

GW-028

2016

AGWMR

Part 4 of 8

2017

[illegible]

[illegible]

Company Name/Address: TRC Solutions - Austin, TX 505 E. Huntland Dr, Ste 250 Austin, TX 78752		Billing Information: Accounts Payable 21 Griffin Road North Windsor, CT 06095		Analysis / Container / Preservative										Chain of Custody Page 1 of 1							
Report to: jspeer@trcsolutions.com		Email To: jspeer@trcsolutions.com												 YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859							
Project Description: TEL Spring 2016 -Team GCH		City/State Collected: Artesia, NM																			
Phone: 512-684-3170 Fax:		Client Project #		Lab Project # TRCATX-TEL SPRING																	
Collected by (print): Scott Ude + HMI Team		Site/Facility ID # TEL - Navajo- Artesia		P.O. #																	
Collected by (signature): <i>Scott Ude</i>		Rush? (Lab MUST Be Notified) ☐ Same Day200% ☐ Next Day100% ☐ Two Day50% ☐ Three Day25%		Date Results Needed		Email? ☐ No ☐ Yes FAX? ☐ No ☐ Yes		No. of Cntrs													
Immediately Packed on Ice ☐ N ☒ Y ☒																					
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time																
TEL-3		GW		4/28/16	1030																
EB-TEL-01				4/28/16	1045																
TEL-2				4/28/16	940																
Trip Blank-TEL-01				4/28/16	-																
TEL-1				4/28/16	855																
TEL-4				4/28/16	755																
DUP-TEL-01				4/28/16	1000																
MW-49	↓	↓		4/28/16	1010																

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____

Remarks: **Log all metals by 6020. Dissolved metals are field filtered.**

pH _____ Temp _____

Flow _____ Other _____

Relinquished by: (Signature) <i>Scott Ude</i>	Date: 4/28/16	Time: 1415	Received by: (Signature) <i>[Signature]</i>	Samples returned via: ☐ UPS ☒ FedEx ☐ Courier ☐	Condition: (lab use only)
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: _____ °C Bottles Received: _____	
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: _____ Time: _____	COC Seal Intact: ☐ Y ☐ N ☐ NA LH checked: ☐ NCF

Company Name/Address: TRC Solutions - Austin, TX 505 E. Huntland Dr, Ste 250 Austin, TX 78752			Billing Information: Accounts Payable 21 Griffin Road North Windsor, CT 06095			Chain of Custody Page <u>1</u> of <u>1</u> ESC L · A · B S · C · I · E · N · C · E · S YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859																																															
Report to: jspeer@trcsolutions.com			Email To: jspeer@trcsolutions.com			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">Analysis / Container / Preservative</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">DRO - 40mlAmb-HCl-BT</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">GRO - 40mlAmb-HCl</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">V8260 - 40mlAmb-HCl</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">Tot./Diss. As,Ba,Cr,Fe,Pb,Mn,Se - 500mlHDPE-HNO3</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">Cyanide (CN) - 250mlHDPEAmb-NaOH</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">Cations-Total Ca, K, Na - 500mlHDPE-HNO3</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">Anions: Chloride, Fluoride, Sulfate-1125mlHDPE-NoPres</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">Nitrate/Nitrite (NO2NO3) - 250mlHDPE-H2SO4</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">TDS - 250mlHDPE-NoPres</td> <td colspan="2" rowspan="3" style="background-color: #cccccc; text-align: center;">Tot/Diss. As,Ba,Cd,Co,Cr,Fe,Hg,Mn,Ni,Pb,Se,U,Y</td> </tr> <tr></tr> <tr></tr> </table>										Analysis / Container / Preservative		DRO - 40mlAmb-HCl-BT		GRO - 40mlAmb-HCl		V8260 - 40mlAmb-HCl		Tot./Diss. As,Ba,Cr,Fe,Pb,Mn,Se - 500mlHDPE-HNO3		Cyanide (CN) - 250mlHDPEAmb-NaOH		Cations-Total Ca, K, Na - 500mlHDPE-HNO3		Anions: Chloride, Fluoride, Sulfate-1125mlHDPE-NoPres		Nitrate/Nitrite (NO2NO3) - 250mlHDPE-H2SO4		TDS - 250mlHDPE-NoPres		Tot/Diss. As,Ba,Cd,Co,Cr,Fe,Hg,Mn,Ni,Pb,Se,U,Y																	
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Project Description: TMD Spring 2016 - Team FCTH			City/State Collected: Artesia, NM																																																		
Phone: 512-684-3170 Fax:		Client Project #		Lab Project # TRCATX-TMD SPRING																																																	
Collected by (print): Scott Ude + HMI Team		Site/Facility ID # TMD - Navajo- Artesia		P.O. #																																																	
Collected by (signature): Scott Ude		Rush? (Lab MUST Be Notified) Same Day200% Next Day100% Two Day50% Three Day25%		Date Results Needed																																																	
Immediately Packed on ice N <u> </u> Y <u> </u> ✓		Email? <u> </u> No <u> </u> Yes FAX? <u> </u> No <u> </u> Yes		No. of Cntrs																																																	
Sample ID		Comp/Grab		Matrix *																																																	
Date		Time		No. of Cntrs																																																	
MW-20		GW		4/28/16 1135																																																	
NP-1		4/28/16 1045		4/28/16 950																																																	
MW-68		4/28/16 900		4/28/16 900																																																	
MW-71		4/28/16 900		4/28/16 900																																																	
Trip Blank-TMD-01		4/28/16 900		4/28/16 900																																																	
Trip Blank-TMD-01		4/28/16 900		4/28/16 900																																																	
Trip Blank-TMD-01		4/28/16 900		4/28/16 900																																																	
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Company Name/Address: TRC Solutions - Austin, TX 505 E. Huntland Dr, Ste 250 Austin, TX 78752		Billing Information: Accounts Payable 21 Griffin Road North Windsor, CT 06095		Analysis / Container / Preservative										Chain of Custody Page <u>1</u> of <u>5</u>			
Report to: jspeer@trcsolutions.com		Email To: jspeer@trcsolutions.com		DRO - 40ml/Amb-HCl-BT GRO - 40ml/Amb-HCl V8260 - 40ml/Amb-HCl Tot./Diss. As, Ba, Cr, Fe, Pb, Mn, Se - 500mlHDPE-HNO3 Cyanide (CN) - 250mlHDPE-Amb-NaOH Cations-Total Ca, K, Na - 500mlHDPE-HNO3 Anions- Chloride, Fluoride, Sulfate - 125mlHDPE-NoPres Nitrate/Nitrite (NO2NO3) - 250mlHDPE-H2SO4 TDS - 250mlHDPE-NoPres Tot/Diss. As, B, Ba, Cd, Co, Cr, Fe, Hg, Mn, Ni, Pb, Se, U, V  YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859										12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859			
Project Description: REST Spring 2016 -Team 62 JH		City/State Collected: Artesia, NM															
Phone: 512-684-3170 Fax:		Client Project # Lab Project # TRCATX-REST SPRING															
Collected by (print): Scott Ude + HMI Team		Site/Facility ID # REST - Navajo- Artesia												P.O. #			
Collected by (signature): Scott Ude		Rush? (Lab MUST Be Notified) ☐ Same Day200% ☐ Next Day100% ☐ Two Day50% ☐ Three Day25%		Date Results Needed Email? ☐ No ☐ Yes FAX? ☐ No ☐ Yes													
Immediately Packed on Ice N ☐ Y ☒				No. of Cntrs													
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time												
MW-65		GW		4/28/16	1515												
RW-5R				4/28/16	1600												
MW-102				4/28/16	1645												
RW-6				4/28/16	1740												
RW-4				4/28/16	1830												
RW-2				4/28/16	1740												
MW-62				4/28/16	1650												
MW-43				4/28/16	1555												
RW-10				4/28/16	1510												
MW-39				4/28/16	1425												

* Matrix: SS - Soil GW - Groundwater WW - Wastewater DW - Drinking Water OT - Other _____

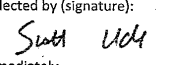
Remarks: **Log all metals by 6020. Dissolved metals are field filtered.**

pH _____ Temp _____

Flow _____ Other _____

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples returned via: ☐ UPS ☒ FedEx ☐ Courier ☐ _____	Condition: _____ (lab use only)
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: _____ °C Bottles Received: _____	COC Seal Intact: Y ☐ N ☐ NA ☐
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: _____ Time: _____	pH Checked: _____ NCP: _____

Company Name/Address: TRC Solutions - Austin, TX 505 E. Huntland Dr, Ste 250 Austin, TX 78752				Billing Information: Accounts Payable 21 Griffin Road North Windsor, CT 06095				Analysis / Container / Preservative										Chain of Custody Page 2 of 5	
Report to: jspeer@trcsolutions.com				Email To: jspeer@trcsolutions.com				 YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859										Rem./Contaminant Sample # (lab only)	
Project Description: REST Spring 2016 -Team-G CJH				City/State Collected: Artesia, NM															
Phone: 512-684-3170 Fax:		Client Project #		Lab Project # TRCATX-REST SPRING															
Collected by (print): Scott Ude + HMI Team		Site/Facility ID # REST - Navajo- Artesia		P.O. #															
Collected by (signature): Scott Ude		Rush? (Lab MUST Be Notified) ☐ Same Day200% ☐ Next Day100% ☐ Two Day50% ☐ Three Day25%		Date Results Needed Email? ☐ No ☐ Yes FAX? ☐ No ☐ Yes				No. of Cntrs		DRO - 40ml/Amb-HCl-BT GRO - 40ml/Amb-HCl V8260 - 40ml/Amb-HCl Tot./Diss. As,Ba,Cr,Fe,Pb,Mn,Se - 500mlHDPE-HNO3 Cyanide (CN) - 250mlHDPEAmb-NaOH Cations-Total Ca, K, Na - 500mlHDPE-HNO3 Anions- Chloride, Fluoride, Sulfate - 125mlHDPE-NoPres Nitrate/Nitrite (NO2NO3) - 250mlHDPE-H2SO4 TDS - 250mlHDPE-NoPres Tot/Diss. As,Ba,Cd,Cr,Co,Cu,Fe,Hg,Mn,Ni,Pb,Se,U,V									
Immediately Packed on Ice ☐ N ☒ Y		Date: Time:		Date: Time:				Date: Time:											
Sample ID		Comp/Grab		Matrix *		Depth		Date				Time							
MW-29 MW-61 MW-105 RW-#16B RW-9 MW-58 MW-136 KWB-2R KWB-13 RW-12R		↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓		GW ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓		↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓		4/28/16 4/28/16 4/28/16 4/28/16 4/28/16 4/28/16 4/28/16 4/28/16 4/28/16 4/28/16				1455 1830 1725 1635 1545 1820 1520 1725 1620 1750							
* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____														pH _____ Temp _____					
Remarks: Log all metals by 6020. Dissolved metals are field filtered.														Flow _____ Other _____					
Relinquished by: (Signature) Scott Ude				Date: 4/29/16		Time: 1500		Received by: (Signature)				Samples returned via: ☒ UPS ☐ FedEx ☐ Courier ☐ _____		Condition: (lab use only)					
Relinquished by: (Signature)				Date:		Time:		Received by: (Signature)				Temp: _____ °C ☐ Bottles Received:		COC Seal Intact: ☒ N ☐ NA					
Relinquished by: (Signature)				Date:		Time:		Received for lab by: (Signature)				Date: Time:		pH checked: ☒ N ☐ NA					

Company Name/Address: TRC Solutions - Austin, TX 505 E. Huntland Dr, Ste 250 Austin, TX 78752				Billing Information: Accounts Payable 21 Griffin Road North Windsor, CT 06095				Analysis / Container / Preservative DRO - 40ml/Amb-HCl-BT GRO - 40ml/Amb-HCl V8260 - 40ml/Amb-HCl Tot./Diss. As, Ba, Cr, Fe, Pb, Mn, Se - 500mlHDPE-HNO3 Cyanide (CN) - 250mlHDPEAmb-NaOH Cations-Total Ca, K, Na - 500mlHDPE-HNO3 Anions- Chloride, Fluoride, Sulfate- 125mlHDPE-NoPres Nitrate/Nitrite (NO2NO3) - 250mlHDPE-H2SO4 TDS - 250mlHDPE-NoPres Tot/Diss. As, B, Ba, Cd, Co, Cr, Fe, Hg, Mn, Ni, Pb, Se, U, V Chain of Custody Page 2 of 5  ESC L.A.B. S.C.I.E.N.C.E.S. YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859									
Report to: jspeer@trcsolutions.com				Email To: jspeer@trcsolutions.com				Project Description: REST Spring 2016 -Team G-CJH City/State Collected: Artesia, NM Lab Project #: TRCATX-REST SPRING P.O. # Rush? (Lab MUST Be Notified) Same Day200% Next Day100% Two Day50% Three Day25% Date Results Needed Email? ☐ No ☐ Yes FAX? ☐ No ☐ Yes No. of Cntrs									
Phone: 512-684-3170 Fax:		Client Project #		Site/Facility ID # REST - Navajo- Artesia		Collected by (print): Scott Ude + HM Team											
Collected by (signature):  Immediately Packed on Ice ☐ N ☒ Y ☒ V		Matrix * GW		Date 4/28/16		Time 1640											

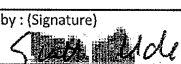
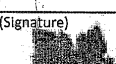
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	DRO - 40ml/Amb-HCl-BT	GRO - 40ml/Amb-HCl	V8260 - 40ml/Amb-HCl	Tot./Diss. As, Ba, Cr, Fe, Pb, Mn, Se - 500mlHDPE-HNO3	Cyanide (CN) - 250mlHDPEAmb-NaOH	Cations-Total Ca, K, Na - 500mlHDPE-HNO3	Anions- Chloride, Fluoride, Sulfate- 125mlHDPE-NoPres	Nitrate/Nitrite (NO2NO3) - 250mlHDPE-H2SO4	TDS - 250mlHDPE-NoPres	Tot/Diss. As, B, Ba, Cd, Co, Cr, Fe, Hg, Mn, Ni, Pb, Se, U, V
MW-113		GW		4/28/16	1640		✓	✓	✓	✓	✓	✓	✓	✓	✓	
EB-REST-01				4/28/16	1655		✓	✓	✓	✓	✓	✓	✓	✓	✓	
DUP-REST-01				4/28/16	1500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-100				4/29/16	925		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EB-REST-04				4/29/16	910		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DUP-REST-04				4/29/16	1000		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW-107				4/29/16	1105		✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-59				4/29/16	1015		✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-52				4/29/16	1050		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW-109	↓	↓		4/29/16	1005		✓	✓	✓	✓	✓	✓	✓	✓	✓	

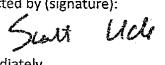
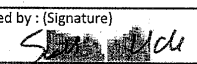
* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____

Remarks: **Log all metals by 6020. Dissolved metals are field filtered.**

pH _____ Temp _____

Flow _____ Other _____

Relinquished by: (Signature) 	Date: 4/29/16	Time: 1500	Received by: (Signature) 	Samples returned via: ☐ UPS ☒ FedEx ☐ Courier ☐ Other	Condition: _____ (lab use only)
Relinquished by: (Signature) 	Date:	Time:	Received by: (Signature) 	Temp: _____ Bottles Received: _____	GOC Seal Intact: ☒ Y ☐ N ☐ NA
Relinquished by: (Signature) 	Date:	Time:	Received for lab by: (Signature)	Date: _____ Time: _____	pH Checked: _____ NCP

Company Name/Address: TRC Solutions - Austin, TX 505 E. Huntland Dr, Ste 250 Austin, TX 78752		Billing Information: Accounts Payable 21 Griffin Road North Windsor, CT 06095		Analysis / Container / Preservative										Chain of Custody Page <u>1</u> of <u>5</u>											
Report to: jspeer@trcsolutions.com		Email To: jspeer@trcsolutions.com																							
Project Description: REST Spring 2016 - Team G & JH		City/State Collected: Artesia, NM												YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859											
Phone: 512-684-3170 Fax:		Client Project #		Lab Project # TRCATX-REST SPRING												Lab #									
Collected by (print): Scott Wade + HMI Team		Site/Facility ID # REST - Navajo- Artesia		P.O. #												Table #									
Collected by (signature): 		Rush? (Lab MUST Be Notified) ☐ Same Day200% ☐ Next Day100% ☐ Two Day50% ☐ Three Day25%		Date Results Needed		Email? ☐ No ☐ Yes FAX? ☐ No ☐ Yes		No. of Cntrs												Accnum: TRCATX Template: T111394 Prelogin: P549622 TSR: Chris McCord Cooler: Shipped Via:					
Immediately Packed on Ice N ☐ Y ☒																				Rem./Contaminant					
Sample ID		Comp/Grab		Matrix *		Depth		Date		Time														Sample # (lab only)	
MW-110				GW				4/29/16		920															
MW-128								4/29/16		1125															
MW-28								4/29/16		1025															
MW-66								4/29/16		940															
Trip Blank-REST-04								4/29/16		—															
MW-99								4/29/16		845															
RW- #17A								4/29/16		940															
MW-135								4/29/16		1125															
MW-115								4/29/16		850															
MW-114		✓		✓				4/29/16		945															
* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____																									
Remarks: Log all metals by 6020. Dissolved metals are field filtered.																									
Relinquished by: (Signature) 		Date: 4/29/16		Time: 1500		Received by: (Signature) 		Samples returned via: ☐ UPS ☒ FedEx ☐ Courier ☐ _____		Condition: (lab use only)															
Relinquished by: (Signature) 		Date:		Time:		Received by: (Signature) 		Temp: °C _____ Bottles Received: _____		GOC Seal Intact: Y ☐ N ☐ NA															
Relinquished by: (Signature) 		Date:		Time:		Received for lab by: (Signature) 		Date: _____ Time: _____		pH Checked: _____ NGF: _____															

[illegible]

Company Name/Address: TRC Solutions - Austin, TX 505 E. Huntland Dr, Ste 250 Austin, TX 78752			Billing Information: Accounts Payable 21 Griffin Road North Windsor, CT 06095			Analysis / Container / Preservative DRO - 40ml/Amb-HCl-BT GRO - 40ml/Amb-HCl V8260 - 40ml/Amb-HCl Tot./Diss. As, Ba, Cr, Fe, Pb, Mn, Se - 500mlHDPE-HNO3 Cyanide (CN) - 250mlHDPEAmb-NaOH Cations-Total Ca, K, Na - 500mlHDPE-HNO3 Anions- Chloride, Fluoride, Sulfate-112.5mlHDPE-NoPres Nitrate/Nitrite (NO2NO3) - 250mlHDPE-H2SO4 TDS - 250mlHDPE-NoPres Tot/Diss. As, B, Ba, Cd, Co, Cr, Fe, Hg, Mn, Ni, Pb, Se, U, V Chain of Custody Page <u>1</u> of <u>1</u> YOUR LAB. OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859 																																																																																																																																																																																																																																			
Report to: jspeer@trcsolutions.com			Email To: jspeer@trcsolutions.com																																																																																																																																																																																																																																						
Project Description: TMD Spring 2016 -Team-B CTH			City/State Collected: Artesia, NM																																																																																																																																																																																																																																						
Phone: 512-684-3170 Fax:			Client Project # Lab Project # TRCATX-TMD SPRING																																																																																																																																																																																																																																						
Collected by (print): Scott Ude + HMI Tam			Site/Facility ID # TMD - Navajo- Artesia																																																																																																																																																																																																																																						
Collected by (signature): Immediately Packed on Ice ☐ N ☒ Y ☒			Rush? (Lab MUST Be Notified) ☐ Same Day200% ☐ Next Day100% ☐ Two Day50% ☐ Three Day25%			Date Results Needed Email? ☐ No ☐ Yes FAX? ☐ No ☐ Yes No. of Cntrs																																																																																																																																																																																																																																			
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* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____													pH _____ Temp _____																																																																																																																																																																																																																												
Remarks: Log all metals by 6020. Dissolved metals are field filtered.																																																																																																																																																																																																																																									
Relinquished by: (Signature)				Date: 4/29/16		Time: 1500		Received by: (Signature)				Samples returned via: ☐ UPS ☒ FedEx ☐ Courier ☐ _____				Condition: _____ (lab use only)																																																																																																																																																																																																																									
Relinquished by: (Signature)				Date: _____		Time: _____		Received by: (Signature)				Temp: _____ C/Bottles Received: _____				CDC Seal Intact: ☒ Y ☐ N ☐ NA																																																																																																																																																																																																																									
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[illegible]

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Elev: 3366 ft. Lat: 32.755° N Lon: 104.384° W
Station: **ARTESIA 6 S, NM US GHCND:USC00290600**

Record of Climatological Observations
These data are quality controlled and may not be identical to the original observations.
Generated on 01/20/2017

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

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					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 Moveme nt (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.
	2016	10	1	77	50	52	0.00		0.0		0.0		0.11	5	63	61			
	2016	10	2	85	52	52	0.00		0.0		0.0		0.19	5	64	62			
	2016	10	3	88	52	59	0.00		0.0		0.0		0.22	5	64	62			
	2016	10	4	87	53	53	0.00		0.0		0.0		0.41	5	63	62			
	2016	10	5	84	45	45	0.00		0.0		0.0		0.18	5	68	64			
	2016	10	6	85	44	49	0.00		0.0		0.0		0.34	5	68	64			
	2016	10	7	88	44	50	0.00		0.0		0.0		0.29	5	68	67			
	2016	10	8	66	49	58	0.00		0.0		0.0		0.07	5	68	67			
	2016	10	9	68	49	58	0.03		0.0		0.0		0.21	5	63	62			
	2016	10	10	71	51	55	0.32		0.0		0.0		0.20	5	65	65			
	2016	10	11	85	51	52	0.93		0.0		0.0		0.00	5	60	52			
	2016	10	12	88	50	51	0.01		0.0		0.0		0.16	5	61	52			
	2016	10	13	87	50	53	0.01		0.0		0.0		0.37	5	61	52			
	2016	10	14	66	49	50	0.12		0.0		0.0		0.13	5	60	52			
	2016	10	15	82	49	50	0.00		0.0		0.0		0.22	5	60	50			
	2016	10	16	93	46	47	0.00		0.0		0.0		0.17	5	60	58			
	2016	10	17	93	45	46	0.00		0.0		0.0		0.18	5	59	58			
	2016	10	18	92	46	50	0.00		0.0		0.0		0.51	5	61	61			
	2016	10	19	80	42	44	0.00		0.0		0.0		0.19	5	59	59			
	2016	10	20	88	44	49	0.00		0.0		0.0		0.22	5	72	60			
	2016	10	21	88	35	35	0.00		0.0		0.0		0.12	5	64	58			
	2016	10	22	75	34	45	0.00		0.0		0.0		0.18	5	60	58			
	2016	10	23	82	39	45	0.00		0.0		0.0		0.46	5	60	58			
	2016	10	24	87	40	46	0.00		0.0		0.0		0.31	5	63	60			
	2016	10	25	81	45	54	0.00		0.0		0.0		0.23	5	63	60			
	2016	10	26	84	46	46	0.00		0.0		0.0		0.23	5	61	60			
	2016	10	27	84	46	47	0.00		0.0		0.0		0.25	5	61	60			
	2016	10	28	82	46	49	0.00		0.0		0.0		0.18	5	60	59			
	2016	10	29	83	48	51	0.00		0.0		0.0		0.10	5	60	59			
	2016	10	30	88	47	49	0.00		0.0		0.0		0.30	5	61	60			
	2016	10	31	87	45	45	0.00		0.0		0.0		0.21	5	61	60			
			Summary	83	46		1.42		0.0										

The "" flags in Preliminary indicate the data have not completed processing and quality control 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.



October 21, 2016

Ms. Julie Speer, P.G., EIT
Associate Project Manager
TRC
505 East Huntland Drive, Suite 250
Austin, Texas 78752

Hydrologic Monitoring

1654 W. Sam Houston Pkwy. N.
Houston, Texas 77043

Phone 713.464.5206
Fax 713.464.5207

Subject: October 2016 (Semiannual Event) Groundwater Monitoring
Sitewide Gauging, October 4, 2016
Groundwater Sampling, October 4-5, 2016
Navajo Refining Company, Artesia, New Mexico

Dear Ms. Speer:

This document summarizes groundwater monitoring field activities conducted by Hydrologic Monitoring, LLC (HMI) on behalf of TRC at the Navajo Refining Company, Artesia Refinery, Artesia, New Mexico.

