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# **LOST CREEK HYDROLOGIC TEST PLAN**

## **KM HORIZON 5-SPOT TEST PATTERN**

### **PRODUCTION / INJECTION TEST**



Lost Creek ISR, LLC  
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## **LOST CREEK PROJECT**

### **SWEETWATER COUNTY, WY**

**June, 2015**

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## 1.0 INTRODUCTION

The purpose of this work plan is to describe the objectives and procedures for conducting an extraction / injection test, with minor bleed, at the existing 5-spot test pattern located at the eastern end of Mine Unit 1 (MU1). The test focus is on defining the vertical drawdown response for use in calibrating a model. The purposed test is intended to simulate current MU1 operating conditions.

Initially, LC ISR had discussed with NRC the use of tracers to evaluate vertical flare. However, a more comprehensive evaluation of tracer use revealed that full tracer break through would require a test duration of 30 to 60 days and the addition of an exorbitant amount of tracer. Given the rapidly advancing MU1 operation and the time required to obtain regulatory approval, LC ISR opted for the following alternative test approach.

### 1.1 Background

LC ISR plans to develop and extract uranium from mine units within the KM Horizon of the Battle Spring Formation via ISR. Initial production from the KM Horizon will occur within an area of the Lost Creek Project currently designated as Resource Area 3. This resource area underlies the eastern end of Mine Unit 1 and extends eastward (see **Figure 1-1**).

With reference to Resource Area 3, significant mineralization has been identified in the KM Horizon, occurring between depths of approximately 430 to 590 feet below ground surface (ft bgs). Average thickness of the KM Horizon is approximately 115 feet and total thickness of the composite KM, L and M Horizons ranges from approximately 260 to 330 feet. Based on the results of testing and stratigraphic analysis (detailed in *Lost Creek Hydrologic Test, Composite KLM Horizon Regional Pump Test, October 2011* [Petrotek, 2013]), the three above-referenced Horizons are in hydraulic communication.

In 2012, LC ISR installed a 5-Spot, extraction / injection test pattern along with observation wells in the overlying and underlying horizons. The purpose of the 5-Spot hydrologic testing was to assess the level of hydraulic communication between the KM Horizon (Production Zone) and the overlying HJ Horizon, as well as the underlying L, M and N Horizons in a typical commercial scale production pattern. Two types of tests were performed: 1) an extraction test followed by, 2) an extraction with injection test performed without bleed (*Lost Creek Hydrologic Test, KLM Horizon 5-Spot Testing, October 2012, 2013* [Petrotek]).

### 1.2 5-Spot Hydrologic Test Objectives

LC ISR intends to essentially duplicate the 2012 extraction / injection test, but incorporate a 1% bleed to simulate actual operating conditions.

The objectives of the KM Horizon 5-spot hydrologic test are to:

1. Characterize pattern-scale aquifer properties within the KM Horizon Production Zone;



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2. Evaluate the degree of hydraulic communication, under simulated production conditions, between KM Horizon and the overlying HJ Horizon and the deeper underlying N Horizon, as well as evaluate the degree of hydraulic communication amongst the KM, L and M Horizons;
  3. Develop vertical and horizontal hydraulic control data in the KM Horizon for input into and calibration of a model; and
  4. Determine site-specific flow hydraulics that will likely manifest during typical ISR production operations.

## 2.0 SITE CHARACTERIZATION

### 2.1 Hydrostratigraphy

LC ISR utilizes the following nomenclature for the hydrostratigraphic units of interest within the Battle Spring Formation in the Lost Creek area (see Stratigraphic Section on **Plate 1** sidebar).

### 2.2 Overlying Units: HJ Horizon and Sagebrush Shale

The KM Horizon is bounded above by the confining unit identified as the Sagebrush Shale. The Sagebrush Shale is continuous throughout the Lost Creek Project, and ranges from 3 to 32 feet thick within the resource study area.

Above the Sagebrush Shale is the HJ Horizon, which represents the overlying aquifer in this test. The HJ Horizon is continuous throughout the Lost Creek Project and ranges from 100 to 151 feet thick, with an average thickness of approximately 120 feet. (Note: the HJ Horizon is also the primary production zone in Mine Unit 1, which partially overlaps Resource Area 3, **Figure 1-1**).

### 2.3 KM Horizon Production Zone and Underlying Horizons

The Production Zone evaluated as part of this investigation is the KM Horizon. The KM Horizon is continuous throughout the Lost Creek Project with a total thickness that averages approximately 115 feet in the test area.

There is no confirmed areally extensive confining unit that isolates the KM, L, M and N Horizons from each other. Rather, there is a series of interfingering layers of mudstone, siltstone and shales (see **Plate 1**). Some of these have historically been referred to as "No Name Shale", K-Shale, LM Shale and MN Shale. Previous pump tests have evaluated some of these as potential lower aquitards to the KM Production Zone. These bedding units may show continuity over large areas, but regional continuity has not been demonstrated. Thus, they cannot be considered truly confining units on a regional scale. However, due to the interfingering nature and low permeability of these units, test results confirm that they limit (attenuate with depth) and/or restrict vertical flow.

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## 2.4 MN Shale and N Horizon

The MN Shale is a zone of interfingering layers of mudstone, siltstone, and shale that separates the M Horizon from the deeper N Horizon (**Plate 1**). Based on geologic data, the MN Shale is not considered a true regional confining unit, as continuity is not observed over a regional scale. The MN Shale appears to limit and/or restrict vertical flow due to the interfingering of finer grained and lower permeability units. It ranges from approximately 10 to 40 feet thick, with a typical thickness of about 10 to 20 feet. As mentioned above, regional continuity of the MN Shale is not certain.

Beneath the MN Shale is the N Horizon and based on limited data, the total thickness of the N Horizon is approximately 100 feet. No isopach maps have been constructed for this aquifer due to the limited number of borings that have penetrated through the entire N Horizon.

The hydrologic gradient in the KM Horizon is 0.0063 ft/ft in a southwesterly direction. A series of single and multiple well pump tests yielded transmissivity values that range from 195 to 2,012 gpd/ft with an average of 740 gpd/ft (99 ft<sup>2</sup>/day).

In the 5-spot test area, the piezometric surface in the confined KM Horizon is at 192 feet below ground surface while the top of the KM Horizon is 516 feet below ground surface. This means the ground-water head is 324 feet above the top of the KM horizon. Assuming a fracture gradient of 0.7 psi per foot, the fracture pressure at the completion interval is 138 psi  $[(0.7 \text{ psi/ft} - 0.433 \text{ psi/ft}) \times 516 \text{ ft}] = 138 \text{ psi}$ . A safety factor of 90% is typically applied, so the injection pressure at the well head will be limited to 124 psi.

## 2.5 Structure

In the Lost Creek Project area, the Battle Spring Formation dips to the west at approximately three degrees. The Lost Creek Fault is oriented in a west-southwest to east-northeast direction that bisects MU1. The main fault traverses diagonally across the northwestern portion of Resource Area 3, and is downthrown to the south. A subsidiary splay fault splits from the main fault to the south for a limited distance in the central portions of Resource Area 3 (see **Figure 1-1**).

The nearly vertical, normal fault and associated minor splay have been recognized approximately 600 feet north-northwest of the 5-spot test site. The fault has approximately 70 to 80 feet of vertical displacement at the eastern end of its trace. As the fault travels west the displacement decreases until the fault cannot be located. The associated minor splay has a maximum vertical displacement of 20 feet. The area between the splay and the main fault is a downthrown block. There is no surface expression of the faults.

A stratigraphic profile encompassing the 5-spot test area is presented as **Plate 1**. The circular shaped profile location is shown on **Figure 2-1**.

