

MONITORING WELL ABANDONMENT AND REPLACEMENT WORK PLAN

Prepared for:



Greenfield Environmental Multistate Trust LLC
Trustee of the Multistate Environmental Response Trust

Prepared By:



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1.0 INTRODUCTION

This Monitoring Well Abandonment and Replacement Work Plan presents the technical approach for abandonment and reinstallation of groundwater monitoring wells at the Kerr-McGee Chemical Corp – Navassa Superfund Site [U.S. Environmental Protection Agency (USEPA) ID# NCD980557805], referred to herein as the Site, located in Navassa, North Carolina (Figure 1). This Work Plan is being submitted by EarthCon Consultants of North Carolina, P.C. (EarthCon) on behalf of Greenfield Environmental Multistate Trust LLC, not individually but solely in its representative capacity as Trustee of the Multistate Environmental Response Trust (the Multistate Trust).

The Site operated as a creosote-based wood treating facility from 1936 to 1974. From 2005 to 2017, groundwater monitoring wells were installed as part of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) site characterization activities. There are currently 58 groundwater monitoring wells at the Site. The monitoring well locations are shown on Figure 2. The objectives of the monitoring well abandonment and replacement activities are to remove the potential for adverse environmental impacts to groundwater from unused and/or compromised monitoring wells. Seven wells have been identified for abandonment and one replacement well is proposed.

There are currently six upgradient background monitoring wells at the Site. Wells MW-01, MW-01D, MW-23 and MW-23D are located in the northernmost portion of the Eastern Upland Area while wells MW-22 and MW-22D are located in the northernmost portion of Operable Unit 1 (OU1) in the Untreated Wood Storage Area. USEPA has indicated that the Eastern Upland Area is not part of the CERCLA Site while OU1 has been defined as that area of the Site that does not pose an unacceptable risk to future residential receptors. Both the Eastern Upland Area and OU1 are anticipated to be available for redevelopment in the near future. Therefore, because these six wells are not sampled as part of the Site groundwater monitoring network, they should be abandoned prior to the anticipated redevelopment of the property to remove potential preferential pathways to groundwater. Note that, as documented in the Remedial Investigation Report, creosote-related constituents were either not detected or were present below screening criteria in groundwater samples collected from these six wells (EarthCon, 2019).

Monitoring well MW-09 is located in the northern portion of the Process Area. Historical groundwater sampling activities have shown a pH greater than 11 and the presence of a white precipitate in the groundwater (Appendix A). These conditions suggest that grout may have entered the well and compromised its integrity. Therefore, well MW-09 should be abandoned and replaced with a new shallow monitoring well (MW-09R) to maintain the monitoring well network at the Site for long-term monitoring. After implementation of this Work Plan, wells MW-09R, MW-09D, and MW-30 will serve as the upgradient monitoring wells.

2.0 MONITORING WELL ABANDONMENT

The monitoring wells will be abandoned by a North Carolina-licensed driller in accordance with the procedures outlined in North Carolina Administrative Code (NCAC) Title 15A, Subchapter 2C, Section.0113 and USEPA Region 4 Laboratory Services and Applied Science Division (LSASD) guidance for Design and Installation of Monitoring Wells (USEPA, 2020). A North Carolina Licensed Geologist will observe the well abandonment activities.

Shallow wells MW-01 and MW-09 were constructed of 2-inch diameter stainless steel well casing and screen installed to depths of 35 feet and 37 feet below ground surface (bgs), respectively. Shallow wells MW-22 and MW-23 were constructed of 2-inch diameter PVC well casing and screen installed to depths of 25 feet and 27 feet bgs, respectively. Deep wells MW-01D, MW-22D, and MW-23D were constructed of 2-inch diameter PVC well casing and screen installed to depths of 60 feet, 57 feet, and 59 feet bgs, respectively. Monitoring well construction details are provided in Table 1.

USEPA's preferred method for monitoring well abandonment is to completely remove the well casing and screen from the borehole, clean out the borehole, and backfill with a cement or bentonite grout. However, this method is not applicable for wells constructed with stainless steel which will be abandoned in place.

2.1 Stainless-Steel Wells

Shallow wells MW-01 and MW-09, which were constructed with stainless steel casing and screen, will be abandoned in place. Prior to well abandonment, the steel bollards and metal stick-up will be removed from around wells to allow access to the monitoring well casing. Following the removal of the stick-up and bollards, a tremie pipe will be set to the bottom of each monitoring well. A neat cement or bentonite slurry grout will be pumped through the tremie pipe from the bottom of the well to the ground surface to seal the well screen and casing. After the well screen and casing are sealed, the steel casing will be removed to a depth of at least 2-feet bgs.

2.2 PVC Wells

Shallow wells MW-22 and MW-23 and deep wells MW-01D, MW-22D and MW-23D, which were constructed with PVC casing and screen, will be abandoned by over drilling. Prior to well abandonment, the steel bollards and metal stick-up will be removed from around each well to allow access to the monitoring well casing. Following the removal of the stick-up and bollards, a tremie pipe will be set to the bottom of each monitoring well. A neat cement or bentonite slurry grout will be pumped through the tremie pipe from the bottom of the well to the ground surface to seal the well screen and casing.

Once the original well casings have been grouted, an 8-inch outside diameter sonic drill casing will be advanced around the original borehole (through the grout, bentonite seal and sand pack) until reaching a termination depth 2 feet below the bottom of the monitoring well. Following the installation of the 8-inch diameter casing, a 5.5 inch outside diameter sonic drill hollow core barrel

be advanced inside the outer casing. The waste material generated, including the PVC pipe cuttings, grout, bentonite seal and sand pack will be circulated out into a plastic tub, containerized in 55-gallon drums and disposed off-site in accordance with the SRI Waste Management Plan (WMP) dated September 2015 (CH2M Hill, 2015).

Upon reaching the termination depth the core barrel will be removed. The outer 8-inch casing will remain in place and a tremie pipe will be set inside the sonic casing string to the bottom of the well. A neat cement or bentonite slurry grout will then be pumped through the tremie pipe. Pumping will continue until the onsite geologist has determined that the sonic casing is filled with grout to the ground surface. As each 10-foot segment of sonic casing is removed from the borehole, additional grout will be pumped into the sonic casing string through the tremie pipe so that a continuous grout seal from the bottom of the borehole up to the ground surface is in place.

3.0 MONITORING WELL INSTALLATION

Replacement monitoring well MW-09R will be installed by a North Carolina-licensed driller in accordance with the procedures outlined in NCAC Title15A, Chapter 2C, Section .0108 and USEPA Region 4 LSASD guidance for Design and Installation of Monitoring Wells (USEPA, 2020). A North Carolina Licensed Geologist will observe the well installation activities.

3.1 Soil Boring and Monitoring Well Installation

Shallow replacement well MW-09R will be located near but outside of the influence (at least 5 feet away, outside the area of grouting) of abandoned well MW-09. The actual well location will be chosen in the field based on terrain/accessibility. The well will be installed to the same depth (37 feet bgs) and same screen interval (27 to 37 feet bgs) as previously abandoned well MW-09. Prior to selection of the final screen interval, the sonic core will be examined to confirm that the lithologies indicate that the proposed screen interval for MW-09R is in the same hydrostratigraphic unit as well MW-09. Based on historical dissolved-phase concentrations and the absence of creosote in this area, well MW-09R will be constructed with PVC rather than stainless-steel.

Using rotosonic drilling equipment, a sonic core barrel and outer casing will be advanced to a depth of approximately 38 feet bgs. Soil samples will be collected continuously until soil boring termination. The soils will be examined for the presence of creosote-staining and odors, screened using a photoionization detector (PID), and classified using the USCS. If creosote-staining or odors are noted, a soil sample will be collected from that interval and analyzed for volatile organic compounds (VOCs) using EPA Method 8260 and semi-volatile organic compounds (SVOCs) using EPA Method 8270. At a minimum, a soil sample will be collected from the interval directly above the shallow clay layer, if present, at an estimated depth of 8 to 9.5 feet bgs. A sample of the shallow clay layer will also be collected for grain size analysis using ASTM D422-63(2007).

Upon soil boring termination, replacement monitoring well MW-09 will be constructed using 2-inch diameter, flush-threaded, Schedule 40 PVC casing and a pre-packed 10-foot long Schedule 40 PVC, 0.010-inch slotted screen. Following the installation of the casing and screen, clean silica

sand will be placed in the annular space surrounding the well screen to a depth approximately 2 feet above the top of the screen. A 2-foot bentonite seal will be added above the sand filter pack. The bentonite seal will be overlain by a cement/bentonite grout mixture extending from the top of the seal to a depth of approximately 2 feet bgs. Centralizers will be installed in the well bore and the filter pack, bentonite seal and grout will be installed using a tremie pipe to ensure proper placement of the well completion materials.

Replacement well MW-09R will be completed with a steel stick-up and traffic bollards on each side for protection. Following well completion, an identification plate will be affixed to the well and will include the following information: drillers name and certification number, date of installation, total depth, casing depth, screened interval and well identification number.

3.2 Monitoring Well Development

Following well construction and after a 24-hour grout stabilization period, the monitoring well will be developed to remove fine-grained silts and clays which may be present within the monitoring well and sand pack. Development will be conducted by pumping and surging with a non-dedicated submersible pump and surge block. MW-09R will be pumped until the purged groundwater is clear of fine materials, pH, temperature, and specific conductance have stabilized, and turbidity has either stabilized or is below 10 NTUs. Groundwater removed during well development will be containerized in 55-gallon drums and disposed off-site.

3.3 Surveying

Upon completion of well installation activities, a North Carolina-licensed surveyor will survey the horizontal location and vertical elevation of the newly installed monitoring well MW-09R as described in the Supplemental Remedial Investigation Work Plan Addendum No. 3 (EarthCon, 2016). The survey data will be incorporated into the next groundwater monitoring report.

4.0 EQUIPMENT DECONTAMINATION

Reusable development and drilling equipment will be decontaminated before and immediately after each use in accordance with USEPA LSASD procedures (USEPA, 2020). A decontamination pad will be constructed to collect and contain decontamination water and debris. Solids and liquids generated by decontamination operations will be containerized in 55-gallon drums and disposed off-site.

5.0 INVESTIGATION DERIVED WASTE

The following waste streams may be generated during these activities:

- Used personal protective equipment (PPE) and trash
- Soils, well materials and groundwater from well abandonment
- Soil cuttings from monitoring well installation

- Monitoring well development water
- Decontamination solids and liquids

Used PPE and trash will be placed in plastic garbage bags, double-bagged, and disposed of in the municipal landfill. Soil cuttings, well materials, development water and decontamination water will be collected in separate DOT-approved 55-gallon drums and separated for waste characterization, management, and disposal as appropriate. Investigation derived waste (IDW) will be managed in accordance with the SRI WMP dated September 2015 (CH2M Hill, 2015).

