

GW – 028

2015 AGWMR

PART 1 OF 25

03 / 2016



Mr. John E. Kieling, Chief
Hazardous Waste Bureau
New Mexico Environmental Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

Mr. Carl Chavez
New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

March 11, 2016

**RE: Submittal of the 2015 Annual Groundwater Report and the 2015 Annual Discharge Permit Report for the Navajo Refining Company, Artesia Refinery
RCRA Permit No. NMD048918817
Discharge Permit GW-028**

Dear Mr. Kieling and Mr. Chavez:

Enclosed are both paper and electronic copies of the *2015 Annual Groundwater Report*, which fulfills requirement 4.7.6.b of the Post Closure Care Permit, and the *2015 Annual Discharge Permit Report*, which fulfills requirement 2.F of Discharge Permit GW-028.

If you have any questions or comments regarding these reports, please feel free to contact me at 575-746-5487 or Robert Combs at 575-746-5382.

Sincerely,

Scott M. Denton
Environmental Manager
Navajo Refining Company, LLC

c: Robert Combs, Navajo
 Laurie Rodriquez, Arcadis
 Brett Mays, Arcadis

APPENDIX A

Field Sampling Notes and Well Logs



A.1 First 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	Snow, ice pellets, hail, ice on ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
	2015	4	1	82	41	49	0.00						0.30	5	55	53			
	2015	4	2	88	47	51	0.00						0.37	5	57	55			
	2015	4	3	88	44	46	0.00						0.58	5	56	55			
	2015	4	4	68	41	42	0.00						0.32	5	56	55			
	2015	4	5	60	42	47	0.00						0.26	5	57	55			
	2015	4	6	88	44	48	0.00						0.36	5	58	55			
	2015	4	7	87	43	45	0.00						0.49	5	58	56			
	2015	4	8	87	44	52	0.00						0.45	5	57	55			
	2015	4	9	89	45	48	0.00						0.54	5	57	55			
	2015	4	10	77	45	46	0.00						0.31	5	57	55			
	2015	4	11	74	45	50	0.04						0.34	5	57	54			
	2015	4	12	87	50	55	0.00						0.45	5	57	54			
	2015	4	13	78	51	54	0.09						0.20	5	58	56			
	2015	4	14	56	39	39	0.79						0.10	5	57	54			
	2015	4	15	67	39	43	0.00						0.28	5	57	54			
	2015	4	16	82	43	50	0.00						0.34	5	57	56			
	2015	4	17	81	35	37	0.00						0.46	5	57	56			
	2015	4	18	75	35	40	0.00						0.37	5	57	55			
	2015	4	19	78	40	45	0.00						0.36	5	57	55			
	2015	4	20	74	41	44	0.00						0.33	5	57	54			
	2015	4	21	71	41	42	0.00						0.33	5	58	56			
	2015	4	22	83	42	56	0.00						0.44	5	58	56			
	2015	4	23	86	44	46	0.00						0.32	5	59	56			
	2015	4	24	78	46	59	0.00						0.29	5	59	56			
	2015	4	25	78	44	48	0.00						0.53	5	59	57			
	2015	4	26	82	48	66	0.00						0.48	5	59	57			
	2015	4	27	77	42	48	0.00						0.44	5	59	57			
	2015	4	28	60	39	41	0.00						0.16	5	58	54			
	2015	4	29	68	32	35	0.00						0.27	5	58	54			
	2015	4	30	75	35	43	0.00						0.26	5	59	57			
Summary				77.5	42.2		0.92		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.

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-6A

Event: Spring 2015 (Biennial)

Area of Concern: EP

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	
4/14/15	1102	NA	11.31	0.0	14.05	14.05	Yes	Yes	Yes	Yes		Weather: Clear 65's
4/15/15	1030	NA	11.19	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	
4/15/15	1035	11.24	0.5	7.31	18.2	8770	3.0	-73.9	15.2	Clear	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
	1037	11.27	1.0	7.26	18.8	8930	1.3	-83.7	15.1		
	1040	11.29	1.5	7.24	18.8	8960	1.8	-85.9	13.8		
	1042	11.30	2.0	7.22	18.7	8970	1.8	-86.2	12.4		
	1045	11.31	2.5	7.21	18.8	8970	1.5	-85.2	12.2		
	1047	11.31	3.0	7.21	18.8	8980	1.4	-83.2	11.2		
	1050	11.32	3.5	7.21	18.8	8980	1.3	-79.1	10.4		
	1052	11.33	4.0	7.21	18.9	8980	1.3	-76.8	9.7		

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	1055	MW-6A	11.33	7.21	18.9	8480	1.3	-76.8	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
						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

Monitoring Well Purging and Sampling Record

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

Well: MW-85
Event: Spring 2015 (Biennial)
Area of Concern: EP

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	
4/14/15	1115	8.91	9.36	0.45	20.34	NA	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-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
										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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-120

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-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	
4/14/15	1130	NA	10.94	0.0	27.92	17.5	Yes	Yes	Yes	Yes		Weather: Clear 60's
4/15/15	1130	NA	11.01	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	
4/15/15	1135	11.38	0.5	7.17	19.2	12040	3.2	-71.2	36.1	Clear with tiny orange particles	Low-flow groundwater sample:
	1137	11.38	1.0	7.10	18.9	12180	1.8	-80.1	38.9		A) peristaltic pump w/ ded tubing
	1140	11.38	1.5	7.07	18.9	12230	1.7	-82.4	40.1		B) ded bladder pump
	1142	11.38	2.0	7.06	18.8	12220	1.1	-84.3	38.7		C) non-ded bladder pump; or
	1145	11.38	2.5	7.05	18.7	1220	0.8	-85.4	36.6		Standard groundwater sample:
	1147	11.38	3.0	7.04	18.8	12190	0.7	-82.6	25.3		D) bailer due to limited column; or
	1150	11.38	3.5	7.03	18.9	12130	0.7	-82.0	20.8	↓	E) recovery well cycling sample
	1152	11.38	4.0	7.03	18.9	12110	0.7	-81.9	19.6		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
4/15/15	1155	MW-120	11.38	7.03	18.9	12110	0.7	-81.9	19.6			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
										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-121

Event: Spring 2015 (Bimonia)

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-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	
4/14/15	1135	NA	1202	0.0	27.28	17.5	Yes	Yes	Yes	Yes		Weather: Clear 70's
4/15/15	1230	NA	11.85	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	
4/15/15	1235	11.98	0.5	7.49	20.8	8040	3.3	-5.7	34.2	Clear with fine orange particles	Low-flow groundwater sample:
	1237	12.01	1.0	7.37	20.2	8010	1.9	-13.6	20.5		(A) peristaltic pump w/ ded tubing
	1240	12.02	1.5	7.27	19.9	7950	1.1	-17.6	17.8		B) ded bladder pump
	1242	12.03	2.0	7.24	19.8	7900	0.8	-23.3	13.4		C) non-ded bladder pump; or
	1245	12.03	2.5	7.23	19.7	7830	0.8	-28.4	11.6		Standard groundwater sample:
	1247	12.04	3.0	7.22	19.7	7830	0.8	-30.7	8.9		D) bailer due to limited column; or
	1250	12.04	3.5	7.21	19.6	7810	0.7	-32.8	6.7	↓	E) recovery well cycling sample
	1252	12.05	4.0	7.20	19.6	7800	0.7	-37.7	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
4/15/15	1255	MW-121	12.05	7.26	19.6	7800	0.7	-37.7	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
										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-84

Event: Spring 2015 (Biennial)

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	
4/14/15	1142	NA	8.20	0.0	20.56	15.2	Yes	Yes	Yes	Yes		Weather: slightly cloudy 60's
4/16/15	1710	NA	8.14	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	
4/16/15	1715	8.29	0.5	7.20	20.1	9290	3.2	67.8	42.4	Clear with gold tint	Low-flow groundwater sample:
	1717	8.36	1.0	7.16	19.7	9380	1.7	66.3	30.6		A) peristaltic pump w/ ded tubing
	1720	8.40	1.5	7.15	19.5	9400	1.2	64.8	38.4		B) ded bladder pump
	1722	8.46	2.0	7.14	19.3	9400	1.1	63.1	34.9		C) non-ded bladder pump; or
	1725	8.50	2.5	7.14	19.2	9410	0.9	61.7	34.8		Standard groundwater sample:
	1727	8.55	3.0	7.14	19.1	9420	0.8	59.9	34.6		D) bailer due to limited column; or
	1730	8.59	3.5	7.14	19.1	9430	0.8	59.0	32.4		E) recovery well cycling sample
✓	1732	8.64	4.0	7.14	19.0	9430	0.8	58.2	31.9	↓	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	1735	MW-84	8.64	7.14	19.0	9430	0.8	58.2	31.9	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		

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	
4/14/15	1320	NA	9.63	0.0	23.31	18.4	Yes	Yes	Yes	Yes		Weather: Clear 60's
4/15/15	1400	NA	9.31	0.0								

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: MW-81

Event: Spring 2015 (Biennial)

Area of Concern: EP

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	
4/14/15	1150	NA	9.96	0.0	18.70	13.70	Yes	Yes	Yes	Yes		Weather: slightly cloudy 78's
4/16/15	1300	NA	9.75	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	
4/16/15	1305	9.86	0.5	7.48	21.0	8160	4.0	52.5	55.3	slightly cloudy	Low-flow groundwater sample:
	1307	9.93	1.0	7.33	20.4	7650	3.7	53.1	19.7	Clear	A) peristaltic pump w/ ded tubing
	1316	10.01	1.5	7.27	19.9	7400	3.0	61.1	12.2		B) ded bladder pump
	1312	10.06	2.0	7.25	19.9	7310	2.8	62.1	8.6		C) non-ded bladder pump; or
	1315	10.12	2.5	7.25	19.5	7276	2.8	63.2	7.6		Standard groundwater sample:
	1317	10.16	3.0	7.24	19.4	7250	2.7	63.4	4.3		D) bailer due to limited column; or
	1320	10.18	3.5	7.23	19.7	7250	2.7	63.3	2.8		E) recovery well cycling sample
	1322	10.22	4.0	7.23	20.0	7250	2.7	63.1	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
4/16/15	1325	MW-81	10.22	7.23	20.0	7250	2.7	63.1	1.6	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: MW-80

Event: Spring 2015 (Biennial)

Area of Concern: EP

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	
4/14/15	1155	NA	8.15	0.0	14.67	14.67	Yes	Yes	Yes	Yes		Weather: slightly cloudy 60's
4/16/15	1400	NA	7.96	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	
4/16/15	1405	8.05	0.5	7.24	20.8	7060	2.7	65.5	15.7	Clear with tiny orange	Low-flow groundwater sample:
	1407	8.07	1.0	7.12	20.0	7150	1.7	69.9	14.8	particles	A) peristaltic pump w/ ded tubing
	1410	8.08	1.5	7.06	19.6	7150	1.4	70.7	14.2		B) ded bladder pump
	1412	8.09	2.0	7.03	19.4	7150	1.2	69.5	13.9		C) non-ded bladder pump; or
	1415	8.09	2.5	7.03	19.3	7160	1.0	68.6	8.6	Clear	Standard groundwater sample:
	1417	8.09	3.0	7.02	19.3	7160	0.9	67.7	8.4		D) bailer due to limited column; or
	1420	8.09	3.5	7.02	19.1	7150	0.8	66.7	7.9		E) recovery well cycling sample
✓	1422	8.09	4.0	7.01	19.0	7150	0.8	65.6	8.3		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
4/16/15	1425	MW-80	8.09	7.01	19.0	7150	0.8	65.6	8.3	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
										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 74702
										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-79

Event: Spring 2015 (Biennial)

Area of Concern: EP

(4-in; stickup)

+ EB-EP-04

(for same analyses)

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	
4/14/15	1200	NA	9.09	0.0	19.37	15.0	Yes	Yes	Yes	Yes		Weather: slightly cloudy 60's
4/16/15	1600	NA	8.94	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	
4/16/15	1605	9.01	0.5	7.37	20.1	6840	3.8	67.6	8.6	Clear	Low-flow groundwater sample:
	1607	9.06	1.0	7.21	14.0	6960	1.6	74.1	7.4		A) peristaltic pump w/ ded tubing
	1610	9.10	1.5	7.16	18.4	7000	1.0	76.3	6.2		B) ded bladder pump
	1612	9.14	2.0	7.12	18.0	7000	0.4	77.5	5.3		C) non-ded bladder pump; or
	1615	9.15	2.5	7.11	18.1	7000	0.8	77.5	4.8		Standard groundwater sample:
	1617	9.18	3.0	7.11	18.3	7000	0.7	77.3	4.2		D) bailer due to limited column; or
	1620	9.18	3.5	7.10	18.4	6990	0.6	76.1	3.2		E) recovery well cycling sample
	1622	9.19	4.0	7.10	18.6	7000	0.6	76.8	2.2		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
4/16/15	1625	MW-79	9.19	7.10	18.6	7000	0.6	76.8	2.2	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8015M
												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
✓	1645	EB-EP-04	NA							Full list shown 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-82

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MDB/BRT

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	1205	NA	8.52	0.0	20.00	15.0	Yes	Yes	Yes	Yes		Weather: Cloudy, 80s
4-16-15	1630	NA	8.51	0.0	20.00	15.0						

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	
4-16-15	1635	8.55	0.5	7.51	19.1	7,920	5.4	-84.9	10.4	clear w/ yellow tint	Low-flow groundwater sample:
	1638	8.55	1.0	7.45	18.7	7,690	3.1	-89.2	10.1		A) peristaltic pump w/ ded tubing
	1640	8.55	1.5	7.36	18.5	7,590	2.4	-99.4	8.2		B) ded bladder pump
	1643	8.55	2.0	7.33	18.4	7,480	2.0	-101.7	7.1		C) non-ded bladder pump; or
	1645	8.55	2.5	7.32	18.3	7,420	1.9	-103.8	6.8		Standard groundwater sample:
	1648	8.55	3.0	7.31	18.3	7,370	1.7	-106.0	6.2		D) bailer due to limited column; or
	1650	8.55	3.5	7.30	18.3	7,340	1.6	-107.2	5.6		E) recovery well cycling sample
	1653	8.55	4.0	7.29	18.2	7,330	1.5	-107.9	5.3		F) irrigation well grab sample
	1655	8.55	4.5	7.29	18.2	7,310	1.5	-108.4	5.1		

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	1700	MW-82	8.55	7.29	18.2	7,310	1.5	-108.4	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
										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-74
Event: Spring 2015 (Biennial)
Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

+ EB-EP-01
(for same analyses)

(4-in; struck up)

Initials: MDB/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	
4/14/15	1215	NA	7.92	0.0	20.16	14.8	Yes	Yes	Yes	Yes		Weather: Pt. Cloudy, 70s
4-16-15	1400	NA	7.94	0.0	20.16	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	
4-16-15	1405	8.02	0.5	7.51	19.8	9490	4.5	98.1	4.3	clear	Low-flow groundwater sample:
	1408	8.06	1.0	7.34	19.4	9610	2.9	97.5	4.2		
	1410	8.10	1.5	7.26	19.2	9750	2.4	96.2	4.0		A) peristaltic pump w/ ded tubing
	1413	8.10	2.0	7.19	19.2	9790	2.1	94.6	3.6		B) ded bladder pump
	1415	8.11	2.5	7.15	19.0	9800	1.7	91.2	3.1		C) non-ded bladder pump; or
	1418	8.11	3.0	7.11	19.0	9810	1.5	89.6	2.9		Standard groundwater sample:
	1420	8.11	3.5	7.09	18.9	9820	1.4	88.3	3.0		D) bailer due to limited column; or
	1423	8.11	4.0	7.07	18.8	9830	1.4	87.9	2.9		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
4-16-15	1430	MW-74	8.11	7.07	18.8	9830	1.4	87.9	2.9	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
										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+
										Full list shown above	Same	same
4-16-15	1450	EB-EP-01	NA									

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-73

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: MDB/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	
4/14/15	1245	NA	7.81	0.0	19.60	14.6	Yes	Yes	Yes	Yes		Weather: Sunny, 80s
4-16-15	1510	NA	7.90	0.0	19.60	14.6						

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	
4-16-15	1515	7.96	0.5	7.27	19.1	10,690	4.8	89.7	87.0	Clear w/ orange algae particles	Low-flow groundwater sample:
	1518	7.98	1.0	7.21	17.8	10,980	2.9	87.1	52.0		A) peristaltic pump w/ ded tubing
	1520	7.99	1.5	7.17	17.4	11,060	2.5	85.8	48.6		B) ded bladder pump
	1523	8.00	2.0	7.17	17.3	11,080	2.3	82.9	32.1		C) non-ded bladder pump; or
	1525	8.00	2.5	7.16	17.2	11,090	2.2	81.6	28.6		Standard groundwater sample:
	1528	8.00	3.0	7.16	17.1	11,090	2.1	80.1	24.2		D) bailer due to limited column; or
	1530	8.00	3.5	7.16	17.1	11,100	2.0	78.6	24.5		E) recovery well cycling sample
	1533	8.00	4.0	7.15	17.0	11,100	1.9	77.2	25.1		F) irrigation well grab sample
	1535	8.00	4.5	7.15	16.9	11,110	1.9	75.9	25.3		

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
4-16-15	1540	MW-73	8.00	7.15	16.9	11,110	1.9	75.9	25.3			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
										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-2A

Event: Spring 2015 (Biennial)

Area of Concern: EP

(2-in; stickup)

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	
4/14/15	1400	NA	10.70	0.0	17.35	15.0	Yes	Yes	Yes	Yes		Weather: slightly cloudy 60's
4/15/15	1530	NA	9.81	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	
4/15/15	1535	10.25	0.5	7.08	22.2	22500	2.4	415.7	7.5	Clear	Low-flow groundwater sample:
	1537	10.25	1.0	6.97	21.6	22900	1.8	44.2	6.4		(A) peristaltic pump w/ ded tubing
	1540	10.25	1.5	6.96	21.5	22900	1.4	43.5	5.1		B) ded bladder pump
	1542	10.25	2.0	6.95	21.3	23100	1.2	42.6	4.3		C) non-ded bladder pump; or
	1545	10.25	2.5	6.95	21.1	23100	1.2	42.1	3.2		Standard groundwater sample:
	1547	10.25	3.0	6.94	21.3	23200	1.2	41.1	2.8		D) bailer due to limited column; or
	1550	10.25	3.5	6.94	21.1	23300	1.1	40.5	1.7		E) recovery well cycling sample
	1552	10.25	4.0	6.94	21.1	23400	1.1	40.3	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
4/15/15	1555	MW-2A	10.25	6.94	21.1	23400	1.1	40.3	1.2	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
						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)

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well Inspection Information

Well: MW-2B

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: **MDB**

[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
		MW-2B										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-72**
Event: Spring **2015 (Biennial)**
Area of Concern: **EP**

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	
4/14/15	1440	NA	6.42	0.8	13.93	11.93	Yes	Yes	Yes	Yes		Weather: Slightly Cloudy 60's
4/16/15	1140	NA	6.33	8.0								

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	
4/16/15	1145	6.45	0.5	7.06	20.1	16250	2.6	20.7	7200	Cloudy Orange tint with fine orange particles	Low-flow groundwater sample:
	1147	6.45	1.0	6.96	19.6	16570	1.6	22.7	7200		A) peristaltic pump w/ ded tubing
	1150	6.47	1.5	6.91	19.1	16630	1.4	22.2	7200		B) ded bladder pump
	1152	6.47	2.0	6.89	19.0	16650	1.1	20.6	7200		C) non-ded bladder pump; or
	1155	6.47	2.5	6.88	18.8	16580	1.0	17.3	7200		Standard groundwater sample:
	1157	6.47	3.0	6.87	18.9	16510	0.9	13.9	7200		D) bailer due to limited column; or
	1200	6.47	3.5	6.87	18.9	16470	0.9	12.2	7200	↓	E) recovery well cycling sample
	1202	6.47	4.0	6.87	12.5	16450	0.9	11.9	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
4/16/15	1205	MW-72	6.47	6.87	18.5	16450	0.9	11.9	7260			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		

**Hydrologic Monitoring
for ARCADIS
Houston, Texas**

Well Inspection Information

(2-in, straleup)

Initials: MDB

[illegible]

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	1045	10.29	0.5	7.16	20.9	12310	2.9	43.3	42.4	Clear with tiny	Low-flow groundwater sample:
	1047	10.29	1.0	7.10	20.6	12630	1.4	40.7	29.3	Orange particles	A) peristaltic pump w/ ded tubing
	1050	10.29	1.5	7.08	20.4	12700	1.3	32.4	27.3		B) ded bladder pump
	1052	10.29	2.0	7.07	20.3	12750	1.2	21.1	25.5		C) non-ded bladder pump; or
	1055	10.29	2.5	7.06	20.3	12780	1.0	12.2	25.3		Standard groundwater sample:
	1057	10.29	3.0	7.06	20.2	12790	1.0	5.3	26.5		D) bailer due to limited column; or
	1100	10.29	3.5	7.06	19.8	12820	0.9	-3.5	25.2		E) recovery well cycling sample
	1102	10.29	4.0	7.05	19.7	12840	0.9	-5.2	24.4		F) irrigation well grab sample
	1105	10.29	4.5	7.05	19.6	12830	0.9	-6.8	23.4		
↓	1107	10.29	5.0	7.05	19.6	12840	0.9	-7.2	22.3	↓	

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
4/16/15	1110	0CD-6	10.24	7.05	19.6	12840	0.9	-7.2	22.3	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
								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: OCD-7AR

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: MDD

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	1520	NA	9.08	0.0	21.28	16.0	Yes	Yes	Yes	Yes		Weather: slightly cloudy 60's
4/15/15	1706	NA	8.69	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	
4/15/15	1705	8.83	0.5	7.15	23.6	12620	3.9	64.2	54	clear gray orange	Low-flow groundwater sample:
	1707	8.90	1.0	7.06	22.1	12290	1.9	65.1	55	particles	A) peristaltic pump w/ ded tubing
	1710	8.93	1.5	7.04	21.8	12220	1.3	65.1	54		B) ded bladder pump
	1712	8.94	2.0	7.03	21.7	12170	1.2	64.4	42.9		C) non-ded bladder pump; or
	1715	9.00	2.5	7.03	21.7	12110	1.1	63.5	24.8		Standard groundwater sample:
	1717	9.05	3.0	7.02	21.8	12100	1.1	61.9	25.1		D) bailer due to limited column; or
	1720	9.08	3.5	7.02	21.6	12080	1.1	59.7	24.9		E) recovery well cycling sample
	1722	9.12	4.0	7.02	21.4	12070	1.0	58.6	23.2		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
4/15/15	1725	OCD-7AR	9.12	7.02	21.4	12070	1.0	58.6	23.2	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
										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: **OCD-7B**

Event: Spring 2015 (Biennial)

Area of Concern:

EP

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	
4/14/15	1530	N/A	8.98	0.0	56.25	51.85	Yes	Yes	Yes	Yes		Weather: <i>Slightly Cloudy</i> <i>60's</i>
4/16/15	915	N/A	8.82	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	
4/16/15	920	9.67	0.5	6.98	20.9	5030	3.0	-170.3	24.2	Clear with tiny Black Particles <i>Reduced purge rate to 0.1 L/min</i>	Low-flow groundwater sample:
	922	10.09	1.0	7.11	20.4	5100	1.5	-160.3	20.6		A) peristaltic pump w/ ded tubing
	925	10.51	1.5	7.16	20.8	5100	0.9	-150.4	16.2		B) ded bladder pump
	930	10.89	2.0	7.20	21.2	5110	0.8	-142.4	12.6		C) non-ded bladder pump; or
	935	11.10	2.5	7.22	21.2	5100	0.7	-138.7	10.7		Standard groundwater sample:
	940	11.28	3.0	7.23	21.6	5110	0.6	-135.8	9.9		D) bailer due to limited column; or
	945	11.53	3.5	7.23	21.7	5110	0.5	-134.6	8.3	↓	E) recovery well cycling sample
	950	11.78	4.0	7.23	21.7	5110	0.5	-133.3	7.8		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
4/16/15	955	OCD-7B	11.78	7.23	21.7	5110	0.5	-133.3	7.8			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
										Dissolved Metals (As,Ba,Cr,Fe,Pb,Mn,Se)		HNO3 Field filtered 0.45-μ; 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		

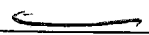
Not in Sampling Program
Monitoring Well Purging and Sampling Record

