10 to 20 ft.
- From 20 to 30 ft.
- From 30 to 40 ft.
- From 40 to 50 ft.
- From 50 to 60 ft.
- From 60 to 70 ft.
- From 70 to 80 ft.
- From 80 to 90 ft.
- From 90 to 100 ft.

**Water table:**

- 10 ft.

**Water well location:**

- X

**WATER WELL RECORD was completed on:**

- March 15, 1981

**All data sample taken on:**

- March 15, 1981

**Groundwater Encountered:**

- Sand and Gravel
- Sandy clay

**Well depth:**

- 100 ft.

**Casing:**

- Steel
- Stainless steel

**Casing:**

- Steel
- RMP (SR)
- Concrete tile
- Other (specify below)

**Holes:**

- 10

**Other (specify below):**

- None used

**Joints:**

- Glued

**Notes:**

- None

**Comments:**

- None

**Management:**

- None

**Fertilizer storage:**

- Yes

**Livestock pens:**

- Yes

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None

**Other (Specify below):**

- None
**WATER WELL RECORD**

**Form WWC-5**

**Division of Water Resources**

App. No. [Blank]

**1 LOCATION OF WATER WELL:**
- **County:** Stafford
- **Street/Rural Address of Well Location:**
  - If known, distance & direction from nearest town or intersection:
  - If at owner's address, check here □
  - 1 South, 4 1/4 East of Hudson

**2 WATER WELL OWNER:**
- **Name:** Tom Turner
- **Telephone:** 785-296-5524
- **Collection Method:** ,
- **Send one copy to WATER WELL OWNER:** and retain one for your records.
- **Include fee of $5.00 for each constructed well.**

**3 LOCATE WELL WITH AN "X" IN SECTION BOX:**

<table>
<thead>
<tr>
<th>□</th>
<th>□</th>
<th>□</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW</td>
<td>NE</td>
<td>SW</td>
</tr>
<tr>
<td>·</td>
<td>·</td>
<td>·</td>
</tr>
</tbody>
</table>

**4 DEPTH OF COMPLETED WELL:**
- **Depth(s) Groundwater Encountered:**
  - (1) ft., (2) ft., (3) ft.
- **WELL'S STATIC WATER LEVEL:**
  - 8 ft. below land surface measured on mo/day/yr. 10/18/11.
- **Pump test data:**
  - Well water was ft. after... hours pumping... gpm
- **EST. YIELD N/A**
  - gpm. Well water was ft. after... hours pumping... gpm
- **Bore Hole Diameter:**
  - 75 ft. in. to 75 ft.
- **WELL WATER TO BE USED AS:**
  - [ ] Public water supply
  - [ ] Geothermal
  - [ ] Injection well
  - [ ] Domestic
  - [ ] Feedlot
  - [ ] Oilfield water supply
  - [ ] Dewatering
  - [ ] Other (Specify below)
  - [ ] Monitoring well
  - [ ] Stock

**5 TYPE OF CASING USED:**
- **CASING JOINTS:**
  - [ ] Glued
  - [ ] Clamped
  - [ ] Welded
  - [ ] Threaded
- **Casing diameter:**
  - . in. to . in.
  - Diameter in. to ft.
  - Diameter in. to ft.
  - Diameter in. to ft.
- **Casing height above land surface:**
  - 18 in.
  - Weight lbs/ft.
  - Wall thickness or gauge No.

**6 SCREEN OR PERFORATION MATERIAL:**
- **TYPE OF SCREEN OR PERFORATION MATERIAL:***
  - [ ] Steel
  - [ ] Stainless Steel
  - [ ] PVC
  - [ ] Galvanized Steel
  - [ ] None used (open hole)

**SCREEN OR PERFORATION OPENINGS ARE:**
- **Continuous slot**
- **Mill slot**
- **Louvered shutter**
- **Key punched**

**SCREEN-PERFORATED INTERVALS:**
- From ft. to ft.
- From ft. to ft.
- From ft. to ft.
- From ft. to ft.

**GRAVEL PACK INTERVALS:**
- From ft. to ft.
- From ft. to ft.
- From ft. to ft.
- From ft. to ft.

**6 GROUT MATERIAL:**
- **GROUT MATERIAL:**
  - [ ] Neat cement
  - [ ] Cement grout
  - [ ] Bentonite
  - [ ] Other (Specify below)

**Grout Intervals:**
- From ft. to ft.
- From ft. to ft.
- From ft. to ft.
- From ft. to ft.

**What is the nearest source of possible contamination:**
- [ ] Septic tank
- [ ] Lateral lines
- [ ] Pit privy
- [ ] Livestock pens
- [ ] Insecticide storage
- [ ] Other (Specify below)
- [ ] Sewer lines
- [ ] Cesspool
- [ ] Sewage lagoon
- [ ] Fuel storage
- [ ] Abandoned well
- [ ] None
- [ ] Water right sewer lines
- [ ] Cesspool
- [ ] Septage pit
- [ ] Feedyard
- [ ] Fertilizer storage
- [ ] Oil well/gas well

**Direction from well:**
- [ ] Top soil
- [ ] Sand & gravel
- [ ] Clay

**LITHOLOGIC LOG**

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>LITHO. LOG (cont.) or PLUGGING INTERVALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>24</td>
<td>Top soil</td>
</tr>
<tr>
<td>24</td>
<td>58</td>
<td>Sand &amp; gravel</td>
</tr>
<tr>
<td>58</td>
<td>75</td>
<td>Sand &amp; gravel</td>
</tr>
</tbody>
</table>

**7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:**
- This water well was [✓] constructed, [ ] reconstructed, or [ ] plugged under my jurisdiction and was completed on (mo/day/year) 10/18/11 and this record is true to the best of my knowledge and belief.
- Kansas Water Well Contractor's License No. 134
- This Water Well Record was completed on (mo/day/year) 11/19/11 under the business name of Rosencrantz, Bemis... by (signature)...

**INSTRUCTIONS:**
- Use typewriter or ball point pen. **PLEASE PRESS FIRMLY** and **PRINT** clearly. Please fill in blanks and check the correct answers. Send three copies (white, blue, pink) to Kansas Department of Health and Environment, Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367.

**Telephone:** 785-296-5524

Send one copy to WATER WELL OWNER and retain one for your records. Include fee of $5.00 for each constructed well. Visit us at http://www kdheks.gov/waterwell/index.html.

KSA 82a-1212

Check: [✓] White Copy, [ ] Blue Copy, [ ] Pink Copy
**LOCATION OF WATER WELL:**
- **County:** Stafford
- **Township Number:** 30
- **Range Number:** 11

**WATER WELL OWNER:** Tom Turner

**LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:**

<table>
<thead>
<tr>
<th>N</th>
<th>W</th>
<th>NW</th>
<th>NE</th>
<th>W</th>
<th>SW</th>
<th>SE</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DEPTH OF COMPLETED WELL:** 64 ft.

**WELL'S STATIC WATER LEVEL:** 29 ft. below land surface measured on mo/day/yr 1-3-86

**Type of Blank Casing Used:**
- 1 Steel
- 2 PVC
- 4 ABS

**Screen or Perforation Openings Are:**
- 1 Continuous slot
- 2 Louvered shutter

**Placing of Blank Casing Above:** 18 in.

**Screen or Perforation Openings Are:**
- 5 Gauzed wrapped
- 4 Key punched

**Gravel Pack Intervals:**
- From 10 ft. to 64 ft.
- From 64 ft. to 10 ft.

**Lithologic Log:**
- 0 ft. to 33 ft. Sandy top of oil
- 3 ft. to 10 ft. Sand
- 10 ft. to 28 ft. Tan clay
- 28 ft. to 43 ft. Tan clay and white broken rock
- 43 ft. to 65 ft. Medium sand and thin streaks of tan clay

**CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:**
- This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 1-3-86 by signature: "Society Doda"

**INSTRUCTIONS:** Use typewriter or ball point pen. PLEASE PRESS HARD and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send three copies to Kansas Department of Health and Environment, Office of Oil Field and Environmental Geology, Regulation and Permitting Section, Topeka, Kansas 66620-7500, Telephone: 913-862-9360. Send one to WATER WELL OWNER and retain one for your records.
<table>
<thead>
<tr>
<th>Location of Water Well</th>
<th>Fraction</th>
<th>Section Number</th>
<th>Township Number</th>
<th>Range Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>County:</td>
<td>Stafford</td>
<td>25</td>
<td>T 22</td>
<td>S R 12 W</td>
</tr>
</tbody>
</table>

### Water Well Record
- **Water Well Owner:** Woodman-Iannitti Drilling Co
- **Address:** 1008 Douglas Blvd, Wichita, KS 67202
- **Application Number:** unknown

### Depth of Completed Well
- **Bore Hole Diameter:** 45 ft.
- **Bore Hole Diameter:** 6 in. to 45 ft.
- **Intervals:** From 0 ft. to 10 ft.,
- **And:** From 10 ft. to 60 ft.
- **Well Static Water Level:** 6 ft. below land surface measured on...
- **Yield:** 50 gpm
- **Well Water Used for:**
  - Public supply
  - Domestic use

### Type of Blank Casing Used
- **Steel:** 1
- **2 PVC:** 2
- **3 RMP (SR):** 3
- **4 Galvanized steel:** 4
- **6 Concrete tile:** 6
- **5 Wrought iron:** 5
- **8 Concrete tile:** 8

### Type of Screen or Perforation Material
- **1 Steel:** 1
- **2 Brass:** 2
- **3 Stainless steel:** 3
- **4 Galvanized steel:** 4
- **5 Fiber glass:** 5
- **6 Concrete tile:** 6
- **7 Fiber glass:** 7
- **8 RMP (SR):** 8
- **9 ABS:** 9

### Gruyard Material
- **1 Neat cement:** 1
- **2 Cement grout:** 2
- **3 Bentonite:** 3
- **4 Other:** 4

### Locate Well’s Location
- **From:** 0 ft.
- **To:** 5 ft.
- **Top Soil-Clay:**
- **From:** 5 ft.
- **To:** 45 ft.
- **Sand-Gravel:**

### Lithographic Log
- **From:** 0 ft.
- **To:** 5 ft.
- **Top Soil-Clay:**
- **From:** 5 ft.
- **To:** 45 ft.
- **Sand-Gravel:**

### Water Well Record Collection
- **Contractor’s or Landowner's Certification:**
  - This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on...
  - **Month:** 6
  - **Day:** 11
  - **Year:** 1980

### Certifications
- **Pump Manufacturer’s name:**
- **Model No.:**
- **Volts:**
- **Pumps Capacity Rated at:**
- **Gal./min:**

### Certification
- **Kelly Waterwell Serv.:**
- **Kelli Price:**

### Instructions
- Use typewriter or ball point pen, please press firmly and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Division of Environment, Water Well Contractors, Topeka, KS 66620. Send one to WATER WELL OWNER and one for your records.
**LOCATION OF WATER WELL**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Stafford</th>
</tr>
</thead>
</table>

**Fraction**

<table>
<thead>
<tr>
<th>NW 1/4</th>
<th>NW 1/4</th>
<th>NW 1/4</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>T 22</td>
<td>S R</td>
</tr>
</tbody>
</table>

**Range Number**

<table>
<thead>
<tr>
<th>11W</th>
<th>E/W</th>
</tr>
</thead>
</table>

Street address of well if located within city?