6.0 IMPLEMENTATION SCHEDULE

The following presents a summary of the approximate duration and constraints for implementation of field activities scheduled for the fourth quarter 2020:

Task Name	Estimated Duration	Notes
Site Preparation		
Site Setup and Demobilization	2 day	Well Abandonment & Installation
Well Abandonment		
Ballard and Pad Removal	1 day	Seven Monitoring Wells (MW-01, MW-01D, MW-09, MW-22, MW-22D, MW-23, and MW-23D).
Well Abandonment	3 days	
Waste Staging	0.5 day	
Well Installation		
Well Installation	2 days	MW-09R
Well Development	0.5 day	
Well Survey	0.5 day	
Waste Staging	0.5 day	

7.0 REFERENCES

CH2M Hill, 2015. Supplemental Remedial Investigation Work Plan, Kerr-McGee Chemical Corporation Site – Navassa, NC, CH2M Hill., September 2015.

EarthCon, 2016. Supplemental Remedial Investigation Work Plan Addendum No. 3, Kerr-McGee Chemical Corporation Site – Navassa, NC, EarthCon Consultants of North Carolina, P.C., December 2016.

EarthCon, 2019. Remedial Investigation Report, Kerr-McGee Chemical Corp – Navassa Superfund Site, Navassa, North Carolina, EarthCon Consultants of North Carolina, P.C., August 2019.

NCAC, 2009. North Carolina Administrative Code Title 15A, Subchapter 2C Section .0100, Well Construction Standards, North Carolina Department of Environment and Natural Resources, Division of Water Quality, October 2009

USEPA, 2020. Field Branches Quality System and Technical Procedures, Region 4 Laboratory Services and Applied Science Division. Available online:
<http://www.epa.gov/region4/sesd/fbgstp/> .

TABLE

Table 1
Summary of Monitoring Well Construction Details
Kerr-McGee Chemical Corp-Navassa Superfund Site
Navassa, North Carolina

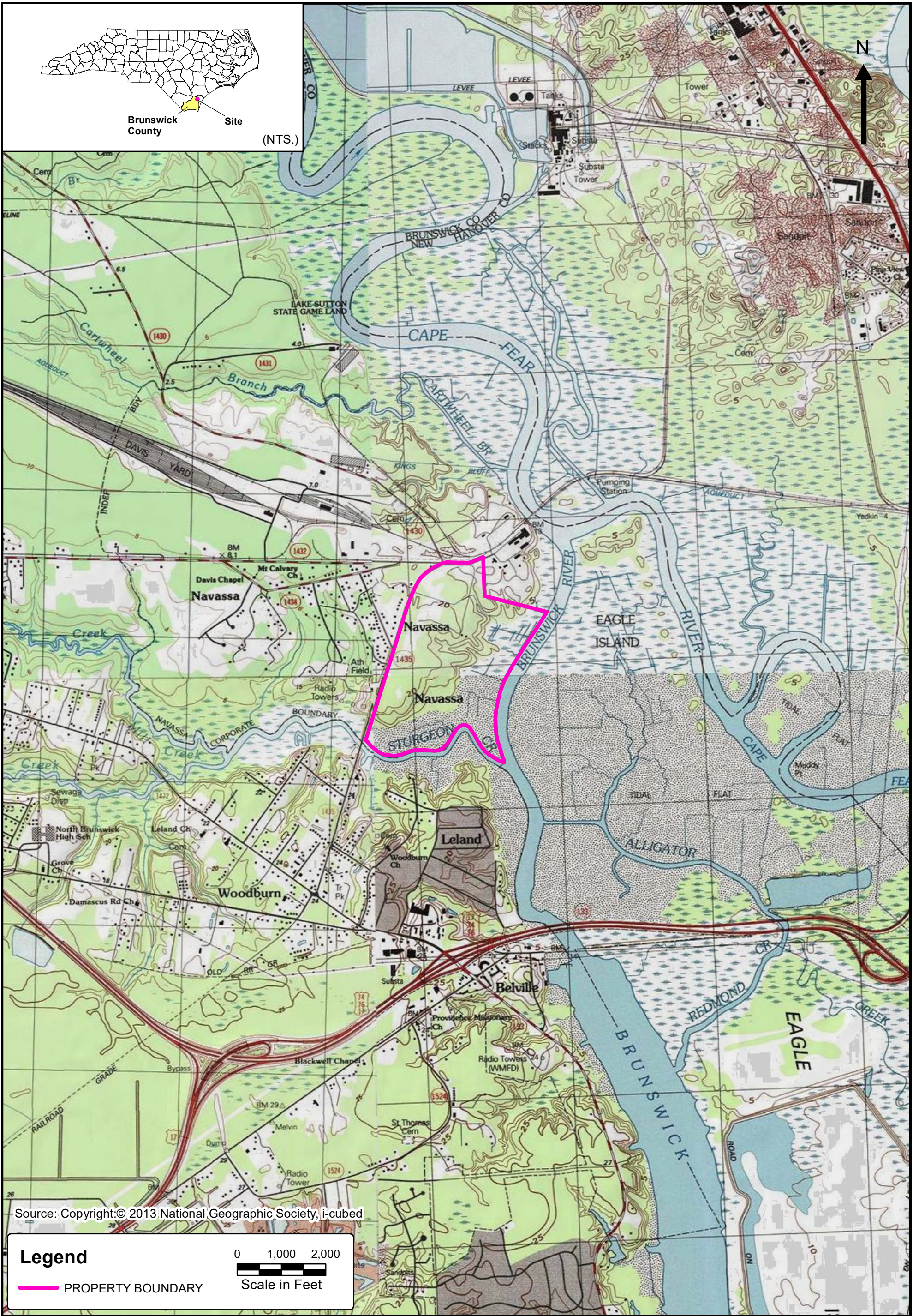
Location Name	Date Installed	Depth of Well from TOC (ft)	Screen Interval from TOC (ft)		TOC Elevation (ft NAVD)	Depth of Well from GS (ft)	Well Stick Up (ft)	Screen Interval from GS (ft)		GS Elevation (ft NAVD)	Well Diameter	Well Material
			Top	Bottom				Top	Bottom			
Permanent Monitoring Wells												
MW-01	01/25/05	37.85	27.85	37.85	19.19	35.00	2.85	25.00	35.00	16.34	2"	SS
MW-01D	12/04/15	62.93	52.93	62.93	19.01	60.00	2.93	50.00	60.00	16.08	2"	PVC
MW-09	01/10/08	39.38	29.38	39.38	25.07	37.00	2.38	27.00	37.00	22.69	2"	SS
MW-22	12/06/15	27.88	17.88	27.88	17.80	25.00	2.88	15.00	25.00	14.92	2"	PVC
MW-22D	12/04/15	59.85	49.85	59.85	17.72	57.00	2.85	47.00	57.00	14.87	2"	PVC
MW-23	12/04/15	29.66	19.66	29.66	21.32	27.00	2.66	17.00	27.00	18.66	2"	PVC
MW-23D	12/05/15	61.53	51.53	61.53	21.20	59.00	2.53	49.00	59.00	18.67	2"	PVC

Notes

ft - feet
GS - Ground Surface
TOC - Top of Casing
NAVD - North American Vertical Datum of 1988
PVC - polyvinyl chloride
SS - stainless steel

Prepared by: DAF 4/21/20
Checked by: CDN 5/15/20

FIGURES



Source: Copyright:© 2013 National Geographic Society, i-cubed

Legend

— PROPERTY BOUNDARY

0 1,000 2,000
Scale in Feet



Greenfield Environmental Multistate Trust, LLC
Trustee of the Multistate Environmental Response Trust

PREPARED BY:

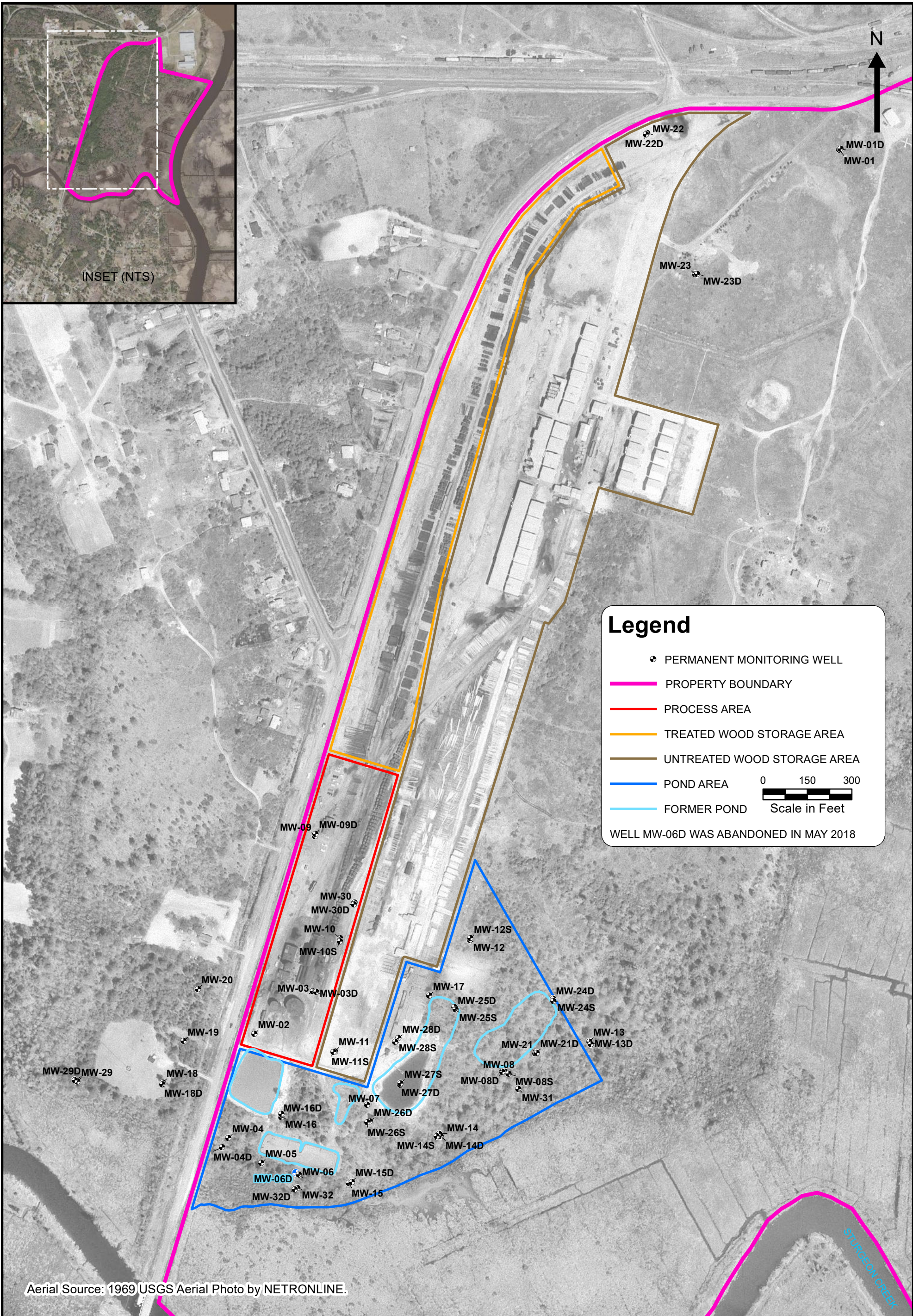


EARTHCON CONSULTANTS OF NORTH CAROLINA, P.C.