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

Well: **OCD-7C**
Event: Spring **2015 (Biennial)**
Area of Concern: **EP**

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	
4/14/15	1540	NA	8.17	0.0	71.27	No Sample	Yes	Yes	Needs lock	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								 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
		OCD-7C										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

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-77

Event: Spring 2015 (Biennial)

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	
4/14/15	1130	NA	8.02	0.0	20.57	15.2	Yes	Yes	Yes	Yes		Weather: Clear, 60s
4/17/15	1020	NA	7.96	0.0	20.57							

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	
4/17/15	1025	8.05	0.5	7.03	18.6	7460	5.3	-55.9	3.7	gold tint, clear, etc.	Low-flow groundwater sample:
	1027	8.10	1.0	6.99	18.4	7440	5.0	-60.9	3.6		A) peristaltic pump w/ ded tubing
	1030	8.12	1.5	6.98	18.3	7430	4.8	-67.3	3.4		B) ded bladder pump
	1032	8.13	2.0	6.98	18.3	7420	4.5	-71.0	3.4		C) non-ded bladder pump; or
	1035	8.14	2.5	6.98	18.3	7410	3.6	-73.9	3.3		Standard groundwater sample:
	1037	8.14	3.0	6.98	18.2	7420	3.1	-79.2	2.5		D) bailer due to limited column; or
	1040	8.15	3.5	6.98	18.2	7420	3.1	-82.2	2.2		E) recovery well cycling sample
	1042	8.15	4.0	6.98	18.1	7410	3.0	-82.8	1.9		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
4/17/15	1045	MW-77	8.15	6.98	18.1	7410	3.0	-82.8	1.9			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
		*Surface tension on VOCs was minimal, making filling of vials without headspace extremely difficult; i.e., no natural meniscus formed on filled vials				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-78

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCD/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	
4/14/15	1130	NA	8.07	0.0	19.61	14.6	Yes	Yes	Yes	Yes		Weather: Sunny, 60s
4/17/15	930	NA	8.11	0.0	19.61	14.6						

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
4/17/15	935	8.19	0.5	7.10	17.6	4,200	3.9	-90.3	11.2	clear w/ gold tint	Low-flow groundwater sample:
	938	8.26	1.0	6.92	17.4	4,160	2.2	-90.2	18.9		A) peristaltic pump w/ ded tubing
	940	8.31	1.5	6.88	17.4	4,130	2.0	-90.6	20.7		B) ded bladder pump
	943	8.36	2.0	6.87	17.3	4,090	1.9	-90.1	23.6		C) non-ded bladder pump; or
	945	8.40	2.5	6.86	17.3	4,070	1.7	-89.9	20.6		Standard groundwater sample:
	948	8.44	3.0	6.86	17.3	4,020	1.6	-86.9	18.1		D) bailer due to limited column; or
	950	8.48	3.5	6.86	17.3	3,970	1.5	-85.7	19.2		E) recovery well cycling sample
	953	8.52	4.0	6.86	17.2	3,900	1.5	-82.7	19.7		F) irrigation well grab sample
	955	8.56	4.5	6.86	17.2	3,880	1.4	-81.6	19.5		

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
4/17/15	1000	MW-78	8.56	6.86	17.2	3,880	1.4	-81.6	19.5			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
								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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-75

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

Initials: SCD/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	
4/14/15	1150	NA	8.23	0.0	23.71	18.4	Yes	Yes	Yes	Yes		Weather: Sunny, 50s
4/17/15	830	NA	8.27	0.0	23.71	18.4						

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	
4/17/15	835	8.30	0.5	7.29	17.1	7,780	4.4	-126.3	2.5	clear w/ gold tint, odor	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
	838	8.30	1.0	7.13	17.2	7,710	2.5	-127.9	2.4		
	840	8.30	1.5	7.06	17.3	7,650	2.1	-129.1	2.2		
	843	8.31	2.0	7.03	17.3	7,590	2.0	-130.1	2.0		
	845	8.31	2.5	7.02	17.3	7,560	1.8	-130.6	1.9		
	848	8.31	3.0	7.01	17.3	7,480	1.7	-131.3	1.7		
	850	8.31	3.5	7.00	17.3	7,460	1.7	-131.7	1.8		
	853	8.31	4.0	7.00	17.3	7,440	1.6	-132.2	1.7		

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
4/17/15	900	MW-75	8.31	7.00	17.3	7,440	1.6	-132.2	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
										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-83
Event: Spring 2015 (Biennial)
Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

(4-in ; strokeup)

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	
4/14/15	1140	NA	8.10	0.0	19.95	15.6	Yes	Yes	Yes	Yes		Weather: Clear, 70~5
4/17/15	1120	NA	8.04	0.0	19.95	15.6						

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	
4/17/15	1125	8.10	0.5	7.28	19.2	5620	2.1	-84.8	16.2	Clear, Slight gold tint	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
	1127	8.14	1.0	7.24	19.0	5680	1.7	-92.3	10.9		
	1130	8.16	1.5	7.22	18.9	5610	1.5	-97.5	10.3		
	1132	8.18	2.0	7.22	18.8	5570	1.2	-103.7	9.7		
	1135	8.20	2.5	7.21	18.7	5570	1.1	-105.7	9.2		
	1137	8.21	3.0	7.21	18.6	5560	1.0	-107.7	9.0		
	1140	8.21	3.5	7.20	18.7	5550	0.9	-108.8	8.7		
	1142	8.22	4.0	7.20	18.7	5550	0.9	-109.6	8.4		

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
4/17/15	1145	MW-83	8.22	7.20	18.7	5550	0.9	-109.6	8.4	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN 8015M
										GRO	HCL	8015M
										VOC	HCL	8260
											HNO3	6010/6020
											HNO3	Field filtered 0.45-u; 6010/6020
											Neat	300
											H2SO4	per ARCADIS
											Neat	2540C
											HNO3	6040/6020 and/or 7476
											NaOH	SM4500

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

(2-in stainless steel well extends above top of protective casing)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-3

Event: Spring 2015 (Biennial)

Area of Concern: EP

+ DUP-EP-03

(for same analyses)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCD/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	
4/14/15	1200	NA	8.21	0.0	20.08	16.1	Yes	Yes	Issue	Yes	No pad visible	Weather: Sunny, 60s
4/17/15	1030	NA	8.22	0.0	20.08	16.1						

(2-in; stick up)

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	
4/17/15	1035	8.30	0.5	7.26	18.7	10,510	4.2	61.3	4.9	clear	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
	1038	8.32	1.0	7.13	18.3	10,790	2.6	65.2	4.2		
	1040	8.33	1.5	7.07	18.1	10,980	2.2	68.0	3.8		
	1043	8.33	2.0	7.03	18.0	11,030	2.0	70.8	3.0		
	1045	8.34	2.5	7.01	17.8	11,070	1.9	72.6	2.6		
	1048	8.34	3.0	6.99	17.7	11,090	1.7	75.0	2.1		
	1050	8.34	3.5	6.98	17.7	11,100	1.6	76.5	1.9		
	1053	8.34	4.0	6.97	17.7	11,120	1.6	77.3	1.8		

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
4/17/15	1100	MW-3	8.34	6.97	17.7	11,120	1.6	77.3	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
								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
										Full list shown above		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: Spring 2015 (Biennial)

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	
4/14/15	1430	NA	7.42	0.0	20.33	14.8	Yes	Yes	Yes	Yes		Weather: Clear 50's
4/15/15	930	NA	7.42	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	
4/15/15	935	7.47	0.5	6.78	16.7	13750	2.4	73.7	17.4	Clear small particles	Low-flow groundwater sample:
	937	7.48	1.0	6.98	16.8	13790	2.2	67.3	13.3		A) peristaltic pump w/ ded tubing
	940	7.49	1.5	7.05	16.8	13740	1.6	64.4	10.7		B) ded bladder pump
	942	7.49	2.0	7.08	16.8	13730	1.2	62.9	9.7		C) non-ded bladder pump; or
	945	7.50	2.5	7.10	16.8	13710	1.0	61.5	9.5		Standard groundwater sample:
	947	7.51	3.0	7.11	16.9	13680	0.9	60.4	8.7		D) bailer due to limited column; or
	950	7.52	3.5	7.11	16.9	13680	0.9	59.8	8.4		E) recovery well cycling sample
	952	7.52	4.0	7.11	16.9	13680	0.8	59.2	8.5		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
4/15/15	955	MW-88	7.52	7.11	16.9	13680	0.8	59.2	8.5			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
						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,Ve)					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: Spring 2015 (Biennial)
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	
4/14/15	1515	NA	6.78	0.0	22.70	17.4	Yes	Yes	Yes	Yes		Weather: Clear, 70's
4/15/15	1215	NA	6.78	0.0	22.70	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	
4/15/15	1220	6.85	0.5	7.43	20.9	8350	2.4	74.4	86.2	Sl. Cloudy small particles	→ orange particles
	1222	6.95	1.0	7.32	20.8	8260	2.1	72.0	>200	Cloudy orange particles	Low-flow groundwater sample:
	1225	6.98	1.5	7.30	20.7	8230	1.9	69.8	>200	Cloudy orange particles	A) peristaltic pump w/ ded tubing
	1227	7.01	2.0	7.28	20.4	8220	1.5	66.3	>200	"	B) ded bladder pump
	1230	7.05	2.5	7.27	20.0	8250	1.4	59.5	196	"	C) non-ded bladder pump; or
	1232	7.08	3.0	7.26	19.9	8220	1.3	45.0	32.6	Clear small orange particles	Standard groundwater sample:
	1235	7.11	3.5	7.26	19.9	8220	1.3	39.2	30.4		D) bailer due to limited column; or
	1237	7.14	4.0	7.25	19.8	8220	1.2	38.1	25.9		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
4/15/15	1240	MW-22A	7.14	7.25	19.8	8220	1.2	38.1	25.9	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
										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
										Full list shown 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: **MW-22B**
Event: Spring **2015 (Biennial)**
Area of Concern: **EP**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	
4/14/15	1525	NA	6.64	0.0	54.66	49.66	Yes	Yes	Yes	Yes		Weather: Clear, 80's
4/15/15	1325	NA	6.55	0.0	54.66	49.66						

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
4/15/15	1330	6.62	0.5	7.26	21.4	6530	1.6	-0.2	10.3	clear	Low-flow groundwater sample:
	1332	6.62	1.0	7.07	21.5	6490	1.3	-21.2	9.8		A) peristaltic pump w/ ded tubing
	1335	6.62	1.5	7.01	21.5	6440	1.1	-32.7	9.6		B) ded bladder pump
	1337	6.62	2.0	6.98	21.2	6410	1.0	-45.6	9.7		C) non-ded bladder pump; or
	1340	6.62	2.5	6.97	21.2	6380	0.9	-52.6	9.4		Standard groundwater sample:
	1342	6.62	3.0	6.96	21.2	6380	0.9	-60.3	9.3		D) bailer due to limited column; or
	1345	6.62	3.5	6.96	21.2	6370	0.8	-65.4	8.9		E) recovery well cycling sample
↓	1347	6.62	4.0	6.96	21.2	6370	0.9	-68.1	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
4/15/15	1350	MW-22B	6.62	6.96	21.2	6370	0.9	-68.1	8.8			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
						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

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: Spring 2015 (Biennial)
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	
4/14/15	1445	NA	4.14	0.0	18.53	13.3	Yes	Yes	Pad Broken	Yes		Weather: Clear 50's
4/15/15	1025	NA	4.14	0.0	18.53	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	
4/15/15	1030	4.15	0.5	7.15	19.6	6370	1.4	82.5	2.5	Clear	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
	1032	4.15	1.0	7.03	19.7	6240	1.1	86.8	2.5		
	1035	4.15	1.5	6.99	19.6	6100	0.9	88.3	2.3		
	1037	4.15	2.0	6.97	19.6	6080	0.9	90.2	2.2		
	1040	4.15	2.5	6.96	19.6	6030	0.8	91.3	2.2		
	1042	4.15	3.0	6.96	19.7	6020	0.7	91.9	2.1		
	1045	4.15	3.5	6.96	19.7	6020	0.7	92.5	2.1		
	1047	4.15	4.0	6.95	19.7	6010	0.7	93.0	2.0		

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
4/15/15	1050	MW-10	4.15	6.95	19.7	6010	0.7	93.0	2.0	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		

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-123

Event: Spring 2015 (Biennial)

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	
4/14/15	1500	NA	4.51	0.0	25.81	25.0	Yes	Yes	Yes	Yes		Weather: Clear 70's
4/15/15	1120	NA	4.51	0.0	25.81	25.0						

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	
4/15/15	1125	4.51	0.5	7.19	22.0	6630	1.6	93.9	13.9	Clear	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
	1127	4.51	1.0	7.07	21.6	6640	1.3	97.4	13.5		
	1130	4.51	1.5	7.03	21.3	6620	1.0	98.3	11.4		
	1132	4.51	2.0	7.01	21.1	6610	0.9	98.7	10.3		
	1135	4.52	2.5	7.00	21.1	6600	0.8	98.8	8.6		
	1137	4.52	3.0	7.00	21.1	6580	0.8	99.1	7.9		
	1140	4.52	3.5	7.00	21.1	6580	0.7	99.2	7.5		
	1142	4.52	4.0	6.99	21.1	6570	0.7	99.4	6.1		

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	1145	MW-123	4.52	6.99	21.1	6570	0.7	99.4	6.1	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
										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,Vs)		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-4A
Event: Spring 2015 (Biennial)
Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

(4-in; stickup)

Initials: SCD/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	
4/14/15	1230	NA	10.69	0.0	>12.06	11.5	Yes	Issue	Yes	Yes	Subsidence	Weather: Clear 80's (no.s')
4/17/15	1140	NA	10.69	0.0	>12.06	11.5		↳ no casing			under pad	

Well Purging Record Blockage at 12.06' TOC. Blockage at 7.3' + 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	
4/17/15	1145	10.71	0.5	7.14	18.5	6610	4.2	-150.9	147.0	black tint, odor	Low-flow groundwater sample:
	1148	10.71	1.0	7.08	18.0	6610	3.3	-165.1	36.2	↓	A) peristaltic pump w/ ded tubing
	1150	10.71	1.5	7.04	17.8	6640	2.8	-170.8	8.5	clear w/ black	B) ded bladder pump
	1153	10.71	2.0	7.06	17.8	6720	2.4	-176.2	8.3	particles	C) non-ded bladder pump; or
	1155	10.71	2.5	7.09	17.7	6830	2.1	-182.3	8.1		Standard groundwater sample:
	1158	10.71	3.0	7.10	17.7	6880	1.9	-186.3	8.4		D) bailer due to limited column; or
	1200	10.71	3.5	7.10	17.7	6910	1.8	-189.7	8.7		E) recovery well cycling sample
	1203	10.71	4.0	7.11	17.7	6920	1.8	-191.5	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
4/17/15	1210	MW-4A	10.71	7.11	17.7	6920	1.8	-191.5	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
										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-4B**

Event: Spring **2015 (Biennial)**

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	
4/14/15	1240	NA	9.95	0.0	72.37	67.37	Yes	Yes	Yes	Yes		Weather: <i>Clear, 80's</i>
4/15/15	1420	NA	9.79	0.0	72.37	67.37						

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	
4/15/15	1425	9.90	0.5	7.42	22.8	4350	4.3	-130.1	>200	Cloudy	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
	1427	9.90	1.0	7.16	22.5	4350	4.1	-151.2	>200	Cloudy	
	1430	9.90	1.5	7.14	22.2	4370	4.1	-159.3	7200	"	
	1432	9.90	2.0	7.10	22.1	4380	4.0	-167.8	7200	"	
	1435	9.90	2.5	7.10	22.2	4410	3.8	-174.5	>200	"	
	1437	9.90	3.0	7.07	21.5	4440	3.7	-180.7	7200	"	
	1440	9.90	3.5	7.06	21.5	4450	3.6	-179.8	>200	"	
	1442	9.90	4.0	7.05	21.5	4440	3.6	-182.4	>200	"	

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	1445	MW-4B	9.90	7.05	21.5	4440	3.6	-182.4	>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
										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		

+ EB-EP-03
(for same analyses)

Well: MW-5A
Event: Spring 2015 (Biennial)
Area of Concern: EP

**Hydrologic Monitoring
for ARCADIS
Houston, Texas**

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	1250	NA	7.23	0.0	20.19	14.8	Yes	Yes	Yes	Yes		Weather: Clear, 70's
4/16/15	930	NA	7.24	0.0	20.19	14.8						

[illegible][illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-5B

Event: Spring 2015 (Biennial)

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	
4/14/15	1300	NA	7.46	0.0	53.54	48.5	Yes	Yes	Yes	Yes		Weather: Clear 70's
4/16/15	1150	NA	7.37	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	
4/16/15	1155	7.38	0.5	7.36	19.5	7620	1.3	-113.5	130.8	Sl. Cloudy Black part	Low-flow groundwater sample:
	1157	7.38	1.0	7.20	19.6	7500	1.1	-117.1	127.8	"	A) peristaltic pump w/ ded tubing
	1200	7.38	1.5	7.16	19.5	7410	1.0	-119.8	112.3	"	B) ded bladder pump
	1202	7.38	2.0	7.13	19.5	7380	0.9	-122.2	54.9	"	C) non-ded bladder pump; or
	1205	7.38	2.5	7.10	19.6	7350	0.8	-122.1	42.8	Clear Black particles	Standard groundwater sample:
	1207	7.38	3.0	7.07	19.6	7360	0.8	-121.8	38.3	Clear Black particles	D) bailer due to limited column; or
	1210	7.38	3.5	7.06	19.6	7370	0.8	-122.0	35.4	"	E) recovery well cycling sample
	1212	7.38	4.0	7.06	19.7	7370	0.7	-122.9	32.5	"	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				
4/16/15	1215	mw-5B	7.38	7.06	19.7	7370	0.7	-122.9	32.5	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				
										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-5c
Event: Spring 2015 (Biennial)
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	
4/14/15	1310	NA	7.66	0.0	71.64	66.6	Yes	Yes	Yes	Yes		Weather: <u>Clear, 70's</u>
4/16/15	1035	NA	7.55	0.0	71.64							

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	1040	7.57	0.5	7.64	20.3	3960	1.7	-15.7	>200	Cloudy	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
	1042	7.57	1.0	7.44	19.6	3940	1.5	-38.5	>200		
	1045	7.57	1.5	7.34	19.8	3920	1.3	-56.0	>200		
	1047	7.57	2.0	7.31	19.9	3830	1.2	-67.0	>200		
	1050	7.57	2.5	7.30	19.7	3800	1.1	-77.8	>200		
	1052	7.57	3.0	7.29	19.9	3790	1.0	-82.0	>200		
	1055	7.57	3.5	7.29	19.8	3790	0.9	-84.9	>200		
	1057	7.57	4.0	7.29	19.8	3780	0.9	-85.3	>200		

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	1100	mw-5c	7.57	7.29	19.8	3780	0.9	-85.3	>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
						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-7A

Event: Spring 2015 (Biennial)

Area of Concern: EP

(2-in; stickup)

+ Dup-EP-01

(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	
4/14/15	1330	NA	7.71	0.0	17.40	12.1	Yes	Yes	Yes	Yes		Weather: Clear, 70's
4/16/15	1255	NA	6.61	0.0	17.40	12.1						

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	
4/16/15	1300	6.74	0.5	7.42	20.0	11280	1.4	1.7	20.5	Clear orange particles	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
	1302	6.75	1.0	7.31	19.5	11300	1.2	-3.1	17.8		
	1305	6.75	1.5	7.27	19.6	11250	1.1	-7.1	10.7		
	1307	6.75	2.0	7.26	19.7	11210	0.9	-11.5	6.4		
	1310	6.75	2.5	7.26	19.6	11200	0.8	-14.1	6.1		
	1312	6.75	3.0	7.25	19.8	11220	0.8	-16.5	5.8		
	1315	6.75	3.5	7.26	19.2	11210	0.7	-17.9	5.4		
	1317	6.75	4.0	7.25	19.3	11220	0.8	-18.1	4.1		

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	1320	MW-7A	6.75	7.25	19.3	11220	0.8	-18.1	4.1	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
										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 6040/6020 and/or 7470
										Cyanide	NaOH	SM4500
	1100	DUP-EP-01	6.75	7.25	19.3	11220	0.8	-18.1	4.1	Full list shown 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-7B

Event: Spring 2015 (Biennial)

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	
4/14/15	1340	NA	8.98	0.0	52.56	47.6	Yes	Yes	Yes	Yes		Weather: Clear, 70's
4/16/15	1405	NA	7.85	0.0	52.56							

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	1410	7.97	0.5	7.64	22.6	5310	1.4	46.5	5.7	Clear	Low-flow groundwater sample:
	1412	7.97	1.0	7.36	22.4	5180	1.1	46.4	5.5		A) peristaltic pump w/ ded tubing
	1415	7.97	1.5	7.27	21.4	5050	1.0	42.9	4.8		B) ded bladder pump
	1417	7.97	2.0	7.20	21.8	4970	0.9	39.1	3.6		C) non-ded bladder pump; or
	1420	7.97	2.5	7.18	21.8	4940	0.8	37.1	2.9		Standard groundwater sample:
	1422	7.97	3.0	7.17	21.9	4920	0.7	35.8	1.5		D) bailer due to limited column; or
	1425	7.97	3.5	7.17	21.8	4920	0.7	34.9	1.3		E) recovery well cycling sample
	1427	7.97	4.0	7.17	21.8	4920	0.6	34.7	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
4/16/15	1430	MW-7B	7.97	7.17	21.8	4920	0.6	34.7	1.3	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)		HNO3 6010/6020
										Anions (Chloride,Fluoride,Sulfate)		HNO3 Field filtered 0.45-u; 6010/6020
										Nitrate-Nitrite		Neat 300
										TDS		H2SO4 per ARCADIS
										Total Metals (Hg,Ni,Va)		Neat 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: **OCD-8A**
Event: Spring **2015 (Biennial)**
Area of Concern: **EP**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(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	
4/14/15	1400	NA	7.93	0.0	20.76	16.4	Yes	Yes	Yes	Yes		Weather: Clear, 70's
4/16/15	1500	NA	7.55	0.0	20.76	16.4			(HMI 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	
4/16/15	1505	8.00	0.5	7.04	21.3	16880	2.9	-94.4	4.7	Clear	Low-flow groundwater sample:
	1507	8.18	1.0	7.00	20.6	16840	2.7	-101.6	7.9	"	(A) peristaltic pump w/ ded tubing
	1510	8.25	1.5	6.99	19.8	16760	2.5	-107.4	10.1	Clear Black particles	B) ded bladder pump
	1512	8.30	2.0	6.98	19.5	16710	2.1	-109.4	9.6	Clear Black particles	C) non-ded bladder pump; or
	1515	8.33	2.5	6.97	19.1	16650	2.0	-111.3	9.4		Standard groundwater sample:
	1517	8.36	3.0	6.98	18.8	16640	1.9	-114.4	8.1		D) bailer due to limited column; or
	1520	8.39	3.5	6.99	18.7	16650	1.8	-114.6	7.7		E) recovery well cycling sample
	1522	8.41	4.0	6.99	18.7	16650	1.8	-114.9	7.3		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
4/16/15	1525	OCD-8A	8.41	6.99	18.7	16650	1.8	-114.9	7.3	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
								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: **OCD-8B**

Event: Spring **2015** (Biennial)

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	
4/14/15	1410	NA	7.96	0.0	56.65	51.7	Yes	Yes	Yes	Yes		Weather: <i>Clear, 80's</i>
4/16/15	1550	NA	7.81	0.0	56.65							

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	1552	7.83	0.5	7.29	21.2	9230	1.6	-72.8	16.5	<i>Clear</i>	Low-flow groundwater sample:
	1555	7.84	1.0	7.11	21.2	8750	1.2	-62.3	11.1		A) peristaltic pump w/ ded tubing
	1557	7.84	1.5	7.04	20.8	8500	1.0	-55.8	9.4		B) ded bladder pump
	1600	7.84	2.0	7.02	20.8	8450	0.9	-56.6	7.9		C) non-ded bladder pump; or
	1602	7.84	2.5	7.01	20.6	8380	0.8	-59.3	6.9		Standard groundwater sample:
	1605	7.84	3.0	7.00	20.2	8340	0.8	-65.6	5.7		D) bailer due to limited column; or
	1607	7.84	3.5	7.00	20.1	8330	0.7	-68.9	4.2	<i>↓</i>	E) recovery well cycling sample
<i>✓</i>	1610	7.84	4.0	7.00	20.1	8320	0.7	-72.2	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
4/16/15	1615	OCD-8B	7.84	7.00	20.1	8320	0.7	-72.2	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
						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: KWB - P4