Contents

Field Activities Narrative

Table 1: (Gauging Data, Groundwater Field Parameters, Well Inspections, with Analytical Program)

Groundwater Sampling SOP Memo

Groundwater Sampling Forms and Field Instrument Calibration Log

(provided in three emails, with wells in geographic-based order shown on Table 1)

Chain-of-Custody Forms (provided in two emails)

Field Activities Narrative

1. HMI conducted the *October 2016 (Fall) Event* (Semiannual event, including the SA = Semiannual Event designations on the attached scoping table, Navajo Refinery, Artesia, New Mexico. Sitewide gauging was conducted October 4, 2016. Groundwater sampling (118 wells sampled) was conducted October 4-5, 2016.
2. Groundwater sampling was conducted in accordance with the Site Sampling and Analysis Plan, EPA guidance, and the attached Memorandum – Low-Flow Groundwater Monitoring Standard Operating Procedures, Navajo Refining Co. - Artesia, New Mexico. Per regulatory instruction, if

measured LNAPL thickness was *less than* 0.03-feet, in any well scheduled for groundwater sampling, the LNAPL was removed, and the well was sampled. And if LNAPL thickness equaled 0.03-feet or *greater*, the well was not sampled. Gauging data, groundwater field parameters, and well inspection information is summarized in Table 1. Samples were shipped FedEx, to ESC Lab Sciences, Mt. Juliet, TN. The groundwater sampling process is documented on the attached groundwater sampling forms.

3. Field QA/QC Sampling (per Refinery Area):

Evaporation Ponds

Duplicates:

Dup-EP-01 at MW-7A

Dup-EP-02 at MW-22A

Dup-EP-03 at MW-3

Equipment Blanks:

EB-EP-01 collected over decontaminated gauging probe following sampling at MW-74

EB-EP-02 collected over decontaminated gauging probe following sampling at MW-124

EB-EP-03 collected over decontaminated gauging probe following sampling at MW-5A

EB-EP-04 collected over decontaminated gauging probe following sampling at MW-79

Trip Blank-EP-01

Trip Blank-EP-02

Trip Blank-EP-03

NCL

Duplicate:

Dup-NCL-01 at NCL-49

Equipment Blank:

EB-NCL-01 collected over decontaminated gauging probe following sampling at NCL-32

Trip Blank-NCL-01

TEL

Duplicate:

Dup-TEL-01 at TEL-4

Equipment Blank:

EB-TEL-01 collected over decontaminated gauging probe following sampling at TEL-3

Trip Blank-TEL-01

TMD

Trip Blank-TMD-01

Limited TMD scope generated no additional field QA/QC samples

REST (“rest” of the site)

Duplicates:

Dup-REST-01 at MW-113

Dup-REST-02 at MW-104

Dup-REST-03 at MW-134

Dup-REST-04 at MW-60

Dup-REST-05 at KWB-12B

Equipment Blanks:

EB-REST-01 collected over decontaminated gauging probe following sampling at MW-113

EB-REST-02 collected over decontaminated gauging probe following sampling at MW-104

EB-REST-03 collected over decontaminated gauging probe following sampling at MW-134
EB-REST-04 collected over decontaminated gauging probe following sampling at MW-60
EB-REST-05 collected over decontaminated gauging probe following sampling at KWB-12B
Trip Blank-REST-01
Trip Blank-REST-02
Trip Blank-REST-03
Trip Blank-REST-04

4. Site Notes:

HMI 8-person team completed annual training at the safety training trailers on 4-26-16 (compliant through end of month of April 2017).

HMI's DISA background check/drug/alcohol requirements were approved by onsite safety-trailer personnel on 10-19-15, as reported through HASC.

Per Navajo, purgewater is disposed in the pad sump, just inside, and to the left of the Main Gate entrance. Alternately, North Bundle Pad sump, as previously (fenced area of drums, etc.), notifying FCC control room for entrance.

Sitewide well and gate lock combinations are "2013" (less often "2002").

With suggested telephone notification, FedEx pickup from locked shed (35-25-39 combination) at approximately 16:00 daily, across from Artesia Wool Co (access area from "inside" Refinery).

North side of Hwy 82, east of site, gate with cable and combination lock (8810).

POTW bldg, check-in as needed, to borrow a key or get gate unlocked.

Navajo's Mr. Robert Combs or Richard Orosco for daily permit(s).

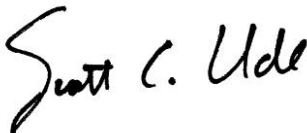
Navajo-well locks have been deployed as possible, as of 2H16.

Well surface completion inspections are documented on respective well gauging and sampling forms, and is summarized in Table 1. Well inspection items of potential concern (i.e., "Issues") are highlighted in yellow-color in Table 1. HMI provided sitewide well inspection photographs on a portable memory stick to TRC on April 7, 2016 (and to Robert Combs, Navajo, on April 26, 2016), documenting well surface completion-conditions of the monitoring/recovery well network.

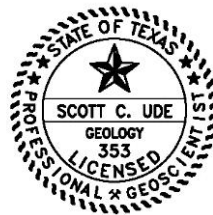
HMI appreciates the opportunity to assist TRC with this project. If you have any questions or would like additional information please feel free to call us at 713.464.5206.

Sincerely,

HYDROLOGIC MONITORING



Scott C. Ude, P.G.



The seal appearing on this document was authorized by Scott C. Ude, P.G. 353 on October 21, 2016.

Attachments

cc: Bryan Gilbert, P.G., TRC-Austin

Table 1: Gauging Data, Groundwater Field Parameters and Well Inspections, 2H16
Navajo Refining Company - Artesia Refinery, Artesia, New Mexico

Well ID	Well Type	HMI Use	HMI Use (# Samp Wells)	Hydrologic Monitoring-Collected Data (Gauging/Groundwater Field Parameter/Well Inspection)																	PSH Expected?	Analytical Suite and Frequency ^c													
				Location																		Gauging Frequency													
				Gauge Date	Gauge Time	Depth to LNAPL (ft btoc)	Depth to Water (ft btoc)	LNAPL Column (ft)	Total Depth (ft btoc)	Sample Date	Sample Time	pH (S.U.)	T (C)	Spec. Cond. (umho/cm)	D. O. (mg/l)	ORP (mg/l)	Turb. (NTU)	Water Clarity	Cap	Casing	Well Secured	Label	Purge Parameters	DRO	IGRO	VOC	Metals (As, Ba, Cr, Fe, Pb, Mn, Se)	Metals (Hg, Ni, V, Bi, Cd, Co, U)	Cyanide	Cations/Anions	Nitrates / Nitrites as Nitrogen	TDS			
MW-6A	Monitoring	MDB		EP	4-Oct	9:05	NA	11.69	0.00	19.01									Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
MW-6B	Monitoring	MDB		EP	4-Oct	9:00	NA	11.55	0.00	52.23				Biennial sampling (1H17, 1H19, etc.)					Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		
MW-85	Monitoring	MDB		EP	4-Oct	17:50	9.20	9.65	0.45	20.34				No sampling (LNAPL 0.03' or greater)					Yes	Yes	Yes	Yes	Y	SA	SA ^a	SA ^a	SA ^a	SA ^a	SA ^a	-	-	SA ^a	SA ^a	SA ^a	
MW-86	Monitoring	MDB		EP	4-Oct	18:10	8.89	8.96	0.07	19.21				No sampling (LNAPL 0.03' or greater)					Yes	Yes	Yes	Yes	Y	SA	SA ^a	SA ^a	SA ^a	SA ^a	SA ^a	SA ^a	-	-	SA ^a	SA ^a	SA ^a
MW-120	Monitoring	MDB	1	EP	4-Oct	9:15	NA	11.65	0.00	28.00	4-Oct	17:20	7.17	21.7	8,040	0.4	-124.7	2.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-121	Monitoring	MDB	2	EP	4-Oct	9:35	NA	11.67	0.00	27.32	4-Oct	16:25	7.29	22.8	6,620	0.4	-13.7	6.0	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-84	Monitoring	MDB	3	EP	4-Oct	9:25	NA	7.42	0.00	20.56	5-Oct	13:00	7.05	23.1	9,670	0.5	-47.3	7.6	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-122	Monitoring	MDB	4	EP	4-Oct	9:40	NA	9.80	0.00	23.31	4-Oct	15:10	7.20	21.6	7,790	0.5	-106.5	5.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-81	Monitoring	MDB		EP	4-Oct	9:45	NA	10.10	0.00	18.63									Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
MW-80	Monitoring	MDB		EP	4-Oct	9:53	NA	8.28	0.00	19.69									Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
MW-79	Monitoring	MDB	5	EP	4-Oct	10:00	NA	9.20	0.00	19.25	5-Oct	13:00	7.30	20.8	6,870	1.1	-124.1	9.1	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-82	Monitoring	MDB		EP	4-Oct	10:10	NA	8.68	0.00	20.00									Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
MW-74	Monitoring	MDB	6	EP	4-Oct	10:15	NA	8.17	0.00	20.19	5-Oct	12:05	7.16	21.9	13,540	0.7	35.7	4.6	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	A	A	A	
MW-73	Monitoring	MDB		EP	4-Oct	10:25	NA	8.57	0.00	19.60									Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
MW-2A	Monitoring	MDB	7	EP	4-Oct	10:40	NA	10.19	0.00	17.31	4-Oct	14:05	7.03	22.6	8,440	0.8	22.4	2.7	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-2B	Monitoring	MDB		EP	4-Oct	10:45	NA	9.98	0.00	52.00				Not in sampling program					Yes	Yes	Yes	Yes	SA	Not in sampling program											
MW-72	Monitoring	MDB		EP	4-Oct	10:55	NA	6.59	0.00	13.92									Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
OCD-6	Monitoring	MDB	8	EP	4-Oct	11:05	NA	10.53	0.00	26.91	4-Oct	11:35	6.74	22.0	6,400	0.8	33.3	6.1	Clear	Yes	Closure	Cracked pad	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
OCD-7AR	Monitoring	MDB	9	EP	4-Oct	12:05	NA	9.33	0.00	21.29	4-Oct	12:35	7.01	23.7	7,480	0.6	-125.4	2.1	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
OCD-7B	Monitoring	MDB		EP	4-Oct	13:05	NA	9.11	0.00	56.81				Biennial sampling (1H17, 1H19, etc.)					Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		
OCD-7C	Monitoring	MDB		EP	4-Oct	13:10	NA	8.29	0.00	71.95				Not in sampling program					Yes	Yes	Yes	Yes	SA	Not in sampling program											
MW-76	Monitoring	SCD	10	EP	4-Oct	9:25	NA	10.04	0.00	20.33	5-Oct	9:55	6.84	21.5	7,580	1.3	-99.2	7.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-77	Monitoring	SCD	11	EP	4-Oct	9:30	NA	8.22	0.00	20.52	5-Oct	10:40	6.84	23.7	7,840	2.7	-81.5	7.3	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-78	Monitoring	SCD		EP	4-Oct	9:35	NA	6.78	0.00	19.57									Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
MW-75	Monitoring	SCD	12	EP	4-Oct	9:40	NA	8.43	0.00	23.74	5-Oct	11:20	7.14	22.0	7,600	0.9	-112.5	3.9	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-83	Monitoring	SCD	13	EP	4-Oct	9:45	NA	8.16	0.00	19.91	4-Oct	17:00	6.97	24.4	4,620	1.4	13.6	8.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-3	Monitoring	SCD	14	EP	4-Oct	9:50	NA	8.44	0.00	20.18	4-Oct	16:20	7.18	22.9	6,950	1.1	-68.2	8.1	Clear	Yes	Yes	Issue	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-88	Monitoring	SCD	15	EP	4-Oct	10:10	NA	7.77	0.00	20.31	5-Oct	8:25	7.19	18.7	9,370	1.0	-20.6	9.7	Clear	Yes	Yes	Hole in pad	Yes	SA	SA	SA	SA	SA	SA	-	-	A	A	A	
MW-22A	Monitoring	SCD	16	EP	4-Oct	10:15	NA	7.06	0.00	22.65	5-Oct	9:05	7.01	21.0	8,890	1.2	-109.8	23.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-22B	Monitoring	SCD		EP	4-Oct	10:20	NA	6.95	0.00	54.66				Biennial sampling (1H17, 1H19, etc.)					Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		

Table 1: Gauging Data, Groundwater Field Parameters and Well Inspections, 2H16
Navajo Refining Company - Artesia Refinery, Artesia, New Mexico

Well ID	Well Type	HMI Use	HMI Use (# Samp Wells)	Hydrologic Monitoring-Collected Data (Gauging/Groundwater Field Parameter/Well Inspection)																	PSH Expected?	Analytical Suite and Frequency ^c														
				Location																		Gauging Frequency														
				Gauge Date	Gauge Time	Depth to LNAPL (ft bloc)	Depth to Water (ft bloc)	LNAPL Column (ft)	Total Depth (ft bloc)	Sample Date	Sample Time	pH (S.U.)	T (C)	Spec. Cond. (umho/cm)	D. O. (mg/l)	ORP (mg/l)	Turb. (NTU)	Water Clarity	Cap	Casing	Well Secured	Label	Purge Parameters	DRO	GRO	VOC	Metals (As, Ba, Cr, Fe, Pb, Mn, Se)	Metals (Hg, Ni, V, B, Cd, Co, U)	Cyanide	Cations/Anions	Nitrates / Nitrites as Nitrogen	TDS				
MW-10	Monitoring	SCD	17	EP	4-Oct	10:35	NA	4.48	0.00	18.45	4-Oct	11:00	6.68	21.2	8,200	1.1	-22.2	4.7	Clear	Yes	Yes	Cracked pad	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-123	Monitoring	SCD	18	EP	4-Oct	11:20	NA	4.90	0.00	25.71	4-Oct	11:45	7.05	20.4	7,370	1.1	4.5	9.3	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-4A	Monitoring	SCD	19	EP	4-Oct	12:10	NA	10.98	0.00	>11.88	4-Oct	12:35	7.33	23.4	6,220	1.4	-252.8	9.2	Clear	Yes	Issue	Issue	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-4B	Monitoring	SCD		EP	4-Oct	12:50	NA	10.25	0.00	72.37									Yes	Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		
MW-5A	Monitoring	SCD	20	EP	4-Oct	13:00	NA	7.20	0.00	20.15	4-Oct	13:25	7.22	23.6	18,260	1.5	-136.1	9.1	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-5B	Monitoring	SCD		EP	4-Oct	13:50	NA	7.66	0.00	53.41									Yes	Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		
MW-5C	Monitoring	SCD		EP	4-Oct	13:55	NA	7.86	0.00	71.60									Yes	Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		
MW-7A	Monitoring	SCD	21	EP	4-Oct	14:05	NA	6.87	0.00	17.25	4-Oct	14:30	7.30	22.1	10,210	1.0	-92.2	24.9	Clear	Yes	Yes	Issue	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-7B	Monitoring	SCD		EP	4-Oct	14:55	NA	8.15	0.00	52.55									Yes	Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		
OCD-8A	Monitoring	SCD	22	EP	4-Oct	15:05	NA	7.94	0.00	20.74	4-Oct	15:30	7.09	23.4	12,980	1.2	-122.5	6.8	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA		
OCD-8B	Monitoring	SCD		EP	4-Oct	15:45	NA	8.10	0.00	56.63									Yes	Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		
KWB-P4	Monitoring	BRH		REST	Biennial gauging (1H17, 1H19, etc.)					30.26									Yes	Yes	Yes	Yes	Yes	B	B	B	-	B	-	-	-	-	-	-		
MW-25	Monitoring	BRH		TMD	4-Oct	12:20	NA	11.06	0.00	28.18									Yes	Yes	Subsidence	Yes	Yes	A	A	A	A	A	A	-	-	A	A	A		
NP-8	Monitoring	BRH		TMD	4-Oct	12:25	NA	11.96	0.00	15.20									Issue	Issue	Yes	Yes	SA	Not in samp prgm; gauged to top of protective steel casing												
MW-1R	Monitoring	BRH		EP	4-Oct	12:32	NA	10.26	0.00	20.62									Yes	Issue	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
MW-15	Monitoring	BRH		EP	4-Oct	12:36	NA	11.24	0.00	21.70									Yes	Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
OCD-1R	Monitoring	BRH	23	EP	4-Oct	12:46	NA	11.68	0.00	23.89	5-Oct	8:15	7.25	19.8	10,370	0.6	-112.7	3.1	Clear	Yes	Issue	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
OCD-2A	Monitoring	BRH	24	EP	4-Oct	12:50	NA	11.75	0.00	27.58	5-Oct	9:00	7.31	19.1	8,090	0.6	-82.6	5.7	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	A	A	A		
OCD-2B	Monitoring	BRH		EP	4-Oct	12:53	NA	10.48	0.00	50.39									Yes	Yes	Yes	Yes	Yes	SA	Not in sampling program											
OCD-3	Monitoring	BRH	25	EP	4-Oct	12:59	NA	12.27	0.00	25.48	5-Oct	9:45	7.17	20.0	7,900	0.7	-41.9	7.3	Clear	Yes	Yes	Pad destrdy	Yes	SA	SA	SA	SA	SA	SA	-	-	A	A	A		
OCD-4	Monitoring	BRH	26	EP	4-Oct	13:05	NA	11.48	0.00	25.42	5-Oct	10:30	7.21	20.6	14,750	0.6	-90.9	16.8	Clear	Yes	Yes	Subsidence	Yes	SA	SA	SA	SA	SA	SA	-	-	A	A	A		
MW-11A	Monitoring	BRH	27	EP	4-Oct	13:11	NA	8.75	0.00	22.01	5-Oct	12:10	6.97	22.3	25,500	0.6	-72.3	4.9	Clear	Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	SA	SA	SA		
MW-11B	Monitoring	BRH		EP	4-Oct	13:14	NA	8.78	0.00	47.30									Yes	Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		
OCD-5	Monitoring	BRH	28	EP	4-Oct	13:22	NA	9.65	0.00	25.42	5-Oct	11:20	7.37	21.0	14,850	0.6	-128.7	22.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-87	Monitoring	BRH	29	EP	4-Oct	13:35	NA	7.70	0.00	20.39	4-Oct	14:00	7.27	23.1	16,710	0.6	-172.4	2.1	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	A	A	A		
MW-18A	Monitoring	BRH	30	EP	4-Oct	14:30	NA	9.62	0.00	22.58	4-Oct	14:55	7.21	21.8	8,530	0.6	-202.3	1.3	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	SA	SA	SA	SA	SA		
MW-18B	Monitoring	BRH		EP	4-Oct	14:27	NA	9.61	0.00	50.60									Yes	Yes	Yes	Yes	Yes	SA	B	B	B	B	B	-	-	B	B	B		
MW-18T	Monitoring	BRH		EP	4-Oct	14:25	NA	9.40	0.00	50.40									Issue	Issue	Issue	Yes	SA	Not in samp prgm; gauged to highest point of shattered PVC												
MW-70	Monitoring	BRH	31	EP	4-Oct	15:25	NA	7.31	0.00	22.05	4-Oct	15:50	7.07	21.4	6,780	0.5	-145.8	9.7	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	A	A	A		
MW-124	Monitoring	BRH	32	EP	4-Oct	16:15	NA	7.81	0.00	22.01	4-Oct	16:40	7.16	22.3	11,460	0.5	-93.2	8.9	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA		

Table 1: Gauging Data, Groundwater Field Parameters and Well Inspections, 2H16
Navajo Refining Company - Artesia Refinery, Artesia, New Mexico

Well ID	Well Type	HMI Use	HMI Use (# Samp Wells)	Hydrologic Monitoring-Collected Data (Gauging/Groundwater Field Parameter/Well Inspection)																		PSH Expected? ^a	Gauging Frequency	Analytical Suite and Frequency ^c											
				Location																															
				Gauge Date	Gauge Time	Depth to LNAPL (ft bloc)	Depth to Water (ft bloc)	LNAPL Column (ft)	Total Depth (ft bloc)	Sample Date	Sample Time	pH (S.U.)	T (C)	Spec. Cond. (umho/cm)	D. O. (mg/l)	ORP (mg/l)	Turb. (NTU)	Water Clarity	Cap	Casing	Well Secured			Label	Purge Parameters	DRO	GRO	VOC	Metals (As, Ba, Cr, Fe, Pb, Mn, Se)	Metals (Hg, Ni, V, B, Cd, Co, U)	Cyanide	Cations/Anions	Nitrates / Nitrites as Nitrogen	TDS	
MW-13	Monitoring	BRH		EP	4-Oct	11:47	NA	11.69	0.00	21.10									Yes	Yes	Yes	Yes	SA	No sampling due to location N. of river											
MW-69	Monitoring	BRH		EP	4-Oct	11:40	NA	10.93	0.00	22.50									Yes	Yes	Yes	Yes	SA	No sampling due to location N. of river											
MW-12	Monitoring	BRH		EP	4-Oct	11:25	NA	10.26	0.00	17.93									Yes	Yes	Yes	Yes	SA	No sampling due to location N. of river											
MW-24	Monitoring	BRH		EP	4-Oct	11:00	NA	11.88	0.00	23.51									Yes	Yes	Issue	Yes	SA	No sampling due to location E. of river											
MW-14	Monitoring	BRH		EP	4-Oct	11:08	NA	11.36	0.00	>11.93									Yes	Issue	Yes	Yes	SA	No sampling due to location N. of river											
RW-12	Recovery ^d	BTB		Field E of Refinery			Not in gauging program				Not in sampling program																								
RW-12R	Recovery ^d	BTB		REST	4-Oct	12:03	17.15	17.18	0.03	NM									Yes	Yes	Yes	Yes	Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
MW-113	Monitoring	BTB	33	REST	4-Oct	12:07	NA	17.58	0.00	37.80	5-Oct	8:35	6.95	18.9	1,967	2.0	-3.3	6.9	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
KWB-8	Monitoring	BTB	34	REST	4-Oct	11:12	NA	16.00	0.00	35.80	5-Oct	10:20	7.53	18.6	3,214	0.9	-210.2	8.7	Clear	Yes	Yes	Yes	Yes	SA	SA	SA ^d	-	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	
RW-22	Recovery ^d	BTB		REST	4-Oct	11:08	NA	20.17	0.00	NM									Yes	Yes	Yes	Yes	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d		
RW-20A	Recovery ^d	BTB		REST	4-Oct	11:05	17.58	17.67	0.09	NM									NA	Yes	Yes	Yes	Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
RW-20B	Recovery ^d	BTB		REST	4-Oct	11:02	17.60	17.72	0.12	NM									NA	Yes	Yes	Yes	Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
RW-13	Recovery ^d	BTB		Field E of Refinery			Not in gauging program				Not in sampling program												Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
RW-13R	Recovery ^d	BTB		REST	4-Oct	12:12	16.44	16.98	0.54	NM									Yes	Yes	Yes	Yes	Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
RW-14	Recovery ^d	BTB		Field E of Refinery			Not in gauging program				Not in sampling program												Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
RW-14R	Recovery ^d	BTB		REST	4-Oct	12:17	16.48	16.59	0.11	NM									Yes	Yes	Yes	Yes	Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
MW-133	Monitoring	BTB		REST	4-Oct	12:29	15.68	15.96	0.28	37.66									Yes	Yes	Yes	Yes	Y	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	
MW-134	Monitoring	BTB	35	REST	4-Oct	9:29	NA	13.66	0.00	32.95	4-Oct	14:35	6.64	20.5	4,143	0.9	115.7	5.9	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
RA-4798	Irrigation	BTB	36	REST	5-Oct	9:35	Not in gauging program			NA	5-Oct	9:35	7.39	18.7	2,714	1.7	21.4	1.4	Clear	NA	NA	Yes	Yes	NA	SA	-	-	SA	-	-	-	SA	SA	SA	
RA-4196	Irrigation	BTB	37	REST	5-Oct	9:15	Not in gauging program			NA	5-Oct	9:15	7.13	23.3	1,085	2.3	-18.7	2.1	Clear	NA	NA	Yes	Yes	NA	SA	-	-	SA	-	-	-	SA	SA	SA	
RA-1227	Irrigation	BTB		REST			Removed from program by Navajo, 4-13-15					Removed from program by Navajo, 4-13-15												NA	A ^b	-	-	A ^b	-	-	-	A ^b	A ^b	A ^b	
RA-3156	Irrigation	BTB		REST			Not in gauging program														NA	NA	NA	Yes	NA	A	-	-	A	-	-	-	A	A	A
RA-313	Irrigation	BTB		REST			Not in gauging program														NA	NA	NA	Yes	NA	A	-	-	A	-	-	-	A	A	A
KWB-7	Monitoring	BTB	38	REST	4-Oct	11:55	16.59	16.60	0.01	34.83	5-Oct	14:20	6.98	19.7	3,255	0.6	-93.3	7.2	Clear	Yes	Yes	Yes	Yes	Y	SA	SA	SA	-	SA	SA	SA	SA	SA	SA	
MW-135	Monitoring	BTB	39	REST	4-Oct	10:40	NA	25.96	0.00	65.55	5-Oct	11:25	6.74	19.2	5,792	2.7	39.3	47.0	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-20	Monitoring	BTB		TMD	4-Oct	9:12	NA	10.18	0.00	26.66									Yes	Yes	Yes	Yes	SA	A	A	-	A	A	-	-	A	A	A		
NP-3	Monitoring	BTB		TMD	4-Oct	9:22	NA	11.43	0.00	21.59									Yes	Yes	Yes	Yes	SA	Not in sampling program											
NP-4	Monitoring	BTB		TMD	4-Oct	9:18	NA	18.98	0.00	36.98									Yes	Yes	Yes	Yes	SA	Not in sampling program											
NP-2	Monitoring	BTB		TMD	4-Oct	9:34	NA	12.97	0.00	21.49									Yes	Yes	Yes	Yes	SA	Not in sampling program											
NP-1	Monitoring	BTB	40	TMD	4-Oct	9:37	NA	13.38	0.00	21.88	4-Oct	13:50	6.94	21.1	3,468	1.3	123.1	1.1	Clear	Yes	Yes	Yes	Yes	SA	SA	-	-	SA	-	-	-	A	A	A	

