January 24, 2017

Reference No. 074937

Vanessa Fields, Environmental Specialist
Oil Conservation Division
Energy, Minerals & Natural Resources
1000 Rio Brazos
Aztec, New Mexico 87410

OIL CONS. DIV DIST. 3
FEB 02 2017

Dear Ms. Fields:

Re: Temporary Groundwater Monitor Well Installation and Sampling

Wilmuth No. 1
Sec 26, T31N, R11W
Aztec, NM
San Juan County, New Mexico

On behalf of ConocoPhillips Company (ConocoPhillips), GHD Services, Inc. is pleased to present this workplan to further assess upgradient groundwater quality at the above referenced site (Site). This workplan is submitted based on discussions regarding this Site with the New Mexico Oil Conservation Division (NMOCD). The Site is situated on private land off County Road 4600, north of Aztec in San Juan County, New Mexico. A Site location map is included as Figure 1.

1. Project Information

The natural gas well that was located at the Site was plugged and abandoned in March 2014. Associated equipment, including the separator, produced water and condensate tanks, and pump jack, were also removed. A metering station remains at the Site.

During line tie-in activities in December 2009, discolored soils were noted in two excavated areas on Site where groundwater was also observed to be infiltrating. Groundwater samples collected from the two areas were noted to be below New Mexico Water Quality Control Commission (NMWQCC) standards for benzene, toluene, ethylbenzene and xylenes (BTEX) but above the standard for chloride. Soil samples were also collected from excavated areas and analyzed for BTEX, total petroleum hydrocarbons and chloride. Analytical results for all soil samples were below NMOCD recommended soil action levels.

Groundwater monitor wells were installed in April 2010 to assess the potential for groundwater impacts. Four groundwater monitor wells were installed to total depths ranging from 30 to 35 feet below ground surface (ft bgs). Soil samples were collected from all four soil borings and analyzed for major ions, total metals, semi-volatile organic compounds (SVOCs), volatile organic compounds

GHD Services Inc.
6121 Indian School Road NE Suite 200 Albuquerque New Mexico 87110 USA
T 505 884 0672 **F** 505 884 4932 **W** www.ghd.com

(VOCs) including BTEX, diesel range organics, and gasoline range organics. Analytical results for all soil samples were below NMOCD recommended soil action levels.

In April 2010, initial groundwater sampling was conducted from the four Site wells. A baseline laboratory analytical suite was completed including major ions, NMWQCC dissolved metals, SVOCs , VOCs including BTEX, diesel range organics, and gasoline range organics. All four Site monitor wells were below NMWQCC standards for BTEX constituents. All four wells were above the standard for dissolved manganese. MW-1, MW-2 and MW-4 were above the standard for total dissolved solids (TDS). MW-1 and MW-4 were also above the standard for sulfate in the initial sample but have remained below this level since that sampling event. All site monitor wells remain above standard for dissolved manganese and intermittently exceed the standard for TDS.

To date, background concentrations for these analytes have not been established. To assist with this, a temporary monitor well is proposed for installation. The well will be located in the field between the Wilmuth No. 1 well pad and the residential structures located northwest of the Site,

A Site meeting with the landowner was held on January 10, 2017 to discuss post-production Site reclamation with other involved parties. This includes possible modifications to the existing monitor well surface completions. The location and sampling of the temporary, up-gradient monitor well proposed herein was discussed at that time with NMOCD. Their affirmative response and specific requirements was provided in a January 12, 2017 email. Those requirements for monitor well installation and soil and groundwater sampling are included in the scope of work that is presented below.

2. Scope of Work

GHD proposes to install a temporary groundwater monitor well to the northeast of MW-4 in the cultivated field (Figure 2). The proposed monitor well, TMW-1, will be advanced to a depth of approximately 35 feet (ft) below ground surface (bgs).

2.1 Project Preparation

This task includes preparation and submittal of this Work Plan, well permitting through the New Mexico Office of the State Engineer, and other project preparation activities. After receiving authorization to proceed, GHD will:

- Update the Site Health and Safety Plan (HASP) and job hazard analyses (JHAs) that address field work specified in the Work Plan;
- Coordinate site access with appropriate ConocoPhillips staff;
- Execute GHD's subsurface clearance protocol; and
- Develop work orders and contracts for subcontractors.

2.2 Temporary Monitor Well Installation

GHD, ConocoPhillips representatives (if available) and the drilling subcontractor will mobilize to the Site to perform a project kickoff meeting. The project kickoff meeting will include a tailgate safety meeting to discuss the Site-specific HASP, applicable JHA's, and stop work authority. Tailgate safety meetings will be conducted daily at the beginning of the day and as Site conditions change.

