

GW – 028

2015 AGWMR

PART 2 OF 25

03 / 2016

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NCL-33

Event: Spring 2015 (Biennial)

Area of Concern:

NCL

(2-in) stickup

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: CSH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1440	NA	6.98	0.0	19.62	17.7	yes	* yes	Issue	yes		Weather: Clear, 80'S

Well Purging Record

* PVC casing is down ~12" within protective casing, making the retrieval of water levels difficult. Also poses a threat for spiders.

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.15.15	1515	7.12	0.5	7.02	21.9	2820	2.2	-48.8	51	Sl. cloudy, yellow	Low-flow groundwater sample:
	1517	7.21	1.0	6.95	21.8	2840	2.1	-46.7	48.3	hint orange algae	A) peristaltic pump w/ ded tubing
	1520	7.25	1.5	6.91	21.7	2860	2.0	-43.6	42.1	particles.	B) ded bladder pump
	1522	7.27	2.0	6.86	21.6	2870	2.0	-40.1	40.4		C) non-ded bladder pump; or
	1525	7.28	2.5	6.81	21.5	2880	1.9	-36.2	41.7		Standard groundwater sample:
	1527	7.29	3.0	6.76	21.4	2880	1.9	-31.7	39.5		D) bailer due to limited column; or
	1530	7.30	3.5	6.74	21.3	2890	1.9	-28.4	38.7		E) recovery well cycling sample
	1532	7.31	4.0	6.73	21.4	2890	1.8	-27.8	38.1		F) irrigation well grab sample
	1535	7.32	4.5	6.73	21.4	2890	1.8	-27.3	37.7		

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments	
4.15.15	1540	NCL-33	7.32	6.73	21.4	2890	1.8	-27.3	37.7	DRO	HCL	8015M	
										GRO	HCL	8015M	
										VOC	HCL	8260	
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020	
								Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)		HNO3		Field filtered 0.45-u; 6010/6020	
								Anions (Chloride,Fluoride,Sulfate)		Neat		300	
										Nitrate-Nitrite	H2SO4	per ARCADIS	
										TDS	Neat	2540C	
										Total Metals (Hg,Ni,Va)		HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500	
										If < 0.03 feet of BSH present, remove BSH and test			

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NCL-44

Event: Spring 2015. (Biennial)

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4-14-15	1500	NA	7.41	0.0	21.6	17.4	* H ₂ O ₂ Replaced	yes	ISSUE	yes		Weather: Clear, 70's

Well Purging Record

* PVC casing needs to be shortened 3-4" so well can be secure with a cap.

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4-15-15	1610	7.46	0.5	6.79	21.4	2290	2.5	-105.9	14.4	clear	
	1612	7.46	1.0	6.75	20.8	2280	2.4	-116.7	12.1		Low-flow groundwater sample:
	1615	7.46	1.5	6.74	20.6	2280	2.4	-121.9	11.5		A) peristaltic pump w/ ded tubing
	1617	7.46	2.0	6.73	20.4	2270	2.3	-131.1	10.9		B) ded bladder pump
	1620	7.46	2.5	6.73	20.3	2260	2.3	-135.7	10.7		C) non-ded bladder pump; or
	1622	7.46	3.0	6.72	20.3	2260	2.3	-138.4	10.1		Standard groundwater sample:
	1625	7.46	3.5	6.72	20.4	2260	2.2	-139.7	10.4		D) bailer due to limited column; or
	1627	7.46	4.0	6.71	20.4	2250	2.2	-141.0	9.6		E) recovery well cycling sample
											F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
4-15-15	1630	NCL-44	7.46	6.71	20.4	2250	2.2	-141.0	9.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)	HNO3	Field filtered 0.45-u; 6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NCL - 32

Event: Spring 2015 (Biennial)

Area of Concern: NCL

air cut-grade

+EB-NCL-01

(for same analyses)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1515	NA	8.08	0.0	17.23	16.5	yes	yes	yes	yes		Weather: Clear, 70's
4.15.15	1700	NA	7.97	0.0	17.23	16.5						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.15.15	1705	8.74	0.5	7.29	20.4	2660	5.9	-2.7	7200	Very Cloudy	Low-flow groundwater sample:
	1707	9.06	1.0	7.26	20.3	2670	5.5	-17.4	7200		A) peristaltic pump w/ ded tubing
	1710	9.30	1.5	7.09	20.2	2700	3.2	-80.4	7200		B) ded bladder pump
	1712	9.54	2.0	7.01	20.3	2710	2.9	-140.2	7200	Reduced purge rate to 0.1 L/min	C) non-ded bladder pump; or
	1717	9.68	2.5	6.95	20.4	2720	2.6	-171.3	7200		Standard groundwater sample:
	1722	9.80	3.0	6.92	20.6	2720	2.5	-176.4	7200		D) bailer due to limited column; or
	1727	9.90	3.5	6.90	20.7	2730	2.4	-179.6	7200		E) recovery well cycling sample
	1732	9.99	4.0	6.88	20.8	2730	2.4	-181.3	7200		F) irrigation well grab sample
	1737	10.08	4.5	6.87	20.7	2730	2.3	-182.0	7200		
			*								

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
4.15.15	1740	NCL-32	10.08	6.87	20.7	2730	2.3	-182.0	7200	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)	HNO3	Field filtered 0.45-u; 6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
4.15.15	1810	EB-NCL-01	NA							Cyanide	NaOH	SM4500
										Same	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-108

Event: Spring 2015 (Biennial)

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in, stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1530	11.4	10.92	0.0	27.75	22.5	yes	yes	yes	yes		Weather: Clear, 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.16.15	825	11.06	0.5	6.75	18.4	2860	2.0	-336.4	19.1	Clear, yellow tint, odor	Low-flow groundwater sample:
	827	11.13	1.0	6.74	18.5	2870	1.7	-352.4	15.3		(A) peristaltic pump w/ ded tubing
	830	11.16	1.5	6.74	18.6	2880	1.6	-359.2	13.2		B) ded bladder pump
	832	11.19	2.0	6.76	18.6	2910	1.6	-367.1	11.9		C) non-ded bladder pump; or
	835	11.21	2.5	6.78	18.6	2920	1.5	-369.2	10.4		Standard groundwater sample:
	837	11.22	3.0	6.79	18.7	2920	1.5	-372.4	9.8		D) bailer due to limited column; or
	840	11.23	3.5	6.80	18.7	2930	1.5	-373.5	9.1		E) recovery well cycling sample
✓	842	11.24	4.0	6.81	18.7	2930	1.5	-374.2	9.4	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments	
4.16.15	845	mw-108	11.24	6.81	18.7	2930	1.5	-374.2	9.4	DRO	HCL	8015M	
										CRO	HCL	8015M	
										VOC	HCL	8260	
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020	
								Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)		HNO3		Field filtered 0.45-u; 6010/6020	
								Anions (Chloride,Fluoride,Sulfate)		Neat		300	
										Nitrate-Nitrite	H2SO4	per ARCADIS	
										TDS	Neat	2540C	
										Total Metals (Hg,Ni,Va)		HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500	

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NCL-31

Event: Spring 2015 (Biennial)

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stackup)

Initials: Cjt

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4-14-15	1540	NA	8.22	0.0	20.16	17.4	* HMI Replaced	yes	Issue	yes		
4-16-15	940	NA	8.49	0.0	20.16	17.4						Weather: Clear, 60'S

Well Purging Record

* PVC Casing needs to be lowered 3-4" for cap to fit in protective casing

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4-16-15	945	8.74	0.5	6.99	20.1	2860	2.0	-246.6	23.8	Clear, light yellow tint, odor	
	947	8.77	1.0	6.92	19.8	2880	1.9	-247.6	20.1		Low-flow groundwater sample:
	950	8.77	1.5	6.88	19.6	2890	1.9	-248.4	19.3		A) peristaltic pump w/ ded tubing
	952	8.78	2.0	6.87	19.4	2910	1.8	-251.1	18.5		B) ded bladder pump
	955	8.78	2.5	6.87	19.4	2920	1.8	-251.8	17.7		C) non-ded bladder pump; or
	957	8.78	3.0	6.86	19.5	2920	1.7	-252.1	17.1		Standard groundwater sample:
	1000	8.78	3.5	6.86	19.6	2920	1.7	-252.4	16.7		D) bailer due to limited column; or
✓	1002	8.78	4.0	6.85	19.7	2920	1.7	-252.8	16.4	↓	E) recovery well cycling sample
											F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
4-16-15	1005	NCL-31	8.78	6.85	19.7	2920	1.7	-252.8	16.4			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)		HNO3	Field filtered 0.45-u; 6010/6020	
								Anions (Chloride,Fluoride,Sulfate)		Neat	300	
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Not in Sampling Program

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: **MW-19**
Event: Spring **2015 (Biennial)**
Area of Concern: **NCL**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: **CSH**

Initials: CJA

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1550	NA	8.21	0.0	22.10	Not Sampled	yes	yes	yes	yes		Weather: _____

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								
			1.0								Low-flow groundwater sample:
			1.5								A) peristaltic pump w/ ded tubing
			2.0								B) ded bladder pump
			2.5								C) non-ded bladder pump; or
			3.0								Standard groundwater sample:
			3.5								D) bailer due to limited column; or
			4.0								E) recovery well cycling sample
											F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		mw-19										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)		HNO3 Field filtered 0.45-u; 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-55

Event: Spring 2015 (Biennial)

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1605	NA	9.25	0.0	26.58	21.7	yes	yes	needs lock	yes		Weather: clear/windy, 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.16.15	1110	9.28	0.5	7.29	20.1	4280	2.9	-18.6	29.1	Clear	Low-flow groundwater sample:
	1112	9.29	1.0	7.14	20.0	4490	2.5	-5.0	25.2		A) peristaltic pump w/ ded tubing
	1115	9.29	1.5	7.07	19.9	4560	2.4	1.1	20.1		B) ded bladder pump
	1117	9.29	2.0	7.03	19.8	4640	2.4	5.6	17.3		C) non-ded bladder pump; or
	1120	9.29	2.5	7.02	19.8	4660	2.4	7.4	15.1		Standard groundwater sample:
	1122	9.29	3.0	7.01	19.8	4690	2.3	8.5	12.1		D) bailer due to limited column; or
	1125	9.29	3.5	7.00	19.8	4710	2.3	9.6	11.0		E) recovery well cycling sample
	1127	9.29	4.0	6.99	19.9	4720	2.3	10.2	9.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
4.16.15	1130	MW-55	9.29	6.99	19.9	4720	2.3	10.2	9.4	DRO	HCL	8015M ✓
										GRO	HCL	8015M ✓
										VOC	HCL	8260 ✓
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020 ✓
										Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)	HNO3	Field filtered 0.45-u; 6010/6020 ✓
										Anions (Chloride,Fluoride,Sulfate)	Neat	300 ✓
										Nitrate-Nitrite	H2SO4	per ARCADIS ✓
										TDS	Neat	2540C ✓
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater.

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RW-#17A

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1625	NA	8.73	0.0	16.02	14.0	NO	Yes	*NO	yes		Weather: Clear / windy, 70's

Well Purging Record

* needs cap 1/2 lock

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.16.15	1200	8.74	0.5	7.35	20.5	6900	2.1	-33.2	9.4	Clear, light yellow	Low-flow groundwater sample:
	1202	8.74	1.0	7.34	20.0	6970	1.9	-20.8	9.6	tint	A) peristaltic pump w/ ded tubing
	1205	8.74	1.5	7.34	19.6	6970	1.9	-13.7	7.1		B) ded bladder pump
	1207	8.74	2.0	7.33	19.4	6960	1.9	-9.7	6.4		C) non-ded bladder pump; or
	1210	8.74	2.5	7.33	19.2	6980	1.8	-5.4	6.1		Standard groundwater sample:
	1212	8.74	3.0	7.33	19.2	6990	1.8	-3.2	5.2		D) bailer due to limited column; or
	1215	8.74	3.5	7.33	19.3	6990	1.7	-2.2	6.3		E) recovery well cycling sample
	1217	8.74	4.0	7.33	19.3	6990	1.7	-1.5	4.9		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
4.16.15	1220	RW-#17A	8.74	7.33	19.3	6990	1.7	-1.5	4.9	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)	HNO3	Field filtered 0.45-u; 6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-18

Event: Spring 2015 (Biennial)

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: CSH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1700	NA	8.72	0.0	22.20	20.2	yes	yes	yes	yes		Weather: Clear, 70's
4.16.15	1300	NA	8.89	0.0	22.20							

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.16.15	1305	8.94	0.5	6.98	20.9	3850	3.5	11.5	4.7	clear	Low-flow groundwater sample:
	1307	8.94	1.0	6.93	20.3	3710	3.4	28.5	4.2		
	1310	8.94	1.5	6.92	20.1	3650	3.3	34.4	3.7		A) peristaltic pump w/ ded tubing
	1312	8.94	2.0	6.90	20.0	3570	3.2	41.0	3.5		B) ded bladder pump
	1315	8.94	2.5	6.89	20.0	3550	3.2	44.4	3.0		C) non-ded bladder pump; or
	1317	8.94	3.0	6.89	19.9	3540	3.1	47.9	2.9		Standard groundwater sample:
	1320	8.94	3.5	6.89	19.7	3520	3.1	48.5	2.8		D) bailer due to limited column; or
	1322	8.94	4.0	6.89	19.6	3500	3.1	49.4	2.2		E) recovery well cycling sample
											F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
4.16.15	1325	mw-18	8.94	6.89	19.6	3500	3.1	49.4	22	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)					HNO3	Field filtered 0.45-u; 6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-54A

Event: Spring 2015 (Biennial)

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1715	NA	9.63	0.0	31.34	23.6	Yes	Yes	Needs Lock	Yes		Weather: Clear, 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.16.15	1415	9.68	0.5	6.71	23.0	2550	5.4	4.5	6.7	Clear	Low-flow groundwater sample:
	1417	9.69	1.0	6.69	21.9	2510	5.0	26.4	6.1		(A) peristaltic pump w/ ded tubing
	1420	9.69	1.5	6.67	21.7	2500	4.5	32.1	5.5		B) ded bladder pump
	1422	9.69	2.0	6.66	21.4	2480	3.9	38.5	5.6		C) non-ded bladder pump; or
	1425	9.69	2.5	6.66	21.3	2470	3.6	41.1	4.9		Standard groundwater sample:
	1427	9.69	3.0	6.65	21.3	2470	3.5	43.2	4.5		D) bailer due to limited column; or
	1430	9.69	3.5	6.65	21.2	2460	3.4	44.4	4.2		E) recovery well cycling sample
✓	1432	9.69	4.0	6.65	21.1	2460	3.4	45.1	3.7	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments	
4.16.15	1435	MW-54A	9.69	6.65	21.1	2460	3.4	45.1	3.7	DRO	HCL	8015M	
										GRO	HCL	8015M	
										VOC	HCL	8260	
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020	
								Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)		HNO3		Field filtered 0.45-u; 6010/6020	
								Anions (Chloride,Fluoride,Sulfate)		Neat		300	
										Nitrate-Nitrite	H2SO4	per ARCADIS	
										TDS	Neat	2540C	
										Total Metals (Hg,Ni,Va)		HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500	
							</						

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-54B

Event: Spring 2015 (Biennial)

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1730	NA	9.69	0.0	46.83	41.8	yes	yes	no ped. lock	yes		Weather: clear, 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.16.15	1500	9.73	0.5	6.75	21.6	2300	2.9	25.1	6.7	clear	Low-flow groundwater sample:
	1502	9.73	1.0	6.67	21.0	2320	2.4	44.3	6.2		A) peristaltic pump w/ ded tubing
	1505	9.73	1.5	6.66	20.7	2330	2.3	52.3	4.1		B) ded bladder pump
	1507	9.73	2.0	6.65	20.6	2340	2.3	61.9	3.8		C) non-ded bladder pump; or
	1510	9.73	2.5	6.63	20.7	2340	2.2	67.1	3.5		Standard groundwater sample:
	1512	9.73	3.0	6.62	20.8	2340	2.2	69.2	3.2		D) bailer due to limited column; or
	1515	9.73	3.5	6.62	20.9	2350	2.2	70.5	2.8		E) recovery well cycling sample
	1517	9.73	4.0	6.61	21.0	2350	2.1	71.3	2.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
4.16.15	1520	MW-54B	9.73	6.61	21.6	2350	2.1	71.3	2.4	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8015M
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		8260
										Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)		6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Field filtered 0.45-u; 6010/6020
										Nitrate-Nitrite		300
										TDS		per ARCADIS
										Total Metals (Hg,Ni,Va)		2540C
										Cyanide		HNO3 6010/6020 and/or 7470
												NaOH SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **NCL-49**

Event: Spring **2015** (Biennial)

Area of Concern: **NCL**

+ DUP-NCL-01

(same analyses)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: **CJH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1745	NA	14.19	0.0	32.20	27.2	Yes	Yes	Needs lock	Yes		Weather: Partly Cloudy, 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.16.15	1555	14.23	0.5	7.10	21.7	2950	3.1	4.7	4.5	Clear	Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or
	1557	14.23	1.0	7.02	21.0	2970	3.0	27.5	4.1		
	1600	14.23	1.5	7.00	20.9	2990	3.0	42.3	3.7		
	1602	14.23	2.0	7.00	20.9	2990	3.0	46.1	3.6		Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
	1605	14.23	2.5	6.99	20.8	3000	2.9	49.3	3.2		
	1607	14.23	3.0	6.99	20.7	3000	2.9	52.1	2.9		
	1610	14.23	3.5	6.99	20.7	3010	2.9	53.2	2.7		
	1612	14.23	4.0	6.99	20.7	3020	2.9	53.7	2.4		

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
4.16.15	1615	NCL-49	14.23	6.99	20.7	3020	2.9	53.7	2.4	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)					HNO3	Field filtered 0.45-u; 6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
						Nitrate-Nitrite					H2SO4	per ARCADIS
						TDS					Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
						Cyanide					NaOH	SM4500
✓	1400	DUP-NCL-01	14.23	6.99	20.7	3020	2.9	53.7	2.4	Same	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-53

Event: Spring 2015 (Biennial)

Area of Concern: NCL * 20ft South of 7cm marker
off 285 N. bound. 2in at-grade

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
4.14.15	1800	NA	9.41	0.0	23.60	19.6	yes	yes	yes	yes		Weather: Partly Cloudy, 70S

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
4.16.15	1715	9.54	0.5	7.02	20.7	3260	2.4	24.2	24.2	clear	Low-flow groundwater sample:
	1717	9.57	1.0	7.00	20.4	3260	2.3	33.4	13.3		(A) peristaltic pump w/ ded tubing
	1720	9.57	1.5	7.00	20.4	3260	2.3	36.7	12.2		B) ded bladder pump
	1722	9.57	2.0	6.99	20.3	3260	2.2	42.9	11.5		C) non-ded bladder pump; or
	1725	9.57	2.5	6.99	20.2	3250	2.1	45.6	10.7		Standard groundwater sample:
	1727	9.57	3.0	6.99	20.2	3250	2.1	48.1	10.1		D) bailer due to limited column; or
	1730	9.57	3.5	6.99	20.3	3250	2.1	49.6	9.9		E) recovery well cycling sample
	1732	9.57	4.0	6.99	20.3	3240	2.0	50.7	9.0		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
4.16.15	1735	MW-53	9.57	6.99	20.3	3240	2.0	50.7	9.0	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)		HNO3	Field filtered 0.45-u; 6010/6020	
								Anions (Chloride,Fluoride,Sulfate)		Neat	300	
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										If < 0.03 feet of PSH present, remove PSH and sample groundwater		