Table 1: Gauging Data, Groundwater Field Parameters and Well Inspections, 2H16
Navajo Refining Company - Artesia Refinery, Artesia, New Mexico

Well ID	Well Type	HMI Use	HMI Use (# Samp Wells)	Hydrologic Monitoring-Collected Data (Gauging/Groundwater Field Parameter/Well Inspection)																PSH Expected?	Analytical Suite and Frequency ^c														
				Location																	Gauging Frequency														
				Gauge Date	Gauge Time	Depth to LNAPL (ft bloc)	Depth to Water (ft bloc)	LNAPL Column (ft)	Total Depth (ft bloc)	Sample Date	Sample Time	pH (S.U.)	T (C)	Spec. Cond. (umho/cm)	D. O. (mg/l)	ORP (mg/l)	Turb. (NTU)	Water Clarity	Cap	Casing	Well Secured	Label	Purge Parameters	DRO	GRO	VOC	Metals (As, Ba, Cr, Fe, Pb, Mn, Se)	Metals (Hg, Ni, V, B, Cd, Co, U)	Cyanide	Cations/Anions	Nitrates / Nitrites as Nitrogen	TDS			
NP-6	Monitoring	BTB		TMD	4-Oct	9:48	NA	9.94	0.00	19.98				Biennial sampling (1H17, 1H19, etc.)					Yes	Yes	Yes	Yes	SA	B	-	-	B	-	-	-	-	-	-		
MW-8	Monitoring	BTB		TMD	4-Oct	12:38	NA	8.48	0.00	20.12									Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A		
MW-21	Monitoring	BTB	41	TMD	4-Oct	9:07	NA	9.84	0.00	25.12	4-Oct	13:05	6.21	21.9	4,571	1.4	124.3	1.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-9	Monitoring	BTB		TMD	4-Oct	9:03	NA	8.96	0.00	20.19				Not in sampling program					Yes	Yes	Cracked pad	Yes	SA	Not in sampling program											
MW-71	Monitoring	BTB		TMD	4-Oct	9:53	NA	11.06	0.00	21.87									Yes	Yes	Yes	Yes	SA	A	A	-	A	A	A	A	A	A	A		
MW-68	Monitoring	BTB		TMD	4-Oct	9:58	NA	12.72	0.00	26.52									Yes	Yes	Yes	Yes	SA	A	A	-	A	A	-	-	A	A	A		
MW-27	Monitoring	BTB		TMD	4-Oct	10:07	NA	14.15	0.00	30.28									Yes	Yes	Yes	Yes	SA	A	A	-	A	A	-	-	A	A	A		
MW-89	Monitoring	BTB		TMD	4-Oct	10:15	NA	8.44	0.00	20.28									Yes	Yes	Yes	Yes	SA	A	A	-	A	A	-	-	A	A	A		
MW-16	Monitoring	BTB		TMD	4-Oct	10:18	NA	7.13	0.00	21.23									Yes	Yes	Yes	Yes	SA	A	A	-	A	A	-	-	A	A	A		
MW-26	Monitoring	BTB		TMD	4-Oct	10:22	NA	7.05	0.00	27.58									Yes	Yes	Yes	Yes	SA	A	A	-	A	A	-	-	A	A	A		
KWB-11A	Monitoring	BTB	42	REST	4-Oct	10:50	NA	15.65	0.00	42.27	5-Oct	12:30	6.77	19.3	5,711	0.8	90.8	2.0	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
KWB-11B	Monitoring	BTB	43	REST	4-Oct	10:54	NA	16.30	0.00	72.45	5-Oct	13:25	6.83	19.3	2,867	1.1	81.7	1.6	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
KWB-3AR	Monitoring	BTB		REST										Removed from program by Navajo, 4-14-15 (farmer Jack Joy, 575-365-6042)									SA	SA	SA	-	SA	SA	SA	SA	SA	SA	SA		
MW-115	Monitoring	BTB	44	REST	4-Oct	15:45	NA	3.98	0.00	27.50	4-Oct	16:10	6.85	20.3	4,151	1.0	66.0	1.9	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-114	Monitoring	BTB	45	REST	4-Oct	16:40	NA	3.68	0.00	38.24	4-Oct	17:05	7.17	22.2	3,375	1.2	169.1	5.9	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-117	Monitoring	GDS	46	REST	4-Oct	11:44	NA	8.25	0.00	27.22	5-Oct	8:45	6.67	18.0	3,820	1.5	27.8	79.2	Sl Cloudy	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-118	Monitoring	GDS	47	REST	4-Oct	11:51	NA	10.21	0.00	28.29	5-Oct	9:30	7.19	18.7	4,010	3.8	43.1	7.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
NP-9	Monitoring	GDS		TMD	4-Oct	11:55	NA	9.48	0.00	25.89				Not in sampling program					Yes	Issue	Issue	Yes	SA	Not in sampling program											
MW-119	Monitoring	GDS	48	REST	4-Oct	11:59	NA	9.80	0.00	28.11	5-Oct	10:20	6.91	18.7	3,770	1.0	32.1	8.6	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
NP-5	Monitoring	GDS		REST	4-Oct	11:28	NA	11.35	0.00	25.06				Biennial sampling (1H17, 1H19, etc.)					Yes	Yes	Yes	Yes	SA	B	B	-	B	B	-	-	B	B	B		
MW-136	Monitoring	GDS	49	REST	4-Oct	11:35	NA	9.62	0.00	27.90	4-Oct	14:55	6.67	22.1	3,630	0.6	25.8	7.9	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
MW-126A	Monitoring	GDS	50	REST	4-Oct	10:47	NA	11.10	0.00	37.51	5-Oct	14:10	7.33	21.1	2,100	0.8	-149.9	8.5	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-126B	Monitoring	GDS	51	REST	4-Oct	10:50	NA	11.01	0.00	51.45	5-Oct	14:50	6.80	20.9	4,120	0.8	33.8	18.4	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-127	Monitoring	GDS	52	REST	4-Oct	10:40	NA	16.50	0.00	53.21	5-Oct	15:35	6.86	22.8	2,650	0.6	-278.5	9.8	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-129	Monitoring	GDS	53	REST	4-Oct	10:25	NA	19.18	0.00	53.08	5-Oct	17:05	6.66	23.7	2,160	0.6	-144.2	8.1	Clear	Yes	Yes	Yes	Yes	SA	SA ^a	SA ^a	SA ^a	SA ^a	SA ^a	-	-	SA ^a	SA ^a	SA ^a	
RW-#18A ^b	Recovery ^d	GDS		REST	4-Oct	9:26	NA	8.25	0.00	17.78									Yes	Yes	Yes	Yes	SA	A	-	-	A	A	-	-	A	A	A		
KWB-1A	Monitoring	GDS	54	REST	4-Oct	9:11	NA	10.71	0.00	33.50	4-Oct	13:45	6.67	20.5	4,280	1.1	-13.2	6.1	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	SA	SA	SA	SA		
KWB-1B	Monitoring	GDS		REST	4-Oct	9:13	NA	12.33	0.00	33.92				Not in sampling program					Yes	Yes	Yes	Yes	SA	Not in sampling program											
KWB-1C	Monitoring	GDS		REST	4-Oct	9:15	NA	12.95	0.00	52.71				Biennial sampling (1H17, 1H19, etc.)					Yes	Yes	Yes	Yes	SA	B	B	-	B	B	-	-	B	B	B		
KWB-10R	Monitoring	GDS	55	REST	4-Oct	9:06	13.95	13.96	0.01	29.46	4-Oct	13:05	6.55	21.8	1,648	0.8	-173.3	20.2	Clear	Yes	Yes	Yes	Yes	Y	SA	SA ^a	SA ^a	-	SA ^a	SA ^a	-	-	SA ^a	SA ^a	SA ^a

Table 1: Gauging Data, Groundwater Field Parameters and Well Inspections, 2H16
Navajo Refining Company - Artesia Refinery, Artesia, New Mexico

Well ID	Well Type	HMI Use	HMI Use (# Samp Wells)	Hydrologic Monitoring-Collected Data (Gauging/Groundwater Field Parameter/Well Inspection)															PSH Expected?	Analytical Suite and Frequency ^c															
				Location																Gauging Frequency															
				Gauge Date	Gauge Time	Depth to LNAPL (ft bloc)	Depth to Water (ft bloc)	LNAPL Column (ft)	Total Depth (ft bloc)	Sample Date	Sample Time	pH (S.U.)	T (C)	Spec. Cond. (umho/cm)	D. O. (mg/l)	ORP (mg/l)	Turb. (NTU)	Water Clarity	Cap	Casing	Well Secured	Label	Purge Parameters	DRO	GRO	VOC	Metals (As, Ba, Cr, Fe, Pb, Mn, Se)	Metals (Hg, Ni, V, B, Cd, Co, U)	Cyanide	Cations/Anions	Nitrates / Nitrites as Nitrogen	TDS			
MW-131	Monitoring	GDS	56	REST	4-Oct	10:31	NA	20.52	0.00	53.35	5-Oct	16:10	6.60	22.6	2,070	0.6	-172.1	5.1	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
KWB-5	Monitoring	GDS	57	REST	4-Oct	10:17	NA	20.59	0.00	37.68	5-Oct	15:20	6.69	24.8	2,800	1.5	-135.0	3.1	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	-	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	
MW-111	Monitoring	GDS	58	REST	4-Oct	10:11	NA	21.51	0.00	40.83	4-Oct	16:40	6.56	24.4	2,360	1.1	-108.4	19.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
KWB-6	Monitoring	GDS	59	REST	4-Oct	9:59	NA	18.35	0.00	36.44	4-Oct	15:50	6.55	22.5	1,982	0.6	-236.1	2.1	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	-	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	
MW-112	Monitoring	GDS		REST	4-Oct	10:05	18.10	18.14	0.04	37.54										Yes	Yes	Yes	Yes	Y	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d
MW-132	Monitoring	GDS		REST	4-Oct	9:54	16.09	16.60	0.51	42.66										Yes	Yes	Yes	Yes	Y	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d
MW-57	Monitoring	GDS	60	REST	4-Oct	9:40	NA	12.68	0.00	34.32	5-Oct	11:20	6.73	20.1	4,730	1.9	44.0	9.7	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
RW-#11-0 ^a	Recovery ^d	GDS		REST	4-Oct	9:37	NA	15.70	0.00	22.20										Yes	Yes	Yes	Yes	SA	SA	A	-	A	A	-	-	A	A	A	
KWB-9	Monitoring	GDS		REST			Historically-obstructed @ 15.11'																Yes	SA ^d	A ^d	A ^d	-	A ^d	A ^d	A ^d	A ^d	A ^d	A ^d	A ^d	
KWB-12A	Monitoring	GDS	61	REST	4-Oct	9:48	NA	15.35	0.00	25.03	5-Oct	12:05	6.72	21.4	3,880	4.3	59.2	4.7	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
KWB-12B	Monitoring	GDS	62	REST	4-Oct	9:50	NA	15.20	0.00	39.39	5-Oct	12:45	6.77	20.8	3,570	3.9	-74.1	2.0	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
KWB-2R	Monitoring	GDS	63	REST	4-Oct	11:14	NA	18.85	0.00	39.41	5-Oct	14:35	6.75	22.7	3,110	0.4	-294.8	1.9	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	-	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	
MW-58	Monitoring	GDS	64	REST	4-Oct	11:19	NA	17.67	0.00	33.06	5-Oct	13:50	6.67	21.3	1,820	0.3	-220.2	5.1	Clear	Yes	Yes	Yes	Yes	SA	SA	SA ^d	-	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	
KWB-13	Monitoring	GDS		REST	4-Oct	11:01	NA	21.19	0.00	33.10										Yes	Yes	Yes	Yes	SA	A	A	-	A	A	A	A	A	A	A	
MW-103	Monitoring	SCU		REST	4-Oct	13:10	NA	15.67	0.00	25.22										Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A	
MW-104	Monitoring	SCU	65	REST	4-Oct	13:15	NA	14.71	0.00	21.97	4-Oct	13:45	6.68	29.0	1,244	1.2	-286.7	1.8	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-64	Monitoring	SCU	66	REST	4-Oct	9:05	NA	16.22	0.00	34.08	4-Oct	14:35	6.88	28.9	2,580	1.3	-296.1	2.4	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	
MW-65	Monitoring	SCU	67	REST	4-Oct	8:50	12.54	12.55	0.01	28.78	4-Oct	15:15	6.73	27.5	2,260	1.3	-188.6	4.6	Clear	Yes	Yes	Yes	Yes	Y	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d
RW-5	Recovery ^d	SCU		S Refinery			Not in gauging program																Y	-	-	-	-	-	-	-	-	-	-	-	
RW-5R	Recovery ^d	SCU		REST	4-Oct	9:20	14.60	14.68	0.08	35.30										Yes	Yes	Yes	Yes	Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d
MW-102	Monitoring	SCU	68	REST	4-Oct	9:30	NA	12.50	0.00	26.45	4-Oct	16:00	6.78	25.9	2,610	1.3	-319.3	3.9	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d
RW-4	Recovery ^d	SCU		REST	4-Oct	9:55	NA	10.88	0.00	36.62										Yes	Yes	Yes	Yes	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
RW-6	Recovery ^d	SCU		REST	4-Oct	9:40	NA	12.69	0.00	34.90										Yes	Yes	Yes	Yes	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
MW-99	Monitoring	SCU	69	REST	4-Oct	10:10	NA	14.01	0.00	27.80	5-Oct	13:15	6.84	25.2	1,713	1.3	-307.1	6.1	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d
MW-66	Monitoring	SCU	70	REST	4-Oct	10:15	NA	12.82	0.00	29.80	5-Oct	12:30	6.91	24.2	1,685	1.3	-163.7	2.4	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
MW-28	Monitoring	SCU	71	REST	4-Oct	10:25	NA	18.33	0.00	34.55	4-Oct	17:45	6.61	25.3	3,440	1.3	-328.4	3.8	Clear	Yes	Issue	Issue	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
MW-59	Monitoring	SCU		REST	4-Oct	10:35	NA	6.06	0.00	32.72										Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A	
MW-60	Monitoring	SCU	72	REST	4-Oct	10:40	NA	7.39	0.00	37.78	4-Oct	16:40	6.75	27.5	3,630	2.0	-293.8	2.2	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
MW-107	Monitoring	SCU	73	REST	4-Oct	10:48	NA	8.95	0.00	19.05	5-Oct	11:40	6.90	25.1	2,170	1.1	-273.1	4.0	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-128	Monitoring	SCU	74	REST	4-Oct	10:55	NA	11.62	0.00	35.35	5-Oct	10:45	6.78	24.0	2,170	1.3	-38.8	27.5	V. Sl. Cloudy	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	

Table 1: Gauging Data, Groundwater Field Parameters and Well Inspections, 2H16
Navajo Refining Company - Artesia Refinery, Artesia, New Mexico

Well ID	Well Type	HMI Use	HMI Use (# Samp Wells)	Hydrologic Monitoring-Collected Data (Gauging/Groundwater Field Parameter/Well Inspection)																	PSH Expected?	Analytical Suite and Frequency ^c													
				Location																		Gauging Frequency													
				Gauge Date	Gauge Time	Depth to LNAPL (ft btoc)	Depth to Water (ft btoc)	LNAPL Column (ft)	Total Depth (ft btoc)	Sample Date	Sample Time	pH (S.U.)	T (C)	Spec. Cond. (umho/cm)	D. O. (mg/l)	ORP (mg/l)	Turb. (NTU)	Water Clarity	Cap	Casing	Well Secured	Label	Purge Parameters	DRO	GRO	VOC	Metals (As, Ba, Cr, Fe, Pb, Mn, Se)	Metals (Hg, Ni, V, B, Cd, Co, U)	Cyanide	Cations/Anions	Nitrates / Nitrites as Nitrogen	TDS			
MW-125	Monitoring	SCU	75	REST	4-Oct	11:05	NA	6.86	0.00	28.31	5-Oct	8:30	6.92	20.9	4,460	0.9	117.9	1.7	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-116	Monitoring	SCU	76	REST	4-Oct	11:10	NA	2.88	0.00	27.63	5-Oct	9:15	6.90	22.4	3,590	1.9	97.7	2.8	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-46R	Monitoring	SCU	77	TMD	4-Oct	11:20	NA	2.84	0.00	19.36	5-Oct	10:00	6.81	25.2	4,190	1.3	94.1	5.0	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	-	-	SA	SA	SA	
RW-#15C ^a	Recovery ^d	SCU		REST	4-Oct	11:45	NA	12.74	0.00	22.30										Yes	Yes	Yes	Yes	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
MW-48	Monitoring	SCU	78	REST	4-Oct	11:55	NA	15.19	0.00	32.00	5-Oct	14:05	6.78	26.0	3,390	1.4	-305.6	4.2	Clear	Yes	Yes	Issue	Yes	SA	SA ^a	SA ^a	SA ^a	SA ^a	-	-	SA ^a	SA ^a	SA ^a		
MW-130	Monitoring	SCU	79	REST	4-Oct	12:00	NA	17.18	0.00	45.00	5-Oct	15:00	6.77	26.5	3,050	1.6	-102.1	7.7	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
KWB-4	Monitoring	SCU		REST	4-Oct	12:05	20.98	21.53	0.55	41.75			No sampling (LNAPL 0.03' or greater)						Yes	Yes	Yes	Yes	Y	SA	SA ^a	SA ^a	-	SA ^a	SA ^a	-	-	SA ^a	SA ^a	SA ^a	
RW-19	Recovery ^d	SCU		REST	4-Oct	12:10	21.32	21.53	0.21	NM										Yes	Yes	Yes	Yes	Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d
MW-52	Monitoring	SCU	80	REST	4-Oct	12:30	NA	15.07	0.00	34.67	5-Oct	15:25	6.91	22.3	2,680	0.5	-130.6	4.5	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-109	Monitoring	SCU	81	REST	4-Oct	12:40	NA	13.50	0.00	29.48	5-Oct	13:55	6.88	24.0	3,290	0.6	-366.5	3.9	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-110	Monitoring	SCU	82	REST	4-Oct	12:45	NA	11.93	0.00	29.75	5-Oct	14:40	7.24	23.0	1,910	0.5	-259.0	8.0	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
UG-2	Monitoring	SCU		REST															Yes	Yes	Yes	Yes	A	A	A	A	A	A	A	A	A	A	A		
UG-3R	Monitoring	SCU		REST															Yes	Yes	Yes	Yes	A	A	A	A	A	A	A	A	A	A	A		
UG-1	Monitoring	SCU		REST															Yes	Yes	Yes	Yes	A	A	A	A	A	A	A	A	A	A	A		
UG-4	Monitoring	SCU		REST															Yes	Yes	Yes	Yes	A	A	A	A	A	A	A	A	A	A	A		
MW-101	Monitoring	TAB	83	REST	4-Oct	9:15	NA	10.78	0.00	26.85	4-Oct	15:15	6.68	24.6	2,010	0.9	-95.7	5.5	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-105	Monitoring	TAB	84	REST	4-Oct	9:00	NA	6.46	0.00	17.20	5-Oct	8:25	6.69	22.7	1,270	1.0	-379.2	10.4	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	
RW-2	Recovery ^d	TAB		REST	4-Oct	11:20	NA	10.38	0.00	36.12									Yes	Yes	Yes	Yes	SA	A ^d	A ^d	A ^d	A ^d	A ^d	-	-	A ^d	A ^d	A ^d		
MW-61	Monitoring	TAB	85	REST	4-Oct	13:20	NA	7.88	0.00	29.30	5-Oct	8:35	7.35	23.5	2,890	0.7	-358.3	1.2	Clear	Yes	Yes	Cracked pad	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-62	Monitoring	TAB	86	REST	4-Oct	11:40	NA	10.65	0.00	29.50	5-Oct	9:20	6.46	21.8	3,920	0.8	-367.1	2.1	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-93	Monitoring	TAB	87	REST	4-Oct	11:30	NA	6.03	0.00	20.23	5-Oct	10:15	6.47	23.5	3,310	0.9	-351.9	9.8	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-43	Monitoring	TAB	88	REST	4-Oct	12:00	NA	6.93	0.00	19.67	5-Oct	13:20	6.74	24.6	6,400	0.8	-404.1	6.4	Clear	Yes	Yes	No pad	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
MW-137	Monitoring	TAB	89	REST	4-Oct	12:20	NA	5.10	0.00	29.60	5-Oct	11:55	6.67	25.2	5,530	3.6	-400.9	21.1	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
MW-138	Monitoring	TAB	90	REST	4-Oct	12:10	NA	6.75	0.00	24.81	5-Oct	12:25	6.54	31.4	3,520	1.4	-353.7	7.6	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
MW-23	Monitoring	TAB	91	REST	4-Oct	11:50	NA	10.30	0.00	23.10	5-Oct	11:05	6.73	27.5	3,210	1.3	-344.8	119.0	Cloudy	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
TEL-4	Monitoring	TAB	92	TEL	4-Oct	13:10	NA	6.14	0.00	27.27	5-Oct	10:25	6.85	22.1	5,030	0.7	-351.3	0.8	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
TEL-3	Monitoring	TAB	93	TEL	4-Oct	13:00	NA	4.89	0.00	27.19	5-Oct	13:20	6.78	23.5	2,050	0.4	-346.8	0.8	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
TEL-2	Monitoring	TAB	94	TEL	4-Oct	12:50	NA	5.63	0.00	27.20	5-Oct	12:35	6.67	23.4	3,560	0.5	-352.3	0.5	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
TEL-1	Monitoring	TAB	95	TEL	4-Oct	12:40	NA	4.74	0.00	27.00	5-Oct	11:40	6.90	22.1	3,260	0.4	-321.4	0.5	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
MW-39	Monitoring	TAB	96	REST	4-Oct	9:45	NA	5.28	0.00	25.44	5-Oct	14:35	6.76	25.5	6,820	0.6	-355.7	1.2	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	

Table 1: Gauging Data, Groundwater Field Parameters and Well Inspections, 2H16
Navajo Refining Company - Artesia Refinery, Artesia, New Mexico

