2017 ANNUAL GROUNDWATER REPORT

Knight #1
NMOCD Case #: 3RP-207-0
Meter Code: 72556
T30N, R13W, Sec5, Unit A

SITE DETAILS

Site Location: Latitude: 36.846870 N, Longitude: -108.222305 W
Land Type: Fee
Former Operator: Fuller Production (Well P&A'd)

SITE BACKGROUND

Environmental Remediation activities at the Knight #1 (Site) are being managed pursuant to the procedures set forth in the document entitled, "Remediation Plan for Groundwater Encountered during Pit Closure Activities" (Remediation Plan, El Paso Natural Gas Company / El Paso Field Services Company, 1995). This Remediation Plan was conditionally approved by the New Mexico Oil Conservation Division (NMOCD) in correspondence dated November 30, 1995; and the NMOCD approval conditions were adopted into El Paso CGP Company, LLC's (EPCGP's) program methods. Formerly, the Site was operated by Fuller Production, Inc. and is no longer active. The wellhead was plugged and abandoned in August 2006.

The Site is located on Private/Fee land. An initial site assessment was completed in January 1995, and an excavation of 60 cubic yards (cy), to a depth of approximately 12 feet below ground surface (bgs), was completed in January 1995. An ORC nutrient injection was completed in November 1996. Various site investigations have occurred since 1995. Monitoring wells were installed in 1995 (MW-1 through MW-4), 2000 (MW-5), and 2015 (MW-6 through MW-13). A soil assessment was completed in 2016 (GP-1 through GP-24). Free product recovery has been periodically observed and recovered at the Site. In 2017, free product was observed in monitoring wells MW-4, MW-11, MW-12, and MW-13. Currently, groundwater sampling is conducted on a semi-annual basis.

GROUNDWATER SAMPLING ACTIVITIES

Pursuant to the Remediation Plan, Stantec provided field work notifications via email to the NMOCD on May 30, 2017, and November 6, 2017, prior to initiating groundwater sampling activities at the Site. Copies of the 2017 NMOCD notifications are provided in Appendix A. Groundwater monitoring and sampling was completed on June 6 and November 10, 2017. During each sampling event, water levels were gauged from monitoring wells MW-1 through MW-13. Monitoring wells MW-1, MW-2, MW-4, MW-7, MW-8 and MW-11 were sampled in 2017 to evaluate concentration trends at these locations. Monitoring wells MW-3, MW-5, MW-6, MW-9, MW-10, MW-12, and MW-13 were not sampled in 2017.

Groundwater samples were collected from selected monitoring wells using HydraSleeve™ (HydraSleeve) no-purge groundwater sampling devices. A groundwater sample was not collected from monitoring well MW-4 on June 6, 2017 due to the presence of free product. The HydraSleeves were set during the previous sampling event. HydraSleeves were suspended approximately 0.5 foot above termination depth of the

monitoring wells using a suspension tether and stainless steel weights to collect a sample from the screened interval.

Groundwater samples were placed into laboratory-supplied sample containers, packed on ice, and shipped under standard chain-of-custody protocols to TestAmerica-Pensacola where they were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX). As requested by the NMOCD on November 13, 2017, BTEX constituents were analyzed using United States Environmental Protection Agency (EPA) Method 8260 during the November sampling event. The unused sample water was combined in a waste container and taken to Basin Disposal, Inc. for disposal. Waste disposal documentation is included as Appendix B.

FREE PROCUCT RECOVERY

Mobile dual phase extraction (MDPE) events were completed on July 24 and 25, 2017, by AcuVac Remediation, LLC, of Houston, Texas (AcuVac). The planned MDPE activities were presented in a work plan dated June 29, 2017, and subsequently approved by the NMOCD. The NMOCD was notified of the start of the July MDPE activities on July 8, 2017. The purpose of the MDPE events was to evaluate more aggressive free product recovery methods from monitoring wells MW-4, MW-11, and MW-12.

MDPE is a process combining soil vapor extraction (SVE) with groundwater depression to enhance the removal of liquid and vapor phase hydrocarbons. A submersible pump is used to simultaneously remove dissolved-phase contaminated groundwater, inducing a hydraulic gradient toward the extraction well, and creating groundwater depression to expose the hydrocarbon smear zone to SVE. Recovered liquids were transferred to a portable storage tank for off-site disposal. Recovered vapors were used as fuel and burned in the MDPE internal combustion engine (ICE), resulting in little to no emissions. Power generated by the ICE is used to create the induced vacuum for SVE.

Four MDPE events were completed, one 10-hour event and one 9.5-hour event using MW-4 as an extraction well, one 10-hour event using MW-12 as an extraction well, and one 8-hour event using MW-11 as an extraction well. Based on field data collected by AcuVac, approximately 1.8 gallons of hydrocarbons were recovered from MW-4, approximately 5.0 gallons of hydrocarbons were recovered from MW-12, and approximately 1.2 gallons of hydrocarbons were recovered from MW-11. AcuVac's report summarizing the MDPE events at the Site is presented as Appendix C. Recovered fluids from the MDPE event where transported to Basin for disposal. Waste disposal documentation is included as Appendix B.

SUMMARY TABLES

Historic groundwater analytical results and well gauging data are summarized in Tables 1 and 2, respectively. When free product was present, static water level elevations were corrected for measurable thicknesses of free product (specific gravity of 0.75).

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SITE MAPS

Groundwater analytical maps (Figures 1 and 3) and groundwater elevation contour maps (Figures 2 and 4) summarize results of the 2017 groundwater sampling and gauging events.

ANALYTICAL LAB REPORTS

The groundwater analytical lab reports are included as Appendix D.

GROUNDWATER RESULTS

- The groundwater flow direction at the Site is generally to the south south-west (see Figures 2 and 4).

- Free product was observed in MW-4, MW-11, and MW-12 at the time of the June 2017 sampling event. No sample was collected from MW-4, MW-11, and MW-12 on June 6, 2017.

- Groundwater samples collected in 2017 from MW-1, MW-4, and MW-7 exceeded the New Mexico Water Quality Control Commission (NMWQCC) standard (10 µg/L) for benzene in groundwater. Monitoring wells MW-2, MW-8, and MW-11 were either below the standard or not detected.

- Concentrations of toluene were either below the NMWQCC standard (750 µg/L) or not detected in all of the Site monitoring wells sampled in 2017.

- Concentrations of ethylbenzene were either below the NMWQCC standard (750 µg/L) or not detected in all of the Site monitoring wells sampled in 2017.

- A groundwater sample collected in November 2017 from MW-4 exceeded the NMWQCC standard (620 µg/L) for total xylenes in groundwater. Total xylene concentrations were either below the standard or not detected in all other Site monitoring wells sampled in 2017.

PLANNED FUTURE ACTIVITIES

Groundwater monitoring events will continue to be conducted on a semi-annual basis. Groundwater samples will be collected from monitoring wells not containing free product and analyzed for BTEX constituents using EPA Method 8260.

Air sparge/soil vapor extraction feasibility testing is planned for 2018 in support of a site-wide plan to remediate the site. A work plan for these activities will be submitted under separate cover for NMOCD approval.

The activities completed in 2018 and their results will be summarized in the 2018 Annual Report, completed for submittal in early 2019.

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TABLES

TABLE 1 - GROUNDWATER ANALYTICAL RESULTS

Knight #1					
Location	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
NMWQCC Standards:		10	750	750	620
MW-1	10/16/95	5080	1180	1050	9970
MW-1	12/12/95	4330	679	1010	8560
MW-1	04/09/96	5490	208	1100	7370
MW-1	07/17/96	6450	279	990	9060
MW-1	10/15/96	9870	840	1120	10900
MW-1	01/13/97	7760	332	914	10900
MW-1	04/22/97	2700	<1	492	6690
MW-1	07/14/97	3900	36.7	530	6700
MW-1	10/22/97	4270	48.7	728	8580
MW-1	01/09/98	4750	24.2	819	9480
MW-1	04/24/98	5610	44.7	898	9530
MW-1	04/16/99	7340	42.8	853	10600
MW-1	04/19/00	9400	510	4300	66000
MW-1	09/19/05	4430	23.7	487	7370
MW-1	03/27/06	4410	26.6 J	337	7860
MW-1	09/26/06	5880	36.5	633	11000
MW-1	03/28/07	3740	<50	441	9210
MW-1	09/17/07	4640	93.3	444	8180
MW-1	09/09/08	3230	<50	324	6780
MW-1	08/27/09	2790	8.3 J	1190	12500
MW-1	09/29/10	2910	<50	1600	15000
MW-1	09/30/11	1590	5 J	1120	10600
MW-1	06/07/13	830	<60	1100	14000
MW-1	09/13/13	810	<60	960	3100
MW-1	12/13/13	600	25 J	730	2200
MW-1	04/03/14	330	28	<0.20	1400
MW-1	10/21/14	380	<7.0	<5.0	3000
MW-1	05/27/15	110	<100	1300	11000
MW-1	11/17/15	220	6.9	770	710
MW-1	04/15/16	110	<25	910	1000
MW-1	10/11/16	110	<25	460	100
MW-1	06/06/17	120	<25	350	36
MW-1	11/10/17	89	2.3	74	200

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Knight #1					
Location	**Date**	**Benzene (µg/L)**	**Toluene (µg/L)**	**Ethylbenzene (µg/L)**	**Total Xylenes (µg/L)**
NMWQCC Standards:		10	750	750	620
MW-2	12/12/95	175	<12.5	74.3	671
MW-2	04/09/96	39.2	<1	13.4	77.9
MW-2	07/17/96	9.55	<1	2.39	3.65
MW-2	10/15/96	49.7	<1	<1	38.4
MW-2	01/13/97	20.3	<1	<1	37.3
MW-2	04/22/97	19.4	<1	<1	29.8
MW-2	10/22/97	155	<1	12.6	204
MW-2	01/09/98	58	<1	3.85	207
MW-2	04/24/98	19.4	<1	<1	40.7
MW-2	02/09/99	19	<1	<1	48
MW-2	04/16/99	16.7	<1	<1	41
MW-2	04/19/00	23	0.5	<0.5	26
MW-2	09/11/01	110	<0.5	17	200
MW-2	09/04/02	269	7.4	48.9	482.4
MW-2	09/17/03	177	<1	41	343
MW-2	09/15/04	291	<0.5	48.9	431
MW-2	09/19/05	126	<1	9.5	231
MW-2	09/26/06	95.8	<1	5.5	189
MW-2	09/17/07	317	<1	12.5	354
MW-2	09/09/08	34.3	<1	1.1	71.9
MW-2	08/27/09	26.6	1.3	1.6	9
MW-2	09/29/10	100	<2	J1.5	34.8
MW-2	09/30/11	26.6	<1	1	9.5
MW-2	06/07/13	200	<0.30	4.4	21
MW-2	09/13/13	120	<0.30	17	150
MW-2	12/13/13	27	3	5.5	74
MW-2	04/03/14	120	3.2 J	12	190
MW-2	10/21/14	0.64 J	<0.70	<0.50	<1.6
MW-2	05/27/15	190	2.5 J	18	59
MW-2	11/17/15	34	<1.0	<1.0	<3.0
MW-2	04/15/16	7.8	<5.0	<1.0	<5.0
MW-2	10/11/16	2	<5.0	<1.0	<5.0
MW-2	06/06/17	1.0	<5.0	<1.0	<5.0
MW-2	11/10/17	<1.0	<1.0	<1.0	<10

TABLE 1 - GROUNDWATER ANALYTICAL RESULTS

Knight #1					
Location	**Date**	**Benzene (µg/L)**	**Toluene (µg/L)**	**Ethylbenzene (µg/L)**	**Total Xylenes (µg/L)**
NMWQCC Standards:		10	750	750	620
MW-3	12/12/95	979	<125	398	2540
MW-3	04/09/96	328	<1	132	369
MW-3	07/17/96	299	<1	76.7	251
MW-3	01/13/97	395	<1	126	955
MW-3	07/14/97	499	<1	104	583
MW-3	10/22/97	817	7.22	141	869
MW-3	01/09/98	702	<1	185	1080
MW-3	04/24/98	377	11.8	126	525
MW-3	04/16/99	191	4.11	18.1	169
MW-3	04/19/00	40	0.6	1.1	28
MW-3	09/19/05	73.8	<1	5.2	158
MW-3	09/26/06	3370	25	498	3960
MW-3	09/17/07	288	<1	65.4	599
MW-3	09/09/08	805	3.3	160	1630
MW-3	08/27/09	2490	<25	842	6560
MW-3	09/29/10	2710	<50	1390	10600
MW-3	09/30/11	1410	5.8 J	1280	12600
MW-3	06/07/13	760	<0.30	1700	19000
MW-3	09/13/13	770	<0.30	1400	11000
MW-3	12/13/13	610	<38	960	9200
MW-3	04/03/14	670	<19	890	10000
MW-3	10/21/14	250	<35	990	10000
MW-3	05/27/15	52	<100	1400	4700
MW-3	11/17/15	44	5.2	1400	1100

TABLE 1 - GROUNDWATER ANALYTICAL RESULTS

Knight #1					
Location	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
NMWQCC Standards:		10	750	750	620
MW-4	12/12/95	90.1	<12.5	16.8	144
MW-4	04/09/96	63.1	<1	<1	42.5
MW-4	07/17/96	35	<1	<1	17.8
MW-4	10/15/96	53.5	<1	<1	28.4
MW-4	01/13/97	56.2	<1	<1	48.4
MW-4	04/22/97	32.8	<1	<1	15.2
MW-4	07/14/97	10.4	<1	<1	5.79
MW-4	10/22/97	215	<1	5.5	184
MW-4	01/09/98	114	<1	2.66	85.7
MW-4	04/24/98	55.4	<1	<1	19.3
MW-4	04/16/99	129	<1	2.03	87.3
MW-4	04/19/00	110	6.5	17	140
MW-4	09/11/01	140	<0.5	9.6	110
MW-4	09/04/02	261	3.1	20.1	246.5
MW-4	09/17/03	192	<1	26.3	194
MW-4	09/15/04	182	<0.5	9.8	161
MW-4	09/19/05	199	<1	53.8	416
MW-4	09/26/06	180	12.5	55.9	417
MW-4	09/17/07	272	4.7	21.3	236
MW-4	09/09/08	265	0.94 J	26.5	274
MW-4	09/23/09	2110	12.6 J	676	6440
MW-4	09/29/10	1400	<50	1020	6410
MW-4	09/30/11	534	<10	1800	9510
MW-4	06/07/13	2700	<0.30	900	12000
MW-4	04/15/16	15	<5.0	8.7	510
MW-4	11/10/17	64	<10	130	900
MW-5	11/15/00	<0.5	<0.5	<0.5	<0.5
MW-5	09/11/01	<0.5	<0.5	<0.5	0.6
MW-5	09/04/02	<0.5	0.3	0.9	1.4
MW-5	09/29/10	34.1	<2	<2	2.7 J
MW-5	09/30/11	<1	<1	<1	1.2 J
MW-5	06/07/13	<0.14	<0.30	<0.20	<0.23
MW-5	09/13/13	<0.14	<0.30	<0.20	<0.23
MW-5	12/13/13	<0.20	<0.38	<0.20	0.68 J
MW-5	04/03/14	<0.20	<0.38	<0.20	<0.65
MW-5	10/21/14	<0.38	<0.70	<0.50	<1.6
MW-5	05/27/15	<1.0	<5.0	<1.0	<5.0
MW-5	11/17/15	<1.0	<1.0	<1.0	<3.0

TABLE 1 - GROUNDWATER ANALYTICAL RESULTS

Knight #1					
Location	**Date**	**Benzene (µg/L)**	**Toluene (µg/L)**	**Ethylbenzene (µg/L)**	**Total Xylenes (µg/L)**
NMWQCC Standards:		10	750	750	620
MW-6	11/17/15	<1.0	<1.0	<1.0	<3.0
MW-7	11/17/15	18	<1.0	38	100
MW-7	04/15/16	7.8	<10	4.3	48
MW-7	10/11/16	81	<10	320	1700
MW-7	06/06/17	20	<5.0	33	390
MW-7	11/10/17	8.3	<1.0	2.5	170
MW-8	11/17/15	<1.0	<1.0	<1.0	<3.0
MW-8	04/15/16	<1.0	<5.0	<1.0	<5.0
MW-8	10/11/16	<1.0	<5.0	<1.0	<5.0
MW-8	06/06/17	<1.0	<5.0	<1.0	<5.0
MW-8	11/10/17	<1.0	<1.0	<1.0	<10
MW-9	11/17/15	1.1	<1.0	<1.0	<3.0
MW-10	11/17/15	<1.0	<1.0	<1.0	<3.0
MW-11	11/17/15	2000	3.7	800	1600
MW-11	04/15/16	410	<50	32	54
MW-11	10/11/16	1100	<100	280	2000
MW-11	11/10/17	3.3	<1.0	2.7	25
MW-12	11/17/15	19	<1.0	12	90
MW-13	11/17/15	<1.0	<1.0	<1.0	<3.0

Notes:
The groundwater monitoring dates for each monitoring well where no groundwater samples were collected and analyzed have been omitted.
"µg/L" = micrograms per liter
Results highlighted yellow exceed their respective New Mexico Water Quality Control Commission (NMWQCC) standards.
"J" = Result is less than the reporting limit but greater than or equal to the method detection limit and the result in an approximate value.
"<" = analyte was not detected at the indicated reporting limit
(some historic data were reported at the detection limit).