If <0.03 feet of PSH present, remove PSH and sample groundwater

Instrument Calibration Log p. 1/2

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Date	Time	pH Hanna (Std. units)	Specific Conductivity Hanna (umho/cm)	Dissolved Oxygen Hanna (Slope Cal. in saturated air)	Turbidity Lamotte (NTU)	ORP Hanna HI 7020 Soln (200-275 mV)	PID Thermo Environmental 100 ppm Isobutylene	Initials / Comments
4/14/15	0650	4.01/7.00	1,000	100%	10.0	249.1	NA	SCU
4/15/15	0655	4.01/7.00	1,000	100%	10.0	247.5	NA	SCU
4/15/15	0700	4.01/7.00	1,000	100%	10.0	251.8	NA	TAB
4/15/15	0711	4.01/7.00	1,000	100%	10.0	241.1	NA	GDS
4/15/15	0714	4.01/7.00	1,000	100%	10.0	220.6	NA	MOB
4/15/15	0718	4.01/7.00	1,000	100%	10.0	223.4	NA	SCD
4/15/15	0721	4.01/7.00	1,000	100%	10.0	232.1	NA	CJH
4/15/15	0724	4.01/7.00	1,000	100%	10.0	249.7	NA	RB
4/15/15	0728	4.01/7.00	1,000	100%	10.0	238.1	NA	BRH
4/16/15	0730	4.01/7.00	1,000	100%	10.0	250.6	NA	BJ
4/16/15	0736	4.01/7.00	1,000	100%	10.0	229.3	NA	SCD
4/16/15	0738	4.01/7.00	1,000	100%	10.0	221.3	NA	MOB
4/16/15	0740	4.01/7.00	1,000	100%	10.0	237.5	NA	BRH
4/16/15	0742	4.01/7.00	1,000	100%	10.0	241.5	NA	CJH
4/16/15	0746	4.01/7.00	1,000	100%	10.0	249.9	NA	GDS
4/16/15	0750	4.01/7.00	1,000	100%	10.0	251.6	NA	TAB
4/16/15	800	4.01/7.00	1,000	100%	10.0	246.1	NA	SCU

p. 2/2

**Hydrologic Monitoring
for ARCADIS
Houston, Texas**

[illegible]

A.2 Second Semiannual Event Rainfall Data and Field Notes



Record of Climatological Observations
These data are quality controlled and may not be identical to the original observations.
Generated on 01/11/2016

Elev: 3366 ft. Lat: 32.755° N Lon: 104.384° W
Station: ARTESIA 6 S, NM US GHCND:USC00290600

Observation Time Temperature: 0730 Observation Time Precipitation: 0730

P r e l i m i n a r y	Y e a r	M o n t h	D a y	Temperature (F)			Precipitation(see **)					Evaporation		Soil Temperature (F)					
				24 hrs. ending at observation time		at O b s e r v a t i o n	24 Hour Amounts ending at observation time				At Obs Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in depth			8 in depth		
				Max.	Min.		Rain, melted snow, etc. (in)	F l a g	Snow, ice pellets, hail (in)	F l a g				Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
	2015	10	1	88	53	54	0.00		0.0		0		0.37	5	73	70			
	2015	10	2	94	54	63	0.00		0.0		0		0.36	5	72	70			
	2015	10	3	89	62	63	0.00		0.0		0		0.36	5	76	70			
	2015	10	4	85	55	55	1.90		0.0		0		0.00	5	75	70			
	2015	10	5	57	54	54	1.10		0.0		0		0.00	5	73	70			
	2015	10	6	63	52	53	0.00		0.0		0		0.00	5	64	60			
	2015	10	7	71	53	56	0.00		0.0		0		0.15	5	61	60			
	2015	10	8	71	55	56	0.65		0.0		0		0.00	5	61	60			
	2015	10	9	71	56	58	0.00		0.0		0		0.00	5	60	60			
	2015	10	10	74	54	56	0.00		0.0		0		0.17	5	60	60			
	2015	10	11	80	54	60	0.00		0.0		0		0.19	5	61	60			
	2015	10	12	89	56	58	0.00		0.0		0		0.28	5	60	60			
	2015	10	13	82	49	50	0.00		0.0		0		0.30	5	62	61			
	2015	10	14	84	48	49	0.00		0.0		0		0.27	5	61	60			
	2015	10	15	88	49	52	0.00		0.0		0		0.22	5	62	61			
	2015	10	16	89	50	58	0.00		0.0		0		0.30	5	62	60			
	2015	10	17	67	45	46	0.00		0.0		0		0.21	5	62	60			
	2015	10	18	74	46	52	0.00		0.0		0		0.20	5	61	60			
	2015	10	19	72	52	53	0.00		0.0		0		0.17	5	61	60			
	2015	10	20	78	53	57	0.00		0.0		0		0.24	5	61	60			
	2015	10	21	80	57	58	0.00		0.0		0		0.20	5	63	61			
	2015	10	22	67	48	48	0.63		0.0		0		0.60	5	61	60			
	2015	10	23	70	47	47	0.00		0.0		0		0.26	5	61	59			
	2015	10	24	76	47	53	0.00		0.0		0		0.19	5	62	61			
	2015	10	25	68	39	48	0.00		0.0		0		0.10	5	62	61			
	2015	10	26	70	41	42	0.00		0.0		0		0.12	5	64	56			
	2015	10	27	71	40	46	0.00		0.0		0		0.26	5	60	55			
	2015	10	28	80	44	44	0.00		0.0		0		0.25	5	58	55			
	2015	10	29	66	41	41	0.00		0.0		0		0.20	5	58	55			
	2015	10	30	67	41	50	0.09		0.0		0		0.00	5	58	55			
	2015	10	31				0.00		0.0		0								
Summary				76.0	49.8		4.37		0.0										

The ** flags in Preliminary indicate the data have not completed processing and qualitycontrol and may not be identical to the original observation
Empty, or blank, cells indicate that a data observation was not reported.
*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown
"s" This data value failed one of NCDC's quality control tests.
"T" values in the Precipitation category above indicate a TRACE value was recorded.
"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.
Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

[illegible]

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-85

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MMB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1230	9.54	10.64	1.10	20.34	NK	Yes	Yes	Yes	Yes		Weather: Sl. cloudy, 70s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
			1.0								
			1.5								
			2.0								
			2.5								
			3.0								
			3.5								
			4.0								

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		MW-85										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-86

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MOB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1245	9.46	9.59	0.13	19.21	IVA	Yes	Yes	Yes	Yes		Weather: Sl. Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		MW-86										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-120

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: MMB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1720	N/A	1.62	0.00	27.98	17.5	Yes	Yes	Yes	Yes		Weather: Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1725	12.20	0.5	7.45	21.7	11950	3.1	-87.3	10.1	Clear	Low-flow groundwater sample:
	1727	12.20	1.0	7.37	21.4	12400	2.0	-87.7	8.8		(A) peristaltic pump w/ ded tubing
	1730	12.20	1.5	7.30	21.1	12620	1.4	-89.5	7.6		B) ded bladder pump
	1732	12.20	2.0	7.26	21.0	12680	1.0	-90.2	6.9		C) non-ded bladder pump; or
	1735	12.20	2.5	7.24	20.8	12700	0.9	-90.7	5.1		Standard groundwater sample:
	1737	12.20	3.0	7.22	20.7	12700	0.8	-90.5	3.2		D) bailer due to limited column; or
	1740	12.20	3.5	7.20	20.8	12690	0.8	-90.8	1.9		E) recovery well cycling sample
	1742	12.20	4.0	7.19	20.8	12700	0.7	-91.1	1.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1745	MW-120	12.20	7.19	20.8	12700	0.7	-91.1	1.1	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										TPH	HCL	TX1005 (comparison)

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-121

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: MPM

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1630	NA	12.11	0.0	27.28	17.5	Yes	Yes	Yes	Yes		Weather: Cloudy, 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1635	12.21	0.5	7.65	22.6	8250	3.8	-11.7	27.1	Clear w/ white	Low-flow groundwater sample:
	1637	12.26	1.0	7.54	22.2	7810	1.9	-7.8	15.1	particles	(A) peristaltic pump w/ ded tubing
	1640	12.30	1.5	7.46	22.0	7550	1.1	-5.4	10.4		B) ded bladder pump
	1642	12.33	2.0	7.41	21.9	7406	0.8	-4.9	5.3		C) non-ded bladder pump; or
	1645	12.35	2.5	7.38	21.9	7330	0.7	-5.9	4.7		Standard groundwater sample:
	1647	12.36	3.0	7.35	21.8	7260	0.7	-9.4	3.4		D) bailer due to limited column; or
	1650	12.36	3.5	7.33	21.8	7240	0.7	-12.4	2.8		E) recovery well cycling sample
	1652	12.37	4.0	7.30	21.8	7220	0.7	-14.1	1.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1655	MW-121	12.37	7.30	21.8	7220	0.7	-14.1	1.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-84

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: MMB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1300	NA	8.06	0.0	20.56	15.2	Yes	Yes	Yes	Yes		Weather: Sl. Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1305	8.19	0.5	7.92	23.9	11130	3.8	116.5	3.4	Clear w/ gold tint	Low-flow groundwater sample:
	1307	8.25	1.0	7.70	23.3	11240	1.7	51.7	3.7		A) peristaltic pump w/ ded tubing
	1310	8.30	1.5	7.53	23.2	11230	1.4	54.9	3.9		B) ded bladder pump
	1312	8.34	2.0	7.43	23.7	11230	1.1	57.3	2.8		C) non-ded bladder pump; or
	1315	8.38	2.5	7.38	23.3	11250	1.1	58.3	3.0		Standard groundwater sample:
	1317	8.42	3.0	7.34	23.3	11280	1.0	59.0	2.7		D) bailer due to limited column; or
	1320	8.44	3.5	7.31	23.3	11260	0.9	59.3	2.8		E) recovery well cycling sample
✓	1322	8.46	4.0	7.30	23.3	11270	0.9	59.5	2.5	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1325	MW-84	8.46	7.30	23.3	11270	0.9	59.5	2.5	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN 8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-122

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MJB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1410	NA	10.19	0.8	23.31	18.4	Yes	Yes	Yes	Yes		Weather: Sl. Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1415	10.72	0.5	7.40	21.4	8540	2.5	-92.8	24.1	Clear	Low-flow groundwater sample:
	1417	10.96	1.0	7.72	21.2	8310	1.6	-94.0	20.6		A) peristaltic pump w/ ded tubing
	1420	11.10	1.5	7.63	20.9	8140	1.4	-91.6	14.3		B) ded bladder pump
	1422	11.25	2.0	7.51	20.7	7880	1.2	-86.5	6.8		C) non-ded bladder pump; or
	1425	11.27	2.5	7.45	20.3	7740	1.1	-84.1	5.6	reduced purge rate to 0.14m	Standard groundwater sample:
	1430	11.28	3.0	7.46	20.8	7720	1.1	-82.1	4.3		D) bailer due to limited column; or
	1435	11.29	3.5	7.37	20.8	7710	1.0	-81.8	3.5		E) recovery well cycling sample
	1440	11.30	4.0	7.37	20.8	7760	1.0	-88.8	2.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1445	MW-122	11.30	7.37	20.8	7700	1.0	-80.8	2.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										TPH	ITC	TX 1005 (Comparison)

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-80

(Gauge only)

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MOB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	950	NA	880	0.0	14.67	14.67	Yes	Yes	Yes	Yes		Weather: Sl. cloudy, 70°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

+ EB-EP-04
(for same analyses)

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: MW-79
Event: Fall 2015
Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: MDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	955	NA	10.17	0.0	19.37	15.0	Yes	Yes	Yes	Yes		Weather: Sl. Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1000	10.29	0.5	7.93	21.2	8470	3.2	-85.1	11.4	Clear	Low-flow groundwater sample:
	1002	10.33	1.0	7.74	20.9	7930	2.2	-84.8	7.5		A) peristaltic pump w/ ded tubing
	1005	10.37	1.5	7.55	20.5	7340	1.6	-86.9	7.0		B) ded bladder pump
	1007	10.40	2.0	7.46	20.3	7140	1.3	-84.2	6.7		C) non-ded bladder pump; or
	1010	10.44	2.5	7.39	20.1	7040	1.1	-82.1	6.0		Standard groundwater sample:
	1012	10.46	3.0	7.36	20.1	7010	1.0	-80.8	5.8		D) bailer due to limited column; or
	1015	10.48	3.5	7.34	20.1	7000	1.0	-80.1	5.1		E) recovery well cycling sample
	1017	10.50	4.0	7.32	20.1	6980	0.9	-79.4	4.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1020	MW-79	10.50	7.32	20.1	6980	0.9	-79.4	4.4	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN 8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
	1035	EB-EP-04	NA							Same as above	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

Monitoring Well Purging and Sampling Record

+EB-EP-01
(for same analyses)

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-74

Event: Fall 2015

Area of Concern: EP

(4-in; stickup)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MMB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1100	NA	9.14	0.0	20.16	14.8	Yes	Yes	Needs lock	Yes		Weather: S. cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1105	9.28	0.5	7.32	22.3	10500	2.5	19.3	5.4	Clear	Low-flow groundwater sample:
	1107	9.31	1.0	7.25	21.8	10730	1.6	25.6	3.7		A) peristaltic pump w/ ded tubing
	1110	9.32	1.5	7.17	21.6	10770	1.1	29.8	2.2		B) ded bladder pump
	1112	9.32	2.0	7.13	21.5	10800	0.9	33.3	2.0		C) non-ded bladder pump; or
	1115	9.32	2.5	7.09	21.4	10820	0.8	36.2	2.2		Standard groundwater sample:
	1117	9.32	3.0	7.07	21.4	10840	0.8	38.7	2.6		D) bailer due to limited column; or
	1120	9.32	3.5	7.06	21.4	10840	0.8	39.8	2.8		E) recovery well cycling sample
	1122	9.32	4.0	7.05	21.4	10830	0.8	40.8	2.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1125	MW-74	9.32	7.05	21.4	10830	0.8	40.8	2.4	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	GM4500
	1140	EB-EP-01	NA							Same as above	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
								Anions (Chloride,Fluoride,Sulfate)		Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-2A

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: MDR

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1530	N/A	10.53	0.0	17.35	15.0	Yes	Yes	Yes	Yes		Weather: Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1535	10.29	0.5	7.52	22.1	10960	3.6	-59.7	3.6	Clear	Low-flow groundwater sample:
	1537	10.49	1.0	7.43	22.0	10970	1.8	-51.1	2.1		(A) peristaltic pump w/ ded tubing
	1540	10.99	1.5	7.32	21.9	11040	1.5	-41.4	1.9		B) ded bladder pump
	1542	11.00	2.0	7.27	21.9	11180	1.3	-35.0	1.7		C) non-ded bladder pump; or
	1545	11.00	2.5	7.21	21.9	11450	1.3	-29.2	2.0		Standard groundwater sample:
	1547	11.01	3.0	7.16	21.8	11470	1.2	-24.3	1.9		D) bailer due to limited column; or
	1550	11.02	3.5	7.14	21.8	11480	1.1	-22.4	1.8		E) recovery well cycling sample
	1552	11.02	4.0	7.11	21.8	11500	1.1	-20.6	1.5		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1555	MW-2A	11.02	7.11	21.8	11500	1.1	-20.6	1.5	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

(Not in Sampling Program)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-2B

(Gauge only)

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MDM

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1620	NA	10.52	0.0	57.98	NO sample	Yes	Yes	Yes	Yes		Weather: Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
			1.0								
			1.5								
			2.0								
			2.5								
			3.0								
			3.5								
			4.0								

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-72 (Gauge only)

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MDP

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	940	NA	7.61	0.0	13.93	11.93	Yes	Yes	Yes	Yes		Weather: 51. Cloudy, 60s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Com. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										BRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: OCD-6

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MBH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	855	NA	10.54	0.0	26.41	21.6	Yes	lid can't close properly	Yes	Yes	Cracked Pad	Weather: Sl. Cloudy 60°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	900	10.79	0.5	7.44	20.8	15830	2.9	-99.0	31.3	Sl. Cloudy	Low-flow groundwater sample:
	902	10.80	1.0	7.26	20.5	15310	1.3	-97.8	21.6	Clear	A) peristaltic pump w/ ded tubing
	905	10.80	1.5	7.17	20.3	15380	1.0	-96.8	20.1		B) ded bladder pump
	907	10.80	2.0	7.13	20.2	15430	0.9	-96.6	19.4		C) non-ded bladder pump; or
	910	10.80	2.5	7.10	20.2	15460	0.8	-96.4	18.3		Standard groundwater sample:
	912	10.80	3.0	7.08	20.2	15440	0.8	-96.3	16.6		D) bailer due to limited column; or
	915	10.80	3.5	7.07	20.1	15440	0.7	-96.3	17.4		E) recovery well cycling sample
	917	10.80	4.0	7.06	20.2	15440	0.7	-96.3	16.5		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	920	OCD-6	10.80	7.06	20.2	15440	0.7	-96.3	16.5	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: OCD-7AR

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: MDB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection				Comments
							Cap	Casing	Well Secured	Label	Other
10/19/15	810	NA	9.68	0.0	21.28	16.0	Yes	Yes	Yes	Yes	
											Weather: si. cloudy 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	815	9.82	0.5	6.63	21.7	12020	2.3	-61.8	15.4	Clear	Low-flow groundwater sample:
	817	9.84	1.0	6.78	21.6	12100	1.6	-81.8	12.2		A) peristaltic pump w/ ded tubing
	820	9.86	1.5	6.87	21.9	12130	1.1	-93.9	9.1		B) ded bladder pump
	822	9.89	2.0	6.93	21.5	12130	0.9	-101.9	7.9		C) non-ded bladder pump; or
	825	9.93	2.5	6.95	21.6	12120	0.8	-104.7	5.1		Standard groundwater sample:
	827	9.96	3.0	6.97	21.6	12120	0.7	-105.4	4.6		D) bailer due to limited column; or
	830	9.97	3.5	6.98	21.6	12130	0.7	-108.0	3.1		E) recovery well cycling sample
	832	9.98	4.0	6.99	21.6	12120	0.7	-108.7	2.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	835	OCD-7AR	9.98	6.99	21.6	12120	0.7	-108.7	2.4			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **OCD-7B** (Gauge Only)

Event: Fall 2015

Area of Concern: **EP**

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: **MDJ**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	800	NA	9.52	0.0	56.85	51.85	Yes	Yes	Yes	Yes		Weather: Sl. Cloudy 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-76

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	900	NA	10.68	0.0	26.35	16.0	Yes	Yes	Yes	Yes		Weather: Partly Cloudy 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	905	10.74	0.5	6.38	20.1	5640	3.4	-66.5	4.5	Clear, odor, colorless	Low-flow groundwater sample:
	907	10.74	1.0	6.60	20.3	5800	1.4	-89.8	3.8		A) peristaltic pump w/ ded tubing
	910	10.74	1.5	6.70	20.4	5840	1.3	-107.7	3.3		B) ded bladder pump
	912	10.74	2.0	6.74	20.5	5860	1.2	-116.2	2.8		C) non-ded bladder pump; or
	915	10.74	2.5	6.76	20.6	5850	1.2	-122.7	2.5		Standard groundwater sample:
	917	10.74	3.0	6.78	20.6	5850	1.1	-128.4	2.1		D) bailer due to limited column; or
	920	10.74	3.5	6.79	20.7	5860	1.1	-133.1	1.9		E) recovery well cycling sample
	922	10.74	4.0	6.80	20.8	5850	1.0	-135.7	1.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	925	MW-76	10.74	6.80	20.8	5850	1.0	-135.7	1.7	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-77

Event: Fall 2015

Area of Concern: EP

(4-in; stickup)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	950	NA	8.87	0.0	20.56	15.2	Yes	Yes	Yes	Yes		Weather: Partly Cloudy 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	955	9.01	0.5	6.81	21.2	7180	4.8	-96.8	5.4	Clear, gold tint, odor	Low-flow groundwater sample:
	957	9.03	1.0	6.78	21.2	7210	4.3	-103.1	4.7		(A) peristaltic pump w/ ded tubing
	1000	9.05	1.5	6.76	21.2	7210	3.8	-113.7	4.1		B) ded bladder pump
	1002	9.06	2.0	6.75	21.3	7220	3.6	-119.9	3.6		C) non-ded bladder pump; or
	1005	9.07	2.5	6.75	21.4	7220	3.4	-125.0	3.2		Standard groundwater sample:
	1007	9.07	3.0	6.75	21.5	7220	3.3	-129.6	3.1		D) bailer due to limited column; or
	1010	9.08	3.5	6.75	21.6	7230	3.3	-132.3	2.9		E) recovery well cycling sample
	1012	9.08	4.0	6.75	21.6	7220	3.2	-134.2	2.9		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1615	MW-77	9.08	6.75	21.6	7220	3.2	-134.2	2.9			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										TPH	HCL	TX1005 (Comparison)