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## 2.6 Previous Testing

As part of the characterization activities for the NRC License and LQD Permit to Mine applications, LC ISR and Petrotek previously performed multiple in-house pump tests including the *2011 Composite KLM Horizon Regional Pump Test* (Petrotek, 2013) and the *2012 Composite KLM Horizon 5-Spot Testing* (Petrotek, 2013).

Of primary relevance to the LC ISR's proposed 2015 testing program is Petrotek's 2012, 5-spot pattern testing program that incorporated both extraction and production / injection tests as described below:

- ❖ A 3-day, 28 gpm extraction test indicated varying degrees of hydraulic communication between the KM Horizon and the underlying L and M Horizons, confirming that the entire composite KM, L and M Horizon are hydraulically connected. Water level responses (< 5-inches) observed in the overlying HJ Horizon and the deeper underlying N Horizon were attributed to barometric pressure change.
- ❖ Following the extraction test and short recovery period, a 3-day, 25 gpm extraction / injection test was performed without subtracting a bleed. Production water was injected into only two of the four injection wells due to limited injectivity in wells KPW-1A and M-UKM1. The test results indicated no drawdown response in any of the overlying or underlying observation wells.

## 3.0 MONITOR WELL LOCATIONS, INSTALLATION, AND COMPLETION

### 3.1 Well Locations

All wells utilized during the 2012 Petrotek tests are located in the 5-spot test area of Resource Area 3 (**Figure 1-1**). A small scale enlargement of the 5-spot test area is presented on **Figure 3-1**.

### 3.2 Well Installation and Completion

Since injection wells KPW-1A and M-UKM1 did not function as designed and were not used in the final 2012 extraction / injection test, LC ISR proposes to install two new injection wells (5S-KM5 and 5S-KM6) and convert the original injection wells to observation wells after re-developing and performing a mechanical integrity test (MIT) on both wells (see **Figure 3-1**).

In an attempt to better define the vertical pressure gradient within the 110 foot thick KM Horizon, LC ISR proposes to install one new lower KM Horizon monitor well, completed just above the K Shale, screened from 610 to 620 feet bgs.

All new wells will be constructed with 4.5-inch inside diameter PVC casing. The wells will be developed using standard water well techniques including but not limited to: an

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application of Aqua-Clear to disperse drill mud, air lifting, pumping, swabbing, and surging. All test and observation wells must pass a MIT before being utilized. Existing well information related to location, construction, completion interval, and initial water levels are provided in **Table 3-1**. Proposed well completion data for the replacement injection wells and new observation well are also shown on **Table 3-1** in blue lettering.

Well Completion Reports for existing 5-spot pattern wells are contained in **Appendix A**.

#### **4.0 5-SPOT HYDROLOGIC TEST DESIGN AND PROCEDURES**

The following section details the proposed 5-spot test design and procedures planned for the 2015 test. Details of testing are summarized below.

##### **4.1 Test Design**

The KM Horizon 5-spot hydrologic test will be conducted in a manner designed to meet the objectives outlined in Section 1.2.

The general testing procedures will be as follows:

1. All wells used in the 2012 5-spot test will be re-developed by swabbing and/or air lifting.
2. In-Situ LevelTROLL® data-logging transducers (vented) will be installed in wells to record changes in water levels during testing. LC staff will verify setting depths and head readings with manual water level measurements;
3. LevelTROLL transducers will measure and record pre-test background water levels and barometric pressure for a period of time prior to the commencement of testing to ensure stability (largely due to the proximity of active ISL mining patterns);
4. Record water levels and barometric pressure throughout pre-test, pumping, and recovery periods.

The 5-spot test will be conducted in three steps as described below:

*Step 1: Extraction Test* – Since two new injection wells will be added to the original 2012 5-spot pattern, as well as one new observation well, a short-term, constant rate pump test will be conducted at the central extraction well 5S-KM3 to demonstrate hydrologic communication with the new wells. The test duration will be intentionally short; only long enough to observe a drawdown response thus proving hydraulic interaction. No other objective is intended. Pumped water will be discharged to the ground surface some distance from the test pattern.

*Step 2: Balanced Extraction and Injection Test* – A balanced, constant rate production / injection test will be conducted by pumping extraction well 5S-KM3 and

injecting the pumped water equally, if possible, into each of four injection wells minus a 1% bleed. To simulate current Mine Unit 1 operating conditions, LC ISR plans to initially pump at approximately 35 gpm and inject at 34.65 gpm. The bleed will be discharged to the ground surface. The test duration is estimated to last 3 to 5 days based on 2012 test results. In any case, the test will be run long enough to meet the stated test objectives.

*Step 3: Out-of-Balance Extraction and Injection Test* - Once the *Step 2* test objectives have been met, LC ISR proposes to intentionally run the pattern slightly out-of-balance (~10%) by cutting back the extraction rate and supplementing water to the injection circuit thereby over pressurizing the aquifer for a short period of time. The purpose of running out-of-balance is to generate an excursion condition and observe the resulting pressure gradients that develop. This information will be useful in providing a second calibration condition for the model. The out-of-balance test duration will depend on the resulting response(s).

Recovery monitoring will commence after the last test and continue until baseline conditions are re-established.

#### 4.2 Pump Test Equipment, Injection Manifold and Monitoring

Aquifer testing will be performed utilizing a Grundfos 40S75-21 (7.5 HP), 460V, 3-phase electrical submersible pump (or equivalent) powered by a portable diesel generator. The pump will be set at an approximate depth of 500 feet (approximately 40 feet off the bottom). Historically, the static depth to water in 5S-KM3 is approximately 192 feet, thus providing for approximately 308 feet of head above the pump.

Flow from the pump will be controlled via a manual ball valve placed at the terminus of a wellhead metering assembly as shown on **Figure 4-1**. Discharge flow monitoring equipment will include a 1.5-inch NU FLO MCII turbine meter. The meter displays total flow (in gallons) and instantaneous flow rate (in gallons per minute [gpm]). The need for a Temporary Discharge Permit is not anticipated based on past experience, but LC ISR will obtain WDEQ-LQD concurrence. Discharge water (bleed) will be land applied approximately 500 feet down-gradient from the 5-spot pattern via a 2-inch high-density polyethylene (HDPE) pipe.

During the injection phase of testing, flow from pumping well 5S-KM3 will be conveyed to an injection manifold via 1.5-inch galvanized pipe attached to a 2-inch flexible discharge line. The injection manifold will consist of 2-inch and 1-inch pipe, fabricated by LC ISR personnel. The 2-inch flexible discharge line running from the pumping well will connect into one, 2-inch tee, with each end connected into two additional 2-inch tees, with reducers to 1-inch lines. Each of the four 1-inch lines will be fitted with 1-inch PVC ball valves for controlling flow to the individual injection wells. The ball valves will be positioned downstream of the turbine flow meters in the configuration shown on **Figure 4-1**.

Water levels will be measured and recorded with In-Situ Level TROLL® pressure transducer

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dataloggers. The pressure rating for the transducers will range from 32 to 100 psi, and programmed to record depth to water measurements at specific time intervals during all phases of testing (pre-test background monitoring, pumping and recovery periods).

The following is the proposed horizon-specific summary of water level monitoring locations by completion interval:

- Overlying HJ Horizon – 1 well (5S-HJ1)
- KM Horizon – 9 wells, including:
  - the central extraction well (5S-KM3), four corner injection wells (5S-KM1, 5S-KM2, 5S-KM5 and 5S-KM6), two former injection wells (KPW-1A and M-UKM1), an intermediate observation well located interior to the 5-spot pattern (5S-KM4), and one lower KM Horizon observation well (5S-KM7 [new]) also located interior to the 5-spot pattern adjacent to the L Horizon observation well.
- Underlying L Horizon – 1 well (KMU-1)
- Underlying M Horizon – 1 well (M-M1)
- Underlying N Horizon – 1 well (5S-N1)

In addition to monitoring water levels in the above-referenced wells, some periphery wells completed in the KM, L, M and N Horizons may also be monitored to assess the radius of influence generated by the test.