5% of Hudson, Kansas

**WATER WELL OWNER:**

<table>
<thead>
<tr>
<th>Woodman &amp; Ianitti Oil Company</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>1008 Douglas Blvd., 10th S Broadway</th>
</tr>
</thead>
</table>

Wichita, Kansas 67202

Board of Agriculture, Division of Water Resources

Application Number: Unknown

**DEPTH OF COMPLETED WELL**

<table>
<thead>
<tr>
<th>60 ft. Bore Hole Diameter</th>
<th>5 1/8 in. to 60 ft. and 13 in. to ft.</th>
</tr>
</thead>
</table>

**Water to be used as:**

1. Public water supply
2. Air conditioning

**Domestic:**

3. Feedlot
4. Oil field water supply
5. Dewatering
6. Observation well

**Irrigation:**

7. Lawn and garden only
8. Septic tank
9. Livestock pens
10. Observation well

**Irrigation in Section:**

1. Septic tank
2. Feedlot
3. Sewage lagoon
4. Cess pool
5. Seepage pit
6. Pit privy
7. Sewage lagoon
8. Feed yard
9. Livestock pens
10. Observation well

**Lateral Lines:**

1. Septic tank
2. Feedlot
3. Sewage lagoon
4. Cess pool
5. Seepage pit
6. Pit privy
7. Sewage lagoon
8. Feed yard
9. Livestock pens
10. Observation well

**Sewer lines:**

1. Septic tank
2. Feedlot
3. Sewage lagoon
4. Cess pool
5. Seepage pit
6. Pit privy
7. Sewage lagoon
8. Feed yard
9. Livestock pens
10. Observation well

**Lawn and garden only:**

1. Septic tank
2. Feedlot
3. Sewage lagoon
4. Cess pool
5. Seepage pit
6. Pit privy
7. Sewage lagoon
8. Feed yard
9. Livestock pens
10. Observation well

**Public water supply:**

1. Septic tank
2. Feedlot
3. Sewage lagoon
4. Cess pool
5. Seepage pit
6. Pit privy
7. Sewage lagoon
8. Feed yard
9. Livestock pens
10. Observation well

**Other:**

1. Septic tank
2. Feedlot
3. Sewage lagoon
4. Cess pool
5. Seepage pit
6. Pit privy
7. Sewage lagoon
8. Feed yard
9. Livestock pens
10. Observation well

**Water Well Retard:**

1. Domestic
2. Irrigation
3. Septic tank
4. Sewage lagoon
5. Cess pool
6. Seepage pit
7. Pit privy
8. Sewage lagoon
9. Feed yard
10. Livestock pens

**Groundwater Encountered:**

13 ft.

**Routed Intervals:**

From: 0 ft. to 10 ft.

**Well Yield:**

50 gpm

**Yield of water well**

<table>
<thead>
<tr>
<th>50 gpm</th>
<th>50 gpm</th>
</tr>
</thead>
</table>

**Well water was used after hours pumping:**

<table>
<thead>
<tr>
<th>16 hours</th>
<th>16 hours</th>
</tr>
</thead>
</table>

**TYPE OF BLANK CASING USED:**

1. Steel
2. PVC
3. RMP (SR)
4. ABS
5. Wrought iron
6. Concrete tile
7. Asbestos-Cement
8. Other (specify below)
9. RMP (SR)
10. Asbestos-cement
11. Other (specify)
12. None used (open hole)

**Casing Joints:**

1. Glued
2. Clamped
3. Welded
4. Threaded

**Height above land surface:**

<table>
<thead>
<tr>
<th>60 ft.</th>
<th>60 ft.</th>
</tr>
</thead>
</table>

**MATERIALS:**

1. Neat cement
2. Galvanized steel
3. Brass
4. Galvanized steel
5. Stainless steel
6. Fiberglass
7. Fiber glass
8. Concrete tile
9. Concrete
10. Other (specify)

**Openings Are:**

1. 5 Gauzed wrapped
2. 8 Saw cut
3. 11 None (open hole)
4. Other

**Well Test Data:**

<table>
<thead>
<tr>
<th>50 gpm</th>
<th>50 gpm</th>
</tr>
</thead>
</table>

**Well water was used after hours pumping:**

<table>
<thead>
<tr>
<th>16 hours</th>
<th>16 hours</th>
</tr>
</thead>
</table>

**Perforation Openings Are:**

1. Continuous slot
2. Mill slot
3. Wire wrapped
4. Key punched
5. Gauzed wrapped
6. Saw cut
7. Torch cut
8. Other (specify)

**Perforation Dia.:**

<table>
<thead>
<tr>
<th>40 ft.</th>
<th>40 ft.</th>
</tr>
</thead>
</table>

**REMARKS:**

1. *Former well/Gas well*
2. *Drilled holes*
3. *Septic tank/Gas well*
4. *Septic tank/Gas well*
5. *Septic tank/Gas well*
6. *Septic tank/Gas well*
7. *Septic tank/Gas well*
8. *Septic tank/Gas well*
9. *Septic tank/Gas well*
10. *Septic tank/Gas well*

**LITMOLGIC LOG:**

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW</td>
<td>SW</td>
<td>NW</td>
<td>SW</td>
</tr>
</tbody>
</table>

**LOCATION OF WATER WELL WITH AN "X" IN SECTION BOX:**

<table>
<thead>
<tr>
<th>0</th>
<th>10</th>
<th>10</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>Sand and Gravel</td>
<td>Sand and Gravel</td>
<td>Sand and Gravel</td>
</tr>
</tbody>
</table>

**EVLATION:**

Unknown

**KELLYS WATER WELL SERVICE:**

<table>
<thead>
<tr>
<th>28</th>
<th>28</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>1980</th>
<th>1980</th>
</tr>
</thead>
</table>

**CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:**

This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on **July 16, 1980.**

If this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. **186.**

This Water Well Record was completed on **August 28, 1980.**

**WATER WELL OWNER:**

<table>
<thead>
<tr>
<th>Kellys Water Well Service</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>28 day</th>
<th>28 day</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>1980</th>
<th>1980</th>
</tr>
</thead>
</table>

**PUMPS USED:**

1. Submersible
2. Turbine
3. Jet
4. Centrifugal
5. Reciprocating
6. Other

**Pumps Capacity rated at:**

<table>
<thead>
<tr>
<th>10 HP</th>
<th>10 HP</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>10 gal./min.</th>
<th>10 gal./min.</th>
</tr>
</thead>
</table>

**HORIZONTAL DISTANCE FROM:**

<table>
<thead>
<tr>
<th>13 ft.</th>
<th>13 ft.</th>
</tr>
</thead>
</table>

**IN SECTION:**

<table>
<thead>
<tr>
<th>10 ft.</th>
<th>10 ft.</th>
</tr>
</thead>
</table>

**DEPT. OF BORE WELL:**

<table>
<thead>
<tr>
<th>60 ft.</th>
<th>60 ft.</th>
</tr>
</thead>
</table>

**DISTANCE FROM NEAREST TOWN OR CITY:**

<table>
<thead>
<tr>
<th>5% of Hudson, Kansas</th>
</tr>
</thead>
</table>

**INSTRUCTIONS:** Use typewriter or ball point pen, please press firmly and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Division of Environment, Water Well Contractors, Topeka, KS 66620. Send one to WATER WELL OWNER and one for your records.
APPENDIX C
Probe / Well / Field Logs & WWC-5 Forms
PROBE LOG NO. P-1

PROJECT: Comprehensive Investigation

SITE: Rose Rock Hudson Station
Stafford County, Kansas

CLIENT: Rose Rock Midstream Crude, LP
Cushing, Oklahoma

GRAPHIC LOG

DEPTH

5.0

SILTY CLAY WITH SAND, brown

Probe Terminated at 5 Feet

DEPTH (ft.) WATER LEVEL OBSERVATIONS SAMPLE TYPE RECOVERY (in.) PID (ppm) SAMPLE SENT TO LAB (ID NUMBER)

5

Dual-tube / Grab

0.0

P-1 (0-2 ft.)

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct-push / Dual Tube

Abandonment Method:
Boring backfilled with bentonite upon completion.

WATER LEVEL OBSERVATIONS

(While Drilling on 2/20/17)

Terracon
1815 S Eisenhower St
Wichita, KS

Probe Started: 02-20-2017
Probe Completed: 02-20-2017

Drill Rig: Geoprobe
Driller: EPS

Project No.: 0116741
Geologist: Staab
The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

**Advance Method:** Direct-push / Dual Tube

**Abandonment Method:** Boring backfilled with bentonite upon completion.

**WATER LEVEL OBSERVATIONS**

(While Drilling on 2/20/17)

**Probe Started:** 02-20-2017  
**Probe Completed:** 02-20-2017  
**Drill Rig:** Geoprobe  
**Driller:** EPS  
**Project No.:** 01167141  
**Geologist:** Staab
PROBE LOG NO. P-3

PROJECT: Comprehensive Investigation

CLIENT: Rose Rock Midstream Crude, LP
Cushing, Oklahoma

SITE: Rose Rock Hudson Station
Stafford County, Kansas

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>WATER LEVEL OBSERVATIONS</th>
<th>SAMPLE TYPE</th>
<th>RECOVERY (in.)</th>
<th>PID (rpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>P-3 (0-2 ft.)</td>
<td>Dual-tube/Grab</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Silty Sand, brown

Saturated at 5 ft.