Boring logs from existing Site monitor wells MW-1 through MW-4 suggest the aquifer beneath the site is under confined/semi-confined conditions (see Attachment A). The logs show a damp to wet, silt/clay layer overlying the apparent sand and gravel interval where saturated conditions were noted. In the MW-4 boring, the saturated sand and gravel is first encountered at a depth of approximately 17 feet bgs. It is this saturated sand/gravel interval beneath the confining silt and clay that GHD believes should be targeted as the aquifer depth. The proposed location for the temporary monitor well is approximately 5 feet higher topographically. GHD therefore proposes to drill to a depth of 25 ft bgs at that location and then to wait up to 12 hours to allow groundwater to come in to the borehole, if indeed the aquifer is encountered at that depth. If groundwater is encountered at that depth, the boring will be drilled deeper as needed to install a well with a minimum of 15 ft of screened section. Should groundwater fail to infiltrate the boring after 12 hours, drilling will proceed to a depth of approximately 40 feet to intercept the same aquifer interval seen in existing borings.

Prior to subsurface penetration, the proposed TMW-1 borehole location will be cleared to a depth of 5 ft bgs using a hand auger The boring will be deepened using a hollow-stem auger drill rig. A GHD scientist will supervise the advancement of the soil borings at the site. Cuttings and samples will be logged according to the Unified Soil Classification System.

The boring will be advanced to an estimated depth of up to 40 ft bgs or until a water bearing zone is encountered or refusal. Soil samples will be collected with a split-spoon sampler to the groundwater interface. Field screening for petroleum hydrocarbons will be performed using the heated headspace method with a calibrated photo-ionization detector (PID). Samples will also be submitted for analyses of manganese by EPA Method 6010.

A 2-in. diameter, Schedule 40 polyvinyl chloride (PVC) monitor well will be installed in the borehole. The exact placement of the slotted PVC well screen will be determined in the field. It is anticipated that a 15-foot section of 2-inch diameter 0.010-inch thick machine slot PVC screen will be installed in the borehole. The screen will be placed approximately 10 feet below and five feet above the water table. The remainder of the well will be constructed with 2-in. diameter PVC blank casing.

The borehole annulus will be backfilled with 10-20 silica sand from the bottom to approximately two feet above the top of the well screen. An approximately 2-ft thick seal of 3/8-in. hydrated bentonite pellets will be placed above the sand pack. The borehole annulus will be left open during well development and groundwater sampling. Once a groundwater sample is collected, the casing material will be pulled from the boring and plugged and abandoned as described below.

Well development will be performed by bailing, pumping, or a combination of both. Development of the well will be performed until the water is reasonably clear and parameters of pH, temperature, and specific conductance have stabilized (within a 10% margin).

Groundwater samples will be collected from TMW-1 and from existing Site wells MW-1, MW-2, MW-3 and MW-4. Samples will be submitted to Pace Analytical and analyzed for dissolved manganese by EPA Method 6010, TDS by EPA Method 2540 and for sulfate by EPA Method 300.

2.2 Monitor Well Plugging and Abandonment

Plugging and abandonment of TMW-1 will be performed in general accordance with New Mexico Office of State Engineer (NMOSE) requirements. A well plugging plan will be submitted to the NMOSE for their approval prior to well abandonment. Plugging operations will not be performed until approval of the plugging plan is received from the NMOSE.

An NMOSE Plugging Record for the well will be submitted by the drilling subcontractor following completion of plugging and abandonment activities.

2.3 Reporting

A summary of the TMW-1 installation, soil and groundwater sampling, and groundwater sampling of existing Site monitor wells will be included in a Letter Report for the Site. Specific reporting on the installation and sampling will include:

- An updated site plan showing the location of TMW-1 and other site features;
- A boring log and monitor well construction diagram;
- Tabulation of field screening and laboratory analytical test results.

The Letter Report will include copies of laboratory chain-of-custody documentation and results, laboratory quality assurance/quality control (QA/QC) documentation, tabulated groundwater elevations and concentration data, groundwater elevation maps, and a summary of findings.

3. Health and Safety Considerations

Personal protective equipment including fire retardant clothing, steel-toed work boots, gloves, safety glasses and hard hats will be required (basic Level D requirements) during field tasks. The project HASP will be maintained onsite. It will be reviewed and signed by on-site personnel, subcontractors, and authorized visitors.

4. Investigation Derived Waste

Soils generated during well drilling are not anticipated to be impacted with hydrocarbons and therefore thin spread on Site. Should soils in fact be impacted above 100 parts per million based on field screening results, soil cuttings and monitor well development purge water will be placed in DOT approved 55-gallon drums, sealed, labeled and staged on Site pending laboratory soils analyses. Disposal of the soil and water at a landfarm will be based on analytical results of samples.

5. Quality Assurance and Quality Control

Well installation and sampling will be completed in accordance with GHDs standard Quality Assurance/Quality Control procedures designed to minimize cross-contamination between samples and to provide reliable laboratory results.

6. Schedule

GHD is prepared to initiate the scope of work immediately, subsequent to NMOCD and ConocoPhillips approvals, the availability of resources, and stakeholder concurrence. A start date and schedule of report submittals will be provided following receipt of driller availability.

Should you have any questions, or require additional information regarding this submittal, please feel free to contact Jeff Walker at (505) 884-0672 or jeff.walker@ghd.com.