LC ISR personnel will collect daily downloads after instrument installation for review and QA/QC for pre-test background monitoring and all phases of 5-spot hydrologic testing.

## **5.0 BAROMETRIC PRESSURE MONITORING**

If significant variations in water levels due to barometric pressure change are suspected, then data may require correction to remove fluctuations in water levels associated with changes in barometric pressure. An In-Situ BaroTROLL® will be installed prior to testing and used to measure barometric pressure during all test phases.

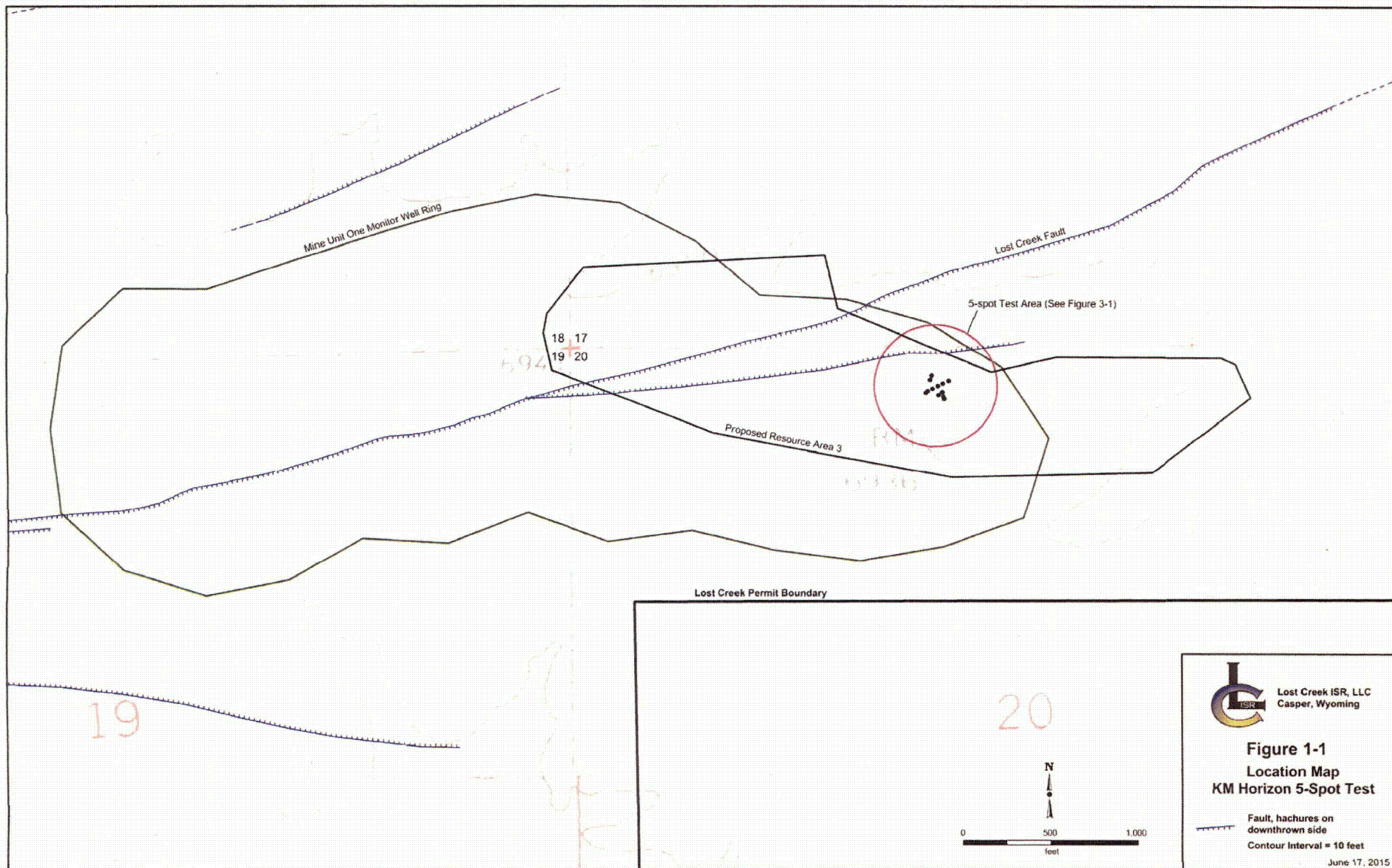
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## 6.0 REFERENCES

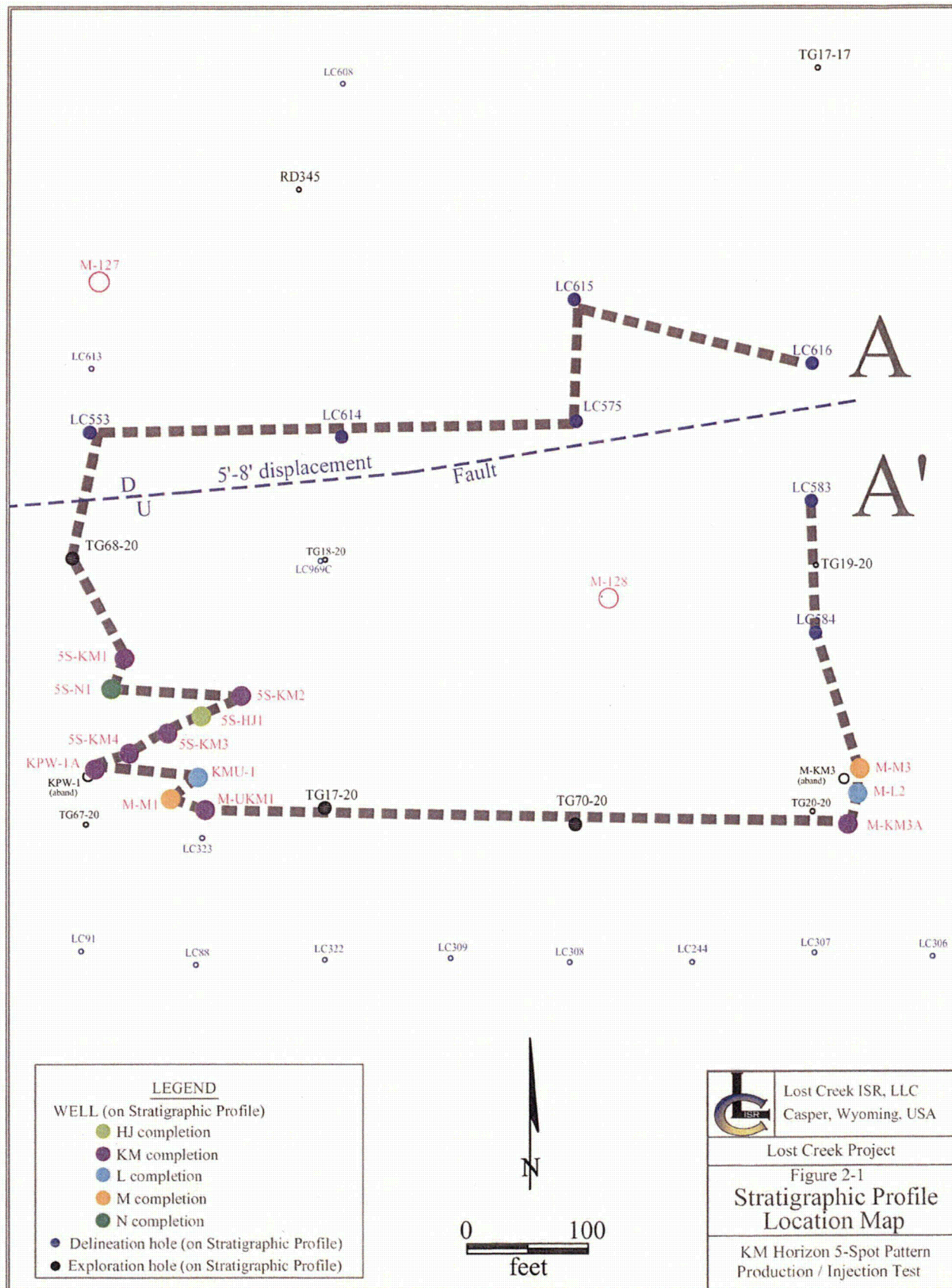
Petrotek Engineering Corporation, 2009. Lost Creek Regional Hydrologic Testing – Mine Unit 1, North and South Tests; prepared for Lost Creek ISR, LLC October 2009.