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-75

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1055	NA	9.08	0.0	23.71	18.4	Yes	Yes	Yes	Yes		Weather: Partly Cloudy 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1100	9.11	0.5	7.30	22.3	6870	3.3	-114.3	4.3	clear w/ gold tint	Low-flow groundwater sample:
	1102	9.11	1.0	7.10	22.2	6830	2.6	-123.2	3.8	odor	A) peristaltic pump w/ ded tubing
	1105	9.11	1.5	7.06	22.2	6810	2.0	-128.2	3.2		B) ded bladder pump
	1107	9.11	2.0	7.03	22.2	6780	1.4	-133.7	2.9		C) non-ded bladder pump; or
	1110	9.12	2.5	7.02	22.1	6760	1.3	-137.4	2.5		Standard groundwater sample:
	1112	9.12	3.0	7.01	22.1	6750	1.4	-140.3	2.1		D) bailer due to limited column; or
	1115	9.12	3.5	7.01	22.1	6750	1.3	-143.0	1.8		E) recovery well cycling sample
	1117	9.12	4.0	7.01	22.1	6750	1.3	-144.5	1.6		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1120	MW-75	9.12	7.01	22.1	6750	1.3	-144.5	1.6			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
						Cyanide					NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: MW-83

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(4-in; stickup)

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1140	NA	8.93	0.0	19.93	15.6	Yes	Yes	Yes	Yes		Weather: Partly Cloudy 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1145	9.02	0.5	7.25	23.4	3820	2.8	-20.5	17.8	Clear w/ slight gold tint	Low-flow groundwater sample:
	1147	9.07	1.0	7.05	23.2	3760	2.1	-8.7	11.5		A) peristaltic pump w/ ded tubing
	1150	9.09	1.5	7.00	23.4	3730	1.5	-2.8	10.6		B) ded bladder pump
	1152	9.11	2.0	6.97	23.3	3710	1.2	-0.6	9.8		C) non-ded bladder pump; or
	1155	9.12	2.5	6.97	23.2	3710	1.1	-1.0	9.4		Standard groundwater sample:
	1157	9.13	3.0	6.96	23.3	3720	1.0	-5.2	9.1		D) bailer due to limited column; or
	1200	9.14	3.5	6.95	23.2	3720	0.9	-8.2	8.8		E) recovery well cycling sample
	1202	9.15	4.0	6.95	23.2	3720	0.9	-10.3	8.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1205	MW-83	9.15	6.95	23.2	3720	0.9	-10.3	8.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

+ Dup-EP-03
(For same analyses)

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-3

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1225	NA	8.98	0.0	20.08	16.1	Yes	Yes	Issue	Yes	No Pad visible	Weather: Partly Cloudy 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1230	9.03	0.5	7.52	23.4	7210	3.5	9.7	5.8	Clear	Low-flow groundwater sample:
	1232	9.04	1.0	7.30	23.0	7260	2.4	14.4	4.9		A) peristaltic pump w/ ded tubing
	1235	9.05	1.5	7.22	22.9	7270	1.9	16.8	4.5		B) ded bladder pump
	1237	9.06	2.0	7.17	22.8	7260	1.6	20.5	4.1		C) non-ded bladder pump; or
	1240	9.06	2.5	7.15	22.8	7230	1.5	22.7	3.5		Standard groundwater sample:
	1242	9.06	3.0	7.13	22.8	7220	1.4	24.7	3.2		D) bailer due to limited column; or
	1245	9.06	3.5	7.12	22.9	7210	1.3	25.1	2.8		E) recovery well cycling sample
	1247	9.06	4.0	7.11	22.9	7200	1.3	25.8	2.5		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1250	MW-3	9.06	7.11	22.9	7200	1.3	25.8	2.5			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										Same as above	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-88

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	740	NA	8.45	0.0	20.33	14.8	Yes	Yes	Yes	Yes	hole in well pad	Weather: Partly Cloudy 60's
10/20/15	830	NA	8.47	0.0	20.33	14.8						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	835	8.52	0.5	6.28	19.1	14,270	2.5	+38.5	18.3	clear w/ small particles	Low-flow groundwater sample:
	837	8.53	1.0	6.55	19.2	14,280	2.0	+25.4	12.5		
	840	8.54	1.5	6.69	19.3	14,300	1.8	+18.2	10.3		A) peristaltic pump w/ ded tubing
	842	8.55	2.0	6.87	19.2	14,320	1.6	+5.7	9.7		B) ded bladder pump
	845	8.55	2.5	6.92	19.2	14,310	1.5	+0.3	9.3		C) non-ded bladder pump; or
	847	8.56	3.0	6.95	19.3	14,290	1.4	-3.2	8.9		Standard groundwater sample:
	850	8.57	3.5	6.97	19.3	14,290	1.4	-6.3	8.6		D) bailer due to limited column; or
	852	8.58	4.0	6.98	19.2	14,280	1.3	-7.1	8.3		E) recovery well cycling sample
											F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	855	MW-88	8.58	6.98	19.2	14,280	1.3	-7.1	8.3			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

+ DUP-EP-02
(for same analyses)

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: MW-22A
Event: Fall 2015
Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

(4-in; stickup)

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	755	NA	7.72	0.0	22.71	17.4	Yes	Yes	Yes	Yes		Weather: Partly Cloudy 60's
10/20/15	915	NA	7.72	0.0	22.71	17.4						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	920	7.79	0.5	6.99	20.7	9250	2.6	-73.0	35.8	Clear w/ small orange	Low-flow groundwater sample:
	922	7.86	1.0	6.91	20.9	9170	2.3	-92.0	26.4	particles	(A) peristaltic pump w/ ded tubing
	925	7.89	1.5	6.90	21.0	9140	1.8	-101.0	15.6		B) ded bladder pump
	927	7.91	2.0	6.88	21.0	9130	1.6	-109.3	13.8		C) non-ded bladder pump; or
	930	7.93	2.5	6.88	21.1	9120	1.5	-114.9	12.5		Standard groundwater sample:
	932	7.95	3.0	6.89	21.0	9120	1.4	-119.0	11.3		D) bailer due to limited column; or
	935	7.97	3.5	6.90	20.9	9110	1.3	-121.9	10.1		E) recovery well cycling sample
	937	7.99	4.0	6.90	20.9	9110	1.3	-122.5	9.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	940	MW-22A	7.99	6.90	20.9	9110	1.3	-122.5	9.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										Same as above	Same	Same
										TPH	HCL	TX 1005 (Comparison)

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

* Located approx. 15 yds off left side of path (after the "S" turn)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-10

Event: Fall 2015

Area of Concern: EP

(2-in; stickup)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	805	NA	5.15	0.0	18.52	13.3	Yes	Yes	Yes	Yes	Cracked/ Pad	Weather: Partly Cloudy 60's
10/20/15	1020	NA	5.15	0.0	18.52	13.3						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	1025	5.16	0.5	7.25	20.3	5320	1.6	-49.5	5.4	Clear	Low-flow groundwater sample:
	1027	5.17	1.0	7.09	20.2	5200	1.3	-43.4	4.1		A) peristaltic pump w/ ded tubing
	1030	5.17	1.5	7.01	20.1	5080	1.0	-36.4	3.7		B) ded bladder pump
	1032	5.17	2.0	6.96	20.0	5060	1.0	-27.8	3.4		C) non-ded bladder pump; or
	1035	5.17	2.5	6.94	20.1	5020	0.9	-23.3	3.0		Standard groundwater sample:
	1037	5.17	3.0	6.93	20.1	5010	0.9	-18.2	2.8		D) bailer due to limited column; or
	1040	5.17	3.5	6.93	20.2	5010	0.8	-16.4	2.4		E) recovery well cycling sample
	1042	5.17	4.0	6.92	20.2	5010	0.8	-13.9	2.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1045	MW-10	5.17	6.92	20.2	5010	0.8	-13.9	2.1	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-4A

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1335	NA	11.54	0.0	>12.06	11.5	Yes	Issue	Yes	Yes	subsidence under pad	Weather: Partly Cloudy 70's (40.5')
								No casing lid				

Well Purging Record

Blockage at 12.06' TOC. Blockage at 7.3' and 10.5' TOC but tubing will pass

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1340	11.56	0.5	7.59	24.0	3490	4.3	-288.4	165.4	black tint, odor	Low-flow groundwater sample:
	1342	11.56	1.0	7.46	23.8	4130	3.2	-305.0	142.8		A) peristaltic pump w/ ded tubing
	1345	11.56	1.5	7.42	23.6	4830	2.6	-305.8	97.4		B) ded bladder pump
	1347	11.56	2.0	7.39	23.3	5070	2.3	-302.5	36.3		C) non-ded bladder pump; or
	1350	11.56	2.5	7.37	23.2	5170	2.1	-299.1	21.5	Clear w/ black particles	Standard groundwater sample:
	1352	11.56	3.0	7.35	23.3	5230	1.9	-295.1	13.6		D) bailer due to limited column; or
	1355	11.56	3.5	7.33	23.4	5240	1.8	-292.5	10.4		E) recovery well cycling sample
	1357	11.56	4.0	7.32	23.4	5250	1.8	-291.4	9.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1400	MW-4A	11.56	7.32	23.4	5250	1.8	-291.4	9.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: MW-5A
Event: Fall 2015
Area of Concern: EP

(2-in; stickup)

+EB-EP-03
(For same analyses)

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1435	NA	7.93	0.0	20.18	14.8	Yes	Yes	Yes	Yes		Weather: Partly Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1440	7.98	0.5	7.51	23.5	16,250	3.9	-133.5	23.2	Clear	Low-flow groundwater sample:
	1442	7.98	1.0	7.37	23.2	17,040	3.3	-145.8	13.5		A) peristaltic pump w/ ded tubing
	1445	7.98	1.5	7.30	23.2	17,240	3.1	-153.2	10.3		B) ded bladder pump
	1447	7.98	2.0	7.26	23.2	17,330	2.9	-157.5	8.7		C) non-ded bladder pump; or
	1450	7.98	2.5	7.23	23.2	17,380	2.8	-161.2	6.4		Standard groundwater sample:
	1452	7.98	3.0	7.20	23.1	17,490	2.7	-166.2	6.1		D) bailer due to limited column; or
	1455	7.98	3.5	7.19	23.0	17,480	2.7	-169.3	5.8		E) recovery well cycling sample
	1457	7.98	4.0	7.19	23.0	17,480	2.6	-170.2	5.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1500	MW-5A	7.98	7.19	23.0	17,480	2.6	-170.2	5.4	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
✓	1515	EB-EP-03	NA							Same as above	same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-5B (Gauge Only)

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1420	NA	8.31	0.0	53.54	48.5	Yes	Yes	Yes	Yes	Cracked Pad	Weather: Partly Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

Monitoring Well Purging and Sampling Record

+ DUP-EP-01

(for same analyses)

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-7A

Event: Fall 2015

Area of Concern: EP

(2-in; stickup)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1540	NA	7.56	0.0	1740	12.1	Yes	Yes	Issue	Yes		Weather: Partly Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1545	7.66	0.5	7.91	21.7	9380	1.7	-70.2	19.8	clear, orange particles	Low-flow groundwater sample:
	1547	7.67	1.0	7.66	21.5	8870	1.5	-75.8	14.5		A) peristaltic pump w/ ded tubing
	1550	7.67	1.5	7.46	21.2	8560	1.3	-80.6	10.8		B) ded bladder pump
	1552	7.67	2.0	7.37	21.2	8340	1.2	-87.2	9.4		C) non-ded bladder pump; or
	1555	7.67	2.5	7.34	21.2	8300	1.1	-88.5	7.3		Standard groundwater sample:
	1557	7.67	3.0	7.30	21.3	8280	1.1	-90.7	6.9		D) bailer due to limited column; or
	1600	7.67	3.5	7.29	21.2	8270	1.0	-91.8	6.7		E) recovery well cycling sample
	1602	7.67	4.0	7.28	21.3	8260	1.1	-92.5	6.6		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1605	MW-7A	7.67	7.28	21.3	8260	1.1	-92.5	6.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
	1100	DUP-EP-01	7.67	7.28	21.3	8260	1.1	-92.5	6.6	Same as above	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)		Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **OCD-8A**

Event: Fall 2015

Area of Concern: **EP**

(2-in; stickup)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1655	NA	9.03	0.0	20.76	16.4	Yes	Yes	Yes	Yes		Weather: Partly Cloudy 70°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1700	9.48	0.5	7.17	22.0	13,990	2.8	-83.5	6.2	Clear w/ black particles	Low-flow groundwater sample:
	1702	9.63	1.0	7.01	21.9	14,280	2.2	-99.0	5.7		A) peristaltic pump w/ ded tubing
	1705	9.70	1.5	6.96	22.0	14,380	1.9	-112.7	5.4		B) ded bladder pump
	1707	9.75	2.0	6.93	22.0	14,470	1.7	-116.2	4.3		C) non-ded bladder pump; or
	1710	9.78	2.5	6.93	22.0	14,500	1.6	-117.7	4.7		Standard groundwater sample:
	1712	9.81	3.0	6.92	22.0	14,520	1.5	-119.6	4.9		D) bailer due to limited column; or
	1715	9.83	3.5	6.92	22.0	14,530	1.4	-120.9	5.1		E) recovery well cycling sample
	1717	9.85	4.0	6.92	22.0	14,530	1.4	-122.1	4.6		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1720	OCD-8A	9.85	6.92	22.0	14,530	1.4	-122.1	4.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

Not in Sampling Program

Monitoring Well Purging and Sampling Record

Navajo Refining Company
 Artesia Refinery
 Artesia, New Mexico
 Well Inspection Information

Well: NP-8 (Gauge Only)
 Event: Fall 2015
 Area of Concern: TMD

Hydrologic Monitoring
 for ARCADIS
 Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	740	NA	12.42	0.0	15.23	NA	Issue	Issue	Issue	Yes		Weather: Sunny, 60s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

PVC well is approx. 2 feet below top of metal protective casing. Unable to access tip of well, so no cap is present. DTW + TOC measured from top of metal casing. Metal protective casing needs to be cut down.

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										BRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: OCLD-1R

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	805	NA	12.20	0.0	23.90	18.6	Yes	OK	Yes	Yes		Weather: Sunny, 60s
								(Issue)				

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-19-15	810	12.38	0.5	7.19	20.5	12,450	4.1	-1.3	6.4	clear	Low-flow groundwater sample:
	813	12.43	1.0	7.14	20.5	12,300	1.8	-10.2	5.1		(A) peristaltic pump w/ ded tubing
	815	12.44	1.5	7.11	20.6	12,140	1.2	-14.6	3.6		B) ded bladder pump
	818	12.44	2.0	7.09	20.6	12,020	0.9	-18.2	2.7		C) non-ded bladder pump; or
	820	12.44	2.5	7.08	20.6	11,970	0.8	-21.9	2.1		Standard groundwater sample:
	823	12.44	3.0	7.08	20.6	11,940	0.8	-24.8	2.0		D) bailer due to limited column; or
	825	12.44	3.5	7.07	20.7	11,890	0.7	-27.0	1.6		E) recovery well cycling sample
	828	12.44	4.0	7.07	20.7	11,860	0.7	-29.3	1.8	✓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	830	OCLD-1R	12.44	7.07	20.7	11,860	0.7	-29.3	1.8	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: OCD-2A

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1210	NA	12.12	0.0	21.59	22.3	Yes	Yes	Yes	Yes		Weather: <u>Sunny, 70s</u>
									Added	lock		

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	1215	12.23	0.5	7.54	22.5	9130	3.6	-70.6	27.1	clear w/ orange	Low-flow groundwater sample:
	1218	12.23	1.0	7.48	21.6	9100	1.6	-70.8	16.8	algae particles	(A) peristaltic pump w/ ded tubing
	1220	12.24	1.5	7.44	21.2	9090	0.9	-71.9	9.7	↓	B) ded bladder pump
	1223	12.24	2.0	7.38	21.0	9000	0.9	-70.1	8.1	clear	C) non-ded bladder pump; or
	1225	12.24	2.5	7.36	20.9	8920	0.8	-67.2	6.7	↓	Standard groundwater sample:
	1228	12.24	3.0	7.35	20.8	8830	0.8	-64.3	6.3	↓	D) bailer due to limited column; or
	1230	12.24	3.5	7.34	20.8	8790	0.9	-61.8	6.0	↓	E) recovery well cycling sample
↓	1233	12.24	4.0	7.33	20.7	8760	0.9	-59.4	5.8	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1235	OCD-2A	12.24	7.33	20.7	8760	0.9	-59.4	5.8	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite		H2SO4 per ARCADIS
										TDS		Neat 2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide		NaOH SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Initials: BRH

[illegible]

Well Purging Record

[illegible]

Well Sampling Record

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: OCLD-3

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1120	NA	12.61	0.0	25.48	20.2	Yes	Yes	Yes	Yes	Pad is destroyed	Weather: Sunny, 70s
									Big lock added			

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	1125	12.75	0.5	7.65	22.7	7130	3.6	23.0	180.0	clear w/ orange	Low-flow groundwater sample:
	1128	12.76	1.0	7.51	22.0	7060	1.4	21.7	112.0	algae particles	A) peristaltic pump w/ ded tubing
	1130	12.76	1.5	7.46	21.7	7030	0.8	22.1	54.0		B) ded bladder pump
	1133	12.76	2.0	7.41	21.6	7030	0.7	23.2	27.8		C) non-ded bladder pump; or
	1135	12.76	2.5	7.39	21.5	7030	0.6	23.8	18.6		Standard groundwater sample:
	1138	12.76	3.0	7.36	21.4	7030	0.6	24.2	10.2		D) bailer due to limited column; or
	1140	12.76	3.5	7.35	21.4	7020	0.7	24.6	9.6		E) recovery well cycling sample
✓	1143	12.76	4.0	7.33	21.3	7020	0.7	25.1	8.4	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1145	OCLD-3	12.76	7.33	21.3	7020	0.7	25.1	8.4			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **OCD-4**

Event: Fall 2015

Area of Concern: **EP**

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: **BRH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1035	NA	11.84	0.0	25.44	20.1	Yes	Yes	Yes	Yes	Subsidence under pad	Weather: Sunny, 60s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	1040	11.85	0.5	7.63	22.1	13,840	3.4	-120.8	178.0	Clear w/ Orange	Low-flow groundwater sample:
	1043	11.85	1.0	7.53	21.8	13,510	1.1	-123.6	87.0	algae particles	A) peristaltic pump w/ ded tubing
	1045	11.85	1.5	7.48	21.6	13,340	0.8	-125.5	56.0		B) ded bladder pump
	1048	11.86	2.0	7.42	21.5	13,210	0.7	-128.1	41.7		C) non-ded bladder pump; or
	1050	11.86	2.5	7.38	21.4	13,100	0.6	-129.4	38.2		Standard groundwater sample:
	1053	11.86	3.0	7.34	21.4	13,060	0.6	-131.0	37.6		D) bailer due to limited column; or
	1055	11.86	3.5	7.31	21.3	13,040	0.5	-132.3	37.9		E) recovery well cycling sample
	1058	11.86	4.0	7.30	21.3	13,030	0.5	-133.7	38.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1100	OCD-4	11.86	7.30	21.3	13,030	0.5	-133.7	38.1	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN 8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-11A

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	950	NA	9.42	0.0	22.00	17.0	Yes	Yes	Yes	Yes		Weather: Sunny, 60s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-19-15	955	9.52	0.5	7.15	21.7	27,100	2.8	-27.1	13.8	clear	Low-flow groundwater sample:
	958	9.53	1.0	7.07	21.7	27,200	1.4	-20.8	9.2		A) peristaltic pump w/ ded tubing
	1000	9.53	1.5	7.02	21.6	27,300	1.0	-24.8	6.1		B) ded bladder pump
	1003	9.54	2.0	6.98	21.6	27,300	0.8	-27.4	5.3		C) non-ded bladder pump; or
	1005	9.54	2.5	6.94	21.6	27,300	0.7	-30.5	5.0		Standard groundwater sample:
	1008	9.54	3.0	6.91	21.5	27,400	0.6	-34.8	4.6		D) bailer due to limited column; or
	1010	9.54	3.5	6.89	21.5	27,400	0.6	-39.1	4.2		E) recovery well cycling sample
	1013	9.54	4.0	6.88	21.4	27,400	0.6	-42.6	4.1	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1015	MW-11A	9.54	6.88	21.4	27,400	0.6	-42.6	4.1			Lab: ESC Lab Sciences, Mt. Juliet, TN
										BRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)		HNO3 6010/6020
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg, Ni, Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: OGD-5

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	900	NA	9.99	0.0	25.42	20.6	Yes	Yes	Yes	Yes		Weather: Sunny, 60s
									(Lock added)			

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	905	10.07	0.5	7.47	20.6	14,350	3.5	-114.7	108.0	clear w/ orange	Low-flow groundwater sample:
	908	10.08	1.0	7.41	20.4	14,460	1.3	-116.0	65.0	algae particles	A) peristaltic pump w/ ded tubing
	910	10.08	1.5	7.39	20.3	14,520	1.1	-117.8	47.3		B) ded bladder pump
	913	10.08	2.0	7.36	20.2	14,560	1.0	-119.1	31.6		C) non-ded bladder pump; or
	915	10.08	2.5	7.35	20.2	14,580	0.9	-120.6	27.8		Standard groundwater sample:
	918	10.08	3.0	7.34	20.2	14,600	0.9	-122.8	25.2		D) bailer due to limited column; or
	920	10.08	3.5	7.32	20.1	14,610	0.8	-125.7	24.5		E) recovery well cycling sample
	923	10.08	4.0	7.31	20.1	14,620	0.8	-127.2	24.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	925	OGD-5	10.08	7.31	20.1	14,620	0.8	-127.2	24.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-87

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1440	NA	8.37	0.0	20.39	15.1	Yes	Yes	Yes	Yes		Weather: Cloudy, 80s
									(lock added)			

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-19-15	1445	8.48	0.5	7.62	22.9	15,540	3.8	-154.2	10.8	Clear	Low-flow groundwater sample:
	1446	8.54	1.0	7.53	22.6	15,720	1.6	-156.8	6.5		A) peristaltic pump w/ ded tubing
	1450	8.59	1.5	7.46	22.5	15,850	1.1	-159.0	4.8		B) ded bladder pump
	1453	8.63	2.0	7.40	22.4	15,900	1.0	-160.9	4.0		C) non-ded bladder pump; or
	1455	8.66	2.5	7.36	22.4	15,910	0.9	-162.3	3.6		Standard groundwater sample:
	1458	8.69	3.0	7.33	22.3	15,930	0.9	-164.8	3.2		D) bailer due to limited column; or
	1500	8.72	3.5	7.31	22.3	15,930	0.9	-165.6	2.9		E) recovery well cycling sample
	1503	8.75	4.0	7.29	22.4	15,940	0.9	-166.5	2.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1505	MW-87	8.75	7.29	22.4	15,940	0.9	-166.5	2.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300-
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

Not in Sampling Program

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-18T

(Gauge Only)

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1608	NA	9.75	0.0	50.40	NA	NO	Issue	Issue	Yes		Weather: Cloudy, 70s
								(Missing)	(a "lock" will not solve this issue)			

Well Purging Record

↳ measured from highest point on PVC

↳ Top of PVC shattered. Needs repairs to allow usage of a cap. No protective lid either.