SITE LOCATION
Monitoring Well Abandonment and Replacement Work Plan
Kerr-McGee Chemical Corp - Navassa Superfund Site
Navassa, North Carolina

DRAWN	CHECKED	DATE	FIGURE
HVP	CDN	MAY 2020	1

S:\Premier\Projects\Greenfield Environmental Multistate Trust\KMCC Navassa NC Superfund Site\CAD GIS Data\EARTHCON_GIS\MXDs\Groundwater_Monitoring_2020\Fig 1 GMR 2020 Site Location.mxd



Aerial Source: 1969 USGS Aerial Photo by NETRONLINE.

S:\Premier\Projects\Greenfield Environmental Multistate Trust\KMCC Navassa NC Superfund Site\CAD GIS Data\EARTHCON_GIS\MXDs\Groundwater_Monitoring_2020\Fig 2 Monitoring Well Locations.mxd



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EARTHCON CONSULTANTS OF NORTH CAROLINA, P.C.

MONITORING WELL LOCATIONS
Monitoring Well Abandonment and Replacement Work Plan
Kerr-McGee Chemical Corp - Navassa Superfund Site
Navassa, North Carolina

DRAWN	CHECKED	DATE	FIGURE
HVP	CDN	MAY 2020	2

APPENDIX A

MW-09 Field Parameters and Groundwater Sampling Forms

Table 2
Field Parameter Results
Kerr-McGee Chemical Corp-Navassa Superfund Site
Navassa, North Carolina

Groundwater Monitoring Report – June 2017 through October 2019
 May 2020

PRELIMINARY DRAFT

Well	Date	Temperature (deg C)	pH (S.U.)	Specific Conductivity (uS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-02							
	9/28/2017	--	--	--	5.00	--	--
	4/12/2018	--	--	--	4.42	--	--
	11/8/2018	--	--	--	1.68	--	--
	4/10/2019	--	--	--	2.29	--	--
	10/24/2019	--	--	--	5.70	--	--
MW-03							
	6/23/2017	20.05	6.21	204	1.38	0.36	-34.9
	9/27/2017	19.81	6.85	202	1.00	0.48	20.9
	12/6/2017	18.36	6.42	29.5	0.51	0.18	-47.7
	4/11/2018	17.52	6.42	236	0.26	0.17	-48.1
	11/7/2018	19.30	6.21	198	0.41	0.37	-74.4
	4/10/2019	19.80	6.37	257	0.51	0.11	-76.9
	10/23/2019	19.60	6.40	0.218	0.33	0.72	-51.9
MW-03D							
	6/20/2017	19.50	7.32	372	0.47	0.39	-101.7
	9/26/2017	19.62	8.31	346	2.00	0.48	-71.3
	12/4/2017	18.50	8.10	433.2	2.06	0.32	-131.1
	4/9/2018	17.51	7.55	517	2.95	0.38	-58.6
	11/6/2018	19.70	7.58	387	2.37	0.28	-128.9
	4/9/2019	19.00	7.62	338.3	3.17	0.48	-119.7
	10/23/2019	19.30	7.71	-137	0.82	0.75	0.4
MW-04							
	6/23/2017	20.03	5.58	144	1.74	0.37	29.5
	9/28/2017	20.04	5.83	142	1.00	0.40	170.0
	12/6/2017	18.86	5.96	55.4	1.05	0.28	-18.4
	4/12/2018	16.01	5.80	200	0.59	0.49	50.1
	11/7/2018	20.00	5.53	131	0.55	0.20	31.8
	4/10/2019	18.50	5.60	189	0.41	0.37	24.0
	10/23/2019	20.50	5.94	196	4.93	0.62	-12.6
MW-04D							
	6/22/2017	19.77	7.98	705	3.84	0.41	-219.0
	9/28/2017	20.47	7.29	692	1.39	0.41	-83.9
	12/6/2017	18.70	7.70	687	3.04	0.15	-166.8
	4/11/2018	17.50	7.94	966	1.15	0.30	-133.6
	11/7/2018	20.50	7.72	582	0.76	1.09	-207.1
	4/9/2019	18.00	7.65	611	1.40	0.46	-160.2
	10/22/2019	20.50	7.79	623	0.92	0.78	-179.0
MW-05							
	9/28/2017	--	--	--	3.00	--	--
	4/12/2018	--	--	--	1.04	--	--
	11/8/2018	19.10	7.04	273	0.29	0.10	-298.6
	4/10/2019	--	--	--	1.12	--	--
	10/23/2019	19.80	7.35	291	1.07	0.54	-288.9

Table 2
Field Parameter Results
Kerr-McGee Chemical Corp-Navassa Superfund Site
Navassa, North Carolina

Groundwater Monitoring Report – June 2017 through October 2019
 May 2020

PRELIMINARY DRAFT

Well	Date	Temperature (deg C)	pH (S.U.)	Specific Conductivity (uS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-06							
	6/23/2017	19.37	7.07	463	2.20	2.19	-126.5
	9/28/2017	20.99	6.60	446	1.14	2.17	-60.0
	4/12/2018	17.99	6.78	377	0.92	0.32	-109.9
	11/8/2018	19.70	6.71	443	0.49	0.12	-212.9
	4/10/2019	18.70	6.62	497	0.33	0.38	-102.5
	10/23/2019	20.40	6.82	448	0.57	0.59	-132.0
MW-06D							
	9/28/2017	--	--	--	5.69	--	--
MW-07							
	6/22/2017	18.98	6.08	162	4.66	0.42	128.5
	9/27/2017	19.64	5.00	169	1.63	0.40	216.4
	12/5/2017	19.00	5.44	168.2	1.73	0.05	133.7
	4/11/2018	16.64	5.66	180	0.53	0.30	244.5
	11/6/2018	19.90	4.92	153	0.18	0.12	293.7
	4/9/2019	18.20	5.43	167.3	0.33	0.37	156.2
	10/22/2019	19.90	5.74	194	0.49	0.66	134.5
MW-08							
	6/23/2017	18.78	4.94	135	2.97	0.31	65.9
	9/27/2017	20.37	4.90	130	3.00	0.25	205.2
	12/6/2017	18.50	4.73	143.5	1.25	0.10	61.4
	4/11/2018	17.29	5.07	232	6.05	0.25	59.4
	11/8/2018	19.40	4.81	112.1	9.80	0.53	64.6
	4/9/2019	17.90	5.17	116	1.11	0.14	43.7
	10/23/2019	19.90	5.73	91	50.80	0.47	83.1
MW-08D							
	6/22/2017	19.29	7.08	273	0.78	0.53	-110.8
	9/27/2017	19.95	6.85	218	0.88	0.18	-60.6
	12/6/2017	18.29	7.07	241	0.80	0.23	-69.4
	4/11/2018	17.68	6.78	347	0.50	0.23	-40.3
	11/7/2018	19.40	6.90	237	0.69	0.34	-101.7
	4/9/2019	17.80	6.82	233.6	0.99	0.39	-80.3
	10/22/2019	20.20	6.95	252	0.82	0.64	-85.1
MW-08S							
	6/22/2017	20.30	4.71	500	5.43	0.50	66.0
	9/27/2017	22.74	5.21	234	8.69	0.09	12.9
	12/6/2017	18.73	4.74	423	8.54	0.13	7.2
	4/11/2018	16.10	4.47	157	2.24	0.54	63.0
	11/7/2018	21.10	4.95	191	1.61	0.21	66.8
	4/9/2019	16.50	4.98	143	3.46	0.43	168.7
	10/22/2019	22.10	5.69	280	19.70	0.59	137.6
MW-09							
	6/20/2017	19.98	12.27	1788	1.11	6.66	69.2
	9/26/2017	20.82	11.42	1723	0.67	5.65	93.2
	12/5/2017	19.70	11.28	1370	0.90	4.00	-27.0
	4/11/2018	17.83	12.10	1270	0.74	4.87	-58.0
	11/6/2018	20.60	11.86	1394	1.60	6.07	-3.2
	4/8/2019	19.50	11.46	878	0.32	3.28	20.4
	10/22/2019	21.00	11.55	984	14.00	4.99	0.3

Table 2
Field Parameter Results
Kerr-McGee Chemical Corp-Navassa Superfund Site
Navassa, North Carolina

Groundwater Monitoring Report – June 2017 through October 2019
 May 2020

PRELIMINARY DRAFT

Well	Date	Temperature (deg C)	pH (S.U.)	Specific Conductivity (uS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
MW-09D							
	6/22/2017	20.35	7.59	532	3.42	0.51	-100.9
	9/26/2017	20.26	7.67	614	2.67	0.35	-119.6
	12/5/2017	19.10	7.75	520	1.44	0.24	-135.4
	4/11/2018	16.96	7.77	568	0.49	0.05	-95.5
	11/5/2018	19.90	7.62	573	0.05	0.78	-103.1
	4/8/2019	20.00	7.64	612	3.87	0.19	-139.8
	10/22/2019	21.50	7.75	689	15.01	0.28	-153.3
MW-10							
	6/20/2017	18.88	5.92	253	0.41	1.04	140.2
	9/26/2017	19.02	5.71	266	2.00	0.52	296.0
	12/4/2017	18.50	6.56	301.9	1.29	0.12	103.5
	4/9/2018	17.09	6.28	408	0.42	0.53	72.6
	11/6/2018	19.90	5.92	321	4.30	0.14	133.6
	4/8/2019	19.10	5.81	357	0.25	0.56	132.4
	10/21/2019	18.80	6.07	385	3.33	0.20	102.0
MW-10S							
	9/27/2017	--	--	--	2.74	--	--
	4/12/2018	--	--	--	8.61	--	--
	11/8/2018	20.50	5.06	141	19.90	0.35	-89.1
	4/10/2019	17.30	4.94	135	15.60	0.36	52.8
	10/23/2019	21.60	5.79	108	9.80	0.64	74.2
MW-11							
	6/20/2017	18.26	5.61	189	2.62	1.10	139.9
	9/26/2017	19.60	5.51	198	1.00	0.57	261.5
	12/4/2017	18.40	6.11	203.5	0.54	0.11	133.0
	4/9/2018	17.20	5.89	263	0.71	0.35	64.8
	11/6/2018	19.20	5.77	205	1.14	0.14	181.1
	4/8/2019	19.00	5.53	195	0.42	0.62	151.8
	10/21/2019	18.90	5.79	212	0.41	0.67	151.8
MW-11S							
	6/22/2017	25.88	3.50	253	850.00	2.26	156.7
	9/27/2017	22.86	3.70	104	9.80	3.43	368.3
	4/12/2018	14.18	3.87	133	33.00	7.42	301.9
	11/8/2018	20.40	3.62	139	42.50	4.05	400.9
	4/9/2019	16.80	3.82	131.4	21.20	5.99	310.3
	10/23/2019	20.30	5.15	175	190.00	2.47	299.7