Probe Terminated at 10 Feet

Advancement Method:
Direct-push / Dual Tube

Abandonment Method:
Boring backfilled with bentonite upon completion.

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

WATER LEVEL OBSERVATIONS
(While Drilling on 2/20/17)

1815 S Eisenhower St
Wichita, KS

Probe Started: 02-20-2017
Probe Completed: 02-20-2017
Drill Rig: Geoprobe
Driller: EPS
Project No.: 01167141
Geologist: Staab
## WELL LOG NO. P-4 / MW-1

### PROJECT: Comprehensive Investigation

### SITE: Rose Rock Hudson Station
Stafford County, Kansas

### CLIENT: Rose Rock Midstream Crude, LP
Cushing, Oklahoma

#### GRAPHIC LOG

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>SAMPLE DESCRIPTION</th>
<th>RECOVERY (in.)</th>
<th>PID (gpm)</th>
<th>SAMPLE SENT TO LAB</th>
<th>ID NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>P-4 (0-2 ft.)</td>
<td>0.0</td>
<td></td>
<td>Auger/Grab</td>
<td>P-4</td>
</tr>
<tr>
<td>0.7</td>
<td>P-4 (2-4 ft.)</td>
<td>0.7</td>
<td></td>
<td>Dual-tube/Grab</td>
<td>P-4</td>
</tr>
</tbody>
</table>

**Surface Elev.: 1817.0 (ft.)**

**Well Completion:**

- **SILTY SAND, brown**
  - 2.0 feet

- **CLAY WITH FINE SAND**
  - 4.0 feet

- **SAND, medium-grained, tan**
  - Saturated at 5 ft.

**Boring Terminated at 13 Feet**

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

### Advancement Method:
Direct-push / HSA

### Abandonment Method:
Completed as monitoring well

### WATER LEVEL OBSERVATIONS

(Static Level on 3/2/17)

- **Well Started:** 02-20-2017
- **Well Completed:** 02-20-2017

**Drill Rig:** Geoprobe

**Driller:** EPS

**Project No.: 01167141**

**Geologist:** Staab
**WATER WELL RECORD**

**Form WWC-5**

**LOCATION OF WATER WELL:**

- County: Stafford
- Township Number: 31T
- Range Number: 22R
- Section Number: S1

**2 WELL OWNER:**

- Last Name: Lawrence
- First Name: Bland
- Address: 3030 NW Expressway, Suite 1100

**3 LOCATE WELL WITH "X" IN SECTION BOX:**

- Nearest source of possible contamination: Gravel Pit Privy & Livestock Pens
- Sewer Lines: Cesspool, Sewage Lagoon
- Septic Tank: Other (Specify)
- Well owner: Other (Specify)

**4 DEPTH OF COMPLETED WELL:**

- Depth(s) Groundwater Encountered: 1) 3.0 ft, 2) 13.0 ft, 3) 13.0 ft, 4) Dry Well
- Well's Static Water Level: ft below land surface, measured on (mo-day-yr)
- Pump test data: Well water was ft after ... hours pumping
- Estimated Yield: gpm

**5 WATER WELL TO BE USED AS:**

- Public Water Supply: Yes
- Household: Yes
- Lawn & Garden: Yes
- Livestock: No
- Irrigation: No
- Environmental Remediation: No

**6 SCREEN OR PERFORATION MATERIAL:**

- PVC: Yes
- Other: Yes (Specify)

**7 SCREEN-PERFORATED INTERVALS:**

- From 3 ft. to 13 ft.
- From 1 ft. to 13 ft.

**GRAVEL PACK INTERVALS:**

- From 1 ft. to 13 ft.
- From 1 ft. to 13 ft.

**8 TYPE OF CASING USED:**

- Steel: Yes
- PVC: No
- Other: No

**9 GROUT MATERIAL:**

- Other: Yes
- Bentonite: Yes
- Other: No

**10 FROM TO LITHOLOGIC LOG**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
</tr>
</tbody>
</table>

**11 CONTRACTOR’S OR LANDOWNER’S CERTIFICATION:**

This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on 2/20/17 ... and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor’s License No. 694. This Water Well Record was completed on (mo-day-year) 3/7/17.

**12 Notes:**

- Mail to: Water Well Owner, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66614-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524.

**WELL LOG NO. P-5 / MW-2**

**PROJECT:** Comprehensive Investigation  
**CLIENT:** Rose Rock Midstream Crude, LP  
**SITE:** Rose Rock Hudson Station  
Stafford County, Kansas

### Graphic Log

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type</th>
<th>Recovery (in)</th>
<th>ID Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>Dual-tube / Grab</td>
<td>0.0</td>
<td>P-5 (0-2 ft.)</td>
</tr>
<tr>
<td>13.0</td>
<td>AUGER / GRAB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Surface Elev.: 1816.6 (Ft)**

**Well Completion:**

- **Depth:** 1815.6 (Ft)
- **Water Level:**
  - **Sample Type:** Dual-tube / Grab
  - **Recovery:** 0.0
  - **ID Number:** P-5 (0-2 ft.)

**Silty Sand**

- SAND, medium-grained, tan, saturated

**Boring Terminated at 13 Feet**

---

**The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.**

**Advancement Method:** Direct-push / HSA

**Abandonment Method:** Completed as monitoring well

---

**Well Started:** 02-20-2017  
**Well Completed:** 02-20-2017  
**Drill Rig:** Geoprobe  
**Driller:** EPS

**1815 S Eisenhower St**  
**Wichita, KS**

**Project No.: 01167141**  
**Geologist:** Staab
1. **LOCATION OF WATER WELL:**
   - County: Stafford

2. **WELL OWNER:**
   - Last Name: First Name: Business: Rose Rock Midstream Crude, L.P.
   - Address: 3030 NW Expressway, Suite 1100

3. **LOCATE WELL WITH "X" IN SECTION BOX:**

4. **DEPTH OF COMPLETED WELL:**
   - Depth (S) Groundwater Encountered: 1. 6 ft, 2. 9 ft, 3. 10 ft, 4. Dry Well
   - Below land surface, measured on (mo-day-yr): 1. 3 ft, 2. 6 ft, 3. 8 ft, 4. 10 ft
   - Pump test data: Well water was 
     - after 
       - 6 hours pumping: 4.5 gpm
     - Well water was
     - after 
       - 6 hours pumping: 4 gpm
   - Estimated Yield: 2.8 gpm

5. **WELL'S STATIC WATER LEVEL:**
   - In. to 13 ft and
   - in. to

6. **WELL WATER TO BE USED AS:**
   - Domestic: Yes
   - Household: Yes
   - Lawn & Garden: Yes
   - Irrigation: Yes
   - Feedyard: Yes
   - Feedlot: Yes
   - External Use: Yes

7. **TYPE OF CASING USED:**
   - Steel: Yes
   - PVC: Yes
   - Other: Yes

8. **TYPE OF SCREEN OR PERFORATION MATERIAL:**
   - Steel: Yes
   - Stainless Steel: Yes
   - Fiberglass: Yes
   - PVC: Yes
   - Brass: Yes
   - Galvanized Steel: Yes
   - Concrete tile: Yes
   - None used (open hole): Yes

9. **GROUT MATERIAL:**
   - Neat cement: Yes
   - Cement grout: Yes
   - Bentonite: Yes
   - Other: Yes

10. **LOCATION OF WATER WELL:**
    - Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection):
    - Just south of intersection of Hudson Road and NE 90th Ave., on east side of NE 90th

11. **WELL OWNER'S OR LANDOWNER'S CERTIFICATION:**
    - Signature:
    - Date:

12. **WELL OWNER:**
    - City: Oklahoma City
    - State: OK
    - ZIP:

13. **WELL ID:**
    - Division of Water Resources App. No:
    - Township Number:
    - Range Number:
    - Well ID:

14. **WELL'S STATIC WATER LEVEL:**
    - Elevation: 10 ft
    - Ground Level: 10 ft
    - TOC:

15. **GRAVEL PACK INTERVALS:**
    - Perforated Intervals:
      - From 3 in. to 13 in.
      - From 13 in. to

16. **LITHOLOGIC LOG FROM TO LITHO. LOG (cont.) OR PLUGGING INTERVALS**
    - FROM TO
      - 0 5 Sandy silt, tan, moist to wet
      - 5 13 Sand, tan, medium, wet

17. **GROUT INTERVALS:**
    - From 0 ft. to 13 ft.
    - From 13 ft. to

18. **LITHEOLOGIC LOG FROM TO LITHO. LOG (cont.) OR PLUGGING INTERVALS**
    - FROM TO
      - 0 5 Sandy silt, tan, moist to wet
      - 5 13 Sand, tan, medium, wet

19. **GRATE PACK INTERVALS:**
    - From 3 in. to 13 in.
    - From 13 in. to

20. **GROUT MATERIAL:**
    - Neat cement: Yes
    - Cement grout: Yes
    - Bentonite: Yes
    - Other: Yes

21. **LOCATION OF WATER WELL:**
    - Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection):
    - Just south of intersection of Hudson Road and NE 90th Ave., on east side of NE 90th

22. **WELL OWNER:**
    - City: Oklahoma City
    - State: OK
    - ZIP:

23. **WELL ID:**
    - Division of Water Resources App. No:
    - Township Number:
    - Range Number:
    - Well ID:

24. **WELL'S STATIC WATER LEVEL:**
    - Elevation: 10 ft
    - Ground Level: 10 ft
    - TOC:

25. **GRAVEL PACK INTERVALS:**
    - Perforated Intervals:
      - From 3 in. to 13 in.
      - From 13 in. to

26. **LITHOLOGIC LOG FROM TO LITHO. LOG (cont.) OR PLUGGING INTERVALS**
    - FROM TO
      - 0 5 Sandy silt, tan, moist to wet
      - 5 13 Sand, tan, medium, wet

27. **GROUT INTERVALS:**
    - From 0 ft. to 13 ft.
    - From 13 ft. to

28. **LITHEOLOGIC LOG FROM TO LITHO. LOG (cont.) OR PLUGGING INTERVALS**
    - FROM TO
      - 0 5 Sandy silt, tan, moist to wet
      - 5 13 Sand, tan, medium, wet

29. **GRATE PACK INTERVALS:**
    - From 3 in. to 13 in.
    - From 13 in. to

30. **GROUT MATERIAL:**
    - Neat cement: Yes
    - Cement grout: Yes
    - Bentonite: Yes
    - Other: Yes