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	Date	TOC	Depth to Water (ft.)	Depth to LNAPL (ft.)	LNAPL Thickness (ft.)	GW Elevation (ft.)
MW-1	10/16/95	5512.35	26.03	NR		5486.32
MW-1	12/12/95	5512.35	25.91	NR		5486.44
MW-1	04/09/96	5512.35	26.71	26.34	0.37	5485.92
MW-1	07/17/96	5512.35	25.39	25.35	0.04	5486.99
MW-1	10/15/96	5512.35	27.35	26.60	0.75	5485.56
MW-1	01/13/97	5512.35	26.53	NR		5485.82
MW-1	04/22/97	5512.35	26.23	NR		5486.12
MW-1	07/14/97	5512.35	25.25	NR		5487.10
MW-1	10/22/97	5512.35	26.22	NR		5486.13
MW-1	01/09/98	5512.35	25.82	NR		5486.53
MW-1	04/24/98	5512.35	26.01	25.87	0.14	5486.44
MW-1	04/16/99	5512.35	26.52	26.40	0.12	5485.92
MW-1	04/19/00	5512.35	27.14	27.07	0.07	5485.26
MW-1	09/05/01	5512.35	28.32	27.93	0.39	5484.32
MW-1	09/11/01	5512.35	28.10	28.05	0.05	5484.29
MW-1	09/04/02	5512.35	28.39	28.31	0.08	5484.02
MW-1	12/10/02	5512.35	28.47	28.31	0.16	5484.00
MW-1	03/20/03	5512.35	28.14	28.05	0.09	5484.28
MW-1	06/19/03	5512.35	28.02	28.00	0.02	5484.34
MW-1	09/17/03	5512.35	28.97	28.95	0.02	5483.39
MW-1	12/09/03	5512.35	28.32	28.30	0.02	5484.04
MW-1	03/15/04	5512.35	27.99	27.89	0.10	5484.43
MW-1	09/15/04	5512.35	28.78	28.77	0.01	5483.58
MW-1	03/16/05	5512.35	28.12	ND		5484.68
MW-1	09/19/05	5512.35	27.47	ND		5484.88
MW-1	03/27/06	5512.35	26.49	ND		5485.86
MW-1	09/26/06	5512.35	25.91	ND		5486.44
MW-1	03/28/07	5512.35	25.87	ND		5486.48
MW-1	09/17/07	5512.35	26.94	ND		5485.41
MW-1	03/04/08	5512.35	25.70	ND		5486.65
MW-1	09/09/08	5512.35	26.68	ND		5485.67
MW-1	03/02/09	5512.35	24.71	ND		5487.64
MW-1	08/27/09	5512.35	24.30	ND		5488.05
MW-1	02/11/10	5512.35	24.83	ND		5487.52
MW-1	05/21/10	5512.35	23.54	ND		5488.81
MW-1	09/29/10	5512.35	24.33	ND		5488.02
MW-1	11/02/10	5512.35	22.31	ND		5490.04
MW-1	02/02/11	5512.35	23.62	ND		5488.73
MW-1	05/04/11	5512.35	22.50	ND		5489.85
MW-1	09/30/11	5512.35	22.26	ND		5490.09
MW-1	11/11/11	5512.35	22.87	ND		5489.48

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	**Date**	**TOC**	**Depth to Water (ft.)**	**Depth to LNAPL (ft.)**	**LNAPL Thickness (ft.)**	**GW Elevation (ft.)**
MW-1	02/16/12	5512.35	24.01	ND		5488.34
MW-1	05/08/12	5512.35	22.01	ND		5490.34
MW-1	06/07/13	5512.35	21.73	ND		5490.62
MW-1	09/13/13	5512.35	26.75	ND		5485.60
MW-1	12/13/13	5512.35	26.45	ND		5485.90
MW-1	04/03/14	5512.35	25.71	ND		5486.64
MW-1	10/21/14	5512.35	25.88	ND		5486.47
MW-1	05/27/15	5512.35	19.29	ND		5493.06
MW-1	11/17/15	5512.35	22.76	ND		5489.59
MW-1	04/15/16	5512.35	23.54	ND		5488.81
MW-1	10/11/16	5512.35	21.69	ND		5490.66
MW-1	06/06/17	5512.35	22.72	ND		5489.63
MW-1	11/10/17	5512.35	23.96	ND		5488.39

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	Date	TOC	Depth to Water (ft.)	Depth to LNAPL (ft.)	LNAPL Thickness (ft.)	GW Elevation (ft.)
MW-2	12/12/95	5511.65	25.37	NR		5486.28
MW-2	04/09/96	5511.65	25.58	NR		5486.07
MW-2	07/17/96	5511.65	25.09	NR		5486.56
MW-2	10/15/96	5511.65	26.36	NR		5485.29
MW-2	01/13/97	5511.65	26.05	NR		5485.60
MW-2	04/22/97	5511.65	25.82	NR		5485.83
MW-2	10/22/97	5511.65	25.86	NR		5485.79
MW-2	01/09/98	5511.65	25.50	NR		5486.15
MW-2	04/24/98	5511.65	25.60	NR		5486.05
MW-2	02/09/99	5511.65	26.05	NR		5485.60
MW-2	04/16/99	5511.65	26.16	NR		5485.49
MW-2	04/19/00	5511.65	25.92	NR		5485.73
MW-2	09/11/01	5511.65	27.60	NR		5484.05
MW-2	09/04/02	5511.65	27.88	NR		5483.77
MW-2	12/10/02	5511.65	27.90	NR		5483.75
MW-2	06/19/03	5511.65	27.46	ND		5484.19
MW-2	09/17/03	5511.65	28.42	ND		5483.23
MW-2	12/09/03	5511.65	27.87	ND		5483.78
MW-2	03/15/04	5511.65	27.55	ND		5484.10
MW-2	09/15/04	5511.65	28.25	ND		5483.40
MW-2	03/16/05	5511.65	27.30	ND		5484.35
MW-2	09/19/05	5511.65	26.80	ND		5484.85
MW-2	03/27/06	5511.65	26.18	ND		5485.47
MW-2	09/26/06	5511.65	25.66	ND		5485.99
MW-2	03/28/07	5511.65	25.58	ND		5486.07
MW-2	09/17/07	5511.65	26.63	ND		5485.02
MW-2	03/04/08	5511.65	25.47	ND		5486.18
MW-2	09/09/08	5511.65	26.30	ND		5485.35
MW-2	03/02/09	5511.65	24.46	ND		5487.19
MW-2	08/27/09	5511.65	24.00	ND		5487.65
MW-2	02/11/10	5511.65	24.45	ND		5487.20
MW-2	05/21/10	5511.65	23.21	ND		5488.44
MW-2	09/29/10	5511.65	23.00	ND		5488.65
MW-2	11/02/10	5511.65	22.03	ND		5489.62
MW-2	02/02/11	5511.65	23.41	ND		5488.24
MW-2	05/04/11	5511.65	22.67	ND		5488.98
MW-2	09/30/11	5511.65	21.75	ND		5489.90
MW-2	11/11/11	5511.65	22.59	ND		5489.06
MW-2	02/16/12	5511.65	23.72	ND		5487.93
MW-2	05/08/12	5511.65	21.99	ND		5489.66
MW-2	06/07/13	5511.65	22.88	ND		5488.77

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	**Date**	**TOC**	**Depth to Water (ft.)**	**Depth to LNAPL (ft.)**	**LNAPL Thickness (ft.)**	**GW Elevation (ft.)**
MW-2	09/13/13	5511.65	26.49	ND		5485.16
MW-2	12/13/13	5511.65	26.18	ND		5485.47
MW-2	04/03/14	5511.65	25.43	ND		5486.22
MW-2	10/21/14	5511.65	25.62	ND		5486.03
MW-2	05/27/15	5511.65	20.41	ND		5491.24
MW-2	11/17/15	5511.65	22.57	ND		5489.08
MW-2	04/15/16	5511.65	23.23	ND		5488.42
MW-2	10/11/16	5511.65	21.33	ND		5490.32
MW-2	06/06/17	5511.65	22.39	ND		5489.26
MW-2	11/10/17	5511.65	23.60	ND		5488.05

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	Date	TOC	Depth to Water (ft.)	Depth to LNAPL (ft.)	LNAPL Thickness (ft.)	GW Elevation (ft.)
MW-3	12/12/95	5512.19	25.67	NR		5486.52
MW-3	04/09/96	5512.19	25.78	NR		5486.41
MW-3	07/17/96	5512.19	25.15	NR		5487.04
MW-3	01/13/97	5512.19	26.41	26.25	0.16	5485.90
MW-3	07/14/97	5512.19	25.21	NR		5486.98
MW-3	10/22/97	5512.19	26.01	NR		5486.18
MW-3	01/09/98	5512.19	25.69	NR		5486.50
MW-3	04/24/98	5512.19	25.76	NR		5486.43
MW-3	04/16/99	5512.19	26.30	NR		5485.89
MW-3	04/19/00	5512.19	26.75	NR		5485.44
MW-3	09/05/01	5512.19	27.91	27.84	0.07	5484.33
MW-3	09/11/01	5512.19	27.91	27.89	0.02	5484.29
MW-3	09/04/02	5512.19	28.17	28.16	0.01	5484.03
MW-3	12/10/02	5512.19	28.20	28.17	0.03	5484.01
MW-3	06/19/03	5512.19	27.81	ND		5484.38
MW-3	09/17/03	5512.19	28.79	28.76	0.03	5483.42
MW-3	12/09/03	5512.19	28.11	ND		5484.08
MW-3	03/15/04	5512.19	27.78	ND		5484.41
MW-3	09/15/04	5512.19	28.60	ND		5483.59
MW-3	03/16/05	5512.19	27.48	ND		5484.71
MW-3	09/19/05	5512.19	27.16	ND		5485.03
MW-3	03/27/06	5512.19	26.34	ND		5485.85
MW-3	09/26/06	5512.19	25.83	ND		5486.36
MW-3	03/28/07	5512.19	25.71	ND		5486.48
MW-3	09/17/07	5512.19	26.85	ND		5485.34
MW-3	03/04/08	5512.19	25.55	ND		5486.64
MW-3	09/09/08	5512.19	25.62	ND		5486.57
MW-3	03/02/09	5512.19	24.55	ND		5487.64
MW-3	08/27/09	5512.19	24.13	ND		5488.06
MW-3	02/11/10	5512.19	24.67	ND		5487.52
MW-3	05/21/10	5512.19	23.40	ND		5488.79
MW-3	09/29/10	5512.19	23.42	ND		5488.77
MW-3	11/02/10	5512.19	22.20	ND		5489.99
MW-3	02/02/11	5512.19	23.44	ND		5488.75
MW-3	05/04/11	5512.19	22.37	ND		5489.82
MW-3	09/30/11	5512.19	21.94	ND		5490.25
MW-3	11/11/11	5512.19	22.75	ND		5489.44
MW-3	02/16/12	5512.19	23.85	ND		5488.34
MW-3	05/08/12	5512.19	21.90	ND		5490.29
MW-3	06/07/13	5512.19	21.61	ND		5490.58
MW-3	09/13/13	5512.19	26.71	ND		5485.48

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	**Date**	**TOC**	**Depth to Water (ft.)**	**Depth to LNAPL (ft.)**	**LNAPL Thickness (ft.)**	**GW Elevation (ft.)**
MW-3	12/13/13	5512.19	26.31	ND		5485.88
MW-3	04/03/14	5512.19	25.55	ND		5486.64
MW-3	10/21/14	5512.19	25.73	ND		5486.46
MW-3	05/27/15	5512.19	19.02	ND		5493.17
MW-3	11/17/15	5512.19	22.61	ND		5489.58
MW-3	04/15/16	5512.19	23.37	ND		5488.82
MW-3	10/11/16	5512.19	21.54	ND		5490.65
MW-3	06/06/17	5512.19	22.56	ND		5489.63
MW-3	11/10/17	5512.19	23.79	ND		5488.40

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	Date	TOC	Depth to Water (ft.)	Depth to LNAPL (ft.)	LNAPL Thickness (ft.)	GW Elevation (ft.)
MW-4	12/12/95	5512.86	26.27	NR		5486.59
MW-4	04/09/96	5512.86	26.40	NR		5486.46
MW-4	07/17/96	5512.86	25.77	NR		5487.09
MW-4	10/15/96	5512.86	27.26	NR		5485.60
MW-4	01/13/97	5512.86	26.96	NR		5485.90
MW-4	04/22/97	5512.86	26.69	NR		5486.17
MW-4	07/14/97	5512.86	25.78	NR		5487.08
MW-4	10/22/97	5512.86	26.72	NR		5486.14
MW-4	01/09/98	5512.86	26.34	NR		5486.52
MW-4	04/24/98	5512.86	26.44	NR		5486.42
MW-4	04/16/99	5512.86	26.97	NR		5485.89
MW-4	04/19/00	5512.86	26.09	NR		5486.77
MW-4	09/11/01	5512.86	28.48	NR		5484.38
MW-4	09/04/02	5512.86	28.76	NR		5484.10
MW-4	12/10/02	5512.86	28.80	NR		5484.06
MW-4	06/19/03	5512.86	28.43	ND		5484.43
MW-4	09/17/03	5512.86	29.36	ND		5483.50
MW-4	12/09/03	5512.86	28.73	ND		5484.13
MW-4	03/15/04	5512.86	28.42	ND		5484.44
MW-4	09/15/04	5512.86	29.20	ND		5483.66
MW-4	03/16/05	5512.86	28.12	ND		5484.74
MW-4	09/19/05	5512.86	27.74	ND		5485.12
MW-4	03/27/06	5512.86	26.87	ND		5485.99
MW-4	09/26/06	5512.86	26.45	ND		5486.41
MW-4	03/28/07	5512.86	26.34	ND		5486.52
MW-4	09/17/07	5512.86	27.44	ND		5485.42
MW-4	03/04/08	5512.86	26.23	ND		5486.63
MW-4	09/09/08	5512.86	26.15	ND		5486.71
MW-4	03/02/09	5512.86	25.19	ND		5487.67
MW-4	08/27/09	5512.86	27.10	24.13	2.97	5487.99
MW-4	09/23/09	5512.86	26.15	25.35	0.80	5487.31
MW-4	10/19/09	5512.86	25.70	25.15	0.55	5487.57
MW-4	11/05/09	5512.86	25.95	25.69	0.26	5487.10
MW-4	12/21/09	5512.86	26.05	25.85	0.20	5486.96
MW-4	02/11/10	5512.86	25.40	25.28	0.12	5487.55
MW-4	05/21/10	5512.86	24.05	24.03	0.02	5488.82
MW-4	09/29/10	5512.86	25.05	23.35	1.70	5489.08
MW-4	11/02/10	5512.86	23.38	22.74	0.64	5489.96
MW-4	02/02/11	5512.86	24.37	24.18	0.19	5488.63
MW-4	05/04/11	5512.86	22.13	ND		5490.73
MW-4	09/30/11	5512.86	24.52	21.85	2.67	5490.34

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	**Date**	**TOC**	**Depth to Water (ft.)**	**Depth to LNAPL (ft.)**	**LNAPL Thickness (ft.)**	**GW Elevation (ft.)**
MW-4	11/11/11	5512.86	23.74	23.40	0.34	5489.37
MW-4	02/16/12	5512.86	24.68	ND		5488.18
MW-4	05/08/12	5512.86	22.46	22.44	0.02	5490.41
MW-4	06/07/13	5512.86	24.76	23.75	1.01	5488.86
MW-4	09/13/13	5512.86	28.84	27.07	1.77	5485.35
MW-4	12/13/13	5512.86	27.30	26.78	0.52	5485.95
MW-4	04/03/14	5512.86	26.43	26.07	0.36	5486.70
MW-4	10/21/14	5512.86	27.02	26.14	0.88	5486.50
MW-4	05/27/15	5512.86	20.58	20.58		5492.28
MW-4	11/17/15	5512.86	23.64	23.07	0.57	5489.65
MW-4	04/15/16	5512.86	23.96	ND		5488.90
MW-4	10/11/16	5512.86	22.55	21.93	0.62	5490.77
MW-4	06/06/17	5512.86	23.74	23.02	0.72	5489.66
MW-4	11/10/17	5512.86	24.41	ND		5488.45

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	Date	TOC	Depth to Water (ft.)	Depth to LNAPL (ft.)	LNAPL Thickness (ft.)	GW Elevation (ft.)
MW-5	11/15/00	5510.04	25.62	NR		5484.42
MW-5	09/11/01	5510.04	25.94	NR		5484.10
MW-5	09/04/02	5510.04	26.21	NR		5483.83
MW-5	12/10/02	5510.04	26.11	NR		5483.93
MW-5	06/19/03	5510.04	25.80	ND		5484.24
MW-5	09/17/03	5510.04	26.67	ND		5483.37
MW-5	12/09/03	5510.04	25.88	ND		5484.16
MW-5	03/15/04	5510.04	25.52	ND		5484.52
MW-5	09/15/04	5510.04	26.60	ND		5483.44
MW-5	03/16/05	5510.04	25.21	ND		5484.83
MW-5	09/19/05	5510.04	25.20	ND		5484.84
MW-5	03/28/07	5510.04	23.54	ND		5486.50
MW-5	09/17/07	5510.04	24.87	ND		5485.17
MW-5	03/04/08	5510.04	23.28	ND		5486.76
MW-5	09/09/08	5510.04	23.69	ND		5486.35
MW-5	03/02/09	5510.04	22.52	ND		5487.52
MW-5	08/27/09	5510.04	22.51	ND		5487.53
MW-5	02/11/10	5510.04	22.74	ND		5487.30
MW-5	05/21/10	5510.04	21.43	ND		5488.61
MW-5	09/29/10	5510.04	21.33	ND		5488.71
MW-5	11/02/10	5510.04	20.48	ND		5489.56
MW-5	02/02/11	5510.04	20.52	ND		5489.52
MW-5	05/04/11	5510.04	20.66	ND		5489.38
MW-5	09/30/11	5510.04	20.24	ND		5489.80
MW-5	11/11/11	5510.04	21.89	ND		5488.15
MW-5	02/16/12	5510.04	21.85	ND		5488.19
MW-5	05/08/12	5510.04	19.79	ND		5490.25
MW-5	06/07/13	5510.04	20.70	ND		5489.34
MW-5	09/13/13	5510.04	24.68	ND		5485.36
MW-5	12/13/13	5510.04	24.13	ND		5485.91
MW-5	04/03/14	5510.04	23.42	ND		5486.62
MW-5	10/21/14	5510.04	23.72	ND		5486.32
MW-5	05/27/15	5510.04	17.17	ND		5492.87
MW-5	11/17/15	5510.04	20.74	ND		5489.30
MW-5	04/15/16	5510.04	21.35	ND		5488.69
MW-5	10/11/16	5510.04	19.74	ND		5490.30
MW-5	06/06/17	5510.04	20.63	ND		5489.41
MW-5	11/10/17	5510.04	21.66	ND		5488.38

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	Date	TOC	Depth to Water (ft.)	Depth to LNAPL (ft.)	LNAPL Thickness (ft.)	GW Elevation (ft.)
MW-6	11/17/15	5510.36	21.31	ND		5489.05
MW-6	04/15/16	5510.36	21.90	ND		5488.46
MW-6	10/11/16	5510.36	20.22	ND		5490.14
MW-6	06/06/17	5510.36	20.13	ND		5490.23
MW-6	11/10/17	5510.36	22.20	ND		5488.16
MW-7	11/17/15	5511.16	21.77	ND		5489.39
MW-7	04/15/16	5511.16	22.43	ND		5488.73
MW-7	10/11/16	5511.16	20.68	ND		5490.48
MW-7	06/06/17	5511.16	21.67	ND		5489.49
MW-7	11/10/17	5511.16	22.77	ND		5488.39
MW-8	11/17/15	5511.95	22.21	ND		5489.74
MW-8	04/15/16	5511.95	22.94	ND		5489.01
MW-8	10/11/16	5511.95	21.25	ND		5490.70
MW-8	06/06/17	5511.95	22.20	ND		5489.75
MW-8	11/10/17	5511.95	23.25	ND		5488.70
MW-9	11/17/15	5513.44	23.49	ND		5489.95
MW-9	04/15/16	5513.44	24.29	ND		5489.15
MW-9	10/11/16	5513.44	22.48	ND		5490.96
MW-9	06/06/17	5513.44	23.54	ND		5489.90
MW-9	11/10/17	5513.44	24.68	ND		5488.76
MW-10	11/17/15	5513.72	24.06	ND		5489.66
MW-10	04/15/16	5513.72	24.84	ND		5488.88
MW-10	10/11/16	5513.72	22.87	ND		5490.85
MW-10	06/06/17	5513.72	24.05	ND		5489.67
MW-10	11/10/17	5513.72	25.32	ND		5488.40
MW-11	11/17/15	5513.41	23.91	ND		5489.50
MW-11	04/15/16	5513.41	24.73	ND		5488.68
MW-11	10/11/16	5513.41	22.66	ND		5490.75
MW-11	06/06/17	5513.41	23.99	23.87	0.12	5489.51
MW-11	11/10/17	5513.41	25.19	ND		5488.22
MW-12	11/17/15	5511.47	22.40	ND		5489.07
MW-12	04/15/16	5511.47	23.05	ND		5488.42
MW-12	10/11/16	5511.47	21.13	ND		5490.34
MW-12	06/06/17	5511.47	22.22	22.21	0.01	5489.26
MW-12	11/10/17	5511.47	23.47	ND		5488.00