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MW-12							
	6/21/2017	19.29	4.83	88.0	4.00	1.36	76.6
	9/26/2017	19.27	4.97	84.00	1.62	0.17	158.4
	12/5/2017	18.36	4.93	113.8	1.24	0.35	172.2
	4/10/2018	17.34	4.82	97.0	2.14	0.60	122.1
	11/6/2018	19.60	4.82	108.8	8.42	0.58	162.3
	4/8/2019	19.00	4.94	102.0	2.22	0.11	150.4
	10/22/2019	18.80	4.96	101.5	44.30	0.16	127.6
MW-12S							
	6/21/2017	19.74	4.10	545	2.14	0.41	160.4
	9/26/2017	21.93	3.92	689	0.87	0.27	154.1
	12/5/2017	18.38	3.76	179.1	2.03	0.28	212.0
	4/10/2018	15.12	4.00	668	2.11	0.35	121.7
	11/6/2018	21.10	3.85	655	1.25	0.66	203.5
	4/8/2019	17.90	3.84	665	1.51	0.14	150.3
	10/22/2019	21.40	3.93	539	0.00	0.13	70.2
MW-13							
	6/21/2017	18.77	5.11	55	0.39	0.35	126.5
	9/26/2017	20.01	4.82	73	1.00	0.31	303.3
	12/5/2017	18.30	4.44	58	0.72	0.09	273.1
	4/10/2018	16.20	5.03	69	1.15	0.47	125.4
	11/6/2018	20.10	4.81	74.1	1.47	0.49	300.2
	4/8/2019	18.00	4.65	61	0.16	0.58	222.1
	10/22/2019	19.80	4.82	57	0.15	0.59	278.7
MW-13D							
	6/21/2017	19.13	9.18	175	16.80	0.80	79.2
	9/27/2017	19.83	8.40	229	10.00	0.38	186.7
	12/4/2017	18.19	9.37	173	9.51	0.53	107.2
	4/10/2018	15.98	9.33	295	9.96	0.51	60.7
	11/6/2018	21.00	9.41	270.7	9.21	1.89	118.7
	4/9/2019	17.50	8.90	235.4	6.49	0.49	97.5
	10/21/2019	19.50	9.64	208	3.79	1.26	42.8
MW-14							
	6/22/2017	19.91	4.58	87.0	0.79	0.90	87.9
	9/27/2017	21.93	4.75	86.0	0.43	0.11	120.8
	12/6/2017	18.80	4.40	85.5	1.04	0.02	155.4
	4/11/2018	16.26	4.75	41.0	0.38	0.19	185.2
	11/7/2018	20.50	4.55	88.0	0.32	0.19	96.8
	4/9/2019	18.00	4.69	84.0	2.38	0.30	173.2
	10/23/2019	20.60	4.58	88.1	17.50	0.21	61.0
MW-14D							
	6/21/2017	19.33	7.31	277	9.43	0.23	-110.1
	9/27/2017	21.82	6.78	350	5.52	0.60	-45.9
	12/5/2017	17.93	7.11	271	4.10	0.24	-101.4
	4/10/2018	16.71	6.87	296	8.95	0.51	18.6
	11/6/2018	20.20	7.44	434.8	5.19	0.62	-134.9
	4/8/2019	18.40	6.61	96.0	1.57	1.05	136.2
	10/23/2019	19.10	7.50	332	4.67	0.71	-142.3

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MW-14S							
	6/22/2017	20.76	5.51	151	1.66	0.56	-12.9
	9/28/2017	21.93	5.67	159	1.59	0.11	-78.9
	12/6/2017	18.40	5.34	145.2	1.34	0.01	-62.7
	4/11/2018	15.15	5.67	150	0.45	-0.12	11.7
	11/7/2018	20.80	5.54	113	1.60	0.08	-84.6
	4/10/2019	17.10	5.56	140	0.59	0.10	-27.3
	10/23/2019	21.20	6.42	130	3.61	0.29	-2.3
MW-15							
	6/23/2017	19.69	6.04	168	3.44	2.48	-49.2
	9/28/2017	21.04	5.89	174	0.31	0.08	33.8
	12/6/2017	19.04	5.57	148	1.49	2.10	60.5
	4/12/2018	--	--	--	0.36	--	--
	11/8/2018	19.80	5.32	148.1	0.38	0.49	118.2
	4/10/2019	18.90	5.79	186	0.58	0.30	59.9
	10/23/2019	20.40	6.66	177	1.12	0.58	4.6
MW-15D							
	6/21/2017	18.90	7.47	4.94	1.74	0.51	-123.1
	9/26/2017	20.12	8.38	485	2.00	0.29	-78.9
	12/5/2017	18.30	7.60	579	3.08	0.23	-125.7
	4/10/2018	16.74	7.65	679	1.46	0.48	73.1
	11/6/2018	20.40	7.62	560	1.48	0.33	-135.0
	4/8/2019	18.80	7.76	59.9	0.74	4.70	105.1
	10/21/2019	19.50	7.68	520	2.31	0.66	-149.9
MW-16							
	6/22/2017	19.04	6.64	351	1.15	0.45	-50.3
	9/28/2017	19.52	6.72	331	0.46	0.11	-109.6
	12/6/2017	18.40	6.44	339.2	1.98	0.12	-97.3
	4/11/2018	17.59	6.65	394	3.63	0.33	-98.0
	11/7/2018	19.00	6.54	325.8	2.49	0.58	-122.6
	4/9/2019	18.30	6.65	345	8.98	0.14	-115.7
	10/23/2019	18.60	6.53	312.6	4.62	0.24	104.9
MW-16D							
	6/22/2017	19.55	7.82	473	2.09	0.51	84.6
	9/27/2017	19.72	7.84	452	2.12	0.58	-62.9
	12/5/2017	18.70	7.35	470	9.80	0.30	58.2
	4/11/2018	17.19	7.86	822	4.22	0.44	-58.3
	11/7/2018	19.20	7.62	517	1.62	0.34	-83.6
	4/9/2019	18.30	7.57	528	3.38	5.80	-114.7
	10/22/2019	20.50	8.52	379	2.87	0.94	89.1
MW-17							
	6/22/2017	18.83	4.02	567	16.60	2.68	76.0
	9/28/2017	20.37	3.70	538	9.20	0.42	269.8
	12/6/2017	18.22	4.35	474	2.48	0.26	233.0
	4/11/2018	17.08	4.14	660	4.34	0.40	130.4
	11/7/2018	19.20	4.08	341	2.40	2.79	145.0
	4/10/2019	17.80	3.90	426.7	2.11	0.52	150.2
	10/23/2019	18.30	3.92	593	5.84	0.29	80.1

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MW-18							
	6/21/2017	19.00	4.52	362	6.50	0.35	158.6
	9/25/2017	20.84	4.11	245	1.00	0.36	279.1
	12/5/2017	19.21	4.79	121.6	1.60	0.42	203.8
	4/10/2018	16.56	4.20	240	0.49	0.18	335.8
	11/6/2018	20.80	4.49	274	0.78	0.23	130.5
	4/9/2019	19.40	4.17	260	0.74	0.42	217.5
	10/21/2019	20.20	4.59	280	1.29	0.78	78.6
MW-18D							
	6/21/2017	19.30	8.54	335	9.40	0.25	-223.0
	9/26/2017	19.99	8.70	311	4.00	0.42	-122.8
	12/5/2017	18.66	7.70	-43.8	1.34	0.26	-101.2
	4/10/2018	16.82	7.69	341	1.36	0.13	-115.4
	11/6/2018	20.90	7.46	315	2.70	0.31	-147.0
	4/9/2019	19.10	7.44	350	0.72	2.40	-145.2
	10/22/2019	19.30	7.96	325	4.02	0.44	-101.6
MW-19							
	6/20/2017	19.31	3.83	422	4.97	0.72	314.3
	9/25/2017	20.41	3.97	335	2.00	1.93	302.2
	12/4/2017	20.12	4.01	166.5	9.32	0.56	308.6
	4/10/2018	16.59	3.77	405	1.25	0.36	368.4
	11/5/2018	20.20	3.97	322	8.90	0.41	340.2
	4/9/2019	18.90	3.83	333	0.98	0.79	352.8
	10/21/2019	19.40	4.37	285	3.11	0.47	245.6
MW-20							
	6/20/2017	18.89	3.70	501	4.12	4.09	329.3
	9/25/2017	19.41	3.88	434	3.00	3.30	301.8
	12/4/2017	18.46	3.83	173.7	0.81	4.40	433.8
	4/9/2018	17.09	3.73	164.6	1.39	1.60	440.2
	11/5/2018	19.40	3.74	412	4.96	2.41	425.2
	4/9/2019	18.90	3.78	444	0.56	36.60	359.8
	10/21/2019	18.70	3.93	494	2.27	2.40	239.5
MW-21							
	6/21/2017	19.03	5.60	119	9.98	1.27	27.0
	9/26/2017	20.57	5.09	102	4.21	0.70	108.5
	12/5/2017	18.82	5.77	105	9.03	0.32	43.1
	4/10/2018	16.72	5.90	124	9.25	1.09	46.7
	11/7/2018	19.30	5.71	113	6.16	0.26	25.0
	4/8/2019	19.00	5.87	140	6.92	0.12	21.2
	10/22/2019	20.60	5.82	118	13.60	0.54	24.9
MW-21D							
	6/21/2017	19.09	6.54	232	0.30	1.08	-1.1
	9/26/2017	20.66	6.12	221	0.39	0.40	28.9
	12/5/2017	18.89	6.71	203	0.16	0.30	-33.9
	4/10/2018	16.44	6.46	184	0.27	-0.35	38.5
	11/6/2018	19.80	6.65	204	0.31	0.36	-44.2
	4/8/2019	19.50	6.03	151	0.25	0.57	53.3
	10/22/2019	19.90	6.53	203	0.14	0.64	-20.6