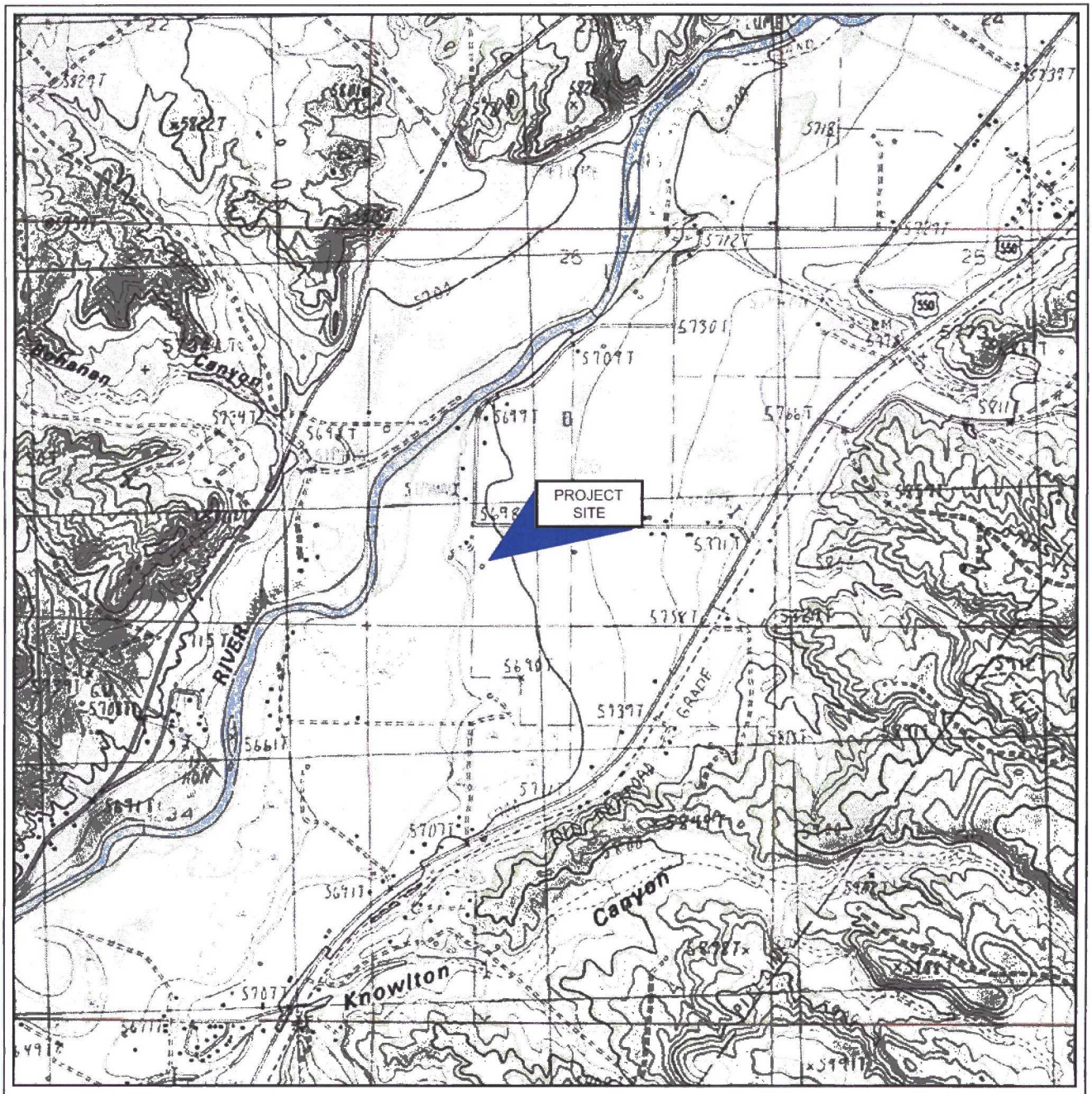
Sincerely,

GHD

Jeff Walker
Senior Project Manager

Bernard Bockisch,
Senior Project Manager

Encl. Figure 1-Vicinity Map
Figure 2 – Site Details Map
Attachment A – Logs of Borings and Cross-Section A-A'