Event: Spring 2015 (Biennial)

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	
4-14-15	1645	NA	3.14	0.0	30.26	22.8	Yes	Yes	needs	Yes		Weather: Pt. Cloudy, 70s
4-16-15	1300	NA	3.26	0.0	30.26	22.8			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	
4-16-15	1305	3.64	0.5	7.38	19.4	6050	4.6	80.2	18.2	clear	Low-flow groundwater sample:
	1308	3.80	1.0	7.17	18.9	5960	3.0	85.5	15.1		
	1310	3.86	1.5	7.05	18.9	5900	2.4	87.3	13.6		A) peristaltic pump w/ ded tubing
	1313	3.87	2.0	6.98	19.0	5850	2.1	87.7	10.8		B) ded bladder pump
	1315	3.88	2.5	6.95	19.0	5810	2.0	88.2	9.2		C) non-ded bladder pump; or
	1318	3.88	3.0	6.94	19.0	5780	1.8	88.9	8.7		Standard groundwater sample:
	1320	3.88	3.5	6.94	19.0	5760	1.8	89.3	8.5		D) bailer due to limited column; or
	1323	3.88	4.0	6.93	19.0	5750	1.7	89.7	8.1		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	KWB - P4	3.88	6.93	19.0	5750	1.7	89.7	8.1	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-µ, 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-25
Event: Spring 2015 (Biennial)
Area of Concern: TMD

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	
4-14-15	1035	NA	7.50	0.0	28.18	23.2	Yes	Yes	Yes	Yes	Subsidence under pad.	Weather: Sunny, 80s
4-15-15	1635	NA	7.31	0.0	28.18	23.2						

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	
4-15-15	1640	7.72	0.5	7.10	20.1	19,260	3.9	98.7	6.8	clear	Low-flow groundwater sample:
	1643	7.78	1.0	7.02	19.8	19,680	3.1	96.1	5.0		A) peristaltic pump w/ ded tubing
	1645	7.79	1.5	6.91	19.7	19,940	2.8	93.5	4.3		B) ded bladder pump
	1648	7.79	2.0	6.88	19.6	20,100	2.4	92.4	4.1		C) non-ded bladder pump; or
	1650	7.79	2.5	6.86	19.6	20,300	2.2	91.5	3.6		Standard groundwater sample:
	1653	7.79	3.0	6.85	19.6	20,600	2.0	91.2	3.3		D) bailer due to limited column; or
	1655	7.79	3.5	6.85	19.5	20,700	1.9	90.8	2.8		E) recovery well cycling sample
	1658	7.79	4.0	6.84	19.5	20,800	1.9	90.6	2.6	✓	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
4-15-15	1700	MW-25	7.79	6.84	19.5	20,800	1.9	90.6	2.6	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						

Not in Sampling Program

Artesia Refinery

Well Inspection Information

Well: NP-8

Event: Spring 2015 (Biennial)

Area of Concern: TMD

for ARCADIS

Houston, Texas

Initials: **BRH**

[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
		NP-8										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
								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

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: **MW-15**
Event: Spring **2015 (Biennial)**
Area of Concern: **EP**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	
4-14-15	1115	NA	11.18	0.0	21.70	17.7	Yes	Yes	Yes	Yes		Weather: Pt. Cloudy, 80°
4-15-15	1445	NA	10.77	0.0	21.70	17.7						

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	1450	10.81	0.5	7.52	20.0	8360	3.9	73.7	3.2	clear	OTW=10.31
	1453	10.81	1.0	7.40	19.4	8310	3.3	73.2	3.8		
	1455	10.81	1.5	7.27	19.1	8220	2.8	72.6	3.5		
	1458	10.81	2.0	7.19	18.9	8150	2.6	71.9	3.0		
	1500	10.82	2.5	7.12	18.8	8040	2.2	72.1	2.7		
	1503	10.82	3.0	7.08	18.7	7950	2.1	72.3	2.1		
	1505	10.82	3.5	7.06	18.7	7910	2.1	72.6	1.9		
	1508	10.82	4.0	7.05	18.6	7890	2.0	72.5	1.8		

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	1510	MW-15	10.82	7.05	18.6	7890	2.0	72.5	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
										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: **OCD - 1R**
Event: Spring **2015 (Biennial)**
Area of Concern: **EP**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(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	
4-14-15	1150	NA	11.83	0.0	23.90	18.6	Yes	Yes	Yes	Yes		Weather: Sunny, 60s
4-15-15	830	NA	11.91	0.0	23.96	18.6						

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	
4-15-15	835	11.80	0.5	6.07	17.3	17,540	2.3	78.4	7.1	Clear	Low-flow groundwater sample:
	838	11.83	1.0	6.52	17.1	17,780	1.9	71.5	3.8		A) peristaltic pump w/ ded tubing
	840	11.85	1.5	6.71	17.0	17,900	1.6	67.7	2.7		B) ded bladder pump
	843	11.85	2.0	6.79	16.9	17,910	1.3	67.2	2.2		C) non-ded bladder pump; or
	845	11.85	2.5	6.83	16.9	17,880	1.2	67.0	1.8		Standard groundwater sample:
	848	11.85	3.0	6.86	16.9	17,860	1.2	67.2	1.4		D) bailer due to limited column; or
	850	11.85	3.5	6.87	16.8	17,850	1.1	67.5	1.3		E) recovery well cycling sample
	853	11.85	4.0	6.89	16.8	17,830	1.1	67.9	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
4-15-15	855	OCD-1R	11.85	6.89	16.8	17,830	1.1	67.9	1.1	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
						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: **OCD-2A**
Event: Spring **2015 (Biennial)**
Area of Concern: **EP**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	1200	NA	11.93	0.0	27.60	22.3	No	Yes	Closure	Yes		Weather: Sunny, 60s
4-15-15	920	NA	11.61	0.0	27.60	22.3						

(2-in; stickup)

Initials: **BRH**

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
4-15-15	925	11.72	0.5	7.36	18.3	10,640	3.7	103.1	15.9	Clear	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
	928	11.73	1.0	7.25	18.0	10,510	2.2	99.8	14.1		
	930	11.73	1.5	7.21	17.8	10,400	1.9	96.2	10.2		
	933	11.74	2.0	7.16	17.8	10,320	1.6	92.8	8.8		
	935	11.74	2.5	7.13	17.7	10,220	1.5	90.6	8.4		
	938	11.74	3.0	7.12	17.6	10,190	1.4	88.9	8.0		
	940	11.74	3.5	7.11	17.6	10,160	1.4	87.5	7.5		
	943	11.74	4.0	7.10	17.6	10,140	1.4	86.2	7.3	↓	

↳ Unable to lock/close well with standard pressure cap on well.

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
4-15-15	945	OCD-2A	11.74	7.10	17.6	10,140	1.4	86.2	7.3	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
										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

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
		06D-2B										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

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: OCP-3

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring for ARCADIS Houston, Texas

Well Inspection Information

(2-in; Strickup)

Initials: **BPH**

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	1220	NA	12.35	0.0	25.48	20.2	Yes	Yes	closure/lock	Yes	Pad is	Weather: Sunny, 60s
4-15-15	1010	NA	11.95	0.0	25.48	20.2			1		destroyed	

Well Purging Record

↳ Cap doesn't allow casing lid to close. No lock.

[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
4-15-15	1035	04D-3	12.10	7.03	18.6	7080	1.6	26.2	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		

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: Spring **2015** (Biennial)

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	
4-14-15	1230	NA	11.61	0.0	25.44	20.1	Yes	Yes	Lock added	Yes		Weather: SUNNY, 70s
4-15-15	1100	NA	11.20	0.0	25.44	20.1			(X15)			

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	1105	11.21	0.5	7.25	20.1	22,300	3.3	105.6	2200	sl. cloudy w/ orange	Low-flow groundwater sample:
	1108	11.21	1.0	6.99	19.4	22,700	2.7	71.3	167.0	algae particles	
	1110	11.22	1.5	6.96	19.4	22,600	2.1	21.4	91.0	↓	B) ded bladder pump
	1113	11.22	2.0	6.94	19.3	22,100	1.9	-18.7	48.6	clear w/ orange	C) non-ded bladder pump; or
	1115	11.22	2.5	6.92	19.2	21,700	1.8	-29.4	38.1	algae particles	Standard groundwater sample:
	1118	11.22	3.0	6.92	19.2	20,900	1.7	-40.7	37.8	↓	
	1120	11.22	3.5	6.92	19.2	20,600	1.6	-51.8	36.8	↓	D) bailer due to limited column; or
	1123	11.22	4.0	6.92	19.2	20,300	1.5	-57.5	35.7	↓	E) recovery well cycling sample
	1125	11.22	4.5	6.92	19.2	20,200	1.4	-62.2	33.8	↓	F) irrigation well grab sample
	1128	11.22	5.0	6.92	19.2	20,100	1.4	-64.1	34.6	↓	

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	1130	OCD-4	11.22	6.92	19.2	20,100	1.4	-64.1	34.6	DRO	HCL	8015M
	1130									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-11A

Event: Spring 2015 (Biennial)

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	
4-14-15	1235	NA	9.04	0.0	22.01	17.0	Yes	Yes	Lock added	Yes		Weather: Sunny, 70s
4-15-15	1155	NA	8.88	0.0	22.01	17.0			(465)			

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	1200	8.99	0.5	6.84	20.8	31,100	3.3	97.9	17.6	clear	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
	1203	9.00	1.0	6.84	20.0	31,300	2.6	97.5	12.0		
	1205	9.00	1.5	6.84	19.3	31,600	2.2	97.4	8.2		
	1208	9.00	2.0	6.83	19.1	31,700	1.9	95.9	7.5		
	1210	9.01	2.5	6.82	19.0	31,700	1.8	94.3	6.7		
	1213	9.01	3.0	6.82	18.8	31,800	1.7	93.0	5.8		
	1215	9.01	3.5	6.81	18.7	31,800	1.7	92.8	5.1		
	1218	9.01	4.0	6.81	18.6	31,800	1.6	92.1	4.8		

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	1220	MW-11A	9.01	6.81	18.6	31,800	1.6	92.1	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	
										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-11B

Event: Spring 2015 (Biennial)

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	
4-14-15	1240	NA	8.97	0.0	47.30	42.3	Yes	Yes	Lock added	Yes		Weather: Sunny, 70s
4-15-15	1245	NA	8.75	0.0	47.30	42.3			(415)			

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	1250	8.77	0.5	7.69	21.1	18,060	4.6	-107.2	3.6	clear	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
	1253	8.77	1.0	7.41	20.6	18,020	3.8	-107.0	2.9		
	1255	8.77	1.5	7.27	20.0	17,980	3.1	-106.8	2.2		
	1258	8.77	2.0	7.13	20.0	17,950	2.4	-107.1	1.7		
	1300	8.77	2.5	7.09	20.1	17,930	2.3	-108.8	1.4		
	1303	8.77	3.0	7.06	20.1	17,920	2.3	-108.3	1.2		
	1305	8.77	3.5	7.05	20.2	17,910	2.2	-108.7	1.1		
	1308	8.77	4.0	7.04	20.2	17,910	2.2	-109.1	0.9		

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	1310	MW-11B	8.77	7.04	20.2	17,910	2.2	-109.1	0.9	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: OLD-5
Event: Spring 2015 (Biennial)
Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(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	
4-14-15	1250	NA	9.76	0.0	25.44	20.6	Yes	Yes	Needs Lock	Yes	Pad severely cracked	Weather: <u>Sunny, 70s</u>
4-15-15	1340	NA	9.39	0.0	25.44	20.6						

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	
4-15-15	1345	9.47	0.5	7.56	19.9	14,220	3.9	-114.5	78.0	Clear w/ orange	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
	1348	9.48	1.0	7.44	19.2	14,240	3.1	-119.0	48.3	algae particles	
	1350	9.48	1.5	7.39	18.8	14,260	2.6	-121.9	39.0		
	1353	9.48	2.0	7.34	18.8	14,280	2.2	-122.7	24.7		
	1355	9.48	2.5	7.31	18.8	14,290	2.0	-123.2	23.8		
	1358	9.48	3.0	7.28	18.8	14,300	1.9	-123.8	23.9		
	1400	9.48	3.5	7.27	18.9	14,310	1.8	-124.5	23.1		
✓	1403	9.48	4.0	7.27	18.9	14,310	1.8	-125.3	22.8		

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	1405	OLD-5	9.48	7.27	18.9	14,310	1.8	-125.3	22.8	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
										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: **MW-87**
Event: Spring **2015 (Biennial)**
Area of Concern: **EP**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(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	
4-14-15	1330	NA	7.68	0.0	20.41	15.1	Yes	Yes	Needs Lock	Yes		Weather: Sunny, 60s
4-16-15	810	NA	7.65	0.0	20.41	15.1						

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	
4-16-15	815	7.75	0.5	7.49	17.5	17,160	4.1	46.8	7.1	clear	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
	818	7.81	1.0	7.32	17.1	16,890	2.6	41.2	5.6		
	820	7.84	1.5	7.27	17.0	16,650	2.2	37.4	4.9		
	823	7.87	2.0	7.21	16.9	16,480	1.9	36.1	4.5		
	825	7.90	2.5	7.18	16.9	16,410	1.8	35.0	4.0		
	828	7.93	3.0	7.17	16.9	16,390	1.7	34.8	3.7		
	830	7.96	3.5	7.17	16.9	16,370	1.7	34.4	3.3		
✓	833	7.99	4.0	7.16	16.9	16,360	1.6	34.1	3.1	↓	

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	835	MW-87	7.99	7.16	16.9	16,360	1.6	34.1	3.1	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
						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: MW-18A

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	
4-14-15	1340	NA	9.64	0.0	22.59	17.9	Yes	Yes	Needs Leak	Yes		Weather: Sunny, 70s
4-16-15	905	NA	9.42	0.0	22.59	17.9						

(4-in; stickup)

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	910	9.61	0.5	7.20	18.7	35,800	4.2	102.1	2.6	clear	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
	913	9.71	1.0	7.18	18.5	36,200	3.5	99.8	1.8		
	915	9.80	1.5	7.15	18.4	36,600	3.2	97.6	1.3		
	918	9.87	2.0	7.13	18.3	36,700	2.9	95.0	1.0		
	920	9.93	2.5	7.12	18.2	36,700	2.7	93.1	1.0		
	923	9.98	3.0	7.12	18.2	36,700	2.6	91.5	0.9		
	925	10.03	3.5	7.12	18.2	36,700	2.5	90.2	0.7		
	928	10.06	4.0	7.11	18.2	36,700	2.5	89.6	0.6		

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	930	MW-18A	10.06	7.11	18.2	36,700	2.5	89.6	0.6	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: MW-18B
Event: Spring 2015 (Biennial)
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	
4-14-15	1343	NA	9.55	0.0	50.59	45.6	Yes	Yes	Needs work	Yes		Weather: Sunny, 70s
4-16-15	950	NA	9.32	0.0	50.59	45.6						

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
4-16-15	1000	9.35	0.5	7.41	21.0	6190	4.4	47.5	3.1	clear	Low-flow groundwater sample:
	1003	9.35	1.0	7.26	20.7	5620	2.8	27.2	2.2		A) peristaltic pump w/ ded tubing
	1005	9.35	1.5	7.14	20.6	5050	2.4	13.1	1.8		B) ded bladder pump
	1008	9.35	2.0	7.06	20.6	4860	1.9	6.7	1.6		C) non-ded bladder pump; or
	1010	9.35	2.5	7.01	20.7	4730	1.8	4.0	1.6		Standard groundwater sample:
	1013	9.35	3.0	6.98	20.6	4700	1.7	3.3	1.4		D) bailer due to limited column; or
	1015	9.35	3.5	6.97	20.5	4670	1.7	2.4	1.1		E) recovery well cycling sample
	1018	9.35	4.0	6.96	20.5	4660	1.7	2.1	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
4-16-15	1020	MW-18B	9.35	6.96	20.5	4660	1.7	2.1	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
						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-18T

Event: Spring 2015 (Biennial)

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	
4-14-15	1346	NA	9.34	0.0	50.40	Not Sampled	NO	NO casing L2	Needs Lock	Yes		Weather: _____

Well Purging Record

TOC of PVC shattered. Needs repair to allow cap to be used.

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-18T										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: **MW-70**
Event: Spring **2015 (Biennial)**
Area of Concern: **EP**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(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	
4-14-15	1410	NA	7.11	0.0	22.06	16.8	Yes	Yes	Yes	Yes		Weather: Sunny, 70s
4-16-15	1050	NA	7.02	0.0	22.06	16.8						

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	
4-16-15	1055	7.08	0.5	7.27	18.7	5880	4.6	-71.7	170.0	clear w/ significant orange algae	Low-flow groundwater sample:
	1058	7.08	1.0	7.14	18.2	5970	2.8	-75.6	100.0		A) peristaltic pump w/ ded tubing
	1100	7.08	1.5	7.10	17.9	6010	2.3	-79.1	51.0		B) ded bladder pump
	1103	7.08	2.0	7.07	17.6	6020	2.0	-80.8	30.8		C) non-ded bladder pump; or
	1105	7.08	2.5	7.06	17.5	6030	1.8	-81.4	27.1		Standard groundwater sample:
	1108	7.08	3.0	7.05	17.5	6030	1.6	-82.6	25.6	clear w/ orange algae particles	D) bailer due to limited column; or
	1110	7.08	3.5	7.03	17.6	6040	1.5	-83.4	24.8		E) recovery well cycling sample
	1113	7.08	4.0	7.02	17.6	6040	1.5	-84.1	25.2		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
4-16-15	1115	MW-70	7.08	7.02	17.6	6040	1.5	-84.1	25.2			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-124

Event: Spring 2015 (Biennial)

Area of Concern: EP

+ EB-EP-02

(for same analyses)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: BRH

(2-in; stick up)

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	1420	NA	7.60	0.0	22.01	17.0	Yes	Yes	needs lock	Yes		Weather: Sunny, 70s
4-16-15	1140	NA	7.57	0.0	22.01	17.0						

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
4-16-15	1145	7.60	0.5	7.19	19.1	11,740	4.8	-40.5	42.3	clear w/ orange	Low-flow groundwater sample:
	1148	7.60	1.0	7.08	18.6	12,010	2.9	-43.1	28.7	algae particles	A) peristaltic pump w/ ded tubing
	1150	7.60	1.5	7.03	18.4	12,230	2.6	-45.9	20.6		B) ded bladder pump
	1153	7.60	2.0	7.00	18.0	12,290	2.2	-48.8	16.5	↓	C) non-ded bladder pump; or
	1155	7.60	2.5	6.96	17.9	12,320	2.1	-51.8	11.1	clear	Standard groundwater sample:
	1158	7.60	3.0	6.96	17.8	12,330	2.1	-53.9	10.8	↓	D) bailer due to limited column; or
	1200	7.60	3.5	6.95	17.8	12,340	2.0	-55.5	10.2	↓	E) recovery well cycling sample
	1203	7.60	4.0	6.95	17.8	12,350	1.9	-57.6	9.7	↓	F) irrigation well grab sample
	1205	7.60	4.5	6.94	17.7	12,350	1.9	-58.2	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
4-16-15	1210	MW-124	7.60	6.94	17.7	12,350	1.9	-58.2	9.4	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
										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
										Fundist shown above	Same	Same
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

↓

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-13

Event: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: **BRH**

[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
		mw-13										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 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-69
Event: Spring 2015 (Biennial)
Area of Concern: EP

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: BRW

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	
4/17/15	1415	NA	10.80	0.0	22.51	Not Sampled	Yes	Yes	Needs Lock	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								 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-69										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 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: Spring 2015 (Biennial)

Area of Concern: EP

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: **BRH**

[illegible]

Well Purging Record

* Broken hasp & needs lock

[illegible]

Well Sampling Record

[illegible]

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

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-14

Event: Spring 2015 (Biennial)

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	
4/17/15	1450	NA	11.09	0.0	>11.95	Not Sampled	YES	Issue *	YES	YES		Weather: _____

Well Purging Record

* Blockage @ 11.95 Ft-TOC

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-14										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: RW-12 R
Event: Spring 2015 (Biennial)
Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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)	Active recovery well, sample port					Comments
							Well Inspection					
							Cap	Casing	Well Secured	Label	Other	
4/14/15	1051	23.05	23.08	0.03	nm	NA	Yes	Yes	Yes	Yes		Weather: Sunny 70's
						5' off base as needed						

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
		RW-12 R								DRO	HCL	8015M
										ERO	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-113
Event: Spring 2015 (Biennial)
Area of Concern: REST

+ EB-REST-01
+ DUP-REST-01
(both for same analyses)

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	
4/14/15	1056	NA	22.86	0.0	37.68	33.8	Yes	Yes	Yes	Yes		Weather: clear 50's
4/17/15	9:05		21.64									

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
4/17/15	910	21.69	0.5	6.07	18.2	2720	2.4	5.8	90	Slightly cloudy	Low-flow groundwater sample:
↓	912	21.69	1.0	6.17	18.2	2650	2.2	1.7	85		A) peristaltic pump w/ ded tubing
↓	915	21.69	1.5	6.21	18.2	2570	1.8	-17.3	80		B) ded bladder pump
↓	917	21.69	2.0	6.56	18.1	2520	1.9	-27.9	73		C) non-ded bladder pump; or
↓	920	21.69	2.5	6.58	18.2	2510	1.9	-34.3	72		Standard groundwater sample:
↓	922	21.69	3.0	6.58	18.3	2490	1.9	-38.9	70		D) bailer due to limited column; or
↓	925	21.69	3.5	6.58	18.3	2480	1.9	-40.6	68		E) recovery well cycling sample
↓	927	21.69	4.0	6.58	18.3	2480	1.9	-41.3	66	↓	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
4/17/15	930	MW-113	21.69	6.58	18.3	2480	1.9	-41.3	66	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
↓	950	EB-REST-01	NA							Cyanide	NaOH	3M4500 Same
↓	1200	DUP-REST-01	21.69	6.58	18.3	2480	1.9	-41.3	66	Full List shown above		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: Spring **2015** (Biennial)

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)	Inactive Recovery well					Comments
							Well Inspection					
							Cap	Casing	Well Secured	Label	Other	
4/14/15	1042	21.12	21.25	0.13	35.83	NA	Yes	Yes	Yes	Yes		Weather: Sunny 50°
						30.8 ft 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: 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
		KWB-8										Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										ORO	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-22

Event: Spring 2015 (Biennial)

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)	Active recovery well, sample port Well Inspection (Losses in well only)					Comments
							Cap	Casing	Well Secured	Label	Other	
4/14/15	1035	21.13	21.15	0.02	NM	NA	Yes	Yes	Yes	Yes		Weather: Sunny 70'S
4/16/15	1755	Shoen	18.78	0.00								

Well Purging Record

screen (11.5-39) (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		Comments
4/16/15	1800	18.78	0.5	6.98	22.8	3684	1.5	-138.4	13.8	Clear (HCO ₃)		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
	1803	18.78	1.0	6.54	22.6	3480	1.3	-159.8	11.4	"	"	
	1805	18.78	1.5	6.42	22.3	3203	1.0	-176.2	10.9	"	"	
	1808	18.78	2.0	6.41	22.2	3142	0.7	-189.6	10.6	"	"	
	1810	18.78	2.5	6.39	22.2	3086	0.5	-197.4	10.6	"	"	
	1813	18.78	3.0	6.36	22.2	2998	0.4	-202.6	10.8	"	"	
	1815	18.78	3.5	6.34	22.2	2991	0.4	-203.7	10.6	"	"	
	1818	18.78	4.0	6.33	22.2	2986	0.4	-204.1	9.6	"	"	

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	1820	RW-22	18.78	6.33	22.2	2986	0.4	-204.1	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: RW-20
Event: Spring 2015 (Biennial)
Area of Concern: REST

(Corrected field label to match map, per Ron 4/14/15)
the only well that has permission to run Hydrologic Monitoring for ARCADIS Houston, Texas

Initials: BB

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)	Active recovery well, sample port					Comments
							Well Inspection					
							Cap	Casing	Well Secured	Label	Other	
4/14/15	1030	NA	1.97	0.0	nm	NA	NA	yes	yes	yes		Weather: Sunny 70's
4/16/15	1630	NA	1.96	0.0								

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	active recovery well with port						(Clear) H2O odor	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
4/16/15	1630	RW-20	1.96	7.29	21.2	2425	5.3	-157.5	4.3	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
										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		

System off due to
water rights?