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15			0.5								 Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
			1.0								
			1.5								
			2.0								
			2.5								
			3.0								
			3.5								
			4.0								

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments	
10-19-15												Lab: ESC Lab Sciences, Mt. Juliet, TN	
										DRO	HCL	8015M	
										GRO	HCL	8015M	
										VOC	HCL	8260	
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020	
								Anions (Chloride,Fluoride,Sulfate)			Neat	300	
										Nitrate-Nitrite	H2SO4	per ARCADIS	
										TDS	Neat	2540C	
										Total Metals (Hg,Ni,Va)		HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500	

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-70

Event: Fall 2015

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1620	NA	7.91	0.0	22.05	16.8	Yes	Yes	Yes	Yes		Weather: Cloudy, 70s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-19-15	1625	7.97	0.5	7.71	21.3	7460	3.2	-118.0	98.0	Clear w/ orange	Low-flow groundwater sample:
	1628	7.97	1.0	7.60	21.1	7110	1.6	-115.8	61.0	algae particles	A) peristaltic pump w/ ded tubing
	1630	7.97	1.5	7.50	21.0	6870	1.2	-113.1	47.5		B) ded bladder pump
	1633	7.97	2.0	7.38	21.0	6520	1.0	-110.7	30.6		C) non-ded bladder pump; or
	1635	7.97	2.5	7.32	20.9	6480	0.9	-107.6	22.5		Standard groundwater sample:
	1638	7.97	3.0	7.29	20.9	6450	0.9	-105.2	18.7		D) bailer due to limited column; or
	1640	7.97	3.5	7.26	20.8	6410	0.8	-103.9	17.2		E) recovery well cycling sample
	1643	7.97	4.0	7.24	20.8	6390	0.8	-102.8	16.8		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1645	MW-70	7.97	7.24	20.8	6390	0.8	-102.8	16.8	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: MW-124
Event: Fall 2015
Area of Concern: EP

+ EB-EP-02
(for same analyses)

Hydrologic Monitoring
for ARCADIS
Houston, Texas

(2-in; stickup)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1705	NA	8.46	0.0	22.02	17.0	Yes	Yes	Yes	Yes		Weather: cloudy, 70s
									(radded)	(lock)		

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	1710	8.49	0.5	7.42	21.8	11,620	3.5	-81.6	71.0	clear w/ orange	Low-flow groundwater sample:
	1713	8.49	1.0	7.33	21.7	11,690	1.2	-81.4	48.2	algae particles	A) peristaltic pump w/ ded tubing
	1715	8.49	1.5	7.25	21.6	11,770	0.8	-82.0	27.5		B) ded bladder pump
	1718	8.49	2.0	7.21	21.6	11,840	0.8	-82.9	19.6		C) non-ded bladder pump; or
	1720	8.49	2.5	7.18	21.5	11,880	0.7	-83.8	12.7		Standard groundwater sample:
	1723	8.49	3.0	7.15	21.5	11,910	0.6	-84.1	11.6		D) bailer due to limited column; or
	1725	8.49	3.5	7.14	21.4	11,920	0.6	-84.3	11.2		E) recovery well cycling sample
	1728	8.49	4.0	7.12	21.4	11,940	0.6	-84.9	10.8		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1730	MW-124	8.49	7.12	21.4	11,940	0.6	-84.9	10.8			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
	1745	EB-EP-02	NA							Same as above	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Well Inspection Information

Event: Fall 2015

Area of Concern: EP

Houston, Texas

Initials: BRH

[illegible]

Well Purging Record

[illegible]

Well Sampling Record

[illegible]

Not in Sampling Program due to location N. of river

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-12

Event: Fall 2015

Area of Concern: EP

(Gauge Only)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1310	NA	10.25	0.0	17.93	NA	Yes	Yes	Yes	Yes		Weather: Sunny, 70s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
			0.5								Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
			1.0								
			1.5								
			2.0								
			2.5								
			3.0								
			3.5								
			4.0								

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Not in Sampling Program due to location E. of river

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-24

Event: Fall 2015

Area of Concern: EP

(Gauge Only)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1345	NA	11.97	0.0	23.50	NA	Yes	Yes	Issue	Yes		Weather: Cloudy, 80s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
			0.5								Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or
			1.0								
			1.5								
			2.0								Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
			2.5								
			3.0								
			3.5								
			4.0								

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRQ	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

System off due to water rights issue?

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RW-12R

(Gauge Only)

Event: Fall 2015

Area of Concern: REST

If active and if sampled;
(Sample Port)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials:

B B

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1020	NA	18.80	0.0	nm	NA	Yes	Yes	Yes	Yes		Weather: Sunny 60's
						5' off base as needed						

Well Purging Record

(Vault)

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-113

Event: Fall 2015

Area of Concern: REST

+ EB-REST-01

+ DUP-REST-01

(both for same analyses)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: BR

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1025	NA	19.09	0.0	37.68	33.8	YES	YES	YES	YES		Weather: Sunny 60s
10/20/15	1050	NA	19.07	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1058	19.09	0.5	6.55	21.9	2924	1.8	-21.2	20.1	Clear	Low-flow groundwater sample:
	1058	19.10	1.0	6.47	21.3	2929	1.3	-16.2	13.6	11	A) peristaltic pump w/ ded tubing
	1100	19.10	1.5	6.41	20.8	2921	1.2	-5.7	11.8	11	B) ded bladder pump
	1103	19.10	2.0	6.42	20.7	2927	1.2	-1.5	10.1	11	C) non-ded bladder pump; or
	1105	19.10	2.5	6.43	20.7	2926	1.1	+0.3	9.8	11	Standard groundwater sample:
	1108	19.10	3.0	6.42	20.7	2926	1.1	0.8	9.7	11	D) bailer due to limited column; or
	1110	19.10	3.5	6.43	20.6	2927	1.1	1.1	9.7	11	E) recovery well cycling sample
	1113	19.10	4.0	6.43	20.6	2927	1.1	1.5	9.7	11	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
10/20/15	1115	MW-113	19.10	6.43	20.6	2927	1.1	1.5	9.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
	1045	EB-REST-01	NA							Same as above	Same	same
	1200	DUP-REST-01	19.10	6.43	20.6	2927	1.1	1.5	9.7	Same as above	Same	same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-8

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials:

B3

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1000	17.19	17.23	0.04	35.83	NA	Yes	Yes	Yes	Yes		Weather: Sunny 60°
						30.8						

If needed

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5	Not sampled due to							B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5	LNAPL ≥ 0.03							Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		KWB-8										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

(Gauge only)

Well: RW-20

Event: Fall 2015

Area of Concern: REST

(Reported IHIS as the only RW with permission to run)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Active RW; sample part

Initials: JS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	955	NP	2.08	0.00	NM	NA	NA	Yes	Yes	Yes		Weather: Sunny, 60°
					(Equipment in well)							

Well Purging Record

[illegible]

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

Monitoring Well Purging and Sampling Record

(Gauge only)

Initials: *BS*

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

Monitoring Well Purging and Sampling Record

System off due to water rights?

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RW-14R

(Gauge Only)

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Active RW; sample part

Initials: BJB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1036	16.64	16.80	0.16	N/A	N/A	Yes	Yes	Yes	Yes		Weather: Sunny 60's
						5 ft off base as needed						

Well Purging Record

(Equipment in well)

(Vault)

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)				HNO3		6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-133

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1040	16.28	16.32	0.04	37.64	27.9	Yes	Yes	Yes	Yes		Weather: Sunny 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5	not sampled due to LNAPL > 0.03						(dark gold) color	Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		MW-133										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-134

Event: Fall 2015

Area of Concern: REST

+ EB-REST-03

+ DUP-REST-03

(both for same analysis)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BS

(2-in; stickup)

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	858	NA	13.44	0.0	32.89	28.4	Yes	Yes	Yes	Yes		Weather: Sunny 60°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1730	13.45	0.5	6.80	20.5	5987	2.7	98.8	21.8	Clear	Low-flow groundwater sample:
	1733	13.45	1.0	6.57	19.9	5790	1.7	104.9	17.2	"	A) peristaltic pump w/ ded tubing
	1735	13.45	1.5	6.52	19.6	5765	1.5	106.7	16.8	"	B) ded bladder pump
	1738	13.45	2.0	6.48	19.4	5761	1.4	107.6	16.8	"	C) non-ded bladder pump; or
	1740	13.45	2.5	6.46	19.3	5762	1.3	108.0	16.5	"	Standard groundwater sample:
	1743	13.45	3.0	6.45	19.2	5761	1.2	108.5	16.4	"	D) bailer due to limited column; or
	1745	13.45	3.5	6.44	19.2	5762	1.2	108.9	16.1	"	E) recovery well cycling sample
	1748	13.45	4.0	6.44	19.2	5762	1.2	109.5	16.3	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1750	MW-134	13.45	6.44	19.2	5762	1.2	109.5	16.3	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN 8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
	1715	EB-REST-03	NA							Same as above	same	same
	1500	DUP-REST-03	13.45	6.44	19.2	5762	1.2	109.5	16.3	Same as above	same	same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RA-4798

Event: Fall 2015

Area of Concern: REST

Screen: 840-850 ft-bgs

Active irrigation well;
Inside green, block bldg;

No purge;

Sample port
(faucet)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BJB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/20/15	1350	NA	NA	NA	NA	NA	NA	NA	NA	YES		Weather: FHy cldy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
			0.5							CLEAR	Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5	No purge, active well with sample port,							B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1350	RA-4798	NA	7.49	19.3	2703	1.6	-57.6	1.1	BRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020 (cations only)
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RA-4196

Event: Fall 2015

Area of Concern: REST

Screen: 280-292 ft.-bgs

Active irrigation well;
Inside green, block bldg;

No purge;
Sample port
(faucet)

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: BR

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/20/15	1335	NA	NA	NA	NA	NA	NA	NA	NA	YES		Weather: Pthly cldy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5							Clear	Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1335	RA-4196	nm	7.03	21.9	2726	2.1	-85.3	2.4	BRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020 Cations only
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	3M4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

[DO NOT ADDRESS - Removed from Program by Navajo, 4-13-15]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RA-1227

Event: Fall 2015

Area of Concern: REST

Screen: 194-246 Ft-bgs

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
												Weather:

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										BRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)		HNO3 6010/6020
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg, Ni, Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

"Annual" only ; DO NOT ADDRESS in Fall 2015

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RA-3156

Event: Fall 2015

Area of Concern: REST

Screen: 182 to (unknown)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
												Weather:

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										BRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)		HNO3 6010/6020
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg, Ni, Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

"Annual" only; DO NOT ADDRESS in Fall 2015

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RA-313

Event: Fall 2015

Area of Concern: REST

Screen: 904 - 1157 Ft-bgs

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
												Weather:

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										BRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-7

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: BRS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1050	NA	18.12	0.0	34.83	30.6	Yes	Yes	Yes	Yes		Weather: Sunny 60°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1055	18.14	0.5	8.03	29.0	3711	2.1	-122.8	10.8	Clear (HCO ₃)	Low-flow groundwater sample:
	1058	18.14	1.0	7.15	23.8	3719	1.2	-129.7	8.9	" "	A) peristaltic pump w/ ded tubing
	1100	18.14	1.5	6.96	19.8	3725	1.0	-128.1	8.6	" "	B) ded bladder pump
	1103	18.14	2.0	6.89	19.6	3728	0.8	-129.6	7.9	" "	C) non-ded bladder pump; or
	1105	18.14	2.5	6.87	19.5	3730	0.7	-130.2	7.9	" "	Standard groundwater sample:
	1108	18.14	3.0	6.86	19.4	3731	0.6	-130.8	7.7	" "	D) bailer due to limited column; or
	1110	18.14	3.5	6.85	19.4	3733	0.5	-131.7	7.5	" "	E) recovery well cycling sample
	1113	18.14	4.0	6.85	19.4	3734	0.5	-132.0	7.2	" "	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1115	KWB-7	18.14	6.85	19.4	3734	0.5	-132.0	7.2	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

[HMI-dedicated bladder pump]

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: MW-135

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(2 in; at-grade)

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection				Comments
							Cap	Casing	Well Secured	Label	Other
10/19/15	928	NA	27.38	0.0	65.55	50.0	Yes	Yes	Yes	Yes	
											Weather: Clear, 60°D

Well Purging Record

(Vault)

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1530	27.39	0.5	7.24	21.3	5241	2.9	68.9	60.2	Slightly Cloudy	Low-flow groundwater sample:
	1533	27.39	1.0	6.63	21.5	6033	2.6	100.8	41.3	"	A) peristaltic pump w/ ded tubing
	1535	27.39	1.5	6.59	21.6	6324	2.5	123.6	34.3	"	B) ded bladder pump
	1538	27.39	2.0	6.58	21.6	6421	2.4	130.8	34.0	"	C) non-ded bladder pump; or
	1540	27.39	2.5	6.57	21.6	6397	2.4	133.4	33.8	Clear	Standard groundwater sample:
	1543	27.39	3.0	6.57	21.5	6395	2.4	135.7	29.9	"	D) bailer due to limited column; or
	1545	27.39	3.5	6.57	21.6	6391	2.3	136.9	28.9	"	E) recovery well cycling sample
	1548	27.39	4.0	6.57	21.6	6389	2.3	137.3	28.4	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1550	MW-135	27.39	6.57	21.6	6389	2.3	137.3	28.4	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										TPH	HCL	TX 1005 (comparison)

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-20

(Gauge only)

Event: Fall 2015

Area of Concern:

TMD

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: KB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	835	NA	10.59	0.0	26.86	21.9	Yes	Yes	Yes	Yes		Weather: Sunny 60°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Not in Sampling Program

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NP-3

Event: Fall 2015

Area of Concern: TMD

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: *135*

[illegible]

Well Purging Record

[illegible]

Well Sampling Record

[illegible]

If <0.03 feet of PSH present, remove PSH and sample groundwater

Not in Sampling Program

Artesia Refinery

Well Inspection Information

Well: NP-4

Event: Fall 2015

Area of Concern: TMD

for ARCADIS

Houston, Texas

Initials:

[illegible]

Well Purging Record

[illegible]

Well Sampling Record

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NP-2

Event: Fall 2015

Area of Concern: TMD

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: **BS**

[illegible]

Well Purging Record

[illegible]

Well Sampling Record

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NP-1

Event: Fall 2015

Area of Concern: TMD

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-inj stickup)

Initials: RS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	840	NA	14.04	0.0	21.53	19.6	Yes	Yes	Yes	Yes		Weather: Sunny 60°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1400	14.05	0.5	6.88	19.7	5279	2.2	80.5	3.9	Clear	Low-flow groundwater sample:
	1403	14.05	1.0	6.59	19.2	5265	1.6	83.8	2.1	"	A) peristaltic pump w/ ded tubing
	1405	14.05	1.5	6.55	18.9	5253	1.5	89.6	1.6	"	B) ded bladder pump
	1408	14.05	2.0	6.54	18.8	5249	1.4	92.8	1.4	"	C) non-ded bladder pump; or
	1410	14.05	2.5	6.54	18.8	5245	1.4	93.6	1.3	"	Standard groundwater sample:
	1413	14.05	3.0	6.54	18.8	5239	1.4	94.1	1.3	"	D) bailer due to limited column; or
	1415	14.05	3.5	6.53	18.8	5237	1.3	94.7	1.1	"	E) recovery well cycling sample
	1418	14.05	4.0	6.53	18.8	5236	1.3	95.2	1.0	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1420	NP-1	14.05	6.53	18.8	5236	1.3	95.2	1.0			Lab: ESC Lab Sciences, Mt. Juliet, TN
										BRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260 (VOC only in 2H15)
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NP-6

(Gauge only)

Event: Fall 2015

Area of Concern: TMD

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	845	NA	10.66	0.0	20.35	15.4	YES	YES	YES	YES		Weather: Sunny 60°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260 (Biennial only)
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)	HNO3	6010/6020
										Anions (Chloride, Fluoride, Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg, Ni, Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Initials:

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-21

Event: Fall 2015

Area of Concern: TMD

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	822	NA	10.38	0.0	25.06	19.9	Yes	Yes	Yes	Yes		Weather: Sunny 60°F

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1630	10.39	0.5	6.99	20.7	6101	2.3	88.6	3.8	Clear	Low-flow groundwater sample:
	1633	10.39	1.0	6.73	20.6	6100	1.6	95.7	2.7	"	A) peristaltic pump w/ ded tubing
	1635	10.39	1.5	6.71	20.5	6098	1.6	102.8	2.4	"	B) ded bladder pump
	1638	10.39	2.0	6.70	20.5	6097	1.6	104.1	1.9	"	C) non-ded bladder pump; or
	1640	10.39	2.5	6.70	20.4	6097	1.6	106.3	1.4	"	Standard groundwater sample:
	1643	10.39	3.0	6.70	20.4	6096	1.5	107.6	1.3	"	D) bailer due to limited column; or
	1645	10.39	3.5	6.69	20.4	6095	1.5	108.3	1.3	"	E) recovery well cycling sample
	1648	10.39	4.0	6.69	20.4	6095	1.5	108.7	1.3	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1650	MW-21	10.39	6.69	20.4	6095	1.5	108.7	1.3	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-71

(Gauge only)

Event: Fall 2015

Area of Concern: TMD

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	848	NA	11.98	0.0	21.85	16.9	Yes	Yes	Yes	Yes		Weather: Sunny 60°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VQC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

[illegible]

[illegible]

If <0.03 feet of PSH present, remove PSH and sample groundwater

[Pecan Grove - Access from 82 gate]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-11A

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	9:45	NA	17.70	0.0	42.38	37.0	Yes	Yes	Yes	Yes		Weather: Sunny 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1200	17.73	0.5	6.59	19.9	7162	2.0	51.0	5.3	clear (H2O2)	Low-flow groundwater sample:
	1203	17.73	1.0	6.45	19.4	7413	1.4	50.3	4.1	" "	A) peristaltic pump w/ ded tubing
	1205	17.73	1.5	6.40	19.1	7501	1.0	47.2	3.2	" "	B) ded bladder pump
	1208	17.73	2.0	6.38	19.0	7520	0.8	45.3	2.6	" "	C) non-ded bladder pump; or
	1210	17.73	2.5	6.36	18.9	7534	0.7	44.5	2.1	" "	Standard groundwater sample:
	1213	17.73	3.0	6.35	18.9	7541	0.6	43.9	1.8	" "	D) bailer due to limited column; or
	1215	17.73	3.5	6.35	18.9	7545	0.6	43.3	1.8	" "	E) recovery well cycling sample
	1218	17.73	4.0	6.34	18.9	7548	0.6	42.8	1.7	" "	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1220	KWB-11A	17.73	6.34	18.9	7548	0.6	42.8	1.7	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

