REC PROGRAM DOCUMENT CERTIFICATION FORM - PAGE 1 OF 2
IHSB SITE NAME UNC Cogeneration Facility
DATE & NAME OF DOCUMENT 6/8/2023 2023 Project Status Report
TYPE OF SUBMITTAL (Report, Plan,Work Phase Comp. Statement, Schedule Change): Report

REMEDIATING PARTY DOCUMENT CERTIFICATION STATEMENT (.0306(b)(2))

"I certify that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this certification, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material and information contained herein is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for willfully submitting false, inaccurate, or incomplete information."

UNC-CH / Cathy Brennan
Name of Remediating Party

Signature of Remediating Party

6/22/23
Date

NOTARIZATION

North Carolina (Enter State)

Alamance **COUNTY**

I, Amy Butler, a Notary Public of said County and State, do hereby certify that Catherine R. Brennan did personally appear and sign before me this day, produced proper identification in the form of Driver's License, was duly sworn or affirmed, and declared that, to the best of his or her knowledge and belief, after thorough investigation, the information contained in the above certification is true and accurate, and he or she then signed this Certification in my presence.

WITNESS my hand and official seal this 22nd day of June, 2023.

Amy Butler
Notary Public (signature)

(OFFICIAL SEAL)

My commission expires: 12/7/2027

Amy Butler
Notary Public
Alamance County
North Carolina

REC PROGRAM DOCUMENT CERTIFICATION FORM - PAGE 2 OF 2
IHSB SITE NAME UNC Cogeneration Facility, Site ID NCR000010272
DATE & NAME OF DOCUMENT May 2023 2023 Project Status Rpt (Remedial Action Progress Rpt)
TYPE OF SUBMITTAL (Report,Work plan,Work Phase Comp. Statement, Schedule Change): Report

REGISTERED SITE MANAGER CERTIFICATION OF SIGNATURES

As the Registered Environmental Consultant for the Site for which this filing is made, I certify that the signatures included herewith are genuine and authentic original handwritten signatures and/or true, accurate, and complete copies of the genuine and authentic original handwritten signatures of the persons who purport to sign for this filing. I further certify that I have collected through reliable means the originals and/or copies of said signatures from the persons authorized to sign for this filing who, in fact, signed the originals thereof. Those persons and I understand and agree that any copies of signatures have the same legally binding effect as original handwritten signatures, and I certify that any person for whom I am submitting a copy of their signature has provided me with their express consent to submit said copy. Additionally, I certify that I am authorized to attest to the genuineness and authenticity of the signatures, both originals and any copies, being submitted herewith and that by signing below, I do in fact attest to the genuineness and authenticity of all the signatures, both originals and copies, being submitted for this filing.

Eric Nesbit
Name of Registered Site Manager

Signature of Registered Site Manager

6/22/23
Date

REGISTERED SITE MANAGER DOCUMENT CERTIFICATION STATEMENT (.0306(b)(1))

"I certify under penalty of law that I am personally familiar with the information contained in this submittal, including any and all supporting documents accompanying this certification, and that the material and information contained herein is, to the best of my knowledge and belief, true, accurate and complete and complies with the Inactive Hazardous Sites Response Act N.C.G.S. 130A-310, et seq, and the remedial action program Rules 15A NCAC 13C .0300. I am aware that there are significant penalties for willfully submitting false, inaccurate or incomplete information."

Eric Nesbit
Name of Registered Site Manager

Signature of Registered Site Manager

6/22/23
Date

NOTARIZATION

North Carolina (Enter State)

Wake COUNTY

I, Holly Van Norman, a Notary Public of said County and State, do hereby certify that Eric Nesbit did personally appear and sign before me this day, produced proper identification in the form of NCDL, was duly sworn or affirmed, and declared that, he or she is the duly authorized environmental consultant of the remediating party of the property referenced above and that, to the best of his or her knowledge and belief, after thorough investigation, the information contained in the above certifications is true and accurate, and he or she then signed these Certifications in my presence.

WITNESS my hand and official seal this 22 day of June

Notary Public (signature)

(OFFICIAL SEAL)

HOLLY VAN NORMAN
Notary Public
Wake County
NORTH CAROLINA

My commission expires: 11/15/2023.

Document Certification Form No DC - II
(Revised 6/19)

Prepared for

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

The University of North Carolina at Chapel Hill
Department of Environment, Health and Safety
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Chapel Hill, North Carolina 27599-1650

2023 PROJECT STATUS REPORT
(Remedial Action Progress Report)

UNC-CH COGENERATION FACILITY
CHAPEL HILL, NORTH CAROLINA
SITE ID# NCR000010272

Prepared by

Geosyntec consultants

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Project Number GN6666

June 2023

Geosyntec consultants

Geosyntec Consultants of NC, P.C.

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Geosyntec Consultants of NC, P.C.

1. INTRODUCTION

On behalf of The University of North Carolina at Chapel Hill (UNC-CH), Geosyntec Consultants of NC, P.C. (Geosyntec) has prepared this Project Status Report for UNC-CH's Cogeneration Facility located at 575 West Cameron Avenue, Chapel Hill, North Carolina. On September 3, 2010, UNC-CH submitted a *Notification of an Inactive Hazardous Substance or Waste Disposal Site* to the North Carolina Department of Environmental Quality's (NCDEQ) Inactive Hazardous Waste Sites Branch (IHSB). The notification was prompted when soils suspected of containing coal combustion by-products (CCBs) were encountered during excavation activities associated with the construction of a new warehouse building for the UNC-CH Cogeneration Facility (the Facility or Site).

UNC-CH entered into an *Administrative Agreement* (AA) dated May 29, 2013, with NCDEQ to enroll the Site into the Registered Environmental Consultant (REC) program. Within the REC program, the remediating party contracts with an IHSB-approved environmental consulting firm to direct, implement, regulate, and certify that all investigation and remediation work is performed in compliance with the program regulations found under Title 15A of the North Carolina Administrative Code, Subchapter 13C .0300 (15A NCAC 13C .0300).

UNC-CH contracted with Geosyntec, an approved REC consultant, to complete a Remedial Investigation (RI). The objectives of the RI were to: (i) identify past releases of hazardous substances to the environment, (ii) identify potential exposure pathways, (iii) characterize the chemical nature of such releases and collect sufficient sampling data to support a cleanup-level determination, (iv) delineate the areal and vertical extent of contamination, and (v) characterize Site conditions sufficiently to conduct a feasibility study of remedial alternatives and to support a proposed remedy.

The RI assessed fill areas in the southern portion of the Facility, the section of McCauley Street constructed of fill material, and the creek or stream floodplain bisecting one of the two UNC-CH owned lots south of McCauley Street.

The *Remedial Investigation Report* (RIR) was submitted on May 27, 2016. The RIR concluded that concentrations of some contaminants of concern (COCs) exceeded their respective Remedial Goals (RGs) in soil (within the Facility property and in isolated

pockets south of McCauley Street) and in limited groundwater samples. The RIR recommended “No Further Action” for in-stream sediment and surface water.

This report provides a status update of soil and groundwater remedial activities.

2. SOIL

Since the last Progress Status Report, a draft *Remedial Action Plan* (RAP) for soil was submitted to the REC Program on May 12, 2023.

The soil RAP proposes removal of two small, isolated areas of impacted soil located south of McCauley Street for the protection of groundwater. A Public Notice Period is the next step. Removal is expected in June 2023.

3. GROUNDWATER

Groundwater is being remediated via Monitored Natural Attenuation (MNA) in general accordance with the 2018 *Remedial Action Plan for Groundwater*.

Groundwater analytical data to date is presented in **Table 1**. The most recent (December 2021) potentiometric surface map is provided as **Figure 1**. Groundwater flows southerly towards an unnamed creek bisecting the Site. Shallow groundwater flowing southerly through CCB-impacted fill or disturbed substrate within the Facility's fence line (Exposure Unit #1) presumably discharges as base flow into the creek. Geosyntec therefore assumes this creek acts as a hydraulic barrier to groundwater flow from northwest side of the creek.

No groundwater monitoring has occurred since the last Progress Status Report. Optimized groundwater and surface water monitoring is proposed to be performed concurrent with the soil removal action (i.e., the two pockets of soil impacts south of McCauley Street.)

3.1. Remedy Performance Evaluation

Since the initial monitoring event in March 2014, the groundwater plume signature or fingerprint emanating from the source area wells, MW-2 & MW-3, is defined by sulfate and total dissolved solids (TDS) with cobalt and manganese elevated about one (1) to two (2) orders of magnitude above their respective 2L Groundwater Standards.

Slight downward trends are apparent (**Figure 2**) across the full-time span of collected data for sulfate concentrations in both source area wells. For TDS, trends are flat to slightly downward (**Figure 3**). Cobalt and manganese remain steady or flat in MW-2 (**Figures 4 & 5**). Cobalt and manganese are trending down in MW-3 (**Figures 4 & 5**).

Downgradient at MW-5 the signature or fingerprint of the plume is reduced. Both cobalt and manganese have been detected in every sampling event at MW-5, but at concentrations of one to two orders of magnitude below their associated concentrations at MW-2 and MW-3 (the source area wells). Concentrations of sulfate and TDS at MW-5 trend below their respective concentrations at MW-3, but above their respective concentrations at MW-2.

3.2. Risk Screening

The 2018 *Remedial Action Plan for Groundwater* established MNA followed by a risk-based approach for groundwater closure as the remedy. To that end, risk screening was performed on the downgradient monitoring well south of McCauley Street (MW-5). Groundwater risk screening was not conducted for monitoring wells MW-1 through MW-4 because these wells are located on the Cogeneration Facility where future land use restrictions preventing groundwater use are anticipated.

NCDEQ's January 2023 *Risk Calculator* was used to perform the risk screening. NCDEQ recognizes a cumulative cancer risk of 1.0E-4 and a cumulative Hazard Index of 1.0 (for non-carcinogens affecting the same target organ or system) as the benchmarks for identifying potentially unacceptable risks. The results of the NCDEQ Risk Calculator screening for the downgradient parcel south of McCauley Street (using MW-5 groundwater data) are discussed below.

3.2.1. Tier 1 Risk Screening

The Tier 1 risk screening conformed to the default Risk Calculator guidance for i) the exposure parameters for both residential and non-residential receptors, ii) identifying chemicals of potential concern (COPCs) for entry into the Risk Calculator, and iii) for establishing exposure point concentrations. The COPCs that were input into the Risk Calculator included:

- constituents detected;
- constituents flagged by the laboratory as an estimated concentration (i.e., "J" flags"); and
- constituents that were not detected but the maximum laboratory method detection limit (MDL) exceeded its respective 2L Groundwater Quality Standard or Remedial Goal.

The exposure point concentrations under the Tier 1 screening were based upon the December 2021 sampling event only. The results for each scenario are summarized below. The *Risk Calculator* Output Sheets 2B and 2D are attached as **Appendix A**.

Receptor	Pathway	Carcinogenic Risk	Hazard Index
Residenti	Groundwater Use	0.0E+00	25
Non-Residenial	Groundwater Use	0.0E+00	3.6

The Tier 1 risk screening indicates a cumulative non-cancer hazard index of 25 and 3.6 for a hypothetical future residential and non-residential receptor, respectively. Both are above the NCDEQ risk/hazard threshold of 1.0, indicating unacceptable risk. For both receptors, the thallium MDL is driving the risk. None of the COPCs screened are knowns carcinogens. Accordingly, the cumulative carcinogenic risk is zero.

3.2.2. Tier II Risk Screening

Given the conservative nature of the Tier 1 screening evaluations, the *NCDEQ Risk Calculator User Guide* allows for modifications to the assumptions upon which the risk screening calculations are based. For example, some of the risk refinement approaches recognized in the *NCDEQ Risk Calculator User Guide* include:

- removing constituents from consideration if they are documented within naturally occurring background concentrations;
- removing constituents from consideration if they have not been detected on site or an elevated MDL or reporting limit (RL) drives the risk; and/or
- modifying exposure point concentrations for constituents based upon statistical evaluation of individual constituent analytical data over time.

At MW-5, the thallium MDL is driving the Tier I risk screening results. Therefore, the contribution or influence of background concentrations of thallium was evaluated. Thallium has been detected in the upgradient groundwater monitoring well MW-1 at a concentration up to 5.2 micrograms per liter (µg/L) in November 2015 (**Table 1**), above its 2L Groundwater Quality Standard of 2 µg/L. Thallium has been detected twice at downgradient well MW-5 at a similar time period (between 7.7 in November 2015 and 10 µg/L in May 2016). The historical, intermittent thallium detections at MW-5 appear to follow a similar pattern with the thallium detection at upgradient well MW-1. Other

than the two thallium detections at MW-5 in November 2015 and May 2016, thallium has not been detected in the five other sampling events in which it was analyzed between 2014 and 2021. In each of these "non-detected" cases, the thallium MDL was 4.9 µg/L, above its 2L Groundwater Quality Standard at MW-5.

Thallium is a naturally occurring element commonly encountered in soil and groundwater in North Carolina. Additionally, thallium is not a recognized constituent of concern at the Site. Accordingly, a refined, Tier II risk screening at MW-5 eliminated the thallium MDL concentration from the risk calculation. The revised *Risk Calculator* Output Sheets 2B and 2D are attached as **Appendix B**.

Receptor	Pathway	Carcinogenic Risk	Hazard Index
Residenti	Groundwater Use	0.0E+00	0.74
Non-Residenial	Groundwater Use	0.0E+00	0.11

The Tier 2 risk screening indicates a cumulative non-cancer hazard index of 0.75 and 0.12 for a hypothetical future residential and non-residential receptor, respectively. Both results are below the NCDEQ risk/hazard threshold of 1.0. Like the Tier 1 risk screening, none of the COPCs screened are known carcinogens. Consequently, the cumulative carcinogenic risk is again zero.

3.3. Discussion

MNA appears to be effective at remediating groundwater. Constituents of concern in groundwater are overall decreasing or stable since monitoring began. Analytical results downgradient from the source wells are one to two orders of magnitude below the source area wells, which illustrates attenuation. When combined with the decreasing or stable concentrations at the source area wells, efficacy of MNA is apparent.