Well ID	Well Type	HMI Use	HMI Use (# Samp Wells)	Hydrologic Monitoring-Collected Data (Gauging/Groundwater Field Parameter/Well Inspection)																PSH Expected? ^b	Analytical Suite and Frequency ^c														
				Location																	Gauging Frequency														
				Gauge Date	Gauge Time	Depth to LNAPL (ft btoc)	Depth to Water (ft btoc)	LNAPL Column (ft)	Total Depth (ft btoc)	Sample Date	Sample Time	pH (S.U.)	T (C)	Spec. Cond. (umho/cm)	D. O. (mg/l)	ORP (mg/l)	Turb. (NTU)	Water Clarity	Cap	Casing	Well Secured	Label	Purge Parameters	DRO	GRO	VOC	Metals (As, Ba, Cr, Fe, Pb, Mn, Se)	Metals (Hg, Ni, V, B, Cd, Co, U)	Cyanide	Cations/Anions	Nitrates / Nitrites as Nitrogen	TDS			
MW-98	Monitoring	TAB	97	REST	4-Oct	13:30	NA	6.53	0.00	26.80	5-Oct	9:25	6.93	20.1	3,150	0.6	-362.3	0.7	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
RW-10	Recovery ^d	TAB		REST	4-Oct	9:50	NA	7.09	0.00	23.77									Issue	Yes	Issue	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A	
MW-40	Monitoring	TAB		REST	4-Oct	10:00	NA	3.32	0.00	24.75									Yes	Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A	
MW-41	Monitoring	TAB		REST	4-Oct	10:20	NA	3.40	0.00	21.56									Yes	Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A	
RW-9	Recovery ^d	TAB		REST	4-Oct	10:30	NA	6.39	0.00	21.97									Yes	Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A	
MW-42	Monitoring	TAB		REST	4-Oct	10:40	NA	6.49	0.00	24.32									Yes	Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A	
MW-29	Monitoring	TAB	98	REST	4-Oct	10:10	NA	7.53	0.00	22.00	5-Oct	15:25	6.68	26.7	3,950	0.6	-301.0	0.7	Clear	Yes	Yes	Issue	Yes	SA	SA	SA	SA	SA	-	-	SA	SA	SA		
RW-#16B ^a	Recovery ^d	TAB		REST	4-Oct	10:50	NA	9.38	0.00	17.70									Yes	Yes	Issue	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A	
MW-30	Monitoring	TAB		REST	4-Oct	11:00	NA	8.06	0.00	23.50			Not in sampling program						Yes	Yes	Yes	Yes	Yes	SA	Not in sampling program										
MW-56	Monitoring	TAB	99	NCL	4-Oct	11:05	NA	9.56	0.00	26.50	5-Oct	14:15	6.79	24.1	4,050	1.4	-282.5	4.4	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	-	-	SA	SA	SA	
MW-49	Monitoring	TAB	100	TEL	4-Oct	9:25	NA	6.75	0.00	33.15	4-Oct	16:15	7.03	25.1	3,160	0.6	-350.2	1.6	Clear	Yes	Non-std	Bad Hinge	Yes	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	
MW-106	Monitoring	TAB	101	REST	4-Oct	9:35	NA	5.79	0.00	22.80	4-Oct	17:15	6.76	25.3	3,560	0.6	-360.0	1.0	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-45	Monitoring	TAB	102	NCL	4-Oct	14:10	NA	3.83	0.00	15.05	4-Oct	14:35	6.91	22.8	5,120	0.4	-65.7	0.5	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	SA	SA	SA	SA	SA	
MW-50	Monitoring	CJH	103	REST	4-Oct	10:35	NA	12.51	0.00	28.22	5-Oct	9:50	6.93	22.6	8,480	1.0	88.5	3.0	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	-	-	SA	SA	SA	
MW-97	Monitoring	CJH		REST	4-Oct	10:23	7.98	8.03	0.05	21.20			No sampling (LNAPL 0.03' or greater)						Yes	Yes	Yes	Yes	Y	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	
MW-92	Monitoring	CJH	104	REST	4-Oct	10:10	9.53	9.54	0.01	22.60	5-Oct	11:20	6.73	25.2	3,450	0.9	-331.0	3.6	Clear	Yes	Yes	Yes	Yes	Y	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d
RW-1	Recovery ^d	CJH		REST	4-Oct	10:48	NA	8.49	0.00	35.39									Yes	Yes	Yes	Yes	Yes	SA	A ^d	A ^d	A ^d	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
MW-91	Monitoring	CJH	105	REST	4-Oct	11:01	NA	8.86	0.00	25.35	5-Oct	10:35	6.54	23.3	2,560	1.0	-382.5	9.4	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	
MW-90	Monitoring	CJH	106	REST	4-Oct	11:12	NA	9.24	0.00	22.80	5-Oct	12:05	7.59	22.7	4,960	1.1	-130.1	8.5	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-96	Monitoring	CJH	107	REST	4-Oct	11:22	NA	8.76	0.00	25.57	5-Oct	12:45	6.74	23.0	2,620	1.2	-341.0	11.4	Clear	Yes	Closure	Issue	Yes	SA	SA	SA	SA	SA	SA	-	-	SA	SA	SA	
MW-94	Monitoring	CJH	108	REST	4-Oct	11:35	NA	10.95	0.00	23.45	5-Oct	13:30	6.73	24.6	3,340	2.5	-397.7	8.6	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	
RW-8	Recovery ^d	CJH		REST	4-Oct	11:50	19.02	19.10	0.08	37.19									Yes	Yes	Yes	Yes	Y	SA	A ^d	A ^d	-	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
MW-67	Monitoring	CJH	109	REST	4-Oct	12:02	NA	8.49	0.00	27.30	5-Oct	14:10	6.66	23.7	2,750	1.6	-347.9	6.2	Clear	Yes	Yes	Yes	Yes	SA	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d	SA ^d
MW-95	Monitoring	CJH		REST	4-Oct	12:13	NA	10.91	0.00	25.37									Yes	Yes	Yes	Yes	Yes	SA	A	A	A	A	A	-	-	A	A	A	
RW-7	Recovery ^d	CJH		REST	4-Oct	12:25	NA	13.42	0.00	37.00									Yes	Yes	Yes	Yes	Yes	SA	A ^d	A ^d	A ^d	A ^d	A ^d	-	-	A ^d	A ^d	A ^d	
NCL-34A	Monitoring	CJH	110	NCL	4-Oct	12:34	NA	8.36	0.00	19.31	5-Oct	14:55	6.51	24.6	2,240	1.2	-347.9	3.7	Clear	Issue	Yes	Yes	Yes	SA	SA ^d	SA ^d	-	SA ^d	SA ^d	-	-	SA ^d	SA ^d	SA ^d	
NCL-33	Monitoring	CJH	111	NCL	4-Oct	12:45	NA	6.37	0.00	19.60	5-Oct	15:05	6.66	24.3	3,180	1.2	-217.7	4.6	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	-	-	SA	SA	SA	
NCL-44	Monitoring	CJH	112	NCL	4-Oct	12:55	NA	6.39	0.00	21.57	4-Oct	15:45	6.87	22.9	2,880	1.3	-257.2	9.4	Clear	Issue	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	-	-	SA	SA	SA	
NCL-32	Monitoring	CJH	113	NCL	4-Oct	8:30	NA	6.39	0.00	20.06	5-Oct	15:40	7.04	22.9	2,770	2.1	-95.4	21.4	Clear	Yes	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	-	-	SA	SA	SA	
MW-108	Monitoring	CJH	114	NCL	4-Oct	13:55	NA	10.54	0.00	27.74	4-Oct	14:20	6.94	24.9	3,120	1.5	-342.1	31.6	Sl Cloudy	Yes	Yes	Yes	Yes	SA	SA	SA	-	SA	SA	-	-	SA	SA	SA	

Table 1: Gauging Data, Groundwater Field Parameters and Well Inspections, 2H16
Navajo Refining Company - Artesia Refinery, Artesia, New Mexico

Well ID	Well Type	HMI Use	HMI Use (# Samp Wells)	Location		Hydrologic Monitoring-Collected Data (Gauging/Groundwater Field Parameter/Well Inspection)																	PSH Expected? ^b	Analytical Suite and Frequency ^c																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

Notes: Abbreviations:

A = Annual (Mar/Apr event)
B = Biennial (starts Mar/Apr 2011)
BR = Bolton Road
DRO = Diesel Range Organics
E = East
EP = Evaporation Ponds
ft bgs = ft below ground surface
ft btoc = ft below top of casing
ft MSL = ft Mean Sea Level
GRO = Gasoline Range Organics
HR = Haldeman Road
in = inches
N = North
NA = Not accessible
NAPI = North API Separator
NCL = North Colony Landfarm
NE = Northeast

NW = Northwest
OCD = Oil Conservation District
PSH = Phase Separated Hydrocarbon
ROW = right of way
RR = Richey Road
S = South
SA = Semi-annual (Mar/Apr and Sep/Oct events)
SE = Southeast
SW = Southwest
TMD = Three Mile Ditch
TEL = Tetra Ethyl Lead Impoundment
UG = Upgradient
US285 = U.S. Highway 285
US82 = U.S. Highway 82
VOC = Volatile Organic Compounds
W = West
Y = Yes

Footnotes:

^a Well const. info. provided where available. TOC & ground surface elevs relative to benchmark G-416. Total depth based on 4/2010 measurements.

^b PSH was present during March 2012 gw monitoring event or a recovery pump is in place. Note that recovery wells are gauged at least monthly.

^c Analytical Suite to include the following:

1. Purge parameters to be measured and recorded in the field will include pH, temp, spec. cond., diss. oxy., and oxidation-reduction potential.
2. DRO by Method 8015Mod.
3. GRO by Method 8015Mod.
4. VOCs by Method 8260, to include methyl tert butyl ether (MTBE).
5. Total metals by Method 6010/6020 and/or 7470. Specific metals shown in heading, abbreviations from periodic chart (incl B, Cd, Co, U, per 3-7-16 State request).
6. Dissolved metals - same list as total metals but only analyzed during March/April event (field filtered by HMI)
7. Cyanide by Method SM4500.
8. Cations/anions to include Calcium, Potassium, and Sodium by Method 6010 or 6020 and Sulfate, Chloride and Fluoride by Method 300.
9. Nitrates/Nitrites as Nitrogen by Method 300.
10. Total Dissolved Solids by Method 2540C.

"-" indicates parameter not required.

Note - samples will not be collected from any well where PSH is measured to be 0.03 feet thick or greater.

^d Samples to be collected at frequency indicated only if <0.03 feet of PSH is present.

^e Recovery trenches 11, 15, 16, 17 and 18 have multiple vertical "wells". Gauging & sampling points are: RW #11-Q, RW #15C, RW #16B, RW #17A and RW #18A.

 = Well with current or former LNAPL (light nonaqueous phase liquid)



Hydrologic Monitoring

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M E M O R A N D U M

Groundwater Monitoring Standard Operating Procedures Navajo Refining Company – Artesia, New Mexico

HMI conducts low-flow groundwater sampling in accordance with the Site's Sampling and Analysis Plan and EPA guidance (including Puls and Barcelona, 1996 EPA Guidance on Low-Flow Groundwater Sampling, and Yeskis & Zavala, 2002, EPA/542:S-02/00, Groundwater Sampling Guidelines for Superfund and RCRA Project Managers).

Groundwater Sampling Methodology

HMI conducts low-flow groundwater sampling using a peristaltic pump and dedicated polyethylene tubing at wells with requisite depths-to-water. At limited wells with depths-to-water greater than peristaltic range, low-flow groundwater sampling is conducted using dedicated or non-dedicated bladder pumps. Sample intakes are generally set at mid-screen, when possible (and no nearer than two feet from the base of the well, when possible). Sample intake depths are permanently marked, ensuring that future sampling events consistently monitor the targeted water-bearing interval. During sampling with a peristaltic pump, the sample tube is attached to the pump using a one-foot section of dedicated, flexible silicone tubing (item #5703, Geotech Environmental Equipment, Inc.). A two-foot segment of polyethylene tubing connects the silicone tubing in the pump to the flow-through cell, using a disposable segment of silicone tubing. Purging commences through a sealed flow-through cell at EPA-recommended purge rates (generally 0.1 to 0.2 liters/minute), while drawdown is monitored in the well. Groundwater field parameter readings are collected at 0.5-liter intervals (generally the equivalent of one cell volume "turnover"). Field parameters of pH, specific conductivity, temperature, dissolved oxygen, and oxidation-reduction potential are monitored inside the cell. Turbidity is monitored outside of the cell. Groundwater field instrumentation is calibrated daily, per manufacturer specifications. The field instrument calibration log is included in the HMI deliverables package. Purging continues until a requisite volume of groundwater is purged (generally a minimum of 3,000 ml or six flow-through cell volumes), and field parameters have stabilized in accordance with EPA guidance:

*Water Quality Parameters (Stabilization Parameters in Accordance with EPA (2002),
Groundwater Sampling Guidelines for Superfund and RCRA Project Managers, Yeskis & Zavala,
EPA/542:S-02/001)*

• pH	+/- 0.1 units;
• Temperature	-
• Conductivity	+/- 3%
• Dissolved Oxygen	+/- 0.3 mg/L
• ORP	+/- 10%
• Turbidity	10%

Just prior to sampling, the input tubing to the flow-through cell is disconnected from the disposable silicone receiving tubing on the input barb on the flow-through cell, and groundwater samples are collected directly into laboratory-supplied containers. Groundwater samples are placed in iced coolers, and remain in HMI's custody until delivered to ESC Lab Sciences via FedEx-overnight. Peristaltic tubes and/or downhole bladder pumps/tubing for non-dedicated bladder pumps, may be dedicated in respective wells. Alternatively, dedicated tubing may be retrieved, bagged, labeled and stored at HMI. In the unlikely event of wells with limited water columns, sampling may be conducted with disposable bailers. Grab samples are collected at operating recovery wells and irrigation wells scheduled for sampling. The purging and sampling process at each sampled well is documented on groundwater sampling field forms.

Cross-Contamination Prevention Program

Dedicated bladder pumps and/or dedicated peristaltic tubing are used as possible, minimizing potential cross-contamination issues during the groundwater monitoring process. Remaining non-dedicated equipment (e.g., non-dedicated bladder pumps, electronic gauging probe, etc.) is properly decontaminated prior to use and between wells. The decontamination procedure may include a combination of chemical and mechanical decontamination. For example, scrubbing with ethyl alcohol (isopropanol) as warranted, followed by scrubbing using an Alconox-water solution, and distilled water rinse. The decontamination procedure for non-dedicated bladder pumps consists of cycling an Alconox-water solution through the pump's bladder. Distilled water is then cycled through the pump's bladder, followed by decontaminating the exterior body of the pump, using methods above.

HMI Deliverables

HMI provides accurate field documentation of all groundwater monitoring activities, with a brief narrative, a summary table (including gauging data, field parameters, well inspection data, and scheduled analytical scope), and a Groundwater Monitoring SOP Memo. Groundwater sampling forms, field instrument calibration log, and Chain-of-Custody forms are also provided.

Hydrologic Monitoring
for TRC
Houston, Texas

Date	Time	Sample I.D.	Depth to Water (FI-TOC)	pH (std units)	T (°C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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- 6B**

Event: Fall 2016 (Semiannual)

Area of Concern:

EP

(Gauge only)

(2 in ; stick up)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **MBB**

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	
10/4/16	400	NA	11.55	0.0	32.23	42.27	Yes	Yes	Yes	Yes		Weather: Clear 70°

Well Purging Record

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

Well Sampling Record

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

Event: Fall 2016 (Semiannual)

Area of Concern: EP

Hydrologic Monitoring

for TRC

Houston, Texas

* Oil absorbent sock in well (correctly gauged w/ sock removed)

(4 in.) Stickup

Initials: MDR

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1750	9.20	9.65	0.45	20.34	NA	Yes	Yes	Yes	Yes		Weather: Clear 80°

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
		MW-85										Lab: ESC Lab Sciences, Mt. Juliet, TN
						Not Sampled				DRO	HCL	8015M ✓
										GRO	HCL	8015M ✓
										VOC	HCL	8260 ✓
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020 ✓
										Total Metals (Hg,Ni,V,B,Cd,Cr,U)	HNO3	6010/6020 and/or 7470 ✓
										Anions (Chloride,Fluoride,Sulfate)	Neat	300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										Sulfide	NaOH	SM4500 ✓

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

* Oil absorbent sock in well
(Correctly gauged w/ sock removed)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-86

Event: Fall 2016 (Semiannual)

Area of Concern: EP

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: MDR

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1810	8.89	8.96	0.07	19.21	NA	Yes	Yes	Yes	Yes		Weather: (Less 28°)

Well Purging Record

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

Well Sampling Record

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

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **MW-120**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

(2-in; stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **map**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	915	NA	11.65	0.0	28.00	17.5	Yes	Yes	Yes	Yes		Weather: Clear 70°
10-4-16	1655	NA	11.63									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-4-16	1700	11.89	0.5	7.32	23.6	8230	1.4	-126.6	7.4	Clear	Low-flow groundwater sample:
	1702	11.90	1.0	7.25	22.7	8220	0.6	-125.2	7.1		A) peristaltic pump w/ ded tubing
	1705	11.90	1.5	7.23	22.4	8250	0.5	-125.5	6.8		B) ded bladder pump
	1707	11.90	2.0	7.21	22.1	8140	0.5	-125.0	5.9		C) non-ded bladder pump; or
	1710	11.90	2.5	7.14	21.9	8100	0.4	-125.5	5.5		Standard groundwater sample:
	1712	11.90	3.0	7.12	21.8	8080	0.4	-125.0	4.7		D) bailer due to limited column; or
	1715	11.90	3.5	7.18	21.8	8060	0.4	-124.9	2.9		E) recovery well cycling sample
	1717	11.90	4.0	7.17	21.7	8040	0.4	-124.7	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
10-4-16	1720	MW-120	11.90	7.17	21.7	8040	0.4	-124.7	2.2	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
										Total Metals (Hg,Al,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: EP

Hydrologic Monitoring

for TRC

Houston, Texas

(2-in; stickup)

Initials: ADP

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	935	NA	11.67	0.0	27.32	17.5	Yes	Yes	Yes	Yes		Weather: <u>Clear 70's</u>
10-4-16	1600	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	Comments
10-4-16	1605	11.77	0.5	7.76	24.5	6620	1.5	16.8	27.9	Sl. Cloudy	Low-flow groundwater sample;
	1607	11.81	1.0	7.64	23.8	6650	0.9	15.3	14.7	Clear	(A) peristaltic pump w/ ded tubing
	1610	11.85	1.5	7.53	23.9	6690	0.6	12.2	8.9		B) ded bladder pump
	1612	11.89	2.0	7.43	23.1	6705	0.5	5.4	8.1		C) non-ded bladder pump; or
	1615	11.93	2.5	7.39	23.1	6690	0.4	-2.2	7.9		Standard groundwater sample;
	1617	11.95	3.0	7.34	22.8	6670	0.4	-8.7	7.4		D) bailer due to limited column; or
	1620	11.97	3.5	7.30	22.8	6650	0.4	-10.4	6.9		E) recovery well cycling sample
	1622	12.01	4.0	7.29	22.8	6620	0.4	-13.7	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
10-4-16	1625	MW-121	12.01	7.29	22.8	6620	0.4	-13.7	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
										Total Metals (Hg,Ni,V,B,Cd,Cr,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

**Hydrologic Monitoring
for TRC
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	
10-4-16	925	NA	7.42	0.0	20.56	15.2	Yes	Yes	Yes	Yes		Weather: Clear 20's
10-5-16	1235	NA	7.46	0.0	20.56	15.2						

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-122

Event: Fall 2016 (Semiannual)

Area of Concern: EP

Hydrologic Monitoring

for TRC

Houston, Texas

(4 in ; Stick up)

Initials: MDR

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	940	NA	9.80	0.0	23.31	18.4	Yes	Yes	Yes	Yes		Weather: Clear 70°
10-4-16	1435	NA	9.77									

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
10-4-16	1440	10.31	0.5	7.74	23.2	8280	1.6	-126.4	16.4	Clear	Low-flow groundwater sample;
	1442	10.45	1.0	7.49	22.5	8250	0.8	-115.2	14.7		A) peristaltic pump w/ ded tubing
	1445	10.57	1.5	7.40	22.6	8150	0.6	-111.1	12.9		B) ded bladder pump
	1447	10.69	2.0	7.33	21.7	8000	0.6	-109.0	10.1		C) non-ded bladder pump; or
	1450	10.78	2.5	7.27	21.6	7940	0.5	-107.2	9.9		Standard groundwater sample;
	1455	10.82	3.0	7.24	21.6	7870	0.5	-107.2	6.4		D) bailer due to limited column; or
	1500	10.85	3.5	7.22	21.6	7820	0.5	-106.9	6.1		E) recovery well cycling sample
	1505	10.88	4.0	7.20	21.6	7790	0.5	-106.5	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
10-4-16	1510	MW-122	10.88	7.20	21.6	7790	0.5	-106.5	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
										Total Metals (Hg,Ni,V,B,Cd,Cr,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-81

Event: Fall 2016 (Semiannual)

Area of Concern:

EP

(Gauge only)
(4-in. Stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: MDG

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	945	NA	10.10	0.0	18.63	13.70	Yes	Yes	Yes	Yes		Weather: Clear 70°

Well Purging Record

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

Well Sampling Record

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

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

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Event: Fall 2016 (Semiannual)

(Gauge only)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: *mm*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	953	NA	8.28	0.0	19.69	14.67	Yes	Yes	Yes	Yes		Weather: Clear 80's

[illegible]

Date	Time	Sample I.D.	Depth to Water (FI-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Total Metals (Hg,Ni,V,B,Cd,Co,U)					HNO3	6010/6020 and/or 7470
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
						Nitrate-Nitrite					H2SO4	per historical, ESC Lab Sciences
						TDS					Neat	2540C
						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: Fall 2016 (Semiannual)

Area of Concern: EP

+ EB-EP-04
(same analysis)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: MDS/SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1000	NA	9.20	0.0	19.25	15.0	Yes	Yes	Yes	Yes		Weather: Clear 80's
10/5/16	1235	NA	9.26	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1240	9.34	0.5	7.64	23.1	7690	3.1	-115.3	13.5	Clear	Low-flow groundwater sample:
	1242	9.38	1.0	7.53	22.1	7370	2.2	-116.8	10.5		(A) peristaltic pump w/ ded tubing
	1245	9.41	1.5	7.46	21.4	7190	1.8	-118.5	10.1		B) ded bladder pump
	1247	9.45	2.0	7.39	21.0	7000	1.5	-119.7	9.9		C) non-ded bladder pump; or
	1250	9.49	2.5	7.35	20.9	6920	1.3	-120.5	9.7		Standard groundwater sample:
	1252	9.53	3.0	7.32	20.8	6890	1.2	-122.9	9.4		D) bailer due to limited column; or
	1255	9.56	3.5	7.30	20.8	6880	1.1	-123.5	9.2		E) recovery well cycling sample
	1257	9.59	4.0	7.30	20.8	6870	1.1	-124.1	9.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1300	MW-79	9.59	7.30	20.8	6870	1.1	-124.1	9.1	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
										Total Metals (Hg,Ni,V,B,Cd,Cr,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
	1315	EB-EP-04	NA							Same as above		Same

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

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Event: Fall 2016 (Semiannual)

Area of Concern:

Hydrologic Monitoring
for TRC
Houston, Texas

EP

1) (gauge only)
(4 in, sticks up)

Initials: MSH

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
												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)					HNO ₃	6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO ₃	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H ₂ SO ₄	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: EP

+ EB-EP-01
(same analysis)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: MDP/SCD

Date	Time	Depth to LNAPL (FL-TOC)	Depth to Water (FL-TOC)	LNAPL Thickness (Ft)	Well Total Depth (FL-TOC)	Sample Intake (FL-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1015	NA	8.17	0.0	20.19	14.8	Yes	Yes	Yes	Yes		Weather: Clear 80's
10/5/16	1140	NA	8.23	0.0								