Monitoring Well Purging and Sampling Record

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

Well: RW-13R
Event: Spring 2015 (Biennial)
Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: BB

Initials: **DB**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Active Recovery Well, Sample Port					Comments
							Well Inspection					
							Cap	Casing	Well Secured	Label	Other	
4/14/15	1102	21.32	21.42	0.10	nm	NA	yes	yes	yes	yes		Weather: Sunny 70°

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: 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
		RW-13R										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: **RW-14R**
Event: Spring **2015 (Biennial)**
Area of Concern: **REST**

System OK due
to water rights?

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Initials: **BB**

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)	Active recovery well, sample part					Comments
							Well Inspection					
							Cap	Casing	Well Secured	Label	Other	
4/14/15	1108	17.22	17.38	0.16	NM	NA	Yes	Yes	Yes	Yes		Weather: Sunny 70'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
		RW-14R										Lab: ESC Lab Sciences, Mt. Juliet, TN
										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 7476
										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: Spring 2015 (Biennial)

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	
4/17/15	1115	NP	16.38	0.00	37.64	27.9	Yes	Yes	Yes	Yes		Weather: clear 50's
4/17/15	1020	NA	15.96	0.0	Soft							

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	
4/17/15	1023	15.98	0.5	6.79	19.0	1804	2.9	-179.6	34.3	Clear tiny Black	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
	1027	15.98	1.0	6.75	18.9	1798	1.9	-189.8	31.6	Particulates	
	1030	15.98	1.5	6.74	18.4	1784	1.9	-200.0	30.8		
	1032	15.98	2.0	6.74	18.8	1768	1.9	-207.9	29.4		
	1035	15.98	2.5	6.74	18.7	1760	2.0	-211.8	28.6		
	1037	15.98	3.0	6.73	18.7	1743	2.1	-216.1	27.3		
	1040	15.98	3.5	6.72	18.5	1737	2.1	-220.4	26.3		
	1042	15.98	4.0	6.72	18.5	1733	2.1	-221.6	24.8		

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
4/17/15	1045	MW-133	15.98	6.72	18.5	1733	2.1	-221.6	24.8			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
										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-134

Event: Spring 2015 (Biennial)

Area of Concern: REST

(2-in; stickup)

+ DUP-REST-03

+ EB-REST-03

(both for same analyses)

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	
4/14/15	1119	NP	12.59	0.00	32.89	28.4	Yes	Yes	Yes	Yes		Weather: Clouds 50's
4/17/15	1310	NA	12.64	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	
4/17/15	1315	12.65	0.5	7.00	20.6	5440	4.2	6.2	15.7	Clear	Low-flow groundwater sample:
	1317	12.65	1.0	6.88	19.8	5590	2.7	11.5	16.8		A) peristaltic pump w/ ded tubing
	1320	12.65	1.5	6.85	19.5	5620	2.2	14.2	22.7		B) ded bladder pump
	1322	12.65	2.0	6.83	19.4	5630	1.7	17.1	24.1		C) non-ded bladder pump; or
	1325	12.65	2.5	6.83	19.2	5620	1.6	18.5	24.3		Standard groundwater sample:
	1327	12.65	3.0	6.83	19.4	5620	1.5	20.9	24.9		D) bailer due to limited column; or
	1330	12.65	3.5	6.83	19.3	5620	1.5	23.8	26.2		E) recovery well cycling sample
	1332	12.65	4.0	6.83	19.3	5630	1.5	24.5	27.1		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
4/17/15	1335	MW-134	12.65	6.83	19.3	5630	1.5	24.5	27.1	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
										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
	1355	EB-REST-03	NA							Cyanide	NaOH	SM4500 Same
	1000	DUP-REST-03	12.65	6.83	19.3	5630	1.5	24.5	27.1	Full list shown above		Same
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

Monitoring Well Purging and Sampling Record

(Irrigation well)
(Inside green block building)

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

Well: RA-4798
Event: Spring 2015 (Biennial)
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	
4/17/15	1145	NA	NA	NA	NA	NA	NA	NA	Yes	Yes		Weather: Sunny 50's

Well Purging Record

Screen: 840-850 ft-bgs

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	No purge, active recovery well.						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
4/17/15	1145	RA-4798	NA	7.11	19.1	3370	2.1	31.6	0.7			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										yes ✓ VOC	HCL	8260
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)		HNO3 6010/6020 Cations only! ✓ (Ca, K, Na)
										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, V)		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

(Irrigation well)
(Inside green black building)

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RA-4196

Event: Spring 2015 (Biennial)

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	
4/17/15	1030	NA	NA	NA	NA	NA	NA	NA	NA	Yes		Weather Sunny 50's

Well Purging Record

Screen: 280-292 ft-bgs

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							Clean	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
4/17/15	1030	RA-4196	nm	6.75	22.5	2814	2.6	-29.8	13			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 cations only! (Ca, K, Na)
										Dissolved Metals (As, Ba, Cr, Fe, Pb, Mn, Se)	HNO3	Field filtered 0.45 u; 6010/6020
										Anions (Chloride, Fluoride, Sulfate)	it	300 ✓
										Nitrate-Nitrite	04	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 removed from program, per 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: Spring 2015 (Biennial)

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	
		NA	NA	NA	NA	NA						Weather:

Well Purging Record

Screen: 194-246 ft-bgs

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
		RA-1227										Lab: ESC Lab Sciences, Mt. Juliet, TN
										BRO	HCL	8015M
										BRO	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: RA-3156

Event: Spring 2015 (Biennial)

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	
4/17/15	1100	NA	NA	NA	NA	NA	NA	NA	NA	✓		Weather Sunny 50°

Well Purging Record

Screen: 182 to (unknown)

Screen: 182 to (Unknown)											
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	Chris Kuykendall denied turning on pump due to multiple valves open & also shared with another property owner where valves are open, too. He ask to call him to check when OK to run pump or when it's on in the future.							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
		RA-3156										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: RA-313

Event: Spring 2015 (Biennial)

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	
4/17/15	1425	NA	NA	NA	NA	NA	NA	NA	NA	Yes		Weather Sunny 60's

Well Purging Record

Screen: 904-1157 Fr-bgs

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	Removed Pressure gauge						Clear	Low-flow groundwater sample:
			1.0	Installed temporary sample port							A) peristaltic pump w/ ded tubing
			1.5								B) ded bladder pump
			2.0								C) non-ded bladder pump; or
			2.5	Navajo (Damago) turned well on							Standard groundwater sample:
			3.0	to sample							D) bailer due to limited column; or
			3.5								E) recovery well cycling sample
			4.0	Reinstalled pressure gauge after sampling							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
4/17/15	1425	RA-313	Nm	7.19	21.9	1228	2.0	-94.7	0.8			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 Cations only (Ca, K, Na)
										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: **KWB-7**

Event: Spring 2015 (Biennial)

Area of Concern: **REST**

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-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	
4/14/15	1305	NA	19.77	0.00	34.83	30.6	Yes	Yes	Yes	Yes		Weather Sunny 80°
4/15/15	1435	NA	18.99	0.00								

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	1440	19.00	0.5	7.17	20.9	3416	1.6	-132.8	9.6	Clear (Hcolor)		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
	1443	19.00	1.0	7.02	20.5	3420	0.9	-138.9	8.8	11	11	
	1445	19.00	1.5	6.89	20.3	3401	0.7	-140.6	8.2	11	11	
	1448	19.00	2.0	6.80	20.1	3400	0.6	-143.7	7.9	11	11	
	1450	19.00	2.5	6.77	20.0	3399	0.5	-145.8	7.8	11	11	
	1453	19.00	3.0	6.74	19.9	3395	0.4	-146.7	7.4	11	11	
	1455	19.00	3.5	6.72	19.9	3391	0.3	-147.8	7.2	11	11	
	1458	19.00	4.0	6.71	19.9	3388	0.3	-148.1	6.9	11	11	

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	1500	KWB-7	19.00	6.71	19.9	3388	0.3	-148.1	6.9	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	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

[HMI-dedicated bladder pump]

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-135

Event: Spring 2015 (Biennial)

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	
4/14/15	1350	NA	28.37	0.00	65.55	50.0	Yes	Yes	Yes	Yes		Weather: Sunny 70's
4/15/15	1205	NA	28.53	0.00								

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		
4/15/15	1210	28.53	0.5	6.55	20.9	7001	3.0	125.5	163	tan cloudy		Low-flow groundwater sample:
	1213	28.53	1.0	6.53	20.5	7426	2.8	130.6	>200	"	"	A) peristaltic pump w/ ded tubing
	1215	28.53	1.5	6.49	20.4	7692	2.8	134.4	>200	"	"	B) ded bladder pump (HMI)
	1218	28.53	2.0	6.46	20.3	7790	2.8	137.8	>200	"	"	C) non-ded bladder pump; or
	1220	28.53	2.5	6.43	20.2	7768	2.7	140.2	>200	"	"	Standard groundwater sample:
	1223	28.53	3.0	6.42	20.2	7740	2.7	141.8	>200	"	"	D) bailer due to limited column; or
	1225	28.53	3.5	6.40	20.2	7736	2.7	142.6	>200	"	"	E) recovery well cycling sample
	1228	28.53	4.0	6.40	20.2	7733	2.7	143.7	>200	"	"	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	1230	MW-135	28.53	6.40	20.2	7733	2.7	143.7	>200			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-20

Event: Spring 2015 (Biennial)

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	
4/14/15	1615	NA	9.73	0.00	26.86	21.9	Yes	Yes	Yes	Yes		Weather: clear 60's
4/17/15	1125	NA	10.01	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	
4/17/15	1130	10.06	0.5	7.16	20.6	4230	4.0	-107.3	8.6	Clear	Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or
	1132	10.06	1.0	7.06	20.5	4350	2.4	-114.2	6.3		
	1135	10.06	1.5	7.02	20.4	4380	1.8	-118.3	4.2		
	1137	10.06	2.0	6.94	20.3	4390	1.4	-119.8	3.2		Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
	1140	10.06	2.5	6.98	20.2	4410	1.3	-119.1	2.8		
	1142	10.06	3.0	6.98	20.1	4410	1.3	-118.6	1.6		
	1145	10.06	3.5	6.98	20.2	4410	1.3	-117.4	1.4		
	1147	10.06	4.0	6.98	20.2	4410	1.3	-117.1	1.3	✓	

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
4/17/15	1150	MW-20	10.06	6.98	20.2	4410	1.3	-117.1	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
										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: NP-3

Event: Spring 2015 (Biennial)

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)	* needs lock					Comments
							Cap	Casing	Well Secured	Label	Other	
4/14/15	1624	NA	11.18	0.00	21.92	Not Sampled	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								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
		NP-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
										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: NP-4

Event: Spring 2015 (Biennial)

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	
4/14/15	1620	NA	18.39	0.00	36.72	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								 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
		NP-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

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NP-2

Event: Spring 2015 (Biennial)

Area of Concern: TMD

Hydrologic Monitoring

for ARCADIS

Houston, Texas

*needs lock

Initials: **BB**

[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: Spring 2015 (Biennial)

Area of Concern: TMD

(2-in; stickup)

missing lock -
(found lock in grass)
and reinstalled on
well.

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	
4/14/15	1607	NA	12.52	0.00	21.53	19.6	Yes	Yes	Yes	Yes		Weather: Sunny 60°
4/15/15	1100	NA	12.48	0.00								

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	1105	12.49	0.5	6.48	19.2	5864	3.3	186.2	2.6	Clear	Low-flow groundwater sample:
	1108	12.49	1.0	6.46	18.4	5740	2.1	212.5	2.1	"	A) peristaltic pump w/ ded tubing
	1110	12.45	1.5	6.43	18.2	5716	1.8	232.6	1.7	"	B) ded bladder pump
	1113	12.49	2.0	6.42	18.1	5704	1.7	238.4	1.6	"	C) non-ded bladder pump; or
	1115	12.49	2.5	6.42	18.1	5702	1.7	239.6	1.3	"	Standard groundwater sample:
	1118	12.49	3.0	6.42	18.0	5700	1.6	239.9	1.0	"	D) bailer due to limited column; or
	1120	12.49	3.5	6.42	18.0	5697	1.6	240.1	0.9	"	E) recovery well cycling sample
	1123	12.49	4.0	6.42	18.0	5696	1.6	240.3	0.8	"	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
4/15/15	1125	NP-1	12.49	6.42	18.0	5696	1.6	240.3	0.8			Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										Yes VOC	HCL	8260
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)		
										Dissolved Metals (As, Ba, Cr, Fe, Pb, Mn, Se)	HNO3	6040/6020 Cations only (Ca, K, Na)
										Anions (Chloride, Fluoride, Sulfate)	Neat	Field filtered 0.45 u; 6010/6020
										Nitrate-Nitrite	H2SO4	300
										TDS	Neat	per ARCADIS
										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

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-8

Event: Spring 2015 (Biennial)

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	
4/17/15	1220	NA	8.16	0.00	20.33	15.3	Yes	Yes	Yes	Yes		Weather: Clear 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	
4/17/15	1225	8.21	0.5	7.36	19.2	3980	3.4	-182.2	8.7	Clear	Low-flow groundwater sample:
	1227	8.21	1.0	7.23	18.8	3940	1.5	-112.6	7.8		A) peristaltic pump w/ ded tubing
	1230	8.21	1.5	7.20	18.5	3940	0.9	-128.7	7.4		B) ded bladder pump
	1232	8.21	2.0	7.18	18.4	3940	0.9	-123.4	7.1		C) non-ded bladder pump; or
	1235	8.21	2.5	7.17	18.4	3940	0.8	-125.7	6.2		Standard groundwater sample:
	1237	8.21	3.0	7.16	18.3	3930	0.6	-126.1	5.8		D) bailer due to limited column; or
	1240	8.21	3.5	7.15	18.3	3940	0.6	-127.4	5.6		E) recovery well cycling sample
	1242	8.21	4.0	7.15	18.3	3930	0.6	-126.0	5.2		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
4/17/15	1245	MW-8	8.21	7.15	18.3	3930	0.6	-126.0	5.2	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
										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-21

Event: Spring 2015 (Biennial)

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	
4/14/15	1556	NA	9.54	0.00	25.06	19.9	Yes	Yes	Yes	Yes		Weather: Sunny 60's
4/15/15	910	NA	9.57	0.00								

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
4/15/15	915	9.58	0.5	6.71	19.1	5951	2.7	40.8	2.2	clear	Low-flow groundwater sample:
	918	9.58	1.0	6.45	18.8	6020	2.1	53.5	1.8	"	A) peristaltic pump w/ ded tubing
	920	9.58	1.5	6.42	18.6	6025	2.0	59.8	1.8	"	B) ded bladder pump
	923	9.58	2.0	6.40	18.5	6029	2.0	61.7	1.6	"	C) non-ded bladder pump; or
	925	9.58	2.5	6.39	18.4	6030	1.9	62.3	1.5	"	Standard groundwater sample:
	928	9.58	3.0	6.38	18.4	6030	1.8	62.8	1.2	"	D) bailer due to limited column; or
	930	9.58	3.5	6.38	18.4	6031	1.8	63.4	0.9	"	E) recovery well cycling sample
	933	9.58	4.0	6.38	18.4	6032	1.8	63.7	0.9	"	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
4/15/15	935	MW-21	9.58	6.38	18.4	6032	1.8	63.7	0.9			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
								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-9

Event: Spring 2015 (Biennial)

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	
4/14/15	1545	NA	8.67	0.00	20.20	Not Sampled	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								 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-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
										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-71

Event: Spring 2015 (Biennial)

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	
4/14/15	1449	NA	11.27	0.00	21.85	16.9	Yes	Yes	Yes	Yes		Weather Sunny 70°
4/16/15	1435	NA	11.16	0.00								

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	1440	11.18	0.5	6.95	21.8	6751	5.4	113.9	6.1	Clear	Low-flow groundwater sample:
	1443	11.19	1.0	6.90	20.7	6988	6.5	120.6	5.3	"	A) peristaltic pump w/ ded tubing
	1445	11.19	1.5	6.92	20.2	7093	5.6	129.4	5.0	"	B) ded bladder pump
	1448	11.19	2.0	6.94	20.0	7106	5.1	131.2	4.8	"	C) non-ded bladder pump; or
	1450	11.19	2.5	6.95	19.9	7109	4.8	133.6	4.7	"	Standard groundwater sample:
	1453	11.19	3.0	6.94	19.8	7111	4.7	134.8	4.7	"	D) bailer due to limited column; or
	1455	11.19	3.5	6.94	19.7	7113	4.7	135.1	4.5	"	E) recovery well cycling sample
	1458	11.19	4.0	6.93	19.7	7113	4.6	135.7	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
4/16/15	1500	MW-71	11.19	6.93	19.7	7113	4.6	135.7	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
										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-27

Event: Spring 2015 (Biennial)

Area of Concern: TMD

(Replaced lock)

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	
4/14/15	1430	NA	12.39	0.00	29.98	25.0	Yes	Yes	Yes	Yes		Weather: Sunny 70°
4/16/15	1335	NA	11.91	0.00								

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	1340	11.93	0.5	7.14	23.4	3855	1.9	15.5	7.7	Clear	Low-flow groundwater sample:
	1343	11.93	1.0	6.78	22.9	3874	1.3	51.4	7.5	"	A) peristaltic pump w/ ded tubing
	1345	11.93	1.5	6.73	22.6	3862	1.0	65.2	7.1	"	B) ded bladder pump
	1348	11.93	2.0	6.71	22.4	3859	0.8	70.8	6.7	"	C) non-ded bladder pump; or
	1350	11.93	2.5	6.70	22.3	3856	0.7	72.6	6.7	"	Standard groundwater sample:
	1353	11.93	3.0	6.70	22.3	3854	0.7	73.8	6.5	"	D) bailer due to limited column; or
	1355	11.93	3.5	6.70	22.3	3853	0.6	74.3	6.3	"	E) recovery well cycling sample
	1358	11.93	4.0	6.70	22.3	3853	0.6	74.7	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
4/16/15	1400	MW-27	11.93	6.70	22.3	3853	0.6	74.7	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
						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

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Event: Spring 2015 (Biennial)

Area of Concern: TMD

**Hydrologic Monitoring
for ARCADIS
Houston, Texas**

Initials: **BB**

Well Purging Record

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	1255	mw-26	7.12	7.15	17.6	8971	0.5	+04.3	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
								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: **KWB-11A**

Event: Spring 2015 (Biennial)

Area of Concern: **REST (Pecan Grove - Access from 82 gate)**
(4-in; stickup)

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	
4/14/15	1325	NA	21.87	0.00	42	37.0	Yes	Yes	Yes	Yes		Weather: Sunny 70's
4/15/15	1255	NA	21.09	Sheen on probe								

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
										*		
4/15/15	1300	21.11	0.5	6.54	21.1	6448	3.9	83.9	4.6	Clean (H2O2)		Low-flow groundwater sample:
	1303	21.11	1.0	6.47	20.6	6367	1.6	91.7	3.5	"	"	(A) peristaltic pump w/ ded tubing
	1305	21.11	1.5	6.43	20.2	6338	0.8	96.4	3.2	"	"	B) ded bladder pump
	1308	21.11	2.0	6.42	20.1	6332	0.6	99.8	3.1	"	"	C) non-ded bladder pump; or
	1310	21.11	2.5	6.42	20.0	6328	0.5	102.6	2.6	"	"	Standard groundwater sample:
	1313	21.11	3.0	6.42	20.0	6325	0.4	103.4	2.2	"	"	D) bailer due to limited column; or
✓	1315	21.11	3.5	6.41	20.0	6323	0.3	104.7	2.2	"	"	E) recovery well cycling sample
	1318	21.11	4.0	6.41	19.9	6321	0.3	105.2	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
												Lab: ESC Lab Sciences, Mt. Juliet, TN
4/15/15	1320	KWB-11A	21.11	6.41	19.9	6321	0.3	105.2	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 ✓
										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: KW8-11B

Event: Spring 2015 (Biennial)

Area of Concern: REST (Pecan Grove - Access From 82 Gate)
(4-in; stickup)

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	
4/15/15	1335	NA	22.54	0.00	72.47	62.2	Yes	Yes	Yes	Yes		Weather: Sunny 70's
4/15/15	1345	NA	21.83	0.00								

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	1350	21.87	0.5	6.98	22.2	4943	1.7	7.2	5.3	Clear	Low-flow groundwater sample:
	1353	21.88	1.0	6.82	21.4	4361	1.1	36.4	4.1	"	A) peristaltic pump w/ ded tubing
	1355	21.89	1.5	6.68	20.9	3692	0.9	55.4	3.0	"	B) ded bladder pump
	1358	21.89	2.0	6.65	20.7	3639	0.8	61.2	2.6	"	C) non-ded bladder pump; or
	1400	21.89	2.5	6.63	20.6	3634	0.7	67.3	2.3	"	Standard groundwater sample:
	1403	21.89	3.0	6.62	20.6	3629	0.7	69.2	2.2	"	D) bailer due to limited column; or
	1405	21.89	3.5	6.61	20.6	3626	0.6	70.4	2.0	"	E) recovery well cycling sample
	1408	21.89	4.0	6.61	20.6	3621	0.6	70.9	2.0	"	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
4/15/15	1410	KWB-11B	21.89	6.61	20.6	3621	0.6	70.9	2.0	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

DO NOT ADDRESS THIS WELL, per Navajo, 4-13-15
Monitoring Well Purging and Sampling Record

Jack Joy (Farmer)
575-365-6042

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

Well: KW3-3AR
Event: Spring 2015 (Biennial)
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	
4/14/15						26.1						Weather:

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								DO NOT ADDRESS THIS WELL, PER NAVAJO 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
		KWB-3AR										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: MW-117

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(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	
4/14/15	1435	NA	8.53	0.0	27.24	19.7	Yes	Yes	Needs lock	Yes		Weather: Sunny, 50's
4/15/15	855	NA	8.95	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
4/15/15	900	8.56	0.5	6.95	13.9	3060	3.2	59.7	31.1	Colorless / Clear	Low-flow groundwater sample:
	903	8.57	1.0	6.78	14.1	3900	2.2	78.8	32.1		A) peristaltic pump w/ ded tubing
	905	8.57	1.5	6.72	14.3	3120	2.1	88.2	33.6		B) ded bladder pump
	907	8.57	2.0	6.71	14.5	3130	2.2	92.7	32.0		C) non-ded bladder pump; or
	910	8.57	2.5	6.70	14.5	3370	2.2	95.1	33.1		Standard groundwater sample:
	913	8.57	3.0	6.70	14.6	3360	2.3	97.6	34.6		D) bailer due to limited column; or
	915	8.57	3.5	6.69	14.6	3360	2.3	99.8	33.9		E) recovery well cycling sample
	917	8.57	4.0	6.68	14.7	3350	2.3	100.4	32.4		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
4/15/15	920	MW-117	8.57	6.68	14.7	3350	2.3	100.4	32.4			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

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: MW-118
Event: Spring 2015 (Biennial)
Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(2-in; stick up)

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	
4/14/15	1440	NA	9.80	0.0	28.29	21.0	Yes	Yes	Yes	Yes		Weather: Sunny, 90's
4/15/15	935	NA	9.84	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
4/15/15	940	9.91	0.5	6.80	16.5	3690	4.8	114.3	70.2	colorless / cloudy	Low-flow groundwater sample:
	943	9.91	1.0	6.75	16.4	3700	4.5	117.8	53.9	↓	A) peristaltic pump w/ ded tubing
	945	9.91	1.5	6.72	16.4	3850	4.3	120.5	43.5		B) ded bladder pump
	947	9.91	2.0	6.72	16.3	3820	4.1	121.7	36.2	colorless / clear	C) non-ded bladder pump; or
	950	9.91	2.5	6.71	16.3	3810	3.9	122.6	32.1		Standard groundwater sample:
	953	9.91	3.0	6.71	16.4	3790	3.9	123.6	29.8	↓	D) bailer due to limited column; or
	955	9.91	3.5	6.70	16.5	3800	3.8	124.3	28.0		E) recovery well cycling sample
	957	9.91	4.0	6.70	16.5	3790	3.8	125.5	27.2	↓	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
4/15/15	1000	MW-118	9.91	6.90	16.5	3790	3.8	125.5	27.2			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: NP-9
Event: Spring 2015 (Biennial)
Area of Concern: TMD