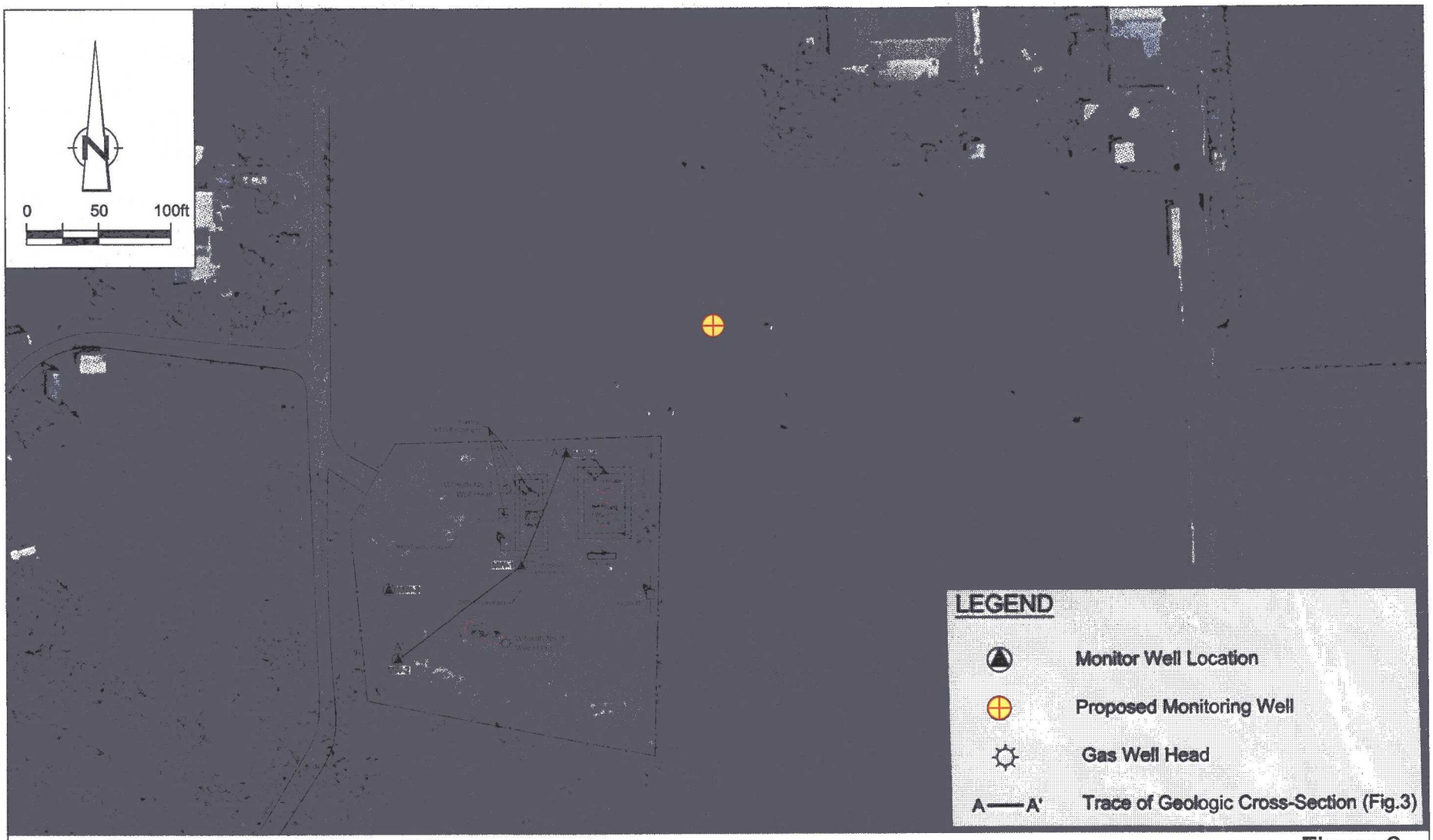
SOURCE: USGS 7.5 MINUTE QUAD
"CEDAR HILL AND AZTEC, NEW MEXICO"

0 1000 2000ft

Figure 1

SITE VICINITY MAP
WILMUTH No. 1 NATURAL GAS WELL SITE
SECTION 26, T31N-R11W, SAN JUAN COUNDY, NEW MEXICO
ConocoPhillips Company

074937-95(006)GN-DL001_TOPO NOV 11/2015



ConocoPhillips high resolution aerial imagery 2008.