Well Purging Record

Date	Time	Depth to Water (FL-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1145	8.28	0.5	7.40	23.7	13,060	2.0	10.5	10.5	Clear	Low-flow groundwater sample:
	1147	8.31	1.0	7.29	22.6	13,360	1.5	20.7	9.8		A) peristaltic pump w/ ded tubing
	1150	8.34	1.5	7.23	22.2	13,470	1.1	24.9	9.1		B) ded bladder pump
	1152	8.35	2.0	7.21	22.1	13,500	0.8	27.4	8.6		C) non-ded bladder pump; or
	1155	8.35	2.5	7.18	22.0	13,540	0.8	30.8	5.4		Standard groundwater sample:
	1157	8.35	3.0	7.17	21.9	13,550	0.7	32.9	5.1		D) bailer due to limited column; or
	1200	8.35	3.5	7.16	21.9	13,540	0.7	34.1	4.8		E) recovery well cycling sample
	1202	8.35	4.0	7.16	21.9	13,540	0.7	35.9	4.6		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (FL-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1205	MW-74	8.35	7.16	21.9	13,540	0.7	35.7	4.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
										Same as above	Same	Same

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

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

Event: Fall 2016 (Semiannual)

Area of Concern:

EP

(gauge only)

(4-m; status)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: *M. H.*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1025	NA	8.57	0.0	14.60	14.60	Yes	Yes	Yes	Yes		Weather: Clear 86°

Date	Time	Depth to Water (FL-TOC)	Cum. 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

Date	Time	Sample I.D.	Depth to Water (Fl-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												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
										Total Metals (Hg,Ni,V,B,Sq,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-2A**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

Hydrologic Monitoring

for TRC

Houston, Texas

(2-in ; stickup)

Initials: *mjm*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1040	NB	10.19	0.0	17.3	15.0	Yes	Yes	Yes	Yes		Weather: Clear 80's
10-4-16	1333	NA	10.17									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-4-16	1340	10.44	0.5	7.74	23.7	9450	1.7	-95.7	6.0	Clear	Low-flow groundwater sample:
	1347	10.50	1.0	7.48	23.0	9340	1.0	-77.2	5.7		(A) peristaltic pump w/ ded tubing
	1345	10.54	1.5	7.38	22.9	9160	1.0	-58.9	5.4		B) ded bladder pump
	1347	10.58	2.0	7.77	22.8	8820	0.9	-38.0	5.0		C) non-ded bladder pump; or
	1350	10.67	2.5	7.16	22.7	8540	0.8	-17.3	4.7		Standard groundwater sample:
	1352	10.65	3.0	7.10	22.6	8520	0.8	0.7	4.1		D) bailer due to limited column; or
	1355	10.69	3.5	7.07	22.6	8500	0.8	12.9	3.8		E) recovery well cycling sample
	1357	10.73	4.0	7.04	22.6	8440	0.8	18.5	3.1		F) irrigation well grab sample
	1400	10.77	4.5	7.03	22.6	8440	0.8	22.4	2.7		

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-4-16	1405	MW-2A	10.77	7.03	22.6	8440	0.8	22.4	2.7	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Ce,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

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

Well: MW-23

Event: Fall 2016 (Semiannual)

Area of Concern:

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: *MDZ*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	(Gin; stick up)					Initials: max
							Well Inspection					
							Cap	Casing	Well Secured	Label	Other	Comments
10-4-16	1045	max	9.98	0.0	52.00	No Sample	Yes	Yes	Yes	Yes		Weather: Clear 80's

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-72**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

(gauge only)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **MPB**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1055	N/A	6.59	0.0	13.92	11.93	Yes	Yes	Yes	Yes		Weather: Clear 80's

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: OCB-6

Event: Fall 2016 (Semiannual)

Area of Concern: EP

Hydrologic Monitoring
for TRC
Houston, Texas

Well Inspection Information

(2-in; stickup)

Initials: MDJ

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1105	<u>NA</u>	<u>10.53</u>	<u>0.0</u>	<u>26.91</u>	<u>21.6</u>	<u>Yes</u>	<u>lid cannot close properly</u>	<u>Yes</u>	<u>Yes</u>	<u>Cracked gail</u>	Weather: <u>Clear 80°</u>

Well Purging Record

* Double-checked

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-4-16	1115	<u>10.87</u>	<u>0.5</u>	<u>6.38</u>	<u>22.4</u>	<u>7070</u>	<u>2.7</u>	<u>38.9</u>	<u>22.1</u>	<u>Clear</u>	Low-flow groundwater sample:
	1117	<u>10.87</u>	<u>1.0</u>	<u>6.49</u>	<u>21.9</u>	<u>6950</u>	<u>1.0</u>	<u>44.2</u>	<u>19.4</u>		A) peristaltic pump w/ ded tubing
	1120	<u>10.87</u>	<u>1.5</u>	<u>6.56</u>	<u>21.9</u>	<u>6810</u>	<u>1.0</u>	<u>50.8</u>	<u>15.7</u>		B) ded bladder pump
	1122	<u>10.87</u>	<u>2.0</u>	<u>6.67</u>	<u>22.0</u>	<u>6550</u>	<u>0.9</u>	<u>53.4</u>	<u>9.9</u>		C) non-ded bladder pump; or
	1125	<u>10.87</u>	<u>2.5</u>	<u>6.70</u>	<u>22.1</u>	<u>6550</u>	<u>0.8</u>	<u>46.6</u>	<u>8.5</u>		Standard groundwater sample:
	1127	<u>10.87</u>	<u>3.0</u>	<u>6.71</u>	<u>22.0</u>	<u>6400</u>	<u>0.8</u>	<u>40.6</u>	<u>7.1</u>		D) bailer due to limited column; or
	1130	<u>10.87</u>	<u>3.5</u>	<u>6.72</u>	<u>22.0</u>	<u>6390</u>	<u>0.8</u>	<u>37.4</u>	<u>6.8</u>		E) recovery well cycling sample
	1132	<u>10.87</u>	<u>4.0</u>	<u>6.74</u>	<u>22.0</u>	<u>6400</u>	<u>0.8</u>	<u>33.3</u>	<u>6.1</u>		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-4-16	1135	<u>OCB-6</u>	<u>10.87</u>	<u>6.74</u>	<u>22.0</u>	<u>6400</u>	<u>0.8</u>	<u>33.3</u>	<u>6.1</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
										Total Metals (Hg, Ni, V, B, Cd, Co, U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4600

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

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

Event: Fall 2016 (Semiannual)

Area of Concern: EP

**Hydrologic Monitoring
for TRC
Houston, Texas**

Initials: WJH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1205	NA	9.33	2.0	21.29	16.0	Yes	Yes	Yes	Yes		Weather: Clear

[illegible]

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC ($\mu\text{mho}/\text{cm}$)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
10-4-16	1235	OCB-7AR	4.74	7.01	23.7	7480	0.6	-135.4	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)				HNO ₃		6010/6020
								Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO ₃		6010/6020 and/or 7470
								Anions (Chloride,Fluoride,Sulfate)		Neat		300
										Nitrate-Nitrite	H ₂ SO ₄	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern:

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: *Wpr*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1305	NA	9.11	0.10	56-81	51.85	Yes	Yes	Yes	Yes		Weather: Clear 80's

[illegible]

Date	Time	Sample I.D.	Depth to Water (FL-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern:

EP

(Gauge only)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **mm**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/11/16	1310	NA	8.29	0.0	71.95	NA	Yes	Yes	Yes	Yes		Weather: Clear 80°

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								
			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
												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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **MW-76**

Event: Fall 2016 (Semiannual)

Area of Concern:

EP

(4-in; stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	925	NA	10.04	0.0	20.33	16.0	Yes	Yes	Yes	Yes		Weather: Clear 60's
10/5/16	930	NA	10.08	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	935	10.13	0.5	7.18	22.5	7750	3.4	-85.5	9.3	Clear - odor	Low-flow groundwater sample:
	937	10.13	1.0	6.99	22.0	7660	2.5	-87.5	8.7		A) peristaltic pump w/ ded tubing
	940	10.13	1.5	6.90	21.7	7620	1.9	-92.8	8.4		B) ded bladder pump
	942	10.13	2.0	6.87	21.6	7610	1.5	-95.4	8.2		C) non-ded bladder pump; or
	945	10.13	2.5	6.86	21.6	7600	1.4	-97.1	7.7		Standard groundwater sample:
	947	10.13	3.0	6.85	21.5	7590	1.3	-98.1	7.5		D) bailer due to limited column; or
	950	10.13	3.5	6.85	21.5	7580	1.3	-98.8	7.4		E) recovery well cycling sample
	952	10.13	4.0	6.84	21.5	7580	1.3	-99.2	7.2		F) Irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	955	MW-76	10.13	6.84	21.5	7580	1.3	-99.2	7.2	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
										Total Metals (Hg,Ni,V,B,Cd,Ce,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-77**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

Hydrologic Monitoring
for TRC
Houston, Texas

Well Inspection Information

(4-in; stickup)

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	930	NA	8.22	NA	20.52	15.2	Yes	Yes	Yes	Yes		Weather: Clear - 60's
10/5/16	1015	NA	8.27	0.0								

Well Purging Record

well surrounded with standing water; had to stretch tube

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity		Comments
10/5/16	1020	8.41	0.5	7.02	25.1	7810	3.9	-72.9	10.5	Clear; gold tint; odor		Low-flow groundwater sample:
	1022	8.43	1.0	6.92	24.4	7830	3.4	-74.2	9.8			(B) peristaltic pump w/ ded tubing
	1025	8.45	1.5	6.89	24.0	7830	3.1	-76.2	9.2			B) ded bladder pump
	1027	8.46	2.0	6.87	23.9	7840	2.9	-78.0	8.7			C) non-ded bladder pump; or
	1030	8.47	2.5	6.86	23.8	7840	2.8	-79.8	8.4			Standard groundwater sample:
	1032	8.47	3.0	6.85	23.8	7830	2.8	-80.3	7.9			D) bailer due to limited column; or
	1035	8.47	3.5	6.85	23.7	7830	2.7	-80.9	7.5			E) recovery well cycling sample
	1037	8.47	4.0	6.84	23.7	7840	2.7	-81.5	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
10/5/16	1040	MW-77	8.47	6.84	23.7	7840	2.7	-81.5	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
										Total Metals (Hg,Ni,V,Cd,Cr,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: **EP**

(Gauge only)

(4-in; stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	935	NA	6.78	NA	19.57	14.6	Yes	Yes	Yes	Yes		Weather: Clear, 80s

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Sum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16			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
10/4/16												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
										Total Metals (Hg,Ni,V,B,Cd,Co,Cu)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	\$M4500

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: Fall 2016 (Semiannual)

Area of Concern: **EP**

Hydrologic Monitoring

for TRC

Houston, Texas

(4-in; stickup)

Initials: **SLD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	940	NA	8.43	0.0	23.74	18.4	Yes	Yes	Yes	Yes		Weather: Clear, 70s
10/5/16	1055	NA	8.48	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
10/5/16	1100	8.51	0.5	7.28	24.2	7680	2.6	-97.4	7.9	Clear; 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
	1102	8.51	1.0	7.23	22.2	7670	1.5	-100.3	7.4		
	1105	8.51	1.5	7.20	22.7	7630	1.2	-103.2	6.9		
	1107	8.52	2.0	7.17	22.3	7610	1.0	-106.5	6.2		
	1110	8.52	2.5	7.16	22.1	7610	1.0	-109.0	5.5		
	1112	8.52	3.0	7.15	22.0	7600	0.9	-110.5	4.9		
	1115	8.52	3.5	7.15	22.0	7600	0.9	-111.8	4.6		
	1117	8.52	4.0	7.14	22.0	7600	0.9	-112.5	3.9		

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
10/5/16	1120	MW-75	8.52	7.14	22.0	7600	0.9	-112.5	3.9			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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	GM4500

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: Fall 2016 (Semiannual)

Area of Concern: **EP**

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	945	NA	8.16	0.0	19.91	15.6	Yes	Yes	Yes	Yes		Weather: Clear 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1640	8.25	0.5	7.16	27.2	4340	2.2	-22.5	16.5	clear w/ gold tint	Low-flow groundwater sample:
	1642	8.30	1.0	7.07	25.6	4550	1.8	-8.2	13.2		A) peristaltic pump w/ ded tubing
	1645	8.32	1.5	7.03	24.7	4580	1.6	+2.5	12.5		B) ded bladder pump
	1647	8.34	2.0	7.01	24.5	4600	1.5	+7.0	10.8		C) non-ded bladder pump; or
	1650	8.35	2.5	6.99	24.4	4610	1.5	+9.1	9.9		Standard groundwater sample:
	1652	8.36	3.0	6.98	24.4	4616	1.4	+11.5	8.7		D) bailer due to limited column; or
	1655	8.36	3.5	6.98	24.5	4620	1.4	+12.8	8.5		E) recovery well cycling sample
	1657	8.37	4.0	6.97	24.4	4620	1.4	+13.6	8.2		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1700	MW-83	8.37	6.97	24.4	4620	1.4	+13.6	8.2	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)	HNO3	6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6040/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-3

Event: Fall 2016 (Semiannual)

Area of Concern: EP

+ DUP-EP-03
(same analysis)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	950	NA	8.44	0.0	20.18	16.1	Yes	Yes	Issue	Yes		Weather:

Well Purging Record

No protective casing; stainless steel well casing with locked expandable cap; probed for pad but not found

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1600	8.49	0.5	7.63	24.2	7370	2.6	-82.2	18.3	Clear	Low-flow groundwater sample:
	1602	8.51	1.0	7.49	24.1	7280	1.8	-77.3	13.2		(A) peristaltic pump w/ ded tubing
	1605	8.52	1.5	7.33	23.3	7130	1.4	-74.2	10.5		B) ded bladder pump
	1607	8.52	2.0	7.24	23.0	6990	1.3	-72.5	9.8		C) non-ded bladder pump; or
	1610	8.53	2.5	7.22	23.0	6980	1.2	-70.5	9.5		Standard groundwater sample:
	1612	8.53	3.0	7.20	22.7	6960	1.2	-67.3	8.7		D) bailer due to limited column; or
	1615	8.53	3.5	7.19	22.9	6950	1.1	-68.7	8.7		E) recovery well cycling sample
	1617	8.53	4.0	7.18	22.9	6950	1.1	-68.2	8.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1620	MW-3	8.53	7.18	22.9	6950	1.1	-68.2	8.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
	1200	DUP-EP-03	8.53	7.18	22.9	6950	1.1	-68.2	8.1	same analysis	same	same

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **MW-88**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

(4-in; stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1010	NA	7.77	0.0	26.31	14.8	Yes	Yes	Yes	Yes	Hole in well pad	Weather: Clear 60's
10/5/16	800	NA	7.75	0.0								

Well Purging Record

*Issue with pad; hole in west side of well pad, well remains functional

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	805	7.82	0.5	7.45	18.7	8970	1.8	-54.1	25.4	clear w/ orange particles	Low-flow groundwater sample:
	807	7.83	1.0	7.39	18.5	9000	1.3	-46.1	19.3		(A) peristaltic pump w/ ded tubing
	810	7.84	1.5	7.34	18.6	9070	1.2	-36.8	16.2		B) ded bladder pump
	812	7.84	2.0	7.29	18.7	9270	1.1	-31.6	12.5		C) non-ded bladder pump; or
	815	7.85	2.5	7.25	18.8	9320	1.1	-28.5	11.9		Standard groundwater sample:
	817	7.85	3.0	7.22	18.8	9350	1.0	-25.4	10.8		D) bailer due to limited column; or
	820	7.85	3.5	7.20	18.7	9360	1.0	-22.1	10.1		E) recovery well cycling sample
	822	7.85	4.0	7.19	18.7	9370	1.0	-20.6	9.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	825	MW-88	7.85	7.19	18.7	9370	1.0	-20.6	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
										Total Metals (Hg,Ni,V,B,Cd,Cr,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										PDS	Neat	25400
										Cyanide	NaOH	GM4500

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

+ Dup - EP-02
(for same analysis)

Hydrologic Monitoring
for TRC
Houston, Texas

Area of Concern: FP

(4-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	Wall Secured	Label	Other	
10/4/16	1015	NA	7.06	0.0	22.65	17.4	Yes	Yes	Yes	Yes		Weather: Clear 60's
10/5/16	840	NA	7.10	0.0								

[illegible][illegible]

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

Monitoring Well Purging and Sampling Record

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

Well: **MW-22B**
Event: Fall 2016 (Semiannual)
Area of Concern: **EP**

(Gauge only)
(2-in; stickup)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1020	NA	6.95	0.0	54.66	49.66	Yes	Yes	Yes	Yes		Weather: clear, 70s

Well Purging Record

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

Well Sampling Record

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

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

Monitoring Well Purging and Sampling Record

**Hydrologic Monitoring
for TRC
Houston, Texas**

Initials: S C W

Date	Time	Sample I.D.	Depth to Water (FI-TOC)	pH (std units)	T (°C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
10/4/16	1100	MW-10	4.50	6.68	21.2	8200	1.1	-22.2	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
								Total Metals (Hg,Ni,V,S,Cd,Ce,U)		HNO3		6010/6020 and/or 7470
								Anions (Chloride,Fluoride,Sulfate)		Neat		300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
												If <0.03 feet of PSH present, remove PSH and sample groundwater

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1145	MW-123	4.92	7.05	20.4	7370	1.1	+4.5	9.3			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	8010/6020
										Total Metals (Hg,Ni,V,S,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: **EP**

~ 1/2-ft of subsidence
under pad of protective steel
casing extends above protective
casing; lock on expandable cap

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **SCP**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1210	NA	10.98	0.0	11.88	11.50	Yes	Issue	Issue	Yes		Weather: Clear 80's

Well Purging Record

Blockage at 11.88'; tubing was able to pass even though intake @ 11.50 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	Comments
10/4/16	1215	11.01	0.5	7.95	25.7	3230	4.2	-158.9	13.2	Clear w/ black particles	Low-flow groundwater sample:
	1217	11.01	1.0	7.76	24.6	3670	3.0	-206.7	10.5	odor	A) peristaltic pump w/ ded tubing
	1220	11.01	1.5	7.53	23.9	5110	2.5	-240.1	10.1		B) ded bladder pump
	1222	11.01	2.0	7.43	23.6	5830	2.1	-247.7	9.8		C) non-ded bladder pump; or
	1225	11.01	2.5	7.38	23.5	6040	1.7	-250.0	9.6		Standard groundwater sample:
	1227	11.01	3.0	7.35	23.4	6190	1.5	-251.5	9.5		D) bailer due to limited column; or
	1230	11.01	3.5	7.34	23.4	6210	1.4	-252.1	9.5		E) recovery well cycling sample
	1232	11.01	4.0	7.33	23.4	6220	1.4	-252.8	9.2	✓ ↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1235	MW-4A	11.01	7.33	23.4	6220	1.4	-252.8	9.2	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
										Total Metals (Hg,Ni,V,B,Cd,Co,Cu)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: **EP**

(Gauge only)

(2-in; stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1250	NA	10.25	0.0	72.37	67.37	Yes	Yes	Yes	Yes		Weather: Clear 80's

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-5A

Event: Fall 2016 (Semiannual)

Area of Concern:

EP

(2-in, stickup)

+ EB-EP-03
(for same analysis)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1300	NA	7.20	0.0	20.15	14.8	Yes	Yes	Yes	Yes		Weather: Clear 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1305	7.26	0.5	7.48	25.9	17,110	4.1	-126.4	26.5	Clear w/ orange particles	Low-flow groundwater sample:
	1307	7.26	1.0	7.38	24.5	17,770	2.2	-128.1	20.7		A) peristaltic pump w/ ded tubing
	1310	7.26	1.5	7.32	23.9	18,050	1.8	-129.7	15.5		B) ded bladder pump
	1312	7.26	2.0	7.29	23.7	18,130	1.5	-131.3	13.2		C) non-ded bladder pump; or
	1315	7.26	2.5	7.25	23.6	18,210	1.4	-132.8	11.9		Standard groundwater sample:
	1318	7.26	3.0	7.23	23.7	18,210	1.4	-135.4	9.9		D) bailer due to limited column; or
	1320	7.26	3.5	7.22	23.6	18,240	1.5	-135.7	9.6		E) recovery well cycling sample
	1322	7.26	4.0	7.22	23.6	18,260	1.5	-136.1	9.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1325	MW-5A	7.26	7.22	23.6	18,260	1.5	-136.1	9.1	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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
	1340	EB-EP-03	NA							Same as above	Same	Same

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

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

Event: Fall 2016 (Semiannual)

Area of Concern: ED

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **SLD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1350	NA	7.66	0.0	53.41	48.5	Yes	Yes	Yes	Yes		Weather: Clear 80's

[illegible][illegible]

Monitoring Well Purging and Sampling Record

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

Well: **MW-5C**
Event: Fall 2016 (Semiannual)
Area of Concern: **EP**

(Gauge only)
(2-in; stickup)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1355	NA	7.86	0.0	71.60	66.6	Yes	Yes	Yes	Yes		Weather: Clear 80's

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std. units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, ML 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
						Total Metals (Hg,Ni,V,B,Cd,Co,U)					HNO3	6010/6020 and/or 7470
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

2-in stainless steel well casing extends approximately 1-foot above to top of the steel protective casing; expandable locking cap is locked

Monitoring Well Purging and Sampling Record

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

Well: MW-7A
Event: Fall 2016 (Semiannual)
Area of Concern: EP

+ DUP - EP-01
(for same analysis)

Hydrologic Monitoring
for TRC
Houston, Texas

(2-in; stickup)

Initials: SCD

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1405	NA	6.87	0.0	17.25	12.1	Yes	Yes	Issue	Yes		Weather: Clear 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1410	6.97	0.5	7.74	23.7	10,930	2.4	-75.9	56.5	Sl. Cloudy w/ orange	Low-flow groundwater sample:
	1412	6.97	1.0	7.60	24.1	10,680	1.7	-76.8	43.8	particles	A) peristaltic pump w/ ded tubing
	1415	6.98	1.5	7.51	23.2	10,520	1.4	-78.2	37.5		B) ded bladder pump
	1417	6.98	2.0	7.46	22.8	10,430	1.3	-80.5	32.4		C) non-ded bladder pump; or
	1420	6.98	2.5	7.40	22.5	10,350	1.1	-83.7	28.7	Clear w/ orange	Standard groundwater sample:
	1422	6.98	3.0	7.35	22.2	10,250	1.0	-89.7	25.1	particles	D) bailer due to limited column; or
	1425	6.98	3.5	7.32	22.1	10,230	1.0	-90.8	25.1		E) recovery well cycling sample
	1427	6.98	4.0	7.30	22.1	10,210	1.0	-92.2	24.9		F) Irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1430	MW-7A	6.98	7.30	22.1	10,210	1.0	-92.2	24.9	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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
✓	1100	DUP-EP-01	6.98	7.30	22.1	10,210	1.0	-92.2	24.9	Same as above	Same	Same

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

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

Event: Fall 2016 (Semiannual)

(Gauge only)
(Zinc stickup)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: S.D.

[illegible][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
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: **OCB - 8A**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

(2-in; stickup)

Hydrologic Monitoring

for TRC
Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1505	NA	7.94	0.0	20.74	16.4	Yes	Yes	Yes	Yes		Weather: Clear 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1510	8.39	0.5	7.35	25.8	12,820	3.1	-116.2	10.1	Clear w/ orange	Low-flow groundwater sample:
	1512	8.54	1.0	7.27	24.9	12,910	2.5	-116.9	9.7	particles	(A) peristaltic pump w/ ded tubing
	1515	8.61	1.5	7.21	24.3	12,910	1.8	-117.4	9.2		B) ded bladder pump
	1517	8.66	2.0	7.15	23.7	12,930	1.4	-119.1	8.6		C) non-ded bladder pump; or
	1520	8.68	2.5	7.11	23.5	12,950	1.3	-120.6	8.3		Standard groundwater sample:
	1522	8.70	3.0	7.10	23.4	12,970	1.3	-121.2	7.7		D) boiler due to limited column; or
	1525	8.72	3.5	7.09	23.4	12,980	1.2	-121.9	7.4		E) recovery well cycling sample
	1527	8.73	4.0	7.09	23.4	12,980	1.2	-122.5	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
10/4/16	1530	OCB-8A	8.73	7.09	23.4	12,980	1.2	-122.5	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 ✓
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470 ✓
										Anions (Chloride,Fluoride,Sulfate)		Neat 300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										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: Fall 2016 (Semiannual)

Area of Concern:

EP

(Gauge only)

(2-in; stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1345	NA	8.10	0.0	56.63	51.7	Yes	Yes	Yes	Yes		Weather: Clear 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Sum. Vol. Purged (L)	pH (std. units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16			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
10/4/16												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
										Total Metals (Hg, Ni, V, B, Cd, Co, U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern:

Rest

Do not address at all during 2H16.