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	
4/14/15	1444	NA	8.97	0.0	25.90	Not Sampled	YES	*ISSUE	*ISSUE	YES		Weather: Sunny, 90's
							SHOVED 2" CAP					

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
		NP-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
										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: MW-119

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(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	
4/14/15	1451	NA	8.78	0.0	28.16	20.8	Yes	Yes	Yes	Yes		Weather: Sunny, 50's
4/15/15	1020	NA	8.73	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
4/15/15	1025	8.74	0.5	6.91	18.1	2820	3.2	122.6	52.1	Colorless / clear	Low-flow groundwater sample:
	1027	8.74	1.0	6.82	17.5	2810	2.5	125.6	48.0		A) peristaltic pump w/ ded tubing
	1030	8.74	1.5	6.79	17.3	2790	2.1	126.9	46.3		B) ded bladder pump
	1033	8.74	2.0	6.77	17.1	2770	2.0	127.5	44.5		C) non-ded bladder pump; or
	1036	8.74	2.5	6.76	17.0	2780	1.9	128.3	43.4		Standard groundwater sample:
	1037	8.74	3.0	6.76	17.0	2770	1.9	128.4	42.7		D) bailer due to limited column; or
	1040	8.74	3.5	6.75	17.0	2770	1.9	128.7	41.9		E) recovery well cycling sample
	1043	8.74	4.0	6.75	16.9	2770	1.8	128.8	40.9		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
4/15/15	1045	MW-119	8.74	6.75	16.9	2770	1.8	128.8	40.9			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
						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-126A

Event: Spring 2015 (Biennial)

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	
4/14/15	10:39	NA	11.76	0.0	37.56	29.5	Yes	Yes	Yes	Yes		Weather: Sunny, 60's
4/15/15	11:15	NA	11.67	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	
4/15/15	11:20	11.69	0.5	6.86	21.3	2950	2.8	-126.5	187	colorless / cloudy	Low-flow groundwater sample:
	11:23	11.69	1.0	6.77	20.7	2970	2.2	-126.1	118		
	11:25	11.70	1.5	6.75	20.5	2960	2.1	-125.2	76.8		B) ded bladder pump
	11:27	11.70	2.0	6.73	20.5	2950	1.7	-125.9	60.8	colorless / sl. cloudy	
	11:30	11.70	2.5	6.73	20.3	2960	1.5	-130.0	40.7		Standard groundwater sample:
	11:33	11.70	3.0	6.72	20.3	2970	1.4	-131.7	36.7		
	11:35	11.70	3.5	6.72	20.4	2970	1.3	-134.3	31.1	colorless / clear	E) recovery well cycling sample
	11:37	11.70	4.0	6.72	20.4	2970	1.3	-134.7	29.9		
	11:40	11.70	4.5	6.72	20.4	2970	1.3	-134.6	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
4/15/15	11:45	MW-126A	11.70	6.72	20.4	2970	1.3	-134.6	28.4	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: MW-126B

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(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	
4/14/15	1042	NA	11.71	0.0	51.99	48.4	Yes	Yes	Yes	Yes		Weather: Sunny, 60's
	1205	NA	11.59	0.0	↳ 50 FT BOTTOM							

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	1210	11.70	0.5	6.96	22.3	3410	3.2	100.2	44.1	Colorless / clear	Low-flow groundwater sample:
	1213	11.70	1.0	6.83	21.7	3410	2.2	111.6	17.8		A) peristaltic pump w/ ded tubing
	1215	11.70	1.5	6.74	21.2	3400	1.7	112.2	9.6		B) ded bladder pump
	1217	11.71	2.0	6.71	21.0	3400	1.6	118.4	7.1		C) non-ded bladder pump; or
	1220	11.71	2.5	6.70	21.0	3330	1.5	116.8	6.7		Standard groundwater sample:
	1223	11.71	3.0	6.69	21.0	3340	1.5	114.9	6.3		D) bailer due to limited column; or
	1225	11.71	3.5	6.68	20.9	3340	1.4	114.0	5.8		E) recovery well cycling sample
	1227	11.71	4.0	6.68	20.9	3340	1.4	113.8	6.1		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
4/15/15	1230	MW-126B	11.71	6.68	20.9	3340	1.4	113.8	6.1	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
										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-127

Event: Spring 2015 (Biennial)

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	
4/14/15	1035	NA	16.48	0.0	53.25	38.4	Yes	Yes	Yes	Yes		Weather: Sunny, 60's
4/15/15	1250	NA	16.29	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	
4/15/15	1255	16.32	0.5	6.74	24.0	2410	3.5	-205.9	126	gray / cloudy	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
	1257	16.32	1.0	6.68	23.0	2470	2.3	-218.9	184	odor	
	1300	16.32	1.5	6.65	22.7	2420	1.8	-240.8	7200		
	1303	16.32	2.0	6.65	22.6	2450	1.6	-252.5	7200		
	1305	16.32	2.5	6.64	22.6	2390	1.5	-258.1	7200		
	1307	16.32	3.0	6.64	22.7	2380	1.5	-263.1	7200		
	1310	16.32	3.5	6.64	22.7	2370	1.4	-266.2	194		
	1313	16.32	4.0	6.64	22.7	2370	1.4	-269.7	186		

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	1315	MW-127	16.32	6.64	22.7	2370	1.4	-269.7	186	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
								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-129

Event: Spring 2015 (Biennial)

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	
4/14/15	1015	20.00	20.02	0.02	53.20	38.2	Yes	Yes	Yes	Yes		Weather: Sunny, 60's
4/15/15	1340	19.80	19.81	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	
4/15/15	1345	19.83	0.5	6.83	26.1	2040	2.8	-78.2	88.2	colorless / sl. Cloudy	Low-flow groundwater sample:
	1347	19.84	1.0	6.77	24.8	2100	2.2	-80.5	66.8	odor	A) peristaltic pump w/ ded tubing
	1350	19.84	1.5	6.74	24.3	2090	1.9	-82.9	70.8		B) ded bladder pump
	1353	19.84	2.0	6.76	23.9	2080	1.9	-83.3	69.8		C) non-ded bladder pump; or
	1355	19.84	2.5	6.77	23.8	1955	1.8	-83.2	72.8		Standard groundwater sample:
	1357	19.84	3.0	6.78	23.7	1959	1.8	-82.4	74.1		D) bailer due to limited column; or
	1400	19.84	3.5	6.78	23.7	1957	1.7	-82.5	75.6		E) recovery well cycling sample
	1403	19.84	4.0	6.76	23.6	1958	1.7	-85.2	77.3		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
4/15/15	1405	MW-129	19.84	6.76	23.6	1958	1.7	-85.2	77.3			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
										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: **RW-#18A**
Event: Spring **2015 (Biennial)**
Area of Concern: **REST**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	
4/14/15	1119	NA	8.51	0.0	17.75	12.7	Yes	Yes	Yes	Yes		Weather: <i>Partly Cloudy, 50's</i>
4/16/15	825	NA	8.34	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	
4/16/15	830	8.35	0.5	7.13	17.5	5730	3.4	62.5	4.1	colorless / clear	Low-flow groundwater sample:
	833	8.36	1.0	7.01	17.6	5710	2.6	75.0	3.2		A) peristaltic pump w/ ded tubing
	835	8.36	1.5	6.98	17.8	5690	2.3	83.0	2.3		B) ded bladder pump
	837	8.36	2.0	6.97	17.8	5690	2.2	89.0	1.7		C) non-ded bladder pump; or
	840	8.36	2.5	6.96	17.9	5680	2.1	92.6	1.3		Standard groundwater sample:
	843	8.36	3.0	6.95	18.0	5670	2.1	96.6	1.5		D) bailer due to limited column; or
	845	8.36	3.5	6.94	18.0	5670	2.1	100.2	1.6		E) recovery well cycling sample
	847	8.36	4.0	6.94	18.0	5670	2.1	104.6	1.4		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	850	RW-#18	8.36	6.94	18.0	5670	2.1	104.6	1.4	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
										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: **KWB-1A**

Event: Spring **2015 (Biennial)**

Area of Concern: **REST**

Hydrologic Monitoring

for ARCADIS

Houston, Texas

AR-grade
(2-in;)

Initials: **GAS**

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	1134	NA	10.25	0.0	33.49	25.8	Yes	Yes	Yes	Yes		Weather: <i>Partly cloudy, 50's</i>
4/16/15	905	NA	10.24	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	
4/16/15	910	10.25	0.5	6.90	19.4	5460	3.5	109.4	18.8	<i>Colorless/clear</i>	Low-flow groundwater sample:
	913	10.26	1.0	6.77	19.0	5480	1.8	119.5	18.1		(A) peristaltic pump w/ ded tubing
	915	10.26	1.5	6.73	18.7	5460	1.5	126.0	17.2		B) ded bladder pump
	917	10.26	2.0	6.74	18.5	5460	1.4	128.5	14.2		C) non-ded bladder pump; or
	920	10.26	2.5	6.73	18.5	5440	1.4	130.2	11.8		Standard groundwater sample:
	923	10.26	3.0	6.73	18.5	5430	1.4	130.1	9.6		D) bailer due to limited column; or
	925	10.26	3.5	6.73	18.6	5420	1.4	130.1	9.1	<i>↓</i>	E) recovery well cycling sample
	927	10.26	4.0	6.73	18.6	5420	1.4	130.0	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
4/16/15	930	KWB-1A	10.26	6.73	18.6	5420	1.4	130.0	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
										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: KWB-1B
Event: Spring 2015 (Biennial)
Area of Concern: REST

**Hydrologic Monitoring
for ARCADIS
Houston, Texas**

Well Inspection Information

Initials: GDS

[illegible]

Well Purging Record

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[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
		KwB-1B										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: **KWB-1C**

Event: Spring **2015 (Biennial)**

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	
4/14/15	1130	NA	12.55	0.0	52.71	42.7	Yes	Yes	Yes	Yes		Weather: Partly cloudy, 50's
4/16/15	950	NA	12.51	0.0								

Well Purging Record

*Added bail

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	955	12.52	0.5	6.83	21.2	5070	2.7	125.8	4.9	colorless / clear	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
	957	12.53	1.0	6.73	20.8	5110	1.9	130.0	3.3		
	1000	12.53	1.5	6.70	20.7	5100	1.6	130.2	2.5		
	1003	12.53	2.0	6.67	20.5	5090	1.4	129.0	2.2		
	1005	12.53	2.5	6.67	20.5	5090	1.3	127.6	1.9		
	1007	12.53	3.0	6.67	20.5	5060	1.2	126.0	1.8		
	1010	12.53	3.5	6.67	20.4	5020	1.1	125.8	2.1		
	1013	12.53	4.0	6.67	20.5	5030	1.1	125.5	1.7		

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
4/16/15	1015	KWB-1C	12.53	6.67	20.5	5030	1.1	125.5	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
										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: KW B-10R

Event: Spring 2015 (Biennial)

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	
4/14/15	1200	14.01	14.02	0.01	29.48	22.0	Yes	Yes	Yes	Yes		Weather: Partly cloudy, 60's
4/16/15	1040	13.95	13.96	0.01								

Well Purging Record $\hookrightarrow$ Removed LNAPL prior to purge/sample

[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
4/16/15	1105	KWB-10R	14.10	6.78	20.1	1973	1.4	-109.4	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
								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

Monitoring Well Purging and Sampling Record

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

Well: MW-131
Event: Spring 2015 (Biennial)
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	
4/14/15	1629	NA	21.09	0.0	53.48	38.1	Yes	Yes	Yes	Yes		Weather: Sunny, 70's
4/15/15	1430	NA	20.94	0.0								

Well Purging Record

Added 10/2

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	1435	20.95	0.5	6.78	24.1	1943	2.6	-127.0	104	Colorless / Sl. Cloudy	Low-flow groundwater sample:
	1437	20.95	1.0	6.71	23.1	1926	2.1	-134.7	78.4		A) peristaltic pump w/ ded tubing
	1440	20.95	1.5	6.68	22.3	1927	1.9	-144.2	75.8		B) ded bladder pump
	1443	20.95	2.0	6.69	22.2	1918	1.7	-151.3	84.1		C) non-ded bladder pump; or
	1445	20.95	2.5	6.69	22.1	1925	1.7	-152.7	78.0		Standard groundwater sample:
	1447	20.95	3.0	6.69	22.0	1925	1.7	-156.0	73.1		D) bailer due to limited column; or
	1450	20.95	3.5	6.69	21.9	1929	1.6	-155.8	70.6		E) recovery well cycling sample
	1453	20.95	4.0	6.68	21.8	1933	1.6	-157.1	67.8		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
4/15/15	1455	MW-131	20.95	6.68	21.8	1933	1.6	-157.1	67.8			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
										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		

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	
4/14/15	1000	NA	21.37	0.0	37.63	30.7	Yes	Yes	Yes	Yes		Weather: Sunny, 70's
4/15/15	1520	NA	21.15	0.0								

Well Purging Record $\hookrightarrow$ unmeasurable sheen on probe

[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
4/15/15	1545	KWB-5	21.19	6.67	23.7	2680	1.6	-118.6	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
								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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **KWB-6**

Event: Spring **2015 (Biennial)**

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	
4/14/15	0948	* NA	20.71	0.0	36.38	27.4	Yes	Yes	Yes	Yes		Weather: Sunny; 70's
4/15/15	1715	* = variable shown on probe										

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	1720	20.60	0.5	6.76	24.5	2270	2.5	-185.1	47.5	Dark tint / clear;	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
	1723	20.60	1.0	6.74	23.3	2280	1.9	-207.3	15.2	color	
	1725	20.60	1.5	6.73	22.8	2270	1.8	-215.8	11.3		
	1727	20.60	2.0	6.72	22.3	2250	1.7	-222.2	9.8		
	1730	20.60	2.5	6.72	22.0	2240	1.5	-229.6	8.5		
	1733	20.60	3.0	6.71	21.9	2240	1.5	-234.1	8.0		
	1735	20.60	3.5	6.71	21.9	2240	1.4	-238.6	8.1		
	1737	20.60	4.0	6.70	21.9	2240	1.4	-241.1	7.4		

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
4/15/15	1740	KWB-6	20.60	6.70	21.9	2240	1.4	-241.1	7.4	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: MW-112
Event: Spring 2015 (Biennial)
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	
4/14/15	1056	19.48	19.51	0.03	37.53	32.5	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	
			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
										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-132

Event: Spring 2015 (Biennial)

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	
4/14/15	1314	18.41	18.82	0.41	42.71	Not Sampled	Yes	Yes	Needs lock	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	
			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
										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-57

Event: Spring 2015 (Biennial)

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	
4/14/15	1242	NA	21.07	0.0	34.36	32.8	Yes	Yes	Yes	Yes		Weather: Partly cloudy, 60's
4/16/15	1145	NA	20.56	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	
4/16/15	1150	20.70	0.5	7.00	23.1	5850	2.9	90.5	23.1	colorless / clear	Low-flow groundwater sample:
	1153	20.77	1.0	6.85	22.0	6280	1.7	68.1	19.6		(A) peristaltic pump w/ ded tubing
	1155	20.82	1.5	6.80	21.6	6380	1.3	79.9	18.0		B) ded bladder pump
	1157	20.85	2.0	6.79	21.4	6420	1.1	86.3	17.0		C) non-ded bladder pump; or
	1200	20.88	2.5	6.77	21.5	6420	1.0	89.5	13.8		Standard groundwater sample:
	1203	20.90	3.0	6.75	21.6	6420	1.0	82.5	11.9		D) bailer due to limited column; or
	1205	20.92	3.5	6.74	21.7	6370	1.0	77.3	10.1		E) recovery well cycling sample
✓	1207	20.93	4.0	6.74	21.8	6350	0.9	73.1	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
4/16/15	1210	MW-57	20.93	6.74	21.8	6350	0.9	73.1	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
										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-#11-0
Event: Spring 2015 (Biennial)
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	
<u>4/14/15</u>	<u>1249</u>	<u>Dry</u>	<u>Dry</u>	<u>Dry</u>	<u>22.20</u>	<u>Not Sampled</u>	<u>Yes</u>	<u>Yes</u>	<u>Yes</u>	<u>Yes</u>		Weather: <u>Sunny, 50's</u>

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
		<u>RW-#11-0</u>										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: **KWB-9**

Event: Spring **2015** (Biennial)

Area of Concern: **REST**

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	
4/14/15	1256	715.11	715.11	NM	715.11	Not Sampled	Yes	# Issue	Check lock	Yes		Weather: Sunny, 90'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
		KWB-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
										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		

✓ No Bladder pump added
due to limited H₂O column.

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-12A

Event: Spring 2015 (Biennial)

Area of Concern: REST

(4-in; at-grade)

Initials: GDS

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

Hydrologic Monitoring
for ARCADIS
Houston, Texas

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	1301	NA	24.17	0.0	25.03	24.9	Yes	Yes	Yes	Yes		Weather: Partly Cloudy, 70's
4/16/15	1240	NA	23.84	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	
4/16/15	1245	23.95	0.5	6.89	24.4	3620	3.9	105.8	7.8	colorless / clear	Low-flow groundwater sample:
	1247	24.00	1.0	6.82	23.7	3570	3.2	112.8	5.1		A) peristaltic pump w/ ded tubing
	1250	24.01	1.5	6.75	23.0	3530	3.0	124.0	3.7		B) ded bladder pump
	1253	24.02	2.0	6.74	23.1	3470	3.0	126.7	3.0		C) non-ded bladder pump; or
	1255	24.02	2.5	6.75	22.9	3470	2.9	128.8	2.5		Standard groundwater sample:
	1257	24.03	3.0	6.76	22.8	3460	2.9	130.7	2.1		D) bailer due to limited column; or
	1300	24.03	3.5	6.77	22.6	3390	2.8	132.3	1.8		E) recovery well cycling sample
	1303	24.04	4.0	6.78	22.5	3390	2.8	132.7	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	
Lab: ESC Lab Sciences, Mt. Juliet, TN													
4/16/15	1305	KWB-12A	24.04	6.78	22.5	3390	2.8	132.7	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 ✓	
								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 ✓
	1200	DUP-REST-05	24.04	6.78	22.5	3390	2.8	132.7	1.8	Cyanide	NaOH	SM4500 (same) ✓	
✓	1320	EB-REST-05	NA	<u>(same) (same</u>									

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

[HMF Installed dedicated bladder 11/15]
in case DTW falls in future

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-12B

Event: Spring 2015 (Biennial)

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	
4/14/15	1304	NA	24.02	0.0	39.39	35.2	Yes	Yes	Yes	Yes		Weather: Partly cloudy, 70's
4/16/15	1410	NA	23.70	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	
4/16/15	1415	23.71	0.5	6.96	24.8	3620	3.5	-79.0	3.1	colorless / clear	Low-flow groundwater sample:
	1417	23.72	1.0	6.87	23.5	3610	3.3	-53.5	2.8		A) peristaltic pump w/ ded tubing
	1420	23.72	1.5	6.84	22.8	3550	3.2	-20.5	2.3		B) ded bladder pump
	1423	23.72	2.0	6.83	22.1	3580	3.2	29.1	2.1		C) non-ded bladder pump; or
	1425	23.72	2.5	6.82	21.6	3540	3.1	78.3	1.8		Standard groundwater sample:
	1427	23.72	3.0	6.81	21.5	3540	3.1	96.3	1.8		D) bailer due to limited column; or
	1430	23.72	3.5	6.81	21.6	3520	3.1	103.5	1.6		E) recovery well cycling sample
	1433	23.72	4.0	6.80	21.5	3510	3.0	107.2	1.5		F) irrigation well grab sample
	1435	23.72	4.5	6.80	21.5	3510	3.0	111.1	1.5		

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	1440	KWB-12B	23.72	6.80	21.5	3510	3.0	111.1	1.5			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 ✓
								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: **KWB-2R**

Event: Spring **2015** (Biennial)

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	
4/14/15	1325	19.96	19.97	0.01	39.86	32.4	Yes	Yes	Yes	Yes		Weather: <i>partly cloudy, 70's</i>
4/16/15	1625	* 19.93	19.94	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	
4/16/15	1630	20.09	0.5	6.89	23.4	3040	4.0	-230.4	22.8	Colorless / clear ;	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
	1633	20.10	1.0	6.80	21.9	3210	1.8	-270.1	13.9	odor	
	1635	20.10	1.5	6.78	21.5	3140	1.6	-281.2	8.6		
	1637	20.10	2.0	6.77	21.3	3150	1.5	-285.0	9.0		
	1640	20.10	2.5	6.79	21.0	3000	1.5	-288.7	8.4		
	1643	20.10	3.0	6.80	20.9	2980	1.5	-288.9	8.0		
	1645	20.10	3.5	6.81	20.9	2980	1.4	-288.7	8.3		
	1647	20.10	4.0	6.81	20.9	2980	1.4	-288.9	7.8		

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	1650	KWB-2R	20.10	6.81	20.9	2980	1.4	-288.9	7.8	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: MW-58

Event: Spring 2015 (Biennial)

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	
4/14/15	1333	18.90	18.91	0.01	33.08	25.6	Yes	Yes	Yes	Yes		Weather: partly cloudy, 70's
4/16/15	1725	18.88	18.89	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	
4/16/15	1730	18.93	0.5	6.76	21.1	1781	2.2	-209.6	14.9	colorless / clear;	Low-flow groundwater sample:
	1733	18.95	1.0	6.71	20.5	1789	1.7	-225.8	11.0	odor; sheer	
	1735	18.95	1.5	6.69	20.3	1777	1.5	-232.4	9.9		A) peristaltic pump w/ ded tubing
	1737	18.95	2.0	6.69	20.1	1780	1.5	-235.7	8.6		B) ded bladder pump
	1740	18.95	2.5	6.68	20.0	1770	1.4	-237.5	8.1		C) non-ded bladder pump; or
	1743	18.95	3.0	6.68	20.0	1767	1.4	-238.9	7.3		Standard groundwater sample:
	1745	18.95	3.5	6.68	20.0	1763	1.3	-239.1	6.8		D) bailer due to limited column; or
	1747	18.95	4.0	6.67	20.0	1768	1.3	-239.8	6.2		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	1750	mw-58	18.95	6.67	20.0	1768	1.3	-239.8	6.2	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
										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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-103

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; at-grade)

Initials: SCU

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	1027	NA	17.62	0.0	25.22	22.2	YES	YES	YES	YES		Weather: clear, 60S
4/15/15	825	NA	17.44	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	
4/15/15	845	17.56	0.5	7.19	23.0	19,700	1.1	-290.7	5.2	clear, colorless	Low-flow groundwater sample:
	847	17.61	1.0	7.27	23.5	19,400	0.9	-311.7	4.8		A) peristaltic pump w/ ded tubing
	850	17.67	1.5	7.26	23.8	19,400	0.8	-315.5	4.6		B) ded bladder pump
	852	17.71	2.0	7.25	24.0	19,400	0.8	-320.6	4.6		C) non-ded bladder pump; or
	855	17.75	2.5	7.24	24.1	19,400	0.7	-323.1	4.5		Standard groundwater sample:
	857	17.78	3.0	7.24	24.1	19,400	0.7	-324.8	4.5		D) bailer due to limited column; or
	900	17.81	3.5	7.23	24.4	19,300	0.7	-325.2	4.5		E) recovery well cycling sample
	902	17.84	4.0	7.23	24.4	19,300	0.7	-325.8	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
4/15/15	905	MW-103	17.84	7.23	24.4	19,300	0.7	-325.8	4.5			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
										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	GM4500
										If <0.03 feet of PSH present, remove PSH and sample groundwater		

(stretch tube 15' to well)

Monitoring Well Purging and Sampling Record

* DUP-REST-02

+ EB-REST-02

(both for shown analysis)

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-104

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

stickup vs ARCADIS table
(4-in, at grade)

Initials: SCU

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	1039	NA	16.51	0.0	21.95	19.0	YES	YES	YES	YES		Weather: clear, 60.5
4/15/15	922	NA	16.40	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	
4/15/15	932	16.52	0.5	7.95	18.8	3,000	1.1	-296.7	6.6	colorless, clear	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
	935	16.58	1.0	7.56	18.7	2,240	0.7	-300.5	5.0		
	937	16.64	1.5	7.41	18.7	1,920	0.6	-301.3	4.8		
	940	16.69	2.0	7.35	18.7	1,792	0.6	-301.3	4.6		
	942	16.74	2.5	7.29	18.7	1,688	0.5	-301.2	4.5		
	945	16.77	3.0	7.25	18.8	1,532	0.5	-302.0	4.4		
	947	16.80	3.5	7.23	18.9	1,527	0.5	-301.9	4.4		
	950	16.83	4.0	7.22	18.8	1,525	0.5	-301.9	4.5		

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	955	MW-104	16.83	7.22	18.8	1,525	0.5	-301.9	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
										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
	1100	DUP-REST-02	16.83	7.22	18.8	1525	0.5	-301.9	4.5	Cyanide (same)	NaOH (same)	SM4500 (same)
	1015	EB-REST-02	NA							(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-64

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; at-grade)

Initials: SLU

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	1047	17.85	18.03	0.18	34.03	26.6	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								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-64										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-65

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCU

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	1120	14.34	14.35	0.01	28.80	23.8	YES	YES	YES	YES		Weather: clear, 70s
4/15/15	1110	14.31	14.32	0.01								

Well Purging Record

At-grade

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	1120	14.32	0.5	6.95	25.7	2160	1.9	-118.6	14.9	clear / odor	Low-flow groundwater sample:
	1122	14.33	1.0	6.84	25.4	2200	1.8	-135.3	15.0		
	1125	14.33	1.5	6.81	25.3	2210	1.5	-143.7	15.1		A) peristaltic pump w/ ded tubing
	1127	14.33	2.0	6.80	25.3	2220	1.5	-149.5	14.8		B) ded bladder pump
	1130	14.33	2.5	6.79	25.3	2220	1.4	-153.2	14.6		C) non-ded bladder pump; or
	1132	14.33	3.0	6.78	25.3	2220	1.4	-154.7	14.6		Standard groundwater sample:
	1135	14.33	3.5	6.78	25.3	2230	1.3	-157.5	14.5		D) bailer due to limited column; or
✓	1137	14.33	4.0	6.78	25.3	2230	1.3	-158.7	14.5	↓ ↓	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	1140	MW-65	14.33	6.78	25.3	2230	1.3	-158.7	14.5	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
										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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RW-4

Event: Spring 2015 (Biennial)

Area of Concern: REST

[Active RW]

Gauged and Sampled through labeled guide tube

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCW

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	1235	NA	13.00	0.0	36.64	31.6	Yes	Yes	Yes	Yes		Weather: <u>clear, 80s</u>

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	1510	NM*	0.5	7.08	26.5	2210	1.3	-301.7	28.3	colorless, clear	Low-flow groundwater sample:
	1512		1.0	7.01	26.2	2230	1.3	-312.6	19.3		A) peristaltic pump w/ ded tubing
	1515		1.5	6.99	25.7	2230	1.3	-314.5	12.6		B) ded bladder pump
	1517		2.0	7.00	25.5	2230	1.3	-314.8	9.5		C) non-ded bladder pump; or
	1520		2.5	7.00	25.6	2230	1.2	-315.3	7.3		Standard groundwater sample:
	1522		3.0	7.00	25.5	2230	1.2	-315.3	7.0		D) bailer due to limited column; or
	1525		3.5	7.00	25.6	2230	1.2	-315.4	6.8		E) recovery well cycling sample
	1527		4.0	7.00	25.6	2220	1.2	-315.3	6.4		F) irrigation well grab sample

Well Sampling Record * Gauged / Sampled inserting poly tube through narrow-diameter guide tube, prohibiting drawdown m.e.s.