Figure 2

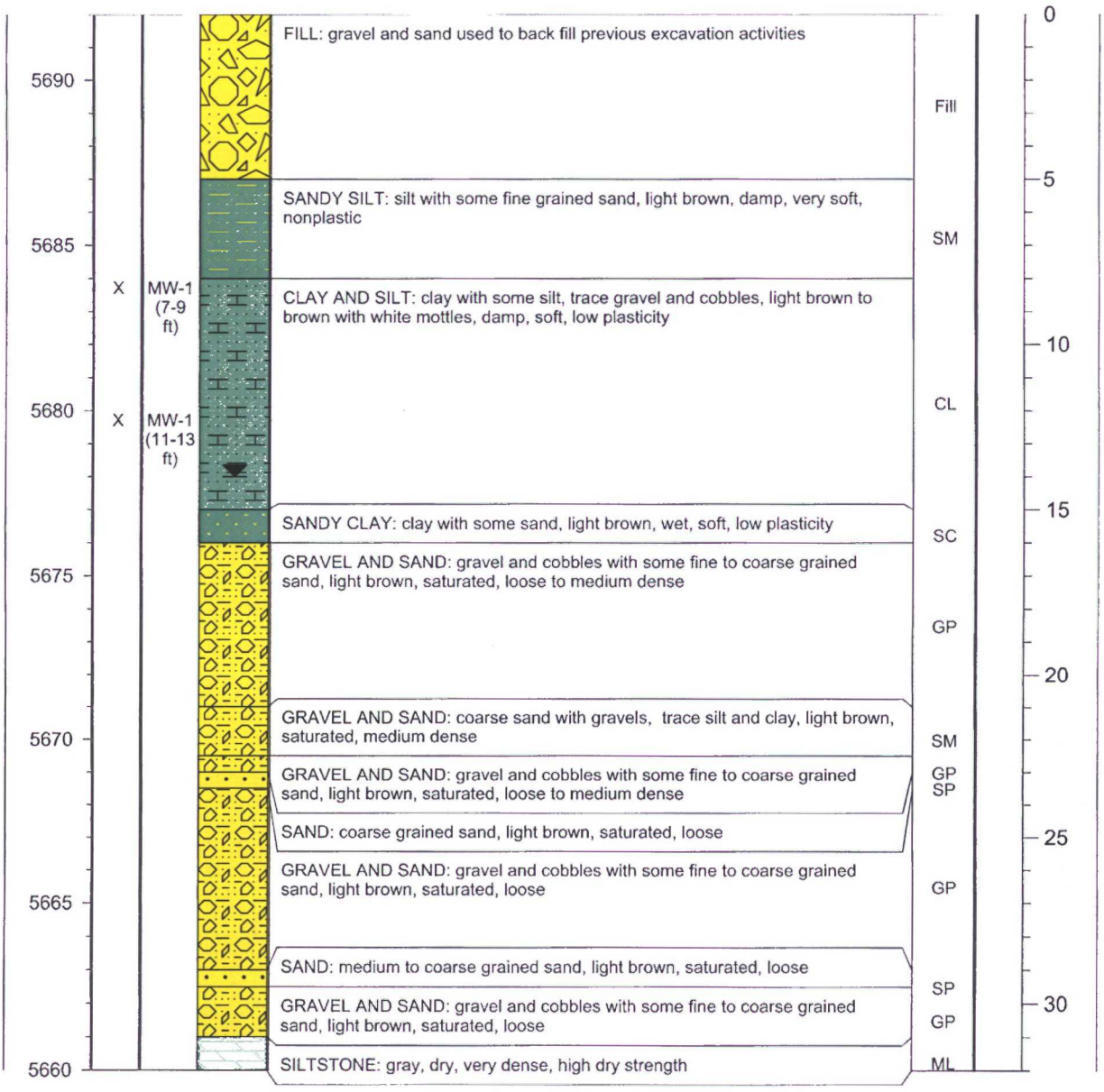
SITE PLAN
WILMUTH No. 1 NATURAL GAS WELL SITE
SECTION 26, T31-R11W, SAN JUAN COUNTY, NEW MEXICO
ConocoPhillips Company

GHD

074937-95(007)GN-DL002_SD NEW JAN 19, 2017

PROJECT NAME: Wilmuth No. 1
LOCATION: Aztec, NM
FIELD LOGGED BY: B. Lauctes
ELEVATION: GROUND SURFACE (msl): 5692
GROUNDWATER ELEVATION (msl): ~ 5678
REMARKS:

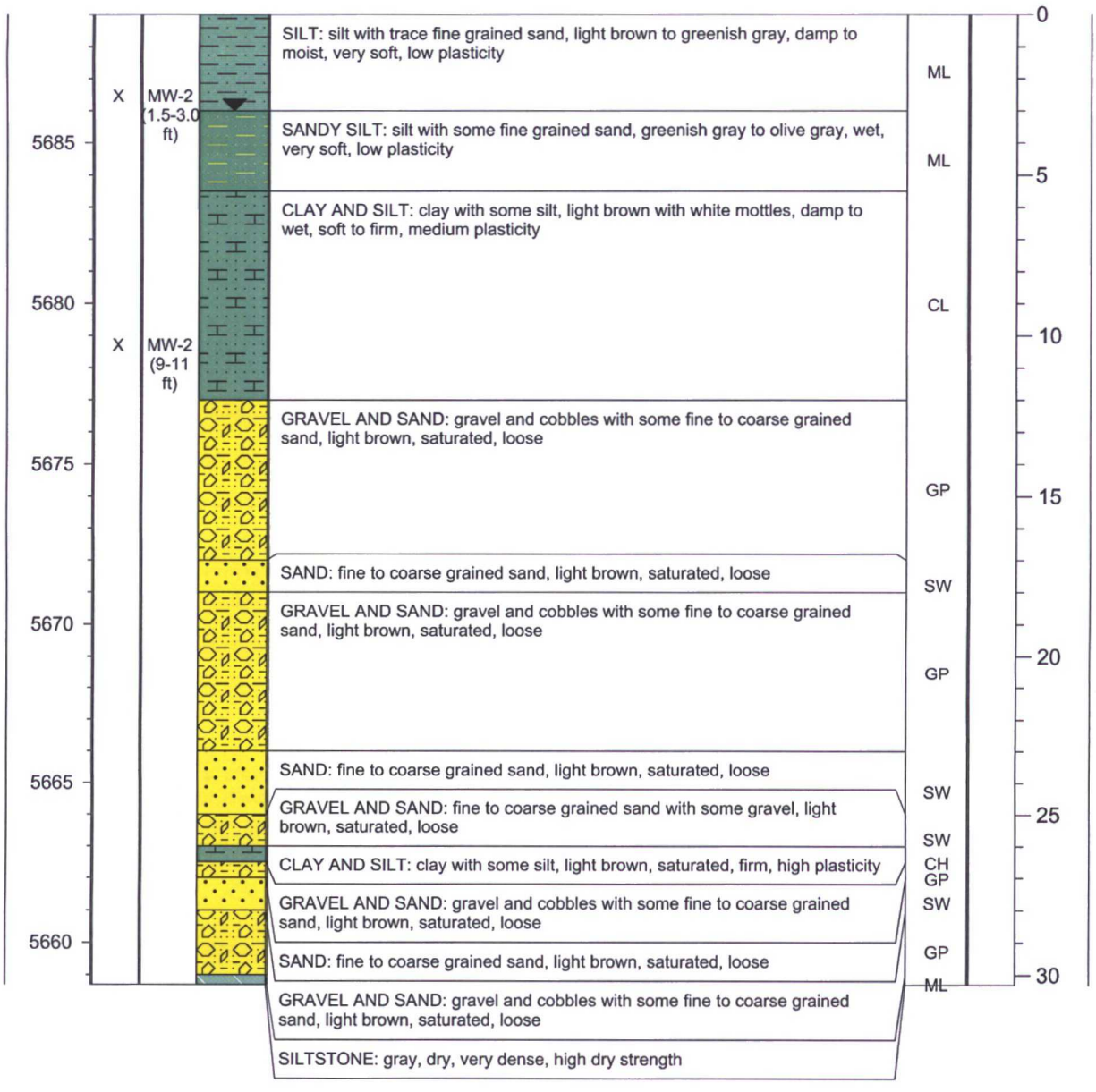
SOIL BORING NO. MW-1
DRILL TYPE: CME 75
Hollow Stem Auger
BORE HOLE DIAMETER: 8 inches
DRILLED BY: Enviro-Drill Inc.
DATE/TIME: HOLE STARTED: 4/5/2010 at 12:40
DATE/TIME: COMPLETED: 4/6/2010 at 10:05



