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NCBC DAVISVILLE
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U S NAVY RESPONSES TO U S EPA REGION I COMMENTS ON THE QDC OUTFALL 001 DRAFT REMEDIAL INVESTIGATION FORMER NCBC DAVISVILLE RI
07/31/2015
RESOLUTION CONSULTANTS

NAVY RESPONSES TO
ENVIRONMENTAL PROTECTION AGENCY
COMMENTS DATED JUNE 29, 2015
ON QDC OUTFALL 001 DRAFT REMEDIAL INVESTIGATION,
FORMER NAVAL CONSTRUCTION BATTALLION CENTER (NCBC) DAVISVILLE, NORTH KINGSTOWN, RHODE ISLAND
(JULY 31, 2015)

EPA comments on the Navy's QDC Outfall 001 Draft Remedial Investigation (December 2014), are presented below. The EPA comments are presented first, followed by the Navy responses (*italics*). The EPA responses follow in <u>underline,</u> and the Navy's second round of responses are presented last in bold.

1. In general EPA is disappointed that Navy submitted this RI using a non-site specific background study to determine site related risks. The approved work plan stated that if an appropriate data set was found it would be used to determine site related contamination and risks. EPA was not consulted as to the appropriateness of the background studies used and does not agree that they were appropriate based on the information provided during the BCT call on January 13, 2015 and the e-mail from Jeff Dale received January 14, 2015. Therefore, EPA rejects the specific conclusions of the determination of site related risk and the entire Appendix E. Please revise with either a site-specific background study, a qualitative evaluation of existing data, or use the site data as is in the risk assessment without any determination of "background".

   The results of the HHRA, without comparison to non-site related background concentrations, and the site data comparison to ecological benchmarks provides enough information to move ahead to a feasibility study. It would be appropriate to evaluate several types of active remedial actions that would greatly improve the area that has been neglected since Navy substantially ceased operations in the 1970s.

   EPA agrees with RIDEM conclusions noted in comment #31 from their February 2, 2015 letter that the data evaluation does support a CERCLA action at this OU.

Navy Response – Upon Navy's consultation with EPA and review of data suggested by EPA, Resolution will conduct a qualitative background evaluation for use in the HHRA and ERA. This qualitative background evaluation will consist of the following background data sets:

Surface Soil: The background data set will be comprised of the 18 background surface soil samples from the Phase II RI. These samples were analyzed for metals only.

Sediment: EPA suggested review of nine sediment samples based on locations on Figure 2-1 of the 1996 Facility Wide Freshwater/Terrestrial Ecological Risk Assessment. Resolution reviewed these locations and determined that several are tidally influenced. Of the nine suggested samples, four are from freshwater locations and will be used to represent qualitative background (TRC1, TRC5, TRC6, and AHW07).

The Navy may elect to revisit background conditions for the QDC Outfall 001 soil and sediment. As necessary to frame any potential risks or clean-up concentrations, a site-specific background

study may be undertaken. Any study would be conducted in consultation and agreement with EPA and RIDEM.

EPA Comment- Previous comments did focus on the deficiencies of the background study relative to the Ecological Risk Assessment. This does affect the outcome of the Ecological Risk Assessment more than the HHRA seeing the HHRA was not based on comparisons to background. However, EPA agrees that the qualitative background evaluation proposed by the Navy will provide a better basis for evaluating and validating the appropriateness of the background assessment used in the RI.

The Navy has proposed using analytical data from locations, TRC 1, TRC 5, TRC 6, and AHW07. EPA agrees that these locations are in the freshwater Allen Harbor Drainage Area and as such may provide information for a qualitative evaluation. TRC 1 is located next to a roadway and may be more biased toward anthropogenic background rather than a more pristine background. TRC 5&6 may be influenced by the densely populated Mt. Hope neighborhood and the accompanying septic systems. AHW07 was down stream of TRC1.

EPA started evaluating the data for these sample locations, however, notes that TRC 1 data may be on Table A-89 or on Table A-90 through 94. Please clarify.

Navy Response – The data for TRC1 (SD01) are provided in Tables A-90 through A-94. The background sediment data proposed for qualitative use in the risk assessments are provided in the attached table (Attachment A).

19. Section 1.3, bullets and Figure 1-2. Two separate drainage systems at Study Area 01 connect to the Outfall 001 drain line. These two drainage systems are described later on page 6 (Section 1.4.1), "For the purposes of this RI, these two additional drainage systems are considered components of the Building 224 drainage system." These two drainage systems are shown in blue on Figure 1-3a. However, the text in Section 1.3 is unclear on whether or not these two additional drainage systems are included in the "...approximately nine storm water catch basins in the vicinity of Study Area 01..." Please clarify the text accordingly, and update Figure 2 as warranted.

    For consistency, the reference in the text to the "outdoor vehicle wash pad" should match the figures, which appear to describe this area as the "truck wash pad."