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	1530	RW-4	NM*	7.00	25.6	2220	1.2	-315.3	6.4	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-6

Event: Spring 2015 (Biennial)

Area of Concern: REST

[Active RW]

Gauged and Sampled through labeled guide tube

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCW

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	1210	NA	14.19	0.0	35.00	30.0	Yes	Yes	Yes	Yes		Weather: clear, 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	
4/15/15	1415	NM #	0.5	6.83	25.7	2420	1.7	-199.2	15.0	gray tint, clear	Low-flow groundwater sample:
	1417		1.0	6.77	25.5	2430	1.7	-215.9	12.9		(A) peristaltic pump w/ ded tubing
	1420		1.5	6.71	25.4	2440	1.7	-235.7	12.1		B) ded bladder pump
	1422		2.0	6.69	25.3	2440	1.8	-243.3	11.9		C) non-ded bladder pump; or
	1425		2.5	6.68	25.3	2440	1.8	-248.1	11.7		Standard groundwater sample:
	1427		3.0	6.67	25.2	2440	1.8	-252.5	11.5		D) bailer due to limited column; or
	1430		3.5	6.67	25.2	2440	1.8	-254.1	11.3		E) recovery well cycling sample
	1432		4.0	6.66	25.2	2440	1.8	-256.1	11.3		F) irrigation well grab sample

Well Sampling Record

Sampled low-flow by inserting poly tubing into narrow diameter guide tube

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	1435	RW-6	NM #	6.66	25.2	2440	1.8	-256.1	11.3	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
										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: MW-99

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	1455	NA	15.48	0.0	27.90	22.8	Yes	Yes	Yes	Yes		Weather: mostly clear, 80s
4/15/15	1545	NA	15.32	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
4/15/15	1550	15.42	0.5	8.00	24.4	545	1.5	-119.5	28.6	clear	Low-flow groundwater sample:
	1552	15.45	1.0	7.92	24.1	522	1.3	-118.9	29.6		A) peristaltic pump w/ ded tubing
	1555	15.47	1.5	7.86	23.9	502	1.2	-118.5	30.1		B) ded bladder pump
	1557	15.48	2.0	7.82	23.7	479	1.1	-118.7	30.5		C) non-ded bladder pump; or
	1600	15.48	2.5	7.80	23.6	465	1.1	-118.8	31.0		Standard groundwater sample:
	1602	15.48	3.0	7.78	23.6	461	1.1	-118.9	31.1		D) bailer due to limited column; or
	1605	15.48	3.5	7.76	23.4	458	1.1	-120.1	31.5		E) recovery well cycling sample
	1607	15.48	4.0	7.75	23.4	456	1.0	-120.5	31.2		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
4/15/15	1610	mw-99	15.48	7.75	23.4	456	1.0	-120.5	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
								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: MW-66
Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(4-injet-grade)

Initials: SCU

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	14.52	0.0	29.80	24.6	Yes	Yes	Yes	Yes		Weather: mostly clear, 80s
4/15/15	1650	NA	14.47	0.0								

Well Purging Record

A+ grade

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
4/15/15	1655	14.56	0.5	7.12	24.2	1347	1.5	-125.9	7.1	clear	Low-flow groundwater sample:
	1657	14.57	1.0	7.10	23.7	1379	1.2	-135.8	7.1		A) peristaltic pump w/ ded tubing
	1700	14.58	1.5	7.07	23.5	1387	1.2	-139.0	7.2		B) ded bladder pump
	1702	14.58	2.0	7.06	23.4	1393	1.3	-142.5	7.0		C) non-ded bladder pump; or
	1705	14.59	2.5	7.06	23.4	1397	1.2	-144.9	6.9		Standard groundwater sample:
	1707	14.59	3.0	7.06	23.3	1405	1.2	-147.1	6.9		D) bailer due to limited column; or
	1710	14.60	3.5	7.06	23.2	1408	1.2	-149.0	6.8		E) recovery well cycling sample
↓	1712	14.60	4.0	7.06	23.3	1410	1.2	-149.6	6.8	↓	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
4/15/15	1715	MW-66	14.60	7.06	23.3	1410	1.2	-149.6	6.8	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 ✓
										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

(6-in; stickup)

Well: MW-28

Event: Spring 2015 (Biennial)

Area of Concern: REST

6" PVC (shattered top w/ 0.65-ft slip collar over it)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

NO cap
No protective casing/pad

Initials: SCU

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	
4/14/15	1510	NA	20.30	0.0	34.48	30.2	NO	Issue	Issue	YES	
4/16/15	1330	NA	20.14	0.6							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	
4/16/15	1340	20.18	0.5	6.75	26.9	2860	1.7	-325.6	8.2	clear; HC odor	Low-flow groundwater sample:
	1342	20.22	1.0	6.71	26.4	2958	2.0	-328.9	8.0		A) peristaltic pump w/ ded tubing
	1345	20.25	1.5	6.69	26.2	2980	2.0	-331.3	7.6		B) ded bladder pump
	1347	20.28	2.0	6.68	26.0	3010	2.0	-333.6	7.3		C) non-ded bladder pump; or
	1350	20.31	2.5	6.67	25.4	3050	2.1	-337.6	7.1		Standard groundwater sample:
	1352	20.33	3.0	6.66	24.9	3070	2.2	-340.9	7.3		D) bailer due to limited column; or
	1355	20.35	3.5	6.66	24.9	3080	2.2	-342.2	7.4		E) recovery well cycling sample
	1357	20.37	4.0	6.66	25.1	3080	2.3	-343.4	7.5		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
4/16/15	1400	MW-28	20.37	6.66	25.1	3080	2.3	-343.4	7.5	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 ✓
										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: MW-59
Event: Spring 2015 (Biennial)
Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

Initials: SW

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	940	NA	6.24	0.0	32.82	25.3	Yes	Yes	Yes	Yes		Weather: pt. cloudy, 80s
4/16/15	1435	NA	6.21	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	
4/16/15	1450	6.23	0.5	7.09	24.2	3200	1.6	-238.5	14.2	clear	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
	1452	6.23	1.0	6.97	23.7	3250	1.6	-250.3	12.1		
	1455	6.23	1.5	6.90	23.5	3250	1.5	-257.7	10.3		
	1457	6.23	2.0	6.88	23.3	3260	1.5	-260.8	10.1		
	1500	6.23	2.5	6.85	23.2	3260	1.5	-263.6	9.1		
	1502	6.23	3.0	6.84	23.3	3260	1.5	-264.9	9.5		
	1505	6.23	3.5	6.84	23.3	3260	1.5	-265.6	9.7		
	1507	6.23	4.0	6.93	23.4	3260	1.5	-266.4	9.6		

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	1510	MW-59	6.23	6.83	23.4	3260	1.5	-266.4	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: MW-60

Event: Spring 2015 (Biennial)

Area of Concern: REST

+ DUP-REST-04

+ EB-REST-04

(both for shown analyses)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; stickup)

Initials: SCU

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	950	NA	7.78	0.0	37.70	26.7	yes	yes	yes	yes		Weather: cloudy, 80s
4/16/15	1540	NA	7.70	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
4/16/15	1550	7.77	0.5	6.95	23.6	3470	1.7	-281.4	6.1	clear	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
	1552	7.83	1.0	6.89	23.0	3520	1.3	-296.7	6.0		
	1555	7.85	1.5	6.86	22.6	3540	1.4	-306.9	5.6		
	1557	7.86	2.0	6.85	22.6	3550	1.3	-308.8	5.4		
	1600	7.87	2.5	6.85	22.6	3560	1.3	-309.9	5.2		
	1602	7.87	3.0	6.85	22.5	3570	1.3	-310.5	3.8		
	1605	7.88	3.5	6.85	22.5	3570	1.3	-311.9	3.6		
	1607	7.88	4.0	6.84	22.4	3570	1.3	-312.5	3.4		

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
Lab: ESC Lab Sciences, Mt. Juliet, TN												
4/16/15	1610	MW-60	7.88	6.84	22.4	3570	1.3	-312.5	3.4	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 ✓
	1300	DUP-REST-04	7.88	6.84	22.4	3570	1.3	-312.5	3.4	Cyanide	NaOH	SM4500 (same) ✓
	1650	EB-REST-04	NA							(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: MW-107

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(4-in-jat-grade)

Initials: scu

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	1520	NA	10.02	0.0	19.05	17.1	Yes	Yes	Yes	Yes	
4/16/15	1220	NA	9.93	0.0							Weather: pt. cloudy, 80s

Well Purging Record

At-grade

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	1230	10.03	0.5	7.04	24.4	2010	1.6	-157.7	9.1	clear	Low-flow groundwater sample:
	1232	10.17	1.0	6.99	24.0	2020	1.3	-165.9	6.9		A) peristaltic pump w/ ded tubing
	1235	10.14	1.5	6.97	23.7	2020	1.4	-169.8	6.5		B) ded bladder pump
	1237	10.17	2.0	6.96	23.6	2020	1.3	-172.9	6.5		C) non-ded bladder pump; or
	1240	10.20	2.5	6.96	23.3	2020	1.2	-174.9	6.4		Standard groundwater sample:
	1242	10.23	3.0	6.96	23.1	2010	1.3	-177.8	6.4		D) bailer due to limited column; or
	1245	10.26	3.5	6.95	23.0	2010	1.2	-180.7	6.3		E) recovery well cycling sample
	1247	10.28	4.0	6.95	23.0	2010	1.2	-181.4	6.3		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
4/16/15	1250	MW-107	10.28	6.95	23.0	2010	1.2	-181.4	6.3	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
						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: **MW-128**

Event: Spring 2015 (Biennial)

Area of Concern: **REST**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(2-in; at-grade)

Initials: **SW**

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	1525	NA	12.43	0.0	35.38	25.4	Yes	Yes	Yes	Yes		Weather: mostly clear, 80s
4/16/15	1115	NA	12.40	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	
4/16/15	1125	12.42	0.5	6.80	24.3	2350	1.6	-62.4	44.7	V. sl. cloudy	Low-flow groundwater sample:
	1127	12.43	1.0	6.74	24.1	2310	1.6	-62.5	46.6		A) peristaltic pump w/ ded tubing
	1130	12.43	1.5	6.72	23.8	2270	1.5	-71.1	49.5		B) ded bladder pump
	1132	12.43	2.0	6.72	23.8	2260	1.5	-78.0	51.7		C) non-ded bladder pump; or
	1135	12.43	2.5	6.72	23.7	2240	1.4	-83.5	52.3		Standard groundwater sample:
	1137	12.43	3.0	6.71	23.7	2240	1.4	-84.4	53.0		D) bailer due to limited column; or
	1140	12.43	3.5	6.71	23.7	2230	1.4	-87.5	53.2		E) recovery well cycling sample
	1142	12.43	4.0	6.71	23.7	2220	1.4	-88.1	53.4		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	1145	MW-128	12.43	6.71	23.7	2220	1.4	-88.1	53.4			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

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: MW-125

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(2-in; Stickup)

Initials: scu

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	1545	NA	7.90	0.0	28.30	23.5	Yes	Yes	Yes	Yes		Weather: mostly clear, 80s
4/16/15	1010	NA	7.91	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
4/16/15	1015	7.96	0.5	6.97	22.2	4270	1.7	120.5	7.3	clear	Low-flow groundwater sample:
	1017	7.96	1.0	6.87	21.7	4340	1.2	121.3	4.4		A) peristaltic pump w/ ded tubing
	1020	7.96	1.5	6.85	21.6	4350	1.4	121.3	4.3		B) ded bladder pump
	1022	7.96	2.0	6.84	21.6	4360	1.3	121.0	4.3		C) non-ded bladder pump; or
	1025	7.96	2.5	6.83	21.5	4360	1.3	120.8	4.2		Standard groundwater sample:
	1027	7.96	3.0	6.83	21.6	4370	1.3	120.6	4.1		D) bailer due to limited column; or
	1030	7.96	3.5	6.83	21.6	4370	1.3	120.5	4.0		E) recovery well cycling sample
	1032	7.96	4.0	6.83	21.6	4370	1.3	120.4	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
4/16/15	1035	MW-125	7.96	6.83	21.6	4370	1.3	120.4	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
						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: MW-116

Event: Spring 2015 (Biennial)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Well Inspection Information

Stretched tube 40' to road due to localized flooding

Area of Concern: REST

(2-in; stickup)

Initials: SCW

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	1555	NA	2.90*	0.0	27.62	20.0	yes	yes	yes	yes		Weather: mostly clear, 70s
4/16/15	920	3.39	(*Area Flooded)			8" deep						

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	925	3.39	0.5	7.13	21.5	3210	2.2	105.2	22.6	clear	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
	927	3.39	1.0	6.98	21.2	3220	1.8	108.0	18.2		
	930	3.39	1.5	6.92	21.4	3210	1.7	108.9	14.7		
	932	3.39	2.0	6.91	21.5	3210	1.7	109.0	10.9		
	935	3.39	2.5	6.90	21.5	3200	1.8	109.1	9.8		
	937	3.39	3.0	6.89	21.5	3200	1.7	108.9	6.5		
	940	3.39	3.5	6.89	21.5	3200	1.7	108.9	5.9		
	942	3.39	4.0	6.89	21.4	3190	1.7	108.8	5.8		

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	945	MW-116	3.39	6.89	21.4	3190	1.7	108.8	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
						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-46R
Event: Spring 2015 (Biennial)
Area of Concern: TMD

(N. side of dirt road; in line w/ last row of Pecan trees)
position marked on fence with survey flagging
Hydrologic Monitoring for ARCADIS Houston, Texas

(2-in; at-grade)

Initials: SCU

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	1600	NA	2.30	0.00	19.38	14.1	yes	yes	yes	yes		Weather: mostly clear, 70s
4/16/15	815	NA	2.53	0.00								

Well Purging Record

At-grade

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	830	2.54	0.5	6.81	20.5	3520	1.4	134.1	7.8	colorless, clear	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
	832	2.55	1.0	6.80	20.5	3600	1.3	132.6	9.1		
	835	2.55	1.5	6.80	20.6	3690	1.4	129.1	13.1		
	837	2.55	2.0	6.80	20.7	3720	1.4	127.8	15.5		
	840	2.55	2.5	6.80	20.8	3780	1.3	126.9	16.0		
	842	2.55	3.0	6.80	20.8	3790	1.3	126.0	16.3		
	845	2.55	3.5	6.80	20.9	3790	1.3	125.8	16.9		
	847	2.55	4.0	6.80	20.9	3780	1.3	124.1	16.5		

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	850	MW-46R	2.55	6.80	20.9	3780	1.3	124.1	16.5	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
										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

ATV only

Well: MW-115

Area Flooded; 6" deep

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(2-in; stickup)

Initials: SCW

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	1615	NA	2.91	0.0	27.49	19.8	Yes	Yes	Yes	Yes		Weather: Sunny 60's
4/16/15	925	NA	2.98	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	
4/16/15	930	3.02	0.5	7.89	16.2	6376	1.6	-5.5	10.3	Clear	Low-flow groundwater sample:
	933	3.02	1.0	6.69	16.1	6453	1.2	+45.6	9.4	"	A) peristaltic pump w/ ded tubing
	935	3.02	1.5	6.47	16.1	6467	0.9	64.5	8.3	"	B) ded bladder pump
	938	3.02	2.0	6.41	16.1	6477	0.8	70.2	7.6	"	C) non-ded bladder pump; or
	940	3.02	2.5	6.39	16.1	6491	0.8	72.8	6.9	"	Standard groundwater sample:
	943	3.02	3.0	6.38	16.1	6503	0.7	73.6	6.5	"	D) bailer due to limited column; or
	945	3.02	3.5	6.38	16.1	6510	0.7	74.4	6.2	"	E) recovery well cycling sample
	948	3.02	4.0	6.38	16.1	6513	0.7	74.7	6.1	"	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
4/16/15	950	MW-115	3.02	6.38	16.1	6513	0.7	74.7	6.1	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
										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

ATV only

Well: MW-114
Event: Spring 2015 (Biennial)
Area of Concern: REST

Need to stretch tube ~25' across walking bridge of wood arranged 2/14
water-filled trench

Area flooded by
South Field Reject RO

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	1635	NA	3.70	0.0	38.20	30.5	yes	yes	yes	yes		Weather: Sunny 60's
4/16/15	1020	NA	3.96	0.0								

(2-in; stickup)

Initials: SCU

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
4/16/15	1025	3.97	0.5	6.74	19.0	3974	3.0	41.3	13.6	Clear	Low-flow groundwater sample:
	1028	3.97	1.0	6.22	18.7	3901	1.4	75.7	21.8	"	A) peristaltic pump w/ ded tubing
	1030	3.97	1.5	6.15	18.6	3874	1.3	83.5	29.7	"	B) ded bladder pump
	1033	3.97	2.0	6.09	18.6	3860	1.0	92.7	38.4	"	C) non-ded bladder pump; or
	1035	3.97	2.5	6.07	18.6	3856	0.9	97.9	39.6	"	Standard groundwater sample:
	1038	3.97	3.0	6.07	18.5	3854	0.9	99.3	38.3	"	D) bailer due to limited column; or
	1040	3.97	3.5	6.07	18.5	3852	0.8	100.4	38.0	"	E) recovery well cycling sample
	1043	3.97	4.0	6.07	18.5	3851	0.8	101.2	38.2	"	F) irrigation well grab sample

(14ml added back 4/14/15)

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	1045	MW-114	3.97	6.07	18.5	3851	0.8	101.2	38.2	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
						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: **RW-#15c**
Event: Spring **2015 (Biennial)**
Area of Concern: **REST**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

Initials: **SCU**

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	1619	14.55	14.67	0.12	18.35	No Sample	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
			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
										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

* At-grade completion destroyed, as in 2H14.
Needs new pad and canister

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: MW-48
Event: Spring 2015 (Biennial)

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(2-in; at-grade)

Area of Concern: REST

Initials: SCU

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	1655	16.55	16.56	0.01	31.89	26.9	Yes	Yes	closure	Yes		Weather: clear, 70s
4/17/15	1120	16.60	16.61	0.01								

Well Purging Record

(HMI added new 2-in cap and lock 4/17/15)

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	
4/17/15	1140	16.83	0.5	7.05	23.5	1650	1.1	-292.9	52.3	v. sl. cloudy, odor	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
	1142	16.90	1.0	6.97	23.8	1627	0.7	-310.7	45.1		
	1145	16.91	1.5	6.95	23.9	1603	0.8	-317.8	37.9		
	1147	16.91	2.0	6.93	24.0	1575	0.9	-321.3	35.1		
	1150	16.91	2.5	6.93	24.0	1513	0.9	-324.5	34.8		
	1152	16.91	3.0	6.94	24.0	1497	0.9	-325.2	33.4		
	1155	16.91	3.5	6.93	24.0	1492	0.9	-325.6	32.7		
✓	1157	16.91	4.0	6.93	24.0	1489	0.9	-325.6	32.3	↓	↓

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
4/17/15	1200	MW-48	16.91	6.93	24.0	1489	0.9	-325.6	32.3	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
										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: MW-130
Event: Spring 2015 (Biennial)
Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	1203	NA	18.44	0.0	44.90	37.4	Yes	Yes	Yes	Yes		Weather: Clear, 70s
4/17/15	1235	NA	18.47	0.0								

(2-in; at-grade)

Initials: SCW

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	
4/17/15	1245	18.53	0.5	6.93	23.8	2850	1.4	-102.0	56.5	v. sl. cloudy	Low-flow groundwater sample:
	1247	18.53	1.0	6.84	23.8	2890	1.7	-98.3	67.1	sl. cloudy	A) peristaltic pump w/ ded tubing
	1250	18.53	1.5	6.82	23.8	2900	1.7	-95.7	77.4		B) ded bladder pump
	1252	18.53	2.0	6.79	23.8	2920	1.7	-90.4	88.4		C) non-ded bladder pump; or
	1255	18.53	2.5	6.78	23.8	2930	1.7	-86.9	91.2		Standard groundwater sample:
	1257	18.53	3.0	6.77	23.8	2930	1.7	-84.7	84.1		D) bailer due to limited column; or
	1300	18.53	3.5	6.77	23.8	2930	1.7	-84.1	79.7		E) recovery well cycling sample
✓	1302	18.53	4.0	7.77	23.8	2930	1.7	-84.0	77.4	✓	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
4/17/15	1305	MW-130	18.53	7.77	23.8	2930	1.7	-84.0	77.4	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: **KWB-4**

Event: Spring **2015 (Biennial)**

Area of Concern: **REST**

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: **SLU**

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	22.16	22.28	0.12	41.74	31.7	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								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
										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: **RW-19**
Event: Spring **2015 (Biennial)**
Area of Concern: **REST**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

Initials: **SW**

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	1631	22.35	22.81	0.46	NM	NA	Yes	Yes	Yes	Yes		Weather:
					Active RW							

Well Purging Record

(plan was 10' off base)

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
		RW-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		

(Driveway by Bldg A/C unit)

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: **MW-52**
Event: Spring **2015 (Biennial)**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

Area of Concern: **REST**

Initials: **SLU**

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	1559	NA	17.30	0.0	34.70	29.5	Yes	Yes	Yes	Yes		Weather: Sunny, 50's
4/17/15	1145	NA	17.30	0.0								