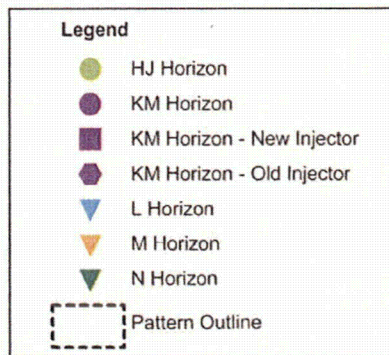
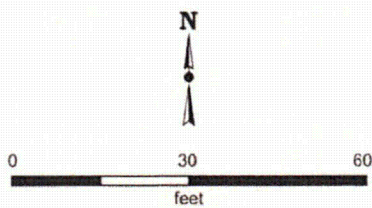
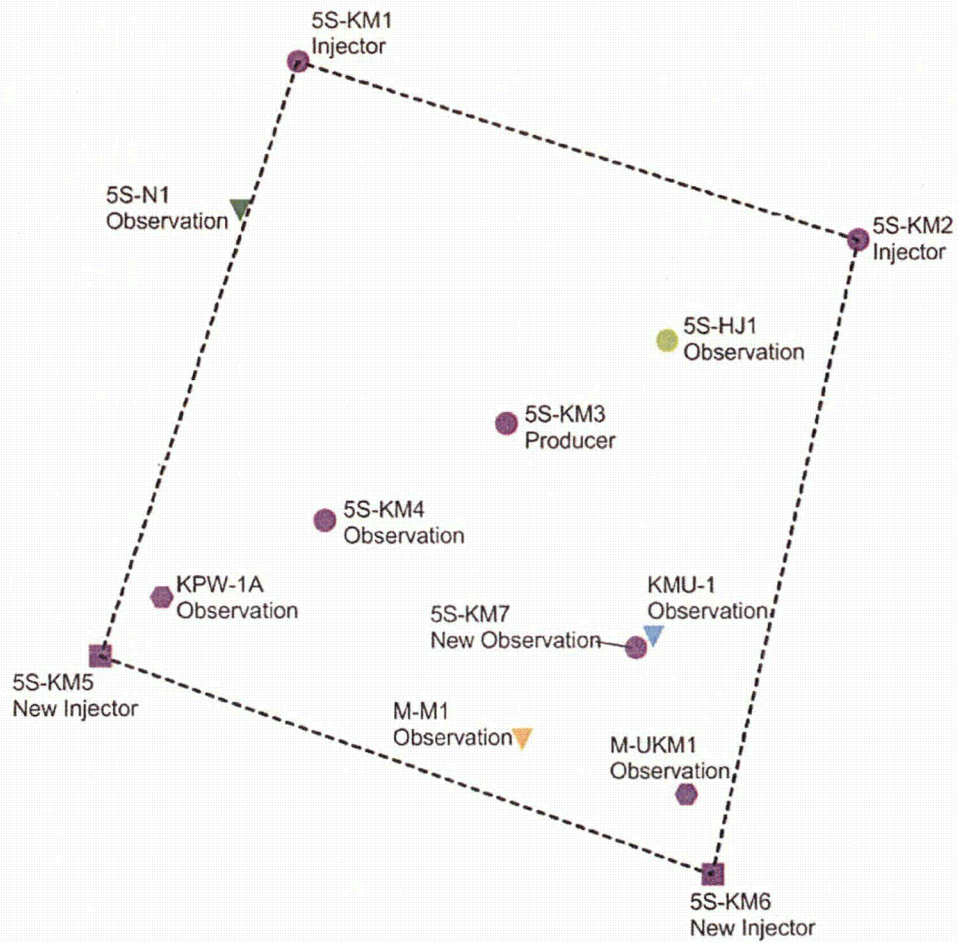
Petrotek Engineering Corporation, 2012. Lost Creek Hydrologic Test, Composite KLM Horizon 5-Spot Testing, October 2012; prepared for LC ISR LLC April 2013.

Petrotek Engineering Corporation, 2013. Lost Creek Hydrologic Test, Composite KLM Horizon Regional Pump Test, October, 2011; prepared for LC ISR LLC April 2013.







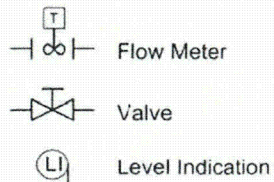
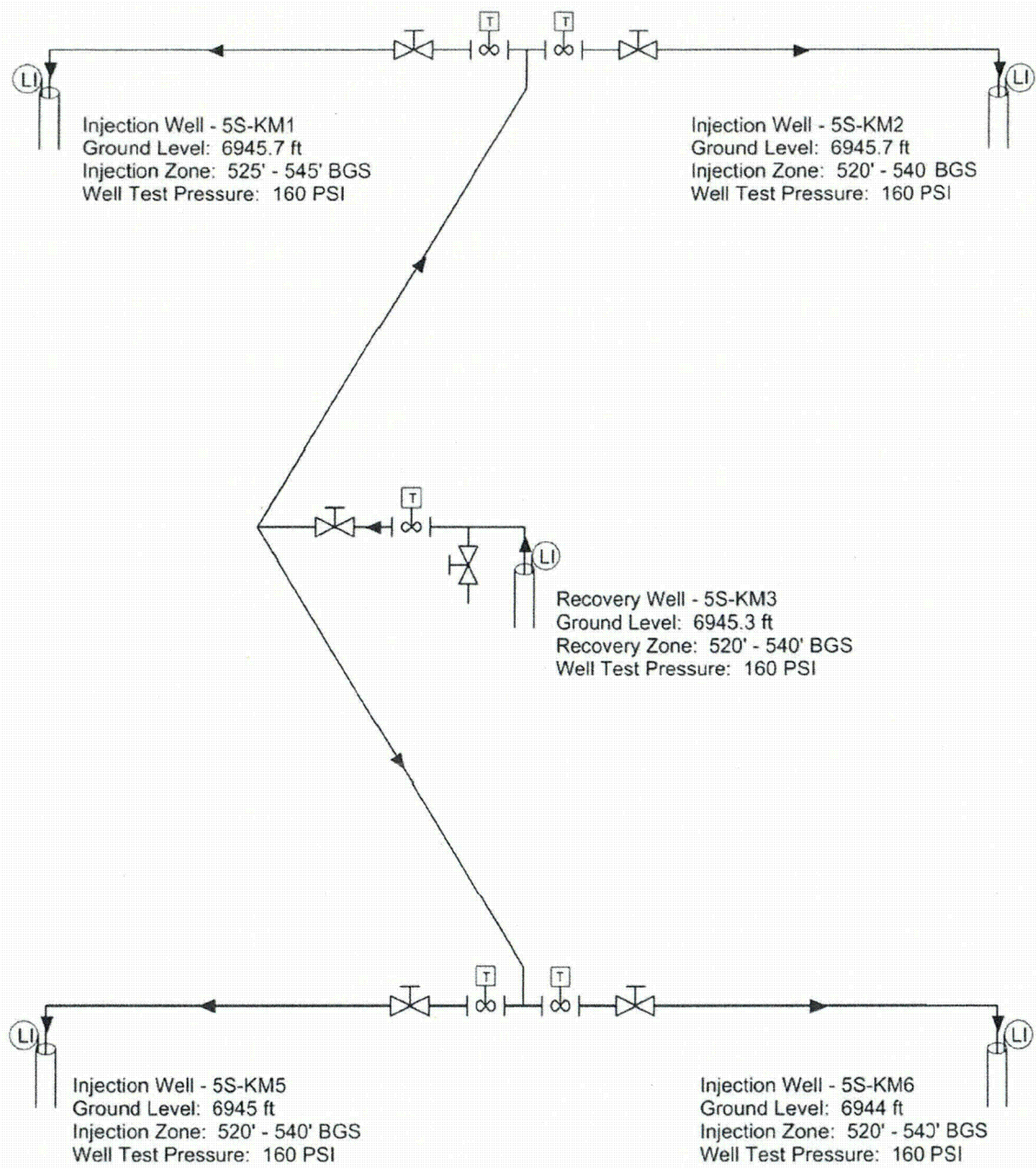


