COMMITMENT & INTEGRITY
DRIVE RESULTS

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Via Electronic Mail

January 29, 2019

Shauna Little
U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP RGP Applications Coordinator
5 Post Office Square – Suite 100 (OEP06-01)
Boston, MA 02109-3912

Re: Remediation General Permit – Notice of Change – Effluent Flow Limitation and Activity Area Authorization #MAG910731
Raytheon BBN Technologies, 10 Moulton St., Cambridge, MA

Dear Ms. Little:

Woodard & Curran is submitting the enclosed Remediation General Permit (RGP) Notice of Change (NOC) on behalf of Raytheon Company for authorized discharge #MAG910731 from the property located at 10 Moulton Street in Cambridge, Massachusetts. This NOC requests a change in the site-specific effluent flow limitation from 20 gallons per minute (gpm) (0.0288 million gallons per day [MGD]) to 100 gpm (0.144 MGD), and, a change in activities contributing to the effluent flow.

The existing treatment system was constructed in September 2016 with the primary objective of treating groundwater containing chlorinated volatile organic compounds (VOCs). The existing treatment system was designed for batch operation at a flow rate of 20 gpm and consists of an oil-water separator, two influent bag filters operated in parallel, an air stripper, and two effluent bag filters operated in parallel.

Improvements to the groundwater / storm water management system proposed in the February 2018 Phase IV Remedy Implementation Plan (RIP) included eliminating building process water from storm drains inside the building ("Project #1"), and, a stormwater diversion project to redirect stormwater away from areas with impacted groundwater ("Project #2"). Construction associated with Project #1 and Project #2 began in September 2018.

At the end of January 2019, it is anticipated that excavation to install a proposed pump chamber and oil-water separator as part of Project #2 will require dewatering at a flow rate exceeding the 20 gpm effluent flow limitation specified in the approved permit. Pre-construction flow tests indicate that dewatering may be required at flow rates up to 100 gpm during installation of these structures. Two options for groundwater management are being considered, including a primary option (Option A) and a contingency option (Option B):

- Option A: if total dewatering needs do not exceed the capacity of one 21,000-gallon fractionation tank at a flow rate < 20 gpm, groundwater pumped from the excavation will be filtered using a duplex bag filter and then discharged to the existing groundwater treatment system. The additional temporary flow of groundwater would be treated and discharged in accordance with the conditions of the existing authorized permit via Outfall #1.

- Option B: if total dewatering needs exceed the capacity of one 21,000-gallon fractionation tank and/or exceed a flow rate of 20 gpm, groundwater pumped from the excavation will be filtered using a duplex bag filter and then pumped through two 2,000-pound carbon vessels operated in

series to treat low concentrations of chlorinated solvents (if necessary based on analytical). After filtration and carbon treatment, the water will be discharged to the existing oil-water separator which is connected to the existing groundwater treatment system and Outfall #1. It is anticipated that dewatering may occur at flow rates up to 100 gpm during daytime work hours (8-10 hours) over the course of 5 to 7 days to complete this work.

In accordance with Appendix IV Part 2 of the RGP, the following additional information is provided in support of this request:

B.1.b.i. *The effluent flow will not exceed 1.0 MGD;*

- ✓ The proposed temporary system flow rate of 100 gpm (0.144 MGD) will not exceed 1.0 MGD.

B.1.b.ii. *The design flow of the treatment system will not be exceeded;*

- ✓ The supplemental temporary treatment system described herein will have the capacity to treat the proposed flow of 100 gpm.

B.1.b.iii. *WQBEL calculations for any limited parameter that applies to the discharge that is based on effluent flow; and;*

- ✓ See attached supporting calculations.

B.1.b.iv. *Certification that any revised effluent limitation or monitoring requirement will be complied with;*

- ✓ The proposed change in flow will be monitored during the dewatering and will not exceed 100 gpm. All other monitoring, including effluent sampling, will be performed in accordance with the requirements of the existing authorization or as approved by USEPA in this NOC.

Please let us know if you have any questions or require any further information in support of this NOC.

Sincerely,

WOODARD & CURRAN INC.