TABLE 2 - GROUNDWATER ELEVATION RESULTS

Knight #1						
Location	**Date**	**TOC**	**Depth to Water (ft.)**	**Depth to LNAPL (ft.)**	**LNAPL Thickness (ft.)**	**GW Elevation (ft.)**
MW-13	11/17/15	5509.07	20.26	ND		5488.81
MW-13	04/15/16	5509.07	20.83	ND		5488.24
MW-13	10/11/16	5509.07	19.01	ND		5490.06
MW-13	06/06/17	5509.07	19.99	19.99	trace	5489.08
MW-13	11/10/17	5509.07	21.17	ND		5487.90

Notes:
"ft" = feet
"TOC" = Top of casing
"LNAPL" = Light non-aqueous phase liquid
"ND" = LNAPL not detected
"NR" = LNAPL not recorded

FIGURES

L:\San Juan River Basin\SJRB GENERAL\GIS-NEW_MXDs\KNIGHT #1\2017 MAPS\Knight#1_GARM_1SA_2017.mxd

SMA BENCHMARK
ELEV. 5511.39'
NAD 83 NAVD 88
STATE PLANE COORDINATE SYSTEM
NEW MEXICO WEST

FORMER KNIGHT #1 WELLHEAD

MW-9
MW-9
NS

MW-8
B: <1.0
T: <5.0
E: <1.0
X: <5.0

MW-8

MW-10
MW-10
NS

MW-4
MW-4
NS

FORMER EPC PIT - EXCAVATED
APPROXIMATELY 12 FEET DEEP

FORMER DEHYDRATOR

MW-11
NS

MW-11

MW-3
MW-3
NS

MW-1

FORMER SEPARATOR

MW-1
B: 120
T: <25
E: 350
X: 36

MW-7
MW-7
B: 20
T: <5.0
E: 33
X: 390

FORMER METER HOUSE

MW-5
NS

MW-5

FORMER TANK

MW-2
B: 1
T: <5.0
E: <1.0
X: <5.0

MW-12
MW-12
NS

MW-6
MW-6
NS

MW-2

MW-13
MW-13
NS

FORMER TANKS

IRRIGATED FIELD

AERIAL IMAGERY FROM GOOGLE EARTH, DATED 3/15/2015

LEGEND:

- 5509 — APPROX. GROUND SURFACE CONTOUR AND ELEVATION, FEET
- ACCESS ROAD
- FENCE
- GAS LINE
- FORMER WELLHEAD
- MONITORING WELL
- SMA BENCHMARK

EXPLANATION OF ANALYTES AND APPLICABLE STANDARDS:

RESULTS IN **BOLDFACE** TYPE INDICATE CONCENTRATION IN EXCESS OF THE STANDARD FOR THAT ANALYTE.
NS = NOT SAMPLED
µg/L = MICROGRAMS PER LITER
<1 = BELOW REPORTING LIMIT

ANALYTE	NMWQCC STANDARDS
B = Benzene	10 µg/L
T = Toluene	750 µg/L
E = Ethylbenzene	750 µg/L
X = Total Xylenes	620 µg/L

N

SCALE IN FEET
0 30 60

REVISION	DATE	DESIGN BY	DRAWN BY	REVIEWED BY
A	7/13/2017	SLG	SLG	SRV

TITLE:

GROUNDWATER ANALYTICAL RESULTS
JUNE 6, 2017

PROJECT:

KNIGHT #1
SAN JUAN RIVER BASIN
SAN JUAN COUNTY, NEW MEXICO

Stantec

Figure No.: 1

L:\San Juan River Basin\SJRB GENERAL\GIS-NEW_MXDs\KNIGHT #1\2017 MAPS\Knight#1_GECM_1SA_2017.mxd

SMA BENCHMARK
ELEV. 5511.39'
NAD 83 NAVD 88
STATE PLANE COORDINATE SYSTEM
NEW MEXICO WEST

FORMER KNIGHT #1 WELLHEAD

MW-9 5489.90
MW-10 5489.67
MW-4 5489.66
MW-8 5489.75
MW-11 5489.51
MW-1 5489.63
MW-3 5489.63
MW-7 5489.49
MW-5 5489.41
MW-12 5489.26
MW-6 5490.23*
MW-2 5489.26
MW-13 5489.08

5489.8
5489.7
5489.6
5489.5
5489.4
5489.3
5489.2
5489.1

5514
5513
5512
5511
5510
5509
5508
5507
5506

FORMER EPC PIT - EXCAVATED APPROXIMATELY 12 FEET DEEP
FORMER DEHYDRATOR
FORMER SEPARATOR
FORMER METER HOUSE
FORMER TANK
FORMER TANKS
IRRIGATED FIELD

AERIAL IMAGERY FROM GOOGLE EARTH, DATED 3/15/2015

LEGEND:

- 5509 — APPROX. GROUND SURFACE CONTOUR AND ELEVATION, FEET
- ACCESS ROAD
- FENCE
- GAS LINE
- FORMER WELLHEAD
- MONITORING WELL
- MONITORING WELL WITH MEASUREABLE FREE PRODUCT
- SMA BENCHMARK

NOTES:

- 5489.39 — GROUNDWATER ELEVATION (CORRECTED FOR PRODUCT THICKNESS WHEN PRESENT) FEET ABOVE MEAN SEA LEVEL
- -5489-25- — CORRECTED WATER ELEVATION CONTOUR DASHED WHERE INFERRED (FEET ABOVE MEAN SEA LEVEL) 0.2 FOOT CONTOUR INTERVAL)
- DIRECTION OF APPARENT GROUNDWATER FLOW
- * — WATER ELEVATION APPEARS ANOMALOUS AND WAS NOT USED FOR CONTOURING WATER ELEVATIONS

N

SCALE IN FEET
0 30 60

REVISION	DATE	DESIGN BY	DRAWN BY	REVIEWED BY
A	7/13/2017	SLG	SLG	SRV

TITLE:

GROUNDWATER ELEVATION MAP
JUNE 6, 2017

PROJECT:

KNIGHT #1
SAN JUAN RIVER BASIN
SAN JUAN COUNTY, NEW MEXICO

Stantec

Figure No.: **2**

L:\San Juan River Basin\SJRB GENERAL\GIS-NEW_MXDs\KNIGHT #1\2017 MAPS\Knight#1_GARM_2SA_2017.mxd

LEGEND:

- 5509 — APPROX. GROUND SURFACE CONTOUR AND ELEVATION, FEET
- ACCESS ROAD
- FENCE
- GAS LINE
- FORMER WELLHEAD
- MONITORING WELL
- SMA BENCHMARK

EXPLANATION OF ANALYTES AND APPLICABLE STANDARDS:

RESULTS IN **BOLDFACE** TYPE INDICATE CONCENTRATION IN EXCESS OF THE STANDARD FOR THAT ANALYTE.
NS = NOT SAMPLED
µg/L = MICROGRAMS PER LITER
<1 = BELOW REPORTING LIMIT

ANALYTE	NMWQCC STANDARDS
B = Benzene	10 µg/L
T = Toluene	750 µg/L
E = Ethylbenzene	750 µg/L
X = Total Xylenes	620 µg/L

N

SCALE IN FEET
0 30 60

REVISION	DATE	DESIGN BY	DRAWN BY	REVIEWED BY
A	12/8/2017	SLG	SLG	SRV

TITLE:

GROUNDWATER ANALYTICAL RESULTS
NOVEMBER 10, 2017

PROJECT:
KNIGHT #1
SAN JUAN RIVER BASIN
SAN JUAN COUNTY, NEW MEXICO

Stantec

Figure No.: 3

L:\San Juan River Basin\SJRB GENERAL\GIS-NEW_MXDs\KNIGHT #1\2017 MAPS\Knight#1_GECM_2SA_2017.mxd

SMA BENCHMARK
ELEV. 5511.39'
NAD 83 NAVD 88
STATE PLANE COORDINATE SYSTEM
NEW MEXICO WEST

FORMER KNIGHT #1 WELLHEAD

MW-9 5488.76
MW-4 5488.45
MW-8 5488.70
MW-10 5488.40
MW-11 5488.22
MW-1 5488.39
MW-3 5488.40
MW-7 5488.39
MW-5 5488.38
MW-6 5488.16
MW-12 5488.00
MW-2 5488.05
MW-13 5487.90

5488.6
5488.4
5488.2
5488

FORMER EPC PIT - EXCAVATED APPROXIMATELY 12 FEET DEEP
FORMER DEHYDRATOR
FORMER SEPARATOR
FORMER METER HOUSE
FORMER TANK
FORMER TANKS
IRRIGATED FIELD
5510

AERIAL IMAGERY FROM GOOGLE EARTH, DATED 3/15/2015

LEGEND:

- 5509 — APPROX. GROUND SURFACE CONTOUR AND ELEVATION, FEET
- ACCESS ROAD
- FENCE
- G A S — GAS LINE
- FORMER WELLHEAD
- MONITORING WELL
- SMA BENCHMARK

NOTES:

5489.39 — GROUNDWATER ELEVATION (CORRECTED FOR PRODUCT THICKNESS WHEN PRESENT) FEET ABOVE MEAN SEA LEVEL

-5489-25- — CORRECTED WATER ELEVATION CONTOUR DASHED WHERE INFERRED (FEET ABOVE MEAN SEA LEVEL) 0.2 FOOT CONTOUR INTERVAL)

DIRECTION OF APPARENT GROUNDWATER FLOW

N

SCALE IN FEET
0 30 60

REVISION	DATE	DESIGN BY	DRAWN BY	REVIEWED BY
A	12/13/2017	SLG	SLG	SRV

TITLE:

GROUNDWATER ELEVATION MAP
NOVEMBER 10, 2017

PROJECT:

KNIGHT #1
SAN JUAN RIVER BASIN
SAN JUAN COUNTY, NEW MEXICO

Stantec

Figure No.: 4

APPENDICES

APPENDIX A – NOTIFICATIONS OF GROUNDWATER SAMPLING ACTIVITIES

APPENDIX B – WASTE DISPOSAL DOCUMENTATION

APPENDIX C – MOBILE DUAL PHASE EXTRACTION REPORT

APPENDIX D – JUNE 6, 2017 GROUNDWATER SAMPLING ANALYTICAL REPORT
NOVEMBER 10, 2017 GROUNDWATER SAMPLING ANALYTICAL REPORT

APPENDIX A

From: Varsa, Steve
To: Randolph.Bayliss@state.nm.us
Cc: brandon.powell@state.nm.us; Wiley, Joe
Subject: El Paso CGP Company - Notice of upcoming groundwater sampling activities
Date: Tuesday, May 30, 2017 3:05:18 PM

Hi Randy –

This correspondence is to provide notice to the NMOCD of upcoming semi-annual groundwater sampling and monitoring activities at the following project sites:

Site Name	NMOCD Case #
Canada Mesa #2	3RP-155-0
Fields A#7A	3RP-170-0
Fogelson 4-1	3RP-068-0
Gallegos Canyon Unit #124E	3RP-407-0
GCU Com A #142E	3RP-179-0
Hammond #41A	3RP-186-0
James F. Bell #1E	3RP-196-0
Johnston Fed #4	3RP-201-0
Johnston Fed #6A	3RP-202-0
K27 LDO72	3RP-204-0
Knight #1	3RP-207-0
Lateral L 40 Line Drip	3RP-212-0
Lat O-21 Line Drip	3RP-213-0
Lindrith B #24	3RP-214-0
Miles Fed #1A	3RP-223-0
Sandoval GC A #1A	3RP-235-0
Standard Oil Com #1	3RP-238-0
State Gas Com N #1	3RP-239-0

Groundwater sampling and monitoring is planned to be conducted the week of June 5, 2017.

Thank you,
Steve

Stephen Varsa, P.G.
Supervising Hydrogeologist
MWH, now part of Stantec
11153 Aurora Avenue
Des Moines, Iowa 50322
Direct: (515) 251-1020
Cell: (515) 710-7523

Office: (515) 253-0830
steve.varsa@stantec.com

From:	Varsa, Steve
To:	Bayliss, Randolph, EMNRD
Cc:	Griswold, Jim, EMNRD; Perrin, Charlie, EMNRD; Powell, Brandon, EMNRD; Smith, Cory, EMNRD; Fields, Vanessa, EMNRD; Wiley, Joe
Subject:	RE: MPDE Work Plan Approvals
Date:	Saturday, July 08, 2017 4:55:00 PM

Hi Randy –

Pursuant to the conditions in the above-referenced July 5, 2017, approval letter, the following is the schedule for the MDPE activities:

James F. Bell #1E – start late the afternoon of Tuesday, July 11, and will go through Friday, July 14.
Johnston Federal #4 and Johnston Federal #6A – both sites beginning on Saturday, July 15, and go through Tuesday, July 18.
No work planned for Wednesday, July 19 (rest day).
GCU #124 – Thursday, July 20 through Sunday, July 23.
Knight #1 – Monday and Tuesday, July 24 and 25.
K27 LD072 – Wednesday, July 26.
Miles Federal #1A – Thursday, July 27.

As noted in the work plan submittal, work at State Gas Com N#1 is still pending receipt of a State Water Easement. NMOCD will be notified once the State Gas Com pilot testing activities have been scheduled, or if there are changes to the schedule offered above. Do you anticipate any OCD staff will be on-site during one or more of these events?

Thank you,
Steve

Stephen Varsa, P.G.
Supervising Hydrogeologist
MWH, now part of Stantec
11153 Aurora Avenue
Des Moines, Iowa 50322
Direct: (515) 251-1020
Cell: (515) 710-7523
Office: (515) 253-0830
steve.varsa@stantec.com

From: Bayliss, Randolph, EMNRD [mailto:Randolph.Bayliss@state.nm.us]
Sent: Wednesday, July 05, 2017 9:08 AM
To: Wiley, Joe <Joe_Wiley@kindermorgan.com>; Varsa, Steve <steve.varsa@stantec.com>
Cc: Griswold, Jim, EMNRD <Jim.Griswold@state.nm.us>; Perrin, Charlie, EMNRD <charlie.perrin@state.nm.us>; Powell, Brandon, EMNRD <Brandon.Powell@state.nm.us>; Smith, Cory, EMNRD <Cory.Smith@state.nm.us>; Fields, Vanessa, EMNRD <Vanessa.Fields@state.nm.us>

Subject: MPDE Work Plan Approvals

Good morning Joe, Steve, others.

Thank you for your proposed MPDE efforts.

Cheers

Randolph Bayliss, P.E.
Hydrologist, Districts III and IV
NMOCD Environmental Bureau
1220 S St Francis St, Santa Fe, NM 87505
505-476-3084, Cell 575-840-5961

From: Varsa, Steve
To: Bayliss, Randolph, EMNRD
Cc: Smith, Cory, EMNRD; Fields, Vanessa, EMNRD; Wiley, Joe
Subject: El Paso CGP Company - Notice of upcoming groundwater sampling activities
Date: Monday, November 06, 2017 11:41:36 AM

Hi Randy –

This correspondence is to provide notice to the NMOCD of upcoming semiannual groundwater sampling and monitoring activities at the following project sites:

Site Name	NMOCD Case #
Canada Mesa #2	3RP-155-0
Fields A#7A	3RP-170-0
Fogelson 4-1	3RP-068-0
Gallegos Canyon Unit #124E	3RP-407-0
GCU Com A #142E	3RP-179-0
James F. Bell #1E	3RP-196-0
Johnston Fed #4	3RP-201-0
Johnston Fed #6A	3RP-202-0
K27 LDO72	3RP-204-0
Knight #1	3RP-207-0
Lateral L 40 Line Drip	3RP-212-0
Lat O-21 Line Drip	3RP-213-0
Miles Fed #1A	3RP-223-0
Sandoval GC A #1A	3RP-235-0
Standard Oil Com #1	3RP-238-0
State Gas Com N #1	3RP-239-0

Groundwater sampling and monitoring is planned to be conducted November 10-14, 2017.

Please contact Joe Wiley, remediation manager with El Paso CGP Company, at (713) 420-3475, or me, if you have any questions.

Thank you,
Steve

Stephen Varsa, P.G.
Supervising Hydrogeologist
MWH, now part of Stantec
11153 Aurora Avenue
Des Moines, Iowa 50322
Direct: (515) 251-1020
Cell: (515) 710-7523
Office: (515) 253-0830
steve.varsa@stantec.com

APPENDIX B

BASIN DISPOSAL

30 Years of Environmental Health and Safety Excellence

200 Montana, Bloomfield, NM 87413
505-632-8936 or 505-334-3013
OPEN 24 Hours per Day

NO. 687962
NMOCD PERMIT: NM -001-0005
Oil Field Waste Document, Form C138
INVOICE:

DATE 6-8-17
DEL. TKT#.
GENERATOR: El PASO
BILL TO: El Paso
HAULING CO. [illegible]
DRIVER: Sarah Gardner
(Print Full Name)
ORDERED BY: Joseph Wiley
CODES:

WASTE DESCRIPTION: ☒ Exempt Oilfield Waste ☐ Produced Water ☐ Drilling/Completion Fluids ☐ Reserve Pit

STATE: ☒ NM ☐ CO ☐ AZ ☐ UT

TREATMENT/DISPOSAL METHODS: ☒ EVAPORATION ☒ INJECTION ☒ TREATING PLANT

NO.	TRUCK	LOCATION(S)	VOLUME	COST	H2S	COST	TOTAL	TIME
1	01	Jones Frankie 1E	1	750			750 '17 JUN 8	4:13PM
2		State Gas Com N #1 Canada Mesa #2						
3		M.Lester 1A Fields A #2A						
4		Lindrith B #24 Hammond #41A						
5		Knight #1 K721D072						

I, [signature] representitive or authorized agent for the above generator and hauler hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination that the above described waste is RCRA Exempt Oil field wastes.

☐ Approved ☐ Denied ATTENDANT SIGNATURE [signature]

san juan reproduction 168-6

BASIN DISPOSAL

30 Years of Environmental Health and Safety Excellence

200 Montana, Bloomfield, NM 87413
505-632-8936 or 505-334-3013
OPEN 24 Hours per Day

NO. 691027

NMOCD PERMIT: NM -001-0005
Oil Field Waste Document, Form C138
INVOICE:

DATE 7-24-24

DEL. TKT#.

GENERATOR: El Paso

BILL TO: El Paso

HAULING CO. Sierra

DRIVER: Calvin
(Print Full Name)

ORDERED BY: Joseph Wiley

CODES:

WASTE DESCRIPTION: ☒ Exempt Oilfield Waste ☐ Produced Water ☐ Drilling/Completion Fluids ☐ Reserve Pit

STATE: ☒ NM ☐ CO ☐ AZ ☐ UT

TREATMENT/DISPOSAL METHODS: ☒ EVAPORATION ☒ INJECTION ☒ TREATING PLANT

NO.	TRUCK	LOCATION(S)	VOLUME	COST	H2S	COST	TOTAL	TIME
1	6	Knight #1	24	25			18 00	
2							17 JUL 24	1:20PM
3								
4								
5								

I, Calvin John representitive or authorized agent for the above generator and hauler hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination that the above described waste is RCRA Exempt Oil field wastes.

☐ Approved ☐ Denied ATTENDANT SIGNATURE

san juan reproduction 168-6

BASIN DISPOSAL

30 Years of Environmental Health and Safety Excellence

200 Montana, Bloomfield, NM 87413

505-632-8936 or 505-334-3013

OPEN 24 Hours per Day

NO. 691045

NMOCD PERMIT: NM -001-0005

Oil Field Waste Document, Form C138

INVOICE:

DATE 7-23-17

DEL. TKT#.