    The leaching field area described in the text should be noted on Figure 1-2 and/or Figure 1-3a. For an example, see Figure 2-3 in the Navy's "Final Study Area Screening Evaluation Report for CED Drum Storage Area, NCBC, Davisville, RI," dated September 1994 (Halliburton NUS Corporation).

    The text and/or figure should indicate that Catch Basin CB-01 could not be found/is no longer present.

Navy Response – These changes will be made in the Draft Final Report.

EPA Comment- The Navy's RTC indicates "These changes will be made in the Draft Final Report." However, EPA's comment also asked the Navy to clarify the text in Section 1.3 regarding whether the two separate drainage systems at Study Area 01 and that connect to the

Outfall 001 drain line were included in the " … approximately nine storm water catch basins in the vicinity of Study Area 01 … " Please clarify the text accordingly, and update Figure 2 as warranted.

Navy Response –Text in Section 1.3 will be updated as follows:

"There are nine storm water catch basins in the vicinity of Study Area 01 that are connected to the drainline leading to QDC Outfall 001; catch basins CB-03, CB-09, and CB-04 which are located on the drainline itself; catch basins CB-03-01, CB-03-02, CB-03-03, and CB-03-04 which are located on the lateral drainline that connects to catch basin CB-03; and catch basins CB-09-01 and CB-09-02 which are located on the lateral drainline that connects at catch basin CB-09." Figure 1-2 has been updated to show the lateral drainlines and associated catch basins that connect to catch basins CB-03 and CB-09 and to show the former leach field in Study Area 01. The revised Figure 1-2 is attached to this Response to Comments (Attachment B). The references to the vehicle wash pad will be made consistent between the text and figures of the report. The text will be updated to note that catch basin CB-01 is no longer present, and the former location of CB-01 will be shown on the appropriate figures with a different color symbol to differentiate it from the existing catch basins shown.

25. Section 2.2, Page 13, paragraph 3. The 12 in. pipe could be an outfall from EBS #53. Please see the June 1998 report map which seems to show a pipe leading from former building 324. In any event this outfall needs to be evaluated and closed. In addition, there is also a storm drain system that drains the CED area including the area south of building 224. See figure 2-18 from the 2012 ACOE document.

Navy Response – In the figure referenced by EPA, it's not labeled as drainage pipe; it's just a line. While this could be drainage from EBS53, it is unlikely. The RI Report will indicate that the origin of the unknown outfall is a data gap to be addressed in the FS or pre-design stage of the program. The storm drain system that drains the CED area does not discharge to the QDC Outfall 001 wetland, but drains directly into Allen Harbor.

EPA Comment- Regarding the pipe that could be an outfall from EBS#53, the Navy's RTC states, "While this could be drainage from EBS52, it is unlikely." While the Navy indicates the [presumed draft final] RI Report and subsequent FS will investigate this pipe, the Navy's RTC has not presented any evidence to support whether or not it is "unlikely" that the pipe is associated with EBS#53. Please provide.

Navy Response – The location of the line on Figure 1 of the June 1998 EBS 53 Investigation is in the area north of the wetland; not in the area north of the drainage ditch to the east. That is why the Navy believes that it is unlikely that the line shown on the figure is the pipe leading to the pipe that is present on the north side of the drainage ditch. As mentioned in the response to the original comment, the Navy plans on delineating the extent of the pipe during the FS stage of the project. The delineation will be performed using geophysics and other appropriate techniques as necessary. The pipe will then be removed during the remediation.

29. Section 2.5, page 16. The report should provide a brief comparison of the well screen depths for PGU-Z3-03D and the replacement well PGU-Z3-03I, such that readers can assess whether the replacement well screen intersected a similar location in the aquifer as the original well.

Navy Response – The well screen depths will be included in the Draft Final Report. The depth of PGU-Z3-03D (screened interval is unknown, but noted as 60 ft in historic reports [Johnson, 2011]) was not viable, Resolution completed installation of PGU-Z3-03I with it screened from 18-28 ft bgs. The depth interval was not meant to replicate the original purpose of the PGU-Z3-03D well (which was very deep, likely for monitoring sites upgradient of the wetland area), rather to monitor the intermediate aquifer depths for potential impacts from the wetland area itself. Given the proximity to the wetland, the 18-28 ft bgs screen of PGU-Z3-03I is depth is more suitable for monitoring potential impacts from the wetland to the intermediate aquifer based on likely limited vertical dispersion of potential contaminants in the aquifer.

EPA Comment- The Navy's RTC states, "The depth of PGU-Z3-03D ... was not viable ... " Please revise this statement for clarity. It seems to have a portion of the statement missing.