31. **LOCATION OF WATER WELL:**
    - Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection):
    - Just south of intersection of Hudson Road and NE 90th Ave., on east side of NE 90th

32. **WELL OWNER:**
    - City: Oklahoma City
    - State: OK
    - ZIP:

33. **WELL ID:**
    - Division of Water Resources App. No:
    - Township Number:
    - Range Number:
    - Well ID:

34. **WELL'S STATIC WATER LEVEL:**
    - Elevation: 10 ft
    - Ground Level: 10 ft
    - TOC:

35. **GRAVEL PACK INTERVALS:**
    - Perforated Intervals:
      - From 3 in. to 13 in.
      - From 13 in. to

36. **LITHOLOGIC LOG FROM TO LITHO. LOG (cont.) OR PLUGGING INTERVALS**
    - FROM TO
      - 0 5 Sandy silt, tan, moist to wet
      - 5 13 Sand, tan, medium, wet

37. **GROUT INTERVALS:**
    - From 0 ft. to 13 ft.
    - From 13 ft. to

38. **LITHEOLOGIC LOG FROM TO LITHO. LOG (cont.) OR PLUGGING INTERVALS**
    - FROM TO
      - 0 5 Sandy silt, tan, moist to wet
      - 5 13 Sand, tan, medium, wet

39. **GRATE PACK INTERVALS:**
    - From 3 in. to 13 in.
    - From 13 in. to

40. **GROUT MATERIAL:**
    - Neat cement: Yes
    - Cement grout: Yes
    - Bentonite: Yes
    - Other: Yes

41. **LOCATION OF WATER WELL:**
    - Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection):
    - Just south of intersection of Hudson Road and NE 90th Ave., on east side of NE 90th

42. **WELL OWNER:**
    - City: Oklahoma City
    - State: OK
    - ZIP:

43. **WELL ID:**
    - Division of Water Resources App. No:
    - Township Number:
    - Range Number:
    - Well ID:

44. **WELL'S STATIC WATER LEVEL:**
    - Elevation: 10 ft
    - Ground Level: 10 ft
    - TOC:

45. **GRAVEL PACK INTERVALS:**
    - Perforated Intervals:
      - From 3 in. to 13 in.
      - From 13 in. to

46. **LITHOLOGIC LOG FROM TO LITHO. LOG (cont.) OR PLUGGING INTERVALS**
    - FROM TO
      - 0 5 Sandy silt, tan, moist to wet
      - 5 13 Sand, tan, medium, wet

47. **GROUT INTERVALS:**
    - From 0 ft. to 13 ft.
    - From 13 ft. to
### Graphic Log

**Depth (ft)** | **Water Level** | **Observations** | **Sample Type** | **Recovery (in.)** | **ID Number** | **Drilling Method**
---|---|---|---|---|---|---
5.0 | 1813.2 | Silty sand | Dual-tube / Grab | 0.0 | P-6 (0-2 ft.) | Direct-push / HSA

**Boring Terminated at 13 Feet**

The stratification lines represent the approximate transition between differing soil types and/or rock types; in situ these transitions may be gradual or may occur at different depths than shown.

**Advancement Method:** Direct-push / HSA

**Abandonment Method:** Completed as monitoring well

### Water Level Observations

**Well Started:** 02-20-2017  
**Well Completed:** 02-20-2017  
**Drill Rig:** Geoprobe  
**Driller:** EPS  
**Project No.:** 01167141  
**Geologist:** Staab
### 1 LOCATION OF WATER WELL:

**County:** Stafford  
**Street or Rural Address where well is located:** (if unknown, and direction from nearest town or intersection):  
**Just south of intersection of Hudson Road and NE 90th Ave., on east side of NE 90th**

### 2 WELL OWNER:

**First Name:**  
**Last Name:**

**Business:** Rose Rock Midstream Crude, L.P.  
**Address:** 3030 NW Expressway, Suite 1100

### 3 LOCATE WELL WITH "X" IN SECTION BOX:

**LITHOLOGIC LOG**

<table>
<thead>
<tr>
<th>Depth(s) Groundwater Encountered</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>3.8 ft.</td>
<td>5 ft.</td>
<td>6 ft.</td>
<td>7 ft.</td>
</tr>
</tbody>
</table>

### 4 DEPTH OF COMPLETED WELL:

- **Depth:** 12 ft.
- **Below Ground Surface:** 6 ft.  
- **Depth:** 20 ft.

**WELL'S STATIC WATER LEVEL:**

**Pump test data:**

- **Well water was**...
- **Well water was**...
- **Well water was**...
- **Well water was**...

**Estimated Yield:** 13 ft.

**Bore Hole Diameter:** 8 in. to 13 ft. and

### 5 WATER WELL TO BE USED AS:

- **Public Water Supply:** well ID
- **Aquifer Recharge:** well ID
- **Monitoring:** well ID

### 6 TYPE OF CASING USED:

- **Steel**
- **PVC**
- **Other:**

**Casing diameter:**

- **2 in. to 3 in.**
- **3 in. to 4 in.**
- **4 in. to 5 in.**

**Casing height above land surface:**

- **3 ft. Diameter**
- **5 ft. Diameter**
- **7 ft. Diameter**

**Wall thickness or gauge No.:**

**Joint Type:**

- **Threaded**
- **Clamped**
- **Welded**

**Screen or perforation openings are:**

- **Continuous Slot**
- **Mill Slot**
- **Partition Slot**
- **Louvered Shutter**
- **Key Punched**
- **Wire Wrapped**
- **Saw Cut**

**Screen-perforated intervals:**

- **From 3 ft. to 13 ft.**
- **From 1 ft. to 3 ft.**

**Gravel pack intervals:**

- **From 1 ft. to 3 ft.**

**Grout intervals:**

- **From 1 ft. to 3 ft.**
- **From 3 ft. to 13 ft.**

**Nearest source of possible contamination:**

- **Septic Tank**
- **Sewer Lines**
- **Water treatment/**

**Most moist area:**

- **Sandy silt, tan, moist to wet**
- **Clay, tan, wet**
- **Sand, tan, medium, wet**

### 11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:

This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) 2/20/17, and this record is true to the best of my knowledge and belief.

Kansas Water Well Contractor's License No. 904.  
This Water Well Record was completed on (mo-day-year) 2/1/17

under the business name of Environmental Priority Services, Inc.  
Signature: __________________________

Mail this white copy along with a fee of $5.00 for each constructed well in. Kansas Department of Health and Environment, Bureau of Water, CWTS Section.

1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524.

Visit us online: www.kdhe.ks.gov/waterwell/index.htm  
KSA 82a-1212  
Revised 7/10/2015
# WELL LOG NO. P-7 / MW-4

**PROJECT:** Comprehensive Investigation  
**CLIENT:** Rose Rock Midstream Crude, LP  
**Cushing, Oklahoma**

**SITE:** Rose Rock Hudson Station  
**Stafford County, Kansas**

---

**GRAPHIC LOG**

<table>
<thead>
<tr>
<th>Water Level Observations</th>
<th>Sample Type</th>
<th>Recovery (In.)</th>
<th>ID Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Silty Sand, brown</strong></td>
<td>5.0</td>
<td>Saturated at 4.5 ft.</td>
<td><strong>P-7 (0-2 ft.)</strong></td>
</tr>
<tr>
<td><strong>Sand, medium-grained, tan</strong></td>
<td>13.0</td>
<td>1805.1</td>
<td><strong>P-7 (2-4 ft.)</strong></td>
</tr>
</tbody>
</table>

---

**WATER LEVEL OBSERVATIONS**

- **Surface Elev:** 1818.1 (Ft.)
- **Well Completion:**
  - **DEPTH (ft):**
    - 5.0
      - Saturated at 4.5 ft.
    - **1813.1**
      - **Silty Sand, brown**
    - **1805.1**
      - **Sand, medium-grained, tan**
  - Boring Terminated at 13 Feet

---

**The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.**

**Advancement Method:** Direct-push / HSA  
**Abandonment Method:** Completed as monitoring well

---

**Terracon**

1815 S Eisenhower St  
Wichita, KS

- **Well Started:** 02-20-2017  
- **Well Completed:** 02-20-2017  
- **Drill Rig:** Geoprobe  
- **Driller:** EPS  
- **Project No.:** 01167141  
- **Geologist:** Staab
**WATER WELL RECORD** Form WWC-5

<table>
<thead>
<tr>
<th>LOCATION OF WATER WELL:</th>
<th>Fraction</th>
<th>Section Number</th>
<th>Township Number</th>
<th>Range Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>County: Stafford</td>
<td>1/4 SW 1/4 SW 1/4 NW 1/4</td>
<td>31</td>
<td>T 22 S</td>
<td>R 11 E W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WELL OWNER:</th>
<th>Last Name:</th>
<th>First:</th>
<th>Business:</th>
<th>Address:</th>
<th>Address:</th>
<th>City:</th>
<th>Location:</th>
<th>OKlahoma City</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rose Rock Midstream Crude, L.P.</td>
<td>3030 NW Expressway, Suite 1100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3 LOCATE WELL WITH “X” IN SECTION BOX:

<table>
<thead>
<tr>
<th>DEPTH OF COMPLETED WELL</th>
<th>13 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth(s) Groundwater Encountered:</td>
<td>1) 3.5 ft, 2) 4.0 ft, 3) 4.5 ft, 4) 5.0 ft</td>
</tr>
</tbody>
</table>

WELL'S STATIC WATER LEVEL:

| below land surface, measured on (mo-day-yr): | 130 ft |

Well water was tested for...

<table>
<thead>
<tr>
<th>Pump test data:</th>
<th>Well water was tested for...</th>
</tr>
</thead>
<tbody>
<tr>
<td>after 2 hours pumping</td>
<td>gpm</td>
</tr>
<tr>
<td>after 4 hours pumping</td>
<td>gpm</td>
</tr>
</tbody>
</table>

Estimated Yield: 5 gpm

Bore Hole Diameter: 6 in.


c.

7 WELL WATER TO BE USED AS:

- 1. Domestic: 5. □ Public Water Supply: well ID...
- 3. Feedlot: □ Air Sparge □ Soil Vapor Extraction
- 4. Industrial: □ Recovery □ Injection

Was a chemical/bacteriological sample submitted to KDHE? □ Yes □ No

If yes, date sample was submitted...