GENERATOR: ~~Knight~~ Elpaso

BILL TO: Elpaso

HAULING CO. Sierra Oilfield

DRIVER: Calvin
(Print Full Name)

ORDERED BY: Chris John

CODES:

WASTE DESCRIPTION: ☒ Exempt Oilfield Waste ☐ Produced Water ☐ Drilling/Completion Fluids ☐ Reserve Pit

STATE: ☐ NM ☐ CO ☐ AZ ☐ UT

TREATMENT/DISPOSAL METHODS: ☒ EVAPORATION ☒ INJECTION ☒ TREATING PLANT

NO.	TRUCK	LOCATION(S)	VOLUME	COST	H2S	COST	TOTAL	TIME
1	6	Knight #1	12	.75				3:38PM
2								
3								
4								
5								

I, _____ representitive or authorized agent for the above generator and hauler hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination that the above described waste is RCRA Exempt Oil field wastes.

☒ Approved ☐ Denied ATTENDANT SIGNATURE Ken Bruce

san juan reproduction 168-6

30 Years of Environmental Health and Safety Excellence

BASIN DISPOSAL

200 Montana, Bloomfield, NM 87413
505-632-8936 or 505-334-3013
OPEN 24 Hours per Day

NO. 691184
NMOCD PERMIT: NM -001-0005
Oil Field Waste Document, Form C138
INVOICE:

DATE 7-26-17
DEL. TKT#.
GENERATOR: E I PASO
BILL TO: E I PASO
HAULING CO. Sierra
DRIVER: B Pena
(Print Full Name)
ORDERED BY: JOSH
CODES:

WASTE DESCRIPTION: ☒ Exempt Oilfield Waste ☑ Produced Water ☐ Drilling/Completion Fluids ☐ Reserve Pit

STATE: ☑ NM ☐ CO ☐ AZ ☐ UT

TREATMENT/DISPOSAL METHODS: ☒ EVAPORATION ☒ INJECTION ☒ TREATING PLANT

NO.	TRUCK	LOCATION(S)	VOLUME	COST	H2S	COST	TOTAL	TIME
1	6	KNight #1	20	750			15	8:30AM
2								
3								
4								
5								

I, RICK representitive or authorized agent for the above generator and hauler hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination that the above described waste is RCRA Exempt Oil field wastes.

☑ Approved ☐ Denied ATTENDANT SIGNATURE

san juan reproduction 168-6

BASIN DISPOSAL

30 Years of Environmental Health and Safety Excellence

200 Montana, Bloomfield, NM 87413
505-632-8936 or 505-334-3013
OPEN 24 Hours per Day

NO. 699930
NMOCD PERMIT: NM -001-0005
Oil Field Waste Document, Form C138
INVOICE:

DATE 11.12.17

GENERATOR: El Paso

HAULING CO. Stantec

ORDERED BY: Joe Wiley

DEL. TKT#.

BILL TO: Stantec

DRIVER: Sam Spiering
(Print Full Name)

CODES:

WASTE DESCRIPTION: ☒ Exempt Oilfield Waste ☐ Produced Water ☑ Drilling/Completion Fluids ☐ Reserve Pit

STATE: ☑ NM ☐ CO ☐ AZ ☐ UT

TREATMENT/DISPOSAL METHODS: ☒ EVAPORATION ☒ INJECTION ☒ TREATING PLANT

NO.	TRUCK	LOCATION(S)	VOLUME	COST	H2S	COST	TOTAL	TIME
1		Fogelson 4-1	1	70			70 17 NOV 12	1:45PM
2		State Gas Com, Knight, JF Bell Lat L-40, Std Oil Com						
3		Sandoval, GCU 124E, J-Fed 4 J-Fed 6						
4								
5								

I, [signature], representitive or authorized agent for the above generator and hauler hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination that the above described waste is RCRA Exempt Oil field wastes.

☑ Approved ☐ Denied ATTENDANT SIGNATURE [signature]

san juan reproduction 168-6

APPENDIX C

AcuVac Remediation, LLC
1656-H Townhurst, Houston, Texas 77043
713.468.6688 • www.acuvac.com

August 15, 2017

Mr. Stephen Varsa
Supervising Hydrogeologist
Stantec Consulting Services, Inc.
11153 Aurora Avenue
Des Moines, IA 50322

Dear Stephen:

Re: Knight #1, San Juan County, NM (Event #1)

At your request, AcuVac Remediation, LLC (AcuVac) performed four Mobile Dual Phase Extraction (MDPE) events as follows; 1) 10.0 hour Event #1A, well MW-4, 2) 10.0 hour Event #1B, well MW-12, on July 24, 2017, 3) 9.5 hour Event #1C, well MW-4, and 4) 8.0 Event #1D well MW-11, on July 25, 2017, at the above referenced site (Site). Following is the Report and a copy of the Operating Data collected during Event #1. Additionally, the attached Table #1 contains the Summary Well Data, and Table #2 contains the Summary Recovery Data.

The purpose of the MDPE events was to enhance recovery of Phase Separated Hydrocarbons (PSH) present at the Site through the removal of petroleum hydrocarbons in both liquid and vapor phases. PSH is referred to as petroleum hydrocarbons and Light Non-Aqueous Phase Liquids (LNAPL). The source of the PSH is a historical release of natural gas condensate.

OBJECTIVES

The objectives of the MDPE events were to:

- Maximize liquid and vapor phase petroleum hydrocarbon removal from groundwater and soils in the subsurface formations within the influence of the extraction well.
- Expose the capillary fringe area and below to the extraction well induced vacuums.
- Increase the vapor phase and liquid LNAPL specific yields with high induced vacuums.
- Create an induced hydraulic gradient to gain hydraulic control of the area surrounding the extraction well during the event periods.
- Select and monitor the groundwater depression and pump rates to accomplish the above objectives.

METHODS AND EQUIPMENT

AcuVac owns and maintains an inventory of equipment to perform MDPE events. No third party equipment was utilized. The events at the Site were conducted using the AcuVac I-6 System (System) with a Roots RAI-33 blower used as a vacuum pump and a Roots RAI-22 positive displacement blower. The following table lists equipment and instrumentation employed during Event #1, and the data element captured by each.

Equipment and Instrumentation Employed by AcuVac	
Measurement Equipment	**Data Element**
Extraction Well Induced Vacuum and Flow	
Dwyer Magnehelic Gauges	Extraction Well Vacuum
Dwyer Averaging Pitot Tubes / Magnehelic Gauges	Extractions Well Vapor Flow
Observation Wells	
Dwyer Digital Manometer	Vacuum / Pressure Influence
Extraction Well Vapor Monitoring	
V-1 vacuum box	Extraction Well Non-Diluted Vapor Sample Collection
HORIBA® Analyzer	Extraction Well Vapor TPH Concentration
QRae Mini II O_2 Monitor	Extraction Well Vapor Oxygen Content
LNAPL Thickness (if present)	
Solinst Interface Probes Model 122	Depth to LNAPL and Depth to Groundwater
Liquid Recovery	
Totalizer Flow Meter	Liquid Flow and Total Volume
Grundfos Red-Flo 2 Total Fluids Pump	In-Well Pumping
Grundfos Variable Frequency Drive	Pump Speed and Other Diagnostics
Groundwater Depression / Upwelling	
In-Situ Level Troll 700 Data Logger	Liquid Column in Extraction and Observation Wells
In-Situ Vented Cable with Chamber	Equalize Well Vacuum/Pressure
In-Situ Rugged Reader Data Logger Interface	Capture Readings from Data Logger Trolls
Atmospheric Conditions	
Testo Model 511	Relative and Absolute Barometric Pressure

The vacuum extraction portion of the System consists of a vacuum pump driven by an internal combustion engine (IC engine). The vacuum pump was connected to the extraction well, and the vacuum created on the extraction well caused light hydrocarbons in the soil and on the groundwater to volatilize and flow through a moisture knockout tank to the vacuum pump and the IC engine where they were burned as part of the normal combustion process. Propane was used as auxiliary fuel to help power the engine if the well vapors did not provide the required energy.

The IC engine provided the power necessary to achieve and maintain high induced vacuums and/or high well vapor flows required to maximize the vacuum radius of influence for pilot tests and short term event remediation.

Emissions from the engine were passed through three catalytic converters to maximize destruction of removed hydrocarbon vapors. The engine's fuel-to-air ratio was adjusted to maintain efficient combustion. Because the engine is the power source for the equipment, the System stops when the engine stops. This prevents an uncontrolled release of hydrocarbons. Since the System is held entirely under vacuum, any leaks in the seals or connections are leaked into the System and not emitted into the atmosphere. The engine is automatically shut down by vacuum loss, low oil pressure, over speed, or overheating.

Groundwater extraction was provided by an in-well Grundfos Redi-Flo 2 total fluids pump that discharged through a totalizer/flow meter. The discharge line from this meter was then connected to a stand-by tank. The electrical power for the groundwater pump was supplied from a 120v Honda generator. The groundwater flow rate was adjusted to maintain a target level. An interface meter was used to collect depth to groundwater and depth to LNAPL measurements. Grab samples of recovered liquid were taken periodically in a graduated cylinder to determine the average percentage of LANPL being recovered.

The design of the AcuVac System enabled independent control of both the induced well vacuum and the groundwater pumping functions such that the AcuVac team controlled the induced hydraulic gradient to increase exposure of the formation to soil vapor extraction (SVE). The ability to separate the vapor and liquid flows within the extraction well improved the LNAPL recovery rates, and enabled the AcuVac team to record data specific to each media.

RECOVERY SUMMARY FOR MDPE EVENT #1

The Recovery Summary table below lists the groundwater and LNAPL recovery data for Event #1

Recovery Summary					
	Event #1A	Event #1B	Event #1C	Event #1D	Total
	MW-4	MW-12	MW-4	MW-11	Event #1
Event Hours	10.0	10.0	9.5	8.0	37.5
GW Recovery	1,193	1,193	843	72	3,301
NAPL Recovery					
Liquid	0	0	0	0	0
Vapor	1.2	5.0	0.6	1.2	8.0
Total	1.2	5.0	0.6	1.2	8.0
Gallons/Hour	**0.12**	**0.5**	**0.07**	**0.15**	**0.21**

SUMMARY OF MDPE EVENT #1A- WELL MW-4

- The total event time was 10.0 hours. The Event was conducted on July 24, 2017. This was the first event completed from well MW-4, and therefore, there was no comparative data from this well.
- The total liquid volume recovered was 1,193 gals with no measureable liquid LNAPL recovered.
- Based on the HORIBA® data, total vapor LNAPL burned as IC engine fuel was 1.2 gals, for a total liquid and vapor LNAPL recovery of 1.2 gals, or 0.12 gals per hour.

- Average HORIBA® analytical data from the influent vapor samples for Event #1A are listed in the table below:

Data Element		Event #1A
TPH- Maximum	ppmv	16,990
TPH- Average	ppmv	11,110
TPH- Minimum	ppmv	7,810
TPH- Initial	ppmv	16,990
TPH- Final	ppmv	7,810
CO_2	%	3.61
CO	%	0.03
O_2	%	14.8
H_2S	ppm	4

- The Event #1A extraction well induced vacuum and well vapor flow are listed in the table below.

Well Vacuum and Well Vapor Flow Well MW-4		
Data Element		**Event #1A**
Well Vacuum- Max	"H_2O	35.00
Well Vacuum- Avg	"H_2O	35.00
Well Vacuum- Min	"H_2O	35.00
Well Vapor Flow- Max	scfm	5.06
Well Vapor Flow- Avg	scfm	5.06
Well Vapor Flow- Min	scfm	5.06

- The groundwater pump inlet was set at 35.5 ft BTOC in well MW-4. The average groundwater pump rate during the course of Event #1A was 1.99 gpm, and the maximum groundwater pump rate was 2.83 gpm. The total liquid volume recovered was 1,193 gals.
- The average groundwater depression, based on the positioning of the groundwater pump in well MW-4, was 2.2 ft below the hydro-equivalent static level.
- LNAPL with a measured thickness of 0.48 ft was recorded in well MW-4 prior to the start of Event #1A, and no measureable LNAPL was recorded at the conclusion of the Event #1A.

The total LNAPL removed, including liquid and vapor, during the 10.0 hour Event #1A, well MW-4 was 1.2 gals.

ADDITIONAL INFORMATION

- Well MW-4 produced a steady amount of liquid volume during the course of the Event #1A. However, no quantifiable liquid LNAPL was recovered from well MW-4.
- All LNAPL volume recovered, 1.2 gals, was burned as IC engine fuel.

- The TPH vapor concentrations were on a mostly decreasing trend during Event #1A. The initial, and maximum TPH reading was 16,990 ppmv, the average reading was 11,110 ppmv, and the lowest, and final, reading, 7,810 ppmv, was recorded at event hour 9.5.

SUMMARY OF MDPE EVENT #1B- WELL MW-12

- The total event time was 10.0 hours. The Event was conducted on July 24, 2017. This was the first event completed from well MW-12, and therefore, there was no comparative data from this well.
- The total liquid volume recovered was 1,193 gals with no measureable liquid LNAPL recovered.
- Based on the HORIBA® data, total vapor LNAPL burned as IC engine fuel was 5.0 gals, for a total liquid and vapor LNAPL recovery of 5.0 gals, or 0.5 gals per hour.
- Average HORIBA® analytical data from the influent vapor samples for Event #1B is listed in the table below:

Data Element		Event #1B
TPH- Maximum	ppmv	41,150
TPH- Average	ppmv	37,605
TPH- Minimum	ppmv	32,950
TPH- Initial	ppmv	38,560
TPH- Final	ppmv	32,950
CO_2	%	7.73
CO	%	0.70
O_2	%	9.3
H_2S	ppm	6

- The Event #1B extraction well induced vacuum and well vapor flow are listed in the table below.

Data Element		Event #1B
Well Vacuum- Max	"H_2O	10.00
Well Vacuum- Avg	"H_2O	10.00
Well Vacuum- Min	"H_2O	10.00
Well Vapor Flow- Max	scfm	6.15
Well Vapor Flow- Avg	scfm	6.15
Well Vapor Flow- Min	scfm	6.15

- The groundwater pump inlet was set at 28.5 ft BTOC in well MW-12. The average groundwater pump rate during the course of Event #1B was 2.09 gpm, and the maximum groundwater pump rate was 2.70 gpm. The groundwater pump in well MW-12 was started at event hour 0.5. The total liquid volume recovered was 1,193 gals.
- The average groundwater depression, based on the positioning of the groundwater pump in well MW-12, was 5.45 ft below the hydro-equivalent static level.

- LNAPL with a measured thickness of 0.01 ft was recorded in well MW-12 prior to the start of Event #1B, and no measureable LNAPL was recorded at the conclusion of the Event #1B.

The total LNAPL removed, including liquid and vapor, during the 10.0 hour Event #1B, Well MW-12, was 5.0 gals.

ADDITIONAL INFORMATION

- Well MW-12 produced a steady amount of liquid volume during the course of the Event #1B. However, no quantifiable liquid LNAPL was recovered from well MW-12.
- All LNAPL volume recovered, 5.0 gals, was burned as IC engine fuel.
- The TPH vapor concentrations increased during Event #1B and then decreased at the end of the event. The initial TPH reading was 38,560 ppmv, the average reading was 37,605 ppmv, the maximum reading, 41,150 ppmv was at event hour 6.5, and the lowest reading, 32,950 ppmv, was recorded at event hour 9.5.

SUMMARY OF MDPE EVENT #1C- WELL MW-4

- The total event time was 9.5 hours. The Event was conducted on July 25, 2017. The data is compared with Event #1A conducted on July 24, 2017, which had total event time of 9.5 hours.
- The total liquid volume recovered was 843 gals with no measureable liquid LNAPL recovered.
- Based on the HORIBA® data, total vapor LNAPL burned as IC engine fuel was 0.6 gals, for a total liquid and vapor LNAPL recovery of 0.6 gals, or 0.07 gals per hour.
- The volume of liquid and vapor LNPAL recovered during Event #1C is compared with Event #1A in the table below.

LNAPL Recovery Well MW-4					
		Event #1C		Event #1A	
		Amount	Percent	Amount	Percent
Event Hours		9.5	-	10.0	-
GW Recovery	gals	843	-	1,193	-
NAPL Recovery					
Liquid	gals	0	0	0	0
Vapor	gals	0.6	100.00	1.2	100.00
Total	gals	0.6	100.00	1.2	100.00
Gallons/Hour		**0.07**	**-**	**0.12**	**-**

- Average HORIBA® analytical data from the influent vapor samples for Event #1C is compared with Event #1A in the table below:

Influent Vapor Data Well MW-4			
Data Element		**Event #1C**	**Event #1A**
TPH- Maximum	ppmv	5,890	16,990
TPH- Average	ppmv	5,390	11,110
TPH- Minimum	ppmv	5,020	7,810
TPH- Initial	ppmv	5,550	16,990
TPH- Final	ppmv	5,020	7,810
CO_2	%	3.28	3.61
CO	%	0	0.03
O_2	%	14.2	14.8
H_2S	ppm	3	4

- The Event #1C extraction well induced vacuum and well vapor flow are compared with Event #1A in the table below.

Well Vacuum and Well Vapor Flow Well MW-4			
Data Element		**Event #1C**	**Event #1A**
Well Vacuum- Max	"H_2O	45.00	35.00
Well Vacuum- Avg	"H_2O	45.00	35.00
Well Vacuum- Min	"H_2O	45.00	35.00
Well Vapor Flow- Max	scfm	5.81	5.06
Well Vapor Flow- Avg	scfm	5.81	5.06
Well Vapor Flow- Min	scfm	5.81	5.06

- The groundwater pump inlet was set at 35.5 ft BTOC in well MW-4. The average groundwater pump rate during the course of Event #1C was 1.56 gpm, and the maximum groundwater pump rate was 2.83 gpm. The total liquid volume recovered was 843 gals.
- The average groundwater depression, based on the positioning of the groundwater pump in well MW-4, was 2.2 ft below the hydro-equivalent static level.
- No measurable LNAPL was recorded in well MW-4 prior to the start of Event #1C, and no measurable LNAPL was recorded at the conclusion of the Event #1C.

The total LNAPL removed, including liquid and vapor, during the 9.5 hour Event #1C, Well MW-4, was 0.6 gals.

ADDITIONAL INFORMATION

- Well MW-4 produced a steady amount of liquid volume during the course of the Event #1C. However, no quantifiable liquid LNAPL was recovered from well MW-4.
- All LNAPL volume recovered, 0.6 gals, was burned as IC engine fuel.

- The TPH vapor concentrations were on a mostly decreasing trend during Event #1C. The initial TPH reading was 5,550 ppmv, the average reading was 5,390 ppmv, the maximum reading, 5,890 ppmv was at event hour 2.0, and the lowest reading, 5,020 ppmv, was recorded at event hour 8.5.

SUMMARY OF MDPE EVENT #1D- WELL MW-11

- The total event time was 8.0 hours. The Event was conducted on July 25, 2017. This was the first event completed from well MW-11, and therefore, there was no comparative data from this well.
- The total liquid volume recovered was 72 gals with no measureable liquid LNAPL recovered.
- Based on the HORIBA® data, total vapor LNAPL burned as IC engine fuel was 1.2 gals, for a total liquid and vapor LNAPL recovery of 1.2 gals, or 0.15 gals per hour.
- Average HORIBA® analytical data from the influent vapor samples for Event #1D is listed in the table below:

Data Element		Event #1D
TPH- Maximum	ppmv	4,100
TPH- Average	ppmv	3,883
TPH- Minimum	ppmv	3,680
TPH- Initial	ppmv	3,870
TPH- Final	ppmv	3,680
CO_2	%	6.51
CO	%	0
O_2	%	12.2
H_2S	ppm	6

- The Event #1D extraction well induced vacuum and well vapor flow are listed in the table below.