Well Purging Record

At-grade

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	
4/17/15	1150	17.30	0.5	6.99	22.6	2730	2.4	80.2	36.1	colorless / clear	Low-flow groundwater sample;
	1153	17.31	1.0	6.91	22.0	2760	1.6	86.6	23.2		A) peristaltic pump w/ ded tubing
	1155	17.31	1.5	6.88	21.6	2750	1.5	93.4	10.4		B) ded bladder pump
	1157	17.31	2.0	6.88	21.4	2750	1.5	99.4	7.7		C) non-ded bladder pump; or
	1200	17.31	2.5	6.88	21.3	2740	1.4	103.2	6.9		Standard groundwater sample:
	1203	17.31	3.0	6.88	21.3	2740	1.5	107.1	6.1		D) bailer due to limited column; or
	1205	17.31	3.5	6.88	21.3	2740	1.5	109.1	5.6		E) recovery well cycling sample
	1207	17.31	4.0	6.88	21.3	2730	1.6	109.6	5.2		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
4/17/15	1210	MW-52	17.31	6.88	21.3	2730	1.6	109.6	5.2	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 ✓
										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

(East 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: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; at-grade)

Initials: SCU

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	1552	NA	15.83	0.0	29.50	25.5	Yes	Yes	Yes	Yes		Weather: Sunny, 60's
4/17/15	1250	NA	15.80	0.0								

Well Purging Record

At-grade

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	
4/17/15	1255	15.91	0.5	6.85	25.3	4200	2.1	-286.7	23.6	colorless / clear; odor	Low-flow groundwater sample:
	1257	15.96	1.0	6.83	24.4	4230	1.7	-295.3	19.1		A) peristaltic pump w/ ded tubing
	1300	15.99	1.5	6.83	24.0	4220	1.5	-299.8	15.4	↓	B) ded bladder pump
	1303	16.00	2.0	6.83	23.4	4220	1.5	-308.3	8.5		C) non-ded bladder pump; or
	1305	16.00	2.5	6.83	23.3	4180	1.4	-311.8	9.3		Standard groundwater sample:
	1307	16.00	3.0	6.83	23.2	4120	1.4	-307.9	8.2		D) bailer due to limited column; or
	1310	16.00	3.5	6.84	23.2	4080	1.4	-307.2	7.7		E) recovery well cycling sample
	1313	16.00	4.0	6.85	23.2	4010	1.4	-308.6	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
4/17/15	1315	MW-109	16.00	6.85	23.2	4010	1.4	-308.6	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
								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		

(West side driveway @ blue Bldg.)
Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-110

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

(2-in; at-grade)

Initials: SCU

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	
4/14/15	1548	NA	14.06	0.0	29.75	24.7	Yes	Yes	Yes	Yes	
4/17/15	1335	NA	14.05	0.0							Weather: Sunny, 60's

Well Purging Record

At-grade

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	
4/17/15	1340	14.23	0.5	7.12	23.7	1980	1.7	-221.8	22.8	colorless / clear;	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
	1343	14.27	1.0	7.08	23.1	1992	1.2	-235.2	16.1	odor	
	1345	14.29	1.5	7.05	22.6	1977	1.0	-245.9	15.8		
	1347	14.30	2.0	7.06	22.3	1956	0.9	-251.6	15.1		
	1350	14.30	2.5	7.05	22.2	1951	0.9	-257.9	14.7		
	1353	14.30	3.0	7.05	22.2	1948	0.8	-259.1	15.3		
	1355	14.30	3.5	7.05	22.2	1947	0.8	-259.5	15.5		
	1357	14.30	4.0	7.06	22.2	1946	0.7	-259.9	14.8		

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
4/17/15	1400	MW-110	14.30	7.06	22.2	1946	0.7	-259.9	14.8	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
										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: **UG-2**

Event: Spring **2015 (Biennial)**

Area of Concern: **REST (upgradient)**

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; at-grade)

Initials: **SCU**

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	1720	NA	18.70	0.0	29.26	24.3	Yes	Yes	Yes	Yes		
4/17/15	1010	NA	18.68	0.0								Weather: clear, 60S

Well Purging Record

At-grade

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	
4/17/15	1020	18.74	0.5	7.23	22.1	2260	1.2	72.9	3.8	clear ↓	Low-flow groundwater sample:
	1022	18.74	1.0	7.15	22.3	2230	1.3	78.2	3.9		A) peristaltic pump w/ ded tubing
	1025	18.74	1.5	7.13	22.5	2220	1.2	80.5	3.9		B) ded bladder pump
	1027	18.75	2.0	7.11	22.5	2210	1.0	82.4	3.8		C) non-ded bladder pump; or
	1030	18.76	2.5	7.11	22.6	2200	1.0	83.4	3.8		Standard groundwater sample:
	1032	18.77	3.0	7.10	22.6	2200	1.1	83.9	3.7		D) bailer due to limited column; or
	1035	18.78	3.5	7.10	22.6	2200	1.1	83.7	3.7		E) recovery well cycling sample
↓	1037	18.79	4.0	7.10	22.6	2200	1.1	83.6	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
4/17/15	1040	UG-2	18.79	7.10	23.6	2200	1.1	83.6	3.7			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 ✓
						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

[HMI installed dedicated bladder pump 1H15]

[HMI replaced degraded cap and added Navajo lock]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: UG-3R

Event: Spring 2015 (Biennial)

Area of Concern: REST (Upgradient)

(4-in; at-grade)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCU/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	
4/14/15	1755	NA	25.95	0.0	38.58	35.6	Yes	Yes	Yes	Yes		Weather: Sunny, 40's
4/17/15	850	NA	26.07	0.0								

Well Purging Record

At-grade

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	
4/17/15	855	26.08	0.5	7.46	18.7	2330	5.1	48.8	7200	colorless / cloudy	Low-flow groundwater sample:
	857	26.09	1.0	7.23	19.1	2400	4.8	59.7	7200		
	900	26.09	1.5	7.12	19.1	2460	4.6	65.2	7200		A) peristaltic pump w/ ded tubing
	903	26.10	2.0	7.06	19.1	2520	4.6	68.8	7200	colorless / very cloudy	B) ded bladder pump
	905	26.10	2.5	7.01	19.1	2540	4.5	73.0	7200		C) non-ded bladder pump; or
	907	26.10	3.0	7.00	19.2	2550	4.5	75.5	7200		Standard groundwater sample:
	910	26.10	3.5	6.98	19.2	2550	4.4	78.4	7200		D) bailer due to limited column; or
	913	26.10	4.0	6.97	19.2	2550	4.4	79.1	7200		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
4/17/15	915	UG-3R	26.10	6.97	19.2	2550	4.4	79.1	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 ✓
										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: Spring 2015 (Biennial)

Area of Concern:

REST (upgradient) (4-in; at-grade)

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Initials: SCU

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	1735	NA	13.59	0.0	24.10	19.1	Yes	Yes	Yes	Yes		Weather: clear, 80s
4/17/15	850	NA	13.54	0.0								

Well Purging Record

At-grade

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	
4/17/15	900	13.55	0.5	6.99	20.9	2690	4.7	122.9	7.5	clear	Low-flow groundwater sample:
	902	13.55	1.0	7.07	21.4	2720	4.3	120.1	4.2		
	905	13.55	1.5	7.08	21.7	2770	4.2	119.3	4.2		(A) peristaltic pump w/ ded tubing
	907	13.55	2.0	7.10	21.8	2850	4.2	119.0	4.3		B) ded bladder pump
	910	13.55	2.5	7.10	22.0	2890	4.1	118.8	3.9		C) non-ded bladder pump; or
	912	13.55	3.0	7.10	22.0	2900	4.1	118.7	3.9		Standard groundwater sample:
	915	13.55	3.5	7.10	22.1	2900	4.0	118.7	3.9		D) bailer due to limited column; or
	917	13.55	4.0	7.10	22.1	2900	4.0	118.8	3.9		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	
4/17/15	920	UG-1	13.55	7.10	22.1	2900	4.0	118.8	3.9	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 BSH present, remove BSH and sample ground water			

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

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(4-in; stizkup)

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	
4/14/15	1020	NA	12.74	0.0	26.86	23.5	Yes	Yes	Yes	Yes		Weather: Clear 50°
4/15/15	830	NA	12.63	0.0	26.36	23.5						

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
4/15/15	855	MW-101	12.68	6.60	19.6	2140	0.4	-226.7	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
								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: MW-105
Event: Spring 2015 (Biennial)
Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(4-in; at-grade)

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	
4/14/15	1630	NA	8.88	0.0	17.24	14.2	Yes	Yes	Yes	Yes		Weather: Clear 56°
4/15/15	900	NA	8.84	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	
4/15/15	905	8.86	0.5	6.74	19.3	1470	1.4	-311.4	24.9	Clear / Black T, nt	Low-flow groundwater sample:
	907	8.86	1.0	6.75	19.3	1369	0.9	-315.7	25.8	ODO	(A) peristaltic pump w/ ded tubing
	910	8.86	1.5	6.76	19.3	1232	0.6	-315.7	25.0		B) ded bladder pump
	913	8.86	2.0	6.75	19.2	995	0.4	-310.1	23.8		C) non-ded bladder pump; or
	915	8.86	2.5	6.74	19.2	897	0.3	-306.2	21.6		Standard groundwater sample:
	917	8.86	3.0	6.73	19.2	890	0.3	-303.2	21.1		D) bailer due to limited column; or
	920	8.86	3.5	6.72	19.2	889	0.2	-302.8	22.6		E) recovery well cycling sample
	923	8.86	4.0	6.71	19.1	887	0.1	-301.7	23.3	Y	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	925	MW-105	8.86	6.71	19.1	887	0.1	-301.7	23.3	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
										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: **RW-2**
Event: Spring **2015** (Biennial)
Area of Concern: **REST**

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

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	
4/14/15	1035	NA	10.35	0.00	19.50	16.50	NO	YES	Issue	4/15		Weather: Clear 50°
4/15/15	1055	NA	10.15	0.00								

Well Purging Record

* SOFT BOTTOM

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
4/15/15	1100	10.15	0.5	6.75	21.1	5630	0.6	-350.6	19.8	Cloudy / Planting	Low-flow groundwater sample:
	1103	10.15	1.0	6.76	20.9	5830	0.5	-356.5	63.9	↓	(A) peristaltic pump w/ ded tubing
	1105	10.15	1.5	6.76	20.9	5880	0.6	-358.8	40.7	sl/clear	B) ded bladder pump
	1107	10.15	2.0	6.76	21.0	5920	0.6	-360.9	41.2		C) non-ded bladder pump; or
	1110	10.15	2.5	6.76	20.8	5960	0.9	-363.1	41.0		Standard groundwater sample:
	1113	10.15	3.0	6.76	20.8	5970	0.9	-363.9	40.3		D) bailer due to limited column; or
	1115	10.15	3.5	6.76	20.8	5980	0.8	-364.7	39.1		E) recovery well cycling sample
↓	1117	10.15	4.0	6.76	20.8	5980	0.8	-364.9	38.2	↓	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
4/15/15	1120	RW-2	10.15	6.76	20.8	5980	0.8	-364.9	38.2	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
							7	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-61

Event: Spring 2015 (Biennial)

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	
4/14/15	1030	NA	11.28	0.00	29.50	21.5	Yes	Yes	Yes	Yes		Weather: Clear 60°
4/15/15	1200	NA	11.07	0.00								

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
4/15/15	1205	11.95	0.5	6.59	23.2	4150	1.3	-351.7	8.9	Clear	Low-flow groundwater sample:
	1207	11.34	1.0	6.59	22.9	4000	1.3	-360.3	3.6		A) peristaltic pump w/ ded tubing
	1210	11.42	1.5	6.59	22.9	3950	1.4	-362.4	3.3		B) ded bladder pump
	1213	11.48	2.0	6.59	22.8	3900	1.3	-365.1	3.1		C) non-ded bladder pump; or
	1215	11.53	2.5	6.58	22.9	3880	1.2	-364.6	3.0		Standard groundwater sample:
	1217	11.58	3.0	6.58	22.9	3870	1.2	-364.7	3.1		D) bailer due to limited column; or
	1220	11.64	3.5	6.58	22.9	3870	1.1	-364.0	3.3		E) recovery well cycling sample
	1223	11.68	4.0	6.58	22.9	3860	1.1	-364.2	3.2		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
												Lab: ESC Lab Sciences, Mt. Juliet, TN
4/15/15	1225	MW-61	11.68	6.58	22.9	3860	1.1	-364.2	3.2	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
								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

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

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

(large-diam PVC pipe; stockup = 3.20')
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	
4/14/15	1100	NA	10.83	0.00	23.00	21.3	Yes	Yes	Issue	Yes		Weather: Clear 76°
4/15/15	1310	NA	10.57	0.00								

[illegible]

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												
4/15/16	1335	mw-62	10.94	7.04	27.3	3400	0.8	-349.4	5.3	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	
								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

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-43
Event: Spring 2015 (Biennial)
Area of Concern: REST

Hydrologic Monitoring
for ARCADIS
Houston, Texas

Well Inspection Information

(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	
4/14/15	1130	NA	8.18	0.00	21.40	16.5	yes	yes	yes	yes		Weather: PT/Cloudy 70s
4/15/15	1415	NA	8.00	0.00								

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
4/15/15	1420	8.02	0.5	6.68	23.8	4060	1.0	-319.7	2.8	clear	Low-flow groundwater sample:
	1423	8.02	1.0	6.67	22.9	4070	1.0	-332.3	2.4		A) peristaltic pump w/ ded tubing
	1425	8.02	1.5	6.67	22.8	4070	1.0	-333.6	2.0		B) ded bladder pump
	1427	8.02	2.0	6.67	22.7	4070	1.0	-332.9	1.6		C) non-ded bladder pump; or
	1430	8.02	2.5	6.66	22.6	4080	0.9	-333.0	1.5		Standard groundwater sample:
	1433	8.02	3.0	6.66	22.6	4080	0.8	-332.8	1.3		D) bailer due to limited column; or
	1435	8.02	3.5	6.65	22.6	4080	0.8	-331.9	1.0		E) recovery well cycling sample
	1437	8.02	4.0	6.65	22.6	4080	0.9	-331.1	0.9		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
4/15/15	1440	MW-43	8.02	6.65	22.6	4080	0.9	-331.1	0.9	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-23

Event: Spring 2015 (Biennial)

Area of Concern: REST

(x 6" PVC needs cap) 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	
4/14/15	1145	NA	7.28	0.00	19.90	17.9	NO	YES	Issue	YES		Weather: pt. cloudy, 70s
4/15/15	1610	NA	7.05	0.00								

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	1615	7.08	0.5	6.81	23.5	5640	2.6	-385.1	20.0	C/294	Low-flow groundwater sample:
	1617	7.10	1.0	6.83	22.7	5660	1.9	-392.8	10.1		A) peristaltic pump w/ ded tubing
	1620	7.10	1.5	6.83	22.6	5670	1.8	-394.5	5.4		B) ded bladder pump
	1623	7.10	2.0	6.83	22.6	5670	1.7	-396.2	5.0		C) non-ded bladder pump; or
	1625	7.10	2.5	6.83	22.6	5660	1.6	-396.4	5.3		Standard groundwater sample:
	1627	7.10	3.0	6.84	22.6	5660	1.5	-396.8	4.0		D) bailer due to limited column; or
	1630	7.10	3.5	6.84	22.5	5670	1.5	-397.2	3.6		E) recovery well cycling sample
✓	1633	7.10	4.0	6.83	22.5	5670	1.6	-397.4	3.5	↓	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
4/15/15	1635	MW-23	7.10	6.83	22.5	5670	1.6	-397.4	3.5	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
										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

+ DUP-TEL-01
(Same analyses)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: TEL-4

Event: Spring 2015 (Biennial)

Area of Concern: TEL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-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	
4/14/15	1150	NA	6.82	0.0	27.28	22.2	Yes	Yes	Yes	Yes		Weather: partly cloudy 50°
4/16/15	800	NA	6.68	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	
4/16/15	805	6.81	0.5	6.42	19.0	4120	1.3	-775.2	5.6	Clear	Low-flow groundwater sample:
	807	6.82	1.0	6.45	19.9	4080	1.4	-789.4	5.4		
	810	6.82	1.5	6.46	19.9	4090	1.3	-795.2	5.1		A) peristaltic pump w/ ded tubing
	813	6.82	2.0	6.46	19.9	4040	1.3	-797.3	4.9		B) ded bladder pump
	815	6.82	2.5	6.46	19.9	4030	1.2	-798.2	4.2		C) non-ded bladder pump; or
	817	6.82	3.0	6.46	19.9	4030	1.2	-300.6	5.6		Standard groundwater sample:
	820	6.82	3.5	6.46	19.9	4040	1.3	-302.0	5.1		D) bailer due to limited column; or
✓	823	6.82	4.0	6.46	19.9	4050	1.3	-303.2	5.0	✓	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	
4/16/15	825	TEL-4	6.82	6.46	19.9	4050	1.3	-303.2	5.0	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	
✓	1000	DUP-TEL-01	6.82	6.46	19.9	4050	1.3	-303.2	5.0	same	same	same	
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: TEL-3
Event: Spring 2015 (Biennial)
Area of Concern: TEL

+ EB-TEL-01
(same analyses)

Hydrologic Monitoring
for ARCADIS
Houston, Texas

(2-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	
4/14/15	1155	NA	5.00	0.00	27.19	22.2	Yes	Yes	Yes	Yes		Weather: mostly clear, 70s
4/16/15	925	NA	5.10	0.00								

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	930	5.28	0.5	6.51	19.1	3440	1.0	-307.3	6.5	Clear / odor light	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
	933	5.29	1.0	6.51	19.0	3430	1.0	-314.8	5.4	Shreen	
	935	5.29	1.5	6.51	19.9	3410	1.1	-319.3	4.5		
	937	5.29	2.0	6.51	19.9	3400	1.2	-322.4	2.8		
	940	5.29	2.5	6.50	19.8	3400	1.1	-324.7	2.2		
	943	5.29	3.0	6.49	19.9	3400	1.1	-325.3	2.1		
	945	5.29	3.5	6.49	19.9	3390	1.1	-326.0	2.1		
✓	947	5.29	4.0	6.49	19.9	3390	1.1	-326.2	2.0	✓	

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
4/16/15	950	TEL-3	5.29	6.49	19.9	3390	1.1	-326.2	2.0	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
										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
✓	10/5	EB-TEL-01	NA							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: TEL-2

Event: Spring 2015 (Biennial)

Area of Concern: TEL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Well Inspection Information

(2-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	
4/14/15	1200	NA	5.70	0.00	27.20	22.1	yes	yes	yes	yes		Weather: p7/ccloud/ 70°
4/16/15	1105	NA	5.77	0.00								

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	5.84	0.5	6.69	22.3	3510	1.6	-354.9	5.4	clear/odor	Low-flow groundwater sample:
	1113	5.84	1.0	6.68	22.0	3500	1.3	-361.0	4.8		(A) peristaltic pump w/ ded tubing
	1115	5.84	1.5	6.67	22.0	3530	1.2	-363.2	3.1		B) ded bladder pump
	1117	5.84	2.0	6.67	22.1	3530	1.2	-363.2	2.9		C) non-ded bladder pump; or
	1120	5.84	2.5	6.66	22.0	3550	1.1	-363.5	1.5		Standard groundwater sample:
	1123	5.84	3.0	6.66	22.0	3550	1.1	-363.6	2.3		D) bailer due to limited column; or
	1125	5.84	3.5	6.65	22.0	3550	1.0	-363.2	1.8		E) recovery well cycling sample
✓	1127	5.84	4.0	6.65	22.0	3550	1.0	-364.1	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
4/16/15	1130	TEL-2	5.84	6.65	22.0	3550	1.0	-364.1	1.8	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
										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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-39

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(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	
4/15/15	1215	NA	4.80	0.0	22.85	17.85	NO	YES	Issue	yes		Weather:
4/16/15	1335	NA	4.90	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	
4/16/15	1340	4.90	0.5	6.84	22.6	3330	0.9	-319.7	2.8	Clear	Low-flow groundwater sample:
	1343	4.90	1.0	6.84	21.8	3260	0.7	-336.9	2.5		
	1345	4.90	1.5	6.84	21.2	3290	0.7	-342.0	1.9		(A) peristaltic pump w/ ded tubing
	1347	4.90	2.0	6.84	20.8	3260	0.8	-342.9	1.6		B) ded bladder pump
	1350	4.90	2.5	6.85	20.8	3260	0.8	-342.9	1.5		C) non-ded bladder pump; or
	1353	4.90	3.0	6.85	20.8	3250	0.8	-343.2	1.3		Standard groundwater sample:
	1355	4.90	3.5	6.84	20.8	3250	0.9	-344.2	1.2		D) bailer due to limited column; or
	1357	4.90	4.0	6.84	20.9	3240	0.9	-344.1	1.0		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
4/16/15	1400	mw-39	4.90	6.84	20.9	3240	0.9	-344.1	1.0			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

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-10

Event: Spring 2015 (Biennial)

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	
4/14/15	1200	NA	6.88	0.0	23.77	18.77	NO	YES	Issue	YES		Weather: Partly cloudy 70°
4/16/15	1445	NA	7.02	0.0	23.77	18.77						

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
4/16/15	1450	7.02	0.5	7.50	21.3	3600	0.7	-62.0	36.0	Clear / yellow tint	Low-flow groundwater sample:
	1453	7.02	1.0	7.45	21.0	3610	0.6	-50.3	15.9	0.40	
	1455	7.02	1.5	7.41	21.9	3600	0.4	-43.1	9.6		(A) peristaltic pump w/ ded tubing
	1457	7.02	2.0	7.38	21.9	3590	0.3	-39.9	7.0		B) ded bladder pump
	1500	7.02	2.5	7.34	21.9	3590	0.3	-32.7	6.7		C) non-ded bladder pump; or
	1503	7.02	3.0	7.30	21.5	3600	0.2	-23.5	6.5		Standard groundwater sample:
	1505	7.02	3.5	7.29	21.5	3590	0.3	-22.1	5.0		D) bailer due to limited column; or
✓	1507	7.02	4.0	7.28	21.5	3590	0.3	-19.8	4.7	↓ ↓	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	1510	RW-10	7.02	7.28	21.5	3590	0.3	-19.8	4.7	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-40

Event: Spring 2015 (Biennial)

Area of Concern:

REST

* HMI installed
cap & lock
(2-in; stickup)

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	
4/16/15	1245	NA	3.18	0.0	24.75	21.75	YES	YES	YES	yes		Weather: Pt cloudy, 70s
4/16/15	1555	NA	3.24	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	
4/16/15	1600	3.40	0.5	6.69	22.8	3370	1.1	-318.6	50.6	sl/clovely black	Low-flow groundwater sample:
	1603	3.40	1.0	6.68	22.9	3360	1.0	-328.8	44.8	odor Tind	
	1605	3.40	1.5	6.68	23.0	3350	0.9	-334.3	31.4	↓	A) peristaltic pump w/ ded tubing
	1607	3.40	2.0	6.68	22.9	3340	0.9	-338.5	27.2	clear odor	B) ded bladder pump
	1610	3.40	2.5	6.68	22.7	3340	0.9	-339.9	26.2		C) non-ded bladder pump; or
	1613	3.40	3.0	6.68	22.5	3330	1.0	-340.8	20.8		Standard groundwater sample:
	1615	3.40	3.5	6.68	22.5	3340	1.0	-340.6	19.7		D) bailer due to limited column; or
	1617	3.40	4.0	6.68	22.8	3330	1.0	-341.4	18.3		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
4/16/15	1620	mw-40	3.40	6.68	22.8	3330	1.0	-341.4	18.3			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
						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	SM4300

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

Hm installed 2-in well cap

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-41

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-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	
4/14/15	1300	NA	3.43	0.0	21.56	18.56	yes	yes	Issue	yes		Weather: pt cloudy, 70s
4/16/15	1710	NA	3.31	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	
4/16/15	1715	3.38	0.5	6.72	20.4	3770	2.5	-295.7	6.7	Clear	Low-flow groundwater sample:
	1717	3.38	1.0	6.70	20.3	3760	1.5	-304.9	4.8		
	1720	3.38	1.5	6.70	20.2	3770	1.4	-307.8	4.4		(A) peristaltic pump w/ ded tubing
	1723	3.38	2.0	6.70	20.2	3770	1.4	-308.3	3.9		B) ded bladder pump
	1725	3.38	2.5	6.70	20.1	3770	1.3	-310.7	2.8		C) non-ded bladder pump; or
	1727	3.38	3.0	6.70	20.1	3770	1.3	-311.2	2.4		Standard groundwater sample:
	1730	3.38	3.5	6.69	20.1	3780	1.2	-313.4	2.0		D) bailer due to limited column; or
	1733	3.38	4.0	6.69	20.2	3790	1.2	-313.7	1.8		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	1735	MW-41	3.38	6.69	20.2	3790	1.2	-313.7	1.8			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
										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-9