As it relates to the risk screening calculations and analysis, it is worth noting:

1. The Cogeneration Facility property is zoned and used for industrial purposes. The Facility has been used for the generation of steam and power since the 1940's and will continue to be used in the same manner for the near future.

2. Groundwater is not being used for consumptive use or industrial purposes onsite. Two water supply wells were installed within the Cogeneration Facility in 1977 for process/irrigation water. One of the wells is still present, but inactive, in the southwestern corner of the Site. Documents indicate that the second well was in the southeastern quadrant of the Site, but remnants of this second well have not been found. It is presumed to have been abandoned in place or removed without documentation.

3. UNC-CH has owned the two undeveloped lots south of McCauley Street since 2007 and 2008, and no water supply wells exist on these two properties. Groundwater is not being used for consumptive use or industrial purposes and UNC-CH does not have plans to sell either in the near future. The undeveloped lots provide open-space or a buffer between residences nearby and the Cogeneration Facility.

4. The initial, Tier I risk screening at MW-5 using the December 2021 analytical data implied an unacceptable non-cancer hazard, driven by an elevated thallium MDL. A subsequent risk refinement with supporting lines of evidence resulted in no unacceptable cancer risks or non-cancer hazards.

UNC-CH anticipates applying for Risk Based Closure of Groundwater in early 2024.

3.4. Amended Groundwater Monitoring Plan

Optimization of the groundwater monitoring plan is proposed. Proposed and implemented changes to the monitoring plan are summarized below.

1. Six groundwater monitoring events performed between September 2014 and December 2018 suggest dioxins / furans and PAHs under site-specific conditions are not leaching to groundwater at concentrations above their RGs. No clear trends of repeatable detections or exceedances have been identified. Prior to the November 2019 groundwater monitoring event, dioxins / furans and PAHs were determined to no longer be groundwater contaminants of concern and removed from the suite of groundwater monitoring requirements.

2. Monitoring of MW-5 and both surface water locations will take place concurrently with the proposed impacted soil removal in 2023.

a. As part of the groundwater monitoring scope of work, the analytical laboratory will attempt to lower the MDL for thallium to the extent practical to build upon the risk screening calculations performed herein, and to support anticipated future groundwater risk screenings.

3. Typical field measurements will be recorded during purging by a low-flow procedure.
4. Field test kits will not be used to estimate Ferrous Iron and Sulfide concentrations.
5. Groundwater and surface water samples will be collected for analysis by the following:

Constituents	Method
Arsenic, Boron, Chromium, Cobalt, Iron, Lithium, Manganese, Molybdenum, Strontium, Thallium, Vanadium	ICP-MS (6020)
TDS	2540C
Sulfate	9056A

6. One field duplicate, quality control sample will be collected.
7. Groundwater and surface water elevation data will be collected during each monitoring event to confirm groundwater flow direction.

TABLES

Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	0.00029	U	0.00093	J	0.00078	U	0.0015	J	0.00054	U	0.00041	U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00032	U	0.00048	J	0.0012	U	0.0005	U	0.00015	U	0.00016	F2
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00033	U	0.00082	J	0.00026	U	0.00041	U	0.00021	U	0.00019	U
1,2,3,4,7,8-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00047	J	0.000079	U	0.00013	U	0.00011	U	0.000063	U	0.00066	U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00038	U	0.000096	U	0.000075	U	0.000079	U	0.000059	U	0.0000055	U
1,2,3,6,7,8-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00012	U	0.000081	U	0.00013	U	0.00012	U	0.000065	U	0.00078	U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00023	U	0.000096	U	0.00024	U	0.000077	U	0.000056	U	0.0000056	U
1,2,3,7,8,9-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00045	U	0.00028	J	0.00012	U	0.00011	U	0.00006	U	0.00066	U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00053	U	0.00048	J	0.000087	U	0.0001	U	0.000077	U	0.00054	J
2,3,7,8-Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	0.000059	U	0.000044	U	0.000013	U	0.000089	U	0.000065	U	0.006	U
1,2,3,7,8-Pentachlorooxanthrene (PeCDD)	ng/L	-	-	0.00036	U	0.000057	U	0.00032	U	0.00031	U	0.000042	U	0.0008	U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00033	U	0.0001	U	0.000057	U	0.00037	U	0.0003	J	0.00074	F2
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00033	U	0.00034	J	0.00043	U	0.000086	U	0.000063	U	0.0000056	U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00028	U	0.000095	U	0.000054	U	0.0003	J	0.00023	J	0.00068	F2
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	0.000093	J	0.00005	U	0.000037	U	0.000099	U	0.00015	J	0.0024	F2
1,2,3,4,6,7,8,9-Octachlorooxanthrene (OCDD)	ng/L	-	-	0.0024	U	0.0078	J	0.011	J	0.014	J	0.0035	U	0.00029	J
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/L	-	-	0.00044	U	0.0044	J	0.017	J	0.0016	U	0.00058	U	0.0013	U
Calculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	0.0000563	U	0.00013596		0.0000084		0.0001092		0.000093		0.000054	
Calculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	0.000047	U	0.000028		ND		ND		ND		ND	
1-Methylnaphthalene	µg/L	1	-	0.0055	U	0.0058	U	0.0056	U	0.0054	U	0.0055	U	0.0069	U
2-methylnaphthalene	µg/L	30	-	0.005	U	0.0052	U	0.0051	U	0.0049	U	0.005	U	0.0063	U
Acenaphthene	µg/L	80	-	0.01	U	0.011	U	0.011	U	0.01	U	0.01	U	0.013	U
Acenaphthylene	µg/L	200	-	0.0097	U	0.01	U	0.0098	U	0.0095	U	0.0096	U	0.012	U
Anthracene	mg/L	2	-	0.000014	U	0.000014	U	0.000014	U	0.000014	U	0.000014	U	0.000017	U
Benz(a)anthracene	µg/L	0.05	-	0.0031	U	0.0033	U	0.0032	U	0.0031	U	0.0031	U	0.0039	U
Benzo(a) pyrene	µg/L	0.005	0.005	0.005	U	0.0052	U	0.0051	U	0.0049	U	0.005	U	0.0063	U
Benzo(b)fluoranthene	µg/L	0.05	-	0.0033	U	0.0035	U	0.0034	U	0.04	J	0.0033	U	0.0042	U
Benzo(g,h,i)perylene	µg/L	200	-	0.0034	U	0.0036	U	0.0035	U	0.0034	U	0.0034	U	0.0043	U
Benzo(k)fluoranthene	µg/L	0.5	-	0.0049	U	0.0051	U	0.005	U	0.013	J	0.0049	U	0.0061	U
Chrysene	µg/L	5	-	0.0031	U	0.0032	U	0.0032	U	0.049	J	0.0031	U	0.0039	U
Dibenz(a,h)anthracene	µg/L	0.005	0.005	0.0047	U	0.0049	U	0.0048	U	0.0046	U	0.0047	U	0.0059	U
Fluoranthene	µg/L	300	-	0.0044	U	0.0046	U	0.0045	U	0.066	J	0.0044	U	0.0055	U
Fluorene	µg/L	300	-	0.018	U	0.019	U	0.019	U	0.018	U	0.018	U	0.023	U
Indeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	0.014	U	0.015	U	0.015	U	0.014	U	0.014	U	0.018	U
Naphthalene	µg/L	6	-	0.0052	U	0.0054	U	0.0053	U	0.0051	U	0.01	J	0.0092	J
Phenanthrene	µg/L	200	-	0.0095	U	0.0099	U	0.0096	U	0.024	J	0.0094	U	0.014	J
Pyrene	µg/L	200	-	0.0078	U	0.0082	U	0.008	U	0.041	J	0.0078	U	0.0098	U
PAH TEQ	µg/L	0.005	0.005	ND		ND		ND		0.00418		ND		ND	
Bromide	mg/L	-	-	-		-		-		-		-		0.11	U
Bicarbonate as CaCO3	mg/L	-	-	76		-		-		-		-		-	
Total Inorganic Carbon	mg/L	-	-	-		-		-		-		-		3.7J	J+
Dissolved Organic Carbon	mg/L	-	-	-		-		-		-		-		0.38	J
Chloride	mg/L	250	-	27		-		-		-		-		16	B
Fluoride	mg/L	2	-	-		-		-		-		-		0.06	U
Nitrate	mg/L	10	-	-		-		-		-		-		1.4	
Nitrite	mg/L	1	-	-		-		-		-		-		0.049	U
Orthophosphate	mg/L	-	-	-		-		-		-		-		0.19	F1
Sulfate	mg/L	250	250	69		77		71	B	71B		62	B	55	B
Sulphide	mg/L	-	-	0.79	U	-		-		-		-		-	
TDS	mg/L	500	500	260		200		180		180		150		140	
TSS	mg/L	-	-	6		-		-		-		-		-	
Aluminium	mg/L	-	-	0.13		1.2		0.46		0.75		0.031	J	-	
Antimony	mg/L	0.001	-	0.0031	U	0.0031	U	0.0031	U	0.0031	U	0.0031	U	-	
Arsenic	ug/L	10	-	4.4	U	8.3	J	4.4	U	4.4	U	4.4	U	-	
Barium	ug/L	700	-	42		36		37	B	38		35		-	
Beryllium	mg/L	0.004	-	0.00047	U	0.00047	U	0.00047	U	0.00047	U	0.00047	U	-	
Boron	ug/L	700	-	-		-		-		-		-		-	
Cadmium	ug/L	2	-	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U	-	
Calcium	mg/L	-	-	24		15		13		10		9.2		6.2	
Chromium (III+VI)	ug/L	10	10	0.74	J	2.8J	J	1.9	J	5.5	J	1.6	J	3.5	J
Hexavalent Chromium (VI)	ug/L	-	-	-		-		-		-		-		-	
Cobalt	mg/L	0.001	0.001	0.0012	U	0.0012	U	0.0012	U	0.0012	U	0.0012	U	0.049	U
Copper	mg/L	1	-	0.0014	U	0.0024	J	0.0014	U	0.0014	U	0.0042	U	0.19	
Iron	ug/L	300	578	140		1,200		430		540		100	U	22	U
Lead	µg/L	15	-	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	-	
Lithium	µg/L	-	-	-		-		-		-		-		-	
Magnesium	mg/L	-	-	5.7		3.3		2.8		2.3		2		1.4	
Manganese	ug/L	50	70	190		50		22		17		10	U	10	U
Mercury	ug/L	1	-	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	-	
Molybdenum	ug/L	-	-	-		-		-		-		-		-	
Nickel	ug/L	100	-	1.3	U	1.3	U	2.1	J	1.3	U	1.3	U	-	
Potassium	mg/L	-	-	3.4		2.8J		2.7	J	2.8	J	3	U	1.5	J
Selenium	ug/L	20	-	4.9	U	4.9	U	5.3	J	13	J	5.6J		-	
Silver	ug/L	20	-	0.93	U	0.93	U	0.93	U	0.93	U	0.93	U	-	
Sodium	mg/L	-	-	57		42		41		40	B	34	B	34	
Strontium	ug/L	2000	-	-		-		-		-		-		-	
Thallium	mg/L	0.002	-	0.0049	U	0.0049	U	0.0049	U	0.0052	J	0.0049	U	-	
Vanadium	mg/L	0.007	0.007	0.0011	U	0.003	J	0.0011	U	0.0023	J	0.0011	U	0.0011	U
Zinc	mg/L	1	-	0.02	U	0.013	J	0.0082	J	0.011	J	0.009	J	-	

Notes:

1. ng/L indicates nanogram per liter.
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4. TEQ indicates total equivalents.
5. U indicates result was below the method detection limit.
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   However, the method detection limit is an approximation.
8. B is a laboratory flag indicating compound was detected in both the method blank and sample
9. R indicates the results are rejected due to deficiencies in the ability to analyze the
   sample and meet quality control criteria. The presence of the analyte cannot be verified.

Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

Method	Analyte	Unit	2Ls and IMACs	Final Remediation Goals for Groundwater	MW-1 continued							
					12/12/2018		14/2019		12/2020		12/14/2021	
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	0.00061	U	-		-		-	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00018	U	-		-		-	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00026	U	-		-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00038	U	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00035	U	-		-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00037	U	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00032	U	-		-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00035	U	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00045	U	-		-		-	
	Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	0.0006	U	-		-		-	
	Pentachlorooxanthrene (PeCDD)	ng/L	-	-	0.00055	U	-		-		-	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00085	U	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00037	U	-		-		-	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00078	U	-		-		-	
	Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	0.00056	U	-		-		-	
	Octachlorooxanthrene (OCDD)	ng/L	-	-	0.12	U	-		-		-	
	Octachlorodibenzofuran (OCDF)	ng/L	-	-	0.12	U	-		-		-	
	alculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	ND		-		-		-	
	alculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	ND		-		-		-	
SVOCs	Methylnaphthalene	µg/L	1	-	0.0062	U	-		-		-	
	methylnaphthalene	µg/L	30	-	0.0056	U	-		-		-	
	cenaphthene	µg/L	80	-	0.012	U	-		-		-	
	cenaphthylene	µg/L	200	-	0.011	U	-		-		-	
	nthracene	mg/L	2	-	0.000016	U	-		-		-	
	enz(a)anthracene	µg/L	0.05	-	0.0035	U	-		-		-	
	enzo(a) pyrene	µg/L	0.005	0.005	0.0056	U	-		-		-	
	enzo(b)fluoranthene	µg/L	0.05	-	0.0038	U	-		-		-	
	enzo(g,h,i)perylene	µg/L	200	-	0.0039	U	-		-		-	
	enzo(k)fluoranthene	µg/L	0.5	-	0.0055	U	-		-		-	
	hrysene	µg/L	5	-	0.0035	U	-		-		-	
	ibenz(a,h)anthracene	µg/L	0.005	0.005	0.0053	U	-		-		-	
	luoranthene	µg/L	300	-	0.005	U	-		-		-	
	luorene	µg/L	300	-	0.021	U	-		-		-	
	ndeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	0.016	U	-		-		-	
	aphthalene	µg/L	6	-	0.012	J	-		-		-	
	henanthrene	µg/L	200	-	0.013	J	-		-		-	
	yrene	µg/L	200	-	0.0089	U	-		-		-	
	AH TEQ	µg/L	0.005	0.005	ND		-		-		-	
General Chemistry	romide	mg/L	-	-	0.11	U	0.23	U	0.23	U	0.23	U
	icarbonate as CaCO3	mg/L	-	-	-		-		-		-	
	otal Inorganic Carbon	mg/L	-	-	6.9		6		5.4	J	3.7	J+
	issolved Organic Carbon	mg/L	-	-	1	U	0.58	J	1	U	0.63	J
	hloride	mg/L	250	-	16		10		10		12	
	luoride	mg/L	2	-	0.06	U	0.19		0.17	U	0.17	U
	itrate	mg/L	10	-	1.6		0.85		-		0.81	
	itrite	mg/L	1	-	0.049		0.056	J	-		0.049	U
	rthophosphate	mg/L	-	-	0.19	F1	0.47	UF1	-		0.47	U
	ulfate	mg/L	250	250	60	J+	62		54		63	
	ulphide	mg/L	-	-	-		-		-		-	
	DS	mg/L	500	500	150		150		150	J	140	
	SS	mg/L	-	-	-		-		-		-	
Metals	luminium	mg/L	-	-	-		-		-		-	
	ntimony	mg/L	0.001	-	-		-		-		-	
	senic	ug/L	10	-	-		-		4.4	U	4.4	U
	rium	ug/L	700	-	-		-		-		-	
	eryllium	mg/L	0.004	-	-		-		-		-	
	oron	ug/L	700	-	-		-		42	J	32	J
	admium	ug/L	2	-	-		-		-		-	
	alcium	mg/L	-	-	6.7		8.6		6.2		4.4	
	hromium (III+VI)	ug/L	10	10	10	U	10	U	1.5	J	1.7	J
	exavalent Chromium (VI)	ug/L	-	-	-		-		-		-	
	obalt	mg/L	0.001	0.001	0.0012	U	0.0012	U	0.0012	U	0.0012	U
	opper	mg/L	1	-	-		-		-		-	
	ron	ug/L	300	578	180		170		22	U	37	J
	ead	µg/L	15	-	-		-		-		-	
	ithium	µg/L	-	-	-		-		9.1	U	9.1	U
	agnesium	mg/L	-	-	1.3		1.9		1.1		0.8	
	Manganese	ug/L	50	70	10	U	5	J	1.9	U	1.9	U
	ercury	ug/L	1	-	-		-		-		-	
	olybdenum	ug/L	-	-	-		-		1.0	U	1.0	U
	ickel	ug/L	100	-	-		-		-		-	
	otassium	mg/L	-	-	1.9	J	3	U	1.9	J	1.6	J
	elenium	ug/L	20	-	-		-		-		-	
	ilver	ug/L	20	-	-		-		-		-	
	odium	mg/L	-	-	42		33		34		36	
	trontium	ug/L	2000	-	-		-		88		65	^6+
	hallium	mg/L	0.002	-	-		-		0.0049	U	0.0049	U
	anadium	mg/L	0.007	0.007	0.0011	U	0.0011	U	0.0011	U	0.0011	U
	nc	mg/L	1	-	-		-		-		-	

Notes:

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11. TDS indicates total dissolved solids.
12. TSS indicates total suspended solids.
13. PAH indicates polyaromatic hydrocarbon.
14. ND indicates all of the input parameters in the calculated parameter equation were non-detect.
15. Groundwater Final Remediation Goals reference Geosyntec's 2016 Remedial Investigation Report.
16. North Carolina Groundwater Quality Standards (2L's and IMACs) from April 1, 2022.
17. In 2022, the Groundwater Quality Standard for vanadium was set at 0.007 mg/L. This changed the final, unrestricted use
    This is a change from the 2018 Remedial Action Plan for groundwater only.

Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

Method	Analyte	Unit	2Ls and IMACs	Final Remediation Goals for Groundwater											
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	0.00028	U	0.00062	J	0.00066	U	0.00054	U	0.00028	U	0.00015	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.0012	J	0.00079	J	0.00047	U	0.00058	J	0.00036	U	0.00016	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00011	U	0.00039	J	0.00014	U	0.00014	U	0.00049	U	0.00019	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00034	U	0.00011	U	0.00072	J	0.00036	U	0.00018	U	0.00057	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00036	U	0.00011	U	0.00005	U	0.00026	U	0.00016	U	0.00011	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00032	U	0.00012	U	0.00039	J	0.00036	U	0.00018	U	0.00058	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00034	U	0.00011	U	0.00015	U	0.00057	J	0.00016	U	0.00012	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.0011	J	0.00011	U	0.000064	U	0.00034	U	0.00017	U	0.00053	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00035	U	0.0004	J	0.000059	U	0.00031	U	0.00023	U	0.00014	
	Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	0.00017	U	0.000041	U	0.000013	U	0.00019	U	0.00022	U	0.0036	
	Pentachlorooxanthrene (PeCDD)	ng/L	-	-	0.00012	U	0.000051	U	0.00045	U	0.00086	U	0.000091	U	0.0012	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.001	J	0.00012	U	0.000025	U	0.00018	U	0.00016	U	0.00058	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00034	U	0.00011	U	0.000054	U	0.00027	U	0.00017	U	0.00012	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00033	U	0.00021	J	0.000025	U	0.00016	U	0.00015	U	0.00056	
	Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	0.0001	U	0.000065	U	0.000027	U	0.0001	U	0.00017	U	0.0017	
	Octachlorooxanthrene (OCDD)	ng/L	-	-	0.0082	J	0.007	J	0.0033	U	0.0024	J	0.0024	U	0.00029	U
	Octachlorodibenzofuran (OCDF)	ng/L	-	-	0.00023	U	0.0039	J	0.0092	U	0.0016	J	0.0017	U	0.00086	U
	alculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	0.00015446		0.00012427		0.000111		0.000064		ND		ND	
	alculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-			ND		0.00011		ND		ND		ND	
SVOCs	Methylnaphthalene	µg/L	1	-		U	0.0056	U	0.0054	U	0.0054	U	0.0054	U	0.0058	
	methylnaphthalene	µg/L	30	-	0.0049	U	0.0051	U	0.0049	U	0.0049	U	0.0049	U	0.0053	
	cenaphthene	µg/L	80	-	0.01	U	0.011	U	0.01	U	0.01	U	0.01	U	0.011	
	cenaphthylene	µg/L	200	-	0.0095	U	0.0099	U	0.0095	U	0.0096	U	0.0094	U	0.01	
	nthracene	mg/L	2	-	0.000013	U	0.000014	U	0.000014	U	0.000014	U	0.000013	U	0.00015	
	enz(a)anthracene	µg/L	0.05	-	0.003	U	0.0032	U	0.0031	U	0.0031	U	0.003	U	0.0033	
	enzo(a) pyrene	µg/L	0.005	0.005	0.0049	U	0.0051	U	0.0049	U	0.0049	U	0.0049	U	0.0053	
	enzo(b)fluoranthene	µg/L	0.05	-	0.0033	U	0.0034	U	0.0033	U	0.0033	U	0.0033	U	0.0036	
	enzo(g,h,i)perylene	µg/L	200	-	0.0034	U	0.0035	U	0.0034	U	0.0034	U	0.0034	U	0.0037	
	enzo(k)fluoranthene	µg/L	0.5	-	0.0048	U	0.005	U	0.0048	U	0.0048	U	0.0048	U	0.0052	
	hrysene	µg/L	5	-	0.003	U	0.0032	U	0.003	U	0.0031	U	0.003	U	0.0033	
	ibenz(a,h)anthracene	µg/L	0.005	0.005	0.0046	U	0.0048	U	0.0046	U	0.0046	U	0.0046	U	0.005	
	luoranthene	µg/L	300	-	0.0043	U	0.0045	U	0.0043	U	0.0043	U	0.0043	U	0.1	
	luorene	µg/L	300	-	0.018	U	0.019	U	0.018	U	0.018	U	0.018	U	0.019	
	ndeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	0.014	U	0.015	U	0.014	U	0.014	U	0.014	U	0.015	
	aphthalene	µg/L	6	-	0.0051	U	0.031	J	0.0051	U	0.0051	U	0.0051	U	0.0086	
	henanthrene	µg/L	200	-	0.0093	U	0.0096	U	0.0093	U	0.0094	U	0.0092	U	0.01	
	yrene	µg/L	200	-	0.0077	U	0.008	U	0.0077	U	0.0078	U	0.0077	U	0.00083	U
	AH TEQ	µg/L	0.005	0.005	ND		ND		ND		ND		ND		ND	
General Chemistry	romide	mg/L	-	-	-		-		-		-		-			U
	icarbonate as CaCO3	mg/L	-	-	140		-		-				-		-	
	otal Inorganic Carbon	mg/L	-	-	-		-		-		-		-		1.5	
	issolved Organic Carbon	mg/L	-	-	-		-		-		-		-		1.5	
	hloride	mg/L	250	-	19		-		-			B	-		17	
	luoride	mg/L	2	-	-		-		-		-		-		0.4J	
	itrate	mg/L	10	-	-		-		-		-		-		0.051J	
	itrite	mg/L	1	-	-		-		-		-		-		0.049	U
	rthophosphate	mg/L	-	-	-		-		-		-		-		0.19	U
	ulfate	mg/L	250	250	170		140		120	B	90	B	85		99	
	ulphide	mg/L	-	-	0.79	U	-		-		-				-	
	DS	mg/L	500	500	400		320		300		250		530		280	
	SS	mg/L	-	-	1.1	U	-		-		-				-	
Metals	luminium	mg/L	-	-	0.018	U	0.018	U	0.018	U	0.018		0.018	U	-	
	ntimony	mg/L	0.001	-		U	0.0031	U	0.0031	U	0.0031		0.0031	U	-	
	senic	ug/L	10	-	4.4	U	6.5	J	4.4	U	5	J	4.4	U	-	
	rium	ug/L	700	-	87		53		57	B	39	J	50		-	
	eryllium	mg/L	0.004	-	0.00047	U	0.00047	U	0.00047	U	0.00047		0.00047	U	-	
	oron	ug/L	700	-	-		-		-		-		-		-	
	admium	ug/L	2	-	0.45	U	0.45	U	0.45	U	0.45		0.45	U	-	
	alcium	mg/L	-	-	31		24		22		15		17		16	
	hromium (III+VI)	ug/L	10	10	0.66	U	0.66	U	0.66	U	2.7	J	0.66	U	0.66	U
	exavalent Chromium (VI)	ug/L	-	-	-		-		-		-		-		-	
	obalt	mg/L	0.001	0.001	0.032		0.028		0.033		0.023		0.029		0.03	
	opper	mg/L	1	-	0.0014	U	0.0014	J	0.0014	U	0.0014		0.0042	U	-	
	ron	ug/L	300	578	22	U	340		190		140		560	J	630	
	ead	µg/L	15	-	2.6	U	2.6	U	2.6	U	2.6		2.6	U	-	
	ithium	µg/L	-	-	9.1	U	-		-		-		-		-	
	agnesium	mg/L	-	-	7		5.9		5.6		3.7		3.8		3.7	B
	Manganese	ug/L	50	70	6,400		5,700		6,000		3,800	B	4,400	B	4,600	
	ercury	ug/L	1	-	0.027	U										
	olybdenum	ug/L	-	-												
	ickel	ug/L	100	-												
	otassium	mg/L	-	-												
	elenium	ug/L	20	-												
	ilver	ug/L	20	-												
	odium	mg/L	-	-												
	trontium	ug/L	2000	-												
	hallium	mg/L	0.002	-												
	anadium	mg/L	0.007	0.007												
	nc	mg/L	1	-												

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Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