Jarrod P. Yoder, PG, LSP
Associate Principal

Enclosures: Notice of Change Form
WQBEL Calculations for 100 gpm
Site Plan

cc: Robert Luhrs (Raytheon)
Cathy Vakalopoulos (MassDEP)
James Wilcox (City of Cambridge DPW)

PN: 230601

II. Suggested Format for the Remediation General Permit Notice of Change (NOC)

A. General site information

<table>
<tr><td colspan="4">1. NPDES permit number assigned by EPA: MAG910731</td></tr>
<tr><td rowspan="2">2. Name of site:
Raytheon BBN Technologies</td><td colspan="3">Site address:
10 Moulton Street
Street:</td></tr>
<tr><td>City: Cambridge</td><td>State: MA</td><td>Zip: 02138</td></tr>
<tr><td rowspan="4">3. Site owner
Raytheon Company

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other, if so, describe:</td><td colspan="3">Contact Person: Robert Moore</td></tr>
<tr><td colspan="2">Telephone: 781-522-3067</td><td>Email: Robert_J_Moore@raytheon.com</td></tr>
<tr><td colspan="3">Mailing address:
870 Winter Street
Street:</td></tr>
<tr><td>City: Waltham</td><td>State: MA</td><td>Zip: 02451</td></tr>
<tr><td rowspan="4">4. Site operator, if different than owner</td><td colspan="3">Contact Person: Robert Luhrs</td></tr>
<tr><td colspan="2">Telephone: 978-858-9423</td><td>Email: Robert_C_Luhrs@raytheon.com</td></tr>
<tr><td colspan="3">Mailing address:
50 Apple Hill Drive
Street:</td></tr>
<tr><td>City: Tewksbury</td><td>State: MA</td><td>Zip: 01876</td></tr>
<tr><td>5. Discharge identification:
Outfall #D36OF0080 - Cambridgepark Drive</td><td colspan="2">Discharge location:
Segment MA71-04 (42.3961, -71.1460)</td><td>Receiving water(s):
Alewife Brook</td></tr>
</table>

B. Type of change(s) requested

Requested change (check all that apply):	
☐	1. Request for reduction in monitoring requirements to no less than once per year, based on monitoring data attached in accordance with Appendix IV, Part 2 instructions. Written approval by EPA is required for this change to be effective.
☐	i. Influent monitoring requirement reduction based on monitoring data for six (6) consecutive months and ten (10) samples.
☐	ii. Effluent monitoring requirement reduction based on monitoring data for six (6) consecutive months and ten (10) samples that are in compliance with the RGP effluent limitations, and data and BMP requirements.
☐	2. Request for site-specific effluent flow limitation, which will not exceed 1.0 MGD or the design flow of the treatment system, or site-specific monitoring requirement that eliminates flow meter requirement based on written rationale attached in accordance with Appendix IV, Part 2 instructions. Written approval by EPA is required for this change to be effective.
☐	3. Request for a change in pH range approved by NHDES, based on supporting documentation attached in accordance with Appendix IV, Part 2 instructions. Written approval by EPA is required for this change to be effective.
☐	4. Request for change in authorized pollutants or pollutant parameters, based on monitoring data attached in accordance with Appendix IV, Part 2 instructions. This type of change requires written approval by EPA. Additional effluent limitations and/or monitoring requirements may apply.
☐	5. Request to discharge chemical(s) and/or additive(s) that were not disclosed in the NOI submitted for the site, based on written rationale and/or monitoring data attached in accordance with Appendix IV, Part 2 instructions. Written approval by EPA is required for this change to be effective.
☐	6. Change to administrative information. Supporting documentation is attached in accordance with Appendix IV, Part 2 instructions.
☐	7. Notification of a change in discharge location. The receiving water information submitted with the NOI for the site remains unchanged. Supporting documentation is attached in accordance with Appendix IV, Part 2 instructions.
☐	8. Notification of a change in activity area. The receiving water information submitted with the NOI for the site and the operator named in the authorization to discharge remain unchanged. Any change in treatment or discharge location are also included in the NOC, or are unchanged. Supporting documentation is attached in accordance with Appendix IV, Part 2 instructions.
☐	9. Notification of a change to a treatment system or process that adds or removes any major component. Supporting rationale is attached in accordance with Appendix IV, Part 2 instructions.
☐	10. Notification of a temporary cessation of discharge greater than 90 days. Supporting rationale is attached in accordance with Appendix IV, Part 2 instructions.