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MW-23							
	10/21/2019	19.50	6.44	170	0.50	2.42	133.0
MW-23D							
	10/21/2019	19.10	7.59	320	4.70	0.14	-155.0
MW-24D							
	6/21/2017	18.73	6.59	244	0.54	1.88	36.1
	9/26/2017	19.59	6.14	204	1.60	0.54	69.6
	12/5/2017	18.35	6.38	218	2.28	0.21	-27.2
	4/10/2018	15.96	6.85	236	0.39	0.18	17.1
	11/6/2018	19.80	6.71	215	0.66	0.28	-10.1
	4/9/2019	17.50	6.65	209	0.22	0.46	6.9
	10/22/2019	19.70	7.01	214	6.00	0.41	21.7
MW-24S							
	6/21/2017	18.61	4.85	94	0.28	2.70	78.7
	9/26/2017	21.03	4.32	84	5.15	1.22	208.4
	12/5/2017	19.35	4.24	83	8.27	1.27	248.7
	4/10/2018	14.64	4.88	94	0.64	1.20	201.1
	11/6/2018	21.10	4.81	84	1.42	0.68	154.5
	4/9/2019	16.80	4.77	81.7	0.69	0.60	175.8
	10/22/2019	20.90	5.55	82	3.39	0.53	179.0
MW-25D							
	6/22/2017	18.70	7.59	289	2.00	0.55	-159.1
	9/27/2017	19.08	6.97	274	2.53	0.32	-106.6
	12/5/2017	18.14	7.07	244	5.89	0.32	-174.4
	4/11/2018	17.05	7.71	286	0.47	0.38	-145.5
	11/7/2018	19.70	7.47	277	19.20	0.89	-157.2
	4/10/2019	17.70	7.20	287.8	2.17	0.54	-141.9
	10/23/2019	17.60	8.23	244	62.90	0.87	-156.1
MW-25S							
	9/28/2017	22.99	4.04	713	0.56	0.65	117.4
	4/12/2018	15.50	4.26	797	1.19	0.28	85.4
	11/8/2018	20.00	3.93	682	0.80	0.55	114.4
	4/10/2019	--	--	--	2.27	--	--
	10/24/2019	--	--	--	5.36	--	--
MW-26D							
	6/22/2017	19.00	7.46	310	1.96	0.65	-140.2
	9/27/2017	20.38	6.93	287	0.74	0.68	-80.9
	12/6/2017	18.37	7.55	262	1.68	0.18	-146.1
	4/11/2018	16.95	7.62	297	0.26	0.13	-150.0
	11/7/2018	19.40	7.40	283.7	0.77	0.56	-156.2
	4/9/2019	18.10	7.34	265.1	0.29	0.64	-91.9
	10/23/2019	18.70	7.55	280	0.70	0.66	-163.2
MW-26S							
	6/23/2017	19.34	4.83	125	3.96	0.53	110.3
	9/27/2017	20.92	5.21	136	1.00	0.22	190.2
	4/11/2018	16.33	5.15	196	1.20	0.28	54.3
	11/7/2018	21.20	4.85	99.8	13.80	0.59	117.1
	4/10/2019	17.10	5.03	105	2.97	0.38	105.0
	10/23/2019	20.80	4.89	113	8.98	0.17	59.0

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MW-27D							
	6/23/2017	19.03	7.54	305	0.79	2.49	-127.3
	9/28/2017	--	--	--	1.00	--	--
	12/6/2017	17.98	7.53	-33.6	4.18	0.26	-143.7
	4/12/2018	17.14	7.51	298	0.33	0.17	-149.1
	11/8/2018	18.60	7.44	294	0.27	0.18	-163.9
	4/10/2019	18.00	7.26	306.9	1.00	0.53	-148.3
	10/23/2019	19.10	8.49	260	0.54	4.85	81.2
MW-27S							
	9/27/2017	--	--	--	2.45	--	--
	4/12/2018	--	--	--	2.89	--	--
	11/8/2018	--	--	--	6.63	--	--
	4/10/2019	17.40	5.92	830	7.47	0.65	23.6
	10/24/2019	--	--	--	34.50	--	--
MW-28D							
	6/21/2017	18.63	7.54	282	315.00	0.36	-155.5
	9/26/2017	19.57	7.52	266	0.35	0.17	-157.2
	12/5/2017	18.33	7.51	-32	2.25	0.98	-119.0
	4/10/2018	17.30	7.14	292	0.60	0.61	-63.7
	11/7/2018	19.00	7.33	270.5	0.61	0.69	-149.4
	4/8/2019	18.40	7.26	286.9	1.51	0.58	-131.1
	10/22/2019	18.80	8.19	259	11.20	0.44	-104.5
MW-28S							
	6/21/2017	18.71	5.63	233	2.99	1.18	106.1
	9/27/2017	20.88	5.06	200	6.29	0.89	164.2
	12/5/2017	19.37	5.28	94	0.93	0.53	183.9
	4/10/2018	16.82	4.73	220	1.10	1.83	163.4
	11/7/2018	19.60	4.59	206.3	9.91	1.41	274.0
	4/8/2019	18.80	4.31	239	2.11	2.34	291.2
	10/22/2019	20.40	4.41	195.2	7.00	0.50	271.8
MW-29							
	6/21/2017	19.10	3.96	215	2.87	0.53	294.3
	9/25/2017	20.47	3.71	185	1.00	0.73	304.0
	12/4/2017	19.00	4.03	164.8	1.41	0.69	407.3
	4/10/2018	15.64	3.98	191	0.40	1.26	402.6
	11/6/2018	20.40	3.98	183	0.29	1.41	387.2
	4/9/2019	17.80	3.94	216	2.14	2.10	411.9
	10/21/2019	20.10	4.13	183	4.37	2.21	176.3
MW-29D							
	6/21/2017	19.49	7.54	375	2.65	0.49	-124.7
	9/25/2017	20.72	8.58	334	3.00	0.41	-96.3
	12/4/2017	18.45	7.48	-30.8	1.78	2.87	-105.1
	4/10/2018	15.89	7.44	344	0.55	0.19	-68.9
	11/6/2018	19.90	7.26	326	0.45	0.27	-135.0
	4/9/2019	18.00	7.36	362	0.29	2.20	-130.9
	10/21/2019	19.90	7.45	340	1.92	0.47	-75.9

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MW-30							
	6/21/2017	18.70	5.69	268	1.01	0.61	136.9
	9/26/2017	20.29	5.82	250	0.33	0.28	127.0
	12/6/2017	18.34	5.77	65.8	1.76	0.70	199.9
	4/11/2018	17.21	5.81	370	1.19	0.61	93.2
	11/7/2018	18.40	5.56	243	0.96	0.28	268.2
	4/8/2019	19.20	5.52	262.7	4.67	0.70	134.6
	10/22/2019	18.80	6.94	238	2.55	0.70	192.4
MW-30D							
	6/22/2017	18.96	7.79	300	9.41	0.56	-153.8
	9/26/2017	20.89	7.61	287	2.19	0.31	-136.8
	12/6/2017	18.11	7.77	-46.4	6.15	0.47	-109.8
	4/11/2018	17.21	8.56	450	3.58	0.38	30.2
	11/7/2018	18.60	7.74	280	1.85	0.25	-148.0
	4/8/2019	19.70	9.13	286	8.61	1.25	-10.3
	10/22/2019	19.80	8.34	268	5.87	0.62	-99.5
MW-31							
	6/22/2017	20.13	5.20	47	8.09	0.29	247.3
	9/27/2017	20.08	4.33	57	0.84	0.52	281.9
	12/5/2017	19.40	4.50	46.6	1.43	0.15	267.8
	4/11/2018	16.31	4.74	53	0.49	0.27	322.2
	11/7/2018	19.60	4.57	50	0.40	0.23	349.9
	4/9/2019	18.20	4.67	53	0.71	0.20	215.1
	10/22/2019	20.40	4.66	53.5	48.60	0.13	228.1
MW-32							
	6/23/2017	19.95	7.70	329	1.72	1.81	-214.2
	9/28/2017	--	--	--	2.00	--	--
	12/6/2017	18.76	7.15	274	2.20	1.03	59.1
	4/12/2018	16.74	7.42	314	0.62	0.22	-95.4
	11/8/2018	19.20	7.21	303	0.34	0.24	-116.7
	4/10/2019	19.00	7.08	323.1	1.09	0.44	-83.0
	10/24/2019				0.99		
MW-32D							
	9/28/2017	--	--	--	2.68	--	--
	4/12/2018	--	--	--	3.95	--	--
	11/8/2018	--	--	--	3.86	--	--
	4/10/2019	--	--	--	21.20	--	--
	10/24/2019	--	--	--	12.20	--	--

Notes:

- Not analyzed due to DNAPL in monitoring well
- deg C - degrees Celsius
- S.U. - standard units
- uS/cm - microsiemens per centimeter
- NTU - nephelometric turbidity units
- mg/L - milligrams per liter
- mv - millivolts

Prepared by: CS 4/15/20
 Checked by: MAB 4/30/20



Groundwater Sampling Record

WELL No. MW- 09 PROJECT # 02.20170023.17 LOCATION Navassa, NC DATE 6.20.17
 SAMPLE No. MW- 09 GW- 062017 PROJECT NAME: KMCC Navassa FIELD PERSONNEL/COMPANY Steve T. / McGEE /EarthCon
 SAMPLE TIME: 1145 SITE Kerr-McGee Chem Corp Site FIELD CONDITIONS/WEATHER cloudy / occasional rain

Well Condition Inspection (circle one)
 cover: locked not locked
 number: legible not legible
 outer casing: good fair poor
 inner casing: good fair poor
 well photographed: yes no

Equipment Cleaning Procedures
 - potable water and phosphate-free soap
 - potable water rinse
 - water rinse: distilled deionized
 - solvent rinse: acetone hexane
 - air dry

Casing Diameter: (circle one) 2" 4" 6" Other: _____
 Casing Volume Calculation: $(\pi r^2 h)(7.48 \text{ gal/ft}^3)$
 Casing Volume (gallons/ft) for: 2" = 0.163; 4" = 0.653; 6" = 1.47
 Casing Volume (liters/ft) for: 2" = 0.618; 4" = 2.47; 6" = 5.56

Depth to Water (feet): 19.83 Measuring Point Elevation (feet): _____
 Depth of Well (feet): 39.10 Groundwater Surface Elevation: _____
 Water Column (feet): 19.27 LNAPL present: No thickness: _____
 Casing Volume (gallons/liters): 3.141 DNAPL present: No thickness: _____
 Calculated Purge Volume (gallons/liters): _____
 Actual Purge Volume (gallons/liters): 1.34 Remarks: _____
 Pump Intake Depth (feet): 33 Ferrous Iron (mg/L): _____

Well Evacuation
 Water level recovery is: very slow slow moderate fast Bailed dry: yes no

TIME 2400 hrs	CUMULATIVE VOLUME (gal)	TEMPERATURE (°C)	pH	DISSOLVED OXYGEN (mg/L)	ORP (mV)	CONDUCTIVITY (µs/cm)	TURBIDITY (NTU)	Depth to Water (Feet)	ODOR/COLOR/REMARKS
	0								PURGE START
<u>1115</u>	<u>1/4</u>	<u>19.62</u>	<u>12.10</u>	<u>9.28</u>	<u>67.1</u>	<u>1.858</u>	<u>6.19</u>	<u>19.95</u>	<u>CLEAR</u>
<u>1121</u>	<u>1/2</u>	<u>19.95</u>	<u>12.18</u>	<u>8.56</u>	<u>75.2</u>	<u>1.877</u>	<u>2.39</u>	<u>20.11</u>	<u>"</u>
<u>1126</u>	<u>3/4</u>	<u>20.14</u>	<u>12.25</u>	<u>7.93</u>	<u>75.1</u>	<u>1.848</u>	<u>1.75</u>	<u>20.10</u>	<u>CLEAR</u>
<u>1131</u>	<u>1</u>	<u>20.24</u>	<u>12.27</u>	<u>7.92</u>	<u>69.4</u>	<u>1.800</u>	<u>1.40</u>	<u>20.08</u>	<u>"</u>
	<u>1 1/4</u>	<u>20.20</u>	<u>12.23</u>	<u>7.71</u>	<u>69.3</u>	<u>1.798</u>	<u>1.12</u>	<u>20.05</u>	<u>"</u>
	<u>1 1/2</u>	<u>19.99</u>	<u>12.29</u>	<u>7.32</u>	<u>69.7</u>	<u>1.793</u>	<u>1.10</u>	<u>20.03</u>	<u>"</u>
<u>1145</u>	<u>1 3/4</u>	<u>19.98</u>	<u>12.27</u>	<u>6.66</u>	<u>69.2</u>	<u>1.788</u>	<u>1.11</u>	<u>20.01</u>	<u>"</u>
	<u>SAMPLE @ 1145</u>								

Measurement and Sampling Equipment

Type	Manufacturer	Model #	Calibration Date
Water Quality	<u>YSI</u>	<u>556 MPS / 14A100108</u>	<u>6-20-17</u>
Turbidity	<u>HANNA</u>	<u>HZ 98703 / 19389</u>	<u>6-20-17</u>
Peri Pump	<u>GEOPUMP</u>	<u>1585</u>	<u>6-20-17</u>

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE / PRESERVATIVES	QA REMARKS
<u>MW-09-GW-</u>	8270C SIM	2 - 250 mL Amber Glass / unpreserved	SVOCs
<u>062017</u>	8260B	3 - 40 mL / HCL	VOCs

S.W.C. F.D.A.