8 TYPE OF CASING USED:

- □ Steel □ PVC □ Other (Specify) CASING JOINTS:
- □ Glued □ Clamped □ Welded □ Threaded

Casing diameter: 2 in. to 3 in., Diameter: 3 in. to...

Casing height above land surface: 0 ft., Weight: lbs.

Wall thickness or gauge No.: 800, 40...

9 SCREEN OR PERFORATION OPENINGS ARE:

- □ Continuous Slot □ Mill Slot □ Gauze Wrapped □ Torch Cut □ Drilled Holes
- □ Key Punched □ Wire Wrapped □ Saw Cut □ None (Open Hole)

SCREEN-PERFORATED INTERVALS:

From...

GRAVEL PACK INTERVALS: From...

9 GROUT MATERIAL:

- □ Neat cement □ Cement grout □ Bentonite

First...

Nearest source of possible contamination:

- □ Septic Tank □ Lateral Lanes □ Pit Privy □ Livestock Pens
- □ Sewer Lines □ Cess Pool □ Sewage Lagoon □ Abandoned Water Well
- □ Watertight Sewer Lines □ Septage Pit □ Fuel Storage □ Abandoned Water Well
- □ Other (Specify) □ Insecticide Storage □ Fertilizer Storage □ Oil Well/Gas Well

Distance from well...

10 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION:

This water well was [constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) 2/21/17]... and this record is true to the best of my knowledge and belief.

Kansas Water Well Contractor's License No. 804... This Water Well Record was completed on (mo-day-year) 3/7/17...

under the business name of [Environmental Priority Service, Inc.]...

Signature...

Mail a true copy along with a fee of $5.00 for each constructed well to Kansas Department of Health and Environment, Bureau of Water, GWTS Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records.

Visit us at: [www.kdam.sc.gov/waterwell/index.html]...

KSA 82a-1212 Revised 7/10/2015
Well Log No. P-8 / MW-5

**PROJECT:** Comprehensive Investigation  
**CLIENT:** Rose Rock Midstream Crude, LP  
**Cushing, Oklahoma**

**SITE:** Rose Rock Hudson Station  
Stafford County, Kansas

**Well Completion:**
- **DEPTH (m):** Surface Elev.: 1616.6 (ft.)
- **SAMPLE SENT TO LAB (ID NUMBER):**
  - P-8 (0-2 ft.)
  - P-8 (2-4 ft.)

**Water Level Observations**
- **Sample Type:**
  - Silty Sand, tan to gray
  - Petroleum odor below 2 ft.

**Boring Terminated at 13 Feet**

**Advance Method:** Direct-push / HSA

**Abandonment Method:** Completed as monitoring well

**Terracon**
1815 S Eisenhower St  
Wichita, KS

Well Started: 02-20-2017  
Well Completed: 02-20-2017

Drill Rig: Geoprobe  
Driller: EPS

Project No.: 01167141  
Geologist: Staab
**WATER WELL RECORD**

**Form WWC-5**

<table>
<thead>
<tr>
<th>Location of Water Well:</th>
<th>Fraction</th>
<th>1/4 SW 1/4 SW NW 1/4</th>
<th>Section Number</th>
<th>Township Number</th>
<th>Range Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>County: Stafford</td>
<td></td>
<td></td>
<td>31</td>
<td>T 22 S</td>
<td>R 11 W</td>
</tr>
</tbody>
</table>

**Well Owner:**
- Last Name: Rose Rock Midstream Crude, L.P.
- Business Address: 3030 NW Expressway, Suite 1100
- City: Oklahoma City
- State: OK
- Zip: 73122

**Locate Well with “X” in Section Box:**

| Depth (s) Groundwater Encountered: | 4.05 ft. | 3.85 ft. | 3.65 ft. | 3.45 ft. | 3.25 ft. | 3.05 ft. | 2.85 ft. | 2.65 ft. | 2.45 ft. | 2.25 ft. | 2.05 ft. | 1.85 ft. | 1.65 ft. | 1.45 ft. | 1.25 ft. | 1.05 ft. | 0.85 ft. | 0.65 ft. | 0.45 ft. | 0.25 ft. | 0.05 ft. |
|-----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Groundwater Level:               |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |

**Well’s Static Water Level:**
- Below land surface: measured on (mo-day-yr) 1/1/17
- Above land surface: measured on (mo-day-yr) 1/1/17

**Pump Test Data:**
- Well water was...
- After hours pumping...
- GPM...

**Estimated Yield:**
- From...
- In. to...
- 13 ft. and...

**Well Water to Be Used As:**
- Domestic
- Public Water Supply: well ID...
- Household
- Irrigation: well ID...
- Aquifer Recharge: well ID...
- Livestock
- Monitoring: well ID...
- Septic Tank
- Livestock Pens
- Industrial
- Other (Specify):...

**Casing Height Above Land Surface:**
- Measured on (mo-day-yr) 1/1/17

**Casing Diameter:**
- In. to...
- Ft., or...

**Estimated Yield:**
- From...
- In. to...
- 13 ft. and...

**Well Water Disinfected:**
- Yes

**Type of Casing Used:**
- Steel
- Stainless Steel
- Fiber glass
- Tank
- Other (Specify):...

**Casing Joints:**
- Threaded
- Other (Specify):...

**Screen or Perforation Openings:**
- Continuous Slot
- Mill Slot
- Gauze Wrapped
- Torch Cut
- Drilled Holes
- Other (Specify):...

**Screen-Perforated Intervals:**
- From...
- To...

**Grout Material:**
- Neat cement
- Cement grout
- Bentonite
- Other (Specify):...

**Nearest Source of Possible Contamination:**
- Septic tank
- Lateral lines
- Pit Privy
- Livestock Pens
- Sewer lines
- Cess pool
- Sewage lagoon
- Fuel storage
- Insecticide storage
- Irrigation
- Well field water supply: lease
- Geotechnical
- Oil field water supply: lease
- Environmental remediation: well ID...
- Other (Specify):...

**Lithologic Log:**
- From...
- To...
- Sandy silt, tan, moist to wet...
- Clayey silt, tan to gray, sandy, petroleum...
- Sand, tan, medium, wet...

**Notes:**

**Contractor’s or Landowner’s Certification:**
- This water well was...
- Constructed, reconstructed, or plugged...
- Under my jurisdiction and was completed on (mo-day-year) 2/21/17...
- and this record is true to the best of my knowledge and belief...
- Kansas Water Well Contractor’s License No. 1203...
- This Water Well Record was completed on (mo-day-year) 3/17/17...
- Under the business name...
- Environmental Priority Service, Inc...
- Signature...

Mail at once along with a fee of $5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWTS Section.

1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524.


KSA 82a-1212
Revised 7/10/2015
**PROBE LOG NO. P-9**

**PROJECT:** Comprehensive Investigation  
**CLIENT:** Rose Rock Midstream Crude, LP  
**Cushing, Oklahoma**

**SITE:** Rose Rock Hudson Station  
**Stafford County, Kansas**

---

**GRAPHIC LOG**

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<th>DEPTH</th>
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<th>SAMPLE TYPE</th>
<th>RECOVERY (%)</th>
<th>PTD (ppm)</th>
<th>SAMPLE SENT TO LAB (ID NUMBER)</th>
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*Probe Terminated at 5 Feet*

---

**WATER LEVEL OBSERVATIONS**

- **(While Drilling on 2/20/17)**

---

**Advance Method:** Direct-push / Dual Tube  
**Abandonment Method:** Boring backfilled with bentonite upon completion.
### PROBE LOG NO. P-10

**PROJECT:** Comprehensive Investigation  
**CLIENT:** Rose Rock Midstream Crude, LP  
**SITE:** Rose Rock Hudson Station  
Stafford County, Kansas  

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<td>0.4</td>
<td>P-10 (2-4 ft.)</td>
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**SANDY SILT WITH CLAY,** dark brown  
**SILTY SAND,** brown, saturated  

*Probe Terminated at 8 Feet*

---

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

**Advancement Method:**  
Direct-push / Dual Tube

**Abandonment Method:**  
Boring backfilled with bentonite upon completion.

**WATER LEVEL OBSERVATIONS**  
Probe Started: 02-20-2017  
Probe Completed: 02-20-2017  
Drill Rig: Geoprobe  
Driller: EPS  
Project No.: 01167141  
Geologist: Staab
APPENDIX D
Laboratory Report
March 02, 2017

Michael Montgomery  
Terracon  
1815 South Eisenhower  
Wichita, KS 67209

RE: Project: Rose Rock Hudson / 01167141  
Pace Project No.: 60238403

Dear Michael Montgomery:  
Enclosed are the analytical results for sample(s) received by the laboratory on February 22, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson  
heather.wilson@pacelabs.com  
1(913)563-1407  
Project Manager

Enclosures:

cc: Adam Staab, TERRACON Wichita
CERTIFICATIONS

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003087
Iowa Certification #: 116
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055

Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704467
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92567
Missouri Certification: 10070

REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

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# SAMPLE ANALYTE COUNT

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

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**REPORT OF LABORATORY ANALYSIS**

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## SAMPLE ANALYTE COUNT

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

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**ANALYTICAL RESULTS**

- **Project:** Rose Rock Hudson / 01167141
- **Pace Project No.:** 60238403
- **Sample:** P-1 0-2

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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**REPORT OF LABORATORY ANALYSIS**

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### ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403  

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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**REPORT OF LABORATORY ANALYSIS**

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### Analytical Results

**Parameters** | **Results** | **Units** | **Report Limit** | **DF** | **Prepared** | **Analyzed** | **CAS No.** | **Qual**
--- | --- | --- | --- | --- | --- | --- | --- | ---

**8015 MOD KS TPH**
- HRH (C19-C35) | ND | mg/kg | 8.5 | 1 | 02/24/17 00:00 | 02/27/17 11:46
- MRH (C9-C18) | ND | mg/kg | 6.4 | 1 | 02/24/17 00:00 | 02/27/17 11:46