[Pecan Grove - Access from 82 gate]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-11B

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: B3

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	940	NA	18.38	0.0	72.47	62.2	Yes	Yes	Yes	Yes		Weather: Sunny 60°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1245	18.41	0.5	6.67	19.8	4140	2.8	83.8	6.2	Clear	Low-flow groundwater sample:
	1248	18.43	1.0	6.63	19.5	3965	2.1	88.0	4.1	"	A) peristaltic pump w/ ded tubing
	1250	18.44	1.5	6.61	19.3	3503	2.0	92.8	3.7	"	B) ded bladder pump
	1253	18.44	2.0	6.61	19.2	3239	1.8	94.1	3.3	"	C) non-ded bladder pump; or
	1255	18.44	2.5	6.60	19.1	3186	1.7	95.3	3.1	"	Standard groundwater sample:
	1258	18.44	3.0	6.60	19.1	3143	1.7	96.1	2.9	"	D) bailer due to limited column; or
	1300	18.44	3.5	6.60	19.1	3129	1.6	96.4	2.8	"	E) recovery well cycling sample
	1303	18.44	4.0	6.59	19.1	3120	1.6	96.8	2.5	"	F) Irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1305	KWB-11B	18.44	6.59	19.1	3120	1.6	96.8	2.5	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

DO NOT ADDRESS THIS WELL, per Navajo, 4-13-15

Jack Joy (farmer)
575-365-6042

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well: KWB-3AR

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(2-in; at-grade)

Initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
						26.1						Weather:

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-117

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: *fix*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1650	NA	9.09	0.0	27.22	19.7	Yes	Yes	Yes	Yes		Weather: Partly cloudy, 70's
10/20/15	1300	"	9.06	"					Yes	lock		

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	1305	9.09	0.5	7.20	22.0	3040	2.5	-82.4	130	colorless / cloudy	Low-flow groundwater sample:
	1307	9.09	1.0	7.06	21.2	3080	1.7	-80.8	78.4		A) peristaltic pump w/ ded tubing
	1310	9.09	1.5	6.96	20.3	3070	1.5	-79.9	80.4		B) ded bladder pump
	1313	9.09	2.0	6.92	20.0	3060	1.4	-79.0	69.8		C) non-ded bladder pump; or
	1315	9.09	2.5	6.88	19.8	3050	1.3	-78.2	60.4	colorless / sl. cloudy	Standard groundwater sample:
	1317	9.09	3.0	6.86	19.7	3060	1.3	-77.4	57.3		D) bailer due to limited column; or
	1320	9.09	3.5	6.85	19.7	3050	1.2	-76.7	55.8		E) recovery well cycling sample
	1323	9.09	4.0	6.84	19.6	3050	1.2	-76.0	53.9		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1325	MW-117	9.09	6.84	19.6	3050	1.2	-76.0	53.9	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6040/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

Monitoring Well Purging and Sampling Record

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

[illegible]

* Installed 7/28/14

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-136

Event: Fall 2015

Area of Concern: REST
(Crossgradient; North of N. RO Field)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection				Comments
							Cap	Casing	Well Secured	Label	
10/19/15	1627	NA	12.15	0.0	28.00	23.0	Yes	Yes	Yes	Yes	Weather: Partly Cloudy, 60's
10/20/15	805	NA	12.21	0.0					Added	lock	

Well Purging Record

Screen: 10 - 25

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	810	12.23	0.5	7.52	19.2	4190	4.5	40.0	7200	colorless / clarity	Low-flow groundwater sample:
	813	12.23	1.0	7.04	19.3	4240	3.0	54.1	7200		A) peristaltic pump w/ ded tubing
	815	12.23	1.5	6.93	19.3	4250	2.5	59.1	7200		B) ded bladder pump
	817	12.23	2.0	6.85	19.4	4260	2.3	63.4	7200		C) non-ded bladder pump; or
	820	12.23	2.5	6.79	19.5	4260	2.1	67.2	7200		Standard groundwater sample:
	823	12.23	3.0	6.76	19.5	4270	2.0	69.7	7200		D) bailer due to limited column; or
	825	12.23	3.5	6.74	19.5	4270	2.0	71.7	7200		E) recovery well cycling sample
	827	12.23	4.0	6.73	19.6	4260	1.9	72.8	7200		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	830	MW-136	12.23	6.73	19.6	4260	1.9	72.8	7200	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-126A

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: *ADS*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1115	NA	8.90	0.0	37.51	29.5	Yes	Yes	Yes	Yes		Weather: Sunny, 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1120	8.97	0.5	7.02	21.8	2890	2.4	-175.2	7200	Colorless/Cloudy	Low-flow groundwater sample:
	1123	8.97	1.0	6.87	21.3	2920	1.4	-189.9	7200		(A) peristaltic pump w/ ded tubing
	1125	8.97	1.5	6.83	21.1	2930	1.2	-195.0	7200		B) ded bladder pump
	1127	8.97	2.0	6.78	21.2	2920	1.2	-200.7	198		C) non-ded bladder pump; or
	1130	8.97	2.5	6.76	21.2	2920	1.0	-205.0	124		Standard groundwater sample:
	1133	8.97	3.0	6.74	21.2	2940	1.0	-209.0	66.8		D) bailer due to limited column; or
	1135	8.97	3.5	6.73	21.3	2940	1.0	-210.8	44.8	Colorless/clear	E) recovery well cycling sample
	1137	8.97	4.0	6.73	21.2	2950	1.0	-214.0	39.3		F) irrigation well grab sample
	1140	8.97	4.5	6.73	21.2	2950	1.0	-218.8	37.3		

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1145	MW-126A	8.97	6.73	21.2	2950	1.0	-218.8	37.3	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-127

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1030	NA	15.70	0.0	53.25	38.4	Yes	Yes	Yes	Yes		Weather: Sunny, 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1035	15.74	0.5	6.79	22.9	2600	3.9	-195.2	180	gray / cloudy / odor	Low-flow groundwater sample:
	1037	15.80	1.0	6.70	22.3	2610	2.6	-206.2	98.8	↓	A) peristaltic pump w/ ded tubing
	1040	15.80	1.5	6.67	21.8	2620	2.0	-218.8	49.2	gray / sl. cloudy / odor	B) ded bladder pump
	1043	15.80	2.0	6.65	21.7	2610	1.8	-224.8	27.3	↓	C) non-ded bladder pump; or
	1045	15.80	2.5	6.64	21.6	2610	1.6	-233.5	17.9	clear / odor	Standard groundwater sample:
	1047	15.80	3.0	6.64	21.6	2610	1.5	-233.7	12.2	↓	D) bailer due to limited column; or
	1050	15.80	3.5	6.64	21.6	2610	1.5	-267.2	9.7	↓	E) recovery well cycling sample
	1053	15.80	4.0	6.64	21.6	2620	1.4	-259.4	8.9	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1055	MW-127	15.80	6.64	21.6	2620	1.4	-259.4	8.9			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										TPH	HCL	TX1005 (comparison)

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-129

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	854	19.09	19.10	0.01	53.20	38.2	Yes	Yes	Yes	Yes		Weather: Sunny, 50's

Well Purging Record

*Removed LNAPL prior to purge/sample

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	900	19.10	0.5	6.87	21.2	2280	2.2	-124.8	7200	colorless / cloudy	Low-flow groundwater sample:
	903	19.10	1.0	6.72	21.1	2270	1.5	-112.6	7200	odor	A) peristaltic pump w/ ded tubing
	905	19.10	1.5	6.69	21.1	2270	1.3	-108.4	7200		B) ded bladder pump
	907	19.10	2.0	6.67	21.0	2270	1.4	-106.3	160		C) non-ded bladder pump; or
	910	19.10	2.5	6.65	21.0	2270	1.4	-103.6	113		Standard groundwater sample:
	913	19.10	3.0	6.64	21.0	2270	1.4	-101.2	75.7	sl. cloudy / colorless	D) bailer due to limited column; or
	915	19.10	3.5	6.63	21.0	2270	1.4	-97.9	53.3	odor	E) recovery well cycling sample
	917	19.10	4.0	6.63	21.1	2260	1.4	-95.5	33.2		F) irrigation well grab sample
	920	19.10	4.5	6.62	21.2	2270	1.5	-97.8	29.6	colorless / clear / odor	
	923	19.10	5.0	6.62	21.2	2270	1.4	-99.1	31.2		

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	925	MW-129	19.10	6.62	21.2	2270	1.4	-99.1	31.2	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **KWB-1A**

Event: **Fall 2015**

Area of Concern: **REST**

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; at-grade)

Initials: **GDS**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1250	NA	8.36	0.0	33.48	25.8	Yes	Yes	Yes	Yes		Weather: Sunny, 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1300	8.37	0.5	7.06	21.4	5090	2.3	2.4	22.7	Colorless / Clear	Low-flow groundwater sample:
	1303	8.38	1.0	6.88	21.1	5140	1.7	1.9	17.3		A) peristaltic pump w/ ded tubing
	1305	8.38	1.5	6.77	20.8	5140	1.4	0.7	12.2		B) ded bladder pump
	1307	8.38	2.0	6.72	20.5	5140	1.2	-0.7	11.7		C) non-ded bladder pump; or
	1310	8.38	2.5	6.69	20.3	5130	1.2	-1.3	10.2		Standard groundwater sample:
	1313	8.38	3.0	6.68	20.2	5130	1.2	-1.6	9.8		D) bailer due to limited column; or
	1315	8.38	3.5	6.67	19.9	5120	1.1	-2.0	9.9		E) recovery well cycling sample
	1317	8.38	4.0	6.66	19.8	5130	1.1	-2.1	9.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1320	KWB-1A	8.38	6.66	19.8	5130	1.1	-2.1	9.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

[illegible]

[illegible]

* Located ~25' N. of original KWB-10 well pad

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-10R

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1355	13.48	13.49	0.01	29.48	22.0	Yes	Yes	Yes	Yes		Weather: Partly cloudy, 80's

Well Purging Record

↳ removed LNAPL prior to purge/sample

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	1405	13.66	0.5	6.81	20.3	1826	3.4	-120.6	14.0	colorless / clear / odor	Low-flow groundwater sample:
	1407	13.67	1.0	6.72	20.3	1842	2.5	-129.4	12.3		A) peristaltic pump w/ ded tubing
	1410	13.67	1.5	6.66	20.2	1836	2.1	-131.9	12.0		B) ded bladder pump
	1413	13.68	2.0	6.61	20.6	1821	1.9	-135.0	11.3		C) non-ded bladder pump; or
	1415	13.68	2.5	6.59	20.7	1812	1.8	-136.8	10.7		Standard groundwater sample:
	1417	13.68	3.0	6.59	20.8	1808	1.7	-136.8	10.5		D) bailer due to limited column; or
	1420	13.68	3.5	6.58	20.8	1806	1.7	-138.2	10.1		E) recovery well cycling sample
✓	1423	13.68	4.0	6.58	20.8	1800	1.6	-138.7	9.6	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1425	KWB-10R	13.68	6.58	20.8	1800	1.6	-138.7	9.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-131

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	945	NA	20.32	0.0	53.44	38.1	Yes	Yes	Yes	Yes		Weather: Sunny, 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	950	20.35	0.5	6.79	20.8	2090	3.0	-128.7	57.1	colorless / clear	Low-flow groundwater sample:
	953	20.35	1.0	6.67	20.6	2100	2.4	-133.8	33.3		A) peristaltic pump w/ ded tubing
	955	20.35	1.5	6.61	20.5	2100	2.1	-135.8	20.7		B) ded bladder pump
	957	20.35	2.0	6.57	20.4	2100	1.9	-137.5	13.2		C) non-ded bladder pump; or
	1000	20.35	2.5	6.56	20.4	2090	1.7	-138.7	10.8		Standard groundwater sample:
	1003	20.35	3.0	6.55	20.4	2090	1.6	-139.6	9.3		D) bailer due to limited column; or
	1005	20.35	3.5	6.53	20.5	2090	1.6	-141.0	8.7		E) recovery well cycling sample
	1007	20.35	4.0	6.52	20.5	2100	1.5	-142.6	8.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1010	MW-131	20.35	6.52	20.5	2100	1.5	-142.6	8.4	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										TPH	HCL	TX100.5 (comparison)

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-5

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: *ADS*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	845	NA	20.19	0.0	37.67	30.7	Yes	Yes	Yes	Yes		Weather: <i>partly cloudy, 60's</i>
10/20/15	945		20.05									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	950	20.12	0.5	6.91	22.2	2290	3.8	-197.9	16.9	Colorless / Clear / 0.4	Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
	953	20.13	1.0	6.71	21.9	2830	2.7	-201.0	13.3		
	955	20.13	1.5	6.62	21.9	2830	2.1	-205.8	12.9		
	957	20.13	2.0	6.59	21.8	2820	1.8	-208.0	11.4		
	1000	20.13	2.5	6.57	21.6	2840	1.6	-217.0	10.8		
	1003	20.13	3.0	6.56	21.8	2830	1.6	-223.4	10.1		
	1005	20.13	3.5	6.54	21.7	2830	1.5	-219.6	9.6		
	1007	20.13	4.0	6.55	21.7	2830	1.5	-217.1	9.4		

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1010	KWB-5	20.13	6.55	21.7	2830	1.5	-217.1	9.4	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-111

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	755	NA	21-01	0.0	40.81	35.8	Yes	Yes	Yes	Yes		Weather: Sunny, 50's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/19/15	800	21-19	0.5	6.85	20.2	2280	3.3	-65.7	113	sl. cloudy / colorless	Low-flow groundwater sample:
	803	21-19	1.0	6.65	20.5	2290	3.0	-62.7	120		A) peristaltic pump w/ ded tubing
	805	21-19	1.5	6.58	20.7	2450	2.6	-69.9	109		B) ded bladder pump
	807	21-19	2.0	6.56	20.9	2460	2.2	-74.0	65.9		C) non-ded bladder pump; or
	810	21-19	2.5	6.56	21.1	2600	1.9	-78.1	28.7	clear / colorless	Standard groundwater sample:
	813	21-19	3.0	6.56	21.0	2720	1.8	-75.0	20.9		D) bailer due to limited column; or
	815	21-19	3.5	6.55	21.0	2710	1.8	-76.5	13.6		E) recovery well cycling sample
	817	21-19	4.0	6.55	21.0	2710	1.7	-74.8	9.8		F) irrigation well grab sample
✓	820	21-19	4.5	6.55	21.0	2710	1.7	-74.7	8.2		

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	825	MW-111	21-19	6.55	21.0	2710	1.7	-74.7	8.2	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-6

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1540	18.81	18.82	0.01	36.38	27.4	Yes	Yes	Yes	Yes		Weather: Partly Cloudy, 60's
10/20/15	855	18.74	18.75	0.01								

Well Purging Record

Removed LNAPL prior to purge/sample

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	900	18.83	0.5	6.70	21.2	2490	2.2	-238.9	36.5	Dark hot / clear	Low-flow groundwater sample:
	903	18.83	1.0	6.64	21.0	2470	1.6	-259.3	19.5	odor	(A) peristaltic pump w/ ded tubing
	905	18.83	1.5	6.64	20.8	2450	1.4	-268.8	12.2		B) ded bladder pump
	907	18.83	2.0	6.63	20.8	2430	1.3	-271.7	9.3		C) non-ded bladder pump; or
	910	18.83	2.5	6.62	20.6	2410	1.2	-276.4	8.6		Standard groundwater sample:
	913	18.83	3.0	6.60	20.6	2410	1.2	-279.2	8.1		D) bailer due to limited column; or
	915	18.83	3.5	6.58	20.7	2400	1.2	-282.4	8.4		E) recovery well cycling sample
	917	18.83	4.0	6.57	20.8	2390	1.1	-284.3	8.0		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	920	KWB-6	18.83	6.57	20.8	2390	1.1	-284.3	8.0	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well: MW-112

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Well Inspection Information

Initials: GRS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1239	18.27	18.31	0.04	37.53	32.5	Yes	Yes	Yes	Yes		Weather: Sunny, 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		MW-112										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: MW-132
Event: Fall 2015
Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1534	16.74	17.19	0.45	42.71	Not Sampled	Yes	Yes	Yes	Yes		Weather: Cloudy, 70's
									Added	lock		

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		MW-132										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-57

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; at-grade)

Initials: BS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/17/15	1457	NA	15.63	0.0	34.36	32.8	Yes	Yes	Yes	Yes		Weather Pth, 60's
10/20/15	1000	NA	15.83	0.2								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1005	15.97	0.5	6.66	20.4	4830	2.8	48.9	16.2	Clear	Low-flow groundwater sample:
	1008	16.04	1.0	6.55	19.9	5203	1.9	78.7	12.6	"	A) peristaltic pump w/ ded tubing
	1010	16.08	1.5	6.43	19.7	5268	1.5	72.9	10.8	"	B) ded bladder pump
	1013	16.11	2.0	6.32	19.6	5283	1.3	40.4	9.9	"	C) non-ded bladder pump; or
	1015	16.15	2.5	6.29	19.5	5291	1.1	28.7	9.5	"	Standard groundwater sample:
	1018	16.18	3.0	6.33	19.5	5278	1.0	-13.2	9.2	"	D) bailer due to limited column; or
	1020	16.20	3.5	6.35	19.5	5269	1.0	-16.1	8.9	"	E) recovery well cycling sample
	1023	16.22	4.0	6.36	19.5	5264	1.0	-16.8	8.7	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1025	MW-57	16.22	6.36	19.5	5264	1.0	-16.8	8.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RW-#11-0 (Gauge only)

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1507	NA	18.31	0.0	22.20	Not Sampled	Yes	Yes	Yes	Yes		Weather: Partly cloudy, 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: **KWB-9** (Gauge Only)
Event: Fall 2015
Area of Concern: **REST**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: **GIS**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1526	NA 4.13 715.11	715.11	NM	Not Sampled 715.11	Not Sampled	Yes	4 issue	Yes	Yes		Weather: Partly cloudy, 70's
									4 added lock			

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

* No bladder pump installed THIS due to limited water column.

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well: **KWB-12A**

Event: Fall 2015

Area of Concern: **REST**

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Well Inspection Information

(4-in; at-grade)

Initials: **SB**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1514	NA	17.93	0.0	25.03	24.9	YES	YES	YES	YES		Weather: Partly cldy 60's
10/20/15	820	NA	17.96	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	825	18.08	0.5	6.79	19.7	4261	4.7	119.6	6.8	Clear	Low-flow groundwater sample:
	828	18.14	1.0	6.60	19.5	4269	4.2	130.7	4.9	"	(A) peristaltic pump w/ ded tubing
	830	18.16	1.5	6.50	19.6	4268	3.8	144.9	4.3	"	B) ded bladder pump
	833	18.17	2.0	6.41	19.6	4270	3.1	148.7	3.2	"	C) non-ded bladder pump; or
	835	18.17	2.5	6.37	19.6	4271	3.0	150.6	2.7	"	Standard groundwater sample:
	838	18.17	3.0	6.36	19.6	4274	3.0	151.8	2.6	"	D) bailer due to limited column; or
	840	18.18	3.5	6.36	19.6	4276	3.0	152.3	2.4	"	E) recovery well cycling sample
	843	18.18	4.0	6.36	19.6	4277	3.0	152.6	2.3	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	845	KWB-12A	18.18	6.36	19.6	4277	3.0	152.6	2.3	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

* Dedicated bladder pump installed 11/15.