Groundwater Sampling Record

WELL No. MW- 09 PROJECT # 02.20170023.17 LOCATION Navassa, NC DATE 9/26/17
 SAMPLE No. MW- 09 GW 092617 PROJECT NAME: KMCC Navassa FIELD PERSONNEL/COMPANY Keaton Henry /EarthCon
 SAMPLE TIME: 9:25 SITE Kerr-McGee Chem Corp Site FIELD CONDITIONS/WEATHER Cloudy, 60's

Well Condition Inspection (circle one)
 cover: locked not locked
 number: legible not legible
 outer casing: good fair poor
 inner casing: good fair poor
 well photographed: yes no

Equipment Cleaning Procedures
 - potable water and phosphate-free soap
 - potable water rinse
 - water rinse: distilled deionized
 - solvent rinse: acetone hexane
 - air dry

Casing Diameter: (circle one) 2" 4" 6" Other: _____
 Casing Volume Calculation: $(\pi r^2 h)(7.48 \text{ gal/ft}^3)$
 Casing Volume (gallons/ft) for: 2" = 0.163; 4" = 0.653; 6" = 1.47
 Casing Volume (liters/ft) for: 2" = 0.618; 4" = 2.47; 6" = 5.56

Depth to Water (feet): 16.79 Measuring Point Elevation (feet): _____
 Depth of Well (feet): 39.38 Groundwater Surface Elevation: _____
 Water Column (feet): 22.59 LNAPL present: _____ thickness: _____
 Casing Volume (gallons/liters): 3.68 DNAPL present: N/A thickness: _____
 Calculated Purge Volume (gallons/liters): 11.05 Remarks: _____
 Actual Purge Volume (gallons/liters): 1.40
 Pump Intake Depth (feet): ~32 ft Ferrous Iron (mg/L): _____

Well Evacuation
 Water level recovery is: very slow slow moderate fast Bailed dry: yes no

TIME 2400 hrs	CUMULATIVE VOLUME (gal)	TEMPERATURE (°C)	pH	DISSOLVED OXYGEN (mg/L)	ORP (mV)	CONDUCTIVITY (µs/cm)	TURBIDITY (NTU)	Depth to Water (Feet)	ODOR/COLOR/REMARKS
8:39	0								PURGE START
8:42	0.00	21.93	11.02	6.93	251.3	1727	3.57	17.64	Clear
8:45	0.15	20.79	11.17	6.20	148.3	1755	1.39	17.65	"
8:50	0.40	20.92	11.29	5.82	146.4	1779	0.89	17.70	"
8:55	0.50	21.00	11.33	5.90	137.0	1801	1.19	17.72	"
9:00	0.70	20.70	11.38	5.99	118.5	1810	0.68	17.90	"
9:05	0.85	20.63	11.41	5.72	108.1	1789	0.67	17.90	"
9:10	1.0	20.78	11.41	5.45	99.4	1745	0.73	17.82	"
9:15	1.10	20.82	11.42	5.2165	93.2	1723	0.67	17.81	"
9:25		s a	m	p	l	e			

Measurement and Sampling Equipment

Type	Manufacturer	Model #	Calibration Date
Water Quality	<u>YSI</u>	<u>556 MPS</u>	<u>9/26/17</u>
Turbidity	<u>Hanna</u>	<u>HI 98703</u>	<u>9/26/17</u>
Peri Pump	<u>Geotech</u>	<u>Geo Pump</u>	<u>1341</u>

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE / PRESERVATIVES	QA REMARKS
<u>MW-09</u>	8270C SIM	2 - 250 mL Amber Glass / unpreserved	SVOCs
<u>u</u>	8260B	3 - 40 mL / HCL	VOCs



Groundwater Sampling Record

WELL No. MW- 09 PROJECT # 02.20170023.17 LOCATION Navassa, NC DATE 12/5/17
 SAMPLE No. MW- 09 GW 120517 PROJECT NAME: KMCC Navassa FIELD PERSONNEL/COMPANY K Henry / J Mucklen /EarthCon
 SAMPLE TIME: 1555 SITE Kerr-McGee Chem Corp Site FIELD CONDITIONS/WEATHER Mostly Cloudy, 70's

Well Condition Inspection (circle one)
 cover: locked not locked
 number: legible not legible
 outer casing: good fair poor
 inner casing: good fair poor
 well photographed: yes no

Equipment Cleaning Procedures
 - potable water and phosphate-free soap
 - potable water rinse
 - water rinse: distilled deionized
 - solvent rinse: acetone hexane
 - air dry

Casing Diameter: (circle one) 2" 4" 6" Other: _____
 Casing Volume Calculation: $(\pi r^2 h)(7.48 \text{ gal/ft}^3)$
 Casing Volume (gallons/ft) for: 2" = 0.163; 4" = 0.653; 6" = 1.47
 Casing Volume (liters/ft) for: 2" = 0.618; 4" = 2.47; 6" = 5.56

Depth to Water (feet): 19.60 Measuring Point Elevation (feet): _____
 Depth of Well (feet): 39.38 Groundwater Surface Elevation: _____
 Water Column (feet): 19.78 LNAPL present: _____ thickness: _____
 Casing Volume (gallons/liters): 3.22 DNAPL present: _____ thickness: _____
 Calculated Purge Volume (gallons/liters): 9.97 Remarks: _____
 Actual Purge Volume (gallons/liters): 1.75
 Pump Intake Depth (feet): ~35' Ferrous Iron (mg/L): _____

Well Evacuation
 Water level recovery is: very slow slow moderate fast Bailed dry: yes no

TIME 2400 hrs	CUMULATIVE VOLUME (gal)	TEMPERATURE (°C)	pH	DISSOLVED OXYGEN (mg/L)	ORP (mV)	CONDUCTIVITY (µs/cm)	TURBIDITY (NTU)	Depth to Water (Feet)	ODOR/COLOR/ REMARKS
1508	0								PURGE START
1510	0.30	14.7	11.35	4.96	-21.6	1580	6.05	20.46	clear / no odor
1515	0.50	14.6	11.39	5.24	-27.7	1579	3.85	20.68	"
1520	0.60	14.8	11.43	4.43	-28.9	1549	2.31	20.66	"
1525	0.75	14.6	11.37	4.46	-28.4	1502	1.43	20.66	"
1530	1.0	14.8	11.36	4.33	-27.5	1468	1.16	20.65	"
1535	1.25	14.6	11.31	4.10	-27.5	1429	0.91	20.64	"
1540	1.40	14.7	11.27	4.13	-27.0	1405	1.15	20.55	"
1545	1.50	14.8	11.26	4.16	-27.0	1400	0.61	20.52	"
1550	1.60	14.7	11.28	4.00	-27.0	1370	0.90	20.51	"
1555		s	a	m	p	e			

Measurement and Sampling Equipment
 Type _____ Manufacturer YSI Professional Plus Model # _____ S/N 17A108413 Calibration Date 12/5/17
 Water Quality _____ Turbidity Hanna HI 98703 S/N 08534787 12/5/17
 Peri Pump Pine Geo Pump S/N 2441 _____

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE / PRESERVATIVES	QA REMARKS
MW-09-GW-120517	8270C SIM	2 - 250 mL Amber Glass / unpreserved	SVOCs
\\	8260B	3 - 40 mL / HCL	VOCs



Groundwater Sampling Record

WELL No. MW- 9 PO # 02.20180016 LOCATION Navassa, NC DATE 4/11/18
 SAMPLE No. MW- 9 GW- 041118 PROJECT NAME: KMCC Navassa FIELD PERSONNEL/COMPANY S. Tyler, E. Cook /EarthCon
 SAMPLE TIME: 1230 SITE Kerr-McGee Chem Corp Site FIELD CONDITIONS/WEATHER Sunny, 60°F

Well Condition Inspection (circle one)
 cover: locked not locked
 number: legible not legible
 outer casing: good fair poor
 inner casing: good fair poor
 well photographed: yes no

Equipment Cleaning Procedures
potable water and phosphate-free soap
 - potable water rinse
 - water rinse: distilled deionized
 - solvent rinse: acetone hexane
 - air dry

Casing Diameter: (circle one) 2" 4" 6" Other: _____
 Casing Volume Calculation: $(\pi r^2 h)(7.48 \text{ gal/ft}^3)$
 Casing Volume (gallons/ft) for: 2" = 0.163; 4" = 0.653; 6" = 1.47
 Casing Volume (liters/ft) for: 2" = 0.618; 4" = 2.47; 6" = 5.56

Depth to Water (feet): 19.42 Measuring Point Elevation (feet): Top of Casing
 Depth of Well (feet): 37 Groundwater Surface Elevation: See Elevation Tables
 Water Column (feet): 17.58 LNAPL present: _____ thickness: _____
 Casing Volume (gallons/liters): 2.27 DNAPL present: _____ thickness: _____
 Calculated Purge Volume (gallons/liters): 8.61 Remarks: _____
 Actual Purge Volume (gallons/liters): 2 1/2
 Pump Intake Depth (feet): 32 Ferrous Iron (mg/L): Not Applicable

Well Evacuation
 Water level recovery is: very slow slow moderate fast Bailed dry: yes no