**Surrogates**
- 1-Chloro-octadecane (S) | 86 | % | 40-140 | 1 | 02/24/17 00:00 | 02/27/17 11:46 | 3386-33-2

**8260/KS TPH**
- LRH (C5-C8) | ND | mg/kg | 27.6 | 1 | 02/24/17 10:07 | 02/25/17 01:39

**Surrogates**
- Toluene-d8 (S) | 96 | % | 80-120 | 1 | 02/24/17 10:07 | 02/25/17 01:39 | 2037-26-5
- 1,2-Dichloroethane-d4 (S) | 93 | % | 75-129 | 1 | 02/24/17 10:07 | 02/25/17 01:39 | 17060-07-0
- 4-Bromofluorobenzene (S) | 96 | % | 76-123 | 1 | 02/24/17 10:07 | 02/25/17 01:39 | 460-00-4
- 2,5-Dibromotoluene (S) | 111 | % | 70-130 | 1 | 02/24/17 10:07 | 02/25/17 01:39 | 615-59-8

**Percent Moisture**
- Percent Moisture | 8.6 | % | 0.50 | 1 | 02/24/17 00:00

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**Report of Laboratory Analysis**

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ANALYTICAL RESULTS

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

Sample: P-4 0-2'
Lab ID: 60238403004
Collected: 02/20/17 11:15
Received: 02/22/17 21:00
Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403  

**Sample:** P-4 2-4'  
**Lab ID:** 60238403005  

**Collected:** 02/20/17 11:15  
**Received:** 02/22/17 21:00  
**Matrix:** Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

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<th>Prepared</th>
<th>Analyzed</th>
<th>CAS No.</th>
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| **8015 MOD KS TPH** | Analytical Method: EPA 8015C MOD  
Preparation Method: EPA 3546 | | | | | | | |
| HRH (C19-C35)  | 14.9 mg/kg | 9.1 | 1 | 02/24/17 00:00 | 02/27/17 12:10 |
| MRH (C9-C18)  | ND mg/kg | 6.8 | 1 | 02/24/17 00:00 | 02/27/17 12:10 |
| **Surrogates** | | | | | | | | |
| 1-Chloro-octadecane (S) | 88 % | 40-140 | 1 | 02/24/17 00:00 | 02/27/17 12:10 |
| **8260/KS TPH** | Analytical Method: EPA 8260  
Preparation Method: EPA 5030 | | | | | | | |
| LRH (C5-C8) | ND mg/kg | 25.6 | 1 | 02/24/17 10:07 | 02/25/17 02:08 |
| **Surrogates** | | | | | | | | |
| Toluene-d8 (S) | 98 % | 80-120 | 1 | 02/24/17 10:07 | 02/25/17 02:08 |
| 1,2-Dichloroethane-d4 (S) | 94 % | 75-129 | 1 | 02/24/17 10:07 | 02/25/17 02:08 |
| 4-Bromofluorobenzene (S) | 95 % | 76-123 | 1 | 02/24/17 10:07 | 02/25/17 02:08 |
| 2,5-Dibromotoluene (S) | 118 % | 70-130 | 1 | 02/24/17 10:07 | 02/25/17 02:08 |
| **Percent Moisture** | | | | | | | | |
| Percent Moisture | 14.7 % | 0.50 | 1 | | | | |

**REPORT OF LABORATORY ANALYSIS**

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Date: 03/02/2017 03:08 PM

Page 10 of 45
ANALYTICAL RESULTS

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

Sample: P-5 0-2' Lab ID: 60238403006 Collected: 02/20/17 11:10 Received: 02/22/17 21:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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<td>02/28/17 13:53</td>
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<tr>
<td>1-Chloro-octadecane (S)</td>
<td>82</td>
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| 8260/KS TPH                 |         |       |              |      |          |          |         |      |
| LRH (C5-C8)                | ND      | mg/kg | 23.7         | 1    | 02/24/17 10:07 | 02/25/17 02:23 |
| Surrogates                 |         |       |              |      |          |          |         |      |
| Toluene-d8 (S)             | 99      | %     | 60-120       | 1    | 02/24/17 10:07 | 02/25/17 02:23 |
| 1,2-Dichloroethane-d4 (S)  | 95      | %     | 75-129       | 1    | 02/24/17 10:07 | 02/25/17 02:23 |
| 4-Bromofluorobenzene (S)   | 96      | %     | 76-123       | 1    | 02/24/17 10:07 | 02/25/17 02:23 |
| 2,5-Dibromotoluene (S)     | 113     | %     | 70-130       | 1    | 02/24/17 10:07 | 02/25/17 02:23 |

| Percent Moisture            |         |       |              |      |          |          |         |      |
| Percent Moisture            | 11.3    | %     | 0.50         | 1    | 02/24/17 00:00 | 02/25/17 02:23 |

REPORT OF LABORATORY ANALYSIS

Date: 03/02/2017 03:08 PM

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## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

**Sample:** P-6 0-2'  
**Lab ID:** 60238403007  
**Collected:** 02/20/17 11:20  
**Received:** 02/22/17 21:00  
**Matrix:** Solid  

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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<td>1,2-Dichloroethane-d4 (S)</td>
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<td>%</td>
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**REPORT OF LABORATORY ANALYSIS**

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## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

**Sample:** P-7 0-2'  
**Lab ID:** 60238403008  
**Collected:** 02/20/17 11:25  
**Received:** 02/22/17 21:00  
**Matrix:** Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

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<tr>
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<td>70-130</td>
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**Percent Moisture**  
*Analytical Method: ASTM D2974*
ANALYTICAL RESULTS

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

Sample: P-7 2-4'
Lab ID: 60238403009
Collected: 02/20/17 11:25
Received: 02/22/17 21:00
Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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<td>%</td>
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### ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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<td>1,2-Dichloroethane-d4 (S)</td>
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## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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<td>1-Chloro-octadecane (S)</td>
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**REPORT OF LABORATORY ANALYSIS**

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## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

**Sample:** P-9 0-Z  
**Lab ID:** 60238403012  
**Collected:** 02/20/17 11:50  
**Received:** 02/22/17 21:00  
**Matrix:** Solid  

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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<td>80-120</td>
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<tr>
<td>1,2-Dichloroethane-d4 (S)</td>
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<td>%</td>
<td>75-129</td>
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<td>4-Bromofluorobenzene (S)</td>
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<td>2,5-Dibromotoluene (S)</td>
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**8015 MOD KS TPH**  
Analytical Method: EPA 8015C MOD  
Preparation Method: EPA 3546

**8260/KS TPH**  
Analytical Method: EPA 8260  
Preparation Method: EPA 5030

**REPORT OF LABORATORY ANALYSIS**

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### ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

#### Sample: P-9 2-4'  
**Lab ID:** 60238403013  
**Collected:** 02/20/17 11:50  
**Received:** 02/22/17 21:00  
**Matrix:** Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

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<th>Prepared</th>
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<th>CAS No.</th>
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| **8015 MOD KS TPH** | Analytical Method: EPA 8015C MOD  
Preparation Method: EPA 3546 |
| HRH (C19-C35)    | ND      | mg/kg   | 8.8          | 1   | 02/24/17 00:00    | 02/28/17 14:49   | 3386-33-2 |      |
| MRH (C9-C18)     | ND      | mg/kg   | 6.6          | 1   | 02/24/17 00:00    | 02/28/17 14:49   | 3386-33-2 |      |
| **Surrogates**   |         |         |              |     |                   |                   |         |      |
| 1-Chloro-octadecane (S) | 86     | %       | 40-140       | 1   | 02/24/17 00:00    | 02/28/17 14:49   | 3386-33-2 |      |
| **8260/KS TPH**  | Analytical Method: EPA 8260  
Preparation Method: EPA 5030 |
| LRH (C5-C8)      | ND      | mg/kg   | 26.5         | 1   | 02/24/17 10:07    | 02/25/17 04:06   | 2037-26-5 |      |
| **Surrogates**   |         |         |              |     |                   |                   |         |      |
| Toluene-d8 (S)   | 97      | %       | 80-120       | 1   | 02/24/17 10:07    | 02/25/17 04:06   | 2037-26-5 |      |
| 1,2-Dichloroethane-d4 (S) | 93 | %    | 75-129       | 1   | 02/24/17 10:07    | 02/25/17 04:06   | 17060-07-0 |      |
| 4-Bromofluorobenzene (S) | 94 | %    | 76-123       | 1   | 02/24/17 10:07    | 02/25/17 04:06   | 460-00-4  |      |
| 2,5-Dibromotoluene (S) | 113 | %    | 70-130       | 1   | 02/24/17 10:07    | 02/25/17 04:06   | 615-59-8  |      |
| **Percent Moisture** | Analytical Method: ASTM D2974 |
| Percent Moisture  | 11.6    | %       | 0.50         | 1   | 02/24/17 00:00    |                   |         |      |

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ANALYTICAL RESULTS

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

Sample: P-10 0-2’
Lab ID: 60238403014
Collected: 02/20/17 11:45
Received: 02/22/17 21:00
Matrix: Solid

Results reported on a “dry weight” basis and are adjusted for percent moisture, sample size and any dilutions.

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<td>%</td>
<td>40-140</td>
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<tr>
<td>LRH (C5-C8)</td>
<td>ND</td>
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<tr>
<td>Toluene-d8 (S)</td>
<td>97</td>
<td>%</td>
<td>80-120</td>
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<td>1,2-Dichloroethane-d4 (S)</td>
<td>96</td>
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<td>4-Bromofluorobenzene (S)</td>
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<tr>
<td>2,5-Dibromotoluene (S)</td>
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Percent Moisture

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REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

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Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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<td>Toluene-d8 (S)</td>
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<td>80-120</td>
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<td>1,2-Dichloroethane-d4 (S)</td>
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<td>%</td>
<td>75-129</td>
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**REPORT OF LABORATORY ANALYSIS**

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**ANALYTICAL RESULTS**

Project: Rose Rock Hudson / 01167141  
Pace Project No.: 60238403

Sample: DUPLICATE 2  
Lab ID: 60238403016  
Collected: 02/20/17 08:00  
Received: 02/22/17 21:00  
Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