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**Figure 3-1**  
**5-Spot Test Layout**

June 23, 2015





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**Figure 4-1**  
**Schematic**  
**Flow Control and**  
**Monitoring**

Not to Scale

June 2015

Table 3-1. Well Information, KM Horizon 5-Spot Test

Well ID	Well Type	Completion Zone	Easting, NAD83 (feet)	Northing, NAD83 (feet)	Distance from Pumping Well (ft)	GL Elev (ft amsl)	TOC Elev (ft amsl)	Drilled TD (ft bgs)	Cased Depth (ft bgs)	Casing ID (in)	Screen Interval (ft bgs)	Total Screen Length (feet)
5S-HJ1	Observation	HJ Horizon	2,214,013.36	595,593.04	31	6,945.32	6,945.83	480	460	4.5	460-480	20
5S-KM1	Injection	KM Horizon	2,213,950.03	595,640.32	71	6,945.65	6,946.20	540	525	4.5	525-545	20
5S-KM2	Injection	KM Horizon	2,214,046.09	595,609.82	68	6,945.68	6,946.02	540	520	4.5	520-540	20
5S-KM3	Pumping	KM Horizon	2,213,985.84	595,579.11	0	6,945.34	6,945.87	540	520	4.5	520-540	20
5S-KM4	Observation	KM Horizon	2,213,954.65	595,562.81	35	6,944.89	6,945.59	540	520	4.5	520-540	20
5S-KM5	Injection	KM Horizon	2,213,916 <sup>1</sup>	595,539 <sup>1</sup>	80 <sup>1</sup>	TBD	TBD	540 <sup>1</sup>	520 <sup>1</sup>	4.5	520-540 <sup>1</sup>	20 <sup>1</sup>
5S-KM6	Injection	KM Horizon	2,214,008 <sup>1</sup>	595,541 <sup>1</sup>	84 <sup>1</sup>	TBD	TBD	540 <sup>1</sup>	520 <sup>1</sup>	4.5	520-540 <sup>1</sup>	20 <sup>1</sup>
5S-KM7	Observation	KM Horizon	2,214,008 <sup>1</sup>	595,541 <sup>1</sup>	48 <sup>1</sup>	TBD	TBD	625 <sup>1</sup>	610 <sup>1</sup>	4.5	610-620 <sup>1</sup>	10 <sup>1</sup>
KPW-1A	Observation	KM Horizon	2,213,927.10	595,549.83	66	6,945.49	6,947.58	540	520	5	519-539	20
M-UKM1	Observation	KM Horizon	2,214,016.65	595,516.07	70	6,944.03	6,945.22	550	520	4.5	520-540	20
KMU-1	Observation	L Horizon	2,214,011.07	595,543.24	44	6,944.61	6,946.00	740	650	4.5	650-675	25
M-M1	Observation	M Horizon	2,213,988.52	595,525.89	53	6,943.94	6,945.82	780	750	4.5	750-770	20
5S-N1	Observation	N Horizon	2,213,940.21	595,615.33	58	6,945.55	6,946.29	900	850	4.5	850-870	20

ft bgs = feet below ground surface

ft amsl = feet above mean sea level

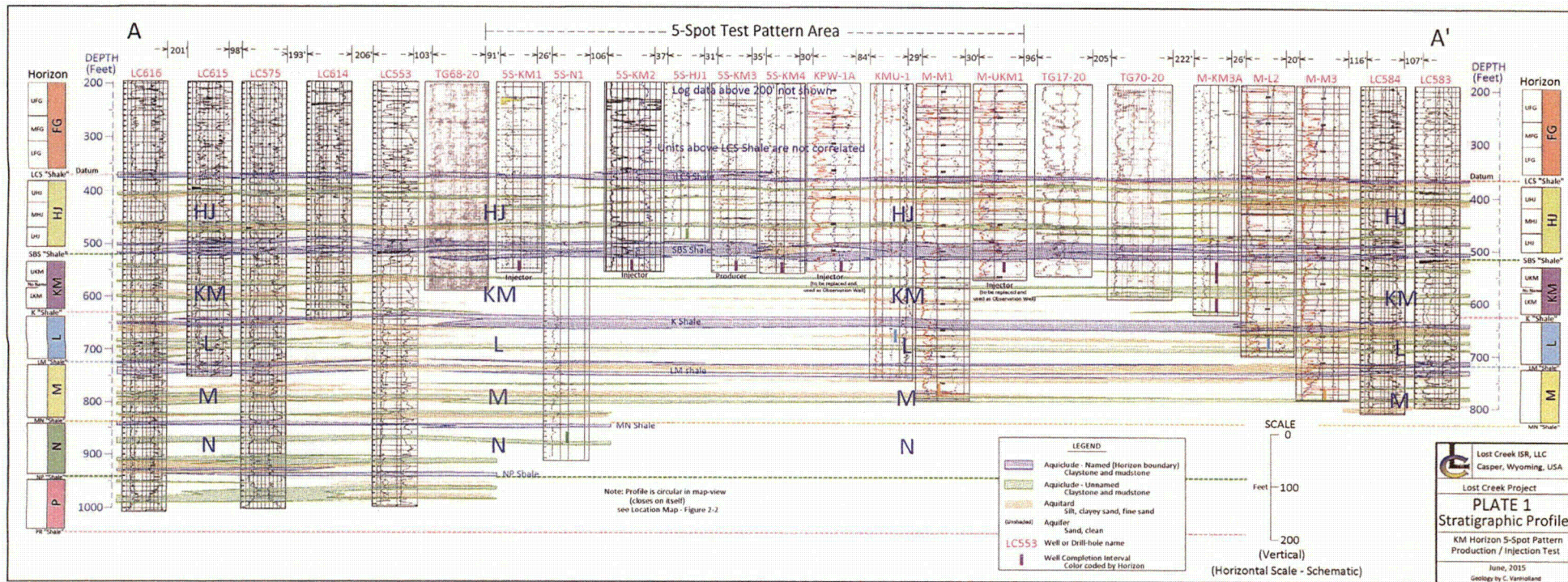
in = inches

<sup>1</sup> = Estimated parameter

TBD = To Be Determined after construction

Blue lettering indicates new wells





# **APPENDIX A**

## **Well Completion Reports**



5S-HJ1

WELL # 5S-HJ1 SEO # 194709 Date Drilled: 7/25/11

Ground Elev: 6945' Measure Point Elev: 6947.2'