Biennial gauge & sample only (2 in, stick-up) 1H17, 1H19, etc.

Hydrologic Monitoring

for TRC

Houston, Texas

Initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	(short stick-up) Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
					30.26	22.8						Weather:

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-25**
Event: Fall 2016 (Semiannual)
Area of Concern: **TMD**

Hydrologic Monitoring
for TRC
Houston, Texas

(Gauge only)
(2m; stick up)

Initials: **BRH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1220	NA	11.06	0.0	28.18	NA	Yes	Yes	Yes	Yes	Subsidence under pad	Weather: Sunny, 80S

Well Purging Record

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

Well Sampling Record

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

Event: Fall 2016 (Semiannual)

Area of Concern: TMD

(Gauge only)

(2 in; stick-up)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: BZ-H

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1225	NA	11.96	0.0	15.20	NA	Issue	Issue	Yes	Yes		Weather: Sunny, 80s

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, MI, 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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-1R**
Event: Fall 2016 (Semiannual)
Area of Concern: **EP**

(Gauge only)

Hydrologic Monitoring
for TRC
Houston, Texas

(2-in. stick-up)

Initials: **BRH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1232	NA	10.26	0.0	20.62	NA	Yes	Issue	Yes	Yes		Weather: Sunny, 80s

Well Purging Record

by casing & lid are bent, making closure & locking difficult. well still functional.

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, ML 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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern:

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: RLH

[illegible]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **OCD-1R**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **BRH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1246	NA	11.68	0.0	23.89	18.6	YES	Issue	Yes	Yes		Weather: Sunny, 50s
10-5-16	750	NA	11.78	0.0	23.89	18.6						

(2-in; stickup)

Well Purging Record

→ Casing lid does not fully close. PVC casing needs to be cut down for full closure. Well is secured w/ long-harp lock.

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-5-16	755	11.96	0.5	7.54	19.2	10630	2.8	-127.7	8.3	clear	Low-flow groundwater sample:
	758	11.98	1.0	7.56	19.3	10660	1.0	-121.5	6.0		A) peristaltic pump w/ ded tubing
	800	11.99	1.5	7.40	19.5	10580	0.8	-117.9	5.2		B) ded bladder pump
	803	11.99	2.0	7.33	19.6	10460	0.7	-115.2	4.8		C) non-ded bladder pump; or
	805	11.99	2.5	7.30	19.6	10420	0.7	-114.8	4.1		Standard groundwater sample:
	808	11.99	3.0	7.28	19.7	10400	0.6	-114.1	3.8		D) bailer due to limited column; or
	810	11.99	3.5	7.26	19.8	10390	0.6	-113.2	3.6		E) recovery well cycling sample
	813	11.99	4.0	7.25	19.8	10370	0.6	-112.7	3.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-5-16	815	OCD-1R	11.99	7.25	19.8	10370	0.6	-112.7	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
										<Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM-4500

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **OCD-2A**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

Hydrologic Monitoring

for TRC

Houston, Texas

(2-in; stickup)

Initials: **BRH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1250	NA	11.75	0.0	27.58	22.3	Yes	Yes	Yes	Yes		Weather: Sunny, 50s
10-5-16	835	NA	11.83	0.0	27.58	22.3						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-5-16	840	11.95	0.5	7.50	19.2	8080	2.9	-107.9	16.1	clear	Low-flow groundwater sample:
	843	11.96	1.0	7.43	19.1	8090	1.3	-98.4	10.8		A) peristaltic pump w/ ded tubing
	845	11.96	1.5	7.40	19.0	8070	1.0	-92.1	9.4		B) ded bladder pump
	848	11.96	2.0	7.38	19.0	8070	0.9	-89.7	7.5		C) non-ded bladder pump; or
	850	11.96	2.5	7.35	18.9	8080	0.8	-87.0	6.8		Standard groundwater sample:
	853	11.96	3.0	7.34	19.0	8080	0.7	-85.4	6.4		D) bailer due to limited column; or
	855	11.96	3.5	7.32	19.0	8090	0.7	-83.8	5.9		E) recovery well cycling sample
	858	11.96	4.0	7.31	19.1	8090	0.6	-82.6	5.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-5-16	900	OCD-2A	11.96	7.31	19.1	8090	0.6	-82.6	5.7	DRO	HCL	8015M ✓
										GRO	HCL	8015M ✓
										VOC	HCL	8260 ✓
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Mg)	HNO3	6010/6020 ✓
										Total Metals (Hg,Ni,V,B,Cd,Cr,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)	Neat	900
										Nitrate-Nitrite	H2SO4	per historical, ESG Lab Sciences
										TDS	Neat	3540G
										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: Fall 2016 (Semiannual)

Area of Concern: EP

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **BRH**

Initials: <u>BEH</u>												
Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection				Comments	
							Cap	Casing	Well Secured	Label		Other
10-4-16	1259	NA	12.27	0.0	25.49	20.2	Yes	Yes	Yes	Yes		Weather: Sunny, 60s
10-5-16	920	NA	12.35	0.0	25.48	20.2					Prod is destroyed	

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: **0CD-4**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

Hydrologic Monitoring

for TRC

Houston, Texas

(2-in; stickup)

Initials: **BRH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1305	NA	11.48	0.0	25.42	20.1	Yes	Yes	Yes	Yes	Subsidence	Weather: Sunny, 60s
10-5-16	1005	NA	11.54	0.0	25.42	20.1					Under pad	

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-5-16	1010	11.56	0.5	7.42	21.4	14120	2.3	-106.0	61.0	Clear w/ orange	Low-flow groundwater sample:
	1013	11.56	1.0	7.32	21.0	14420	1.0	-103.2	48.3	algae particles	A) peristaltic pump w/ ded tubing
	1015	11.56	1.5	7.28	20.9	14550	0.8	-100.1	29.3		B) ded bladder pump
	1018	11.56	2.0	7.27	20.8	14610	0.8	-98.4	20.7		C) non-ded bladder pump; or
	1020	11.56	2.5	7.24	20.8	14670	0.7	-96.9	18.6		Standard groundwater sample:
	1023	11.56	3.0	7.22	20.7	14710	0.7	-94.8	17.4		D) bailer due to limited column; or
	1025	11.56	3.5	7.22	20.6	14730	0.6	-92.3	17.0		E) recovery well cycling sample
	1028	11.56	4.0	7.21	20.6	14750	0.6	-90.9	16.8		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-5-16	1030	0CD-4	11.56	7.21	20.6	14750	0.6	-90.9	16.8	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)	HNO3	6010/6020
										Total Metals (Hg, Ni, V, B, Cd, Co, U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										IDS	Neat	2540C
										Cyanide	NaOH	GM4800

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **MW-11A**

Event: Fall 2016 (Semiannual)

Area of Concern: **EP**

(4 in. stick-up)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **BRH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1311	NA	8.75	0.0	22.01	17.0	Yes	Yes	Yes	Yes		Weather: Sunny, 70s
10-5-16	1145	NA	8.81	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
10-5-16	1150	8.91	0.5	7.09	22.8	25,100	2.3	-66.5	16.4	clear	Low-flow groundwater sample:
	1153	8.92	1.0	7.10	22.7	25,200	1.3	-68.1	10.8		(A) peristaltic pump w/ ded tubing
	1155	8.92	1.5	7.07	22.6	25,400	1.0	-70.2	8.0		B) ded bladder pump
	1158	8.92	2.0	7.04	22.5	25,400	0.8	-70.9	7.4		C) non-ded bladder pump; or
	1200	8.92	2.5	7.01	22.4	25,400	0.7	-71.4	6.1		Standard groundwater sample:
	1203	8.92	3.0	6.99	22.4	25,500	0.7	-71.8	5.8		D) bailer due to limited column; or
	1205	8.92	3.5	6.98	22.3	25,500	0.6	-72.0	5.3		E) recovery well cycling sample
	1208	8.92	4.0	6.97	22.3	25,500	0.6	-72.3	4.9		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-5-16	1210	MW-11A	8.92	6.97	22.3	25,500	0.6	-72.3	4.9			Lab: ESC Lab Sciences, Mt. Juliet, TN
										BRO	HCL	6015M
										GRO	HCL	6015M
										VOC	HCL	8200
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)		HNO3 6010/6020 ✓
										Total Metals (Hg, Ni, V, B, Cd, Co, U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)		Neat 300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										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: Fall 2016 (Semiannual)
Area of Concern: **EP** (2 in. stick-up)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **BTH**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1314	NA	8.78	0.0	47.30	NA (42.3)	Yes	Yes	Yes	Yes		Weather: Sunny, 80s

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Cs,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern:

EP

$$(2 - i\eta; \text{stickup})$$

Hydrologic Monitoring
for TRC
Houston, Texas

initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1322	NA	9.65	0.0	25.42	20.6	Yes	Yes	Yes	Yes		Weather: Sunny, 60x
10-5-16	1050	NA	9.69	0.0	25.42	20.6						

[illegible]

Date	Time	Sample I.D.	Depth to Water (FI-TOC)	pH (std units)	T (°C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
10-5-16	1120	DCD-5	9.77	7.37	21.0	14850	0.6	-128.7	22.2	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
						Total Metals (Hg,Ni,V,B,Cd,Co,U)					HNO3	6040/6020 and/or 7470-
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4300
												If <0.03 feet of PSH present, remove PSH and sample groundwater

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

Event: Fall 2016 (Semiannual)

(4-in; strokeup)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: BEH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-1-16	1335	NA	7.70	0.0	20.39	15.1	Yes	Yes	Yes	Yes		Weather: Sunny, 80s

[illegible]

Date	Time	Sample I.D.	Depth to Water (FI-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-4-16	1400	mw-87	8.06	7.27	23.1	16710	0.6	-172.4	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
										Total Metals (Hg,Ni,V,B,Cd,Ce,U)	HNO3	6040/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										PBS	Neat	2540C
										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-18A

Event: Fall 2016 (Semiannual)

Area of Concern: EP

(4-in; stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: BHH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1430	NA	9.62	0.0	22.58	17.9	Yes	Yes	Yes	Yes		Weather: Sunny, 80°F

Well Purging Record

* confirmed SC

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-4-16	1435	9.84	0.5	7.33	23.7	7410	2.2	-188.2	5.9	clear	Low-flow groundwater sample:
	1438	9.92	1.0	7.28	22.3	8230	0.9	-193.8	5.2		A) peristaltic pump w/ ded tubing
	1440	9.99	1.5	7.25	22.2	8410	0.8	-195.7	3.1		B) ded bladder pump
	1443	10.05	2.0	7.24	22.1	8460	0.7	-198.1	2.4		C) non-ded bladder pump; or
	1445	10.10	2.5	7.23	22.0	8490	0.7	-200.3	1.9		Standard groundwater sample:
	1448	10.14	3.0	7.22	21.9	8510	0.6	-201.0	1.5		D) bailer due to limited column; or
	1450	10.17	3.5	7.21	21.9	8520	0.6	-201.8	1.2		E) recovery well cycling sample
	1453	10.20	4.0	7.21	21.8	8530	0.6	-202.3	1.3		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-4-16	1455	MW-18A	10.20	7.21	21.8	8530	0.6	-202.3	1.3	DRO	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 ✓
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470 ✓
										Anions (Chloride,Fluoride,Sulfate)		Neat 300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										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: Fall 2016 (Semiannual)

Area of Concern: EP

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **BZM**

[illegible][illegible]

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-18T

Event: Fall 2016 (Semiannual)

Area of Concern: EP

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: BJR

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	(2 in, 5 ft or up)					Initials: BJK
							Well Inspection					
							Cap	Casing	Well Secured	Label	Other	Comments
10-4-16	1425	NA	9.40	0.0	50.39	NA	No	Issue	Issue	yes		
								(misaligned)	(lock won't resolve issue)			

Well Purging Record

Date	Time	Depth to Water (ft-TGS)	Cum. 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								
			1.5								
			2.0								
			2.5								
			3.0								
			3.5								
			4.0								

Well Sampling Record

Monitoring Well Purging and Sampling Record

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

Well: MW-70
Event: Fall 2016 (Semiannual)
Area of Concern: EP

Hydrologic Monitoring
for TRC
Houston, Texas

(4-in; stickup)

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1525	NA	7.31	0.0	22.05	16.8	Yes	Yes	Yes	Yes		Weather: Sunny, 80S

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-4-16	1530	7.37	0.5	7.24	25.0	7660	2.2	-146.2	44.2	Clear w/ orange	Low-flow groundwater sample:
	1533	7.37	1.0	7.23	23.5	6920	0.8	-146.6	28.3	algae particles	A) peristaltic pump w/ ded tubing
	1535	7.38	1.5	7.20	22.0	6870	0.7	-147.5	21.5		B) ded bladder pump
	1538	7.38	2.0	7.16	21.8	6840	0.6	-147.8	16.4		C) non-ded bladder pump; or
	1540	7.38	2.5	7.12	21.6	6810	0.5	-148.1	10.8		Standard groundwater sample:
	1543	7.38	3.0	7.10	21.5	6790	0.5	-147.3	10.1		D) bailer due to limited column; or
	1545	7.38	3.5	7.09	21.5	6780	0.5	-146.5	9.6		E) recovery well cycling sample
	1548	7.38	4.0	7.07	21.4	6780	0.5	-145.8	9.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-4-16	1550	MW-70	7.38	7.07	21.4	6780	0.5	-145.8	9.7	DRO	HCL	8015M ✓
										GRO	HCL	8015M ✓
										VOC	HCL	8260 ✓
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, Cu, Na)	HNO3	6010/6020 ✓
										Total Metals (Hg, Ni, V, B, Cd, Co, U)	HNO3	6010/6020 and/or 7476
										Anions (Chloride, Fluoride, Sulfate)	Neat	860
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										PDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-124

Event: Fall 2016 (Semiannual)

Area of Concern: EP

+ EB-EP-02
(For same analysis)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1615	NA	7.81	0.0	22.01	17.0	Yes	Yes	Yes	Yes		Weather: Sunny, 80°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10-4-16	1620	7.84	0.5	7.29	24.2	10320	2.8	-133.7	52.0	clear w/ orange	Low-flow groundwater sample:
	1623	7.84	1.0	7.23	23.0	10980	1.4	-116.3	31.4	algae particles	A) peristaltic pump w/ ded tubing
	1625	7.84	1.5	7.19	22.6	11340	1.2	-102.0	21.7		B) ded bladder pump
	1628	7.84	2.0	7.18	22.4	11390	0.8	-101.4	14.6		C) non-ded bladder pump; or
	1630	7.84	2.5	7.18	22.3	11410	0.7	-99.8	10.8		Standard groundwater sample:
	1633	7.84	3.0	7.17	22.2	11420	0.6	-97.6	10.1		D) bailer due to limited column; or
	1635	7.84	3.5	7.17	22.2	11440	0.6	-94.9	9.4		E) recovery well cycling sample
✓	1638	7.84	4.0	7.16	22.3	11460	0.5	-93.2	8.9	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10-4-16	1640	MW-124	7.84	7.16	22.3	11460	0.5	-93.2	8.9	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Cr,U)		HNO3 6010/6020 and/or 7476
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
✓	1655	EB-EP-02	NA							Same as above	Same	Same

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

Monitoring Well Purging and Sampling Record

Initials: BRH

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: Fall 2016 (Semiannual)
Area of Concern: EP

(Gauge only)
(4 in stickup)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: BRH

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1140	NA	10.93	0.0	22.50	NA	Yes	Yes	Yes	Yes		Weather: Sunny, 70s

Well Purging Record

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

Well Sampling Record

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

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

Monitoring Well Purging and Sampling Record

Artesia Refinery
Artesia, New Mexico

Well: MW-14

Area of Concern: **EP**

(Gauge only)

(4 in; stick-up)

Initials: *SRH*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	(9 in. stick-up) Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10-4-16	1108	NA	11.36	0.0	>11.93	NA	Yes	Issue	Yes	Yes		Weather: Sunny, 70s.
								I				

Blockage @ 11.93' TOC

[illegible]

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC ($\mu\text{mho/cm}$)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO ₃	6010/6020
						Total Metals (Hg,Ni,V,B,Cd,Co,U)					HNO ₃	6010/6020 and/or 7470
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H ₂ SO ₄	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
										<i>If <0.03 feet of PSH present, remove PSH and sample groundwater</i>		

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

[Historically off; due to water rights issue]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **RW-12R**

Event: Fall 2016 (Semiannual)

(Gauge only)

Hydrologic Monitoring

for TRC

Houston, Texas

Area of Concern:

Rest

12-in well casing diameter

Initials: **RD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1203	17.15	17.18	0.03	DM	(top of pump) (if not running)	Yes	Yes	Yes	Yes		Weather: Sunny 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	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
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Total Metals (Hg,Ni,V,B,Cd,Co,U)					HNO3	6010/6020 and/or 7470
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-113**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

+ EB-Rest-01

+ Dup-Rest-01

(both for same analysis)

Hydrologic Monitoring

for TRC

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
10/4/16	1207	NA	17.58	0.0	37.80	33.8	Yes	Yes	Yes	Yes	
10/5/16	810	NA	17.67	0.0							Weather: Sunny & 4

(2-in; stickup)

Initials: **B3**

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	815	17.69	0.5	7.45	18.5	2002	2.4	-37.6	13.1	Clear	Low-flow groundwater sample:
	818	17.69	1.0	7.27	18.6	1981	2.2	-31.8	11.2	"	A) peristaltic pump w/ ded tubing
	820	17.70	1.5	7.19	18.7	1980	2.1	-22.3	9.8	"	B) ded bladder pump
	823	17.70	2.0	7.13	18.7	1978	2.1	-12.2	8.7	"	C) non-ded bladder pump; or
	825	17.70	2.5	7.04	18.8	1976	2.1	-4.9	7.9	"	Standard groundwater sample:
	828	17.70	3.0	6.98	18.8	1972	2.0	-4.1	7.4	"	D) bailer due to limited column; or
	830	17.70	3.5	6.96	18.8	1969	2.0	-3.6	7.1	"	E) recovery well cycling sample
	833	17.70	4.0	6.95	18.9	1967	2.0	-3.3	6.9	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	835	MW-113	17.70	6.95	18.9	1967	2.0	-3.3	6.9	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Ce,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
	845	EB-Rest-01	NA							Same as above		Same
	1200	Dup-Rest-01	17.70	6.95	18.9	1967	2.0	-3.3	6.9	Same as 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: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **BS**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1112	NA	16.00	0.0	35.80	30.8	Yes	Yes	Yes	Yes		Weather: Sunny 80's
10/5/16	955	NA	16.16			30.8 if sampled						

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1000	16.24	0.5	7.46	18.4	3181	1.6	-185.4	11.2	(clear, small blk particles and stringy stuff)	Low-flow groundwater sample:
	1003	16.28	1.0	7.41	18.5	3209	1.2	-194.3	13.8		A) peristaltic pump w/ ded tubing
	1005	16.30	1.5	7.43	18.5	3203	1.0	-199.5	14.1	"	B) ded bladder pump
	1008	16.32	2.0	7.49	18.5	3196	0.9	-201.7	13.2	"	C) non-ded bladder pump; or
	1010	16.33	2.5	7.51	18.6	3204	1.0	-205.7	12.9	"	Standard groundwater sample:
	1013	16.33	3.0	7.52	18.6	3209	1.0	-207.9	11.2	"	D) bailer due to limited column; or
	1015	16.33	3.5	7.52	18.6	3211	0.9	-209.1	10.8	"	E) recovery well cycling sample
	1018	16.33	4.0	7.53	18.6	3214	0.9	-210.2	8.7	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1020	KWB-8	16.33	7.53	18.6	3214	0.9	-210.2	8.7	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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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

Well: RW-22 (Gauge only)

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring
for TRC
Houston, Texas

Above-grade Recovery Vault
12" casing diam; sample port

Initials: *BB*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1108	NA	20.77	0.0	0m	NA	Yes	Yes	Yes	Yes		Weather: Sunny 80's

Well Purging Record

(Screen 11.5-39)

[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
										DRO	HCL	8015M 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)				HNO ₃		6010/6020
						Total Metals (Hg,Ni,V,B,Cd,Co,U)				HNO ₃		6010/6020 and/or 7470
						Anions (Chloride,Fluoride,Sulfate)				Neat		300
										Nitrate-Nitrite	H ₂ SO ₄	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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

Monitoring Well Purging and Sampling Record

Well: **RW-20A**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring

for TRC

Houston, Texas

N
↑
metal roof canopy

RW-20A

Vault

RW-20B

(Gauge only)

At-grade (Recovery Well) vault
(6" casing diam; sample port)

Initials: **BB**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1105	17.58	17.67	0.09	nm	na	Yes	Yes	Yes	Yes		Weather: Sunny 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	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
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Ce,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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

Monitoring Well Purging and Sampling Record

Well: **RW-20B**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring
for TRC
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	
10/4/16	1102	17.60	17.72	0.12	nm	NA	Yes	Yes	Yes	Yes		Weather: Sunny 80's

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, M.L. 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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-13R**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **BB**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	12/2	16.44	16.98	0.54	nm	top of pump in well	Yes	Yes	Yes	Yes		Weather: Sunny 80s

Well Purging Record

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

Well Sampling Record

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

Well: RW-14R

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring
for TRC
Houston, Texas

(Gauge only) Above-grade recovery well vault
12" casing diam. Sample port Initials: BC

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	
10/4/16	12:17	16.48	16.59	0.11	nm	na	yes	yes	yes	yes		Weather: Sunny 80's
						5' off base						

Well Purging Record

[illegible]

Well Sampling Record

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-133

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1229	15.68	15.96	0.28	37.66	27.9	Yes	Yes	Yes	Yes		Weather: Sunny 80's
					50 ft							

Well Purging Record

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

Well Sampling Record

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

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-134

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

+ EB-Rest-03

+ Dup-Rest-03

(both for same analysis)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: BS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	929	NA	13.66	0.0	32.95	28.4	Yes	Yes	Yes	Yes		Weather: Sunny 80°P
					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	Comments
10/4/16	1415	13.67	0.5	7.38	22.1	4257	2.7	86.3	11.2	Clear	Low-flow groundwater sample:
	1418	13.67	1.0	7.02	21.4	4117	1.9	98.6	9.7	"	A) peristaltic pump w/ ded tubing
	1420	13.67	1.5	6.79		4123	1.6	110.2	8.5	"	B) ded bladder pump
	1423	13.67	2.0	6.71	20.8	4129	1.3	113.8	8.0	"	C) non-ded bladder pump; or
	1425	13.67	2.5	6.68	20.6	4132	1.1	114.2	6.8	"	Standard groundwater sample:
	1428	13.67	3.0	6.67	20.5	4139	1.0	114.9	6.3	"	D) bailer due to limited column; or
	1430	13.67	3.5	6.65	20.5	4141	0.9	115.2	6.1	"	E) recovery well cycling sample
	1433	13.67	4.0	6.64	20.5	4143	0.9	115.7	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
10/4/16	1435	MW-134	13.67	6.64	20.5	4143	0.9	115.7	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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4506
	1450	EB-Rest-03	NA							Same as above		Same
	1500	Dup-Rest-03	13.67	6.64	20.5	4143	0.9	115.7	5.9	Same as 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: RA-4798

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Irrigation well;
Inside green, black bldg;
No purge; sample port (faucet)
Hydrologic Monitoring
for TRC
Houston, Texas

Screen 840-850 ft-bgs

Initials: BS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/5/16	935	NA	NA	NA	NA	NA	NA	NA	YES	YES		Weather: Sunny 70s

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	935	RA-4798	NA	7.39	18.7	2714	1.7	21.4	1.4			Lab: ESC Lab Sciences, MI, Juliet, TN
										BRO	HCL	6015M
										ERO	HCL	6015M
										VOC	HCL	8260
										Total Metals (As, Be, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)		HNO3 6010/6020
										Total Metals (Hg, Ni, V, B, Cd, Co, U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	CM4500

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

Monitoring Well Purging and Sampling Record

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

Well: RA-4196

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Active irrigation well;
Inside green, black bldg;
No purge; Sample port (faucet)