Method	Analyte	Unit	2Ls and IMACs	Final Remediation Goals for Groundwater	M2 continued							
					12/17/2018		11/2019		12/2020		12/13/2021	
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	0.00055	U	-		-		-	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00038	U	-		-		-	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00056	U	-		-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00036	U	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00035	U	-		-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00038	U	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00034	U	-		-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00035	U	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00044	U	-		-		-	
	Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	0.00047	U	-		-		-	
	Pentachlorooxanthrene (PeCDD)	ng/L	-	-	0.00033	U	-		-		-	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00033	U	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00037	U	-		-		-	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00031	U	-		-		-	
	Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	0.00039	U	-		-		-	
	Octachlorooxanthrene (OCDD)	ng/L	-	-	0.11	U	-		-		-	
	Octachlorodibenzofuran (OCDF)	ng/L	-	-	0.00037	U	-		-		-	
	alculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	ND		-		-		-	
	alculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	ND		-		-		-	
SVOCs	Methylnaphthalene	µg/L	1	-	R		-		-		-	
	methylnaphthalene	µg/L	30	-	R		-		-		-	
	cenaphthene	µg/L	80	-	R		-		-		-	
	cenaphthylene	µg/L	200	-	R		-		-		-	
	nthracene	mg/L	2	-	R		-		-		-	
	enz(a)anthracene	µg/L	0.05	-	0.11	U	-		-		-	
	enzo(a) pyrene	µg/L	0.005	0.005	0.11	U	-		-		-	
	enzo(b)fluoranthene	µg/L	0.05	-	0.11	U	-		-		-	
	enzo(g,h,i)perylene	µg/L	200	-	0.11	U	-		-		-	
	enzo(k)fluoranthene	µg/L	0.5	-	0.0057	J	-		-		-	
	hrysene	µg/L	5	-	0.11	U	-		-		-	
	ibenz(a,h)anthracene	µg/L	0.005	0.005	R		-		-		-	
	luoranthene	µg/L	300	-	0.11	U	-		-		-	
	luorene	µg/L	300	-	R		-		-		-	
	ndeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	R		-		-		-	
	aphthalene	µg/L	6	-	0.0067	J	-		-		-	
	henanthrene	µg/L	200	-	R		-		-		-	
	yrene	µg/L	200	-	0.11	U	-		-		-	
	AH TEQ	µg/L	0.005	0.005	0.000057		-		-		-	
General Chemistry	romide	mg/L	-	-	0.11	U	0.23	U	0.23	U	0.23	U
	icarbonate as CaCO3	mg/L	-	-	-		-		-		-	
	otal Inorganic Carbon	mg/L	-	-	22		24		22	J	26	
	issolved Organic Carbon	mg/L	-	-	1.7	B	1.4				1.7	
	hloride	mg/L	250	-	11	B	8.4				18	
	luoride	mg/L	2	-	0.47	J	0.48	J	0.58		0.69	
	itrate	mg/L	10	-	0.12	J	0.09	U	0.29	J	0.19	J
	itrite	mg/L	1	-	0.049	U	0.049	U	-		0.049	U
	rthophosphate	mg/L	-	-	0.19	U	0.47	U	-		0.47	U
	ulfate	mg/L	250	250	96	B	51		100		89	
	ulphide	mg/L	-	-	-		-		-		-	
	DS	mg/L	500	500	260		210		270		270	
	SS	mg/L	-	-	-		-		-		-	
Metals	luminium	mg/L	-	-	-		-		-		-	
	ntimony	mg/L	0.001	-	-		-		-		-	
	senic	ug/L	10	-	-		-		4.4	U	4.4	U
	rium	ug/L	700	-	-		-		-		-	
	eryllium	mg/L	0.004	-	-		-		-		-	
	oron	ug/L	700	-	-		-		42	J	50	J
	admium	ug/L	2	-	-		-		-		-	
	alcium	mg/L	-	-	15		14		30		29	
	hromium (III+VI)	ug/L	10	10	0.74	J	10	U	0.66	U	0.66	U
	exavalent Chromium (VI)	ug/L	-	-	-		-		-		-	
	obalt	mg/L	0.001	0.001	0.024		0.026		0.043		0.04	
	opper	mg/L	1	-	-		-		-		-	
	ron	ug/L	300	578	100		400		130		110	
	ead	µg/L	15	-	-		-		-		-	
	ithium	µg/L	-	-	-		-		9.1	U	9.1	U
	agnesium	mg/L	-	-	3.7		3.7				8.9	
	Manganese	ug/L	50	70	3,900	B	3,600		7,100		6,600	
	ercury	ug/L	1	-	-		-		-		-	
	olybdenum	ug/L	-	-	-		-		1	U	2.3	J
	ickel	ug/L	100	-	-		-		-		-	
	otassium	mg/L	-	-	2.6	J	3	U	3.5		3.7	
	elenium	ug/L	20	-	-		-		-		-	
	ilver	ug/L	20	-	-		-		-		-	
	odium	mg/L	-	-	61		44		37		38	
	trontium	ug/L	2000	-	-		-		550		550	^6+
	hallium	mg/L	0.002	-	-		-		0.0049	U	0.0056	J
	anadium	mg/L	0.007	0.007	0.0011	U	0.0011	U	0.0011	U	0.0011	U
	nc	mg/L	1	-	-		-		-		-	

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17. In 2022, the Groundwater Quality Standard for vanadium was set at 0.007 mg/L. This changed the final, unrestricted use
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Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

Method	Analyte	Unit	2Ls and IMACs	Final Remediation Goals for Groundwater											
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	0.00038	U	0.000098	U	0.0022	U	0.00045	U	0.00075	U	0.00024	U
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00037	U	0.00036	U	0.00035	J, U	0.000094	U	0.00017	U	0.0008	U
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00033	U	0.00011	U	0.000071	U	0.000046	U	0.00021	U	0.00094	U
	1,2,3,4,7,8-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.000087	U	0.00011	U	0.00012	U	0.000086	U	0.00011	U	0.00013	U
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00022	U	0.000044	U	0.00035J		0.000086	J, U	0.00006	U	0.000075	U
	1,2,3,6,7,8-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.000095	U	0.00028	U	0.00013	U	0.000087	U	0.00072	J	0.00015	J,U
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00022	U	0.000055	U	0.000081	U	0.000082	U	0.000058	U	0.000039	U
	1,2,3,7,8,9-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00042	U	0.00011	U	0.00012	U	0.00033	U	0.000099	U	0.00013	U
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00019	U	0.00017	U	0.000093	U	0.0001	U	0.000072	U	0.000089	U
	2,3,7,8-Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	0.000055	U	0.000043	U	0.000059	U	0.000027	U	0.000013	U	0.000018	U
	1,2,3,7,8-Pentachlorooxanthrene (PeCDD)	ng/L	-	-	0.000041	U	0.00011	U	0.000062	U	0.00004	U	0.00063	J	0.0004	U
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00058	J	0.000069	U,J	0.000066	J, U	0.00028	J	0.000068	U	0.00012	U
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.000035	U	0.000046	U	0.000084	U	0.000089	U	0.000066	U	0.00048J	J
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00034	U	0.00018	U	0.000059	U	0.000077	U	0.000063	U	0.000061	U
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	0.000038	U	0.000025	U	0.000046	U	0.000062	U	0.000046	U	0.000039	U
	1,2,3,4,6,7,8,9-Octachlorooxanthrene (OCDD)	ng/L	-	-	0.00051	U	0.00052	U	0.013	U	0.0025	U	0.0037	U	0.007	U
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/L	-	-	0.00013	U	0.00032	U	0.0014	U	0.0015	U	0.0081	U	0.0062	U
	Calculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	0.0000174		ND		0.000035		0.0000084		0.000702		0.000048	
	Calculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	ND		ND		ND		ND		0.000072		ND	
SVOCs	1-Methylnaphthalene	µg/L	1	-	0.0055	U	0.0054	U	0.0054	U	0.0054	U	0.0055	U	0.0056	U
	2-methylnaphthalene	µg/L	30	-	0.005	U	0.0049	U	0.0049	U	0.0049	U	0.005	U	0.0051	U
	Acenaphthene	µg/L	80	-	0.011	U	0.01	U	0.01	U	0.01	U	0.01	U	0.011	U
	Acenaphthylene	µg/L	200	-	0.0097	U	0.0095	U	0.0095	U	0.0095	U	0.0096	U	0.0098	U
	Anthracene	mg/L	2	-	0.000014	U	0.000013	U	0.000014	U	0.000014	U	0.000014	U	0.000014	U
	Benz(a)anthracene	µg/L	0.05	-	0.0031	U	0.0031	U	0.0031	U	0.0031	U	0.0031	U	0.0032	U
	Benzo(a) pyrene	µg/L	0.005	0.005	0.005	U	0.0049	U	0.0049	U	0.0049	U	0.005	U	0.0051	U
	Benzo(b)fluoranthene	µg/L	0.05	-	0.0033	U	0.0033	U	0.0033	U	0.0033	U	0.0033	U	0.0034	U
	Benzo(g,h,i)perylene	µg/L	200	-	0.0035	U	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.0035	U
	Benzo(k)fluoranthene	µg/L	0.5	-	0.0049	U	0.0048	U	0.0048	U	0.0048	U	0.0049	U	0.005	U
	Chrysene	µg/L	5	-	0.0031	U	0.003	U	0.003	U	0.003	U	0.0031	U	0.0031	U
	Dibenz(a,h)anthracene	µg/L	0.005	0.005	0.0047	U	0.0046	U	0.0046	U	0.0046	U	0.0047	U	0.0048	U
	Fluoranthene	µg/L	300	-	0.0044	U	0.0043	U	0.0043	U	0.0043	U	0.0044	U	0.0045	U
	Fluorene	µg/L	300	-	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U	0.019	U
	Indeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U	0.014	U
	Naphthalene	µg/L	6	-	0.0052	U	0.0051	U	0.0051	U	0.0051	U	0.0051	U	0.0053	U
	Phenanthrene	µg/L	200	-	0.0095	U	0.0093	U	0.0093	U	0.0093	U	0.0094	U	0.0096	U
	Pyrene	µg/L	200	-	0.0079	U	0.0077	U	0.0077	U	0.0077	U	0.0078	U	0.008	U
	PAH TEQ	µg/L	0.005	0.005	ND		ND		ND		ND		ND		ND	
General Chemistry	Bromide	mg/L	-	-	-		-		-		-		-		-	
	Bicarbonate as CaCO3	mg/L	-	-	55		-		-		-		-		-	
	Total Inorganic Carbon	mg/L	-	-	-		-		-		-		-		-	
	Dissolved Organic Carbon	mg/L	-	-	-		-		-		-		-		-	
	Chloride	mg/L	250	-	45		-		-		-		-		-	
	Fluoride	mg/L	2	-	-		-		-		-		-		-	
	Nitrate	mg/L	10	-	-		-		-		-		-		-	
	Nitrite	mg/L	1	-	-		-		-		-		-		-	
	Orthophosphate	mg/L	-	-	-		-		-		-		-		-	
	Sulfate	mg/L	250	250	330		-		290		280		330		350	
	Sulphide	mg/L	-	-	0.79	U	-		-		-		-		-	
	TDS	mg/L	500	500	600		-		650		640		670		670	
	TSS	mg/L	-	-	1.1	U	-		-		-		-		-	
Metals	Aluminium	mg/L	-	-	0.12		0.018	U,J	0.018	U	0.018	U	0.018	U	0.018	U
	Antimony	mg/L	0.001	-	0.0031	U	0.0031	U	0.0031	U	0.0031	U	0.0031	U	0.0031	U
	Arsenic	ug/L	10	-	4.4	U	4.4	U	4.4	U	4.4	U	4.4	UJ	5.3	J
	Barium	ug/L	700	-	22		21		18		19		19		19	
	Beryllium	mg/L	0.004	-	0.00053	J	0.00055J		0.00051	J	0.00069	J	0.00061	J	0.00055	J
	Boron	ug/L	700	-	-		-		-		-		-		-	
	Cadmium	ug/L	2	-	0.67	J	0.91J		0.45	U	0.45	U	0.5	J	0.58	J
	Calcium	mg/L	-	-	61		-		65		63		78		77	
	Chromium (III+VI)	ug/L	10	10	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U		U
	Hexavalent Chromium (VI)	ug/L	-	-	-		-		-		-		-		-	
	Cobalt	mg/L	0.001	0.001	0.15		0.15		0.13		0.12		0.13		0.12	
	Copper	mg/L	1	-	0.0015	J	0.0014	U,J	0.0028		0.0025	J	0.0014	U		U
	Iron	ug/L	300	578	200		67J		460		450		370		340	
	Lead	µg/L	15	-	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U
	Lithium	µg/L	-	-	-		-		-		-		-		-	
	Magnesium	mg/L	-	-	16		-		19		18		20		20	
	Manganese	ug/L	50	70	8,500		8,500		7,700		7,600		8,500		8,200	
	Mercury	ug/L	1	-	0.027	U	0.027	U	0.027	U	0.027	U	0.027			
	Molybdenum	ug/L	-	-												
	Nickel	ug/L	100	-												
	Potassium	mg/L	-	-												
	Selenium	ug/L	20	-												
	Silver	ug/L	20	-												
	Sodium	mg/L	-	-												
	Strontium	ug/L	2000	-												
	Thallium	mg/L	0.002	-												
	Vanadium	mg/L	0.007	0.007												
	Zinc	mg/L	1	-												