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-12B

Event: Fall 2015

Area of Concern: REST

(4-in; at-grade)

+ EB-REST-05
+ DUP-REST-05
(both for same analysis)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1517	NA	17.76	0.0	39.39	35.2	Yes	Yes	Yes	Yes		Weather: Pthly cldy 60's
10/20/15	905	NA	17.92	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	910	17.94	0.5	7.78	19.9	3873	3.6	-106.7	4.2	Clear	Low-flow groundwater sample:
	913	17.94	1.0	7.47	19.4	3924	3.3	-81.2	3.8	"	A) peristaltic pump w/ ded tubing
	915	17.94	1.5	7.18	19.2	3947	3.1	-54.1	3.1	"	(B) ded bladder pump
	918	17.94	2.0	6.85	19.1	3963	3.1	-24.1	2.9	"	C) non-ded bladder pump; or
	920	17.94	2.5	6.67	19.1	3968	3.2	+39.3	2.6	"	Standard groundwater sample:
	923	17.94	3.0	6.61	19.2	3973	3.2	60.9	2.5	"	D) bailer due to limited column; or
	925	17.94	3.5	6.59	19.1	3976	3.3	63.1	2.5	"	E) recovery well cycling sample
	928	17.94	4.0	6.58	19.1	3978	3.3	64.8	2.3	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	930	KWB-12B	17.94	6.58	19.1	3978	3.3	64.8	2.3	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓
	945	EB-REST-05	NA							Same as above	Same	Same
	900	DUP-REST-05	17.94	6.58	19.1	3978	3.3	64.8	2.3	Same as above	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-2R

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1549	18.25	18.26	0.01	39.86	32.4	Yes	Yes	Yes	Yes		Weather: Partly Cloudy 70°
10/20/15	1245	18.26	18.27	0.01								

Well Purging Record

* Double checked Ph.

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1250	18.42	0.5	8.96	22.9	3352	0.9	-262.8	16.3	Clean (No odor)	Low-flow groundwater sample:
	1253	18.43	1.0	9.21	22.2	3410	0.7	-272.7	12.2	" "	A) peristaltic pump w/ ded tubing
	1255	18.43	1.5	9.43	22.1	3562	0.6	-286.8	9.8	" "	B) ded bladder pump
	1258	18.43	2.0	9.46	22.0	3619	0.6	-290.3	9.5	" "	C) non-ded bladder pump; or
	1300	18.43	2.5	9.48	22.0	3638	0.6	-292.6	9.1	" "	Standard groundwater sample:
	1303	18.43	3.0	9.46	22.0	3648	0.7	-293.8	8.9	" "	D) bailer due to limited column; or
	1305	18.43	3.5	9.45	21.9	3651	0.6	-294.2	8.8	" "	E) recovery well cycling sample
	1308	18.43	4.0	9.45	21.9	3655	0.6	-294.8	8.8	" "	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1310	KWB-2R	18.43	9.45	21.9	3655	0.6	-294.8	8.8	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-58

Event: Fall

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: KDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1556	17.25	17.26	0.01	33.06	25.6	Yes	Yes	Yes	Yes		Weather: Partly Cloudy 70°
10/20/15	1150	17.26	17.27	0.01								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	1155	19.30	0.5	7.67	22.2	2222	1.7	-127.0	12.3	Clear (H2O2)	Low-flow groundwater sample:
	1158	19.32	1.0	7.79	22.2	2237	1.2	-130.3	9.8	"	A) peristaltic pump w/ ded tubing
	1200	19.33	1.5	7.84	22.0	2239	1.0	-136.4	8.4	"	B) ded bladder pump
	1203	19.33	2.0	7.92	21.9	2239	0.8	-138.0	7.9	"	C) non-ded bladder pump; or
	1205	19.33	2.5	7.95	21.8	2239	0.8	-139.4	7.5	"	Standard groundwater sample:
	1208	19.33	3.0	7.96	21.8	2240	0.7	-140.1	7.2	"	D) bailer due to limited column; or
	1210	19.33	3.5	7.96	21.8	2240	0.7	-140.4	7.2	"	E) recovery well cycling sample
	1213	19.33	4.0	7.96	21.8	2240	0.7	-140.9	7.1	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1215	MW-58	19.33	7.96	21.8	2240	0.7	-140.9	7.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

* HMI installed dedicated bladder pump 11/15.

(Re-found and marked, per ARCADIS 4-9-15)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-13

(Gauge only)

Event: Fall

Area of Concern: REST

(cross-gradient) (2-in; at-grade)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: GOS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1605	NA	21.51	0.0	33.10	30.1	Yes	Yes	Yes	Yes		Weather: partly cloudy, 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

(Stretch tube 15' to well)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-104

Event: Fall 2015

Area of Concern: REST

+ EB-REST-02

+ DUP-REST-02

(both for same analyses)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1800	NA	14.16	0.0	21.95	19.0	Yes	Yes	Yes	Yes		Weather: Sunny, 80s
10/20/15	1245	NA	14.55	0.0	21.95	19.0						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1250	14.67	0.5	7.75	24.5	1112	3.6	-323.8	8.1	clear	Low-flow groundwater sample:
	1253	14.73	1.0	7.73	22.9	1106	1.3	-334.8	7.1		A) peristaltic pump w/ ded tubing
	1255	14.79	1.5	7.71	22.3	1102	0.8	-342.5	6.3		B) ded bladder pump
	1258	14.84	2.0	7.68	22.3	1101	0.5	-346.2	5.8		C) non-ded bladder pump; or
	1300	14.88	2.5	7.65	22.3	1100	0.4	-347.6	5.0		Standard groundwater sample:
	1303	14.91	3.0	7.61	22.2	1099	0.4	-349.9	4.7		D) bailer due to limited column; or
	1305	14.94	3.5	7.59	22.2	1098	0.3	-351.2	4.2		E) recovery well cycling sample
	1308	14.97	4.0	7.57	22.1	1098	0.3	-353.6	4.0		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1310	MW-104	14.97	7.57	22.1	1098	0.3	-353.6	4.0	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)				HNO3		6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
	1335	EB-REST-02	NA							Same as above	Same	Same
	1200	DUP-REST-02	14.97	7.57	22.1	1098	0.3	-353.6	4.0	Same as above	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-64

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; at-grade)

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1806	16.54	16.72	0.18	34.08	26.6	Yes	Yes	Yes	Yes		Weather: partly cloudy, 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: **MW-65**
Event: Fall 2015
Area of Concern: **REST**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

At-grade

Initials: **GPS**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1749	12.82	12.87	0.05	28.80	23.8	Yes	Yes	Yes	Yes		Weather: <i>Partly Cloudy, 70°</i>

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								<i>Low-flow groundwater sample:</i>
			1.0								
			1.5								
			2.0			<i>Not Sampled due to presence of LNAPL (0.05')</i>					<i>A) peristaltic pump w/ ded tubing</i>
			2.5								<i>B) ded bladder pump</i>
			3.0								<i>C) non-ded bladder pump; or</i>
			3.5								<i>Standard groundwater sample:</i>
			4.0								<i>D) bailer due to limited column; or</i>
											<i>E) recovery well cycling sample</i>
											<i>F) irrigation well grab sample</i>

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		MW-65										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RW-5R

Event: Fall 2015

Area of Concern: REST

(Gauge only;
to top of guide pipe)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Active RW; above-grade vault

Initials: GWS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1741	13.80	13.84	0.04	NM (pump in well)	24.0	Yes	Yes	Yes	Yes		Weather:

Well Purging Record

(35.30 TD meas. 2/14/14)

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)				HNO3		6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-102

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1811	NA	13.03	0.0	26.77	21.3	Yes	Yes	Yes	Yes		Weather: Pt. Cloudy, 80s
10/20/15	1155	NA	13.11	0.0	26.47	21.3						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1200	13.14	0.5	7.12	26.8	2440	2.0	-306.9	10.8	clear	Low-flow groundwater sample:
	1203	13.14	1.0	6.95	23.7	2450	1.0	-329.3	10.4		A) peristaltic pump w/ ded tubing
	1205	13.14	1.5	6.82	23.6	2450	1.0	-338.1	10.1		B) ded bladder pump
	1208	13.14	2.0	6.77	23.5	2450	0.9	-345.2	9.8		C) non-ded bladder pump; or
	1210	13.14	2.5	6.74	23.4	2450	0.9	-347.5	9.7		Standard groundwater sample:
	1213	13.14	3.0	6.72	23.3	2450	0.8	-349.6	9.8		D) bailer due to limited column; or
	1215	13.14	3.5	6.72	23.3	2450	0.8	-350.2	9.9		E) recovery well cycling sample
	1218	13.14	4.0	6.71	23.2	2450	0.8	-351.3	9.6	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1220	MW-102	13.14	6.71	23.2	2450	0.8	-351.3	9.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Active RW

Initials: *WDS*

[illegible]

Well Purging Record

[illegible]

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										<i>If <0.03 feet of PSH present, remove PSH and sample groundwater</i>		

If <0.03 feet of PSH present, remove PSH and sample groundwater

* Position marked on fence w/ survey flagging

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well: MW-99

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Well Inspection Information

(4-in; at-grade)

Initials: MDP

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1756	NA	13.91	0.0	27.96	22.8	Yes	Yes	Yes	Yes		Weather: sl. cloudy 80's
10/20/15	1355	NA	13.93	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	1400	14.07	0.5	7.11	23.1	740	2.0	-148.6	28.4	Clear	Low-flow groundwater sample:
	1407	14.13	1.0	6.82	22.8	732	1.7	-140.4	27.3		A) peristaltic pump w/ ded tubing
	1410	14.15	1.5	6.80	22.9	724	1.2	-132.5	25.4		B) ded bladder pump
	1412	14.17	2.0	6.73	22.9	700	1.0	-127.6	27.6		C) non-ded bladder pump; or
	1415	14.20	2.5	6.71	23.0	691	1.1	-120.4	28.9		Standard groundwater sample:
	1417	14.20	3.0	6.70	22.9	684	1.0	-118.9	29.1		D) bailer due to limited column; or
	1420	14.20	3.5	6.69	22.9	680	1.0	-115.7	26.5		E) recovery well cycling sample
	1422	14.20	4.0	6.68	22.8	676	1.0	-113.1	27.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1425	MW-99	14.20	6.68	22.8	676	1.0	-113.1	27.4			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-66

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in ; at-grade)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/14/15	1812	NA	13.20	0.0	29.80	24.6	Yes	Yes	Yes	Yes		Weather: Cloudy, 70s
10/20/15	1515	NA	13.25	0.0	29.80	24.6						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1520	13.34	0.5	7.22	23.7	1635	2.6	-237.5	8.4	clear	Low-flow groundwater sample:
	1523	13.34	1.0	7.02	22.0	1644	1.8	-241.7	8.0		A) peristaltic pump w/ ded tubing
	1525	13.35	1.5	6.91	21.7	1631	1.3	-244.0	7.3		B) ded bladder pump
	1528	13.35	2.0	6.85	21.4	1643	1.1	-247.2	6.9		C) non-ded bladder pump; or
	1530	13.36	2.5	6.83	21.4	1640	1.0	-250.8	6.4		Standard groundwater sample:
	1533	13.36	3.0	6.80	21.3	1633	0.9	-252.1	5.8		D) bailer due to limited column; or
	1535	13.37	3.5	6.79	21.3	1629	0.9	-253.4	5.6		E) recovery well cycling sample
	1538	13.37	4.0	6.78	21.2	1627	0.9	-254.7	5.1	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1540	MW-66	13.37	6.78	21.2	1627	0.9	-254.7	5.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-28

Event: Fall 2015

Area of Concern: REST

(6-in; stickup through berm)

no protective casing/pad to lock

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BKH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1804	NA	18.98	0.0	34.48	30.2	Yes	Issue	Issue	Yes		Weather: Clear, 80s
10/20/15	1430	NA	18.95	0.0	34.48	30.2						

Well Purging Record

6" PVC (shattered at top w/ 0.65' slip collar over it)

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	1435	19.00	0.5	6.97	26.3	2610	2.8	-339.1	8.7	clear, odor	Low-flow groundwater sample:
	1438	19.04	1.0	6.70	24.0	2690	1.8	-347.2	8.0		(A) peristaltic pump w/ ded tubing
	1440	19.07	1.5	6.57	23.1	2760	1.4	-358.2	7.3		B) ded bladder pump
	1443	19.10	2.0	6.47	22.7	2820	1.2	-363.4	6.8		C) non-ded bladder pump; or
	1445	19.13	2.5	6.42	22.6	2840	1.2	-365.1	6.4		Standard groundwater sample:
	1448	19.15	3.0	6.40	22.5	2870	1.1	-368.4	6.1		D) bailer due to limited column; or
	1450	19.17	3.5	6.39	22.5	2900	1.1	-369.9	5.9		E) recovery well cycling sample
	1453	19.19	4.0	6.38	22.4	2910	1.0	-370.2	5.6		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1455	MW-28	19.19	6.38	22.4	2910	1.0	-370.2	5.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-60

Event: Fall 2015

Area of Concern: REST

+ EB-REST-04
+ DUP-REST-04
(both for shown analyses)

Hydrologic Monitoring
for ARCADIS
Houston, Texas

(2-in; stickup)

Initials: MDR

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1100	NA	6.79	0.0	37.70	26.7	Yes	Yes	Yes	Yes		Weather: Sl. cloudy 70's
10/20/15	1125	NA	6.79	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1130	6.46	0.5	7.24	22.5	64	1.5	-290.5	7.1	clear	Low-flow groundwater sample:
	1132	7.02	1.0	7.13	22.2	6450	1.4	-296.7	5.4		A) peristaltic pump w/ ded tubing
	1135	7.07	1.5	6.93	22.1	6170	1.3	-298.4	4.6		B) ded bladder pump
	1137	7.08	2.0	6.90	22.1	6130	1.2	-301.4	4.4		C) non-ded bladder pump; or
	1140	7.09	2.5	6.84	22.1	6000	1.2	-307.1	3.1		Standard groundwater sample:
	1142	7.10	3.0	6.81	22.1	5970	1.1	-310.5	3.0		D) bailer due to limited column; or
	1145	7.10	3.5	6.80	22.0	5960	1.1	-312.4	2.8		E) recovery well cycling sample
	1147	7.10	4.0	6.77	22.0	5950	1.1	-313.8	2.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1150	MW-60	7.10	6.77	22.0	5950	1.1	-313.8	2.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓
	1230	EB-REST-04	NA							same as above	same	same
✓	1500	DUP-REST-04	7.10	6.77	22.0	5950	1.1	-313.8	2.1	same as above	same	same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-107

Event: Fall

Area of Concern: REST

(4-in; at-grade)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MDB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1748	NA	8.79	0.0	19.05	17.1	Yes	Yes	Yes	Yes		Weather: Sl. Cloudy 80's
10/20/15	1300	NA	8.76	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1305	8.93	0.5	7.08	24.0	4230	1.7	-200.4	10.1	clear	Low-flow groundwater sample:
	1307	9.01	1.0	6.95	24.0	3960	1.5	-198.5	9.4		A) peristaltic pump w/ ded tubing
	1310	9.04	1.5	6.88	24.0	3740	1.4	-195.7	7.1		B) ded bladder pump
	1312	9.10	2.0	6.87	24.1	3510	1.3	-192.4	6.9		C) non-ded bladder pump; or
	1315	9.15	2.5	6.85	24.2	3470	1.3	-187.4	6.4		Standard groundwater sample:
	1317	9.17	3.0	6.84	24.3	3450	1.2	-185.5	6.3		D) bailer due to limited column; or
	1320	9.20	3.5	6.83	24.1	3440	1.2	-182.1	6.2		E) recovery well cycling sample
	1322	9.22	4.0	6.82	24.0	3430	1.2	-184.5	6.0		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1325	MW-107	9.22	6.82	24.0	3430	1.2	-184.5	6.0	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-128

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; at-grade)

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	800	NA	11.36	0.0	35.38	25.4	Yes	Yes	Yes	Yes		Weather: Partly cloudy
10/20/15	1500	NA	11.38									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	1505	11.41	0.5	6.78	22.7	2354	1.6	+3.7	41.6	slightly cloudy	Low-flow groundwater sample:
	1508	11.41	1.0	6.61	22.0	2359	1.2	7.1	40.2	" "	(A) peristaltic pump w/ ded tubing
	1510	11.41	1.5	6.57	21.6	2365	1.1	9.5	38.4	" "	B) ded bladder pump
	1513	11.41	2.0	6.57	21.5	2369	1.0	6.8	36.2	" "	C) non-ded bladder pump; or
	1515	11.41	2.5	6.57	21.5	2372	0.9	3.1	33.8	" "	Standard groundwater sample:
	1518	11.41	3.0	6.56	21.5	2375	0.9	0.8	31.0	" "	D) bailer due to limited column; or
	1520	11.41	3.5	6.56	21.5	2377	0.9	-1.3	30.2	" "	E) recovery well cycling sample
	1523	11.41	4.0	6.56	21.5	2379	0.9	-1.8	29.6	" "	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1525	MW-128	11.41	6.56	21.5	2379	0.9	-1.8	29.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well: MW-125

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Well Inspection Information

(2-in; stickup)

Initials: M

MDP

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	930	NA	5.11	0.0	28.31	23.5	Yes	Yes	Yes	Yes		Weather: Gl. Cloudy 70°
10/20/15	1030	NA	5.10	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1035	5.17	0.5	7.28	20.5	6100	1.9	124.6	8.6	Clear	Low-flow groundwater sample:
	1037	5.17	1.0	7.02	20.1	6110	1.6	125.7	7.9		A) peristaltic pump w/ ded tubing
	1040	5.17	1.5	6.93	20.1	6120	1.4	124.8	7.5		B) ded bladder pump
	1042	5.17	2.0	6.40	20.1	6160	1.3	123.4	7.1		C) non-ded bladder pump; or
	1045	5.17	2.5	6.87	20.1	6200	1.2	122.5	6.1		Standard groundwater sample:
	1047	5.17	3.0	6.84	20.0	6220	1.1	121.1	5.4		D) bailer due to limited column; or
	1050	5.17	3.5	6.83	20.0	6210	1.1	121.4	4.8		E) recovery well cycling sample
	1052	5.17	4.0	6.81	20.0	6210	1.1	121.9	4.0		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1055	MW-125	5.17	6.81	20.0	6210	1.1	121.9	4.0	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(2-in; strokeup)

Initials: MB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1748	NA	2.57	0.0	27.62	20.0	Yes	Yes	Yes	Yes		Weather: Cloudy 70°
10/10/15	1530	NA	2.60	0.0								

Well Purging Record

[illegible]

Well Sampling Record

[illegible]

* N. side of dirt road; in line with last row of pecan trees; position marked on fence with survey flagging

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-46R

Event: Fall 2015

Area of Concern: TMD

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MJB

(2-in; At-grade)

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	855	NA	2.66	0.0	19.37	14.1	Yes	Yes	Yes	Yes		Weather: 61. Cloudy, 70's
10/20/15	930	NA	2.64	0.0	19.37							

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/16/15	935	2.66	0.5	7.05	23.2	5280	1.3	140.6	4.6	Clear	Low-flow groundwater sample:
	937	2.66	1.0	6.40	23.3	5320	1.2	136.7	3.6		A) peristaltic pump w/ ded tubing
	940	2.66	1.5	6.84	23.1	5270	1.1	133.4	3.4		B) ded bladder pump
	942	2.66	2.0	6.82	23.1	5200	1.1	130.5	3.3		C) non-ded bladder pump; or
	945	2.66	2.5	6.80	23.1	5180	1.1	127.6	7.7		Standard groundwater sample:
	947	2.66	3.0	6.79	23.0	5150	1.1	125.4	1.9		D) bailer due to limited column; or
	950	2.66	3.5	6.78	23.0	5140	1.1	123.9	1.1		E) recovery well cycling sample
	952	2.66	4.0	6.77	23.0	5130	1.1	120.5	1.3		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	955	MW-46R	2.66	6.77	23.0	5130	1.1	120.5	1.3	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4600

If <0.03 feet of PSH present, remove PSH and sample groundwater

(BTB ATU in 1915)
 Flooded 6" deep
 (S. Field Reject RO)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-115

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MDB (ATU)

(2-in; stickup)

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1755	NA	3.44	0.0	27.49	19.8	Yes	Yes	Yes	Yes		Weather: Cloudy 60's
10/20/15	745	NA	3.43	0.0	27.49							

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	750	3.49	0.5	6.27	19.8	5780	2.9	218.8	3.2	Clear	Low-flow groundwater sample:
	752	3.49	1.0	6.46	19.9	5520	2.8	209.6	2.8		A) peristaltic pump w/ ded tubing
	755	3.49	1.5	6.55	20.0	5370	1.4	200.0	2.4		B) ded bladder pump
	757	3.49	2.0	6.61	20.1	5330	1.1	188.0	2.2		C) non-ded bladder pump; or
	800	3.49	2.5	6.63	20.1	5330	1.0	181.4	2.1		Standard groundwater sample:
	802	3.49	3.0	6.67	20.1	5350	0.9	174.1	1.8		D) bailer due to limited column; or
	805	3.49	3.5	6.67	20.1	5360	0.9	170.2	1.7		E) recovery well cycling sample
	807	3.49	4.0	6.68	20.1	5370	0.9	162.4	1.5		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	810	MW-115	3.49	6.68	20.1	5370	0.9	168.4	1.5	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

BTB ATU in 1H15
Flooded 6" deep
(S. Field Reject RO)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-114

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MJB (ATV)

(2-in; stickup)

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/14/15	915	NA	3.79	0.0	38.21	30.5	Yes	Yes	Yes	Yes		Weather: Cloudy 70's
10/20/15	835	NA	3.76	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	840	3.80	0.5	7.31	20.8	4390	3.2	56.4	38.4	St. Cloudy	Low-flow groundwater sample:
	842	3.80	1.0	6.60	20.9	4360	1.6	80.6	24.3	Clear	A) peristaltic pump w/ ded tubing
	845	3.80	1.5	6.49	21.0	4270	1.2	92.4	20.6		B) ded bladder pump
	847	3.80	2.0	6.41	21.0	4190	1.0	95.7	15.4		C) non-ded bladder pump; or
	850	3.80	2.5	6.34	21.1	4180	0.9	98.4	12.3		Standard groundwater sample:
	852	3.80	3.0	6.37	21.1	4190	0.8	100.4	10.1		D) bailer due to limited column; or
	855	3.80	3.5	6.36	21.0	4190	0.8	103.5	9.8		E) recovery well cycling sample
	857	3.80	4.0	6.34	21.0	4180	0.8	107.6	8.6		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	900	MW-114	3.80	6.34	21.0	4180	0.8	107.6	8.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: **RW- #15c**
Event: Fall 2015
Area of Concern: **REST**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: **CJH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1711	13.00	13.12	0.12	18.35	No SAMPLE	Yes	Yes	Yes	Yes		Weather: partly cloudy, 70s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		RW-#15c										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

* At-grade Completion destroyed,
as in 2H14. Needs new
Pack and Canister.