Hydrologic Monitoring
for TRC
Houston, Texas

Screen: 280-292 ft-bgs Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/5/16	9:15	NA	NA	NA	NA	NA	NA	NA	YES	YES		Weather: Sunny 80°F

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	9:15	RA-4196	nm	7.13	23.3	1085	2.3	-18.7	2.1	BRO	HCL	8045M
										GRO	HCL	8045M
										VOC	HCL	8260
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)		HNO3 6010/6020
										Total Metals (Hg, Ni, V, B, Cd, Co, U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	EM4600

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

[Do not address - Removed from program by Navajo, 4-13-15]

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RA-1227

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring

for TRC

Houston, Texas

Screen: 194-246 ft-bgs

Initials:

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

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										YQC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2548C
										Cyanide	NaOH	SM4500

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

[No Activity at RA-3156 in Fall 2016]

Monitoring Well Purging and Sampling Record

Active irrigation well;
No purge; sample port

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: RA-3156

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring

for TRC

Houston, Texas

(Screen: 182 - unknown) initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection				Comments
							Cap	Casing	Well Secured	Label	
		NA	NA	NA	NA	NA	NA	NA	NA	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
												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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2548C
										Cyanide	NaOH	SM4500

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

[No activity at RA-313 in Fall 2016]
Monitoring Well Purging and Sampling Record

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

Well: **RA-313**
 Event: Fall 2016 (Semiannual)
 Area of Concern: **Rest**

Irrigation well and
 water supply role, per
 Navajo Shift Foreman
 (Doug Collins, 11/16) **Hydrologic Monitoring**
 for TRC
 Houston, Texas

(Screen - 904-1157 ft-bgs) initials:

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16		NA	NA	NA	NA	NA	NA	NA	NA	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
												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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-7**

Event: Fall 2016 (Semiannual)

Hydrologic Monitoring
for TRC
Houston, Texas

Well Inspection Information

Area of Concern: **Rest**

(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	
10/14/16	1155	16.59	16.60	0.01	34.83	30.6	Yes	Yes	Yes	Yes		Weather Sunny 80's
10/15/16	1355	16.65	16.66	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	Comments
10/15/16	1400	16.68	0.5	7.36	21.3	3011	1.5	-63.4	14.2	Clear (strong HC odor)	Low-flow groundwater sample:
	1403	16.68	1.0	7.13	20.2	3190	1.2	-83.4	12.6	"	A) peristaltic pump w/ ded tubing
	1405	16.68	1.5	7.06	20.0	3235	0.9	-89.6	10.3	"	B) ded bladder pump
	1408	16.68	2.0	7.03	19.9	3242	0.8	-91.2	8.5	"	C) non-ded bladder pump; or
	1410	16.68	2.5	7.01	19.8	3246	0.7	-92.1	7.7	"	Standard groundwater sample:
	1413	16.68	3.0	6.99	19.7	3250	0.7	-92.8	7.4	"	D) bailer due to limited column; or
	1415	16.68	3.5	6.99	19.7	3253	0.6	-93.0	7.2	"	E) recovery well cycling sample
	1418	16.68	4.0	6.98	19.7	3255	0.6	-93.3	7.2	"	F) Irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/15/16	1420	KWB-7	16.68	6.98	19.7	3255	0.6	-93.3	7.2	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 ✓
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470 ✓
										Anions (Chloride,Fluoride,Sulfate)		Neat 300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										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-135

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1040	NA	25.96	0.0	65.55	50.0	Yes	Yes	Yes	Yes		Weather: Sunny 80s
10/5/16	1102	NA	25.87	0.0								

Welt Purging Record

* Collected prior to cell

[illegible]

Well Sampling Record

[illegible]

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

Event: Fall 2016 (Semiannual)

Area of Concern: TMD

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: CS

[illegible][illegible]

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

Monitoring Well Purging and Sampling Record

Well Inspection Information

Event: Fall 2016 (Semiannual)

(Gauge only)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials:

Date	Time	Depth to LNAPL (ft-TOC)	Depth to Water (ft-TOC)	LNAPL Thickness (ft)	Well Total Depth (ft-TOC)	Sample Intake (ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	922	na	11.43	0.0	21.59	Not Sampled	Yes	Yes	Yes	Yes		Weather Sunny 80's

Well Purging Record

[illegible]

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Fl-TOC)	pH (std units)	T (°C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												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,R,Nd)					HNO3	6010/6020
								Total Metals (Hg,Ni,V,B,Cd,Co,U)			HNO3	6010/6020 and/or 7470
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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

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: Fall 2016 (Semiannual)

Area of Concern: TMD

(Gauge only)

2" stickup

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: BB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	9:18	NA	18.98	0.0	36.98	Not Sampled	Yes	Yes	Yes	Yes		Weather: Sunny 80's

Well Purging Record

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

Well Sampling Record

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

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: NP-1

Event: Fall 2016 (Semiannual)

Area of Concern: TMD

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: B3

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	937	NA	13.38	0.0	21.88	19.6	Yes	Yes	Yes	Yes		Weather: Sunny 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1330	13.40	0.5	7.85	21.2	4124	2.3	88.6	3.8	Clear	Low-flow groundwater sample:
	1333	13.40	1.0	7.62	21.2	3979	2.7	110.8	2.9	11	A) peristaltic pump w/ ded tubing
	1335	13.40	1.5	7.22	21.1	3703	1.9	117.7	2.6	11	B) ded bladder pump
	1338	13.40	2.0	7.15	21.2	3586	1.6	120.2	1.8	11	C) non-ded bladder pump; or
	1340	13.40	2.5	7.03	21.2	3493	1.4	121.8	1.4	11	Standard groundwater sample:
	1343	13.40	3.0	6.97	21.1	3486	1.3	122.3	1.2	11	D) bailer due to limited column; or
	1345	13.40	3.5	6.95	21.1	3471	1.3	122.8	1.1	11	E) recovery well cycling sample
	1348	13.40	4.0	6.94	21.1	3468	1.3	123.1	1.1	11	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1350	NP-1	13.40	6.94	21.1	3468	1.3	123.1	1.1			Lab: ESC Lab Sciences, Mt. Juliet, TN
										ORO	HCL	6045M
										GRO	HCL	6015M
										VOC	HCL	8260 (VOL only in Fall 2016)
										Total Metals (As, Ba, Cr, Fe, Pb, Mn, Se) and/or Cations (Ca, K, Na)	HNO3	6010/6020
										Total Metals (Hg, Ni, V, B, Cd, Co, U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)	Neat	900
										Nitrate Nitrite	H2SO4	per historical, ESC Lab Sciences
										PDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: TMD

Hydrologic Monitoring
for TRC
Houston, Texas

(Gauge only)

2" Stockup

Initials: 

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
6/14/16	948	NA	9.94	0.0	19.98	15.4	Yes	Yes	Yes	Yes		Weather: Sunny 80°

Date	Time	Depth to Water (Fe-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (°C)	SC (µmho/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

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
						Total Metals (Hg,Ni,V,B,Cd,Co,U)					HNO3	6010/6020 and/or 7470
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: **TMD**

(Gauge only)

2" stick up

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **BSB**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1238	NA	8.48	0.0	20.12	15.3	Yes	Yes	Yes	Yes		Weather: Sunny 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	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
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: **TMD**

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **BB**

(4-in. stickup)

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	907	NA	9.84	0.0	25.12	19.9	Yes	Yes	Yes	Yes		Weather: Sunny 80°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1245	9.86	0.5	7.44	23.3	4170	2.6	107.1	4.7	Clear	Low-flow groundwater sample;
	1248	9.86	1.0	7.36	22.9	3969	2.1	116.4	3.2	"	A) peristaltic pump w/ ded tubing
	1250	9.86	1.5	6.49	22.6	4138	1.7	120.6	2.1	"	B) ded bladder pump
	1253	9.86	2.0	6.36	22.3	4362	1.6	122.2	1.8	"	C) non-ded bladder pump; or
	1255	9.86	2.5	6.24	22.1	4494	1.5	123.4	1.5	"	Standard groundwater sample;
	1258	9.86	3.0	6.22	22.0	4521	1.5	123.9	1.3	"	D) bailer due to limited column; or
	1300	9.86	3.5	6.21	22.0	4558	1.4	124.1	1.3	"	E) recovery well cycling sample
	1303	9.86	4.0	6.21	21.9	4571	1.4	124.3	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
10/4/16	1305	MW-21	9.86	6.21	21.9	4571	1.4	124.3	1.2	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										-Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	GM4500

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

Monitoring Well Purging and Sampling Record

Well Inspection Information

Area of Concern: T.M.D.

Houston, Texas

Initials: **RH**

[illegible][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
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)				HNO3		6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Cr,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: TMD

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: B K

[illegible][illegible]

Date	Time	Sample I.D.	Depth to Water (FI-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, ML 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
						Total Metals (Hg,Ni,V,B,Cd,Co,U)					HNO3	6010/6020 and/or 7470
						Anions (Chloride,Fluoride,Sulfate)					Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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

Well: MW-68

Event: Fall 2016 (Semiannual)

Area of Concern: TMD

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: *BR*

Date	Time	Depth to LNAPL (FL-TOC)	Depth to Water (FL-TOC)	LNAPL Thickness (ft)	Well Total Depth (FL-TOC)	Sample Intake (FL-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	958	NA	12.72	0.0	26.52	21.5	Yes	Yes	Yes	Yes		Weather: Sunny 80°

[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
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Total Metals (Hg,Ni,V,B,Cd,Cu)			HNO3	6010/6020 and/or 7470
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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

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

Well: MW-27

Event: Fall 2016 (Semiannual)

Area of Concern: TMD

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: *BS*

Date	Time	Depth to LNAPL (FL-TOC)	Depth to Water (FL-TOC)	LNAPL Thickness (ft)	Well Total Depth (FL-TOC)	Sample Intake (FL-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1007	NA	14.15	0.0	30.28	25.0	yes	yes	yes	yes		Weather: Sunny 80's

[illegible][illegible]

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

Well: MW-89

Event: Fall 2016 (Semiannual)

Area of Concern: TMD

(Gauge only)

4¹² stock y.f

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **BS**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/14/16	10:15	NA	8.44	0.0	20.38	15.2	Yes	Yes	Yes	Yes		Weather: Sunny 80°F

[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
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
						Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)					HNO3	6010/6020
								Total Metals (Hg,Ni,V,B,Cd,Co,U)			HNO3	6010/6020 and/or 7470
								Anions (Chloride,Fluoride,Sulfate)			Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2549C
										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

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

Well: MW-16

Event: Fall 2016 (Semiannual)

Area of Concern: TMD

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: BR

T - Stick up											Initials: JES	
Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
12/4/16	10:18	NA	7.13	0.0	21.23	16.2	Yes	Yes	Yes	Yes		Weather: Sunny 80°

[illegible]

Date	Time	Sample I.D.	Depth to Water (Fl-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, ML 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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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

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

Event: Fall 2016 (Semiannual)

Area of Concern: TMD

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: *BS*

[illegible][illegible][illegible]

Pecan grove - access from 82 gate

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **KWB-11B**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring

for TRC

Houston, Texas

(4-in; stickup)

Initials: **BR**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1054	NA	16.30	0.0	72.45	62.2	Yes	Yes	Yes	Yes		Weather: Sunny 80s
10/5/16	1300	NA	16.30	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1305	16.35	0.5	6.98	20.4	3227	2.2	75.4	5.1	Clear	Low-flow groundwater sample:
	1308	16.37	1.0	6.82	20.2	2919	1.8	76.9	4.2	"	A) peristaltic pump w/ ded tubing
	1310	16.37	1.5	6.81	19.7	2886	1.4	78.4	3.0	"	B) ded bladder pump
	1313	16.37	2.0	6.82	19.5	2879	1.2	79.9	2.2	"	C) non-ded bladder pump; or
	1315	16.37	2.5	6.84	19.4	2875	1.1	80.6	1.8	"	Standard groundwater sample:
	1318	16.37	3.0	6.84	19.3	2872	1.1	81.2	1.7	"	D) bailer due to limited column; or
	1320	16.37	3.5	6.83	19.3	2869	1.1	81.5	1.7	"	E) recovery well cycling sample
	1323	16.37	4.0	6.83	19.3	2867	1.1	81.7	1.6	"	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1325	KWB-11B	16.37	6.83	19.3	2867	1.1	81.7	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 ✓
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470 ✓
										Anions (Chloride,Fluoride,Sulfate)		Neat 300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										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

Well: **KWB-3AR**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Jack Joy (farmer)
575-365-6042

Hydrologic Monitoring
for TRC
Houston, Texas

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

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	
												Weather:

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, ML 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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 360
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

ATV needed (S. field RO-Reject water field)
Monitoring Well Purging and Sampling Record

Navajo Refining Company
 Artesia Refinery
 Artesia, New Mexico

Well: MW-115

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring
 for TRC
 Houston, Texas

Well Inspection Information

(2-in) stickup

Initials: MS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1545	NA	3.98	0.0	27.50	19.8	Yes	Yes	Yes	Yes		Weather: Sunny 80°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1550	4.00	0.5	7.82	21.9	3975	2.2	23.4	3.7	Clear	Low-flow groundwater sample:
	1553	4.02	1.0	7.08	21.4	4116	1.6	46.2	3.4	"	A) peristaltic pump w/ ded tubing
	1555	4.03	1.5	6.94	20.7	4139	1.4	53.8	2.8	"	B) ded bladder pump
	1558	4.03	2.0	6.90	20.5	4141	1.2	59.2	2.6	"	C) non-ded bladder pump; or
	1600	4.03	2.5	6.87	20.4	4144	1.1	63.8	2.3	"	Standard groundwater sample:
	1603	4.03	3.0	6.86	20.4	4146	1.1	64.2	2.1	"	D) bailer due to limited column; or
	1605	4.03	3.5	6.85	20.3	4149	1.0	65.1	1.9	"	E) recovery well cycling sample
	1608	4.03	4.0	6.85	20.3	4151	1.0	66.0	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
10/4/16	1610	MW-115	4.03	6.85	20.3	4151	1.0	66.0	1.9	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
										Total Metals (Hg, Ni, V, B, Cd, Co, U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

ATV needed (S. Field RO-Reject water)
Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: MW-114

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring
for TRC
Houston, Texas

Well Inspection Information

(2-in; stickup)

Initials: BJB

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1640	NA	3.68	0.0	38.24	30.5	yes	Yes	Yes	Yes		Weather: Sunny 80°

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1645	3.71	0.5	7.66	24.9	3261	1.9	117.2	8.1	Clear	Low-flow groundwater sample;
	1648	3.72	1.0	7.52	24.3	3247	1.6	138.7	7.5	"	A) peristaltic pump w/ ded tubing
	1650	3.72	1.5	7.32	23.6	3336	1.4	153.8	7.2	"	B) ded bladder pump
	1653	3.72	2.0	7.23	22.8	3358	1.3	160.1	6.7	"	C) non-ded bladder pump; or
	1655	3.72	2.5	7.20	22.5	3364	1.3	165.8	6.3	"	Standard groundwater sample;
	1658	3.72	3.0	7.18	22.3	3369	1.2	167.2	6.0	"	D) bailer due to limited column; or
	1700	3.72	3.5	7.17	22.2	3373	1.2	168.4	6.0	"	E) recovery well cycling sample
	1703	3.72	4.0	7.17	22.2	3375	1.2	169.1	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
10/4/16	1705	MW-114	3.72	7.17	22.2	3375	1.2	169.1	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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6040/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-117

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

(2-in; stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: AOS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1144	NA	8.25	0.0	27.22	19.7	Yes	Yes	Yes	Yes		Weather: Sunny, 50's
10/5/16	820	NA	8.27									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	825	8.29	0.5	6.98	17.4	3850	2.7	72.8	131	Colorless/cloudy	Low-flow groundwater sample:
	827	8.31	1.0	6.81	17.7	3850	2.0	59.0	108		A) peristaltic pump w/ ded tubing
	830	8.31	1.5	6.76	17.8	3840	1.7	53.9	90.8		B) ded bladder pump
	833	8.31	2.0	6.72	17.8	3840	1.7	45.9	80.6	Colorless/st. cloudy	C) non-ded bladder pump; or
	835	8.31	2.5	6.70	17.9	3840	1.6	42.0	79.5		Standard groundwater sample:
	837	8.31	3.0	6.68	17.8	3830	1.6	34.7	79.5		D) bailer due to limited column; or
	840	8.31	3.5	6.67	18.0	3810	1.5	28.6	80.1		E) recovery well cycling sample
	843	8.31	4.0	6.67	18.0	3820	1.5	27.8	79.2		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	845	MW-117	8.31	6.67	18.0	3820	1.5	27.8	79.2	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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-118**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

(2-in; stickup)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **ads**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1151	NA	10.21	0.0	28.29	21.0	Yes	Yes	Yes	Yes		Weather: Sunny, 50's
10/5/16	905	NA	10.18									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	910	10.30	0.5	7.19	18.3	4010	5.2	39.6	132	Colorless / Cloudy	Low-flow groundwater sample:
	913	10.31	1.0	7.19	18.3	4010	4.6	39.3	53.4	↓	
	915	10.31	1.5	7.19	18.3	4010	4.3	40.4	26.3	Colorless / Clear	Standard groundwater sample:
	917	10.31	2.0	7.19	18.4	4020	4.2	38.4	18.3		
	920	10.31	2.5	7.19	18.5	4020	4.1	38.9	14.6		
	923	10.31	3.0	7.19	18.6	4010	3.9	39.7	10.9		
	925	10.31	3.5	7.19	18.7	4010	3.8	41.0	8.3		
	927	10.31	4.0	7.19	18.7	4010	3.8	43.1	7.2		

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	930	MW-118	10.31	7.19	18.7	4010	3.8	43.1	7.2	DRO	HCL	Lab: ESC Lab Sciences, Mt. Juliet, TN
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Mn,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

Artesia Refinery
Artesia, New Mexico

Well: NP-9

Event: Fall 2016 (Semiannual)

Area of Concern: TMD

(Gauge only)

(2-1a; stick up)

for TRC

Houston, Texas

Initials: *WJS*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/14/16	1155	NA	94.8	0.0	25.89	Not Sampled	Yes	# Issue	# Issue	Yes		Weather: Sunny, 60°s

Well Purging Record

* Needs New Monument casing top

[illegible]

Well Sampling Record

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

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

Event: Fall 2016 (Semiannual)

Area of Concern:

Rest

(2-in; strokeup)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: *CO*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1159	NA	9.80	0.0	28.11	20.8	Yes	Yes	Yes	Yes		Weather: Sunny, 60's
10/5/16	950	NA	9.76									

[illegible]

Date	Time	Sample I.D.	Depth to Water (FI-TOC)	pH (std units)	T (°C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1020	MW-119	980	6.91	18.7	3770	1.0	-32.1	8.6	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)				HNO ₃		6010/6020
								Total Metals (Hg,Ni,V,P,Cd,Ga,U) Anions (Chloride,Fluoride,Sulfate)		HNO ₃		6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)	Neat	300
										Nitrate-Nitrite	H ₂ SO ₄	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	GM4300
												If <0.03 feet of PSH present, remove PSH and sample groundwater

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

Initials: *LOS*

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

[* Installed 7-28-14]

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: MW-136
Event: Fall 2016 (Semiannual)

Hydrologic Monitoring
for TRC
Houston, Texas

Well Inspection Information

(2-in; stickup)

Area of Concern: Rest

(Cross-Gradient; North of North RO-Reject Field)

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1135	NA	9.62	0.0	22.90	23.0	Yes	Yes	Yes	Yes		Weather: Sunny, 70's
10/4/16	1425	NA	9.62		to surf bottom							

Well Purging Record

Screen: 10-25 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
10/4/16	1430	9.65	0.5	7.16	24.2	3680	2.6	23.8	199	colorless / cloudy	Low-flow groundwater sample:
	1433	9.65	1.0	6.87	22.8	3680	1.1	23.9	128	↓	A) peristaltic pump w/ ded tubing
	1435	9.65	1.5	6.79	22.4	3670	0.8	23.9	56.5	colorless / st. cloudy	B) ded bladder pump
	1437	9.65	2.0	6.73	22.2	3660	0.7	23.7	40.2	↓	C) non-ded bladder pump; or
	1440	9.65	2.5	6.73	22.2	3650	0.7	23.9	28.3	colorless / clear	Standard groundwater sample:
	1443	9.65	3.0	6.69	22.1	3650	0.6	24.4	15.3	↓	D) bailer due to limited column; or
	1445	9.65	3.5	6.68	22.1	3650	0.6	24.8	12.4	↓	E) recovery well cycling sample
	1447	9.65	4.0	6.67	22.1	3640	0.6	25.4	9.8	↓	F) irrigation well grab sample
	1450	9.65	4.5	6.67	22.1	3630	0.6	25.8	7.9	↓	

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
10/4/16	1455	MW-136	9.65	6.67	22.1	3630	0.6	25.8	7.9	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 ✓
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470 ✓
										Anions (Chloride,Fluoride,Sulfate)		Neat 300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										Cyanide	NaOH	SM4500 ✓

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

Initials: GDS / SLD

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: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring
for TRC
Houston, Texas

Well Inspection Information

(2-in; stickup)

Initials: **GIS/SCD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1050	NA	11.01	0.0	51.45	48.4	Yes	Yes	Yes	Yes		Weather: Sunny, 70's
10/5/16	1425	NA	11.07	0.0	45.0 ft	bottom						Clear 80's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1430	11.18	0.5	7.23	23.6	3960	4.2	1.4	98.3	Sl. Cloudy / colorless	Low-flow groundwater sample:
	1432	11.22	1.0	7.04	22.2	4050	1.6	13.8	65.4		A) peristaltic pump w/ ded tubing
	1435	11.22	1.5	6.98	21.8	4070	1.3	18.7	37.5		B) ded bladder pump
	1437	11.22	2.0	6.91	21.3	4080	1.1	26.2	29.8	Clear	C) non-ded bladder pump; or
	1440	11.22	2.5	6.86	21.1	4090	0.9	28.3	20.3		Standard groundwater sample:
	1442	11.22	3.0	6.83	20.9	4100	0.8	31.2	18.7		D) bailer due to limited column; or
	1445	11.22	3.5	6.81	20.9	4110	0.8	32.5	18.5		E) recovery well cycling sample
	1447	11.22	4.0	6.80	20.9	4120	0.8	33.8	18.4		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1450	MW-126B	11.22	6.80	20.9	4120	0.8	33.8	18.4	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
										Total Metals (Hg, Ni, V, B, Cd, Co, U)		HNO3 6040/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern:

Rest

(2-in; stickup)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **lps/sld**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1040	NA	16.50	0.0	53.21	38.4	Yes	Yes	Yes	Yes		Weather: Sunny, 70's Clear 80's
10/5/16	1510	NA	16.45	0.0								

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1515	16.49	0.5	7.02	25.2	2800	1.7	-239.2	55.4	sl. cloudy/colorless	Low-flow groundwater sample:
	1517	16.49	1.0	6.96	24.3	2760	1.2	-253.8	32.8	odor ↓	A) peristaltic pump w/ ded tubing
	1520	16.49	1.5	6.92	23.4	2700	0.9	-267.8	20.5	clear, colorless, odor	B) ded bladder pump
	1522	16.49	2.0	6.90	23.1	2680	0.7	-270.3	19.6		C) non-ded bladder pump; or
	1525	16.49	2.5	6.89	22.9	2670	0.7	-275.4	15.4		Standard groundwater sample:
	1527	16.49	3.0	6.87	22.8	2660	0.6	-277.5	13.2		D) bailer due to limited column; or
	1530	16.49	3.5	6.86	22.8	2660	0.6	-278.3	10.5		E) recovery well cycling sample
✓	1532	16.49	4.0	6.86	22.8	2650	0.6	-278.5	9.8	↓ ↓ ↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1535	MW-127	16.49	6.86	22.8	2650	0.6	-278.5	9.8			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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring

for TRC

Houston, Texas

(2-in; Stick-up)

Initials: GWS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1025	NA	19.18	0.0	53.08	38.2	Yes	Yes	Yes	Yes		Weather: Sunny, 70's
10/5/16	1635	+	19.11									