TIME 2400 hrs	CUMULATIVE VOLUME (gal)	TEMPERATURE (°C)	pH	DISSOLVED OXYGEN (mg/L)	ORP (mV)	CONDUCTIVITY (µs/cm)	TURBIDITY (NTU)	Depth to Water (Feet)	ODOR/COLOR/ REMARKS
<u>113540</u>	<u>0</u>								PURGE START
<u>1145</u>	<u>1/2</u>	<u>17.33</u>	<u>12.30</u>	<u>6.88</u>	<u>-75.8</u>	<u>1.638</u>	<u>1.47</u>	<u>20.0</u>	<u>clear white flat</u>
<u>1155</u>	<u>1</u>	<u>17.55</u>	<u>12.25</u>	<u>6.11</u>	<u>-67.0</u>	<u>1.526</u>	<u>1.28</u>	<u>20.02</u>	<u>"</u>
<u>1210</u>	<u>1 1/2</u>	<u>17.73</u>	<u>12.14</u>	<u>5.59</u>	<u>-63.2</u>	<u>1.422</u>	<u>1.14</u>	<u>19.97</u>	<u>"</u>
<u>1220</u>	<u>2</u>	<u>17.79</u>	<u>12.15</u>	<u>5.51</u>	<u>-61.1</u>	<u>1.319</u>	<u>0.72</u>	<u>19.92</u>	<u>"</u>
<u>1230</u>	<u>2 1/2</u>	<u>17.83</u>	<u>12.10</u>	<u>4.87</u>	<u>-58.0</u>	<u>1.270</u>	<u>0.79</u>	<u>19.90</u>	<u>"</u>
	<u>sample @</u>	<u>1230</u>							

Measurement and Sampling Equipment

Type	Manufacturer	Model #	Calibration Date
Water Quality	YSI	556 MPS / SN: <u>15J100914</u>	<u>4/11/18</u>
Turbidity	Hanna	HI 98703 / SN: <u>039482</u>	<u>4/11/18</u>
Peri Pump	Geotech	Geo Pump / SN: <u>11023</u>	Not Applicable
Tubing		Tubing P/Tef .17 ID X 1/4 OD : Teflon Line Poly Tubing	Not Applicable

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE / PRESERVATIVES	QA REMARKS
	8270C SIM		SVOCs
	8260B	3 - 40 mL / HCL	VOCs
DUPLICATE			
	8270C SIM	2 - 250 mL Amber Glass / unpreserved	SVOCs
	8260B	3 - 40 mL / HCL	VOCs



Groundwater Sampling Record

WELL No. MW- 09 PROJECT # 02.20180016 LOCATION Navassa, NC DATE 11/6/18

SAMPLE No. MW- 09 GW- 110618 PROJECT NAME: KMCC Navassa FIELD PERSONNEL/COMPANY TM, EC /EarthCon

SAMPLE TIME: 0910 SITE Kerr-McGee Chem Corp Site FIELD CONDITIONS/WEATHER Sunny, 80°F

Well Condition Inspection (circle one)
 cover: locked not locked
 number: legible not legible
 outer casing: good fair poor
 inner casing: good fair poor
 well photographed: yes no

Equipment Cleaning Procedures
potable water and phosphate-free soap
 - potable water rinse
 - water rinse: distilled deionized
 - solvent rinse acetone hexane
 - air dry

Turbidity (10% for values > than 5 NTUs; if three Turbidity values are < than 5 NTUs, consider the values as stabilized),
 Dissolved Oxygen (10% for values > than 0.5 mg/L, if three Dissolved Oxygen values are < than 0.5 mg/L, consider the values as stabilized),
 Specific Conductance (3%), pH (+/- 0.1 unit) ORP (+/- 10 millivolts)

Casing Diameter: (circle one) 4"
 Casing Volume Calculation: $(\pi^2 h)(7.48 \text{ gal/ft}^3)$
 Casing Volume (gallons/ft) for: 2" = 0.163; 4" = 0.653; 6" = 1.47
 Casing Volume (liters/ft) for: 2" = 0.618; 4" = 2.47; 6" = 5.56
 1 liter = 0.264172 gallons
 250 ml = 0.250 liters

Depth to Water (feet): 18.3
 Depth of Well (feet): 37
 Water Column (feet): 18.7
 Casing Volume (gallons/liters): 3.05
 Calculated Purge Volume (gallons/liters): 9.15
 Actual Purge Volume (gallons/liters): 1.10
 Pump Intake Depth (feet): ~32

Measuring Point Elevation (feet): Top of Casing (See Tables)
 Groundwater Surface Elevation: See Elevation Tables
 LNAPL present: None thickness: _____
 DNAPL present: None thickness: _____
 Remarks: _____
 Ferrous Iron (mg/L): Not Applicable

Well Evacuation
 Water level recovery is: very slow slow moderate fast
 Bailed dry: yes no

TIME 2400 hrs	PURGE RATE (gal/min)	CUMULATIVE VOLUME (gal)	TEMP (°C)	pH	DISSOLVED OXYGEN (mg/L)	ORP (mV)	CONDUCTIVITY (µs/cm)	TURBIDITY (NTU)	Depth to Water (Feet)	ODOR/COLOR/REMARKS
<u>08:35</u>										PURGE START
<u>08:40</u>	<u>0.05</u>	<u>.25</u>	<u>20.5°C</u>	<u>11.87</u>	<u>6.92</u>	<u>65.1</u>	<u>1.493</u>	<u>17.4</u>	<u>19.21</u>	<u>clear, white flake</u>
<u>08:45</u>	<u>0.05</u>	<u>.50</u>	<u>20.6</u>	<u>11.86</u>	<u>6.61</u>	<u>14.6</u>	<u>1.439</u>	<u>15.9</u>	<u>19.49</u>	<u>"</u>
<u>08:50</u>	<u>0.05</u>	<u>.75</u>	<u>20.6</u>	<u>11.87</u>	<u>6.39</u>	<u>1.6</u>	<u>1.417</u>	<u>13.39</u>	<u>19.65</u>	<u>"</u>
<u>08:55</u>	<u>0.05</u>	<u>1.0</u>	<u>20.6</u>	<u>11.87</u>	<u>6.24</u>	<u>-1.6</u>	<u>1.395</u>	<u>6.52</u>	<u>19.76</u>	<u>"</u>
<u>09:00</u>	<u>~0.02</u>	<u>1.10</u>	<u>20.6</u>	<u>11.86</u>	<u>6.07</u>	<u>-3.2</u>	<u>1.394</u>	<u>1.60</u>	<u>19.66</u>	<u>"</u>
		<u>sample @</u>		<u>0910</u>						

Measurement and Sampling Equipment

Type	Manufacturer	Model #	Calibration Date
Water Quality	YSI	YSA Pro DSS/ SN: <u>15040C040126</u>	<u>11/6/18</u>
Turbidity	HACK	HACK 2100Q / SN: <u>15040C040126</u>	<u>11/6/18</u>
Peri Pump	Geotech	Geo Pump / SN:	Not Applicable
Tubing		Tubing P/Tel. 0.17 ID X 1/4OD: Teflon Line Poly Tubing	Not Applicable

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE / PRESERVATIVES	QA REMARKS
<u>6WMW09110618</u>	<u>SVOC / 8270</u>	<u>Amber Glass / unpreserved</u>	<u>SVOCs</u>
<u>"</u>	<u>SVOC / 8270 SIM - PAH</u>	<u>Amber Glass / unpreserved</u>	<u>SVOCs</u>
<u>"</u>	<u>VOC / 8260B</u>	<u>Viials / HCL</u>	<u>VOCs</u>
<u>N/A</u>		<u>DUPLICATE</u>	
<u>"</u>	<u>SVOC / 8270</u>	<u>Amber Glass / unpreserved</u>	<u>SVOCs</u>
<u>"</u>	<u>SVOC / 8270 SIM - PAH</u>	<u>Amber Glass / unpreserved</u>	<u>SVOCs</u>
<u>"</u>	<u>VOC / 8260B</u>	<u>Viials / HCL</u>	<u>VOCs</u>

WELL No. MW- <u>09</u>	PROJECT # <u>02.20190041</u>	LOCATION <u>Navassa, NC</u>	DATE <u>4/8/19</u>
SAMPLE No. MW- <u>09</u> - GW- <u>040819</u>		PROJECT NAME: <u>KMCC Navassa</u>	FIELD PERSONNEL/COMPANY <u>S. Tyler / B. Hatfield</u> /EarthCon
SAMPLE TIME: <u>1750</u>	SITE <u>Kerr-McGee Chem Corp Site</u>	FIELD CONDITIONS/WEATHER <u>Sunny 80's</u>	NOTES:

Well Condition Inspection (circle one) cover: <u>locked</u> not locked number: <u>legible</u> not legible outer casing: <u>good</u> fair poor inner casing: <u>good</u> fair poor well photographed: <u>yes</u> <u>no</u>	Equipment Cleaning Procedures <u>potable water and phosphate-free soap</u> - potable water rinse - water rinse: <u>distilled</u> deionized - solvent rinse acetone hexane - air dry	Turbidity (10% for values > than 5 NTUs; if three Turbidity values are < than 5 NTUs, consider the values as stabilized), Dissolved Oxygen (10% for values > than 0.5 mg/L, if three Dissolved Oxygen values are < than 0.5 mg/L, consider the values as stabilized), Temperature (3%) Specific Conductance (3%), pH (+/- 0.1 unit) ORP (+/- 10 millivolts)
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Casing Diameter: (circle one) <u>2"</u> 4" 6" Other: _____	Casing Volume Calculation: $(\pi r^2 h)(7.48 \text{ gal/ft}^3)$ Casing Volume (gallons/ft) for: 2" = 0.163; 4" = 0.653; 6" = 1.47 Casing Volume (liters/ft) for: 2" = 0.618; 4" = 2.47; 6" = 5.56	1 liter = 0.264172 gallons 250 ml = 0.250 liters
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Depth to Water (feet): <u>18.52</u> Depth of Well (feet): <u>37</u> Water Column (feet): <u>18.48</u> Casing Volume (gallons/liters): <u>3.01</u> Calculated Purge Volume (gallons/liters): <u>9.04</u> Actual Purge Volume (gallons/liters): <u>5.25</u> Pump Intake Depth (feet): <u>32</u>	Measuring Point Elevation (feet): <u>Top of Casing (See Tables)</u> Groundwater Surface Elevation: <u>See Elevation Tables</u> LNAPL present: <u>No</u> thickness: _____ DNAPL present: <u>No</u> thickness: _____ Remarks: _____ Ferrous Iron (mg/L): <u>Not Applicable</u>
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Well Evacuation
 Water level recovery is: very slow slow moderate fast Bailed dry: yes no