Data Element		Event #1D
Well Vacuum- Max	"H_2O	80.00
Well Vacuum- Avg	"H_2O	69.62
Well Vacuum- Min	"H_2O	35.00
Well Vapor Flow- Max	scfm	19.43
Well Vapor Flow- Avg	scfm	17.87
Well Vapor Flow- Min	scfm	12.66

- The groundwater pump inlet was initially set at 22.5 ft BTOC in well MW-11. At event hour 1.5, the groundwater pump was repositioned to approximately 29.0 ft BTOC. The average groundwater pump rate during the course of Event #1D was 0.16 gpm, and the maximum groundwater pump rate was 0.30 gpm. The total liquid volume recovered was 72 gals.

- The average groundwater depression, based on the positioning of the groundwater pump in well MW-11, was 5.5 ft below the hydro-equivalent static level.
- No measurable LNAPL was recorded in well MW-11 prior to the start of Event #1D, and no measurable LNAPL was recorded at the conclusion of the Event #1D.

The total LNAPL removed, including liquid and vapor, during the 8.0 hour Event #1D, Well MW-11, was 1.2 gals.

ADDITIONAL INFORMATION

- Well MW-11 produced a steady amount of liquid volume during the course of the Event #1D. However, no quantifiable liquid LNAPL was recovered from well MW-11.
- All LNAPL volume recovered, 1.2 gals, was burned as IC engine fuel.
- The TPH vapor concentrations increased during Event #1D and then decreased at the end of the event. The initial TPH reading was 3,870 ppmv, the average reading was 3,883 ppmv, the maximum reading, 4,100 ppmv was at event hour 4.0, and the lowest reading, 3,680 ppmv, was recorded at event hour 7.5.
- At event hour 8.0, a Stop Work Order was issued due to inclement weather moving into the area. Event #1D, well MW-11, was concluded first and demobilized due to the low liquid recovery from this well.

The total LNAPL removed, including liquid and vapor, during the 37.50 hour Event #1, wells MW-4, MW-11 and MW-12 was 8.0 gals.

METHOD OF CALIBRATION AND CALCULATIONS

The HORIBA® Analytical instrument is calibrated with Hexane, CO and CO_2.

The formula used to calculate the emission rate is:

$$ER = HC\ (ppmv) \times MW\ (Hexane) \times Flow\ Rate\ (scfm) \times 1.58E^{-7} \frac{(min)(lb\ mole)}{(hr)(ppmv)(ft^3)} = lbs/hr$$

INFORMATION INCLUDED WITH REPORT

- Table #1 Summary Well Data
- Table #2 Summary Recovery Data
- Recorded Data
- Photographs of the MDPE System.

After you have reviewed the report and if you have any questions, please contact me. We appreciate you selecting AcuVac to provide this service.

Sincerely,
ACUVAC REMEDIATION, LLC

Paul D. Faucher
Vice President, Operations

Summary Well Data
Table #1

Event		1A	1B	1C	1D
WELL NO.		**MW-4**	**MW-12**	**MW-4**	**MW-11**
Total Event Hours		10.0	10.0	9.5	8.0
TD	ft BGS	34.0	40.0	34.0	40.0
Well Screen	ft BGS	19.0 – 34.0	15.0 – 40.0	19.0 – 34.0	15.0 – 40.0
Well Size	in	4.0	2.0	4.0	2.0
Well Data					
DTGW - Static - Start Event	ft BTOC	24.78	23.31	24.37	-
DTLNAPL - Static - Start Event	ft BTOC	24.30	23.30	-	-
LNAPL	ft BTOC	0.48	0.01	-	-
Hydro-Equivalent- Beginning	ft BTOC	24.42	23.30	24.37	-
DTGW - End Event	ft BTOC	24.71	23.51	-	25.06
DTLNAPL - End Event	ft BTOC	-	-	-	-
LNAPL	ft BTOC	-	-	-	-
Hydro-Equivalent- Ending	ft BTOC	23.71	23.51	-	25.06
Extraction Data					
Maximum Extraction Well Vacuum	"H_2O	35.00	10.00	45.00	80.00
Average Extraction Well Vacuum	"H_2O	35.00	10.00	45.00	69.62
Minimum Extraction Well Vacuum	"H_2O	35.00	10.00	45.00	35.00
Maximum Extraction Well Vapor Flow	scfm	5.06	6.15	5.81	19.43
Average Extraction Well Vapor Flow	scfm	5.06	6.15	5.81	17.87
Minimum Extraction Well Vapor Flow	scfm	5.06	6.15	5.81	12.66
Maximum GW / LNAPL Pump Rate	gpm	2.83	2.70	2.83	0.30
Average GW / LNAPL Pump Rate	gpm	1.99	2.09	1.56	0.16
Influent Data					
Maximum TPH	ppmv	16,990	41,150	5,890	4,100
Average TPH	ppmv	11,110	37,605	5,390	3,883
Minimum TPH	ppmv	7,810	32,950	5,020	3,680
Initial TPH	ppmv	16,990	38,560	5,550	3,870
Final TPH	ppmv	7,810	32,950	5,020	3,680
Average CO_2	%	3.61	7.73	3.28	6.51
Average CO	%	0.03	0.70	0	0
Average O_2	%	14.8	9.3	14.2	12.2
Average H_2S	ppm	4	6	3	0

Summary Recovery Data
Table #2

Event		1A	1B	1C	1D
WELL NO.		**MW-4**	**MW-12**	**MW-4**	**MW-11**
Recovery Data- Current Event					
Total Liquid Volume Recovered	gals	1,193	1,193	843	72
Total Liquid LNAPL Recovered	gals	-	-	-	-
Total Liquid LNAPL Recovered / Total Liquid	%	-	-	-	-
Total Liquid LNAPL Recovered / Total LNAPL	%	-	-	-	-
Total Vapor LNAPL Recovered	gals	1.2	5.0	0.6	1.2
Total Vapor LNAPL Recovered / Total LNAPL	%	100.00	100.00	100.00	100.00
Total Vapor and Liquid LNAPL Recovered	gals	1.2	5.0	0.6	1.2
Average LNAPL Recovery	gals/hr	0.12	0.50	0.07	0.15
Total LNAPL Recovered	lbs	9	35	5	8
Total Volume of Well Vapors	cu. ft	3,036	3,690	3,312	8,578
Recovery Data- Cumulative					
Total Liquid Volume Recovered	gals	1,193	1,193	2,036	72
Total Liquid LNAPL Recovered	gals	-	-	-	-
Total Vapor LNAPL Recovered	gals	1.2	5.0	1.8	1.2
Total Vapor and Liquid LNAPL Recovered	gals	1.2	5.0	1.8	1.2
Average LNAPL Recovery	gals/hr	0.12	0.50	0.10	0.15
Total LNAPL Recovered	lbs	9	35	13	8
Total Volume of Well Vapors	cu. ft	3,036	3,690	6,348	8,578

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OPERATING DATA – EVENT # 1A PAGE # 1 ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM **Project Managers:** Faucher / George /Hendley / Morris

Well # MW-4		Date						
		Time	0830	0900	0930	1000	1030	1100
		Hr Meter	8025.5	8026.0	8026.5	8027.0	8027.5	8028.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	130	140	140	140	140	140
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	12	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	130	120	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	10	–	35	35	35	35
	Extraction Well Flow	scfm	.4	–	6	6	6	6
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	75.2	77.8	79.2	80.4	81.9	84.8
	Barometric Pressure	"Hg	30.01	30.01	30.01	30.01	30.01	30.00
VAPOR / INFLUENT	TPH	ppmv	–	16,590	–	12,090	–	12,550
	CO_2	%	–	3.40	–	3.18	–	3.86
	CO	%	–	.11	–	.04	–	.05
	O_2	%	–	15.8	–	15.7	–	15.2
	H_2S	ppm	–	0	–		–	0

NOTES

AT APPROX 0845 HRS GW PUMPING STARTED. IMMEDIATE DRAWDOWN IN THE 3 FT RANGE. AT 0935 PUMPING STOPPED TO FIX LEAK IN VAC HOSE. PUMPING RESUMED AFTER FIX. AT 1045 HRS RELOCATED IN-WELL PUMP TO 32.5 FT BTOC. DATA LOGGER STATIC READING 4.22 FT. RESUMED VACUUM AND PUMPING. TPH VAPOR CONCENTRATIONS ↓ AT 1000 HRS AND CONSISTENT W/ FIRST READING AT 1100 HRS.

RECOVERY	GW Pump	ON/OFF	6077.92	6134.42	6180.57	6260.16	6344.55	6414.15
	Pump Rate	gals/min	1.88	1.54	2.65	2.83	2.31	2.50
	Total Volume	gals	–	56.50	102.65	182.24	267.03	336.23
	NAPL	% Vol	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	–	–	–	–	–	–
EW	Data Logger Head 10.04	ft	7.08	6.93	5.44	4.69	4.33	.74
	GW Depression	ft	-2.96	-3.11	-.6	-5.35	-5.71	-3.48
	Extraction Well	DTNAPL	24.30					
	Extraction Well	DTGW	24.78					

LNAPL .48

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OPERATING NOTES - EVENT # 1A PAGE # 2 ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM Project Managers: Faucher / George / Hendley / Morris

NOTES

7/24/17 0630 Hrs ARRIVED ON SITE. PARKED ACUVAC VEHICLES NEAR ROAD ON SITE. HELD TAILGATE SAFETY MEETING DISCUSSED POSITIONING OF ACUVAC SYSTEMS. POSITIONED ACUVAC SYSTEMS A CLOSE TO WELLS AS POSSIBLE WHILE REMAINING OUTSIDE FENCE LINE.

GAUGED ALL WELLS. POSITIONED IN-WELL PUMP IN WELL MW-4 APPROXIMATELY 1.5 FT ABOVE WELL BOTTOM.

SIERRA ARRIVED AT APPROXIMATELY 0645 WITH 3 100 FT LENGTHS OF CORROGATED 4" PLASTIC HOSE. ONLY 200 FT OF HOSE WAS REQUIRED. SIERRA CLAMPED 4" MALE CAM LOCK FITTINGS ON EACH END AND USED A 4" COUPLER IN THE MIDDLE.

0730 Hrs EVENT STARTED INITIAL WELL VAC 10" H_2O W/A WVF OF 30.77 SCFM. WVF SEEMED HIGH. CHECKED HOSE, COUPLING WAS LEAKING AIR. SEALED COUPLING WITH ACUVAC SEALANT. RESTARTED WELL VAC. WELL VAC SPIKED TO 150" H_2O AND COLLAPSED THE HOSE. SECTION OF HOSE REPLACED WITH REMAINING 100 FT SECTION.

0830 EVENT STARTED. VAC SET AT 35" H_2O / 5.06 SCFM.

0900 RESTARTED WELL VAC. DISCOVERED OTHER LEAKS AT CLAMPS. TIGHTENED CLAMPS.

0930 ATTEMPTED TO INCREASE WELL VAC. HIGH WELL VAC COMPACTED THE HOSE. REDUCED WELL VAC TO 35" H_2O / 5.06 SCFM

AcuVac Remediation

OPERATING DATA – EVENT # 1A PAGE # 3 ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-4		Date	7/24/17					
		Time	1130	1200	12300	1300	1330	1400
		Hr Meter	8028.5	8029.0	8029.5	8030.0	8030.5	8031.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	150	150	150	150	150	150
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	18	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	35	35	35	35	35	35
	Extraction Well Flow	scfm	5.06	5.06	5.06	5.06	5.06	5.06
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	86.2	88.7	89.2	89.5	89.8	90.1
	Barometric Pressure	"Hg	29.99	29.98	29.97	29.96	29.95	29.95
VAPOR / INFLUENT	TPH	ppmv	-	10,260	-	11,750	-	10,170
	CO_2	%	-	3.58	-	4.10	-	3.86
	CO	%	-	.01	-	.01	-	.01
	O_2	%	-	14.7	-	13.9	-	15.8
	H_2S	ppm	-	0	-	5.1	-	3.7

NOTES

AT 1215 HRS CHANGED LIQUID COLLECTION TANKS. GW PUMP SHUT OFF FOR APPROX 15 MINUTES.

WELL VAC AND WVF STEADY DURING PERIOD AT 35"H_2O AND 5.06 SCFM.

TPH VAPOR CONCENTRATIONS MOSTLY STEADY DURING PERIOD.

LIQUID RECOVERY RATE MOSTLY STEADY DURING PERIOD.

RECOVERY	GW Pump	ON/OFF	6489.06	6572.09	6638.99	6671.17	6743.62	6799.03
	Pump Rate	gals/min	1.38	1.11	.54	1.21	.92	1.06
	Total Volume	gals	411.14	494.17	561.07	593.25	665.70	821.11
	NAPL	% Vol	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	—	—	—	—	—	—
EW	Data Logger Head	4.22 ft	.54	.81	5.85	3.33	3.90	4.12
	GW Depression	ft	-3.68	-3.41	1.63	-.89	-.32	-.10
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						

AcuVac Remediation

OPERATING DATA – EVENT # 1A | PAGE # 4 | ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM | **Project Managers:** Faucher / George /Hendley / Morris

Well # MW-4		Date	7/24/17					
		Time	1430	1500	1530	1600	1630	1700
		Hr Meter	8031.5	8032.0	8032.5	8033.0	8033.5	8034.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	56	50	50
	Water Temp	°F	160	160	160	160	160	160
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	18	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	35	35	35	35	35	35
	Extraction Well Flow	scfm	5.06	5.06	5.06	5.06	5.06	5.06
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	90.4	90.8	91.1	90.7	89.1	88.7
	Barometric Pressure	"Hg	29.95	29.95	29.95	29.95	29.95	29.95
VAPOR / INFLUENT	TPH	ppmv	-	10,100	-	9970	-	9370
	CO_2	%	-	3.48	-	3.56	-	3.94
	CO	%	-	.01	-	0	-	0
	O_2	%	-	15.3	-	13.5	-	13.7
	H_2S	ppm	-	3.8	-	6.2	-	4.9
NOTES	WELL VAC AND WVF STEADY DURING PERIOD. AT 35"H_2O AND 5.06 SCFM. TPH VAPOR CONCENTRATION STARTED A DECREASING TREND AT 1500 HRS. AFTER 1500 HRS, GW RECOVERY RATE MOSTLY STEADY.							
RECOVERY	GW Pump	ON/OFF	6862.63	6892.62	6960.72	7029.64	7069.28	7123.75
	Pump Rate	gals/min	.50	1.14	.57	.33	.45	.45
	Total Volume	gals	784.71	814.70	882.80	951.72	991.36	1045.83
	NAPL	% Vol	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	-	-	-	-	-	-
EW	Data Logger Head 4.22	ft	3.65	7.33	3.40	2.78	.45	1.18
	GW Depression	ft	-.57	3.11	-.82	-1.44	-3.77	-3.04
	Extraction Well	DTNAPL						TRACE
	Extraction Well	DTGW						24.71

LNAPL 0

AcuVac Remediation

OPERATING DATA – EVENT # 1A **PAGE # 5** **ACUVAC MDP SYSTEM**

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-4

	Date		7/24/17					
	Time		1730	1800	1830			
	Hr Meter		8034.5	8035.0	8035.5			
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800			
	Oil Pressure	psi	50	50	50			
	Water Temp	°F	150	150	150			
	Alternator	Volts	14	14	14			
	Intake Vacuum	"Hg	18	18	18			
	Gas Flow Fuel/Propane	cfh	110	110	110			
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	35	35	35			
	Extraction Well Flow	scfm	5.06	5.06	5.06			
	Influent Vapor Temp.	°F	70	70	70			
	Air Temp	°F	88.2	87.5	86.7			
	Barometric Pressure	"Hg	29.95	29.55	29.95			
VAPOR / INFLUENT	TPH	ppmv	–	7810	–			
	CO_2	%	–	3.16	–			
	CO	%	–	.01	–			
	O_2	%	–	14.3	–			
	H_2S	ppm	–	3.6	–			
NOTES	TPH VAPOR CONCENTRATIONS ↓ AT 1800 HRS TO 7810 PPMV							
	1830 HRS EVENT CONCLUDED. PUMP REMOVED FROM WELL AND WELL GAUGED.							
	A TRACE OF LNAPL WAS DETECTED IN THE WELL.							
RECOVERY	TOTALIZER	GALS	7178.85	7235.59	7270.44			
	Pump Rate	gals/min	.48	.29	–			
	Total Volume	gals	1099.93	1157.67	1192.52			
	NAPL	% Vol	SHEEN	SHEEN	SHEEN			
	NAPL	Gals	–	–	–			
EW	Data Logger Head 4.22	ft	.85	.24	–			
	GW Depression	ft	-3.77	-3.98	–			
	Extraction Well	DTNAPL			TRACE			
	Extraction Well	DTGW			24.71			

LNAPL ∅

AcuVac Remediation

OPERATING DATA – EVENT # 18 **PAGE # 1** **ACUVAC MDP SYSTEM**

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-12 TD 45.00 Ft BTOC

		Date	7/24/17					
		Time	0830	0900	0930	1000	1030	1100
		Hr Meter	1862.5	1763.0	1763.5	1764.0	1764.5	1865.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	140	150	160	160	160	160
	Alternator	Volts	13	13	13	13	13	13
	Intake Vacuum	"Hg	18	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	0	0	0	0	0	0
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	10	10	10	10	10	10
	Extraction Well Flow	scfm	7	7	7	6.15	6.15	6.15
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	75.2	77.8	79.2	80.4	81.9	84.8
	Barometric Pressure	"Hg	30.01	30.01	30.01	30.01	30.01	30.00
VAPOR / INFLUENT	TPH	ppmv	-	38,560	-	37,640	-	37,040
	CO_2	%	-	6.92	-	7.64	-	7.52
	CO	%	-	.74	-	.92	-	.82
	O_2	%	-	8.8	-	10.2	-	10.0
	H_2S	ppm	-	0	-	0	-	0

NOTES

WELL VAC LOW AT 10" H_2O MOST LIKELY DUE TO LONG VAC HOSE. WELL VAPOR FLOW LOW AS WELL. WELL VAC AND FLOW CONSISTENT DURING PERIOD. TPH VAPOR CONCENTRATIONS MOSTLY STEADY DURING PERIOD ALTHOUGH HOW A SLIGHTLY DECREASING TREND. AT 1045 HRS RELOCATED THE IN-WELL PUMP TO APPROXIMATELY 28.5 FT BTOC. NEW STATIC DATA LOGGER READING 2.33 FT.