TD: 480'      Hole Dia.: 7-7/8"

CASED to: 460' Casing: PVC SDR17 ID: 4.5" OD: 5"

GROUT: Portland Cement - Type I/II  
Pumped thru casing, displaced to surface with water

COMPLETION Aquifer: L H J Sub-Horizon

Static Water Level: Depth 173.3' Elev. 6773.9'  
(10/4/12)

UNDERREAM: Blade Dia: 10.5"  
Intervals: from 460' to 480' / length 20'  
from        to        / length       

## SCREEN LINER ASSEMBLY

Description	Depth		Elev.		Length
	From	To	From	To	
K-pack string	453'	453'	6492'	6485'	7'
Slotted PVC	460'	480'	6485'	6465'	20'

SCREEN SPECIFICATIONS:

Slot: 0.030" Composition 3" PVC-Slotted Casing

FILTER PACKING: N/A

Volume: \_\_\_\_\_ (bags)(ft<sup>3</sup>) Sand Specs. \_\_\_\_\_

**Method:**

WELL STIMULATION: Method Airlift

Yield: Good / Moderate / Poor  
35 gpm

5S-HJ1

## 5S-KM1

WELL COMPLETION REPORT

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—TD 540

5S-KM1

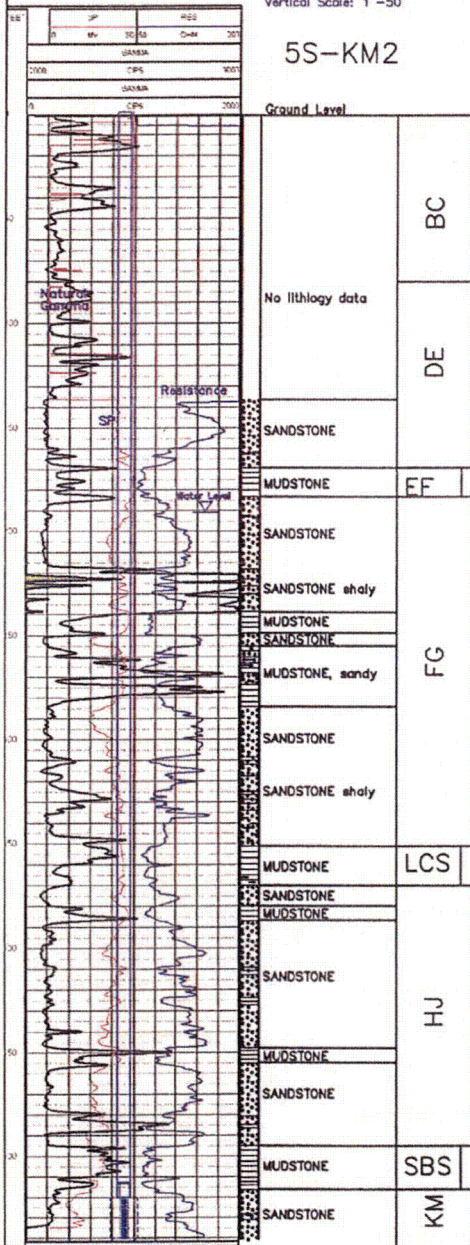


5S-KM2

Lost Creek ISR, LLC  
WELL COMPLETION REPORT

Vertical Scale: 1"=50'

5S-KM2



WELL # 5S-KM2 SEO # 194712 Date Drilled: 7/19/11

Location: E 2,214,046 / N 595,610 (NAD 83)

Ground Elev: 6946' Measure Point Elev: 6946.0'

TD: 540' Hole Dia.: 7-7/8"

CASED to: 520' Casing: PVC SDR17 ID: 4.5" OD: 5"

GROUT: Portland Cement - Type I/II  
Pumped thru casing, displaced to surface with water

COMPLETION Aquifer: UKM Sub-Horizon

Static Water Level: Depth 190.1' Elev: 6756.9'  
(3/15/13)

UNDERREAM: Blade Dia: 10.5"

Intervals: from 520' to 540' / length 20'  
from \_\_\_\_\_ to \_\_\_\_\_ / length \_\_\_\_\_

SCREEN LINER ASSEMBLY

Description	Depth	Elev.	Length
	From - To	/ From - To	
K-packer string	523' 520'	6433' 6426'	7'
Slotted PVC	520' 540'	6426' 6406'	20'

SCREEN SPECIFICATIONS:

Slot: 0.030" Composition 3" Slotted PVC

FILTER PACKING: N/A

Volume: \_\_\_\_\_ (bags)(ft<sup>3</sup>) Sand Specs. \_\_\_\_\_

Method: \_\_\_\_\_

WELL STIMULATION: Method Airlift

Yield: Good / Moderate / Poor  
35 gpm

5S-KM2

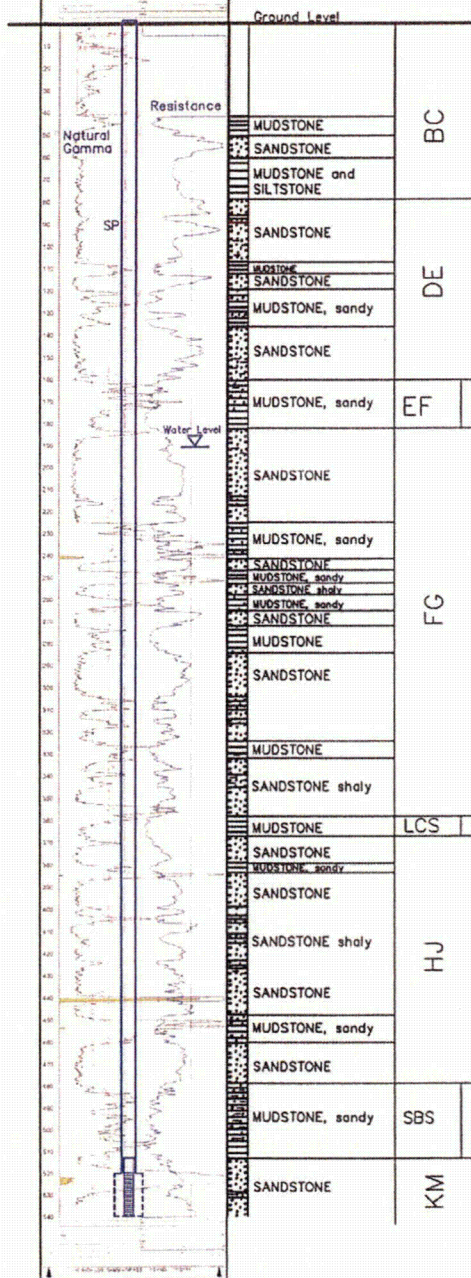
5S-KM3

Lost Creek ISR, LLC

# WELL COMPLETION REPORT

Vertical Scale: 1"=50'

5S-KM3



WELL # 5S-KM3 SEO # 194713 Date Drilled: 7/27/11

Location: E 2,213,985 / N 595,579 (NAD 83)

Ground Elev: 6945' Measure Point Elev: 6945.5'

TD: 540' Hole Dia.: 7-7/8"

CASED to: 570' Casing: PVC SDR17 ID: 4.5" OD: 5"

GROUT: Portland Cement - Type I/II  
Pumped thru casing, displaced to surface with water

COMPLETION Aquifer: UKM Sub-Horizon

Static Water Level: Depth 191' Elev: 6754'  
(10/6/11)

UNDERREAM: Blade Dia: 10.5"  
Intervals: from 520' to 540' / length 20'  
from \_\_\_\_\_ to \_\_\_\_\_ / length \_\_\_\_\_