* (CONFIRMED); NO MEASURABLE LNAPL

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std. units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1640	19.12	0.5	6.90	25.6	2160	2.5	-133.1	79.1	colorless / sl. cloudy	Low-flow groundwater sample:
	1643	19.12	1.0	6.77	24.5	2160	1.3	-130.6	56.2	↓	A) peristaltic pump w/ ded tubing
	1645	19.12	1.5	6.71	24.0	2160	0.9	-131.8	34.1	colorless / clear	B) ded bladder pump
	1647	19.12	2.0	6.67	23.8	2160	0.7	-137.9	15.2	↓	C) non-ded bladder pump; or
	1650	19.12	2.5	6.68	23.8	2160	0.7	-140.1	12.1	↓	Standard groundwater sample:
	1653	19.12	3.0	6.67	23.8	2160	0.6	-142.1	10.6	↓	D) bailer due to limited column; or
	1655	19.12	3.5	6.66	23.7	2160	0.6	-142.7	8.9	↓	E) recovery well cycling sample
	1657	19.12	4.0	6.66	23.7	2160	0.6	-144.2	8.1	↓	F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std. units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1705	MW-129	19.12	6.66	23.7	2160	0.6	-144.2	8.1	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Cr,Cu)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	GM4500

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-# 18A**
Event: Fall 2016 (Semiannual)
Area of Concern: **Rest**

(Gauge only)
(4-in ; stick up)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **GR**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	926	NA	8.25	0.0	17.78	12.7	Yes	Yes	Yes	Yes		Weather: Sunny, 60's

Well Purging Record

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

Well Sampling Record

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

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

Initials: *WJ*

[illegible]

Not in Sampling program

Monitoring Well Purging and Sampling Record

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

Well: **KWB-1-B**
Event: Fall 2016 (Semiannual)
Area of Concern: **Rest**

(Gauge only)
(4-in; stickup)

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: **GDJ**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	913	NA	12.93	0.0	33.92	Net 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	Comments
			0.5								Low-flow groundwater sample: A) peristaltic pump w/ ded tubing B) ded bladder pump C) non-ded bladder pump; or Standard groundwater sample: D) bailer due to limited column; or E) recovery well cycling sample F) irrigation well grab sample
			1.0								
			1.5								
			2.0								
			2.5								
			3.0								
			3.5								
			4.0								

Well Sampling Record

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

Well: KW3-1C

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: GDJ

[illegible][illegible]

Date	Time	Sample I.D.	Depth to Water (FI-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, ML 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
										Total Metals (Hg,Ni,V,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
												If <0.03 feet of PSH present, remove PSH and sample groundwater

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: KWB-10R

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

(2-in; at-grade)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	906	13.95	13.96	0.01	29.46	22.0	Yes	Yes	Yes	Yes		Weather: Sunny, 70's
10/4/16	1240											

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1245	14.02	0.5	6.81	22.8	1734	2.1	-142.2	20.9	Colorless / clear / low	Low-flow groundwater sample:
	1247	14.05	1.0	6.63	22.3	1717	1.3	-155.6	23.6		A) peristaltic pump w/ ded tubing
	1250	14.06	1.5	6.57	22.0	1705	1.1	-164.8	22.9		B) ded bladder pump
	1253	14.07	2.0	6.55	21.9	1697	0.9	-168.9	20.1		C) non-ded bladder pump; or
	1255	14.07	2.5	6.53	21.8	1669	0.9	-172.7	21.2		Standard groundwater sample:
	1257	14.07	3.0	6.54	21.9	1665	0.8	-172.2	21.8		D) bailer due to limited column; or
	1300	14.07	3.5	6.55	21.8	1651	0.8	-172.9	20.9		E) recovery well cycling sample
	1303	14.07	4.0	6.55	21.8	1648	0.8	-173.3	20.2		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1305	KWB-10R	14.07	6.55	21.8	1648	0.8	-173.3	20.2	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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6040/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	GM4500

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **MW-131**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring

for TRC

Houston, Texas

Initials: **AK**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/14/16	1031	NA	20.52	0.0	53.35	38.1	Yes	Yes	Yes	Yes		Weather: Sunny, 70's
10/15/16	1545	NA	20.50									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/15/16	1550	20.51	0.5	6.91	26.1	2150	2.3	-147.9	72.4	colorless / sl. cloudy	Low-flow groundwater sample:
	1553	20.51	1.0	6.75	24.5	2120	1.3	-170.6	60.1		A) peristaltic pump w/ ded tubing
	1555	20.51	1.5	6.68	23.6	2100	0.9	-154.5	39.9		B) ded bladder pump
	1557	20.51	2.0	6.65	23.0	2090	0.7	-159.6	20.0	colorless / clear	C) non-ded bladder pump; or
	1600	20.51	2.5	6.66	22.6	2080	0.6	-165.1	10.9		Standard groundwater sample:
	1603	20.51	3.0	6.60	22.6	2070	0.6	-169.4	7.3		D) bailer due to limited column; or
	1605	20.51	3.5	6.59	22.6	2070	0.6	-171.0	5.9		E) recovery well cycling sample
	1607	20.51	4.0	6.60	22.6	2070	0.6	-172.1	5.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/15/16	1610	MW-131	20.51	6.60	22.6	2070	0.6	-172.1	5.1			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
										Total Metals (Hg, Ni, V, B, Cd, Co, U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride, Fluoride, Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-5**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring

for TRC

Houston, Texas

(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	
10/4/16	1017	NA	20.59	0.0	37.68	30.7	Yes	Yes	Yes	Yes		Weather: Sunny, 70's
10/5/16	1455	NA	20.55									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1500	20.57	0.5	6.95	26.7	2850	2.3	-144.2	8.8	colorless / clear	Low-flow groundwater sample:
	1503	20.59	1.0	6.84	25.8	2840	2.0	-143.0	6.2		A) peristaltic pump w/ ded tubing
	1505	20.58	1.5	6.80	25.4	2830	1.7	-142.4	4.5		B) ded bladder pump
	1507	20.58	2.0	6.73	25.0	2810	1.6	-140.6	4.0		C) non-ded bladder pump; or
	1510	20.58	2.5	6.70	24.9	2810	1.6	-139.9	3.7		Standard groundwater sample:
	1513	20.58	3.0	6.70	24.8	2800	1.6	-137.9	4.1		D) bailer due to limited column; or
	1515	20.58	3.5	6.69	24.8	2800	1.5	-135.8	3.3		E) recovery well cycling sample
	1517	20.58	4.0	6.69	24.8	2800	1.5	-135.0	3.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1520	KWB-5	20.58	6.69	24.8	2800	1.5	-135.0	3.1	DRO	HCL	8015M
										GRO	HCL	8016M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,Co,Cd,Cr,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

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

Well: MW-111
Event: Fall 2016 (Semiannual)
Area of Concern: Rest

Hydrologic Monitoring
for TRC
Houston, Texas

(2-in; stickup)

Initials: cus

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1011	NA	21.51	0.0	40.83	35.8	Yes	Yes	Yes	Yes		Weather: <u>Sunny, 70's</u>
10/4/16	1610	NA	21.48									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1615	21.55	0.5	6.95	26.4	2330	2.7	-106.2	107	Colorless / cloudy	Low-flow groundwater sample:
	1617	21.56	1.0	6.81	26.0	2340	1.9	-103.1	88.6	↓ ↓	A) peristaltic pump w/ ded tubing
	1620	21.57	1.5	6.71	25.3	2360	1.4	-101.5	74.0	↓ ↓	B) ded bladder pump
	1623	21.57	2.0	6.63	24.8	2340	1.2	-101.3	42.6	colorless / sl. cloudy	C) non-ded bladder pump; or
	1625	21.57	2.5	6.59	24.6	2340	1.2	-100.2	34.1	↓ ↓	Standard groundwater sample:
	1627	21.57	3.0	6.57	24.5	2340	1.2	-101.9	28.9	colorless / clear	D) bailer due to limited column; or
	1630	21.57	3.5	6.57	24.4	2350	1.1	-105.1	23.1		E) recovery well cycling sample
	1633	21.57	4.0	6.56	24.4	2360	1.1	-107.0	20.5	↓ ↓	F) irrigation well grab sample
	1635	21.57	4.5	6.56	24.4	2360	1.1	-108.4	19.2	↓ ↓	

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1640	MW-111	21.57	6.56	24.4	2360	1.1	-108.4	19.2	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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6040/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

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

Well: **KWB-6**
Event: Fall 2016 (Semiannual)
Area of Concern: **Rest**

Hydrologic Monitoring
for TRC
Houston, Texas

[Historical absorbent sock]
* No absorbent sock in 2H16

(2-in) stuck up

Initials: **GHF**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	959	NA	18.35	0.0	36.44	27.4	Yes	Yes	Yes	Yes		Weather: Sunny, 70°
10/4/16	1525	NA	18.34									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/4/16	1530	18.38	0.5	6.69	24.6	2150	2.2	-196.9	8.4	Dark brn / clear / odor	Low-flow groundwater sample:
	1533	18.39	1.0	6.61	23.3	2150	1.2	-207.7	5.6		A) peristaltic pump w/ ded tubing
	1535	18.39	1.5	6.57	22.9	2080	0.9	-214.6	3.9		B) ded bladder pump
	1537	18.39	2.0	6.56	22.5	2020	0.8	-222.7	3.3		C) non-ded bladder pump; or
	1540	18.39	2.5	6.56	22.3	2000	0.7	-225.8	2.7		Standard groundwater sample:
	1543	18.39	3.0	6.55	22.4	1990	0.7	-228.9	2.4		D) bailer due to limited column; or
	1545	18.39	3.5	6.55	22.5	1980	0.7	-232.9	2.1		E) recovery well cycling sample
	1547	18.39	4.0	6.55	22.5	1982	0.6	-236.1	2.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1550	KWB-6	18.39	6.55	22.5	1982	0.6	-236.1	2.1	DRO	HCL	8015M
										CRD	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Cr,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company
Artesia Refinery
Artesia, New Mexico

Well: **MW-112**
Event: Fall 2016 (Semiannual)
Area of Concern: **Rest**

Hydrologic Monitoring
for TRC
Houston, Texas

(2-10; stick-up)

Initials: **GLS**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1005	18.10	18.14	0.04	37.54	32.5	Yes	Yes	Yes	Yes		Weather: Sunny, 70's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
			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
										Total Metals (Hg,Ni,V,B,Cd,Ce,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

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

Well: **MW-132**
Event: Fall 2016 (Semiannual)
Area of Concern: **Rest**

Hydrologic Monitoring
for TRC
Houston, Texas

(2-in; shclup)

Initials: **gds**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	954	16.09	16.60	0.51	42.66	NA	Yes	Yes	Yes	Yes		Weather: Sunny, 60's

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
			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

Not sampled due to well having LNAPL thickness > 0.03 ft.

Well Sampling Record

Date	Time	Sample I.D.	Depth to 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
										Total Metals (Hg,Ni,V,B,Cd,Ge,U)	HNO3	6040/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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

Hydrologic Monitoring
for TRC
Houston, Texas

This is correct...
RW-11-0 is similar Area

Area of Concern: Rest

(2-in; at-grade)

Initials: *ads*

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	940	NA	12.68	0.0	34.32	32.8	Yes	Yes	Yes	Yes		Weather: Sunny, 60's
10/5/16	1055		12.59									

[illegible][illegible]

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

Monitoring Well Purging and Sampling Record

Well: **RW-#11-0**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring
for TRC
Houston, Texas

(Gauge only)

(#32" corrugated stick up)

Initials: **GD**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	937	NA	15.70	0.0	22.20	NA	Yes	Yes	Yes	Yes		Weather: Sunny, GD's

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

[*Until further notice, do not address this well in any way, per Navajo, 4-26-16]

Monitoring Well Purging and Sampling Record

Jack Joy (farmer)

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **KWB-9**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

(2in; stick-up)

Hydrologic Monitoring

for TRC

Houston, Texas

Initials:

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

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	
			0.5								
			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
		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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 900
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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-12A**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring
for TRC
Houston, Texas

(4-in jet-grade)

Initials: **GDs**

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	
10/4/16	948	NA	15.35	0.0	25.03	24.9	Yes	Yes	Yes	Yes		Weather: Sunny, 60's
10/5/16	1140	NA	15.31									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1145	15.32	0.5	7.11	23.0	3970	5.3	51.7	18.8	Colorless / clear	Low-flow groundwater sample:
	1147	15.32	1.0	6.98	22.4	3960	4.6	51.2	16.2		A) peristaltic pump w/ ded tubing
	1150	15.32	1.5	6.84	21.7	3870	4.4	54.2	14.1		B) ded bladder pump
	1153	15.32	2.0	6.77	21.3	3900	4.5	55.1	8.9		C) non-ded bladder pump; or
	1155	15.32	2.5	6.75	21.3	3890	4.4	56.0	6.5		Standard groundwater sample:
	1157	15.32	3.0	6.73	21.4	3880	4.4	58.2	5.8		D) baller due to limited column; or
	1200	15.32	3.5	6.73	21.4	3880	4.3	59.1	5.2		E) recovery well cycling sample
	1203	15.32	4.0	6.72	21.4	3880	4.3	59.2	4.7		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/5/16	1205	KWB-12A	15.32	6.72	21.4	3880	4.3	59.2	4.7			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 ✓
						Total Metals (Hg,Ni,V,B,Cd,Co,U)					HNO3	6010/6020 and/or 7470 ✓
						Anions (Chloride,Fluoride,Sulfate)					Neat	300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										Cyanide	NaOH	SM4500 ✓

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

* HMI - dedicated bladder pump

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

Monitoring Well Purging and Sampling Record

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

Well: KW8-12B
Event: Fall 2016 (Semiannual)
Area of Concern: Rest

Hydrologic Monitoring
for TRC
Houston, Texas

(4-in; at-grade)

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	950	NA	15.20	0.0	39.39	35.2	Yes	Yes	Yes	Yes		Weather: Sunny, 60's
10/5/16	1220	NA	15.14									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/5/16	1225	15.15	0.5	6.95	23.1	3780	4.4	-155.7	5.1	colorless / clear	Low-flow groundwater sample:
	1227	15.15	1.0	6.90	21.8	3710	4.1	-139.6	4.0		A) peristaltic pump w/ ded tubing
	1230	15.15	1.5	6.86	21.3	3670	4.1	-127.3	3.4		B) ded bladder pump
	1233	15.15	2.0	6.83	21.1	3630	4.1	-114.5	2.7		C) non-ded bladder pump; or
	1235	15.15	2.5	6.80	21.0	3590	4.0	-97.3	2.5		Standard groundwater sample:
	1237	15.15	3.0	6.78	20.9	3580	4.0	-82.5	2.1		D) bailer due to limited column; or
	1240	15.15	3.5	6.77	20.9	3560	3.9	-78.9	1.9		E) recovery well cycling sample
	1243	15.15	4.0	6.77	20.8	3570	3.9	-74.1	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
10/5/16	1245	KW8-12B	15.15	6.77	20.8	3570	3.9	-74.1	2.0			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 ✓
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470 ✓
										Anions (Chloride,Fluoride,Sulfate)		Neat 300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										Cyanide	NaOH	SM4500 ✓
	1300	EB-Rest-05	NA							Same as above	Same	Same
✓	1200	DUP-Rest-05	15.15	6.77	20.8	3570	3.9	-74.1	2.0	Same as above	Same	Same

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: **KWB-2R**

Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring

for TRC

Houston, Texas

(2-in; at-grade)

Initials: **GDS**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1114	NA	18.85	0.0	39.41	32.4	Yes	Yes	Yes	Yes		Weather: Sunny, 70°
10/5/16	140	NA	18.81									

Well Purging Record

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity			
10/5/16	1415	19.09	0.5	6.86	24.3	3100	1.6	-234.4	5.6	colorless	clear	odor	Low-flow groundwater sample:
	1417	19.09	1.0	6.79	23.5	3120	0.9	-246.1	4.4				A) peristaltic pump w/ ded tubing
	1420	19.09	1.5	6.78	23.1	3130	0.6	-256.2	2.8				B) ded bladder pump
	1423	19.09	2.0	6.77	22.8	3120	0.5	-268.2	3.2				C) non-ded bladder pump; or
	1425	19.09	2.5	6.76	22.8	3110	0.5	-276.2	2.8				Standard groundwater sample:
	1427	19.09	3.0	6.75	22.8	3110	0.5	-285.7	2.4				D) bailer due to limited column; or
	1430	19.09	3.5	6.75	22.7	3110	0.4	-290.0	2.3				E) recovery well cycling sample
	1433	19.09	4.0	6.75	22.7	3110	0.4	-294.8	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
10/5/16	1435	KWB-2R	19.09	6.75	22.7	3110	0.4	-294.8	1.9	DRO	HCL	8015M
										GRO	HCL	6015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cr,Cu)		HNO3 6010/6020 and/or 7170
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500

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

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-58

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring

for TRC

Houston, Texas

(2-in; at-grade)

Initials: GDS

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/15/16	1119	* NA	17.67	0.0	33.06	25.6	Yes	Yes	Yes	Yes		Weather: Sunny, 70's
10/15/16	1325	* NA	17.62									

Well Purging Record f unmeasurable shown on probe

Date	Time	Depth to Water (Ft-TOC)	Cum. Vol. Purged (L)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Water Color / Clarity	Comments
10/15/16	1330	17.70	0.5	6.87	24.5	1875	2.6	-180.0	6.09	colorless / clear / odor	Low-flow groundwater sample:
	1333	17.71	1.0	6.76	23.2	2000	1.2	-185.6	5.9		A) peristaltic pump w/ ded tubing
	1335	17.71	1.5	6.70	22.1	1940	0.8	-193.8	6.4		B) ded bladder pump
	1337	17.71	2.0	6.69	21.4	1882	0.5	-203.1	6.1		C) non-ded bladder pump; or
	1340	17.71	2.5	6.68	21.3	1876	0.4	-207.4	5.8		Standard groundwater sample:
	1343	17.71	3.0	6.66	21.2	1840	0.3	-214.3	5.7		D) bailer due to limited column; or
	1345	17.71	3.5	6.67	21.3	1829	0.3	-216.1	5.3		E) recovery well cycling sample
	1347	17.71	4.0	6.67	21.3	1820	0.3	-220.2	5.1		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/15/16	1350	MW-58	17.71	6.67	21.3	1820	0.3	-220.2	5.1			Lab: ESC Lab Sciences, Mt. Juliet, TN
										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 ✓
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470 ✓
										Anions (Chloride,Fluoride,Sulfate)		Neat 300 ✓
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences ✓
										TDS	Neat	2540C ✓
										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-13**
Event: Fall 2016 (Semiannual)

Area of Concern: **Rest**

Hydrologic Monitoring
for TRC
Houston, Texas

[HMI-dedicated bladder pump]

(Gauge only)

(2-in; at-grade)

Cross-Gradient

Initials: **Ans**

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	1101	NA	21.19	0.0	32.10	30.1	Yes	Yes	Yes	Yes		Weather: Sunny, 70's

Well Purging Record

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

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												Lab: ESC Lab Sciences, Mt. Juliet, TN
										DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4300

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

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

* See note for MW-103; Safe Work Permit issued by Darlene Vernon (during sign-in at South Control Room) (Not in 2416)

Monitoring Well Purging and Sampling Record

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-104

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

(4-in; stickup)

EB-Rest-02

DUP-Rest-02

Hydrologic Monitoring

for TRC

Houston, Texas

(both for same analysis)

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	
10/4/16	1315	NP	14.71	0.0	21.97	19.0	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	Comments
10/4/16	1325	14.85	0.5	6.52	29.0	1222	1.6	-258.2	3.3	colorless / clear	Low-flow groundwater sample:
	1327	14.91	1.0	6.58	29.0	1228	1.4	-265.6	2.2		A) peristaltic pump w/ ded tubing
	1330	14.97	1.5	6.62	29.0	1232	1.3	-273.1	2.0		B) ded bladder pump
	1332	15.02	2.0	6.64	29.0	1237	1.2	-279.9	1.9		C) non-ded bladder pump; or
	1335	15.07	2.5	6.66	29.0	1240	1.2	-283.8	1.9		Standard groundwater sample:
	1337	15.10	3.0	6.68	29.0	1243	1.2	-285.7	1.8		D) bailer due to limited column; or
	1340	15.13	3.5	6.68	29.0	1243	1.2	-286.3	1.8		E) recovery well cycling sample
	1342	15.16	4.0	6.68	29.0	1244	1.2	-286.7	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
10/4/16	1345	MW-104	15.16	6.68	29.0	1244	1.2	-286.7	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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										Cyanide	NaOH	SM4500
	1400	EB-Rest-02	NA							Same as above	Same	Same
	1300	DUP-Rest-02	15.16	6.68	29.0	1244	1.2	-286.7	1.8	Same as above	Same	Same

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

Historical absorbent sock
(sock in well 2H16)

initials: SC

[illegible]

Non-dedicated tube

Historical absorbent sock

Monitoring Well Purging and Sampling Record

No sock 2H16

Navajo Refining Company

Artesia Refinery

Artesia, New Mexico

Well Inspection Information

Well: MW-65

Event: Fall 2016 (Semiannual)

Area of Concern: Rest

Hydrologic Monitoring

for TRC

Houston, Texas

(at-grade, 4-in; in front of storage shed)

Initials: SC

Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/16	0850	12.54	12.55	0.01	28.78	23.8	Yes	Yes	Yes	Yes		Weather: Clear, 70.5
10/4/16	1445	12.54	12.55	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	Comments
10/4/16	1455	12.56	0.5	6.75	28.0	2260	1.5	-163.8	7.7	Clear, low/155	Low-flow groundwater sample:
	1457	12.57	1.0	6.74	27.9	2260	1.4	-167.7	5.7		A) peristaltic pump w/ ded tubing
	1500	12.57	1.5	6.74	27.7	2260	1.3	-175.4	5.3		B) ded bladder pump
	1502	12.57	2.0	6.73	27.6	2260	1.3	-179.1	5.0		C) non-ded bladder pump; or
	1505	12.57	2.5	6.73	27.5	2260	1.3	-183.8	4.8		Standard groundwater sample:
	1507	12.57	3.0	6.73	27.5	2260	1.3	-185.3	4.7		D) bailer due to limited column; or
	1510	12.57	3.5	6.73	27.5	2260	1.3	-187.1	4.7		E) recovery well cycling sample
	1512	12.57	4.0	6.73	27.5	2260	1.3	-188.6	4.6		F) irrigation well grab sample

Well Sampling Record

Date	Time	Sample ID	Depth to Water (Ft-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction-Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
10/4/16	1515	MW-65	12.57	6.73	27.5	2260	1.3	-188.6	4.6	DRO	HCL	8015M
										GRO	HCL	8015M
										VOC	HCL	8260
										Total Metals (As,Ba,Cr,Fe,Pb,Mn,Se) and/or Cations (Ca,K,Na)		HNO3 6010/6020
										Total Metals (Hg,Ni,V,B,Cd,Co,U)		HNO3 6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)		Neat 300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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: Fall 2016 (Semiannual)

Area of Concern: Rest

Active RW; above-grade vault; Sampled by part, when sampled

Hydrologic Monitoring
for TRC
Houston, Texas

Initials: *SM*

Active RW; above-grade vault; Sampled by part, when sampled											Initials: SLM	
Date	Time	Depth to LNAPL (Ft-TOC)	Depth to Water (Ft-TOC)	LNAPL Thickness (Ft)	Well Total Depth (Ft-TOC)	Sample Intake (Ft-TOC)	Well Inspection					Comments
							Cap	Casing	Well Secured	Label	Other	
10/4/14	9:20	14.60	14.68	0.08	N/A	24.0	Yes	Yes	Yes	Yes		Weather: clear, 70s
					(pumps in well)							

Well Purging Record

Formerly - reported 35.30 ft - TOC

[illegible]

Well Sampling Record

Date	Time	Sample I.D.	Depth to Water (FL-TOC)	pH (std units)	T (C)	SC (umho/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Parameter	Preserv	Comments
												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
										Total Metals (Hg,Ni,V,B,Cd,Co,U)	HNO3	6010/6020 and/or 7470
										Anions (Chloride,Fluoride,Sulfate)	Neat	300
										Nitrate-Nitrite	H2SO4	per historical, ESC Lab Sciences
										TDS	Neat	2540C
										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