Total Depth = 32 feet	TETRA TECH	BORING LOG	Page 1 of 1

PROJECT NAME: Wilmuth No. 1
LOCATION: Aztec, NM
FIELD LOGGED BY: B. Lauctes
ELEVATION: GROUND SURFACE (msl): 5689 feet
GROUNDWATER ELEVATION (msl): ~ 5685 feet
REMARKS:

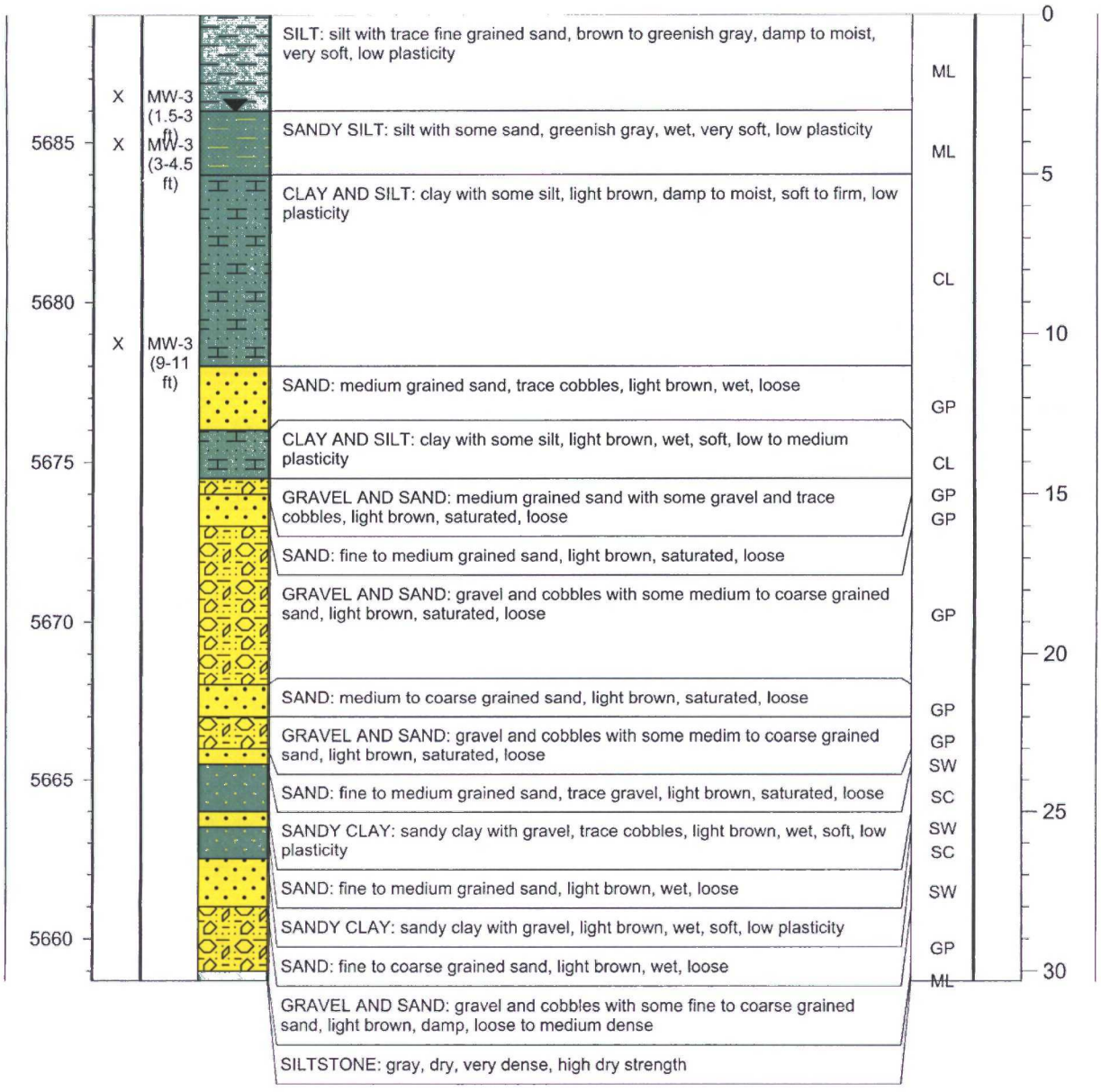
SOIL BORING NO. MW-2
DRILL TYPE: CME 75
Hollow Stem Auger
BORE HOLE DIAMETER: 8 inches
DRILLED BY: Enviro-Drill Inc.
DATE/TIME: HOLE STARTED: 4/5/2010 at 13:30
DATE/TIME: COMPLETED: 4/6/2010 at 17:00