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Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	0.00069	U	0.00029	U	0.00059	U	0.00013	U	0.00082	U	-	
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.000088	J,U	0.00038	J	0.00029	U	0.00041	U	0.0003	U	-	
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00041	U	0.00012	U	0.00029	U	0.00053	U	0.00049	U	-	
	1,2,3,4,7,8-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00024	U	0.00013	U	0.00014	U	0.00041	U	0.00096	U	-	
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.0003	U	0.00018	U	0.00014	U	0.00023	U	0.00038	U	-	
	1,2,3,6,7,8-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00028	U	0.00012	U	0.00014	U	0.00041	U	0.001	U	-	
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00029	U	0.00018	U	0.00013	U	0.00025	U	0.00037	U	-	
	1,2,3,7,8,9-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00024	U	0.00012	U	0.00013	U	0.00038	U	0.00092	U	-	
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00035	U	0.00021	U	0.00018	U	0.0003	U	0.0005	U	-	
	2,3,7,8-Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	0.00011	U	0.000072	U	0.00015	U	0.0038	U	0.00071	U	-	
	1,2,3,7,8-Pentachlorooxanthrene (PeCDD)	ng/L	-	-	0.00013	U	0.00082	U	0.000084	U	0.00056	U	0.00044	U	-	
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00021	U	0.00093	U	0.00013	U	0.00093	U	0.00038	U	-	
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.0003	U	0.0002	U	0.00014	U	0.00025	U	0.00041	U	-	
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00018	U	0.000094	U	0.00013	U	0.00082	U	0.00034	U	-	
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	0.00017	U	0.00006	U	0.00011	U	0.002	U	0.0005	U	-	
	1,2,3,4,6,7,8,9-Octachlorooxanthrene (OCDD)	ng/L	-	-	0.0015	U	0.0031	J	0.0082	J	0.099	U	0.1	U	-	
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/L	-	-	0.00016	U	0.00093	U	0.00091	U	0.0016	U	0.00053	U	-	
	Calculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	ND		0.000005		0.0000025		ND		ND		-	
	Calculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	ND		ND		ND		ND		ND		-	
SVOCs	1-Methylnaphthalene	µg/L	1	-	0.0055	U	0.0054	U	0.0054	U	0.0054	U	0.0062	U	-	
	2-methylnaphthalene	µg/L	30	-	0.005	U	0.0049	U	0.0049	U	0.0049	U	0.0056	U	-	
	Acenaphthene	µg/L	80	-	0.01	U	0.01	U	0.01	U	0.01	U	0.012	U	-	
	Acenaphthylene	µg/L	200	-	0.0096	U	0.0098	U	0.0095	U	0.0095	U	0.011	U	-	
	Anthracene	mg/L	2	-	0.000014	U	0.000014	U	0.000013	U	0.000014	U	0.000016	U	-	
	Benz(a)anthracene	µg/L	0.05	-	0.0031	U	0.0031	U	0.0031	U	0.0083	J	0.11	U	-	
	Benzo(a) pyrene	µg/L	0.005	0.005	0.005	U	0.0049	U	0.0049	U	0.0049	U	0.11	U	-	
	Benzo(b)fluoranthene	µg/L	0.05	-	0.0033	U	0.0033	U	0.0033	U	0.0033	U	0.11	U	-	
	Benzo(g,h,i)perylene	µg/L	200	-	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.014	J	-	
	Benzo(k)fluoranthene	µg/L	0.5	-	0.0049	U	0.0048	U	0.0048	U	0.0048	U	0.0075	J	-	
	Chrysene	µg/L	5	-	0.0031	U	0.0031	U	0.003	U	0.0092	J	0.11	U	-	
	Dibenz(a,h)anthracene	µg/L	0.005	0.005	0.0047	U	0.0046	U	0.0046	U	0.0046	U	0.0053	U	-	
	Fluoranthene	µg/L	300	-	0.0044	U	0.0043	U	0.0043	U	0.095	U	0.11	U	-	
	Fluorene	µg/L	300	-	0.018	U	0.018	U	0.018	U	0.018	U	0.021	U	-	
	Indeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	0.014	U	0.014	U	0.014	U	0.014	U	0.016	U	-	
	Naphthalene	µg/L	6	-	0.0052	U	0.0051	U	0.095	U	0.0051	U	0.0085	J	-	
	Phenanthrene	µg/L	200	-	0.0094	U	0.0094	U	0.0093	U	0.015	J	0.012	J	-	
	Pyrene	µg/L	200	-	0.0078	U	0.0078	U	0.0077	U	0.013	J	0.11	U	-	
	PAH TEQ	µg/L	0.005	0.005	ND		ND		ND		0.000839		0.000075		-	
General Chemistry	Bromide	mg/L	-	-	-		-		-		0.14	J	0.11	U	0.23	U
	Bicarbonate as CaCO3	mg/L	-	-	-		-		-		-		-		-	
	Total Inorganic Carbon	mg/L	-	-	-		-		-		Not Reported		39	J+	39	
	Dissolved Organic Carbon	mg/L	-	-	-		-		-		0.78	J	1.0	B	0.9	J
	Chloride	mg/L	250	-	54	B	53	B	-		13	B	13	B	12	
	Fluoride	mg/L	2	-	-		-		-		0.16	J	0.14	J	0.17	U
	Nitrate	mg/L	10	-	-		-		-		0.042	U	0.042	U	0.09	R
	Nitrite	mg/L	1	-	-		-		-		0.049	U	0.049	U	0.049	R
	Orthophosphate	mg/L	-	-	-		-		-		0.19	U	0.19	U	0.47	R
	Sulfate	mg/L	250	250	340	B	340	B	330	B	250	B	300		210	
	Sulphide	mg/L	-	-	-		-		-		-		-		-	
	TDS	mg/L	500	500	680		680		630		540		560		480	
	TSS	mg/L	-	-	-		-		-		-		-		-	
Metals	Aluminium	mg/L	-	-	0.018	U	0.018	U	0.31		-		-		-	
	Antimony	mg/L	0.001	-	0.0031	U	0.0031	U	0.0031	U	-		-		-	
	Arsenic	ug/L	10	-	12	J	12	J	4.4	U	-		-		-	
	Barium	ug/L	700	-	19		19		20		-		-		-	
	Beryllium	mg/L	0.004	-	0.00052	J	0.00048	J	0.00048	J	-		-		-	
	Boron	ug/L	700	-	-		-		-		-		-		-	
	Cadmium	ug/L	2	-	0.45	U	0.45	U	0.88	J	-		-		-	
	Calcium	mg/L	-	-	73		74		71		73		77		65	
	Chromium (III+VI)	ug/L	10	10	2	J	1.8	J	0.99	J	0.66	U	0.66	U	10	U
	Hexavalent Chromium (VI)	ug/L	-	-	-		-		-		-		-		-	
	Cobalt	mg/L	0.001	0.001	0.12		0.12		0.11		0.06		0.073		0.055	
	Copper	mg/L	1	-	0.0014	U	0.0014	U	0.0042	U	-		-		-	
	Iron	ug/L	300	578	360		330		940	J	110		170		480	
	Lead	µg/L	15	-	2.6	U	2.6	U	2.6	U	-		-		-	
	Lithium	µg/L	-	-	-		-		-		-		-		-	
	Magnesium	mg/L	-	-	20		20		18		18		20		18	
	Manganese	ug/L	50	70	7,800	B	7,900	B	7,200		5,400		6,300	B	4,800	
	Mercury	ug/L	1	-	0.027	U	0.027	U	0.027	U	-		-		-	
	Molybdenum	ug/L	-	-	-		-		-		-		-		-	
	Nickel	ug/L	100	-	25	J	25	J	22	J	-		-		-	
	Potassium	mg/L	-	-	9.5		10		8.8	B	6.5		7.5			
	Selenium	ug/L	20	-												
	Silver	ug/L	20	-												
	Sodium	mg/L	-	-												
	Strontium	ug/L	2000	-												
	Thallium	mg/L	0.002	-												
	Vanadium	mg/L	0.007	0.007												
	Zinc	mg/L	1	-												

Notes:

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2. mg/L indicates milligram per liter.
3. µg/L indicates microgram per liter.
4. TEQ indicates total equivalents.
5. U indicates result was below the method detection limit.
6. J indicates results is an estimate.
7. UJ indicates the analyte was not detected above the method detection limit.
   However, the method detection limit is an approximation.
8. B is a laboratory flag indicating compound was detected in both the method blank and sample
9. R indicates the results are rejected due to deficiencies in the ability to analyze the
   sample and meet quality control criteria. The presence of the analyte cannot be verified.
10. F1 & F2 are data qualifiers used by the laboratory.
11. TDS indicates total dissolved solids.
12. TSS indicates total suspended solids.
13. PAH indicates polyaromatic hydrocarbon.
14. ND indicates all of the input parameters in the calculated parameter equation were non-detect.
15. Groundwater Final Remediation Goals reference Geosyntec's 2016 Remedial Investigation Report.
16. North Carolina Groundwater Quality Standards (2L's and IMACs) from April 1, 2022.
17. In 2022, the Groundwater Quality Standard for vanadium was set at 0.007 mg/L. This changed the final, unrestricted use
    This is a change from the 2018 Remedial Action Plan for groundwater only.

Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

Method	Analyte	Unit	2Ls and IMACs	Final Remediation Goals for Groundwater	M3 continued			
					12/17/2020		13/2021	
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	-		-	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	-		-	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	-		-	
	Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	-		-	
	Pentachlorooxanthrene (PeCDD)	ng/L	-	-	-		-	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	-		-	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	-		-	
	Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	-		-	
	Octachlorooxanthrene (OCDD)	ng/L	-	-	-		-	
	Octachlorodibenzofuran (OCDF)	ng/L	-	-	-		-	
	alculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	-		-	
	alculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	-		-	
SVOCs	Methylnaphthalene	µg/L	1	-	-		-	
	methylnaphthalene	µg/L	30	-	-		-	
	cenaphthene	µg/L	80	-	-		-	
	cenaphthylene	µg/L	200	-	-		-	
	nthracene	mg/L	2	-	-		-	
	enz(a)anthracene	µg/L	0.05	-	-		-	
	enzo(a) pyrene	µg/L	0.005	0.005	-		-	
	enzo(b)fluoranthene	µg/L	0.05	-	-		-	
	enzo(g,h,i)perylene	µg/L	200	-	-		-	
	enzo(k)fluoranthene	µg/L	0.5	-	-		-	
	hrysene	µg/L	5	-	-		-	
	ibenz(a,h)anthracene	µg/L	0.005	0.005	-		-	
	luoranthene	µg/L	300	-	-		-	
	luorene	µg/L	300	-	-		-	
	ndeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	-		-	
	aphthalene	µg/L	6	-	-		-	
	henanthrene	µg/L	200	-	-		-	
	yrene	µg/L	200	-	-		-	
	AH TEQ	µg/L	0.005	0.005	-		-	
General Chemistry	romide	mg/L	-	-	0.23	U	0.23	U
	icarbonate as CaCO3	mg/L	-	-	-		-	
	otal Inorganic Carbon	mg/L	-	-	45	J	47	
	issolved Organic Carbon	mg/L	-	-	0.78	J	1.3	
	hloride	mg/L	250	-	19		19	
	luoride	mg/L	2	-	0.17	J	0.17	J^1-
	itrate	mg/L	10	-	0.09	U	0.09	U
	itrite	mg/L	1	-	-		0.049	U
	rthophosphate	mg/L	-	-	-		0.47	U
	ulfate	mg/L	250	250	280		270	
	ulphide	mg/L	-	-	-		-	
	DS	mg/L	500	500	560		580	
	SS	mg/L	-	-	-		-	
Metals	luminium	mg/L	-	-	-		-	
	ntimony	mg/L	0.001	-	-		-	
	senic	ug/L	10	-	4.4	U	4.4	U
	rium	ug/L	700	-	-		-	
	eryllium	mg/L	0.004	-	-		-	
	oron	ug/L	700	-	78	J	77	J
	admium	ug/L	2	-	-		-	
	alcium	mg/L	-	-	83		91	
	hromium (III+VI)	ug/L	10	10	0.66	U	0.66	U
	exavalent Chromium (VI)	ug/L	-	-	-		-	
	obalt	mg/L	0.001	0.001	0.061		0.051	
	opper	mg/L	1	-	-		-	
	ron	ug/L	300	578	120		270	
	ead	µg/L	15	-	-		-	
	ithium	µg/L	-	-	9.1	U	9.1	U
	agnesium	mg/L	-	-	21		22	
	Manganese	ug/L	50	70	5,800		5,400	
	ercury	ug/L	1	-	-		-	
	olybdenum	ug/L	-	-	1	U	1	U
	ickel	ug/L	100	-	-		-	
	otassium	mg/L	-	-	6.7		6.1	
	elenium	ug/L	20	-	-		-	
	ilver	ug/L	20	-	-		-	
	odium	mg/L	-	-	53		44	
	trontium	ug/L	2000	-	1,100		1,300	^6+
	hallium	mg/L	0.002	-	0.0049	U	0.0052	J
	anadium	mg/L	0.007	0.007	0.0011	U	0.0013	J
	nc	mg/L	1	-	-		-	

Notes:

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   sample and meet quality control criteria. The presence of the analyte cannot be verified.
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16. North Carolina Groundwater Quality Standards (2L's and IMACs) from April 1, 2022.
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    This is a change from the 2018 Remedial Action Plan for groundwater only.

Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

Method	Analyte	Unit	2Ls and IMACs	Final Remediation Goals for Groundwater											
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	0.00013	U	0.00056		0.00017	0.00025		0.00012	U	0.00021	U
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.000053	U	0.001	U	0.00005	0.000075	U	0.051	U	0.000044	U
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00019	U	0.00016		0.00069	0.00005		0.00027	U	0.00006	U
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00011	U	0.00013		0.00011	0.00015		0.0014	U	0.00011	U
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00011	U	0.00007		0.00011	0.00018		0.00062	U	0.00022	U
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00011	U	0.00033		0.00011	0.00015		0.0017	U	0.00011	U
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.0001	U	0.000071	U	0.0001	0.00016		0.00061	U	0.00021	U
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.0001	U	0.00012		0.00041	0.00014		0.0014	U	0.0001	U
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00038	U	0.000088	U	0.00013	0.00024		0.00081	U	0.00028	U
	Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	0.000095	U	0.000035	U	0.00012	0.00017		0.0045	U	0.0015	U
	Pentachlorooxanthrene (PeCDD)	ng/L	-	-	0.000026	U	0.00028		0.0001	0.00011		0.00072	U	0.00039	U
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.000087	U	0.000047	U	0.000086	0.00015		0.00071	U	0.0003	U
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00026	U	0.00034		0.00011	0.00018		0.00069	U	0.00021	U
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00008	U	0.00005		0.00008	0.00014		0.00065	U	0.00029	U
	Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	0.000041	U	0.000028	U	0.000095	0.00013		0.0022	U	0.00063	U
	Octachlorooxanthrene (OCDD)	ng/L	-	-	0.0054	U	0.0036	U	0.0021	0.005	j	0.00076	U	0.11	U
	Octachlorodibenzofuran (OCDF)	ng/L	-	-	0.002	U	0.0072	U	0.00036	0.00092	U	0.0015	U	0.00055	U
	alculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	ND		0.000033		ND	0.0000015				ND	
	alculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	ND		0.00033		ND			ND		ND	
SVOCs	Methylnaphthalene	µg/L	1	-	0.0054	U	0.0056	U	0.0054	0.0054	U	0.0059	U	0.0065	U
	methylnaphthalene	µg/L	30	-	0.0049	U	0.0051	U	0.0049	0.0049	U	0.0053	U	0.0059	U
	cenaphthene	µg/L	80	-	0.01	U	0.011		0.01	0.01		0.011	U	0.012	U
	cenaphthylene	µg/L	200	-	0.0095	U	0.0098	U	0.0096	0.0095	U	0.01	U	0.011	U
	nthracene	mg/L	2	-	0.000014	U	0.000014	U	0.000014	0.000014	U	0.000015	U	0.000016	U
	enz(a)anthracene	µg/L	0.05	-	0.0031	U	0.0032	U	0.0031	0.0031	U	0.0033	U	0.12	U
	enzo(a) pyrene	µg/L	0.005	0.005	0.0049	U	0.0051	U	0.0049	0.0049	U	0.0053	U	0.12	U
	enzo(b)fluoranthene	µg/L	0.05	-	0.0033	U	0.0034	U	0.0033	0.0033	U	0.0036	U	0.12	U
	enzo(g,h,i)perylene	µg/L	200	-	0.0034	U	0.0035	U	0.0034	0.0034	U	0.0037	U	0.019	J
	enzo(k)fluoranthene	µg/L	0.5	-	0.0048	U	0.005	U	0.0048	0.0048	U	0.0052	U	0.015	J
	hrysene	µg/L	5	-	0.0031	U	0.0031	U	0.0031	0.003	U	0.0033	U	0.12	U
	ibenz(a,h)anthracene	µg/L	0.005	0.005	0.0046	U	0.0048	U	0.0046	0.0046	U	0.005	U	0.017	J
	luoranthene	µg/L	300	-	0.0043	U	0.0045	U	0.0043	0.0043	U	0.0047	U	0.12	U
	luorene	µg/L	300	-	0.018	U	0.019		0.018	0.018	U	0.019	U	0.022	U
	ndeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	0.014	U	0.014		0.014	0.014	U	0.015	U	0.025	J
	aphthalene	µg/L	6	-	0.0051	U	0.0053	U	0.0051	0.095	U	0.007	J	0.0061	U
	henanthrene	µg/L	200	-	0.0093	U	0.0096	U	0.0094	0.0093	U	0.01	U	0.011	U
	yrene	µg/L	200	-	0.0077	U	0.008	U	0.0078	0.0077	U	0.0084	U	0.0093	U
	AH TEQ	µg/L	0.005	0.005	ND		ND		ND			ND		0.02145	
General Chemistry	romide	mg/L	-	-	-		-		-			0.11	U	0.11	U
	icarbonate as CaCO3	mg/L	-	-	-		-		-			-		-	
	otal Inorganic Carbon	mg/L	-	-	-		-		-			6.7		13	J+
	issolved Organic Carbon	mg/L	-	-	-		-		-			0.28	J	1	U
	hloride	mg/L	250	-	-		-		-			3	U	3	U
	luoride	mg/L	2	-	-		-		-			0.06	U	0.06	U
	itrate	mg/L	10	-	-		-		-			1.3		1.1	
	itrite	mg/L	1	-	-		-		-			0.049		0.049	U
	rthophosphate	mg/L	-	-	-		-		-			0.19	F1, U	0.81	J+
	ulfate	mg/L	250	250	53		62B		73	21		16	B	9.7	B
	ulphide	mg/L	-	-	-		-		-			-		-	
	DS	mg/L	500	500	140		140		170			62		70	
	SS	mg/L	-	-	-		-		-			-		-	
Metals	luminium	mg/L	-	-	0.022	J	0.046	J	0.046	0.88				-	
	ntimony	mg/L	0.001	-	0.0031	U	0.0031	U	0.0031	0.0031	U	-		-	
	senic	ug/L	10	-	4.4	U	4.4	U	7.1	4.4	U	-		-	
	rium	ug/L	700	-	34		32	B	41			-		-	
	eryllium	mg/L	0.004	-	0.00047	U	0.00047		0.00047	0.00047	U	-		-	
	oron	ug/L	700	-	-		-		-			-		-	
	admium	ug/L	2	-	0.45	U	0.45		0.45	0.45	U	-		-	
	alcium	mg/L	-	-	14		15		20	7				5.8	
	hromium (III+VI)	ug/L	10	10	19		26		29			8.7	J	8.3	J
	exavalent Chromium (VI)	ug/L	-	-	-		-		-			8.8	J	7.6	B
	obalt	mg/L	0.001	0.001	0.0012	U	0.0012	U	0.0012	0.0012	U	0.0012	U	0.0012	U
	opper	mg/L	1	-	0.0017	J	0.0014	U	0.0014	0.0042	U				
	ron	ug/L	300	578											
	ead	µg/L	15	-											
	ithium	µg/L	-	-											
	agnesium	mg/L	-	-											
	Manganese	ug/L	50	70											
	ercury	ug/L	1	-											
	olybdenum	ug/L	-	-											
	ickel	ug/L	100	-											
	otassium	mg/L	-	-											
	elenium	ug/L	20	-											
	ilver	ug/L	20	-											
	odium	mg/L	-	-											
	trontium	ug/L	2000	-											
	hallium	mg/L	0.002	-											
	anadium	mg/L	0.007	0.007											
	nc	mg/L	1	-											

Notes:

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14. ND indicates all of the input parameters in the calculated parameter equation were non-detect.
15. Groundwater Final Remediation Goals reference Geosyntec's 2016 Remedial Investigation Report.
16. North Carolina Groundwater Quality Standards (2L's and IMACs) from April 1, 2022.
17. In 2022, the Groundwater Quality Standard for vanadium was set at 0.007 mg/L. This changed the final, unrestricted use
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Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

Method	Analyte	Unit	2Ls and IMACs	Final Remediation Goals for Groundwater	PZ/M4 continued					
					11/14/2019		12/17/2020		12/13/2021	
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	-		-		-	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	-		-		-	
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	-		-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	-		-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	-		-		-	
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	-		-		-	
	Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	-		-		-	
	Pentachlorooxanthrene (PeCDD)	ng/L	-	-	-		-		-	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	-		-		-	
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	-		-		-	
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	-		-		-	
	Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	-		-		-	
	Octachlorooxanthrene (OCDD)	ng/L	-	-	-		-		-	
	Octachlorodibenzofuran (OCDF)	ng/L	-	-	-		-		-	
	alculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	-		-		-	
	alculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	-		-		-	
SVOCs	Methylnaphthalene	µg/L	1	-	-		-		-	
	methylnaphthalene	µg/L	30	-	-		-		-	
	cenaphthene	µg/L	80	-	-		-		-	
	cenaphthylene	µg/L	200	-	-		-		-	
	nthracene	mg/L	2	-	-		-		-	
	enz(a)anthracene	µg/L	0.05	-	-		-		-	
	enzo(a) pyrene	µg/L	0.005	0.005	-		-		-	
	enzo(b)fluoranthene	µg/L	0.05	-	-		-		-	
	enzo(g,h,i)perylene	µg/L	200	-	-		-		-	
	enzo(k)fluoranthene	µg/L	0.5	-	-		-		-	
	hrysene	µg/L	5	-	-		-		-	
	ibenz(a,h)anthracene	µg/L	0.005	0.005	-		-		-	
	luoranthene	µg/L	300	-	-		-		-	
	luorene	µg/L	300	-	-		-		-	
	ndeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	-		-		-	
	aphthalene	µg/L	6	-	-		-		-	
	henanthrene	µg/L	200	-	-		-		-	
	yrene	µg/L	200	-	-		-		-	
	AH TEQ	µg/L	0.005	0.005	-		-		-	
General Chemistry	romide	mg/L	-	-	0.23	U	1.2	U	0.23	U
	icarbonate as CaCO3	mg/L	-	-	-		-		-	
	otal Inorganic Carbon	mg/L	-	-	6.7		7.7	J	5.3	
	issolved Organic Carbon	mg/L	-	-	0.35	U	0.35	U	0.69	J
	hloride	mg/L	250	-	1.9 J	J	9.9	J	2.4	J
	luoride	mg/L	2	-	0.17	U	0.83	U	0.17	UJ
	itrate	mg/L	10	-	0.88		0.74	J	0.85	
	itrite	mg/L	1	-	0.049	U	-		0.049	U
	rthophosphate	mg/L	-	-	0.47	U	-		0.47	U
	ulfate	mg/L	250	250	8.9		73		10	
	ulphide	mg/L	-	-	-		-		-	
	DS	mg/L	500	500	59		64		62	
	SS	mg/L	-	-	-		-		-	
Metals	luminium	mg/L	-	-	-		-		-	
	ntimony	mg/L	0.001	-	-		-		-	
	senic	ug/L	10	-	-		4.4	U	4.4	U
	rium	ug/L	700	-	-		-		-	
	eryllium	mg/L	0.004	-	-		-		-	
	oron	ug/L	700	-	-		11	J	13	J
	admium	ug/L	2	-	-		-		-	
	alcium	mg/L	-	-	4.9		5.3		5	
	hromium (III+VI)	ug/L	10	10	10	U	3.1	J	3.5	J
	exavalent Chromium (VI)	ug/L	-	-	4.7		3.2	J	2.6	
	obalt	mg/L	0.001	0.001	0.0012	U	0.0012	U	0.0012	U
	opper	mg/L	1	-	-		-		-	
	ron	ug/L	300	578	350		22	U	520	
	ead	µg/L	15	-	-		-		-	
	ithium	µg/L	-	-	-		9.1	U	9.1	U
	agnesium	mg/L	-	-	1.5		1.4		1.4	
	Manganese	ug/L	50	70	14		1.9	U	16	
	ercury	ug/L	1	-	-		-		-	
	olybdenum	ug/L	-	-	-		1	U	1	U
	ickel	ug/L	100	-	-		-		-	
	otassium	mg/L	-	-	3	B	2.6	J	2.7	J
	elenium	ug/L	20	-	-		-		-	
	ilver	ug/L	20	-	-		-		-	
	odium	mg/L	-	-	5.1		4.9		5.1	
	trontium	ug/L	2000	-	-		79		80	[6+]
	hallium	mg/L	0.002	-	-		0.0049	U	0.0049	U
	anadium	mg/L	0.007	0.007	0.0011	U	0.0011	U	0.0012	J
	nc	mg/L	1	-	-		-		-	

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Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

Method	Analyte	Unit	2Ls and IMACs	Final Remediation Goals for Groundwater											
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	0.00026	U	0.00065	U	0.00013	U	0.00026	U	0.00033	U	0.00071	U
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00022	U	0.00016	U	0.00022	U	0.00019	U	0.000064	U	0.00012	U
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.00029	U	0.00021	U	0.000066	U	0.00024	U	0.000099	U	0.00013	U
	1,2,3,4,7,8-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.000055	U	0.00013	U	0.00012	U	0.00015	U	0.00017	U	0.00059	U
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00005	U	0.0003	J	0.000081	U	0.00015	U	0.0002	U	0.00052	U
	1,2,3,6,7,8-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.000057	U	0.00014	U	0.00013	U	0.00015	U	0.00015	U	0.00063	U
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.000048	U	0.000063	U	0.000078	U	0.00014	U	0.0002	U	0.0005	U
	1,2,3,7,8,9-Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00022	U	0.00013	U	0.00012	U	0.00014	U	0.00015	U	0.00057	U
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.000059	U	0.00016	U	0.0001	U	0.0002	U	0.00029	U	0.00062	U
	2,3,7,8-Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	0.000026	U	0.00001	U	0.00014	U	0.00016	U	0.00017	U	0.0036	U
	1,2,3,7,8-Pentachlorooxanthrene (PeCDD)	ng/L	-	-	0.000022	U	0.00024	U	0.000084	U	0.000081	U	0.0001	U	0.00089	U
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.00006	U	0.000062	U	0.000093	U	0.00013	U	0.00015	U	0.000072	U
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00005	U	0.00041	U	0.000082	U	0.00016	U	0.00021	U	0.00055	U
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.000052	U	0.00006	U	0.000089	U	0.00012	U	0.00014	U	0.000069	U
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	0.000028	U	0.00003	U	0.00011	U	0.00015	U	0.00022	U	0.0018	U
	1,2,3,4,6,7,8,9-Octachlorooxanthrene (OCDD)	ng/L	-	-	0.0026	U	0.0058	U	0.002	U	0.0015	U	0.00093	U	0.00017	U
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ng/L	-	-	0.0011	U	0.007	U	0.00085	U	0.00076	U	0.0011	U	0.0012	U
	Calculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	0.00002278		0.00003		ND		ND		ND		ND	
	Calculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	0.000022		ND		ND		ND		ND		ND	
SVOCs	1-Methylnaphthalene	µg/L	1	-	0.0054	U	0.006	U	0.0054	U	0.0055	U	0.0055	U	0.0056	U
	2-methylnaphthalene	µg/L	30	-	0.0049	U	0.0055	U	0.0049	U	0.005	U	0.005	U	0.0051	U
	Acenaphthene	µg/L	80	-	0.01	U	0.011	U	0.01	U	0.01	U	0.01	U	0.011	U
	Acenaphthylene	µg/L	200	-	0.0095	U	0.011	U	0.0096	U	0.0097	U	0.0096	U	0.0099	U
	Anthracene	mg/L	2	-	0.000013	U	0.000015	U	0.000014	U	0.000014	U	0.000014	U	0.000014	U
	Benz(a)anthracene	µg/L	0.05	-	0.003	U	0.0034	U	0.043	J	0.0031	U	0.0031	U	0.0032	J,U
	Benzo(a) pyrene	µg/L	0.005	0.005	0.0049	U	0.0055	U	0.036	J	0.005	U	0.005	U	0.0051	U
	Benzo(b)fluoranthene	µg/L	0.05	-	0.0033	U	0.0037	U	0.049	J	0.0033	U	0.0033	U	0.0034	U
	Benzo(g,h,i)perylene	µg/L	200	-	0.0034	U	0.0038	U	0.067	J	0.0034	U	0.0034	U	0.0035	U
	Benzo(k)fluoranthene	µg/L	0.5	-	0.0048	U	0.0054	U	0.049	J	0.0049	U	0.0049	U	0.005	U
	Chrysene	µg/L	5	-	0.003	U	0.0034	U	0.048	J	0.0031	U	0.0031	U	0.0032	U
	Dibenz(a,h)anthracene	µg/L	0.005	0.005	0.0046	U	0.0051	U	0.07	J	0.0047	U	0.0047	U	0.0048	U
	Fluoranthene	µg/L	300	-	0.0043	U	0.0048	U	0.0043	U	0.0044	U	0.0044	U	0.1	U
	Fluorene	µg/L	300	-	0.018	U	0.02	U	0.018	U	0.018	U	0.018	U	0.019	U
	Indeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	0.014	U	0.016	U	0.061	J	0.014	U	0.014	U	0.015	U
	Naphthalene	µg/L	6	-	0.0051	U	0.0057	U	0.0051	U	0.0052	U	0.0052	U	0.0056	J
	Phenanthrene	µg/L	200	-	0.0093	U	0.01	U	0.0094	U	0.0095	U	0.0094	U	0.0097	U
	Pyrene	µg/L	200	-	0.0077	U	0.0086	U	0.027	J	0.0078	U	0.0078	U	0.008	U
	PAH TEQ	µg/L	0.005	0.005	ND		ND		0.122		ND		ND		ND	
General Chemistry	Bromide	mg/L	-	-	-		-		-		-		-		0.14	J
	Bicarbonate as CaCO3	mg/L	-	-	-		-		-		-		-		-	
	Total Inorganic Carbon	mg/L	-	-	-		-		-		-		-		0.71	J
	Dissolved Organic Carbon	mg/L	-	-	-		-		-		-		-		0.77	J
	Chloride	mg/L	250	-	-		-		-		-		-		20	
	Fluoride	mg/L	2	-	-		-		-		-		-		0.08	J
	Nitrate	mg/L	10	-	-		-		-		-		-		1.1	
	Nitrite	mg/L	1	-	-		-		-		-		-		0.049	U
	Orthophosphate	mg/L	-	-	-		-		-		-		-		0.26	J
	Sulfate	mg/L	250	250	170		200		200	J	210	B	210	B	210	
	Sulphide	mg/L	-	-	-		-		-		-		-		-	
	TDS	mg/L	500	500	420		390		410		420		400		440	
	TSS	mg/L	-	-	-		-		-		-		-		-	
Metals	Aluminium	mg/L	-	-	0.018	U	0.054	J	0.12		0.018	U	0.018	U	-	
	Antimony	mg/L	0.001	-	0.0031	U	0.0031	U	0.0031	U	0.0031	U	0.0031	U	-	
	Arsenic	ug/L	10	-	4.4	U	4.4	U	5.1	J	5.2J	J	4.4	J,U	-	
	Barium	ug/L	700	-	18		23	B	21		21		21		-	
	Beryllium	mg/L	0.004	-	0.00047	U	0.00047	U	0.00047	U	0.00047	U	0.00047	U	-	
	Boron	ug/L	700	-	-		-		-		-		-		-	
	Cadmium	ug/L	2	-	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U	-	
	Calcium	mg/L	-	-	42		37		40		42		44		43	
	Chromium (III+VI)	ug/L	10	10	0.66	U	0.69	J	4.4	J	0.68J	J	0.73	J	0.66	U
	Hexavalent Chromium (VI)	ug/L	-	-	-		-		-		-		-		-	
	Cobalt	mg/L	0.001	0.001	0.0018	J	0.0021	J	0.0015	J	0.0019J	J	0.0016		0.0016	J
	Copper	mg/L	1	-	0.0018	J	0.0014	U	0.0014	U	0.0042	U	0.0042	U	-	
	Iron	ug/L	300	578	22	U	36	J	67	J	22	U	100	U	110	
	Lead	µg/L	15	-	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	-	
	Lithium	µg/L	-	-	-		-		-		-		-		-	
	Magnesium	mg/L	-	-	14		13		13		13					
	Manganese	ug/L	50	70												
	Mercury	ug/L	1	-												
	Molybdenum	ug/L	-	-												
	Nickel	ug/L	100	-												
	Potassium	mg/L	-	-												
	Selenium	ug/L	20	-												
	Silver	ug/L	20	-												
	Sodium	mg/L	-	-												
	Strontium	ug/L	2000	-												
	Thallium	mg/L	0.002	-												
	Vanadium	mg/L	0.007	0.007												
	Zinc	mg/L	1	-												