## SCREEN LINER ASSEMBLY

Description	Depth		Elev.		Length
	From - To		From - To		
K-packer string	513' - 520'		6432' - 6425"		7'
Slotted PVC	520' - 540'		6425' - 6405'		20'

## SCREEN SPECIFICATIONS:

Slot: 0.030" Composition 3" Slotted PVC

## FILTER PACKING: N/A

Volume: \_\_\_\_\_ (bags)(ft<sup>3</sup>) Sand Specs. \_\_\_\_\_

Method: \_\_\_\_\_

WELL STIMULATION: Method Airlift

Yield: Good / Moderate / Poor

25 gpm

— TD 540'

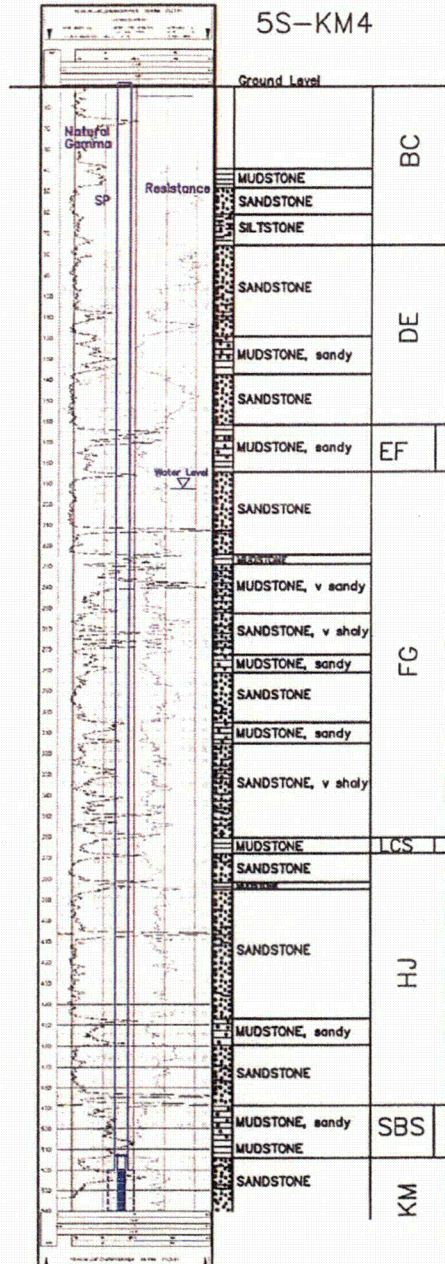
5S-KM3



5S-KM4

Vertical Scale: 1"=50'

5S-KM4



Lost Creek ISR, LLC

# WELL COMPLETION REPORT

WELL # 5S-KM4 SEO # 194714 Date Drilled: 7/21/11

Location: E 2,213,955 / N 595,563 (NAD 83)

Ground Elev. 6946' Measure Point Elev. 6945.6'

TD: 540' Hole Dia.: 7-7/8"

CASED to: 520' Casing: PVC SDR17 ID: 4.5" OD: 5"

GROUT: Portland Cement - Type I/II  
Pumped thru casing, displaced to surface with water

COMPLETION Aquifer: UKM Sub-Horizon

Static Water Level: Depth 192.2' Elev. 6753.4'  
(3/15/13)

UNDERREAM: Blade Dia: 10.5"

Intervals: from 520' to 540' / length 20'  
from \_\_\_\_\_ to \_\_\_\_\_ / length \_\_\_\_\_

## SCREEN LINER ASSEMBLY

Description	Depth		Elev.		Length
	From -	To	From -	To	
K-pack string	513'	520'	6432'	6425'	7'
Slotted PVC	520'	540'	6425'	6405'	20'

## SCREEN SPECIFICATIONS:

Slot: 0.030" Composition 3" Slotted PVC

## FILTER PACKING: N/A

Volume: \_\_\_\_\_ (bags)(ft<sup>3</sup>) Sand Specs. \_\_\_\_\_

Method: \_\_\_\_\_

WELL STIMULATION: Method Airlift

Yield: Good / Moderate / Poor

35 gpm

5S-KM4

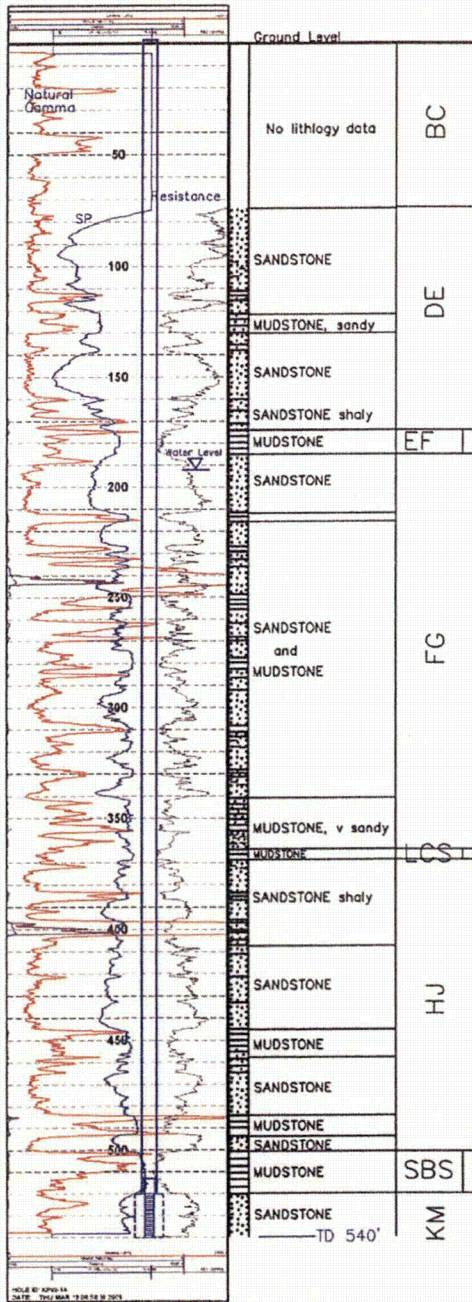


# KPW-1A

## Lost Creek ISR, LLC WELL COMPLETION REPORT

Vertical Scale: 1"=50'

### KPW-1A



WELL # KPW-1A SEO # 189592 Date Drilled: 3/19/09

Location: E 2,213,927 / N 595,550 (NAD 83)

Ground Elev: 6945 Measure Point Elev: 6947.6

TD: 540' Hole Dia.: 7-7/8"

CASED to: 520' Casing: PVC SDR17 ID: 4.5" OD: 5"

GROUT: Portland Cement - Type I/II  
Pumped thru casing, displaced to surface with water

COMPLETION Aquifer: UKM Sub-Horizon

Static Water Level: Depth 191.8' Elev: 6755.8'  
(11/15/10)

UNDERREAM: Blade Dia: 10.5"  
Intervals: from 520' to 540' / length 20'  
from \_\_\_\_\_ to \_\_\_\_\_ / length \_\_\_\_\_

#### SCREEN LINER ASSEMBLY

Description	Depth	Elev.	Length
	From - To	/ From - To	
K-pack string	513' 520'	6432' 6425'	7'
Screen	520' 540'	6425' 6405'	20'

#### SCREEN SPECIFICATIONS:

Slot: 0.020" Composition 3" PVC Screen (wrapped)