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-48

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; at-grade)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1704	NA	15.01	0.0	31.90	26.9	yes	yes	* Issue	yes		Weather: Partly cloudy, 70s
10-20-15	1450	NA	14.97	0.0	31.90							

Well Purging Record

* Needs new canister and Prot. lid.

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-20-15	1455	15.26	0.5	6.95	25.3	2280	2.0	-300.8	29.6	Sl. Cloudy, black	Low-flow groundwater sample:
	1457	15.32	1.0	6.91	24.4	2580	1.6	-326.1	24.0	tint, odor ↓	
	1500	15.35	1.5	6.90	24.1	2720	1.4	-340.2	18.7	Clear, black tint,	A) peristaltic pump w/ ded tubing
	1502	15.36	2.0	6.90	23.8	2810	1.3	-354.6	14.7	odor	B) ded bladder pump
	1505	15.36	2.5	6.90	23.7	2820	1.3	-358.4	12.3		C) non-ded bladder pump; or
	1507	15.36	3.0	6.90	23.5	2830	1.2	-360.2	11.8		Standard groundwater sample:
	1510	15.36	3.5	6.89	23.4	2840	1.2	-360.9	9.6		D) bailer due to limited column; or
↓	1512	15.36	4.0	6.89	23.4	2850	1.2	-361.4	8.9		E) recovery well cycling sample
											F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-20-15	1515	MW-48	15.36	6.89	23.4	2850	1.2	-361.4	8.9	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)				HNO3		6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (FL-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1325	MW-130	16.88	6.79	24.4	2860	1.6	57.2	62.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										TPH	HCL	TX1005 (comparison)
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **KWB-4**

Event: Fall 2015

Area of Concern: **REST**

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1750	20.57	21.27	0.70	41.74	31.7	Yes	Yes	Yes	Yes		Weather: Cloudy 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		KWB-4										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-52

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: *GRS*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1819	NA	15.81	0.0	34.67	29.5	Yes	Yes	Yes	Yes		Weather: partly cloudy, 70's
10/20/15	1205	NA	15.73									

Well Purging Record

[illegible]

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
10/20/15	1230	MW-52	15.76	6.91	22.1	2740	1.2	-199.2	23.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

* E. side of blue bldg.

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-109

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; at-grade)

Initials: GWS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1825	NA	14.57	0.0	29.50	25.5	Yes	Yes	Yes	Yes		Weather: Partly Cloudy, 70's
10/20/15	1120	NA	14.41	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	1125	14.59	0.5	6.80	24.7	3880	2.6	-318.8	26.2	colorless / clear / odor	Low-flow groundwater sample:
	1127	14.61	1.0	6.75	24.5	3920	1.9	-328.6	15.1	(dark hint)	A) peristaltic pump w/ ded tubing
	1130	14.62	1.5	6.73	23.9	3910	1.6	-332.6	9.7		B) ded bladder pump
	1133	14.62	2.0	6.72	23.7	3890	1.7	-333.7	7.6		C) non-ded bladder pump; or
	1135	14.62	2.5	6.73	23.6	3800	1.7	-333.3	7.1		Standard groundwater sample:
	1137	14.62	3.0	6.74	23.5	3700	1.6	-333.3	6.8		D) bailer due to limited column; or
	1140	14.62	3.5	6.74	23.5	3660	1.6	-333.4	6.2		E) recovery well cycling sample
	1143	14.62	4.0	6.74	23.6	3570	1.6	-333.3	6.5		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1145	MW-109	14.62	6.74	23.6	3570	1.6	-333.3	6.5	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-110

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: *aps*

(2-in; at-grade)

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1830	NA	12.80	0.0	29.75	24.7	Yes	Yes	Yes	Yes		Weather: Partly Cloudy, 60's
10/20/15	1030	NA	12.72	0.0								

Well Purging Record

[illegible]

Well Sampling Record

[illegible]

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **UG-2** (No activity for 2H15 event)

Event: Fall 2015

Area of Concern: **REST**

(Upgradient)

(4-in; at-grade)

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
						24.3						Weather:

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

[HMI installed dedicated bladder pump 1H15.]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: UG-3R

Event: Fall 2015

Area of Concern: REST

(upgradient)

(No activity for 2H15 event)

(4-in; at-grade)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
						35.6						Weather:

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: UG-1

Event: Fall 2015

Area of Concern: REST

(Upgradient)

(No activity for ZH15 event)

(4-in; at-grade)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
												Weather:

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Well: UG-4

Event: Fall 2015 (No Activity for ZH15 event)

Area of Concern: REST

for ARCADIS

Houston, Texas

(Screen: 19.5-39.5 ft - bgs) ^{Are}

(up gradient)

(2-in ; at-grade)

Initials:

Well Purging Record

Well Sampling Record

[illegible]

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-101

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1245	NP	10.96	0.0	26.86	23.5	yes	yes	yes	yes		Weather: Clear, 70's
10.20.15	1340	NA	10.97	0.0	26.86	23.5						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10.20.15	1345	11.03	0.5	7.01	24.5	2090	2.0	-181.2	9.5	Clear, Colorless	Low-flow groundwater sample:
	1347	11.03	1.0	6.90	24.1	2100	1.7	-180.0	9.2		A) peristaltic pump w/ ded tubing
	1350	11.03	1.5	6.85	23.9	2100	1.6	-179.5	8.5		B) ded bladder pump
	1352	11.03	2.0	6.82	23.7	2100	1.7	-179.1	8.1		C) non-ded bladder pump; or
	1355	11.03	2.5	6.80	23.6	2100	1.8	-178.9	7.5		Standard groundwater sample:
	1357	11.03	3.0	6.78	23.6	2110	1.8	-178.5	6.6		D) bailer due to limited column; or
	1400	11.03	3.5	6.77	23.6	2110	1.7	-178.3	5.8		E) recovery well cycling sample
	1402	11.03	4.0	6.76	23.6	2110	1.7	-178.1	4.5		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10.20.15	1405	MW-101	11.03	6.76	23.6	2110	1.7	-178.1	4.5	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500-
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-62

Event: Fall 2015

Area of Concern: REST

(large-diam PVC pipe; stickup = 3.20')

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1230	N/A	10.34	0.0	29.50	21.3	yes	yes	yes	yes		Weather: p/c cloudy 65
10/20/15	1000	N/A	10.36									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/20/15	1005	10.61	0.5	6.62	23.7	4200	2.2	-374.5	3.2	clear	Low-flow groundwater sample:
	1007	10.70	1.0	6.59	23.6	4240	1.9	-378.9	3.0		
	1010	10.78	1.5	6.58	23.6	4250	1.7	-379.6	2.7		A) peristaltic pump w/ ded tubing
	1013	10.84	2.0	6.58	23.7	4260	1.5	-381.0	2.4		B) ded bladder pump
	1015	10.89	2.5	6.57	23.7	4270	1.5	-381.5	2.0		C) non-ded bladder pump; or
	1017	10.94	3.0	6.58	23.8	4270	1.4	-381.6	1.6		Standard groundwater sample:
	1020	10.98	3.5	6.57	23.8	4280	1.4	-381.9	1.4		D) bailer due to limited column; or
↓	1023	11.02	4.0	6.57	23.8	4280	1.3	-381.9	1.2	↓	E) recovery well cycling sample
											F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1025	mw-62	11.02	6.57	23.8	4280	1.3	-381.9	1.2	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-93

Event: Fall 2015

Area of Concern: REST

(4-in; at-grade)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	750	MP	4.93	0.0	20.23	15.9	YES	YES	YES	YES		Weather: pt cloudy 70°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity		
10/19/15	11:00	5.09	0.5	6.73	24.5	3000	2.1	-345.2	30.4	clear / 1000		Low-flow groundwater sample:
	11:03	5.19	1.0	6.64	24.3	3050	2.0	-352.8	29.6			(A) peristaltic pump w/ ded tubing
	11:05	5.21	1.5	6.59	24.2	3030	1.8	-361.4	20.1			B) ded bladder pump
	11:07	5.25	2.0	6.57	24.2	3030	1.6	-367.2	10.7			C) non-ded bladder pump; or
	11:10	5.29	2.5	6.56	24.2	3020	1.5	-370.5	8.4			Standard groundwater sample:
	11:13	5.33	3.0	6.56	24.2	3020	1.4	-370.9	8.0			D) bailer due to limited column; or
	11:15	5.36	3.5	6.57	24.1	3010	1.3	-371.3	6.8			E) recovery well cycling sample
	11:17	5.39	4.0	6.57	24.1	3010	1.2	-371.6	6.0	✓	✓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	12:20	MW-93	5.39	6.57	24.1	3010	1.2	-371.6	6.0	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-43

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(6-in; stickup)

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1510	NF	6.22	0.0	19.70 (Sat+ bottom)	16.5	yes	yes (But no upright steel)	yes	yes		Weather: PT/CLOUDY 70s protective casing)

Well Purging Record

* HMI Installed, lock directly on 6" expandable locking cap / No protective steel casing

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity		Comments
10/19/15	1515	6.26	0.5	6.78	24.9	5580	3.5	-395.9	9.3	C/gray, yellow tint		Low-flow groundwater sample:
	1517	6.28	1.0	6.73	24.7	5680	2.7	-400.0	4.9		Odor	A) peristaltic pump w/ ded tubing
	1520	6.28	1.5	6.73	24.6	5630	2.7	-400.6	4.0			B) ded bladder pump
	1523	6.28	2.0	6.72	24.3	5670	2.5	-402.1	2.9			C) non-ded bladder pump; or
	1525	6.28	2.5	6.72	24.3	5690	2.3	-402.2	2.7			Standard groundwater sample:
	1527	6.28	3.0	6.71	24.3	5700	2.1	-402.5	2.0			D) bailer due to limited column; or
	1530	6.28	3.5	6.70	24.3	5700	2.0	-402.6	1.9			E) recovery well cycling sample
✓	1533	6.28	4.0	6.70	24.3	5700	1.9	-402.8	1.7	✓	✓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1535	MW-43	6.28	6.70	24.3	5700	1.9	-402.8	1.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-137

Event: Fall 2015

Area of Concern: REST

(N. Refinery; Main API Separator)

(4-in; At-grade)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	740	NP	4.20	0.0	29.60	24.60	yes	yes	yes	yes		Weather: pt/cloudy, 70°

Well Purging Record

Screen: 10-30

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	900	4.20	0.5	6.64	23.9	5550	1.3	-390.7	7200	Black tint/odor	Low-flow groundwater sample:
	903	4.20	1.0	6.63	24.1	5570	1.2	-402.1	7200	light shear	A) peristaltic pump w/ ded tubing
	905	4.20	1.5	6.63	24.2	5600	1.6	-406.7	7200	cloudy	B) ded bladder pump
	907	4.20	2.0	6.63	24.5	5620	1.7	-407.7	7200		C) non-ded bladder pump; or
	910	4.20	2.5	6.62	24.4	5620	1.9	-407.8	7200		Standard groundwater sample:
	913	4.20	3.0	6.63	24.4	5630	2.0	-407.9	7200		D) bailer due to limited column; or
	915	4.20	3.5	6.63	24.4	5640	2.1	-408.0	7200		E) recovery well cycling sample
	917	4.20	4.0	6.63	24.4	5640	2.1	-408.1	7200	↓ ↓ ↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	920	MW-137	4.20	6.63	24.4	5640	2.1	-408.1	>200	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-138

Event: Fall 2015

Area of Concern: REST

(N. Refinery; Main API Separator)

(4-in; At-grade)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	735	NP	6.10	0.0	24.81	19.91	yes	yes	yes	yes		Weather: 11/16 cloudy 70°

Well Purging Record

Screen: 10-25

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1050	6.11	0.5	6.79	29.6	3330	1.9	-338.3	99.5	cloudy, gray f. nt	Low-flow groundwater sample:
	1003	6.11	1.0	6.75	29.8	3270	2.2	-344.9	89.5		(A) peristaltic pump w/ ded tubing
	1005	6.11	1.5	6.72	29.7	3210	2.3	-347.7	70.7		B) ded bladder pump
	1007	6.11	2.0	6.71	29.7	3190	2.4	-348.4	66.6		C) non-ded bladder pump; or
	1010	6.11	2.5	6.70	29.5	3160	2.4	-349.4	52.5		Standard groundwater sample:
	1013	6.11	3.0	6.69	29.5	3150	2.5	-349.9	49.3		D) bailer due to limited column; or
	1015	6.11	3.5	6.69	29.5	3140	2.4	-349.6	47.8		E) recovery well cycling sample
✓	1017	6.11	4.0	6.68	29.5	3130	2.4	-349.4	46.1	✓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1020	mw-138	6.11	6.68	29.5	3130	2.4	-349.4	46.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-23

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(6-in ; stickup)

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	730	NP	9.76	0.0	23.00	17.9	YES	YES	YES	YES		Weather: pt/cloudy 70°

Well Purging Record

HMI installed a new 6-in expandable locking cap and lock 2415; no protective steel casing

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1100	9.82	0.5	7.22	28.6	3130	2.2	-269.8	31.7	clear, yellow tint	Low-flow groundwater sample:
	1103	9.88	1.0	7.09	28.6	3130	2.2	-275.3	12.8	clear	A) peristaltic pump w/ ded tubing
	1105	9.92	1.5	7.02	28.5	3130	2.4	-277.8	10.4		B) ded bladder pump
	1107	9.96	2.0	6.93	28.6	3120	2.0	-283.4	8.5		C) non-ded bladder pump; or
	1110	9.99	2.5	6.87	28.9	3120	1.6	-283.9	8.0		Standard groundwater sample:
	1113	10.02	3.0	6.85	28.9	3120	1.5	-286.2	7.9		D) bailer due to limited column; or
	1115	10.05	3.5	6.83	28.9	3110	1.4	-287.9	7.5		E) recovery well cycling sample
✓	1117	10.07	4.0	6.81	28.9	3110	1.3	-289.3	6.9	✓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1120	MW-23	10.07	6.81	28.9	3110	1.3	-289.3	6.9	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

+ DUP-TEL-01
(for same analyses)

Well: TEL-4

Event: Fall 2015

Area of Concern: TEL

for ARCADIS

Houston, Texas

Initials: TAB / B R N

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1300	NP	4.51	0.0	29.98	22.2	Yes	Yes	Yes	Yes		Weather: Cloudy, 60s
10/20/15	720	NA	4.72	0.0	27.28	22.2						

Well Purging Record

[illegible]

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN	
10/20/15	745	TEL-4	4.85	6.67	21.7	5,740	0.7	-331.8	2.9	DRO	HCL	8015M	
↓										GRO	HCL	8015M	
										VOC	HCL	8260	
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020	
								Anions (Chloride,Fluoride,Sulfate)		Neat	300		
										Nitrate-Nitrite	H2SO4	per ARCADIS	
										TDS	Neat	2540C	
										Total Metals (Hg,Ni,Va)		HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500	
✓	900	DVP-TEL-01	4.85	6.67	21.7	5,740	0.7	-331.8	2.9	Same as above	Same	Same	
										If <0.03 feet of PSH present, remove PSH and sample groundwater			

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: TEL-3

Event: Fall 2015

Area of Concern: TEL

(2-in; stickup)

+ EB-TEL-01
(for same analyses)

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1305	NP	3.98	0.0	27.19	22.2	Yes	Yes	Yes	Yes		Weather: Pt. Cloudy, 70s
10/20/15	1025	NP	4.16	0.0	27.19	22.2						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	1030	4.33	0.5	6.79	21.8	2630	2.3	-329.8	10.3	clear w/ black tint,	Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or
	1033	4.33	1.0	6.65	21.4	2630	1.0	-336.2	6.8	odor, sheen	
	1035	4.33	1.5	6.60	21.2	2630	0.7	-339.5	4.7		
	1038	4.33	2.0	6.57	21.2	2640	0.6	-341.8	4.1		Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
	1040	4.33	2.5	6.54	21.1	2640	0.5	-343.0	3.4		
	1043	4.33	3.0	6.51	21.1	2640	0.5	-344.2	3.0		
	1045	4.33	3.5	6.49	21.0	2640	0.4	-345.7	2.9		
	1048	4.33	4.0	6.48	21.0	2650	0.4	-348.6	2.7		

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1050	TEL-3	4.33	6.48	21.0	2650	0.4	-348.6	2.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
	1105	EB-TEL-01	NA							Same as above	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: TEL-2

Event: Fall 2015

Area of Concern: TEL

(2-in; stickup)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1310	NA	4.71	0.0	27.20	22.1	Yes	Yes	Yes	Yes		Weather: Pt. Cloudy, 70s
10/20/15	940	NA	4.96	0.0	27.20	22.1						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/20/15	945	4.98	0.5	6.97	22.2	3030	1.8	-333.7	5.9	Clear w/ black tint, odor, sheen	Low-flow groundwater sample:
	948	4.98	1.0	6.82	22.1	3060	1.3	-337.2	3.9		A) peristaltic pump w/ ded tubing
	950	4.98	1.5	6.79	22.0	3070	1.2	-339.8	3.4		B) ded bladder pump
	953	4.98	2.0	6.75	21.9	3090	1.0	-340.9	3.0		C) non-ded bladder pump; or
	955	4.98	2.5	6.73	21.8	3110	0.9	-342.1	2.8		Standard groundwater sample:
	958	4.98	3.0	6.69	21.8	3140	0.8	-342.8	2.5		D) bailer due to limited column; or
	1000	4.98	3.5	6.66	21.7	3180	0.8	-343.5	2.6		E) recovery well cycling sample
	1003	4.98	4.0	6.65	21.7	3210	0.7	-344.2	2.3		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1003	TEL-2	4.98	6.65	21.7	3210	0.7	-344.2	2.3			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
10/20/15	920	TEL-1	4.27	6.87	21.8	3580	0.6	-306.1	3.8	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
								Anions (Chloride,Fluoride,Sulfate)		Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-98

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1410	NP	6-14	0.0	26.80	21.5	yes	yes	yes	yes		Weather: P/K/Cloud/68°
10/20/15	730	NP	6-20									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity		Comments
10/20/15	735	6-28	0.5	6.68	20.6	3130	1.9	-386.7	3.0	Clear, colorless		Low-flow groundwater sample:
	737	6-28	1.0	6.67	20.7	3130	1.7	-387.3	2.2			A) peristaltic pump w/ ded tubing
	740	6-28	1.5	6.67	20.9	3120	1.5	-388.7	1.9			B) ded bladder pump
	743	6-28	2.0	6.66	21.1	3110	1.4	-389.0	1.8			C) non-ded bladder pump; or
	745	6-28	2.5	6.65	21.1	3110	1.3	-389.9	1.6			Standard groundwater sample:
	747	6-28	3.0	6.67	21.1	3110	1.2	-388.6	1.5			D) bailer due to limited column; or
	750	6-28	3.5	6.67	21.0	3100	1.1	-388.8	1.2			E) recovery well cycling sample
	753	6-28	4.0	6.67	21.0	3100	1.1	-389.1	1.0			F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	755	MW-98	6-28	6.67	21.0	3100	1.1	-389.1	1.0	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500-