C. Certification requirement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.
Notification provided to the appropriate State, including a copy of this NOC. Check one: Yes ■ No ☐
Notification has been provided to the municipality in which the discharge is located, including a copy of this NOC, if requested. Check one: Yes ■ No ☐
Notification has been provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOC, if requested. Check one: Yes ■ No ☐ NA ☐
Signature: [signature] Date: 1-29-19
Print Name and Title: ROBERT C. LUHRS SR MANAGER EHSS

Enter number values in green boxes below

Enter values in the units specified

↓

0.19517	Q_R = Enter upstream flow in **MGD**
0.144	Q_P = Enter discharge flow in **MGD**
0	Downstream 7Q10

Enter a dilution factor, if other than zero

↓

0

Enter values in the units specified

↓

440	C_d = Enter influent hardness in **mg/L** $CaCO_3$
180	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

Enter **receiving water** concentrations in the units specified

↓

7.76	pH in **Standard Units**
22	Temperature in **°C**
1.4	Ammonia in **mg/L**
180	Hardness in **mg/L** $CaCO_3$
0	Salinity in **ppt**
0	Antimony in **µg/L**
0	Arsenic in **µg/L**
0	Cadmium in **µg/L**
10	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
15	Copper in **µg/L**
7000	Iron in **µg/L**
27	Lead in **µg/L**
0	Mercury in **µg/L**
6.5	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
54	Zinc in **µg/L**

Notes:

Freshwater: Q_R equal to the 7Q10; enter alternate Q_R if approved by the State; enter 0 if no dilution factor approved

Saltwater (estuarine and marine): enter Q_R if approved by the State; enter 0 if no entry

Discharge flow is equal to the design flow or 1 MGD, whichever is less

Only if approved by State as the entry for Q_R; leave 0 if no entry

Saltwater (estuarine and marine): only if approved by the State

Leave 0 if no entry

Freshwater only

pH, temperature, and ammonia required for all discharges

Hardness required for freshwater

Salinity required for saltwater (estuarine and marine)

Metals required for all discharges if present and if dilution factor is > 1

Enter 0 if non-detect or testing not required

Enter **influent** concentrations in the units specified

if >1 sample, enter maximum

if >10 samples, may enter 95th percentile

Enter 0 if non-detect or testing not required

↓

12	TRC in **µg/L**
2.7	Ammonia in **mg/L**
0	Antimony in **µg/L**
0	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
383	Copper in **µg/L**
7348	Iron in **µg/L**
66.32	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
526.4	Zinc in **µg/L**
0	Cyanide in **µg/L**
0	Phenol in **µg/L**
0	Carbon Tetrachloride in **µg/L**
17	Tetrachloroethylene in **µg/L**
0	Total Phthalates in **µg/L**
0	Diethylhexylphthalate in **µg/L**
0	Benzo(a)anthracene in **µg/L**
0	Benzo(a)pyrene in **µg/L**
0	Benzo(b)fluoranthene in **µg/L**
0	Benzo(k)fluoranthene in **µg/L**
0	Chrysene in **µg/L**
0	Dibenzo(a,h)anthracene in **µg/L**
0	Indeno(1,2,3-cd)pyrene in **µg/L**
0	Methyl-tert butyl ether in **µg/L**

I. Dilution Factor Calculation Method

A. 7Q10

Refer to Appendix V for determining critical low flow; must be approved by State before use in calculations.