#### FILTER PACKING: N/A

Volume: \_\_\_\_\_ (bags)(ft<sup>3</sup>) Sand Specs. \_\_\_\_\_

Method: \_\_\_\_\_

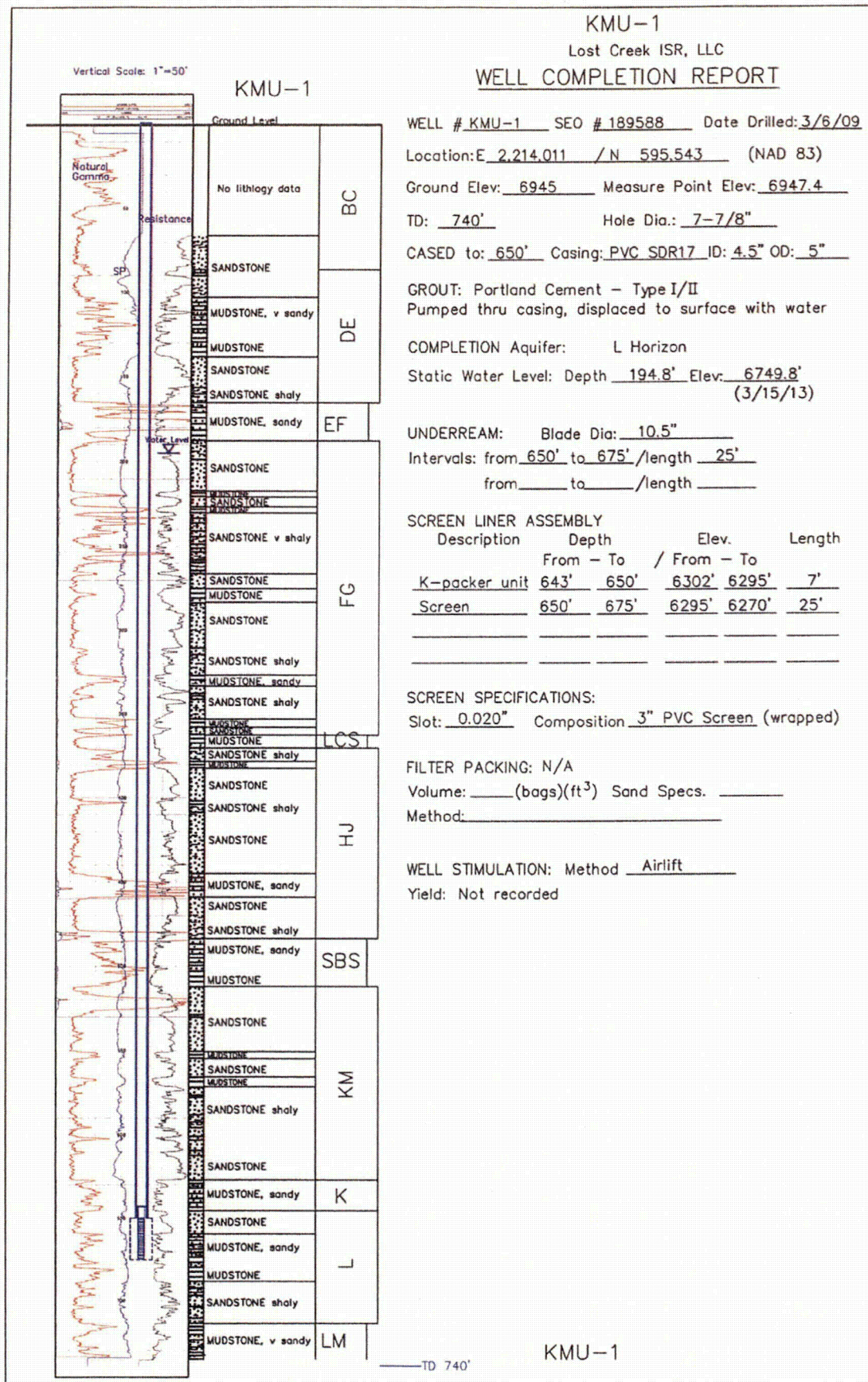
WELL STIMULATION: Method Airlift

Yield: Good / Moderate / Poor

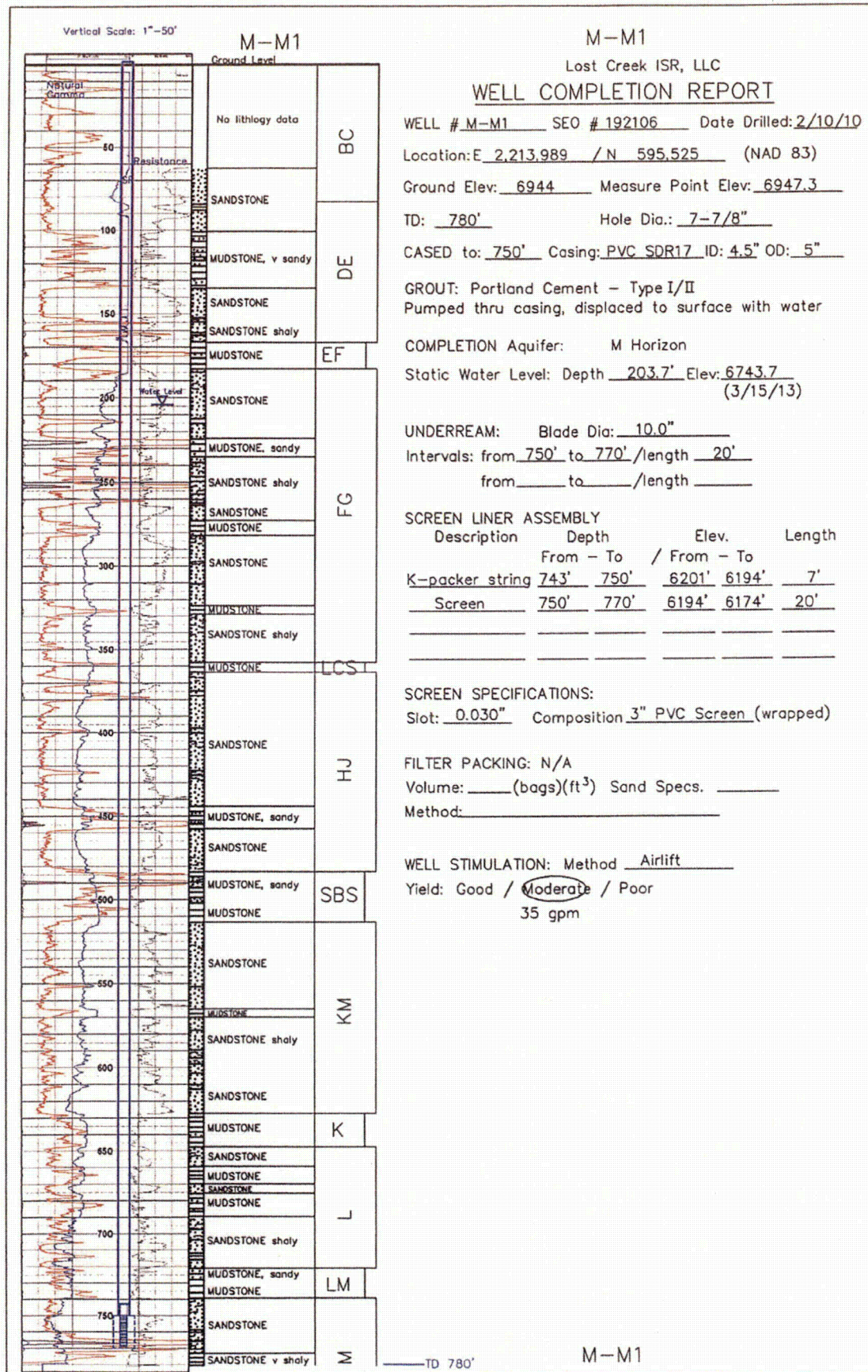
100 gpm

KPW-1A











# WELL COMPLETION REPORT

Yield: Good / Moderate / Poor  
60 gpm



5S-N1