Total Depth = 30 feet	TETRA TECH	BORING LOG	Page 1 of 1

PROJECT NAME: Wilmuth No. 1
LOCATION: Aztec, NM
FIELD LOGGED BY: B. Lauctes
ELEVATION: GROUND SURFACE (msl): 5689
GROUNDWATER ELEVATION (msl): ~ 5686
REMARKS:

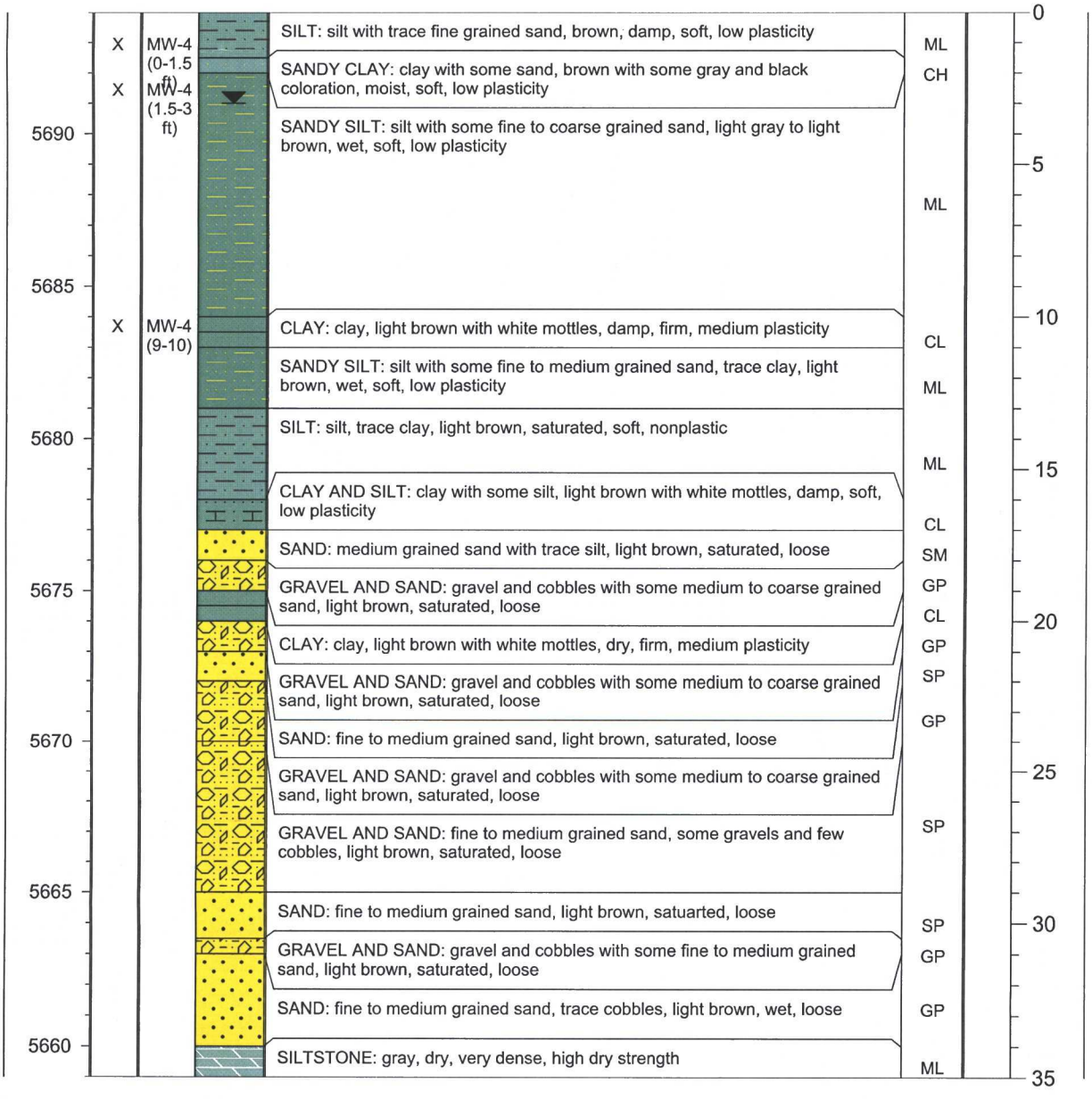
SOIL BORING NO. MW-3
DRILL TYPE: CME 75
Hollow Stem Auger
BORE HOLE DIAMETER: 8 inches
DRILLED BY: Enviro-Drill Inc.
DATE/TIME: HOLE STARTED: 4/7/2010 at 10:35
DATE/TIME: COMPLETED: 4/5/2010 at 14:30