B. Dilution Factor

Calculated as follows:

$$Df = \frac{Q_R + Q_P}{Q_P}$$

Q_R = 7Q10 in MGD

Q_P = Discharge flow, in MGD

II. Effluent Limitation Calculation Method

A. Calculate Water Quality Criterion:

Step 1. Downstream hardness, calculated as follows:

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r}$$

C_r = Downstream hardness in mg/L

Q_d = Discharge flow in MGD

C_d = Discharge hardness in mg/L

Q_s = Upstream flow (7Q10) in MGD

C_s = Upstream (receiving water) hardness in mg/L

Q_r = Downstream receiving water flow in MGD

Step 2. Total recoverable water quality criteria for hardness-dependent metals, calculated as follows:

Total Recoverable Criteria = $\exp\{m_c [\ln(h)] + b_c\}$

m_c = Pollutant-specific coefficient (m_a for silver)

b_c = Pollutant-specific coefficient (b_a for silver)

ln = Natural logarithm

h = Hardness calculated in Step 1

Step 3. Total recoverable water quality criteria for non-hardness-dependent metals, calculated as follows:

$$\text{WQC in µg/L} = \frac{\text{dissolved WQC in µg/L}}{\text{dissolved to total recoverable factor}}$$

B. Calculate WQBEL:

Step 1. WQBEL calculated as follows for parameter sampled in and detected in the receiving water:

$$C_d = \frac{Q_r C_r - Q_s C_s}{Q_d}$$

C_r = Water quality criterion in µg/L

Q_d = Discharge flow in MGD

C_d = WQBEL in µg/L
Q_s = Upstream flow (7Q10) in MGD
C_s = Ustream (receiving water) concentration in µg/L
Q_r = Downstream receiving water flow in MGD

Step 2. WQBEL calculated as follows for parameter not sampled in or not detected in receiving water:

$$C_d = (Q_r/Q_d) \times C_r$$

C_r = Water quality criterion in µg/L
Q_d = Discharge flow in MGD
Q_r = Downstream receiving water flow in MGD

C. Determine if a WQBEL applies:

Step 1. For parameter sampled in and detected in receiving water, downstream concentrations calculated as follows:

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_r}$$

C_r = Downstream concentration in µg/L
Q_d = Discharge flow in MGD
C_d = Influent concentration in µg/L
Q_s = Upstream flow (7Q10) in MGD
C_s = Upstream (receiving water) concentration in µg/L
Q_r = Downstream receiving water flow in MGD

The WQBEL applies if:

1) the projected downstream concentration calculated in accordance with Step 1, above, and the discharge concentration of a parameter are greater than the WQC calculated for that parameter in accordance with II.A, above

AND

2) the WQBEL determined for that parameter in accordance with II.B, above, is less than the TBEL in Part 2.1.1 of the RGP for that parameter. Otherwise, the TBEL in Part 2.1.1

of the RGP for that parameter applies.

Step 2. For a parameter not sampled in or not detected in receiving water, the WQBEL applies if:

1) the discharge concentration of a parameter is greater than the WQBEL determined for that parameter in accordance with II.A or II.B, above;

AND

2) the WQBEL determined for that parameter in accordance with II.A or II.B, above is less than the TBEL in Part 2.1.1 of the RGP for that parameter. Otherwise, the TBEL in

Part 2.1.1 of the RGP for that parameter applies.