RECOVERY	GW Pump	ON/OFF	3176.68	3176.68	3245.78	3318.05	3386.82	3437.73
	Pump Rate	gals/min	-	2.30	2.41	2.29	1.70	2.70
	Total Volume	gals	-	-	69.10	141.37	210.14	261.05
	NAPL	% Vol	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	-	-	-	-	-	-
EW	Data Logger Head 15.25	ft	-	17.46	16.11	16.07	16.05	1.95
	GW Depression	ft		+2.21	+.86	.82	.80	-.38
	Extraction Well	DTNAPL	23.30					
	Extraction Well	DTGW	23.31					

LNAPL .01

AcuVac Remediation

OPERATING DATA – EVENT # 1B PAGE # 2 ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-12

		Date	7/24/17					
		Time	1130	1200	1230	1300	1330	1400
		Hr Meter	1765.5	1766.0	1766.5	1767.0	1768.5	1768.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	160	160	160	160	160	160
	Alternator	Volts	13	13	13	13	13	13
	Intake Vacuum	"Hg	18	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	0	0	0	0	0	0
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	10	10	10	10	10	10
	Extraction Well Flow	scfm	6.15	6.15	6.15	6.15	6.15	6.15
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	86.2	88.7	89.2	89.5	89.8	90.1
	Barometric Pressure	"Hg	29.99	29.98	29.96	29.95	29.95	29.95
VAPOR / INFLUENT	TPH	ppmv	–	38,640	–	40,200	–	41,150
	CO_2	%	–	6.70	–	8.20	–	8.74
	CO	%	–	.48	–	.96	–	.88
	O_2	%	–	9.3	–	8.8	–	8.3
	H_2S	ppm	–	0	–	4.5	–	6.3

NOTES

AT 1215 HRS CHANGED LIQUID COLLECTION TANKS. GW PUMP SHUT OFF FOR APPROX 15 MINUTES

TPH VAPORS ON AN INCREASING TREND DURING PERIOD.

GW RECOVERY MOSTLY STEADY DURING PERIOD.

RECOVERY	GW Pump	ON/OFF	3518.59	3609.21	3676.21	3719.19	3779.26	3831.54
	Pump Rate	gals/min	1.51	1.12	.72	1.00	.87	.92
	Total Volume	gals	392.11	432.53	459.53	542.51	602.58	654.86
	NAPL	% Vol	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	–	–	–	–	–	
EW	Data Logger Head 2.33	ft	1.74	1.73	2.68	2.93	2.95	2.93
	GW Depression	ft	-.59	-0.6	+.35	+.60	+.62	+.60
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						

AcuVac Remediation

OPERATING DATA – EVENT # 13 **PAGE # 3** **ACUVAC MDP SYSTEM**

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-12

		Date	7/24/17					
		Time	1430	1500	1530	1600	1630	1700
		Hr Meter	1768.5	1769.0	1769.5	1770.0	1770.5	1771.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	160	160	160	160	160	160
	Alternator	Volts	13	13	13	13	13	13
	Intake Vacuum	"Hg	18	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	0	0	0	0	0	0
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	10	10	10	10	10	10
	Extraction Well Flow	scfm	6.15	6.15	6.15	6.15	6.15	6.15
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	90.4	90.8	91.1	90.7	89.1	88.7
	Barometric Pressure	"Hg	29.95	29.95	29.95	29.95	29.95	29.95
VAPOR / INFLUENT	TPH	ppmv	-	35,590	-	35,640	-	38,640
	CO_2	%	-	8.14	-	8.38	-	6.70
	CO	%	-	.57	-	.62	-	.48
	O_2	%	-	5.9	-	10.3	-	9.3
	H_2S	ppm	-	7.2	-	5.5	-	5.8

NOTES

AT 1500 HRS TPH CONCENTRATIONS ↓ TO 35,590 AND ↑ 38,640 AT 1700 HRS.
GW RECOVERY SEEMS STRONG FOR ONLY 10"H_2O WITH A WVF OF 6.15 SCFM.
GW RECOVERY MOSTLY STEADY DURING PERIOD.

RECOVERY	GW Pump	ON/OFF	3886.97	4008.76	4088.76	4060.93	4130.77	4192.23
	Pump Rate	gals/min	1.03	1.00	.87	1.16	1.02	.99
	Total Volume	gals	710.29	772.08	832.08	884.25	954.09	1015.55
	NAPL	% Vol	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	-	-	-	-	-	-
EW	Data Logger Head 2.33	ft	4.30	4.35	4.28	4.29	4.18	4.14
	GW Depression	ft	+1.97	+2.02	+1.95	+1.96	+1.85	+1.81
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						

AcuVac Remediation

OPERATING DATA – EVENT # 18 PAGE # 4 ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-12		Date	7/24/17					
		Time	1730	1800	1830			
		Hr Meter	1771.5	1772.0	1772.5			
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800			
	Oil Pressure	psi	50	50	50			
	Water Temp	°F	150	150	150			
	Alternator	Volts	13	13	13			
	Intake Vacuum	"Hg	18	18	18			
	Gas Flow Fuel/Propane	cfh	0	0	0			
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	10	10	10			
	Extraction Well Flow	scfm	6.15	6.15	6.15			
	Influent Vapor Temp.	°F	70	70	70			
	Air Temp	°F	88.2	87.5	86.7			
	Barometric Pressure	"Hg	29.95	29.95	29.95			
VAPOR / INFLUENT	TPH	ppmv	–	32,950	–			
	CO_2	%	–	8.32	–			
	CO	%	–	.49	–			
	O_2	%	–	10.6	–			
	H_2S	ppm	–	6.3	–			
NOTES	TPH CONCENTRATIONS CONTINUE ON DECREASING TREND.							
	AT 1830 EVENT CONCLUDED. - NO LNAPL PRESENT IN WELL							
	DEMOBILIZED WELL MW-12 AND MOVED PUMP AND DATA LOGGER TO MW-11							
RECOVERY	GW Pump	ON/OFF	4251.88	4314.92	4369.39			
	Pump Rate	gals/min	1.05	.91	–			
	Total Volume	gals	1075.20	1138.24	1192.71			
	NAPL	% Vol	SHEEN	SHEEN	SHEEN			
	NAPL	Gals	–	–	–			
EW	Data Logger Head 2.33	ft	5.32	5.12	–			
	GW Depression	ft	+2.99	2.79	–			
	Extraction Well	DTNAPL			–			
	Extraction Well	DTGW			23.51			

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AcuVac Remediation

OPERATING DATA – EVENT # 1C **PAGE # 1** **ACUVAC MDP SYSTEM**

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-4

		Date	7/25/17					
		Time	0730	0800	0830	0900	0930	1000
		Hr Meter	8035.5	8036.0	8036.5	8037.0	8037.5	8038.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	130	140	140	140	150	150
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	18	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	125	125	125	125	125	125
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	45	45	45	45	45	45
	Extraction Well Flow	scfm	5.81	5.81	5.81	5.81	5.81	5.81
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	68	69	70	71	73	75
	Barometric Pressure	"Hg	30.10	30.10	30.10	30.10	30.10	30.10
VAPOR / INFLUENT	TPH	ppmv	-	5550	-	-	-	5890
	CO_2	%	-	3.06	-	-	-	3.06
	CO	%	-	0	-	-	-	0
	O_2	%	-	14.3	-	-	-	14.4
	H_2S	ppm	-	2.5	-	-	-	3.2

NOTES

ARRIVED ON SITE AT 0650 HRS. GAUGED WELL MW-4. HELD TAILGATE SAFETY MEETING. POSITIONED PUMP 1.5 FT ABOVE WELL BOTTOM CONSISTENT W/EVENT #1A. 0730 HRS EVENT STARTED. WELL VAC 45 "H_2O W/A WTF OF 5.81 SCFM. GW PUMP STARTED SHORTLY AFTER START OF VACUUM. PUMP RATE CONSISTENT W/EVENT #1A. AT 0800 HRS VAPOR SAMPLE OBTAINED. TPH CONCENTRATIONS IN THE 5500 PPMV RANGE. ON A DECREASING TREND FROM EVENT #1A.

RECOVERY	TOTALIZER	GAL	7270.44	7317.71	7374.58	7412.38	7445.76	7530.53
	Pump Rate	gals/min	1.58	1.90	1.26	1.11	2.93	.79
	Total Volume	gals	-	47.27	104.14	141.94	175.32	260.09
	NAPL	% Vol	-	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	-	-	-	-	-	
EW	Data Logger Head 1.30	ft	-	-	1.32	-	-	-
	GW Depression	ft	-	-	.02	-	-	-
	Extraction Well	DTNAPL	-					
	Extraction Well	DTGW	24.37					

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AcuVac Remediation

OPERATING DATA – EVENT # 1C **PAGE # 2** **ACUVAC MDP SYSTEM**

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-4		Date	7/25/17					
		Time	1030	1100	1130	1200	1230	1300
		Hr Meter	8038.5	8039.0	8039.5	8040.0	8040.5	8041.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	150	150	150	150	150	150
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	18	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	125	125	125	125	125	125
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	45	45	45	45	45	45
	Extraction Well Flow	scfm	5.81	5.81	5.81	5.81	5.81	5.81
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	77	81	84	85	86	88
	Barometric Pressure	"Hg	30.10	30.09	30.08	30.07	30.06	30.05
VAPOR / INFLUENT	TPH	ppmv	-	-	-	5410	-	-
	CO_2	%	-	-	-	3.42	-	-
	CO	%	-	-	-	0	-	-
	O_2	%	-	-	-	13.6	-	-
	H_2S	ppm	-	-	-	2.8	-	-
NOTES	WELL VAC AND INF STEADY AT 45" H_2O AND 5.81 SCFM, RESPECTIVELY							
	TPH CONCENTRATIONS CONTINUE ON A DECREASING TREND.							
RECOVERY	TOTALIZER	GAL	7554.29	7607.64	7633.27	7683.60	7737.79	7794.34
	Pump Rate	gals/min	1.78	.85	.68	2.81	1.89	1.50
	Total Volume	gals	283.85	337.20	362.83	383.16	467.35	523.90
	NAPL	% Vol	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	-	-	-	—	—	-
EW	Data Logger Head 1.30	ft	-	2.19	1.87	1.52	1.54	1.70
	GW Depression	ft	-	+.89	+.57	+.22	+.64	+.40
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						

AcuVac Remediation

OPERATING DATA – EVENT # 1-C PAGE # 3 ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-4

		Date	7/25/17					
		Time	1330	1400	1430	1500	1530	1600
		Hr Meter	8041.5	8042.0	8042.5	8043.0	8043.5	8044.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	150	150	150	150	150	150
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	18	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	125	125	125	125	125	125
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	45	45	45	45	45	45
	Extraction Well Flow	scfm	5.81	5.81	5.81	5.81	5.81	5.81
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	Cloudy 89	88	86.	85	84	83
	Barometric Pressure	"Hg	30.04	30.02	30.00	29.98	29.97	29.96
VAPOR / INFLUENT	TPH	ppmv	–	5080	–	–	–	5020
	CO_2	%	–	3.64	–	–	–	3.20
	CO	%	–	0	–	–	–	0
	O_2	%	–	14.5	–	–	–	14.3
	H_2S	ppm	–	3.1	–	–	–	2.8

NOTES

WELL VAC AND WVF STEADY DURING PERIOD AT 45"H_2O AND 5.81SCFM, RESPECTIVELY. TPH CONCENTRATIONS CONTINUE ON A DECREASING TREND.

RECOVERY	TOTALIZER	GAL	7839.41	7877.64	7956.03	7990.32	8039.18	8082.87
	Pump Rate	gals/min	1.27	2.61	1.14	1.63	1.46	1.0
	Total Volume	gals	568.97	607.20	685.59	719.88	768.74	812.43
	NAPL	% Vol	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	–	–	–	–	–	–
EW	Data Logger Head	1.30 ft	1.79	1.58	1.98	1.36	1.50	–
	GW Depression	ft	+.49	+.28	+.68	+.06	+.20	–
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						

AcuVac Remediation

OPERATING DATA – EVENT # 1C PAGE # 4 ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-4		Date	7/25/17					
		Time	1615					
		Hr Meter	8044.5					
ENGINE / BLOWER	Engine Speed	RPM	1800					
	Oil Pressure	psi	50					
	Water Temp	°F	150					
	Alternator	Volts	14					
	Intake Vacuum	"Hg	18					
	Gas Flow Fuel/Propane	cfh	125					
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	45					
	Extraction Well Flow	scfm	5.81					
	Influent Vapor Temp.	°F	70					
	Air Temp	°F	82					
	Barometric Pressure	"Hg	29.95					
VAPOR / INFLUENT	TPH	ppmv	–					
	CO_2	%	–					
	CO	%	–					
	O_2	%	–					
	H_2S	ppm	–					
NOTES	AT APPROXIMATELY 1530 HRS THE DECISION WAS MADE FOR SIERRA TO REMOVE THE 1,000 GAL AND HAVE IT READY FOR THE K-27 SITE ON 7/26/17. AT 1615 HRS THE REMAINING TANKS WERE TOPPED OFF AND EVENT WAS CONCLUDED. DEMOBILIZED THE ACUVAC SYSTEM AND EQUIPMENT, DEPARTED SITE.							
RECOVERY	TOTALIZER	GAL	8112.97					
	Pump Rate	gals/min	–					
	Total Volume	gals	842.53					
	NAPL	% Vol	SHEEN					
	NAPL	Gals	–					
EW	Data Logger Head	ft	–					
	GW Depression	ft	–					
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						

AcuVac Remediation

OPERATING DATA – EVENT # 1D **PAGE # 1** **ACUVAC MDP SYSTEM**

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-11		Date	7/25					
		Time	0800	0830	0900	0930	1000	1030
		Hr Meter	1772.5	1773.0	1773.5	1774.0	1774.5	1775.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	60	50	50	50
	Water Temp	°F	130	140	140	140	150	150
	Alternator	Volts	13	13	13	13	13	13
	Intake Vacuum	"Hg	12	12	12	12	12	12
	Gas Flow Fuel/Propane	cfh	100	100	100	80	80	80
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	35	35	35	80	80	80
	Extraction Well Flow	scfm	12.66	12.66	12.66	19.43	19.43	19.43
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	69	70	71	73	75	77
	Barometric Pressure	"Hg	30.10	30.10	30.10	30.10	30.10	30.10
VAPOR / INFLUENT	TPH	ppmv	–	–	–	–	3870	–
	CO_2	%	–	–	–	–	7.50	–
	CO	%	–	–	–	–	.01	–
	O_2	%	–	–	–	–	10.4	–
	H_2S	ppm	–	–	–	–	0	–

NOTES

EVENT STARTED AT 0800 hrs. POSITIONED IN-WELL PUMP APPROXIMATELY 22.5 FT BTOC. CONSISTENT WITH EVENT #13 PERFORMED IN WELL MW-2. COULD NOT MAINTAIN CONSTANT LIQUID FLOW. REPOSITIONED THE PUMP 1.5 FT LOWER AT 0830 AND ANOTHER 3.0 FT AT 0900 AND ANOTHER 2.0 FT AT 0920 HRS. ADJUSTED PUMP RATE DOWN AND INCREASED WELL VAC IN ORDER TO MAINTAIN A CONSTANT LIQUID FLOW.

RECOVERY	TOTALIZER	GALS	4369.39	4372.62	4378.47	4386.34	4392.57	4401.43
	Pump Rate	gals/min	.11	.20	.26	.21	.30	.26
	Total Volume	gals	–	3.23	9.08	16.95	23.18	32.04
	NAPL	% Vol	–	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	–	–	–	–	–	–
EW	Data Logger Head	6.95 ft	–	–	–	–	–	–
	GW Depression	ft	–	–	–	–	–	–
	Extraction Well	DTNAPL	24.45					
	Extraction Well	DTGW	24.46					

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AcuVac Remediation

OPERATING DATA – EVENT # 1D PAGE # 2 ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

Well # MW-11		Date	7/25/17					
		Time	1100	1130	1200	1230	1300	1330
		Hr Meter	1775.5	1776.0	1776.5	1777.0	1777.5	1778.0
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	50	50	50	50	50	50
	Water Temp	°F	150	150	150	150	150	150
	Alternator	Volts	13	13	13	13	13	13
	Intake Vacuum	"Hg	12	12	12	12	12	12
	Gas Flow Fuel/Propane	cfh	80	80	80	80	80	80
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	80	80	80	80	80	80
	Extraction Well Flow	scfm	19.43	19.43	19.43	19.43	19.43	19.43
	Influent Vapor Temp.	°F	70	70	70	70	70	70
	Air Temp	°F	81	84	85	86	88	89
	Barometric Pressure	"Hg	30.09	30.08	30.07	30.06	30.05	30.04
VAPOR / INFLUENT	TPH	ppmv	–	–	4100	–	–	–
	CO_2	%	–	–	6.56	–	–	–
	CO	%	–	–	0	–	–	–
	O_2	%	–	–	13.0	–	–	–
	H_2S	ppm	–	–	0	–	–	–
NOTES	AT 1100 HRS LIQUID RECHARGE RATE DECREASED TO THE EXTENT THAT A STEADY FLOW RATE COULD NOT BE MAINTAINED. THE GW PUMP WAS THEN CYCLED ON/OFF EVERY 30 MINUTES. WHEN CYCLED ON THE PUMP RAN AT A LOW RATE FOR APPROX 10-15 MINUTES.							
RECOVERY	TOTALIZER	GALS	4409.23	4413.72	4420.71	4427.53	4432.09	4437.63
	Pump Rate	gals/min	.07	.12	.12	.07	.09	.06
	Total Volume	gals	39.84	44.33	51.32	58.54	62.70	68.24
	NAPL	% Vol	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN
	NAPL	Gals	–	–	–	–	–	–
EW	Data Logger Head	ft	–	–	–	–	–	–
	GW Depression	ft	–	–	–	–	–	–
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						

AcuVac Remediation

OPERATING DATA – EVENT # 10 PAGE # 3 ACUVAC MDP SYSTEM

Location: Knight, San Juan County, NM **Project Managers: Faucher / George /Hendley / Morris**

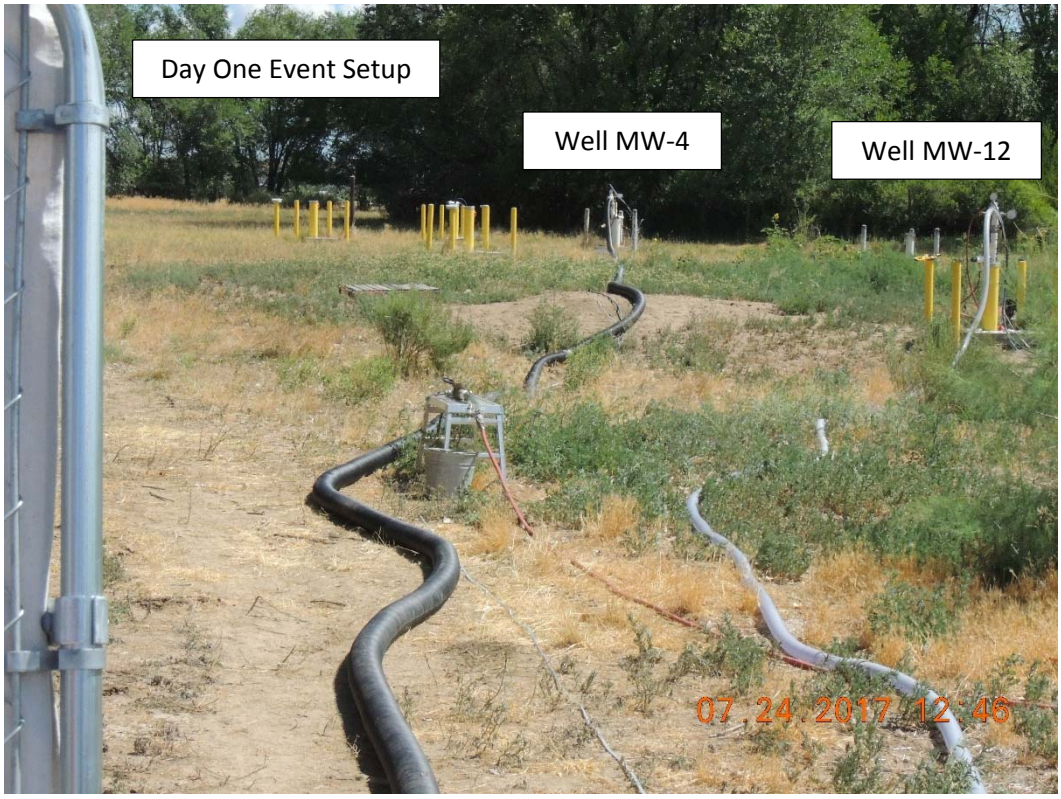
Well # MW-11	Date		7/05/17					
	Time		1400					
	Hr Meter		1770.5					
ENGINE / BLOWER	Engine Speed	RPM	1800					
	Oil Pressure	psi	50					
	Water Temp	°F	150					
	Alternator	Volts	13					
	Intake Vacuum	"Hg	12					
	Gas Flow Fuel/Propane	cfh	80					
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	"H_2O	80					
	Extraction Well Flow	scfm	19.43					
	Influent Vapor Temp.	°F	70					
	Air Temp	°F	88					
	Barometric Pressure	"Hg	30.02					
VAPOR / INFLUENT	TPH	ppmv	3680					
	CO_2	%	5.46					
	CO	%	0					
	O_2	%	13.3					
	H_2S	ppm	0					
NOTES	AT 1330 THREATENING WEATHER WAS MOVING NEAR THE SITE FROM THE SOUTH AND THE WEST. THE WEATHER WAS WATCHED AND AT 1400 HRS THE MUTUAL DECISION WAS MADE TO STOP WORK ON MW-11 DUE TO LOW LIQUID RECOVERY AND TO GIVE ACUVAC SUFFICIENT TIME TO DEMOBE BOTH MW-11 AND IF NECESSARY MW-4.							
RECOVERY	TOTALIZER	GALS	4441.28					
	Pump Rate	gals/min	–					
	Total Volume	gals	71.89					
	NAPL	% Vol	SHEEN					
	NAPL	Gals	–					
EW	Data Logger Head	ft	–					
	GW Depression	ft	–					
	Extraction Well	DTNAPL	–					
	Extraction Well	DTGW	25.06					