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15. Groundwater Final Remediation Goals reference Geosyntec's 2016 Remedial Investigation Report.
16. North Carolina Groundwater Quality Standards (2L's and IMACs) from April 1, 2022.
17. In 2022, the Groundwater Quality Standard for vanadium was set at 0.007 mg/L. This changed the final, unrestricted use
    This is a change from the 2018 Remedial Action Plan for groundwater only.

Table 1
Groundwater Analytical Results
UNC-CH Cogeneration Facility - Chapel Hill, North Carolina

Method	Analyte	Unit	2Ls and IMACs	Final Remediation Goals for Groundwater	M5 continued													
					6/14/(Dup)		12/13/2018		12/2018 (D		11/2019		12/17/2020		12/13/2021			
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorooxanthrene (HpCDD)	ng/L	-	-	0.00031	U	0.00044	U	0.00046	U	-		-		-			
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.000036	U	0.00015	U	0.00033	U	-		-		-			
	Heptachlorodibenzofuran (HpCDF)	ng/L	-	-	0.000039	U	0.00021	U	0.00045	U	-		-		-			
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00062	U	0.00018	U	0.00041	U	-		-		-			
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.0004	U	0.00031	J,U	0.00074	J	-		-		-			
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00064	U	0.00019	U	0.00044	U	-		-		-			
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00041	U	0.00034	U	0.00021	U	-		-		-			
	Hexachlorooxanthrene (HxCDD)	ng/L	-	-	0.00059	U	0.00017	U	0.00039	U	-		-		-			
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00051	U	0.00045	U	0.00028	U	-		-		-			
	Tetrachlorooxanthrene (TCDD)	ng/L	0.0002	-	0.006	U	0.0016	U	0.0019	U	-		-		-			
	Pentachlorooxanthrene (PeCDD)	ng/L	-	-	0.00085	U	0.00039	U	0.00098	U	-		-		-			
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.000078	U	0.0004	U	0.00039	U	-		-		-			
	Hexachlorodibenzofuran (HxCDF)	ng/L	-	-	0.00042	U	0.00034	U	0.00023	U	-		-		-			
	Pentachlorodibenzofuran (PeCDF)	ng/L	-	-	0.000076	U	0.00037	U	0.00037	U	-		-		-			
	Tetrachlorodibenzofuran (TCDF)	ng/L	-	-	0.002	U	0.00063	U	0.0013	U	-		-		-			
	Octachlorooxanthrene (OCDD)	ng/L	-	-	0.0002	U	0.11	U	0.00036	U	-		-		-			
	Octachlorodibenzofuran (OCDF)	ng/L	-	-	0.0023	U	0.00053	U	0.00058	U	-		-		-			
	alculated Dioxin/Furan TEQ	ng/L	0.0002	0.0002	ND		ND		0.000074		-		-		-			
	alculated Hexachlorodibenzo-p-dioxin, Mixture	ng/L	-	-	ND		ND		ND		-		-		-			
SVOCs	Methylnaphthalene	µg/L	1	-	0.0058	U	0.0061	U	0.0062	U	-		-		-			
	methylnaphthalene	µg/L	30	-	0.0053	U	0.0063	J	0.0056	J,U	-		-		-			
	cenaphthene	µg/L	80	-	0.011	U	0.012	U	0.012	U	-		-		-			
	cenaphthylene	µg/L	200	-	0.01	U	0.011	U	0.011	U	-		-		-			
	nthracene	mg/L	2	-	0.000015	U	0.000015	U	0.000015	U	-		-		-			
	enz(a)anthracene	µg/L	0.05	-	0.0043	J	0.11	U	0.0035	U	-		-		-			
	enzo(a) pyrene	µg/L	0.005	0.005	0.0053	U	0.0055	U	0.0056	U	-		-		-			
	enzo(b)fluoranthene	µg/L	0.05	-	0.0035	U	0.11	U	0.0037	U	-		-		-			
	enzo(g,h,i)perylene	µg/L	200	-	0.0036	U	0.0038	U	0.0039	U	-		-		-			
	enzo(k)fluoranthene	µg/L	0.5	-	0.0052	U	0.0054	U	0.0055	U	-		-		-			
	hrysene	µg/L	5	-	0.0033	U	0.11	U	0.0035	J	-		-		-			
	ibenz(a,h)anthracene	µg/L	0.005	0.005	0.0049	U	0.0052	U	0.0053	U	-		-		-			
	luoranthene	µg/L	300	-	0.1	U	0.11	U	0.0049	U	-		-		-			
	luorene	µg/L	300	-	0.019	U	0.02	U	0.02	U	-		-		-			
	ndeno(1,2,3-c,d)pyrene	µg/L	0.05	0.05	0.015	U	0.016	U	0.016	U	-		-		-			
	aphthalene	µg/L	6	-	0.0056	J	0.0061	J	0.0058	J,U	-		-		-			
	henanthrene	µg/L	200	-	0.01	U	0.01	U	0.011	U	-		-		-			
	yrene	µg/L	200	-	0.0083	U	0.0087	U	0.0088	U	-		-		-			
	AH TEQ	µg/L	0.005	0.005	0.43		ND		0.0000035		-		-		-			
General Chemistry	romide	mg/L	-	-	0.17	J	0.13	J	0.12	J	0.23		0.23	U	0.23	U		
	icarbonate as CaCO3	mg/L	-	-	-		-		-		-		-		-			
	otal Inorganic Carbon	mg/L	-	-	0.71	J	31		29		8.3		19	J	18			
	issolved Organic Carbon	mg/L	-	-	0.75	J	1		1	U	1.2		0.91	J	1.1			
	hloride	mg/L	250	-	20		19	B	19	J	20		25		30			
	luoride	mg/L	2	-	0.071	J	0.12		0.06	U	0.57		0.17	U	0.17	U^1+		
	itrate	mg/L	10	-	1.2		2.5	J	1.1	J	1.3J	J	0.92	J	1.1			
	itrite	mg/L	1	-	0.049		0.049		0.049	1F2,	0.049	R	-		0.049	U		
	rthophosphate	mg/L	-	-	0.19	J	0.98	J	0.19	J,U	0.47	R	-		0.47	U		
	ulfate	mg/L	250	250	210		220		210		230		210	J	250			
	ulphide	mg/L	-	-	-		-		-		-		-		-			
	DS	mg/L	500	500	440		420		430		500		400		460			
	SS	mg/L	-	-	-		-		-		-		-		-			
Metals	luminium	mg/L	-	-	-		-		-		-		-		-			
	ntimony	mg/L	0.001	-	-		-		-		-		-		-			
	senic	ug/L	10	-	-		-		-		-		4.4	U	4.4	U		
	rium	ug/L	700	-	-		-		-		-		-		-			
	eryllium	mg/L	0.004	-	-		-		-		-		-		-			
	oron	ug/L	700	-	-		-		-		-		32	J	35	J		
	admium	ug/L	2	-	-		-		-		-		-		-			
	alcium	mg/L	-	-	42		41		43		41		38		46			
	hromium (III+VI)	ug/L	10	10	0.66	U	0.77	J	0.83	J	10	U	0.68	J	0.66	U		
	exavalent Chromium (VI)	ug/L	-	-	-		-		-		-		-		-			
	obalt	mg/L	0.001	0.001	0.0022	J	0.0015	J	0.0017	J	0.0042	J	0.002	J	0.0024	J		
	opper	mg/L	1	-	-		-		-		-		-		-			
	ron	ug/L	300	578	110		240	J	350	J	840		550		1,200			
	ead	µg/L	15	-	-		-		-		-		-		-			
	ithium	µg/L	-	-	-		-		-		-		9.1	U	0.0091	U		
	agnesium	mg/L	-	-	14	B	13		13		14		12		14			
	Manganese	ug/L	50	70	79		73		90		480		78		76			
	ercury	ug/L	1	-	-		-		-		-		-		-			
	olybdenum	ug/L	-	-	-		-		-		-		1	U	1.0	U		
	ickel	ug/L	100	-	-		-		-		-		-		-			
	otassium	mg/L	-	-	2.7	J	2.7	J	2.8	J	3.6	B	2.9	J	2.8	J		
	elenium	ug/L	20	-	-		-		-		-		-		-			
	ilver	ug/L	20	-	-		-		-		-		-		-			
	odium	mg/L	-	-	66	B	68		71		77		65		68			
	rontium	ug/L	2000	-	-		-		-		-		360		440	^6+		
	hallium	mg/L	0.002	-	-		-		-		-		0.0049	U	0.0049	U		
	anadium	mg/L	0.007	0.007	0.0011	U	0.0011		0.0011	U	0.0011	U	0.0011	U	0.0011	U		
	nc	mg/L	1	-	-		-		-		-		-		-			

Notes:

1. ng/L indicates nanogram per liter.
2. mg/L indicates milligram per liter.
3. µg/L indicates microgram per liter.
4. TEQ indicates total equivalents.
5. U indicates result was below the method detection limit.
6. J indicates results is an estimate.
7. UJ indicates the analyte was not detected above the method detection limit.
   However, the method detection limit is an approximation.
8. B is a laboratory flag indicating compound was detected in both the method blank and sample
9. R indicates the results are rejected due to deficiencies in the ability to analyze the
   sample and meet quality control criteria. The presence of the analyte cannot be verified.
10. F1 & F2 are data qualifiers used by the laboratory.
11. TDS indicates total dissolved solids.
12. TSS indicates total suspended solids.
13. PAH indicates polyaromatic hydrocarbon.
14. ND indicates all of the input parameters in the calculated parameter equation were non-detect.
15. Groundwater Final Remediation Goals reference Geosyntec's 2016 Remedial Investigation Report.
16. North Carolina Groundwater Quality Standards (2L's and IMACs) from April 1, 2022.
17. In 2022, the Groundwater Quality Standard for vanadium was set at 0.007 mg/L. This changed the final, unrestricted use
    This is a change from the 2018 Remedial Action Plan for groundwater only.