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<th>Analyzed</th>
<th>CAS No.</th>
<th>Qual</th>
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| **8015 MOD KS TPH** | **Analytical Method:** EPA 8015C MOD  
**Preparation Method:** EPA 3546 | | | | | | | |
| HRH (C19-C35) | 332 | mg/kg | 8.8 | 1 | 02/24/17 00:00 | 02/28/17 15:13 |
| MRH (C9-C18) | 192 | mg/kg | 6.6 | 1 | 02/24/17 00:00 | 02/28/17 15:13 |
| Surrogates | | | | | | | | |
| 1-Chloro-octadecane (S) | 105 | % | 40-140 | 1 | 02/24/17 00:00 | 02/28/17 15:13 |
| **8260/KS TPH** | **Analytical Method:** EPA 8260  
**Preparation Method:** EPA 5030 | | | | | | | |
| LRH (C5-C8) | ND | mg/kg | 26.9 | 1 | 02/24/17 12:15 | 02/27/17 13:00 |
| Surrogates | | | | | | | | |
| Toluene-d8 (S) | 98 | % | 80-120 | 1 | 02/24/17 12:15 | 02/27/17 13:00 |
| 1,2-Dichloroethane-d4 (S) | 96 | % | 75-129 | 1 | 02/24/17 12:15 | 02/27/17 13:00 |
| 4-Bromofluorobenzene (S) | 95 | % | 76-123 | 1 | 02/24/17 12:15 | 02/27/17 13:00 |
| 2,5-Dibromotoluene (S) | 116 | % | 70-130 | 1 | 02/24/17 12:15 | 02/27/17 13:00 |
| **Percent Moisture** | | | | | | | | |
| Percent Moisture | 10.9 | % | 0.50 | 1 | 02/24/17 00:00 |
# Analytical Results

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

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<td>1-Chloro-octadecane (S)</td>
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# Analytical Results

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

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## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

### Sample: RINSATE 2

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Date: 03/02/2017 03:08 PM
## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403  
**Sample:** MW-1  
**Lab ID:** 60238403020

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## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

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## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

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Date: 03/02/2017 03:08 PM
## ANALYTICAL RESULTS

Project: Rose Rock Hudson / 01167141  
Pace Project No.: 60238403

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| Surrogates    |         |       |              |    |          |          |         |      |
| Toluene-d8 (S) | 99     | %     | 80-120       | 1  |          | 02/24/17 17:47 | 2037-26-5 |
| 4-Bromofluorobenzene (S) | 96   | %     | 80-120       | 1  |          | 02/24/17 17:47 | 460-00-4 |
| 1,2-Dichloroethane-d4 (S) | 98  | %     | 80-120       | 1  |          | 02/24/17 17:47 | 17000-07-0 |
| Preservation pH | 1.0   |       |              | 1  |          | 02/24/17 17:47 |

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## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

**Sample:** MW-5  
**Lab ID:** 60238403024  
**Collected:** 02/21/17 09:45  
**Received:** 02/22/17 21:00  
**Matrix:** Water

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**REPORT OF LABORATORY ANALYSIS**

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## ANALYTICAL RESULTS

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

**Sample:** ONSITE WATER WELL  
**Lab ID:** 60238403025  
**Collected:** 02/21/17 10:50  
**Received:** 02/22/17 21:00  
**Matrix:** Water

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**REPORT OF LABORATORY ANALYSIS**

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## ANALYTICAL RESULTS

### Project: Rose Rock Hudson / 01167141
### Pace Project No.: 60238403

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### REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: Rose Rock Hudson / 01167141  
Pace Project No.: 60238403

| QC Batch: | 466683 |
| QC Batch Method: | EPA 5030 |
| Associated Lab Samples: | 60238403001, 60238403002, 60238403003, 60238403004, 60238403005, 60238403006, 60238403007, 60238403008, 60238403009, 60238403010, 60238403011, 60238403012, 60238403013, 60238403014 |

### METHOD BLANK: 1909903

| Associated Lab Samples: | 60238403001, 60238403002, 60238403003, 60238403004, 60238403005, 60238403006, 60238403007, 60238403008, 60238403009, 60238403010, 60238403011, 60238403012, 60238403013, 60238403014 |

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### LABORATORY CONTROL SAMPLE & LCSD: 1909904

| Associated Lab Samples: | 1909904, 1909905 |

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### MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1909906

| Associated Lab Samples: | 60238471001, 60238471001 |

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Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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Date: 03/02/2017 03:08 PM

Page 32 of 45
QUALITY CONTROL DATA

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

QC Batch: 466684  Analysis Method: EPA 8260
QC Batch Method: EPA 5030  Analysis Description: 8260/KS TPH
Associated Lab Samples: 60238403015, 60238403016

METHOD BLANK: 1909914  Matrix: Solid
Associated Lab Samples: 60238403015, 60238403016

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LABORATORY CONTROL SAMPLE: 1909915

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LABORATORY CONTROL SAMPLE & LCSD: 1909916 1909917

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<td>75-129</td>
<td>96</td>
<td>76-123</td>
<td>99</td>
<td>101</td>
<td>70-130</td>
<td>10</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>2,5-Dibromotoluene (S)</td>
<td>%</td>
<td>98</td>
<td>70-130</td>
<td>107</td>
<td>76-123</td>
<td>91</td>
<td>101</td>
<td>70-130</td>
<td>16</td>
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<tr>
<td>4-Bromofluorobenzene (S)</td>
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<td>97</td>
<td>76-123</td>
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<td>98</td>
<td>80-120</td>
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<td>50</td>
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<tr>
<td>Toluene-d8 (S)</td>
<td>%</td>
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MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1909918 1909919

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<th>% Rec</th>
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<td>1,2-Dichloroethane-d4 (S)</td>
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<td>93</td>
<td>75-129</td>
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<td>93</td>
<td>75-129</td>
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<tr>
<td>2,5-Dibromotoluene (S)</td>
<td>%</td>
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<td>101</td>
<td>70-130</td>
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<td>70-130</td>
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<tr>
<td>4-Bromofluorobenzene (S)</td>
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<td>98</td>
<td>76-123</td>
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<td>76-123</td>
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<td>Toluene-d8 (S)</td>
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<td>98</td>
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<td>80-120</td>
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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

QC Batch: 466737  Analysis Method: EPA 8260
QC Batch Method: EPA 8260  Analysis Description: 8260/KS TPH-WATER
Associated Lab Samples: 60238403017, 60238403018, 60238403019, 60238403020, 60238403021, 60238403022, 60238403023, 60238403024, 60238403025, 60238403026

METHOD BLANK: 1910175  Matrix: Water
Associated Lab Samples: 60238403017, 60238403018, 60238403019, 60238403020, 60238403021, 60238403022, 60238403023, 60238403024, 60238403025, 60238403026

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<td>mg/L</td>
<td>ND</td>
<td>0.050</td>
<td>02/24/17 15:19</td>
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</tr>
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<td>1,2-Dichloroethane-d4 (S)</td>
<td>%</td>
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<td>80-120</td>
<td>02/24/17 15:19</td>
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<td>4-Bromofluorobenzene (S)</td>
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<td>%</td>
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LABORATORY CONTROL SAMPLE & LCSD: 1910176  1910177

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<tr>
<td>1,2-Dichloroethane-d4 (S)</td>
<td>%</td>
<td></td>
<td>95</td>
<td>98</td>
<td></td>
<td></td>
<td>80-120</td>
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<td>%</td>
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<td>97</td>
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</tr>
<tr>
<td>Toluene-d8 (S)</td>
<td>%</td>
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QUALITY CONTROL DATA

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

QC Batch: 466671  Analysis Method: EPA 8015C MOD
QC Batch Method: EPA 3546  Analysis Description: EPA 8015 KS TPH
Associated Lab Samples: 60238403001, 60238403002, 60238403003, 60238403004, 60238403005, 60238403006, 60238403007, 60238403008, 60238403009, 60238403010, 60238403011, 60238403012, 60238403013, 60238403014, 60238403015, 60238403016

METHOD BLANK: 1909823  Matrix: Solid
Associated Lab Samples: 60238403001, 60238403002, 60238403003, 60238403004, 60238403005, 60238403006, 60238403007, 60238403008, 60238403009, 60238403010, 60238403011, 60238403012, 60238403013, 60238403014, 60238403015, 60238403016

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<td>1-Chloro-octadecane (S)</td>
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LABORATORY CONTROL SAMPLE & LCSD: 1909824

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<th>LCSD Result</th>
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<th>% Rec</th>
<th>Limits</th>
<th>RPD</th>
<th>Max</th>
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<tr>
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<td>mg/kg</td>
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<td>6.3</td>
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<td>107</td>
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<td>%</td>
<td>90</td>
<td>90</td>
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MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1909826

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<th>MSD Result</th>
<th>% Rec</th>
<th>% Rec</th>
<th>Limits</th>
<th>RPD</th>
<th>Max</th>
<th>Qualifiers</th>
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<tr>
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<td>mg/kg</td>
<td>ND</td>
<td>9</td>
<td>8.8</td>
<td>8.8J</td>
<td>9.2</td>
<td>89</td>
<td>40-140</td>
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<td></td>
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<tr>
<td>MRH (C9-C18)</td>
<td>mg/kg</td>
<td>ND</td>
<td>6.8</td>
<td>6.6</td>
<td>ND</td>
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<td>93</td>
<td>40-140</td>
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</tr>
<tr>
<td>1-Chloro-octadecane (S)</td>
<td>%</td>
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<td></td>
<td></td>
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QUALITY CONTROL DATA

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

QC Batch: 466672
QC Batch Method: EPA 3511
Analysis Method: EPA 8015C
Analysis Description: EPA 8015C
Associated Lab Samples: 60238403017, 60238403018, 60238403019, 60238403023, 60238403024, 60238403025, 60238403026

METHOD BLANK: 1909829
Matrix: Water
Associated Lab Samples: 60238403017, 60238403018, 60238403019, 60238403023, 60238403024, 60238403025, 60238403026

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LABORATORY CONTROL SAMPLE & LCSD: 1909830

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<th>RPD</th>
<th>Max</th>
<th>% Rec Limits</th>
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<tr>
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<td>mg/L</td>
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<td>0.28</td>
<td>0.24</td>
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<tr>
<td>MRH (C9-C18)</td>
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<td>0.21</td>
<td>0.17</td>
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<td>40-140</td>
<td>22</td>
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<td>1-Chloro-octadecane (S)</td>
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<td>112</td>
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<td>40-140</td>
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LABORATORY CONTROL SAMPLE & LCSD: 1909831

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<td>MRH (C9-C18)</td>
<td>mg/L</td>
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<td>0.45</td>
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<td>148</td>
<td>40-140</td>
<td>43</td>
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<tr>
<td>1-Chloro-octadecane (S)</td>
<td>%</td>
<td>100</td>
<td>45</td>
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<td>40-140</td>
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QUALITY CONTROL DATA