Total Depth = 30 feet	TETRA TECH	BORING LOG	Page 1 of 1

PROJECT NAME: Wilmuth No. 1
LOCATION: Aztec, NM
FIELD LOGGED BY: B. Lauctes
ELEVATION: GROUND SURFACE (msl): elevation
GROUNDWATER ELEVATION (msl): 5694 feet
REMARKS:

SOIL BORING NO. MW-4
DRILL TYPE: CME 75
Hollow Stem Auger
BORE HOLE DIAMETER: 8 inches
DRILLED BY: Enviro-Drill Inc.
DATE/TIME: HOLE STARTED: 4/5/2010 at 11:40
DATE/TIME: COMPLETED: 4/6/2010 at 14:35



Total Depth = 35 feet | TETRA TECH | **BORING LOG** | Page 1 of 1

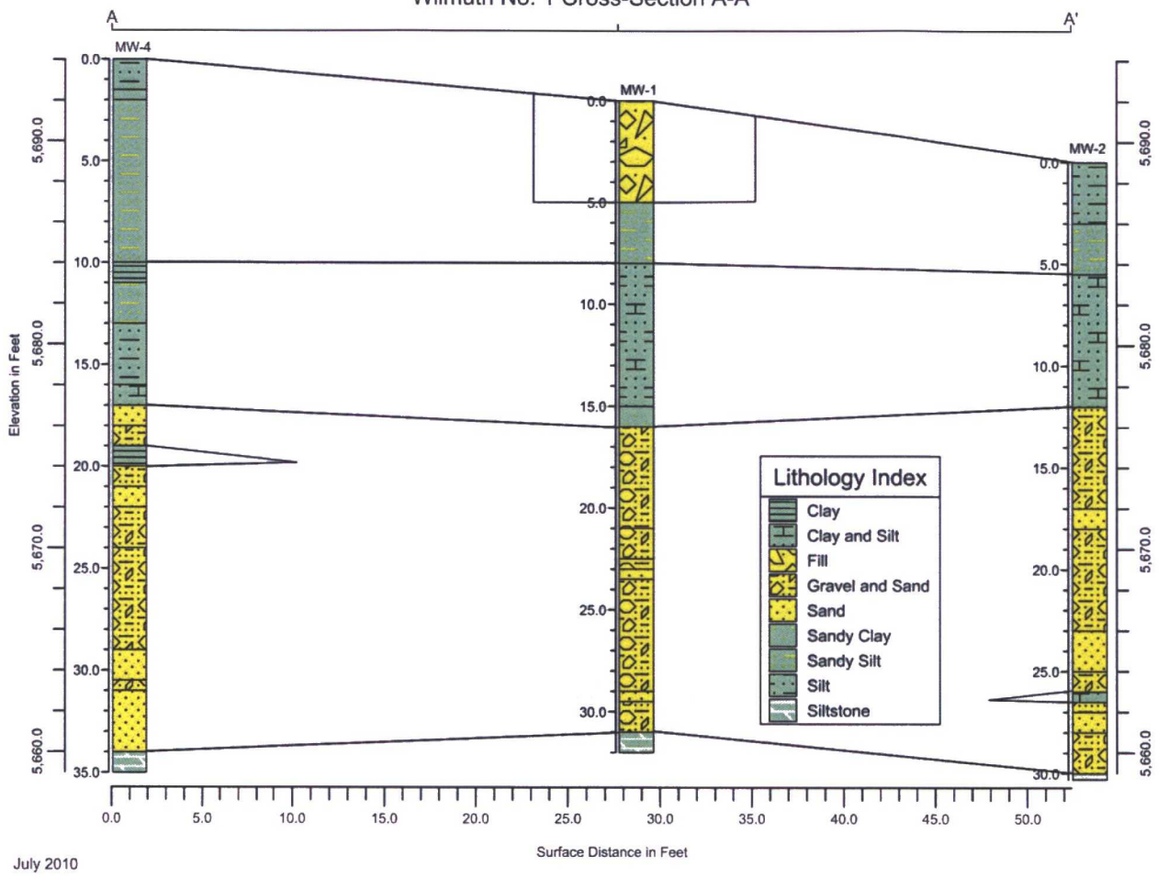


Figure 3

GEOLOGICAL CROSS SECTION
WILMUTH NO. 1 NATURAL GAS WELL SITE
SECTION 26, T31-R11W, SAN JUAN COUNTY, NEW MEXICO
ConocoPhillips Company

GHD

074937-95(006)GN-DL003_XSEC NOV 11/2015