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: RW-9 (Gauge Only)
Event: Fall 2015
Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1420	NP	6.05	0.0	21.97	17.0	Yes	Yes	Yes	Yes		Weather: pt. cloudy, 70s

Well Purging Record

(Corrugated metal; large diameter RW stickup)

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								(A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RW-# 16B (gauge only)

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(stickup; 8 3/8" OD / 7 7/8" ID)

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1425	NP	9.13	0.0	17.70	14.7	Issue	yes	Issue	yes		Weather: pt. cloudy, 70s

Well Purging Record

(Non-standard "Bell" top of PVC; dimensions as above stickup)

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample:
			1.0								A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5								Standard groundwater sample:
			3.0								D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0								F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)				HNO3		6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Not in Sampling Program

Artesia Refinery

Well Inspection Information

Well: MW-30 (Gauge Only)
Event: Fall 2015

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: TAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1225	NP	7.68	0.0	23.50	Not Sampled	yes	yes	yes	yes		Weather: pt- cloudy, 70s

Well Purging Record

[illegible]

Well Sampling Record

[illegible]

[illegible]

If <0.03 feet of PSH present, remove PSH and sample groundwater

["Re-found" from under gravel by surveyor, 4-9-15]
Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-106

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; at-grade)

Initials: JAB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1355	NP	5.64	0.0	22.80	17.5	YES	YES	YES	YES		Weather: p/c/cloudy 70°
10/16/15	1200	NP	5.45									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity		Comments
10/20/15	1205	5.50	0.5	6.66	25.2	3370	2.6	-384.7	18.7	Clear/clear		Low-flow groundwater sample:
	1207	5.51	1.0	6.66	25.0	3430	2.6	-387.7	15.6			A) peristaltic pump w/ ded tubing
	1210	5.53	1.5	6.65	25.0	3450	2.7	-388.9	14.7			B) ded bladder pump
	1213	5.56	2.0	6.65	24.9	3480	2.7	-389.9	13.3			C) non-ded bladder pump; or
	1215	5.59	2.5	6.65	24.8	3490	2.8	-390.1	11.6			Standard groundwater sample:
	1217	5.62	3.0	6.65	24.8	3500	2.8	-390.3	10.4			D) bailer due to limited column; or
	1220	5.64	3.5	6.66	24.9	3550	2.7	-390.7	9.8			E) recovery well cycling sample
✓	1223	5.66	4.0	6.66	24.9	3510	2.6	-390.6	9.7	✓	✓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/20/15	1225	MW-106	5.66	6.66	24.9	3510	2.6	-390.6	9.7			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-45

Event: Fall 2015

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/19/15	1610	NP	3.50	0.0	15.05	12.3	yes	yes	yes	yes		Weather:

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/19/15	1615	3.71	0.5	6.98	21.3	5310	1.6	-385.2	8.9	Clear; colorless	Low-flow groundwater sample:
	1617	3.72	1.0	6.93	21.1	5180	1.3	-374.3	6.4	odor	A) peristaltic pump w/ ded tubing
	1620	3.72	1.5	6.90	21.0	5080	1.3	-362.3	3.2		B) ded bladder pump
	1623	3.72	2.0	6.88	21.0	5030	1.2	-353.0	2.8		C) non-ded bladder pump; or
	1625	3.72	2.5	6.88	21.9	4980	1.1	-343.2	2.0		Standard groundwater sample:
	1627	3.72	3.0	6.88	21.9	4970	1.0	-340.1	1.6		D) bailer due to limited column; or
	1630	3.72	3.5	6.87	21.9	4960	1.0	-338.9	1.4		E) recovery well cycling sample
✓	1633	3.72	4.0	6.87	21.9	4950	0.9	-330.1	1.2	✓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/19/15	1635	MW-45	3.72	6.87	21.9	4950	0.9	-330.1	1.2	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-50

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1000	NA	13.29	0.0	28.27	24.1	yes	yes	yes	yes		Weather: Clear, 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	1005	13.30	0.5	7.58	22.4	3400	1.6	-203.8	3.9	Clear, sl. odor	Low-flow groundwater sample:
	1007	13.30	1.0	7.50	22.4	3410	1.1	-226.3	3.5		A) peristaltic pump w/ ded tubing
	1010	13.30	1.5	7.48	22.3	3420	0.9	-242.1	3.6		B) ded bladder pump
	1012	13.30	2.0	7.47	22.4	3440	0.8	-256.4	3.2		C) non-ded bladder pump; or
	1015	13.30	2.5	7.47	22.4	3450	0.8	-265.1	3.0		Standard groundwater sample:
	1017	13.30	3.0	7.47	22.4	3450	0.8	-270.7	2.9		D) bailer due to limited column; or
	1020	13.30	3.5	7.46	22.3	3450	0.8	-274.6	2.5		E) recovery well cycling sample
	1022	13.30	4.0	7.46	22.3	3460	0.8	-278.9	2.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1025	MW-50	13.30	7.46	22.3	3460	0.8	-278.9	2.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

UNABLE TO ACCESS

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-97

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; at-grade)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1805	NM	NM	NM	NM	NA	Historically	Historically	Historically	Historically		Weather: pt. cloudy, 70s
						5' off base as needed	yes	yes	yes	yes		

Well Purging Record

(Historical) TD = 21.24'

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or
			1.0								
			1.5								
			2.0								Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
			2.5								
			3.0								
			3.5								
			4.0								

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		MW-97										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-92

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1755	9.12	9.16	0.04	22.60	NA	yes	yes	yes	yes		Weather: pt. cloudy, 70s
						5' feet at base as needed						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
			0.5								Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or
			1.0								
			1.5								
			2.0								Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
			2.5								
			3.0								
			3.5								
			4.0								

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		MW-92										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-91

Event: Fall 2015

Area of Concern:

(4-in; stickup)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1050	NA	8.12	NA	25.31	17.9	yes	yes	yes	yes		Weather: Clear, 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	1055	8.20	0.5	7.10	23.7	2960	2.4	-343.5	12.6	Clear, black tint, odor	Low-flow groundwater sample:
	1057	8.24	1.0	6.95	23.6	2900	2.1	-357.1	9.6		A) peristaltic pump w/ ded tubing
	1100	8.27	1.5	6.90	23.5	2780	2.0	-371.4	8.8		B) ded bladder pump
	1102	8.30	2.0	6.87	23.5	2650	1.9	-382.6	7.7		C) non-ded bladder pump; or
	1105	8.32	2.5	6.85	23.6	2600	1.8	-387.3	6.6		Standard groundwater sample:
	1107	8.33	3.0	6.84	23.6	2570	1.7	-391.7	6.0		D) bailer due to limited column; or
	1110	8.35	3.5	6.83	23.7	2550	1.7	-393.6	5.8		E) recovery well cycling sample
	1112	8.36	4.0	6.83	23.7	2540	1.6	-395.2	5.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1115	MW-91	8.36	6.83	23.7	2540	1.6	-395.2	5.4			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)				HNO3		6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-90

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in ; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1140	NA	9.11	0.0	22.80	21.5	Yes	Yes	Yes	Yes		Weather: Clear, 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	1145	9.21	0.5	7.01	23.8	4880	2.1	-224.8	9.4	Clear, small black	Low-flow groundwater sample:
	1147	9.23	1.0	7.10	23.8	5050	1.8	-223.1	9.0	Particles, color	A) peristaltic pump w/ ded tubing
	1150	9.25	1.5	7.14	23.9	5110	1.4	-221.6	8.7		B) ded bladder pump
	1152	9.26	2.0	7.16	23.7	5170	1.2	-220.4	7.8		C) non-ded bladder pump; or
	1155	9.27	2.5	7.18	23.5	5190	1.1	-221.1	6.6		Standard groundwater sample:
	1157	9.27	3.0	7.20	23.4	5200	1.0	-221.7	6.2		D) bailer due to limited column; or
	1200	9.28	3.5	7.21	23.4	5210	0.9	-222.3	5.8		E) recovery well cycling sample
	1202	9.28	4.0	7.22	23.3	5210	0.9	-222.8	4.8		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1205	MW-90	9.28	7.22	23.3	5210	0.9	-222.8	4.8			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)					HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-96

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1230	NA	8.48	0.0	25.53	21.2	yes	*Issue	needs lock	yes		Weather: Clear, 70's

Well Purging Record

* Damaged hinge, prevents Prot. Casing lid from shutting properly, resulting in the inability to lock the Prot. Casing

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-19-15	1235	8.49	0.5	7.21	24.4	3180	1.9	-316.8	8.4	Colorless, Clear, ?	Low-flow groundwater sample:
	1237	8.49	1.0	7.10	23.9	3060	1.8	-339.4	7.5	odor	A) peristaltic pump w/ ded tubing
	1240	8.49	1.5	7.07	23.7	3020	1.7	-347.1	6.8		B) ded bladder pump
	1242	8.49	2.0	7.06	23.7	2980	1.7	-356.2	5.9		C) non-ded bladder pump; or
	1245	8.49	2.5	7.06	23.7	2950	1.8	-364.3	5.4		Standard groundwater sample:
	1247	8.49	3.0	7.05	23.7	2930	1.8	-369.5	4.6		D) bailer due to limited column; or
	1250	8.49	3.5	7.05	23.6	2920	1.7	-373.6	4.2		E) recovery well cycling sample
	1252	8.49	4.0	7.05	23.6	2910	1.7	-376.8	3.8		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1255	MW-96	8.49	7.05	23.6	2910	1.7	-376.8	3.8			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

If <0.03 feet of PSH present, remove PSH and sample groundwater

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-67

Event: Fall 2015

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; at-grade)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1425	NA	6.61	0.0	27.30	19.9	yes	yes	yes	yes		Weather: Partly Cloudy, 70%

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	1430	6.76	0.5	7.40	23.9	2540	2.2	-360.1	4.7	(Clear, Colorless, Small	Low-flow groundwater sample:
	1432	6.81	1.0	7.30	23.8	2530	2.3	-363.3	4.4	black particles, sl.	(A) peristaltic pump w/ ded tubing
	1435	6.86	1.5	7.25	23.7	2520	2.3	-366.0	4.1	Odor	B) ded bladder pump
	1437	6.88	2.0	7.23	23.7	2490	2.2	-368.0	3.8		C) non-ded bladder pump; or
	1440	6.89	2.5	7.22	23.6	2490	2.1	-368.5	4.0		Standard groundwater sample:
	1442	6.90	3.0	7.20	23.6	2480	2.1	-368.9	3.9		D) bailer due to limited column; or
	1445	6.91	3.5	7.19	23.6	2480	2.1	-369.4	3.7		E) recovery well cycling sample
	1447	6.92	4.0	7.18	23.5	2480	2.0	-370.0	3.6		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1450	MW-67	6.92	7.18	23.5	2480	2.0	-370.0	3.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470 ✓
										Cyanide	NaOH	SM4500 ✓

If <0.03 feet of PSH present, remove PSH and sample groundwater

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If <0.03 feet of PSH present, remove PSH and sample groundwater

* 20 yds north of NCL-34-A is a newer well, labeled NCL-34A. opening the prot. casing lid I found just soil within the Prot. casing, but no well. I sampled the "NCL-34A" that has been sampled for the previous events.

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NCL-34A

Event: Fall 2015

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1645	NA	8.21	0.0	19.31	16.9	Issue*	yes	Issue	yes		Weather: Cloudy, 70's
10-20-15	1245	NA	8.28	0.0	19.31							

Well Purging Record

* Cannot fit cap and properly secure the well, PVC casing needs to be lowered, or Prot. casing heightened.

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-19-15	1250	8.42	0.5	6.95	24.1	1967	2.1	-285.2	16.7	Clear, light	Low-flow groundwater sample:
	1252	8.45	1.0	6.89	23.9	1958	2.0	-293.4	11.4	Yellow tint, 3 sl.	(A) peristaltic pump w/ ded tubing
	1255	8.45	1.5	6.85	23.7	1927	1.9	-306.1	9.6	odor	B) ded bladder pump
	1257	8.45	2.0	6.83	23.6	1905	1.9	-314.2	8.5		C) non-ded bladder pump; or
	1300	8.45	2.5	6.82	23.5	1895	1.8	-320.1	7.7		Standard groundwater sample:
	1302	8.45	3.0	6.82	23.5	1888	1.8	-324.3	7.0		D) bailer due to limited column; or
	1305	8.45	3.5	6.81	23.5	1883	1.7	-327.7	6.4		E) recovery well cycling sample
	1307	8.45	4.0	6.81	23.6	1880	1.7	-330.4	5.6		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-19-15	1310	NCL-34A	8.45	6.81	23.6	1880	1.7	-330.4	5.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NCL-33

Event: Fall 2015

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10.19.15	1655	NA	6.93	0.0	19.60	17.7	Yes	Yes	Yes	Yes		Weather: Partly Cloudy, 70's
10.20.15	1155	NA	6.94	0.0	19.60							

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10.20.15	1200	7.06	0.5	6.99	23.6	2920	3.4	-95.6	11.7	Colorless, clear	Low-flow groundwater sample:
	1202	7.15	1.0	6.87	23.5	2930	2.9	-98.3	10.1		A) peristaltic pump w/ ded tubing
	1205	7.20	1.5	6.79	23.4	2960	2.7	-100.5	9.4		B) ded bladder pump
	1207	7.23	2.0	6.74	23.3	2980	2.6	-103.0	8.6		C) non-ded bladder pump; or
	1210	7.25	2.5	6.71	23.2	3000	2.6	-105.1	8.1		Standard groundwater sample:
	1212	7.26	3.0	6.69	23.1	3010	2.6	-106.9	7.7		D) bailer due to limited column; or
	1215	7.27	3.5	6.68	23.2	3010	2.5	-108.2	6.8		E) recovery well cycling sample
↓	1217	7.28	4.0	6.68	23.2	3020	2.5	-109.3	6.0	↓ ↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10.20.15	1220	NCL-33	7.28	6.68	23.2	3020	2.5	-109.3	6.0	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)				HNO3		6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NCL-44

Event: Fall 2015

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1705	NA	7.01	0.0	21.55	17.4	*Issue	yes	Issue	yes		Weather: Partly Cloudy, 70's
10-20-15	1105	NA	7.01	0.0	21.55							

Well Purging Record

*PVC well casing is flush with top of Prot. Casing. Unable to use a well cap and properly close Prot. Casing lid.

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-20-15	1110	7.05	0.5	6.99	22.2	2410	2.4	-200.4	10.7	Colorless, Clear	Low-flow groundwater sample:
	1112	7.05	1.0	6.95	22.0	2400	2.1	-202.4	10.1		(A) peristaltic pump w/ ded tubing
	1115	7.05	1.5	6.91	21.8	2390	1.9	-203.9	9.7		B) ded bladder pump
	1117	7.05	2.0	6.89	21.7	2380	1.8	-204.7	9.5		C) non-ded bladder pump; or
	1120	7.05	2.5	6.88	21.5	2360	1.7	-206.1	9.6		Standard groundwater sample:
	1122	7.05	3.0	6.87	21.4	2340	1.7	-207.7	9.9		D) bailer due to limited column; or
	1125	7.05	3.5	6.86	21.4	2330	1.7	-208.6	9.2		E) recovery well cycling sample
	1127	7.05	4.0	6.86	21.4	2320	1.6	-209.6	8.9		F) Irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-20-15	1130	NCL-44	7.05	6.86	21.4	2320	1.6	-209.6	8.9	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN 8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NCL-32

Event: Fall 2015

Area of Concern: NCL

(2-in; at-grade)

+ EB-NCL-01
(for same analyses)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1715	NA	7.91	0.0	17.19	16.5	yes	yes	yes	yes		Weather: partly cloudy, 60's
10-20-15	955	NA	7.76	0.0	17.19							

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-20-15	1000	8.18	0.5	7.51	20.7	2930	4.6	-258.1	>200 *	Very cloudy, dark	Low-flow groundwater sample:
	1002	8.31	1.0	7.42	20.7	2950	3.1	-257.4	>200 *	brown	A) peristaltic pump w/ ded tubing
	1005	8.42	1.5	7.36	20.6	2970	2.2	-256.1	>200 *		B) ded bladder pump
	1007	8.52	2.0	7.33	20.4	3020	2.0	-254.2	>200 *	Reduced purge	C) non-ded bladder pump; or
	1012	8.57	2.5	7.30	20.5	3040	1.9	-253.7	>200 *	rate to 0.1 L/min	Standard groundwater sample:
	1017	8.59	3.0	7.28	20.5	3060	1.8	-253.0	>200 *		D) bailer due to limited column; or
	1022	8.61	3.5	7.26	20.6	3080	1.7	-252.5	>200 *		E) recovery well cycling sample
	1027	8.63	4.0	7.25	20.6	3090	1.7	-252.1	>200 *		F) irrigation well grab sample
										* Turbidity reading taken outside cell	

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-20-15	1030	NCL-32	8.63	7.25	20.6	3090	1.7	-252.1	>200	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)		HNO3 6010/6020 and/or 7470
										Cyanide	NaOH	SM4500
	1050	EB-NCL-01	NA							Same as above	Same	Same

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-108

Event: Fall 2015

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10.19.15	1720	NA	10.07	0.0	27.75	22.5	yes	yes	yes	yes		Weather: Cloudy, 60's
10.20.15	850	NA	10.21	0.0	27.75							

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10.20.15	855	10.37	0.5	7.07	21.1	2910	1.8	-347.2	15.6	Clear, yellow tint, 3 odor	Low-flow groundwater sample:
	857	10.45	1.0	6.97	20.7	2890	1.6	-366.1	12.8		A) peristaltic pump w/ ded tubing
	900	10.49	1.5	6.93	20.6	2870	1.5	-376.7	10.4		B) ded bladder pump
	902	10.52	2.0	6.91	20.5	2860	1.5	-382.6	9.7		C) non-ded bladder pump; or
	905	10.54	2.5	6.90	20.4	2850	1.5	-389.4	9.9		Standard groundwater sample:
	907	10.56	3.0	6.90	20.4	2840	1.4	-393.2	8.8		D) bailer due to limited column; or
	910	10.57	3.5	6.89	20.3	2830	1.5	-396.1	8.5		E) recovery well cycling sample
✓	912	10.58	4.0	6.88	20.4	2830	1.5	-398.3	8.1	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10.20.15	915	MW-108	10.58	6.88	20.4	2830	1.5	-398.3	8.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
						Total Metals (Hg,Ni,Va)				HNO3		6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico
Well Inspection Information

Well: NCL-31
Event: Fall 2015
Area of Concern: NCL

Hydrologic Monitoring
for ARCADIS
Houston, Texas

(2-in; stickup)

Initials: CJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-19-15	1730	NA	7.52	0.0	20.16	17.4	Issue	Yes		Yes		Weather: Cloudy, 60's
10-20-15	750	NA	7.64	0.0	20.16	17.4						

Well Purging Record

*PVC well casing is flush with Prot. casing top, unable to use a Cap and Close Prot. casing lid!

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10-20-15	755	7.85	0.5	7.41	18.8	3560	1.7	-133.0	24.6	Clear, light yellow tint, 3 sl. odor	Low-flow groundwater sample:
	757	7.87	1.0	7.30	18.9	3570	1.5	-135.4	16.4		A) peristaltic pump w/ ded tubing
	800	7.87	1.5	7.25	19.0	3550	1.4	-138.2	11.3		B) ded bladder pump
	802	7.87	2.0	7.22	19.3	3530	1.3	-140.6	12.4		C) non-ded bladder pump; or
	805	7.87	2.5	7.20	19.5	3520	1.3	-142.7	10.9		Standard groundwater sample:
	807	7.87	3.0	7.18	19.6	3510	1.2	-144.1	9.8		D) bailer due to limited column; or
	810	7.87	3.5	7.17	19.7	3500	1.2	-146.0	9.4		E) recovery well cycling sample
	812	7.87	4.0	7.16	19.8	3490	1.2	-147.8	9.0		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-20-15	815	NCL-31	7.87	7.16	19.8	3490	1.2	-147.8	9.0	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN 8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H2SO4	per ARCADIS
										TDS	Neat	2540C
										Total Metals (Hg,Ni,Va)	HNO3	6010/6020 and/or 7470
										Cyanide	NaOH	SM4500

If <0.03 feet of PSH present, remove PSH and sample groundwater