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

QC Batch: 467111
QC Batch Method: EPA 3511
Analysis Method: EPA 8015C
Analysis Description: EPA 8015C
Associated Lab Samples: 60238403020, 60238403021, 60238403022

METHOD BLANK: 1911586
Matrix: Water
Associated Lab Samples: 60238403020, 60238403021, 60238403022

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<td>40-140</td>
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LABORATORY CONTROL SAMPLE & LCSD: 1911587

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<tbody>
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<td>0.20</td>
<td>0.25</td>
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<td>109</td>
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<tr>
<td>1-Chloro-octadecane (S)</td>
<td>%</td>
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Date: 03/02/2017 03:08 PM
## QUALITY CONTROL DATA

**Project:** Rose Rock Hudson / 01167141  
**Pace Project No.:** 60238403

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<td>Dry Weight/Percent Moisture</td>
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**QC Batch Method:** ASTM D2974  
**Analysis Description:** Dry Weight/Percent Moisture

**Associated Lab Samples:**
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**METHOD BLANK:** 1910196  
**Matrix:** Solid

**Associated Lab Samples:**
- 60238403001, 60238403002, 60238403003, 60238403004, 60238403005, 60238403006, 60238403007, 60238403008, 60238403009, 60238403010, 60238403011, 60238403012, 60238403013, 60238403014, 60238403015, 60238403016

### METHOD BLANK

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<td>20.5</td>
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QUALIFIERS

Project: Rose Rock Hudson / 01167141
Pace Project No.: 60238403

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.
ND - Not Detected at or above adjusted reporting limit.
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
MDL - Adjusted Method Detection Limit.
POL - Practical Quantitation Limit.
RL - Reporting Limit.
S - Surrogate
1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.
Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.
LCS(D) - Laboratory Control Sample (Duplicate)
MS(D) - Matrix Spike (Duplicate)
DUP - Sample Duplicate
RPD - Relative Percent Difference
NC - Not Calculable.
SG - Silica Gel - Clean-Up
U - Indicates the compound was analyzed for, but not detected.
N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.
Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.
TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

BATCH QUALIFIERS

Batch: 466737
[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1 RPD value was outside control limits.
S8 Surrogate recovery outside laboratory control limits due to matrix interferences (confirmed by similar results from sample re-extraction and/or re-analysis)
# QUALITY CONTROL DATA CROSS REFERENCE TABLE

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**Sample Condition Upon Receipt**

**Client Name:**

**Courier:** FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ EC ☐ Pace ☐ Xroads ☐ Client ☐ Other ☐

**Tracking #:**

**Pace Shipping Label Used?** Yes ☐ No ☐

**Custody Seal on Cooler/Box Present:**

**Seals intact:** Yes ☐ No ☐

**Packing Material:** Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other ☐

**Type of Ice:** Wet ☐ Blue ☐ None ☐

**Thermometer Used:**

**Cooler Temperature (°C):** 17/21°C

**Corr. Factor:** 1.0

**Corrected:** 3.4/1°C

**Date and initials of person examining contents:** 2/23/17

**Comment/Resolution:**

**Objectives:**

- Temperature should be above freezing to 6°C
- Chain of Custody present:
- Chain of Custody relinquished:
- Samples arrived within holding time:
- Short Hold Time analyses (<72hr):
- Rush Turn Around Time requested:
- Sufficient volume:
- Correct containers used:
- Pace containers used:
- Containers intact:
- Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?
- Filtered volume received for dissolved tests?
- Sample labels match COC: Date / time / ID / analyses
- Samples contain multiple phases?
- Matrices:

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<tr>
<th>Matrix</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
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</table>
- Containers requiring pH preservation in compliance:
  - (HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide)
  - (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)
- Cyanide water sample checks:
- Lead acetate strip turns dark? (Record only)
- Potassium iodide test strip turns blue/purple? (Preserve)
- Trip Blank present:
- Headspace in VOA vials (>6mm):
- Samples from USDA Regulated Area:
  - State:
- Additional labels attached to 5035A / TX1005 vials in the field:

**Client Notification/Resolution:**

**Copy COC to Client?** Y ☐ N ☐

**Field Data Required?** Y ☐ N ☐

**Person Contacted:**

**Date/Time:**

**Comments/Resolution:**

**Additional labels attached to 5035A / TX1005 vials in the field:**

**Samples from USDA Regulated Area:**

**State:**

- All was (no) traveled to TB
- No TB for soil

**Project Manager Review:**

**By hwilson at 7:04 pm, 2/23/17**

**Reviewed**

**Date:**
# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

## Section A
### Required Client Information:
- **Company:** Terracon
- **Address:** 1815 South Eisenhower, Wichita, KS 67209
- **Email:** michael.montgomery@terracon.com
- **Phone:** (316) 448-3891
- **Fax:** (316) 262-6997

## Section B
### Required Project Information:
- **Report To:** Michael Montgomery
- **Copy To:**
- **Project Name:** Rose Rock Hudson Station
- **Project Number:** 01167141
- **Pace Project Manager:** Heather Wilson

## Section C
### Invoice Information:
- **Attention:** Michelle Ogden
- **Company Name:** Terracon
- **Address:** Same as Section A

## Section D
### Valid Matrix Codes

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## Additional Comments
- **RELINQUISHED BY / AFFILIATION:**
- **DATE / TIME:** 2-22-17 14:30
- **ACCEPTED BY / AFFILIATION:**
- **DATE / TIME:** 2-22-17 14:30

**SAMPLE CONDITIONS:**

- 3.2 Y Y Y
- 4.1 Y Y Y

**SAMPLER NAME AND SIGNATURE:**
- **PRINT Name of SAMPLER:**
- **SIGNATURE of SAMPLER:**
- **DATE Signed:** 2-22-17

---

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.*
**CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

### Section A
- **Required Client Information**
  - **Company:** Terracon
  - **Address:** 1815 South Eisenhower, Wichita, KS 67209
  - **Email To:** michael.montgomery@terracon.com
  - **Phone:** (316) 448-3891, Fax: (316) 262-6997

### Section B
- **Required Project Information**
  - **Report To:** Michael Montgomery
  - **Copy To:** Michelle Ogden

### Section C
- **Invoice Information**
  - **Invoice Information:** Page: of .

### Section D
- **Valid Matrix Codes**
  - **MATRIX CODE:**
    - **SAMPLE TYPE:** (G=GRAB, C=COMP)
    - **SAMPLE TEMP AT COLLECTION**
    - **NUMBER OF CONTAINERS**
    - **Preservatives**
      - **Unpreserved**
      - **H2SO4, HNO3, HCl, NaOH, Na2SO3, Methanol, Other**

### Requested Analysis Filtered (Y/N)

### Additional Comments
- **RELINQUISHED BY / AFFILIATION:**
- **DATE:**
- **TIME:**
- **ACCEPTED BY / AFFILIATION:**
- **DATE:**
- **TIME:**
- **SAMPLE CONDITIONS:**
  - **ADDITIONAL COMMENTS RELINQUISHED BY / AFFILIATION DATE TIME ACCEPTED BY / AFFILIATION DATE TIME SAMPLE CONDITIONS**

### Sampler Name and Signature
- **PRINT Name of SAMPLER:**
- **SIGNATURE of SAMPLER:**
- **DATE Signed (MM/DD/YYYY):** 2-22-17

---

*Note: By clicking this form, you are accepting Pace’s NFT 30 day payment terms and agreeing to late charges of 1.5% per month for all invoices not paid within 30 days.*
**CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

---

**Section A**

**Required Client Information:**
- **COMPANY:** Terracon
- **REPORT TO:** Michael Montgomery
- **ADDRESS:** 1815 South Eisenhower
  Wichita, KS 67209
- **EMAIL TO:** michael.montgomery@terracon.com
- **PHONE:** (316) 448-3891
- **FAX:** (316) 262-6997
- **REQUESTED DUE DATE/TAT:**

**Section B**

**Required Project Information:**
- **PROJECT NAME:** Rose Rock Hudson Station
- **FACILITY NAME:** Heather Wilson
- **PROJECT NUMBER:** 01167141
- **PAC Project No./ Lab I.D. DATE TIME:**

**Section C**

**Invoice Information:**
- **REQUESTED ANALYSIS FILTERED (Y/N):**

**Section D**

**Valid Matrix Codes:**
- **CODE:**
  - DRINKING WATER DW
  - WATER WT
  - WASTE WATER WW
  - PRODUCT P
  - SOLVENT S
  - OIL OL
  - AIR AR
  - OTHER OT
  - TISSUE TS

**SAMPLE ID**

**SAMPLE CODE (A-Z, 0-9 / , -):**

**MATRIX CODE (see wet matrix to the right):**

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**ADDITIONAL COMMENTS**

 рассказ

**RELINQUISHED BY / AFFILIATION DATE TIME:**

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<th>ITEM #</th>
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**SAMPLE CONDITIONS**

- Residual Chlorine (Y/N)
  - N
  - Y
- Pace Project No./ Lab I.D.
  - 4326/403
  - 4032/403

**SAMPLER NAME AND SIGNATURE**

**PRINT Name of SAMPLER:** Adam Stadler Terracon
**DATE Signed (MM/DD/YY):** 2-22-17

**SIGNATURE of SAMPLER:** Adam Stadler

---

*Important Note: By signing this form you are accepting Pace’s NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev 07, 15-Feb-2007
SURVEY FOR: TERRACON

DESCRIPTION: Survey of Monitor Wells in the Northwest Quarter of Section 31, Township 22 South, Range 11 West of the 6th Principal Meridian in Stafford County, Kansas.

<table>
<thead>
<tr>
<th>Monitor Well</th>
<th>NAD83-1502 US Survey Feet</th>
<th>NAD83 Geographic (Decimal Degrees)</th>
<th>NAVD88</th>
<th>Description</th>
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</table>

BENCHMARK:
HVCP-6  GSS red capped 5/8"x24" Rebar 2' Southeast of C/L MW-1.
Elevation=1817.03 NAVD 88

Scale: 1"=300'
BASIS OF BEARING = NAD 83 KANSAS SOUTH ZONE

DATE OF FIELD WORK: August 9, 2017

SURVEYOR'S CERTIFICATE:
I hereby certify this plat to be a true, correct and complete representation of the property described above as surveyed under my supervision.
Dated: August 14, 2017

Copyright © 2016 Garber Surveying Service, P.A.