Dilution Factor	2.4					
A. Inorganics	TBEL applies if bolded		WQBEL applies if bolded		Compliance Level applies if shown	
Ammonia	**Report**	mg/L	---			
Chloride	**Report**	µg/L	---			
Total Residual Chlorine	0.2	mg/L	**26**	µg/L	50	µg/L
Total Suspended Solids	**30**	mg/L	---			
Antimony	**206**	µg/L	1507	µg/L		
Arsenic	**104**	µg/L	24	µg/L		
Cadmium	**10.2**	µg/L	1.4042	µg/L		
Chromium III	**323**	µg/L	472.4	µg/L		
Chromium VI	**323**	µg/L	26.9	µg/L		
Copper	242	µg/L	**34.3**	µg/L		
Iron	5000	µg/L	**1000**	µg/L		
Lead	160	µg/L	**12.36**	µg/L		
Mercury	**0.739**	µg/L	2.13	µg/L		
Nickel	**1450**	µg/L	293.9	µg/L		
Selenium	**235.8**	µg/L	11.8	µg/L		
Silver	**35.1**	µg/L	55.8	µg/L		
Zinc	**420**	µg/L	623.2	µg/L		
Cyanide	**178**	mg/L	12.2	µg/L	---	µg/L
B. Non-Halogenated VOCs						
Total BTEX	**100**	µg/L	---			
Benzene	**5.0**	µg/L	---			
1,4 Dioxane	**200**	µg/L	---			
Acetone	**7970**	µg/L	---			
Phenol	**1,080**	µg/L	707	µg/L		
C. Halogenated VOCs						
Carbon Tetrachloride	**4.4**	µg/L	3.8	µg/L		
1,2 Dichlorobenzene	**600**	µg/L	---			
1,3 Dichlorobenzene	**320**	µg/L	---			
1,4 Dichlorobenzene	**5.0**	µg/L	---			
Total dichlorobenzene	**---**	µg/L	---			
1,1 Dichloroethane	**70**	µg/L	---			
1,2 Dichloroethane	**5.0**	µg/L	---			
1,1 Dichloroethylene	**3.2**	µg/L	---			
Ethylene Dibromide	**0.05**	µg/L	---			
Methylene Chloride	**4.6**	µg/L	---			
1,1,1 Trichloroethane	**200**	µg/L	---			
1,1,2 Trichloroethane	**5.0**	µg/L	---			
Trichloroethylene	**5.0**	µg/L	---			
Tetrachloroethylene	**5.0**	µg/L	7.8	µg/L		
cis-1,2 Dichloroethylene	**70**	µg/L	---			
Vinyl Chloride	**2.0**	µg/L	---			
D. Non-Halogenated SVOCs						
Total Phthalates	**190**	µg/L	---	µg/L		
Diethylhexyl phthalate	**101**	µg/L	5.2	µg/L		

Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---			
Benzo(a)anthracene	**1.0**	µg/L	0.0090	µg/L	---	µg/L
Benzo(a)pyrene	**1.0**	µg/L	0.0090	µg/L	---	µg/L
Benzo(b)fluoranthene	**1.0**	µg/L	0.0090	µg/L	---	µg/L
Benzo(k)fluoranthene	**1.0**	µg/L	0.0090	µg/L	---	µg/L
Chrysene	**1.0**	µg/L	0.0090	µg/L	---	µg/L
Dibenzo(a,h)anthracene	**1.0**	µg/L	0.0090	µg/L	---	µg/L
Indeno(1,2,3-cd)pyrene	**1.0**	µg/L	0.0090	µg/L	---	µg/L
Total Group II Polycyclic Aromatic Hydrocarbons	**100**	µg/L	---			
Naphthalene	**20**	µg/L	---			
E. Halogenated SVOCs						
Total Polychlorinated Biphenyls	**0.000064**	µg/L	---		0.5	µg/L
Pentachlorophenol	**1.0**	µg/L	---			
F. Fuels Parameters						
Total Petroleum Hydrocarbons	**5.0**	mg/L	---			
Ethanol	**Report**	mg/L	---			
Methyl-tert-Butyl Ether	**70**	µg/L	47	µg/L		
tert-Butyl Alcohol	**120**	µg/L	---			
tert-Amyl Methyl Ether	**90**	µg/L	---			

Location of existing 20 gpm treatment system and original effluent discharge sample location **(Outfall #1)**

Proposed temporary 100 gpm treatment system (if warranted)

Discharge to existing storm drain **(Outfall #1)**

Proposed 100 gpm dewatering locations for stormwater diversion project

Existing Stormwater Sump

Existing oil-water separator connected to stormwater management system

MOULTON STREET

CONCORD AVENUE

SIDEWALK

LOADING DOCK

DUMPSTER

GENERATOR

EXISTING STRUCTURAL COLUMN

EXISTING STORM DRAIN

EXISTING TRENCH DRAIN

20' 0 20' 40'

BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

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COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD &CURRAN

EXISTING CONDITIONS

DESIGNED BY: AM
DRAWN BY: PF
CHECKED BY: AM
230601.00-AS-BUILT-BASE.dwg

RAYTHEON BBN
CAMBRIDGE, MA

JOB NO: 230601.00
DATE: JANUARY 2019
SCALE: AS NOTED

FIGURE 1

\\woodardcurran.net\shared\Projects\0230601.00 Raytheon – Cambridge MA\wip\Drawings\XREF\230601.00-AS-BUILT-BASE.dwg