TIME 2400 hrs	PURGE RATE (gal/min)	CUMULATIVE VOLUME (gal)	TEMP (°C)	pH	DISSOLVED OXYGEN (mg/L)	ORP (mV)	CONDUCTIVITY (µs/cm)	TURBIDITY (NTU)	Depth to Water (Feet)	ODOR/COLOR/ REMARKS
<u>1632</u>										PURGE START
<u>1637</u>	<u>0.10</u>	<u>0.5</u>	<u>19.0</u>	<u>11.71</u>	<u>8.22</u>	<u>25.8</u>	<u>1569</u>	<u>1.33</u>	<u>21.26</u>	<u>Clear no odor</u>
<u>1641</u>	<u>0.12</u>	<u>1.0</u>	<u>19.1</u>	<u>11.70</u>	<u>7.92</u>	<u>25.2</u>	<u>1487</u>	<u>1.31</u>	<u>21.84</u>	" "
<u>1646</u>	<u>0.10</u>	<u>1.5</u>	<u>19.5</u>	<u>11.68</u>	<u>7.79</u>	<u>23.4</u>	<u>1429</u>	<u>0.85</u>	<u>21.64</u>	" "
<u>1654</u>	<u>0.06</u>	<u>2.0</u>	<u>19.6</u>	<u>11.65</u>	<u>7.33</u>	<u>21.2</u>	<u>1333</u>	<u>0.79</u>	<u>21.08</u>	" "
<u>1702</u>	<u>0.06</u>	<u>2.5</u>	<u>19.4</u>	<u>11.63</u>	<u>6.82</u>	<u>19.4</u>	<u>1263</u>	<u>0.55</u>	<u>21.03</u>	" "
<u>1709</u>	<u>0.07</u>	<u>3.0</u>	<u>19.4</u>	<u>11.59</u>	<u>6.36</u>	<u>18.9</u>	<u>1147</u>	<u>0.35</u>	<u>21.15</u>	" "
<u>1717</u>	<u>0.06</u>	<u>3.5</u>	<u>19.7</u>	<u>11.56</u>	<u>5.36</u>	<u>18.4</u>	<u>1077</u>	<u>0.89</u>	<u>20.95</u>	" "
<u>1727</u>	<u>0.05</u>	<u>4.0</u>	<u>19.5</u>	<u>11.50</u>	<u>4.64</u>	<u>19.9</u>	<u>943</u>	<u>0.70</u>	<u>20.88</u>	" "
<u>1737</u>	<u>0.05</u>	<u>4.5</u>	<u>19.6</u>	<u>11.47</u>	<u>3.66</u>	<u>20.4</u>	<u>915</u>	<u>0.71</u>	<u>20.76</u>	" "
<u>1743</u>	<u>0.04</u>	<u>4.75</u>	<u>19.5</u>	<u>11.46</u>	<u>3.33</u>	<u>20.1</u>	<u>869</u>	<u>0.77</u>	<u>20.62</u>	" "
<u>1747</u>	<u>0.04</u>	<u>5.0</u>	<u>19.5</u>	<u>11.46</u>	<u>3.28</u>	<u>20.4</u>	<u>878</u>	<u>0.32</u>	<u>20.53</u>	" "
<u>1750</u>		<u>S</u>	<u>A</u>	<u>M</u>	<u>P</u>	<u>L</u>	<u>E</u>			

Measurement and Sampling Equipment			
Type	Manufacturer	Model #	Calibration Date
Water Quality	<u>YSI</u>	YSA Pro DSS/ SN: <u>39561</u>	<u>4/8/19</u>
Turbidity	<u>HACK</u>	HACK 2100Q / SN: <u>042871</u>	<u>4/8/19</u>
Peri Pump	<u>Geotech</u>	Geo Pump / SN: <u>013157</u>	Not Applicable
Tubing	-	Tubing P/Tef. 0.17 ID X 1/4OD: Teflon Line Poly Tubing	Not Applicable

SAMPLE NUMBER	ANALYTICAL / METHOD	BOTTLE TYPE/PRESERVATIVES	QA REMARKS
MW - <u>09</u> - GW- <u>040819</u>	SVOC / 8270D	Amber Glass / unpreserved	SVOCs
	PAH-PCP / 8270D SIM	Amber Glass / unpreserved	PAH
	VOC / 8260B	40-ml HCL Vials	VOCs
DUPLICATE			
DUP - GW -	SVOC / 8270D	Amber Glass / unpreserved	SVOCs
	PAH-PCP / 8270D SIM	Amber Glass / unpreserved	PAH
	VOC / 8260B	40-ml HCL Vials	VOCs
MS/MSD			
MW - MS -	SVOC / 8270D	Amber Glass / unpreserved	SVOCs
MW - MSD -	PAH-PCP / 8270D SIM	Amber Glass / unpreserved	PAH
	VOC / 8260B	40-ml HCL Vials	VOCs

WELL No. MW- <u>9</u>	PROJECT # 02.20190041	LOCATION Navassa, NC	DATE <u>10/22/19</u>
SAMPLE No. MW- <u>9</u>	GW- <u>102219</u>	PROJECT NAME: KMCC Navassa	FIELD PERSONNEL/COMPANY <u>DANIEL EVANS / CHUCK THIBAUT</u> / EarthCon
SAMPLE TIME: <u>16:10</u>	SITE Kerr-McGee Chem Corp Site	FIELD CONDITIONS/WEATHER <u>CLAY SO'S</u>	NOTES:

Well Condition Inspection (circle one) cover: <u>locked</u> not locked number: <u>legible</u> not legible outer casing: <u>good</u> fair poor inner casing: <u>good</u> fair poor well photographed: <u>yes</u> <u>no</u>	Equipment Cleaning Procedures - potable water and phosphate-free soap - potable water rinse - water rinse: <u>distilled</u> deionized - solvent rinse: acetone hexane - air dry	Turbidity (10% for values > than 5 NTUs; if three Turbidity values are < than 5 NTUs, consider the values as stabilized), Dissolved Oxygen (10% for values > than 0.5 mg/L, if three Dissolved Oxygen values are < than 0.5 mg/L, consider the values as stabilized), Temperature (3%) Specific Conductance (3%), pH (+- 0.1 unit) ORP (+- 10 millivolts)
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Casing Diameter: (circle one) <u>2"</u> 4" 6" Other: _____	Casing Volume Calculation: $(\pi r^2 h)(7.48 \text{ gal/ft}^3)$ Casing Volume (gallons/ft) for: 2" = 0.163; 4" = 0.653; 6" = 1.47 Casing Volume (liters/ft) for: 2" = 0.618; 4" = 2.47; 6" = 5.56	1 liter = 0.264172 gallons 250 ml = 0.250 liters
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Depth to Water (feet): <u>19.84</u> Depth of Well (feet): <u>39.35</u> Water Column (feet): <u>19.51</u> Casing Volume (gallons/liters): <u>3.18</u> Calculated Purge Volume (gallons/liters): <u>9.55</u> Actual Purge Volume (gallons/liters): <u>2.60</u> Pump Intake Depth (feet): <u>35</u>	Measuring Point Elevation (feet): <u>Top of Casing (See Tables)</u> Groundwater Surface Elevation: <u>See Elevation Tables</u> LNAPL present: _____ thickness: _____ DNAPL present: _____ thickness: _____ Remarks: <u>THREATENING MATERIAL NOT WORKING</u> Alkalinity (mg/L): _____ Ferrous Iron (mg/L): _____
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Well Evacuation
 Water level recovery is: very slow slow moderate fast Bailed dry: yes no

TIME 2400 hrs	PURGE RATE (gal/min)	CUMULATIVE VOLUME (gal)	TEMP (°C)	pH	DISSOLVED OXYGEN (mg/L)	ORP (mV)	CONDUCTIVITY (µs/cm) ms/cm	TURBIDITY (NTU)	Depth to Water (Feet)	ODOR/COLOR/ REMARKS
<u>15:14</u>										PURGE START
<u>15:15</u>	<u>0.08</u>	<u>0.40</u>	<u>20.8</u>	<u>11.59</u>	<u>7.68</u>	<u>54.5</u>	<u>1361</u>	<u>3.87</u>		<u>CLAY</u>
<u>15:20</u>	<u>0.05</u>	<u>0.65</u>	<u>21.1</u>	<u>11.66</u>	<u>7.52</u>	<u>50.7</u>	<u>1377</u>	<u>20.11</u>	<u>21.46</u>	
<u>15:25</u>	<u>0.05</u>	<u>0.90</u>	<u>21.0</u>	<u>11.69</u>	<u>7.37</u>	<u>35.2</u>	<u>1355</u>	<u>24.2</u>	<u>21.72</u>	
<u>15:30</u>	<u>0.05</u>	<u>1.15</u>	<u>21.0</u>	<u>11.68</u>	<u>6.93</u>	<u>24.9</u>	<u>1302</u>		<u>21.78</u>	
<u>15:35</u>	<u>0.04</u>	<u>1.40</u>	<u>21.0</u>	<u>11.65</u>	<u>6.58</u>	<u>22.1</u>	<u>1251</u>		<u>21.78</u>	
<u>15:40</u>	<u>0.04</u>	<u>1.60</u>	<u>21.0</u>	<u>11.62</u>	<u>6.21</u>	<u>21.0</u>	<u>1169</u>		<u>21.78</u>	
<u>15:45</u>	<u>0.04</u>	<u>1.80</u>	<u>21.0</u>	<u>11.60</u>	<u>5.82</u>	<u>15.7</u>	<u>1114</u>	<u>18.77</u>	<u>21.77</u>	
<u>15:50</u>	<u>0.04</u>	<u>2.00</u>	<u>20.9</u>	<u>11.59</u>	<u>5.54</u>	<u>11.0</u>	<u>1081</u>	<u>11.45</u>	<u>21.77</u>	
<u>15:55</u>	<u>0.04</u>	<u>2.20</u>	<u>21.0</u>	<u>11.57</u>	<u>5.31</u>	<u>6.4</u>	<u>1036</u>	<u>13.30</u>	<u>21.77</u>	
<u>16:00</u>	<u>0.04</u>	<u>2.40</u>	<u>21.1</u>	<u>11.56</u>	<u>5.08</u>	<u>2.7</u>	<u>998</u>	<u>14.55</u>	<u>21.76</u>	
<u>16:05</u>	<u>0.04</u>	<u>2.60</u>	<u>21.0</u>	<u>11.55</u>	<u>4.99</u>	<u>0.3</u>	<u>954</u>	<u>14.00</u>	<u>21.77</u>	
<u>SAMPLE 16:10</u>										

Measurement and Sampling Equipment			
Type	Manufacturer	Model #	Calibration Date
Water Quality	YSI	YSA Pro DSS/ SN: <u>044647</u>	<u>10/22/19</u>
Turbidity	HACK	HACK 2100Q / SN: <u>015027</u>	<u>10/22/19</u>
Peri Pump	Geotech	Geo Pump / SN: <u>3731</u>	Not Applicable
Tubing	-	Tubing P/Tef. 0.17 ID X 1/4OD: Teflon Line Poly Tubing	Not Applicable

SAMPLE NUMBER	ANALYTICAL / METHOD	BOTTLE TYPE/PRESERVATIVES	QA REMARKS
MW - <u>9</u> GW- <u>102219</u>	SVOC / 8270D	2 Amber Glass / unpreserved	SVOCs
	PAH-PCP / 8270D SIM	2 Amber Glass / unpreserved	PAH
	VOC / 8260B	3 40-ml VOA Vials / HCl	VOCs
	Metals / 6010	1 250 mL plastic / HNO3	Metals - Ca, Fe, Na, K, Mg, Mn
	Ions / 9056A/300	1 250 mL plastic / unpreserved	Chloride, Sulfate, Nitrate, Nitrite
	Sulfide/4500S F	1 250 mL plastic / NaOH/ZnAc	Sulfide
	Dissolved Gases / RSK 175	3 40 mL VOA Vials / HCl	Methane, Ethane, Ethene
Carbon Dioxide / RSK 175	3 40 mL VOA Vials / unpreserved	Carbon dioxide - NJ lab	
DUPLICATE			
DUP -	GW -	See above	See above
MS/MSD			
MW -	MS -	See above	See above
MW -	MSD -	See above	See above