CNAPL Ø

KNIGHT #1
SAN JUAN COUNTY, NM

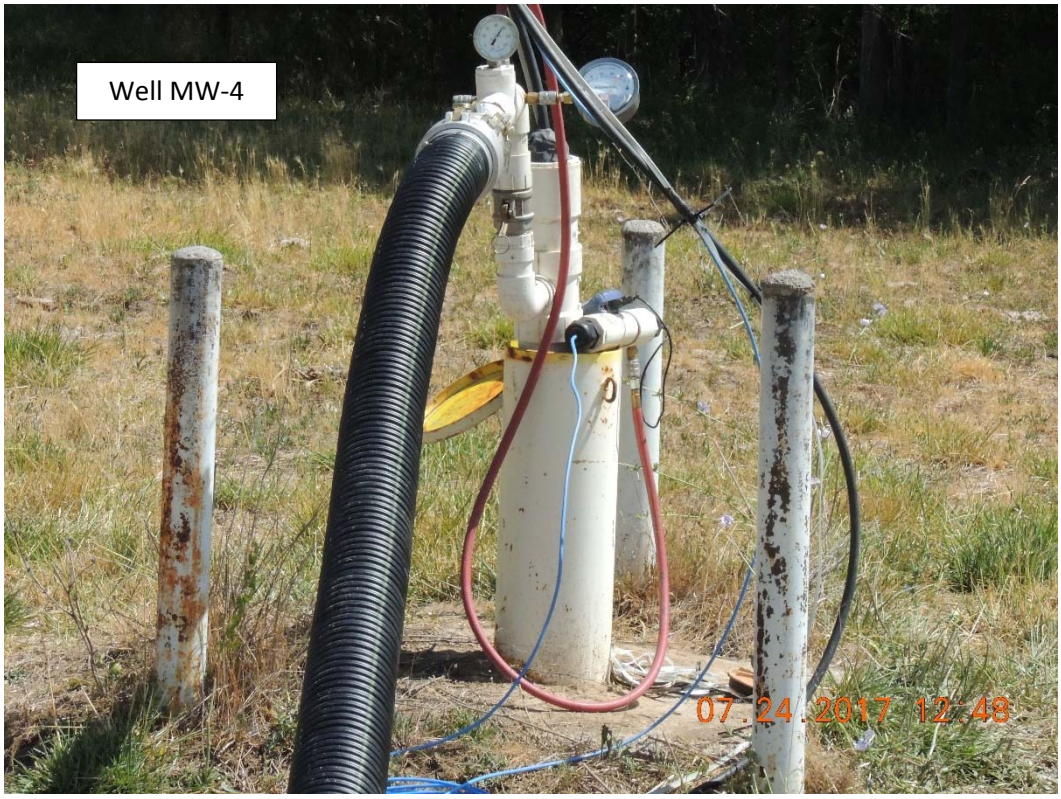
KNIGHT #1
SAN JUAN COUNTY, NM

KNIGHT #1
SAN JUAN COUNTY, NM



KNIGHT #1
SAN JUAN COUNTY, NM

KNIGHT #1
SAN JUAN COUNTY, NM



APPENDIX D

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

TestAmerica Job ID: 400-139058-1
Client Project/Site: ElPaso CGP Company, LLC - Knight #1

For:
Stantec Consulting Services Inc
1560 Broadway
Suite 1800
Denver, Colorado 80202

Attn: Ms. Sarah Gardner

Madonna Myers

Authorized for release by:
6/22/2017 11:58:22 AM
Madonna Myers, Project Manager II
(615)796-1870
madonna.myers@testamericainc.com

Designee for

Carol Webb, Project Manager II
(850)471-6250
carol.webb@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Job ID: 400-139058-1

Laboratory: TestAmerica Pensacola

Narrative

Job Narrative
400-139058-1

Comments
No additional comments.

Receipt
The samples were received on 6/9/2017 11:11 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.7º C and 3.1º C.

GC VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Client Sample ID: MW-1 — Lab Sample ID: 400-139058-1

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Benzene	120		5.0		ug/L	5		8021B	Total/NA
Ethylbenzene	350		5.0		ug/L	5		8021B	Total/NA
Xylenes, Total	36		25		ug/L	5		8021B	Total/NA

Client Sample ID: MW-2 — Lab Sample ID: 400-139058-2

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Benzene	1.0		1.0		ug/L	1		8021B	Total/NA

Client Sample ID: MW-7 — Lab Sample ID: 400-139058-3

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Benzene	20		1.0		ug/L	1		8021B	Total/NA
Ethylbenzene	33		1.0		ug/L	1		8021B	Total/NA
Xylenes, Total	390		5.0		ug/L	1		8021B	Total/NA

Client Sample ID: MW-8 — Lab Sample ID: 400-139058-4

No Detections.

Client Sample ID: TRIP PLANK — Lab Sample ID: 400-139058-5

No Detections.

This Detection Summary does not include radiochemical test results.

Sample Summary

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-139058-1	MW-1	Water	06/06/17 16:30	06/09/17 11:11
400-139058-2	MW-2	Water	06/06/17 18:10	06/09/17 11:11
400-139058-3	MW-7	Water	06/06/17 16:20	06/09/17 11:11
400-139058-4	MW-8	Water	06/06/17 18:00	06/09/17 11:11
400-139058-5	TRIP PLANK	Water	06/06/17 17:50	06/09/17 11:11

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Client Sample ID: MW-1
Date Collected: 06/06/17 16:30
Date Received: 06/09/17 11:11

Lab Sample ID: 400-139058-1
Matrix: Water

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**120**		5.0		ug/L			06/13/17 14:45	5
Ethylbenzene	**350**		5.0		ug/L			06/13/17 14:45	5
Toluene	<25		25		ug/L			06/13/17 14:45	5
Xylenes, Total	**36**		25		ug/L			06/13/17 14:45	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene (pid)	*80*		*78 - 124*		*06/13/17 14:45*	*5*

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Client Sample ID: MW-2
Date Collected: 06/06/17 18:10
Date Received: 06/09/17 11:11

Lab Sample ID: 400-139058-2
Matrix: Water

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**1.0**		1.0		ug/L			06/14/17 04:40	1
Ethylbenzene	<1.0		1.0		ug/L			06/14/17 04:40	1
Toluene	<5.0		5.0		ug/L			06/14/17 04:40	1
Xylenes, Total	<5.0		5.0		ug/L			06/14/17 04:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene (pid)	*93*		*78 - 124*		*06/14/17 04:40*	*1*

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Client Sample ID: MW-7
Date Collected: 06/06/17 16:20
Date Received: 06/09/17 11:11

Lab Sample ID: 400-139058-3
Matrix: Water

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**20**		1.0		ug/L			06/14/17 14:50	1
Ethylbenzene	**33**		1.0		ug/L			06/14/17 14:50	1
Toluene	<5.0		5.0		ug/L			06/14/17 14:50	1
Xylenes, Total	**390**		5.0		ug/L			06/14/17 14:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene (pid)	*111*		*78 - 124*		*06/14/17 14:50*	*1*

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Client Sample ID: MW-8
Date Collected: 06/06/17 18:00
Date Received: 06/09/17 11:11

Lab Sample ID: 400-139058-4
Matrix: Water

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0		ug/L			06/14/17 03:36	1
Ethylbenzene	<1.0		1.0		ug/L			06/14/17 03:36	1
Toluene	<5.0		5.0		ug/L			06/14/17 03:36	1
Xylenes, Total	<5.0		5.0		ug/L			06/14/17 03:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene (pid)	*97*		*78 - 124*		*06/14/17 03:36*	*1*

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Client Sample ID: TRIP PLANK
Date Collected: 06/06/17 17:50
Date Received: 06/09/17 11:11

Lab Sample ID: 400-139058-5
Matrix: Water

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0		ug/L			06/14/17 02:33	1
Ethylbenzene	<1.0		1.0		ug/L			06/14/17 02:33	1
Toluene	<5.0		5.0		ug/L			06/14/17 02:33	1
Xylenes, Total	<5.0		5.0		ug/L			06/14/17 02:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene (pid)	*98*		*78 - 124*		*06/14/17 02:33*	*1*

QC Association Summary

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

GC VOA

Analysis Batch: 356745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-139058-1	MW-1	Total/NA	Water	8021B	
400-139058-2	MW-2	Total/NA	Water	8021B	
400-139058-4	MW-8	Total/NA	Water	8021B	
400-139058-5	TRIP PLANK	Total/NA	Water	8021B	
MB 400-356745/2	Method Blank	Total/NA	Water	8021B	
LCS 400-356745/1001	Lab Control Sample	Total/NA	Water	8021B	
400-139054-A-3 MS	Matrix Spike	Total/NA	Water	8021B	
400-139054-A-3 MSD	Matrix Spike Duplicate	Total/NA	Water	8021B	

Analysis Batch: 356920

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-139058-3	MW-7	Total/NA	Water	8021B	
MB 400-356920/2	Method Blank	Total/NA	Water	8021B	
LCS 400-356920/1001	Lab Control Sample	Total/NA	Water	8021B	
400-139062-B-5 MS	Matrix Spike	Total/NA	Water	8021B	
400-139062-B-5 MSD	Matrix Spike Duplicate	Total/NA	Water	8021B	

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 400-356745/2
Matrix: Water
Analysis Batch: 356745

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0		ug/L			06/13/17 12:39	1
Ethylbenzene	<1.0		1.0		ug/L			06/13/17 12:39	1
Toluene	<5.0		5.0		ug/L			06/13/17 12:39	1
Xylenes, Total	<5.0		5.0		ug/L			06/13/17 12:39	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene (pid)	*100*		*78 - 124*		*06/13/17 12:39*	*1*

Lab Sample ID: LCS 400-356745/1001
Matrix: Water
Analysis Batch: 356745

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene			50.0	46.8		ug/L		94	85 - 115		
Ethylbenzene			50.0	47.9		ug/L		96	85 - 115		
Toluene			50.0	46.1		ug/L		92	85 - 115		
Xylenes, Total			150	141		ug/L		94	85 - 115		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
a,a,a-Trifluorotoluene (pid)	*100*		*78 - 124*

Lab Sample ID: 400-139054-A-3 MS
Matrix: Water
Analysis Batch: 356745

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene	<1.0		50.0	47.3		ug/L		95	44 - 150		
Ethylbenzene	<1.0		50.0	47.6		ug/L		95	70 - 142		
Toluene	<5.0		50.0	46.6		ug/L		93	69 - 136		
Xylenes, Total	<5.0		150	143		ug/L		95	68 - 142		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
a,a,a-Trifluorotoluene (pid)	*97*		*78 - 124*

Lab Sample ID: 400-139054-A-3 MSD
Matrix: Water
Analysis Batch: 356745

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<1.0		50.0	48.3		ug/L		97	44 - 150	2	16
Ethylbenzene	<1.0		50.0	48.5		ug/L		97	70 - 142	2	16
Toluene	<5.0		50.0	46.7		ug/L		93	69 - 136	0	16
Xylenes, Total	<5.0		150	147		ug/L		98	68 - 142	3	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
a,a,a-Trifluorotoluene (pid)	*96*		*78 - 124*

Method: 8021B - Volatile Organic Compounds (GC) (Continued)

Lab Sample ID: MB 400-356920/2
Matrix: Water
Analysis Batch: 356920

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0		ug/L			06/14/17 10:25	1
Ethylbenzene	<1.0		1.0		ug/L			06/14/17 10:25	1
Toluene	<5.0		5.0		ug/L			06/14/17 10:25	1
Xylenes, Total	<5.0		5.0		ug/L			06/14/17 10:25	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene (pid)	*107*		*78 - 124*		*06/14/17 10:25*	*1*

Lab Sample ID: LCS 400-356920/1001
Matrix: Water
Analysis Batch: 356920

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene			50.0	55.6		ug/L		111	85 - 115		
Ethylbenzene			50.0	55.2		ug/L		110	85 - 115		
Toluene			50.0	54.2		ug/L		108	85 - 115		
Xylenes, Total			150	166		ug/L		111	85 - 115		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
a,a,a-Trifluorotoluene (pid)	*108*		*78 - 124*

Lab Sample ID: 400-139062-B-5 MS
Matrix: Water
Analysis Batch: 356920

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene	12		50.0	71.2		ug/L		118	44 - 150		
Ethylbenzene	<1.0		50.0	61.5		ug/L		123	70 - 142		
Toluene	<5.0		50.0	60.1		ug/L		118	69 - 136		
Xylenes, Total	<5.0		150	189		ug/L		124	68 - 142		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
a,a,a-Trifluorotoluene (pid)	*106*		*78 - 124*

Lab Sample ID: 400-139062-B-5 MSD
Matrix: Water
Analysis Batch: 356920

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	12		50.0	71.2		ug/L		118	44 - 150	0	16
Ethylbenzene	<1.0		50.0	62.0		ug/L		124	70 - 142	1	16
Toluene	<5.0		50.0	60.6		ug/L		119	69 - 136	1	16
Xylenes, Total	<5.0		150	191		ug/L		124	68 - 142	1	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
a,a,a-Trifluorotoluene (pid)	*106*		*78 - 124*

Lab Chronicle

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Client Sample ID: MW-1

Lab Sample ID: 400-139058-1

Date Collected: 06/06/17 16:30

Matrix: Water

Date Received: 06/09/17 11:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8021B		5	5 mL	5 mL	356745	06/13/17 14:45	MKA	TAL PEN
	Instrument ID: CH_CAROL									

Client Sample ID: MW-2

Lab Sample ID: 400-139058-2

Date Collected: 06/06/17 18:10

Matrix: Water

Date Received: 06/09/17 11:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8021B		1	5 mL	5 mL	356745	06/14/17 04:40	MKA	TAL PEN
	Instrument ID: CH_CAROL									

Client Sample ID: MW-7

Lab Sample ID: 400-139058-3

Date Collected: 06/06/17 16:20

Matrix: Water

Date Received: 06/09/17 11:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8021B		1	5 mL	5 mL	356920	06/14/17 14:50	CMW	TAL PEN
	Instrument ID: CH_PAULA									

Client Sample ID: MW-8

Lab Sample ID: 400-139058-4

Date Collected: 06/06/17 18:00

Matrix: Water

Date Received: 06/09/17 11:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8021B		1	5 mL	5 mL	356745	06/14/17 03:36	MKA	TAL PEN
	Instrument ID: CH_CAROL									

Client Sample ID: TRIP PLANK

Lab Sample ID: 400-139058-5

Date Collected: 06/06/17 17:50

Matrix: Water

Date Received: 06/09/17 11:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8021B		1	5 mL	5 mL	356745	06/14/17 02:33	MKA	TAL PEN
	Instrument ID: CH_CAROL									

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Accreditation/Certification Summary

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Laboratory: TestAmerica Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alabama	State Program	4	40150	06-30-17
Arizona	State Program	9	AZ0710	01-11-18
Arkansas DEQ	State Program	6	88-0689	09-01-17
California	ELAP	9	2510	03-31-18
Florida	NELAP	4	E81010	06-30-18
Georgia	State Program	4	N/A	06-30-17
Illinois	NELAP	5	200041	10-09-17
Iowa	State Program	7	367	08-01-18
Kansas	NELAP	7	E-10253	10-31-17
Kentucky (UST)	State Program	4	53	06-30-17
Kentucky (WW)	State Program	4	98030	12-31-17
L-A-B	ISO/IEC 17025		L2471	02-22-20
Louisiana	NELAP	6	30976	06-30-18
Louisiana (DW)	NELAP	6	LA170005	12-31-17
Maryland	State Program	3	233	09-30-17
Massachusetts	State Program	1	M-FL094	06-30-17
Michigan	State Program	5	9912	06-30-17
New Jersey	NELAP	2	FL006	06-30-17
North Carolina (WW/SW)	State Program	4	314	12-31-17
Oklahoma	State Program	6	9810	08-31-17
Pennsylvania	NELAP	3	68-00467	01-31-18
Rhode Island	State Program	1	LAO00307	12-30-17
South Carolina	State Program	4	96026	06-30-17
Tennessee	State Program	4	TN02907	06-30-17
Texas	NELAP	6	T104704286-16-10	09-30-17
USDA	Federal		P330-16-00172	05-24-19
Virginia	NELAP	3	460166	06-14-18
Washington	State Program	10	C915	05-15-18
West Virginia DEP	State Program	3	136	06-30-17

Method Summary

Client: Stantec Consulting Services Inc
Project/Site: ElPaso CGP Company, LLC - Knight #1

TestAmerica Job ID: 400-139058-1

Method	Method Description	Protocol	Laboratory
8021B	Volatile Organic Compounds (GC)	SW846	TAL PEN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Gardner & J. Garvey	Lab PM: Webb, Carol M	Carrier Tracking No(s):	COC No: 400-65865-26940.1
Client Contact: Ms. Sarah Gardner	Phone: 303 291 2239	E-Mail: carol.webb@testamericainc.com		Page: Page 1 of 1
Company: Stantec Consulting Services Inc				Job #:
Address: 1560 Broadway Suite 1800	Due Date Requested:			
City: Denver	TAT Requested (days): Standard			
State, Zip: CO, 80202	PO #: Purchase Order Requested			
Phone: 303-291-2239(Tel)	WO #:			
Email: sarah.gardner@mwhglobal.com	Project #: 40005479			
Project Name: Knight #1	SSOW#:			
Site: Knight #1				

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

400-139058 COC

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8021B - BTEX 8021	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A		
MW-1	6/6/2017	1630	G	W			2	2	
MW-2	6/6/2017	1810	G	W			2	2	
MW-7	6/6/2017	1620	G	W			2	2	
MW-8	6/6/2017	1800	G	W			2	2	
TRIP BLANK	6/6/2017	1750		W			2	2	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/8/2017 845	Stantec			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	6.9.17 1111	

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 3.1°, 2.7°, IR2

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6/22/2017

Login Sample Receipt Checklist

Client: Stantec Consulting Services Inc

Job Number: 400-139058-1

Login Number: 139058

List Source: TestAmerica Pensacola

List Number: 1

Creator: Johnson, Jeremy N

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.1°C 2.7 IR2
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

TestAmerica Job ID: 400-145959-1
Client Project/Site: El Paso CGP Company - Knight 1

For:
Stantec Consulting Services Inc
1560 Broadway
Suite 1800
Denver, Colorado 80202

Attn: Ms. Sarah Gardner

Madonna Myers

Authorized for release by:
11/20/2017 12:01:33 PM
Madonna Myers, Project Manager II
(615)796-1870
madonna.myers@testamericainc.com

Designee for

Carol Webb, Project Manager II
(850)471-6250
carol.webb@testamericainc.com

Table of Contents

Definitions/Glossary

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Job ID: 400-145959-1

Laboratory: TestAmerica Pensacola

Narrative

Job Narrative
400-145959-1

Comments
No additional comments.