Event: Spring 2015 (Biennial)

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	
4/14/15	1310	NA	6.39	0.0	21.97	16.97	yes	yes	yes	yes		Weather: partly cloudy 70°
4/16/15	1815	NA	6.34	0.0	21.97	16.97						

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	1820	6.35	0.5	6.82	20.2	3950	2.1	-327.2	1.7	clear / color		Low-flow groundwater sample:
	1823	6.35	1.0	6.82	20.0	3990	1.3	-335.3	1.4			(A) peristaltic pump w/ ded tubing
	1825	6.35	1.5	6.82	20.0	3990	1.3	-338.5	1.2			B) ded bladder pump
	1827	6.35	2.0	6.82	19.9	3940	1.2	-342.2	1.1			C) non-ded bladder pump; or
	1830	6.35	2.5	6.82	19.9	3940	1.2	-344.7	1.0			Standard groundwater sample:
	1833	6.35	3.0	6.82	19.9	3940	1.1	-345.9	0.8			D) bailer due to limited column; or
	1835	6.35	3.5	6.82	19.9	3940	1.1	-346.2	0.7			E) recovery well cycling sample
✓	1837	6.35	4.0	6.81	19.8	3930	1.0	-347.4	0.5	↓	↓	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
4/16/15	1840	RW-9	6.35	6.81	19.8	3930	1.0	-347.4	0.5			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
						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-42

Event: Spring 2015 (Biennial)

Area of Concern: REST

(* HMI installed LOCK 4/14/15)
(2-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	
4/14/15	1315	NA	6.60	0.0	24.34	21.3	yes	yes	HMI Replaced	yes		Weather: 50's, clear
4/17/15	845	NA	6.61	0.0	24.34	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	
4-17-15	850	6.83	0.5	6.71	18.2	4500	2.2	-232.1	17.8	Clear, brown particles	Low-flow groundwater sample:
	852	6.84	1.0	6.70	18.3	4590	2.1	-245.2	12.7		
	855	6.84	1.5	6.69	18.4	4650	2.0	-259.2	11.1		A) peristaltic pump w/ ded tubing
	857	6.84	2.0	6.67	18.4	4670	2.0	-270.4	8.2		B) ded bladder pump
	900	6.84	2.5	6.66	18.4	4690	2.0	-280.5	8.7		C) non-ded bladder pump; or
	902	6.84	3.0	6.66	18.5	4690	1.9	-289.4	7.6		Standard groundwater sample:
	905	6.84	3.5	6.67	18.4	4700	1.9	-295.2	7.1		D) bailer due to limited column; or
	907	6.84	4.0	6.67	18.5	4700	1.9	-301.7	6.6		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
4-17-15	910	MW-42	6.84	6.67	18.5	4700	1.9	-301.7	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
										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-29

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(8-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	
4/14/15	1325	N/A	7.24	0.0	22.00	16.7	Yes	Yes	Yes	Yes		Weather: clear, 80s
4/15/15	1810	N/A	7.28	0.0	22.00	16.7						

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	1815	7.30	0.5	6.68	21.8	3950	2.1	-300.8	1.0	Clear	Low-flow groundwater sample:
	1817	7.32	1.0	6.66	21.5	3960	1.8	-307.4	0.9		A) peristaltic pump w/ ded tubing
	1820	7.33	1.5	6.65	21.5	3950	1.8	-310.9	0.8		B) ded bladder pump
	1823	7.33	2.0	6.65	21.5	3950	1.9	-311.7	0.7		C) non-ded bladder pump; or
	1825	7.33	2.5	6.64	21.4	3940	2.0	-317.2	0.5		Standard groundwater sample:
	1827	7.33	3.0	6.64	21.4	3940	1.9	-317.9	0.4		D) bailer due to limited column; or
	1830	7.33	3.5	6.64	21.3	3940	1.8	-318.3	0.4		E) recovery well cycling sample
↓	1833	7.33	4.0	6.64	21.3	3940	1.8	-318.9	0.2	↓	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
4/15/15	1835	mw-29	7.33	6.64	21.3	3940	1.8	-318.9	0.2	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
						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 #16B**

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	1335	NA	9.55	0.0	17.70	14.7	NO	yes	* NO	yes		Weather: Clear, 60's
4/17/15	950	NA	9.49	0.0	17.70	14.7						

Well Purging Record

* Open 6 in RW with no 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	
4.17.15	955	9.52	0.5	6.80	18.2	6030	2.0	-7.5	8.8	clear	Low-flow groundwater sample:
	957	9.52	1.0	6.75	18.0	6100	1.9	2.0	8.6		
	1000	9.52	1.5	6.73	17.7	6120	1.8	7.6	7.3		(A) peristaltic pump w/ ded tubing
	1002	9.52	2.0	6.72	17.6	6130	1.8	10.7	7.5		B) ded bladder pump
	1005	9.52	2.5	6.72	17.7	6130	1.8	11.5	7.1		C) non-ded bladder pump; or
	1007	9.52	3.0	6.72	17.7	6130	1.7	13.1	6.7		Standard groundwater sample:
	1010	9.52	3.5	6.71	17.8	6130	1.7	14.0	6.2		D) bailer due to limited column; or
	1012	9.52	4.0	6.71	17.8	6130	1.7	14.9	5.8		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
4.17.15	1015	RW #16B	9.52	6.71	17.8	6130	1.7	14.9	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
						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-30**

Event: Spring **2015 (Biennial)**

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	
4/14/15	1345	N/A	6.88	0.0	23.50	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-30										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-56

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	1355	NA	8.64	0.0	26.50	21.4	yes	yes	HA1 Replaced	yes		Weather: Clear, 60's
4.17.15	1055	NA	8.87	0.0	26.2	21.4						

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	
4.17.15	1100	8.92	0.5	6.77	20.6	4690	2.7	-34.2	3.5	clear	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
	1102	8.92	1.0	6.73	20.2	4590	2.5	-9.6	4.2		
	1105	8.92	1.5	6.72	20.0	4550	2.4	12.5	3.4		
	1107	8.92	2.0	6.72	20.0	4520	2.4	29.5	3.0		
	1110	8.92	2.5	6.72	19.9	4500	2.3	42.1	2.8		
	1112	8.92	3.0	6.71	19.9	4490	2.2	46.4	2.5		
	1115	8.92	3.5	6.71	19.8	4480	2.1	48.0	2.2		
	1117	8.92	4.0	6.71	19.8	4480	2.1	49.3	2.6		

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
4.17.15	1120	MW-56	8.92	6.71	19.8	4480	2.1	49.3	2.6	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: MW-49

Event: Spring 2015 (Biennial)

Area of Concern: TEL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-in; at-grade)

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	
4/14/15	1405	NA	8.54	0.0	33.15	27.8	Yes	Yes	NO (closure)	Yes		
4/17/15	925	NA	8.50	0.0	33.15	27.8						Weather: Clear 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	
4/17/15	920	8.68	0.5	6.59	21.0	2660	1.7	-307.0	50.1	Slightly cloudy	Low-flow groundwater sample:
	933	8.68	1.0	6.59	21.1	3010	1.4	-310.3	31.4	11	A) peristaltic pump w/ ded tubing
	935	8.68	1.5	6.59	21.2	3130	1.4	-313.4	22.6	Clear	B) ded bladder pump
	937	8.68	2.0	6.58	21.3	3240	1.4	-321.8	22.1		C) non-ded bladder pump; or
	940	8.68	2.5	6.58	21.4	3330	1.3	-325.1	16.5		Standard groundwater sample:
	943	8.68	3.0	6.58	21.4	3350	1.3	-326.2	16.2		D) bailer due to limited column; or
	945	8.68	3.5	6.58	21.4	3360	1.2	-326.7	18.2		E) recovery well cycling sample
	947	8.68	4.0	6.58	21.4	3370	1.2	-326.0	19.1		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
4/17/15	950	MW-49	8.68	6.58	21.4	3370	1.2	-326.0	19.1	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 ✓
										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

(Found by Surveyor, per Arcadis 4-9-15)
Monitoring Well Purging and Sampling Record (Buried in Nov 2014)
 (See historical form)

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

Well: **MW-106**
 Event: Spring **2015 (Biennial)**
 Area of Concern: **REST**

Hydrologic Monitoring
 for ARCADIS
 Houston, Texas

(4-in; at-grade)

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	
4/17/15	800	N/A	6.35	0.0	22.80	17.5	yes	yes	yes	yes		Weather: 50s, clear

Well Purging Record

Historical TD = 22.53 ft-TOC
 Reported screen (likely incorrect) = 0-11 ft-bgs ??

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	
4/17/15	805	6.44	0.5	6.95	19.8	2340	1.2	-3.9	105.2	cloudy with particles	Low-flow groundwater sample:
	807	6.52	1.0	7.03	19.9	2260	0.9	-2.4	94.9	White	(A) peristaltic pump w/ ded tubing
	810	6.57	1.5	7.05	20.1	2240	0.7	-11.7	86.2		B) ded bladder pump
	813	6.58	2.0	7.10	20.1	2220	0.5	-23.9	84.8		C) non-ded bladder pump; or
	815	6.62	2.5	7.13	20.3	2210	0.5	-21.7	79.9		Standard groundwater sample:
	817	6.66	3.0	7.13	20.2	2200	0.4	-33.8	70.0		D) bailer due to limited column; or
	820	6.70	3.5	7.15	20.2	2190	0.4	-34.3	64.8		E) recovery well cycling sample
	823	6.73	4.0	7.17	20.3	2190	0.3	-32.6	62.1		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
4/17/15	825	MW-106	6.73	7.17	20.3	2190	0.3	-32.6	62.1			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-45

Event: Spring 2015 (Biennial)

Area of Concern: NCL

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(2-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	
4/14/15	1425	NA	2.53	0.0	15.05	12.3	yes	yes	yes	yes		Weather: PT/Cloudy 60°
4/17/15	1050	NA	2.98									

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	
4/17/15	1055	3.20	0.5	6.83	19.3	5530	0.6	-95.9	6.4	clear	Low-flow groundwater sample:
	1057	3.23	1.0	6.80	19.1	5530	0.6	-98.8	2.4		A) peristaltic pump w/ ded tubing
	1100	3.23	1.5	6.79	18.8	5530	0.6	-100.0	2.1		B) ded bladder pump
	1103	3.23	2.0	6.77	18.8	5530	0.5	-103.6	2.0		C) non-ded bladder pump; or
	1105	3.23	2.5	6.76	19.0	5530	0.5	-106.6	1.8		Standard groundwater sample:
	1107	3.23	3.0	6.76	19.0	5530	0.5	-109.5	1.3		D) bailer due to limited column; or
	1110	3.23	3.5	6.76	19.0	5520	0.6	-110.2	1.2		E) recovery well cycling sample
	1113	3.23	4.0	6.76	19.0	5520	0.6	-112.8	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	
4/17/15	1115	MW-45	3.23	6.76	19.0	5520	0.6	-112.8	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	
										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 ground			

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: Spring 2015 (Biennial)

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	
4.14.15	955	NA	15.15	0.0	28.28	24.1	YES **	YES	*YES	YES		Weather: Clear, 50's

Well Purging Record

** HMI Replaced Cap

* HMI lock replaced

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	825	15.16	0.5	6.73	18.3	3550	1.9	-229.1	82	Sl. Cloudy	Low-flow groundwater sample:
	827	15.17	1.0	6.83	18.8	3600	1.7	-251.8	61		A) peristaltic pump w/ ded tubing
	830	15.17	1.5	6.88	18.9	3650	1.5	-262.1	52		B) ded bladder pump
	832	15.17	2.0	6.90	19.0	3660	1.3	-269.3	49.1		C) non-ded bladder pump; or
	835	15.17	2.5	6.92	19.1	3670	1.2	-273.1	45.3		Standard groundwater sample:
	837	15.17	3.0	6.94	19.2	3670	1.1	-279.4	44.0		D) bailer due to limited column; or
	840	15.17	3.5	6.95	19.2	3670	1.0	-282.1	43.2		E) recovery well cycling sample
	842	15.17	4.0	6.96	19.2	3670	1.0	-283.0	42.7		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
4.15.15	845	MW-50	15.17	6.96	19.2	3670	1.0	-283.0	42.7	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-97

Event: Spring 2015 (Biennial)

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	
4.14.15	1030	8.36	8.63	0.27	21.24	NA	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-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
										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-92

Event: Spring 2015 (Biennial)

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	
4.14.15	1055	10.21	10.26	0.05	22.62	NA	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								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		Not	Sampled	due to	LNAPL	column		
			1.5		20.03						
			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-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
										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

Active recovery well
turned off.

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well: RW-1

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Well Inspection Information

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	1130	NA	8.92	0.0	35.45	30.4	Yes	Yes	Yes	Yes		
4/17/15	1205		8.97									Weather: Sunny 60's

Well Purging Record

* 1" guide pipe for tube only

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
4/17/15	1210	nm	0.5	6.69	19.5	3387	1.7	-216.6	13.9	Clear (HCO ₃)	Low-flow groundwater sample:
	1213		1.0	6.61	19.3	3421	1.2	-221.9	13.7	"	(A) peristaltic pump w/ ded tubing
	1215		1.5	6.54	19.2	3443	0.9	-227.3	13.6	"	B) ded bladder pump
	1218		2.0	6.51	19.1	3461	0.8	-230.2	13.6	"	C) non-ded bladder pump; or
	1220		2.5	6.48	19.0	3470	0.7	-231.8	13.4	"	Standard groundwater sample:
	1223		3.0	6.47	18.9	3473	0.7	-232.6	13.7	"	D) bailer due to limited column; or
	1225		3.5	6.47	18.9	3476	0.6	-235.1	13.6	"	E) recovery well cycling sample
	1228		4.0	6.46	18.9	3478	0.6	-233.4	13.6	"	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
4/17/15	1230	RW-1	nm	6.46	18.9	3478	0.5	-233.4	13.6			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
						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-91

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

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	1155	NA	9.17	0.0	25.31	17.9	*yes	yes	yes	yes		Weather: Clear, 60's
4.15.15	915	NA	9.02	0.0	25.31	17.9						

Well Purging Record

*HMI Replaced

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	920	9.15	0.5	6.74	20.0	2630	1.5	-358.8	24.1	Clear, black tint & strong odor	Low-flow groundwater sample:
	922	9.18	1.0	6.74	19.9	2600	1.3	-366.1	11.9		A) peristaltic pump w/ ded tubing
	925	9.20	1.5	6.74	19.9	2580	1.2	-369.2	10.2		B) ded bladder pump
	927	9.21	2.0	6.75	19.9	2550	1.2	-372.5	9.7		C) non-ded bladder pump; or
	930	9.22	2.5	6.75	19.8	2520	1.1	-373.1	9.2		Standard groundwater sample:
	932	9.22	3.0	6.75	19.9	2510	1.1	-375.2	8.6		D) bailer due to limited column; or
	935	9.23	3.5	6.75	19.9	2500	1.0	-376.4	8.2		E) recovery well cycling sample
↓	937	9.23	4.0	6.75	19.9	2490	1.0	-376.9	7.8	↓	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
4.15.15	940	MW-91	9.23	6.75	19.9	2490	1.0	-376.9	7.8	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
						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-90

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

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	1215	NA	10.43	0.0	22.80	21.5	yes	yes	yes, HMI reflected	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	
4.15.15	1020	10.47	0.5	7.05	19.8	4330	1.9	-319.9	11.6	Clear, black tint,	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
	1022	10.49	1.0	7.01	19.6	4360	1.8	-329.1	10.5	Small black particles &	
	1025	10.50	1.5	7.00	19.5	4360	1.8	-335.4	9.2	Odor	
	1027	10.51	2.0	7.00	19.5	4370	1.7	-340.0	8.7		
	1030	10.51	2.5	6.99	19.4	4370	1.7	-344.3	8.1		
	1032	10.51	3.0	6.99	19.4	4380	1.7	-346.2	7.7		
	1035	10.51	3.5	6.98	19.5	4370	1.6	-349.5	7.9		
	1037	10.51	4.0	6.98	19.5	4360	1.6	-351.2	7.4		

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
4-15-15	1040	MW-90	10.51	6.98	19.5	4360	1.6	-351.2	7.4			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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-96

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

(4-in; stickup)

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	1245	NA	10.29	0.0	25.55	21.2	yes, HML Replaced	Closure	Needs lock	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	
4.15.15	1115	10.30	0.5	6.97	21.0	2860	2.1	-333.5	32.1	Clear, black tint,	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
	1117	10.31	1.0	6.95	20.7	2770	2.0	-344.9	30.2	white particles &	
	1120	10.31	1.5	6.94	20.5	2720	1.9	-352.1	22.3	odor	
	1122	10.31	2.0	6.94	20.4	2690	1.9	-354.2	21.1		
	1125	10.31	2.5	6.94	20.3	2670	1.8	-359.0	20.7		
	1127	10.31	3.0	6.94	20.3	2660	1.8	-362.6	19.2		
	1130	10.31	3.5	6.94	20.3	2650	1.7	-363.5	18.6		
↓	1132	10.31	4.0	6.94	20.2	2650	1.7	-364.2	18.1	↓	

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	1135	MW-96	10.31	6.94	20.2	2650	1.7	-364.2	18.1			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

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

Monitoring Well Purging and Sampling Record

Active recovery well
(turned off)

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RW-8

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	1315	NA	9.42	0.0	37.22	35.2	yes	yes	yes	yes		Weather: Sunny 60's
4/17/15	1255	NA	9.31	0.0								

Well Purging Record

* 1" guide pipe for tubing only.

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
4/17/15	1300	nm	0.5	7.09	20.8	2698	3.5	-224.4	3.8	Clear (H.C. odor)	Low-flow groundwater sample:
	1303		1.0	6.91	20.4	2722	1.9	-229.3	2.7	" "	(A) peristaltic pump w/ ded tubing
	1305		1.5	6.82	20.2	2759	1.1	-234.8	2.1	" "	B) ded bladder pump
	1308		2.0	6.78	20.1	2783	0.7	-238.6	1.9	" "	C) non-ded bladder pump; or
	1310		2.5	6.75	20.0	2792	0.6	-239.7	1.8	" "	Standard groundwater sample:
	1313		3.0	6.73	20.0	2796	0.5	-240.2	1.8	" "	D) bailer due to limited column; or
	1315		3.5	6.73	19.9	2801	0.5	-240.7	1.7	" "	E) recovery well cycling sample
	1318		4.0	6.72	19.9	2804	0.4	-241.3	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
4/17/15	1320	RW-8	nm	6.72	19.9	2804	0.4	-241.3	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
										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-67

Event: Spring 2015 (Biennial)

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	
4.14.15	1330	NA	7.72	0.0	27.30	19.9	* Yes	Yes	Yes	Yes		Weather: Clear, 80's
4.15.15	1205	NA	7.51	0.0	27.30	19.9						

Well Purging Record

*HMI Replaced

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	1210	7.62	0.5	7.25	22.1	2380	2.9	-323.1	8.3	Clear, black tint, black particles	Low-flow groundwater sample:
	1212	7.70	1.0	7.10	21.3	2350	2.7	-337.3	8.0		
	1215	7.76	1.5	7.07	21.0	2340	2.6	-342.5	7.2	↓	A) peristaltic pump w/ ded tubing
	1217	7.79	2.0	7.06	20.9	2330	2.5	-343.9	5.8		B) ded bladder pump
	1220	7.81	2.5	7.06	20.8	2330	2.4	-344.5	5.1		C) non-ded bladder pump; or
	1222	7.82	3.0	7.06	20.8	2340	2.3	-345.2	4.9		Standard groundwater sample;
	1225	7.82	3.5	7.05	20.8	2350	2.2	-349.9	5.3		D) bailer due to limited column; or
↓	1227	7.83	4.0	7.05	20.8	2360	2.2	-346.4	5.0		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	
4.15.15	1230	MW-67	7.83	7.05	20.8	2360	2.2	-346.4	5.0			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: MW-95

Event: Spring 2015 (Biennial)

Area of Concern: REST

Hydrologic Monitoring

for ARCADIS

Houston, Texas

Well Inspection Information

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	1350	NA	10.76	0.0	25.40	20.4	* Yes	Yes	needs lock	Yes		Weather: Clear, 80's
4.15.15	1305	NA	10.48	0.0	25.40	20.4						

(4-in; string)

Initials: CSH

Well Purging Record

* HMI Replaced

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	1310	10.55	0.5	7.17	22.0	2530	2.2	-278.3	13.7	Clear, sl. odor	Low-flow groundwater sample:
	1312	10.56	1.0	7.09	21.6	2550	2.1	-293.1	11.9		
	1315	10.56	1.5	7.04	21.2	2540	2.1	-302.4	10.5		A) peristaltic pump w/ ded tubing
	1317	10.56	2.0	7.02	21.0	2530	2.1	-308.4	9.9		B) ded bladder pump
	1320	10.56	2.5	7.01	20.9	2540	2.0	-310.9	9.7		C) non-ded bladder pump; or
	1322	10.56	3.0	7.00	21.0	2540	2.0	-313.0	9.4		Standard groundwater sample:
	1325	10.56	3.5	6.99	21.0	2550	1.9	-315.1	8.7		D) bailer due to limited column; or
	1327	10.56	4.0	6.99	21.0	2550	1.9	-316.8	8.2		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	
4.15.15	1330	MW-95	10.56	6.99	21.0	2550	1.9	-316.8	8.2			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

Active Recovery wells
(turned off)

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RW-7

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	1410	NA	9.37	0.0	37.01	32.0	Yes	Yes	Yes	Yes		Weather Sunny 60's
4/17/15	945	NA	9.47	0.0								

Well Purging Record

* 1" grade pipe for tubing only

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
4/17/15	950	nm	0.5	6.88	22.3	2726	1.4	-260.3	12.2	Clear (No odor)	Low-flow groundwater sample:
	953		1.0	6.81	21.4	2784	1.0	-262.8	12.1	" "	A) peristaltic pump w/ ded tubing
	955		1.5	6.76	21.2	2832	0.7	-264.3	12.0	" "	B) ded bladder pump
	958		2.0	6.72	21.0	2863	0.6	-264.9	11.8	" "	C) non-ded bladder pump; or
	1000		2.5	6.71	20.9	2884	0.5	-265.1	11.3	" "	Standard groundwater sample:
	1003		3.0	6.70	20.9	2893	0.4	-265.3	10.8	" "	D) bailer due to limited column; or
	1005		3.5	6.70	20.9	2899	0.4	-265.4	10.6	" "	E) recovery well cycling sample
	1008		4.0	6.70	20.9	2911	0.4	-265.4	10.6	" "	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
4/17/15	1010	RW-7	nm	6.70	20.9	2911	0.4	-265.4	10.6	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-34A

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	1425	NA	8.72	0.0	19.31	16.9	* HMI Replaced	yes	Issue	yes		Weather: Clear, 80's

Well Purging Record

* Cannot fit Cap and properly secure well casing. PVC casing needs to be lowered.

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	1415	8.85	0.5	6.69	23.1	2220	2.3	-336.9	12.6	Clear, odor 3	Low-flow groundwater sample:
	1417	8.87	1.0	6.68	22.4	2190	2.2	-345.4	8.8	light yellow tint	A) peristaltic pump w/ ded tubing
	1420	8.87	1.5	6.68	22.0	2180	2.2	-356.1	7.6		B) ded bladder pump
	1422	8.87	2.0	6.68	22.1	2190	2.1	-359.0	7.7		C) non-ded bladder pump; or
	1425	8.87	2.5	6.68	22.1	2200	2.0	-360.7	6.8		Standard groundwater sample:
	1427	8.87	3.0	6.67	22.0	2190	2.0	-361.4	6.2		D) bailer due to limited column; or
	1430	8.87	3.5	6.67	22.1	2180	2.0	-361.9	5.5		E) recovery well cycling sample
	1432	8.87	4.0	6.67	22.1	2180	1.9	-362.3	5.9		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
4.15.15	1435	NCL-34A	8.87	6.67	22.1	2180	1.9	-362.3	5.9	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