FIGURES


SW-UP
423.00
SW-DOWN
416.89

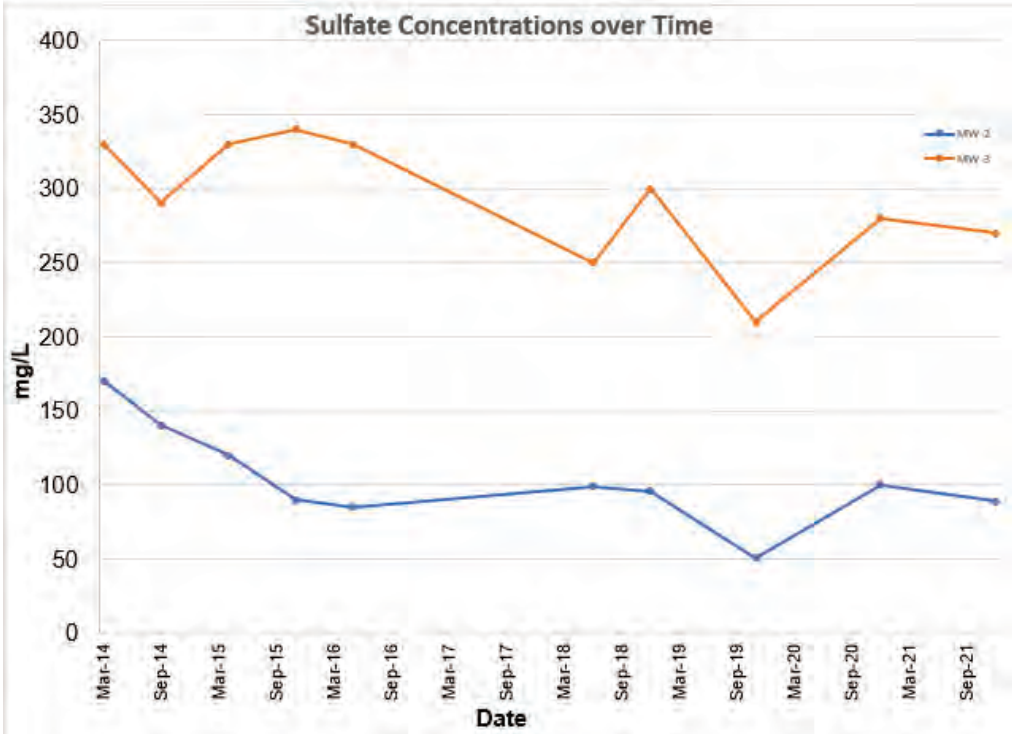

Figure 2

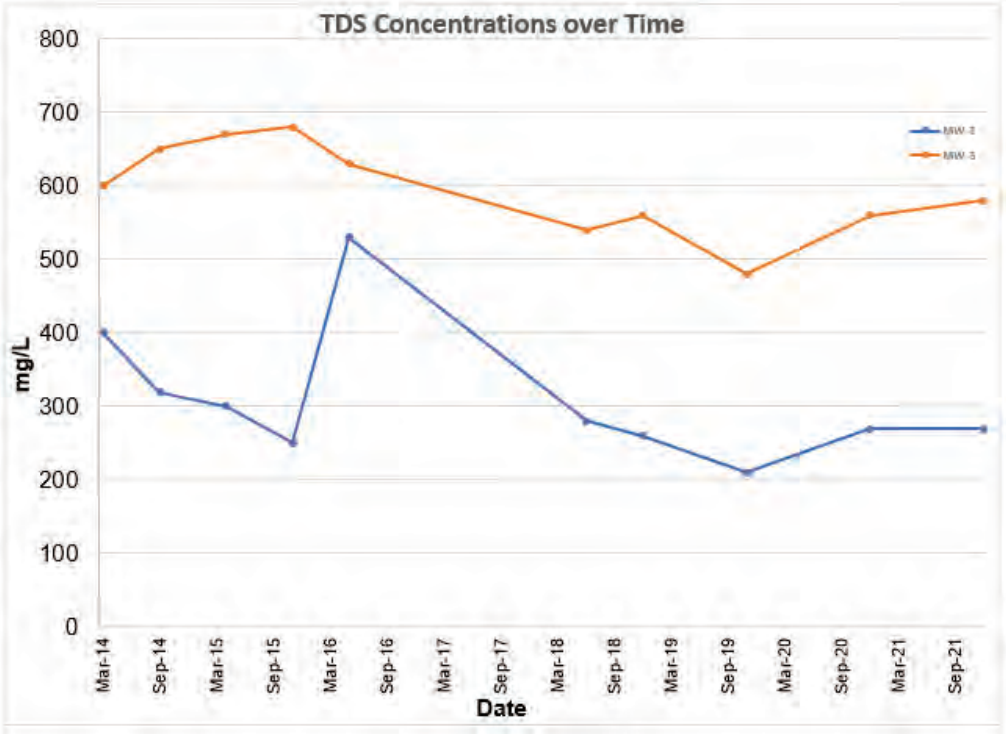

Figure 3

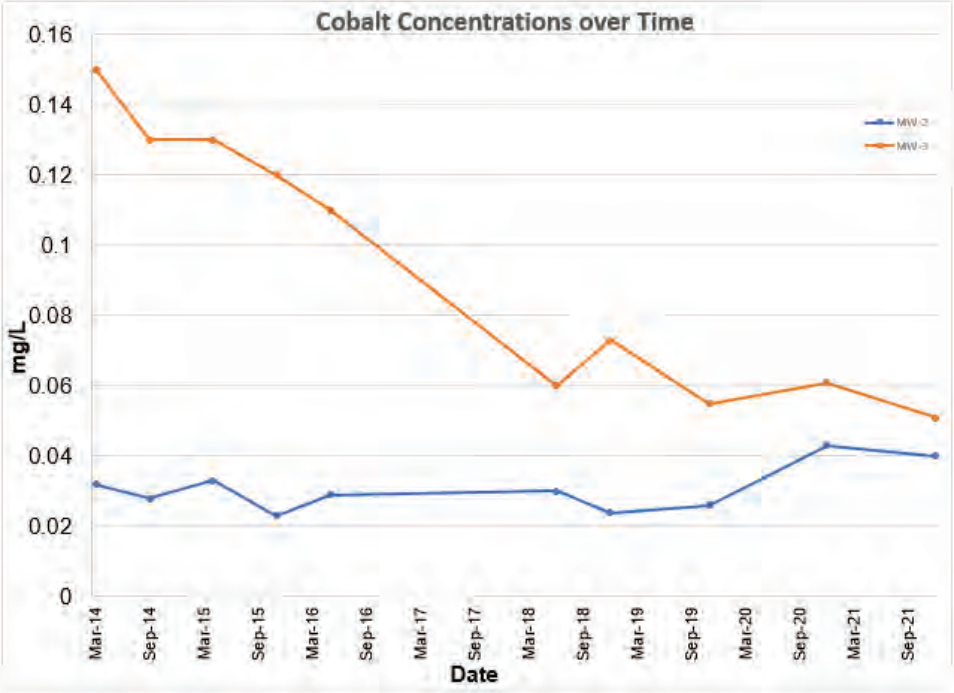

Figure 4

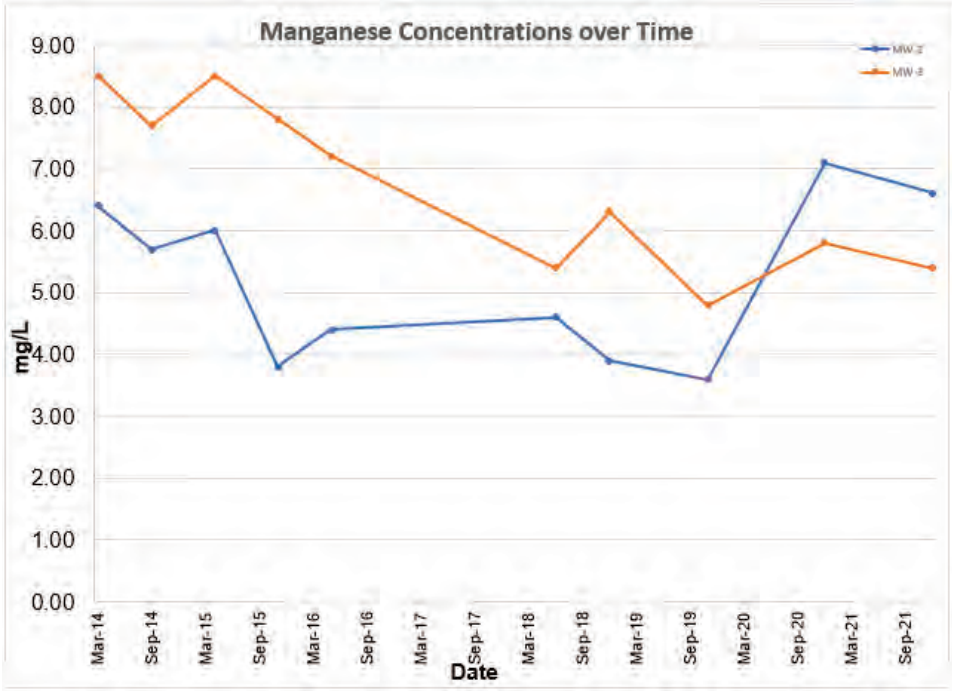

Figure 5

APPENDIX A

Risk Calculator Output Sheets for MW-5 for Tier I Risk Screening

DEQ Risk Calculator - Direct Contact - Resident Groundwater Use **Output Form 2B**

Version Date: January 2023

Basis: November 2022 EPA RSL Table

Site ID: UNC Cogen

Exposure Unit ID: MW5

** - Note that inhalation on this calculator refers to inhalation associated with tapwater use, not inhalation associated with vapor intrusion from subsurface groundwater sources.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA Action Level of 15 µg/L.*

CAS #	Chemical Name:	Ingestion Concentration (ug/L)	Dermal Concentration (ug/L)	Inhalation Concentration (ug/L)*	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk*	Calculated Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient*	Calculated Non-Carcinogenic Hazard Quotient
7440-42-8	Boron And Borates Only	35	35	35					8.7E-03	3.8E-05		8.8E-03
7440-48-4	Cobalt	2.4	2.4	2.4					**4.0E-01**	7.0E-04		**4.0E-01**
7439-89-6	Iron	1200	1200	1200					8.5E-02	3.8E-04		8.6E-02
7439-96-5	Manganese (Non-diet)	76	76	76					1.6E-01	1.7E-02		1.8E-01
14797-55-8	Nitrate (measured as nitrogen)	1100	1100	1100					3.4E-02	1.5E-04		3.4E-02
7440-24-6	Strontium, Stable	440	440	440					3.7E-02	1.6E-04		3.7E-02
7440-28-0	Thallium (Soluble Salts)	4.9	4.9	4.9					**2.4E+01**	1.1E-01		**2.5E+01**
						Cumulative:		0.0E+00				**2.5E+01**

DEQ Risk Calculator - Direct Contact - Non-Residential Worker Groundwater Use **Output Form 2D**

Version Date: January 2023

Basis: November 2022 EPA RSL Table

Site ID: UNC Cogen

Exposure Unit ID: MW5

** - Note that inhalation on this calculator refers to inhalation associated with tapwater use, not inhalation associated with vapor intrusion from subsurface groundwater sources.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA Action Level of 15 µg/L.*

CAS #	Chemical Name:	Ingestion Concentration (ug/L)	Dermal Concentration (ug/L)	Inhalation Concentration (ug/L)*	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Calculated Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Calculated Non-Carcinogenic Hazard Quotient
7440-42-8	Boron And Borates Only	35	35	35					1.2E-03	2.0E-05		1.3E-03
7440-48-4	Cobalt	2.4	2.4	2.4					5.7E-02	3.6E-04		5.7E-02
7439-89-6	Iron	1200	1200	1200					1.2E-02	1.9E-04		1.2E-02
7439-96-5	Manganese (Non-diet)	76	76	76					2.3E-02	8.9E-03		3.1E-02
14797-55-8	Nitrate (measured as nitrogen)	1100	1100	1100					4.9E-03	7.8E-05		5.0E-03
7440-24-6	Strontium, Stable	440	440	440					5.2E-03	8.3E-05		5.3E-03
7440-28-0	Thallium (Soluble Salts)	4.9	4.9	4.9					**3.5E+00**	5.5E-02		**3.5E+00**
						Cumulative:		0.0E+00				**3.6E+00**

APPENDIX B

Risk Calculator Output Sheets for MW-5 for Tier II Risk Screening

DEQ Risk Calculator - Direct Contact - Resident Groundwater Use **Output Form 2B**

Version Date: January 2023

Basis: November 2022 EPA RSL Table

Site ID: UNC Cogen

Exposure Unit ID: MW5

** - Note that inhalation on this calculator refers to inhalation associated with tapwater use, not inhalation associated with vapor intrusion from subsurface groundwater sources.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA Action Level of 15 µg/L.*

CAS #	Chemical Name:	Ingestion Concentration (ug/L)	Dermal Concentration (ug/L)	Inhalation Concentration (ug/L)*	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk*	Calculated Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient*	Calculated Non-Carcinogenic Hazard Quotient
7440-42-8	Boron And Borates Only	35	35	35					8.7E-03	3.8E-05		8.8E-03
7440-48-4	Cobalt	2.4	2.4	2.4					**4.0E-01**	7.0E-04		**4.0E-01**
7439-89-6	Iron	1200	1200	1200					8.5E-02	3.8E-04		8.6E-02
7439-96-5	Manganese (Non-diet)	76	76	76					1.6E-01	1.7E-02		1.8E-01
14797-55-8	Nitrate (measured as nitrogen)	1100	1100	1100					3.4E-02	1.5E-04		3.4E-02
7440-24-6	Strontium, Stable	440	440	440					3.7E-02	1.6E-04		3.7E-02
						Cumulative:		0.0E+00				7.4E-01

DEQ Risk Calculator - Direct Contact - Non-Residential Worker Groundwater Use **Output Form 2D**

Version Date: January 2023

Basis: November 2022 EPA RSL Table

Site ID: UNC Cogen

Exposure Unit ID: MW5

** - Note that inhalation on this calculator refers to inhalation associated with tapwater use, not inhalation associated with vapor intrusion from subsurface groundwater sources.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA Action Level of 15 µg/L.*

CAS #	Chemical Name:	Ingestion Concentration (ug/L)	Dermal Concentration (ug/L)	Inhalation Concentration (ug/L)*	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Calculated Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Calculated Non-Carcinogenic Hazard Quotient
7440-42-8	Boron And Borates Only	35	35	35					1.2E-03	2.0E-05		1.3E-03
7440-48-4	Cobalt	2.4	2.4	2.4					5.7E-02	3.6E-04		5.7E-02
7439-89-6	Iron	1200	1200	1200					1.2E-02	1.9E-04		1.2E-02
7439-96-5	Manganese (Non-diet)	76	76	76					2.3E-02	8.9E-03		3.1E-02
14797-55-8	Nitrate (measured as nitrogen)	1100	1100	1100					4.9E-03	7.8E-05		5.0E-03
7440-24-6	Strontium, Stable	440	440	440					5.2E-03	8.3E-05		5.3E-03
						Cumulative:		0.0E+00				1.1E-01