Receipt
The samples were received on 11/14/2017 9:01 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.0º C.

Receipt Exceptions

The Chain-of-Custody (COC) was incomplete as received and/or improperly completed. Per client instructions, method 8260 was used in place of method 8021.

GC/MS VOA
Method(s) 8260C: Surrogate recovery for the following sample was outside control limits: MW-11 (400-145959-6). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Client Sample ID: MW-1 — Lab Sample ID: 400-145959-1

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Benzene	89		1.0		ug/L	1		8260C	Total/NA
Toluene	2.3		1.0		ug/L	1		8260C	Total/NA
Ethylbenzene	74		1.0		ug/L	1		8260C	Total/NA
Xylenes, Total	200		10		ug/L	1		8260C	Total/NA

Client Sample ID: MW-2 — Lab Sample ID: 400-145959-2

No Detections.

Client Sample ID: MW-4 — Lab Sample ID: 400-145959-3

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Benzene	64		10		ug/L	10		8260C	Total/NA
Ethylbenzene	130		10		ug/L	10		8260C	Total/NA
Xylenes, Total	900		100		ug/L	10		8260C	Total/NA

Client Sample ID: MW-7 — Lab Sample ID: 400-145959-4

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Benzene	8.3		1.0		ug/L	1		8260C	Total/NA
Ethylbenzene	2.5		1.0		ug/L	1		8260C	Total/NA
Xylenes, Total	170		10		ug/L	1		8260C	Total/NA

Client Sample ID: MW-8 — Lab Sample ID: 400-145959-5

No Detections.

Client Sample ID: MW-11 — Lab Sample ID: 400-145959-6

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Benzene	3.3		1.0		ug/L	1		8260C	Total/NA
Ethylbenzene	2.7		1.0		ug/L	1		8260C	Total/NA
Xylenes, Total	25		10		ug/L	1		8260C	Total/NA

Client Sample ID: TRIP BLANK — Lab Sample ID: 400-145959-7

No Detections.

This Detection Summary does not include radiochemical test results.

Sample Summary

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-145959-1	MW-1	Water	11/10/17 14:18	11/14/17 09:01
400-145959-2	MW-2	Water	11/10/17 14:12	11/14/17 09:01
400-145959-3	MW-4	Water	11/10/17 14:40	11/14/17 09:01
400-145959-4	MW-7	Water	11/10/17 13:49	11/14/17 09:01
400-145959-5	MW-8	Water	11/10/17 13:44	11/14/17 09:01
400-145959-6	MW-11	Water	11/10/17 14:00	11/14/17 09:01
400-145959-7	TRIP BLANK	Water	11/10/17 13:30	11/14/17 09:01

Client Sample ID: MW-1
Date Collected: 11/10/17 14:18
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-1
Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**89**		1.0		ug/L			11/17/17 19:19	1
Toluene	**2.3**		1.0		ug/L			11/17/17 19:19	1
Ethylbenzene	**74**		1.0		ug/L			11/17/17 19:19	1
Xylenes, Total	**200**		10		ug/L			11/17/17 19:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane	*108*		*81 - 121*		*11/17/17 19:19*	*1*
4-Bromofluorobenzene	*86*		*78 - 118*		*11/17/17 19:19*	*1*
Toluene-d8 (Surr)	*110*		*80 - 120*		*11/17/17 19:19*	*1*

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Client Sample ID: MW-2
Date Collected: 11/10/17 14:12
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-2
Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0		ug/L			11/17/17 19:08	1
Toluene	<1.0		1.0		ug/L			11/17/17 19:08	1
Ethylbenzene	<1.0		1.0		ug/L			11/17/17 19:08	1
Xylenes, Total	<10		10		ug/L			11/17/17 19:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane	*108*		*81 - 121*		*11/17/17 19:08*	*1*
4-Bromofluorobenzene	*93*		*78 - 118*		*11/17/17 19:08*	*1*
Toluene-d8 (Surr)	*93*		*80 - 120*		*11/17/17 19:08*	*1*

Client Sample ID: MW-4
Date Collected: 11/10/17 14:40
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-3
Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**64**		10		ug/L			11/18/17 03:24	10
Toluene	<10		10		ug/L			11/18/17 03:24	10
Ethylbenzene	**130**		10		ug/L			11/18/17 03:24	10
Xylenes, Total	**900**		100		ug/L			11/18/17 03:24	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane	*104*		*81 - 121*		*11/18/17 03:24*	*10*
4-Bromofluorobenzene	*96*		*78 - 118*		*11/18/17 03:24*	*10*
Toluene-d8 (Surr)	*93*		*80 - 120*		*11/18/17 03:24*	*10*

Client Sample ID: MW-7
Date Collected: 11/10/17 13:49
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-4
Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**8.3**		1.0		ug/L			11/17/17 22:03	1
Toluene	<1.0		1.0		ug/L			11/17/17 22:03	1
Ethylbenzene	**2.5**		1.0		ug/L			11/17/17 22:03	1
Xylenes, Total	**170**		10		ug/L			11/17/17 22:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane	*104*		*81 - 121*		*11/17/17 22:03*	*1*
4-Bromofluorobenzene	*106*		*78 - 118*		*11/17/17 22:03*	*1*
Toluene-d8 (Surr)	*91*		*80 - 120*		*11/17/17 22:03*	*1*

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Client Sample ID: MW-8
Date Collected: 11/10/17 13:44
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-5
Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0		ug/L			11/17/17 22:32	1
Toluene	<1.0		1.0		ug/L			11/17/17 22:32	1
Ethylbenzene	<1.0		1.0		ug/L			11/17/17 22:32	1
Xylenes, Total	<10		10		ug/L			11/17/17 22:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane	*108*		*81 - 121*		*11/17/17 22:32*	*1*
4-Bromofluorobenzene	*93*		*78 - 118*		*11/17/17 22:32*	*1*
Toluene-d8 (Surr)	*90*		*80 - 120*		*11/17/17 22:32*	*1*

Client Sample ID: MW-11
Date Collected: 11/10/17 14:00
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-6
Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**3.3**		1.0		ug/L			11/17/17 23:02	1
Toluene	<1.0		1.0		ug/L			11/17/17 23:02	1
Ethylbenzene	**2.7**		1.0		ug/L			11/17/17 23:02	1
Xylenes, Total	**25**		10		ug/L			11/17/17 23:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane	*102*		*81 - 121*		*11/17/17 23:02*	*1*
4-Bromofluorobenzene	*121*	*X*	*78 - 118*		*11/17/17 23:02*	*1*
Toluene-d8 (Surr)	*93*		*80 - 120*		*11/17/17 23:02*	*1*

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Client Sample ID: TRIP BLANK
Date Collected: 11/10/17 13:30
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-7
Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0		ug/L			11/17/17 21:05	1
Toluene	<1.0		1.0		ug/L			11/17/17 21:05	1
Ethylbenzene	<1.0		1.0		ug/L			11/17/17 21:05	1
Xylenes, Total	<10		10		ug/L			11/17/17 21:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane	*109*		*81 - 121*		*11/17/17 21:05*	*1*
4-Bromofluorobenzene	*93*		*78 - 118*		*11/17/17 21:05*	*1*
Toluene-d8 (Surr)	*92*		*80 - 120*		*11/17/17 21:05*	*1*

QC Association Summary

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

GC/MS VOA

Analysis Batch: 376306

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-145959-1	MW-1	Total/NA	Water	8260C	
MB 400-376306/5	Method Blank	Total/NA	Water	8260C	
LCS 400-376306/3	Lab Control Sample	Total/NA	Water	8260C	
400-145965-A-2 MS	Matrix Spike	Total/NA	Water	8260C	
400-145965-A-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8260C	

Analysis Batch: 376424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-145959-2	MW-2	Total/NA	Water	8260C	
400-145959-3	MW-4	Total/NA	Water	8260C	
400-145959-4	MW-7	Total/NA	Water	8260C	
400-145959-5	MW-8	Total/NA	Water	8260C	
400-145959-6	MW-11	Total/NA	Water	8260C	
400-145959-7	TRIP BLANK	Total/NA	Water	8260C	
MB 400-376424/4	Method Blank	Total/NA	Water	8260C	
LCS 400-376424/1002	Lab Control Sample	Total/NA	Water	8260C	
400-145959-2 MS	MW-2	Total/NA	Water	8260C	
400-145959-2 MSD	MW-2	Total/NA	Water	8260C	

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 400-376306/5
Matrix: Water
Analysis Batch: 376306

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0		ug/L			11/17/17 09:20	1
Toluene	<1.0		1.0		ug/L			11/17/17 09:20	1
Ethylbenzene	<1.0		1.0		ug/L			11/17/17 09:20	1
Xylenes, Total	<10		10		ug/L			11/17/17 09:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane	*96*		*81 - 121*		*11/17/17 09:20*	*1*
4-Bromofluorobenzene	*88*		*78 - 118*		*11/17/17 09:20*	*1*
Toluene-d8 (Surr)	*105*		*80 - 120*		*11/17/17 09:20*	*1*

Lab Sample ID: LCS 400-376306/3
Matrix: Water
Analysis Batch: 376306

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene			50.0	47.6		ug/L		95	70 - 130		
Toluene			50.0	50.0		ug/L		100	70 - 130		
Ethylbenzene			50.0	50.3		ug/L		101	70 - 130		
Xylenes, Total			100	98.6		ug/L		99	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Dibromofluoromethane	*96*		*81 - 121*
4-Bromofluorobenzene	*84*		*78 - 118*
Toluene-d8 (Surr)	*96*		*80 - 120*

Lab Sample ID: 400-145965-A-2 MS
Matrix: Water
Analysis Batch: 376306

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene	<1.0		50.0	50.3		ug/L		101	56 - 142		
Toluene	<1.0		50.0	49.7		ug/L		99	65 - 130		
Ethylbenzene	<1.0		50.0	51.4		ug/L		102	58 - 131		
Xylenes, Total	<10		100	101		ug/L		101	59 - 130		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Dibromofluoromethane	*101*		*81 - 121*
4-Bromofluorobenzene	*87*		*78 - 118*
Toluene-d8 (Surr)	*96*		*80 - 120*

Lab Sample ID: 400-145965-A-2 MSD
Matrix: Water
Analysis Batch: 376306

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<1.0		50.0	47.4		ug/L		95	56 - 142	6	30
Toluene	<1.0		50.0	48.5		ug/L		97	65 - 130	2	30

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 400-145965-A-2 MSD
Matrix: Water
Analysis Batch: 376306

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ethylbenzene	<1.0		50.0	47.7		ug/L		94	58 - 131	7	30
Xylenes, Total	<10		100	95.6		ug/L		96	59 - 130	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Dibromofluoromethane	*100*		*81 - 121*
4-Bromofluorobenzene	*88*		*78 - 118*
Toluene-d8 (Surr)	*97*		*80 - 120*

Lab Sample ID: MB 400-376424/4
Matrix: Water
Analysis Batch: 376424

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<1.0		1.0		ug/L			11/17/17 18:39	1
Toluene	<1.0		1.0		ug/L			11/17/17 18:39	1
Ethylbenzene	<1.0		1.0		ug/L			11/17/17 18:39	1
Xylenes, Total	<10		10		ug/L			11/17/17 18:39	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane	*109*		*81 - 121*		*11/17/17 18:39*	*1*
4-Bromofluorobenzene	*96*		*78 - 118*		*11/17/17 18:39*	*1*
Toluene-d8 (Surr)	*90*		*80 - 120*		*11/17/17 18:39*	*1*

Lab Sample ID: LCS 400-376424/1002
Matrix: Water
Analysis Batch: 376424

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene			50.0	54.4		ug/L		109	70 - 130		
Toluene			50.0	51.5		ug/L		103	70 - 130		
Ethylbenzene			50.0	52.6		ug/L		105	70 - 130		
Xylenes, Total			100	104		ug/L		104	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Dibromofluoromethane	*101*		*81 - 121*
4-Bromofluorobenzene	*91*		*78 - 118*
Toluene-d8 (Surr)	*93*		*80 - 120*

Lab Sample ID: 400-145959-2 MS
Matrix: Water
Analysis Batch: 376424

Client Sample ID: MW-2
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene	<1.0		50.0	51.8		ug/L		104	56 - 142		
Toluene	<1.0		50.0	46.8		ug/L		94	65 - 130		
Ethylbenzene	<1.0		50.0	46.8		ug/L		94	58 - 131		
Xylenes, Total	<10		100	94.1		ug/L		94	59 - 130		

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 400-145959-2 MS
Matrix: Water
Analysis Batch: 376424

Client Sample ID: MW-2
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Dibromofluoromethane	*100*		*81 - 121*
4-Bromofluorobenzene	*95*		*78 - 118*
Toluene-d8 (Surr)	*94*		*80 - 120*

Lab Sample ID: 400-145959-2 MSD
Matrix: Water
Analysis Batch: 376424

Client Sample ID: MW-2
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<1.0		50.0	53.0		ug/L		106	56 - 142	2	30
Toluene	<1.0		50.0	49.1		ug/L		98	65 - 130	5	30
Ethylbenzene	<1.0		50.0	49.8		ug/L		100	58 - 131	6	30
Xylenes, Total	<10		100	98.9		ug/L		99	59 - 130	5	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Dibromofluoromethane	*99*		*81 - 121*
4-Bromofluorobenzene	*96*		*78 - 118*
Toluene-d8 (Surr)	*92*		*80 - 120*

Lab Chronicle

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Client Sample ID: MW-1
Date Collected: 11/10/17 14:18
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	376306	11/17/17 19:19	RS	TAL PEN
	Instrument ID: CH_LARS									

Client Sample ID: MW-2
Date Collected: 11/10/17 14:12
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	376424	11/17/17 19:08	CAR	TAL PEN
	Instrument ID: Einstein									

Client Sample ID: MW-4
Date Collected: 11/10/17 14:40
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		10	5 mL	5 mL	376424	11/18/17 03:24	CAR	TAL PEN
	Instrument ID: Einstein									

Client Sample ID: MW-7
Date Collected: 11/10/17 13:49
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	376424	11/17/17 22:03	CAR	TAL PEN
	Instrument ID: Einstein									

Client Sample ID: MW-8
Date Collected: 11/10/17 13:44
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	376424	11/17/17 22:32	CAR	TAL PEN
	Instrument ID: Einstein									

Client Sample ID: MW-11
Date Collected: 11/10/17 14:00
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	376424	11/17/17 23:02	CAR	TAL PEN
	Instrument ID: Einstein									

Lab Chronicle

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Client Sample ID: TRIP BLANK

Date Collected: 11/10/17 13:30
Date Received: 11/14/17 09:01

Lab Sample ID: 400-145959-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	376424	11/17/17 21:05	CAR	TAL PEN
	Instrument ID: Einstein									

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Accreditation/Certification Summary

Client: Stantec Consulting Services Inc
TestAmerica Job ID: 400-145959-1
Project/Site: El Paso CGP Company - Knight 1

Laboratory: TestAmerica Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alabama	State Program	4	40150	06-30-18
Arizona	State Program	9	AZ0710	01-11-18
Arkansas DEQ	State Program	6	88-0689	09-01-18
California	ELAP	9	2510	03-31-18
Florida	NELAP	4	E81010	06-30-18
Georgia	State Program	4	N/A	06-30-18
Illinois	NELAP	5	200041	10-09-18
Iowa	State Program	7	367	08-01-18
Kansas	NELAP	7	E-10253	12-31-17
Kentucky (UST)	State Program	4	53	06-30-18
Kentucky (WW)	State Program	4	98030	12-31-17
L-A-B	ISO/IEC 17025		L2471	02-22-20
Louisiana	NELAP	6	30976	06-30-18
Louisiana (DW)	NELAP	6	LA170005	12-31-17
Maryland	State Program	3	233	09-30-18
Massachusetts	State Program	1	M-FL094	06-30-18
Michigan	State Program	5	9912	06-30-18
New Jersey	NELAP	2	FL006	06-30-18
North Carolina (WW/SW)	State Program	4	314	12-31-17
Oklahoma	State Program	6	9810	08-31-18
Pennsylvania	NELAP	3	68-00467	01-31-18
Rhode Island	State Program	1	LAO00307	12-30-17
South Carolina	State Program	4	96026	06-30-18
Tennessee	State Program	4	TN02907	06-30-18
Texas	NELAP	6	T104704286-17-12	09-30-18
USDA	Federal		P330-16-00172	05-24-19
Virginia	NELAP	3	460166	06-14-18
Washington	State Program	10	C915	05-15-18
West Virginia DEP	State Program	3	136	06-30-18

Method Summary

Client: Stantec Consulting Services Inc
Project/Site: El Paso CGP Company - Knight 1

TestAmerica Job ID: 400-145959-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL PEN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: SMS	Lab PM: Webb, Carol M	Carrier Tracking No(s):	COC No: 400-69062-27996.1
Client Contact: Ms. Sarah Gardner	Phone: 515-306-1353	E-Mail: carol.webb@testamericainc.com		Page: Page 1 of 1
Company: Stantec Consulting Services Inc		Analysis Requested		Job #: 203720281
Address: 1560 Broadway Suite 1800	Due Date Requested:			Preservation Codes:
City: Denver	TAT Requested (days): 10 day Std.			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: CO, 80202				
Phone: 303-291-2239(Tel)	PO #: Purchase Order Requested			
Email: sarah.gardner@mwhglobal.com	WO #: ARF W-ERG-STN-05-17-17-SLG-11 - Knight #1			Other:
Project Name: Knight #1 Nov 2017	Project #: 40005479			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	8021B - BTEX 8021	Special Instructions/Note:
MW-1	11/10/17	1418	G	W	A 2	Ref ARF
MW-2	11/10/17	1412			A 2	
MW-4	11/10/17	1440			A 2	
MW-7	11/10/17	1349			A 2	
MW-8	11/10/17	1344			A 2	
MW-11	11/10/17	1400			A 2	
Trip Blank	11/10/17	1330			A 2	

400-145959 COC

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Babcock	11/13/17 1100	Stantec		11.14.17 0901	TA
2						
3						

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.0C IR-7 NH

Ver: 08/04/2016

Login Sample Receipt Checklist

Client: Stantec Consulting Services Inc

Job Number: 400-145959-1

Login Number: 145959
List Number: 1
Creator: Johnson, Jeremy N

List Source: TestAmerica Pensacola

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.0°C IR7
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	