Navy Response –The response is edited as follows:

The well screen depths will be included in the Draft Final Report. The screened interval depth of PGU-Z3-03D is unknown, the total well depth was noted as 60 ft in historic reports (Johnson, 2011). This well was not viable due to an unknown obstruction that was present approximately 10 feet from the top of casing. Resolution tried to redevelop the well during the RI, but was unable to. Therefore, the decision was made to install replacement well PGU-Z3-03I screened in the intermediate aquifer. The condition of PGU-Z3-03D and proposal for a new intermediate well was communicated via email to EPA and RIDEM on March 17, 2014. Resolution completed installation of replacement well PGU-Z3-03I with a screened interval of 18-28 ft bgs on March 20, 2014. The intermediate screened interval was not meant to replicate the original purpose of the PGU-Z3-03D well but rather to monitor the intermediate aquifer depths for potential impacts from the wetland area itself. Given the proximity to the wetland, the 18-28 ft bgs screen of PGU-Z3-03I is more suitable for monitoring potential impacts from the wetland to the intermediate aquifer based on the likely limited vertical dispersion of potential contaminants in the aquifer.

50. Section 4.4, Surface Water, 2nd paragraph, page 41. The text describes one sample from the western portion with higher concentrations, but the sample and chemical are not defined, or is the reference to divalent metals? Please clarify.

Navy Response – This will be clarified in the Draft Final Report.

EPA Comment- The Navy's RTC to EPA's comment states, "This will be clarified in the Draft Final Report." The purpose of the RTC document is to provide a response for EPA review prior to issuance of the Draft Final Report Please provide a response to the original comment.

Navy Response – The text will be edited as follows:

"One sample (QDC1-SW05) collected from the western portion of the drainage ditch had concentrations of zinc that were higher than the surface water samples collected on the southern side of the wetland (QDC1-SW01, QDC1-SW02), but lower than locations at the outfall (QDC1-SW06), on the west side of the wetland (QDC1-SW03), and on the north side of the wetland (QDC1-SW04, QDC1-SW07)."

52. Section 5.0, pages 43-47. The Contaminant Fate and Transport describes the geochemical interactions for several chemicals detected at the site. However, this section is generally vague on the specific fate and transport mechanism(s) for chemicals from the former Building 224 area to the site. This section should be revised accordingly to describe the transport mechanism(s) and whether chemical migration may continue via these mechanism(s) if no action is taken.

    Additionally, the Contaminant Fate and Transport section should include a discussion of the fate and transport mechanism(s) of chemicals within and beyond the site. For example, in soil the concentration of trans-chlordane is highest at the northeastern end of the drainage ditch (QF-SO22). The text does not appear to discuss the fate of this and other chemicals beyond this point.

    It is noted that information regarding fate and transport is provided much later in the Summary and Conclusions in Section 7.2 (page 58); this information should be provided for each of the appropriate chemicals.

Navy Response – Text will be added discussing possible transport mechanisms and whether chemical migration may continue via these mechanism(s) if no action is taken. A discussion of the fate and transport mechanism(s) of chemicals within and beyond the site will also be included.

<u>EPA Comment- Please ensure over excavation beyond the last sampling point is performed during the planned State regulated cleanup so that any additional trans-chlordane is removed.</u>

Navy Response – Comment noted. The excavation footprint will include over excavation beyond sample QF-SO22 as necessary to connect the wetland and ditch to Allen Harbor. Details will be provided in the Focused Feasibility Study (or EE/CA) and Remedial Action Work Plan.

55. Section 5.1, page 43. The text should indicate whether the pH range mentioned in this section (5.5-6.5) applies to soil and sediment collected from the outfall excavation, drainage ditch, and wetland. Additionally, it is unclear whether sediment samples were analyzed for pH, which is not reported in Table 4-3.

Navy Response – Sediment surface samples (0-0.5 feet) were analyzed for pH, as outlined in table 2-2.

<u>EPA Comment- Please address the first part of the comment as to whether the pH ranged applies to soil and sediment.</u>

Navy Response – The response is edited as follows: "Surface soil samples (0-1 ft) were analyzed for pH, as outlined in Table 2-2. Table 2-2 of the Draft RI Report incorrectly lists surface sediment samples being analyzed for pH; pH was not analyzed in the surface sediment samples, which is consistent with the SAP. This error will be corrected in Table 2-2."

Additionally, the text will be revised to include the following:

"The pH in the QDC Outfall 001 wetland surface soil ranges from 4.8 (QF-SO21) to 6.4 (QF-SO24). In the drainage ditch, pH ranges from 5 (QF-SO23) to 6.7 (QF-SO09). These pH ranges indicate that these metals are unlikely to demonstrate high solubility."

57. Section 5.3, 2nd paragraph, page 45. The text should discuss the potential for transport of trans-chlordane in soil beyond the far northeastern end of the drainage ditch, where trans-chlordane concentrations were highest.

Navy Response –Section 5 will be updated to reflect the trans-chlordane concentrations in the ditch relative to the sampling limits. The following text will be included:

"The concentrations of trans-chlordane are high in this area; however, based on the tendency for the chemicals to persist due to their tendency to sorb to soil and sediments, migration from these soils to off-site locations is not expected assuming no remedial action. "

<u>EPA Comment- Unless the Navy has data indicating that trans-chlordane was released to the northeastern end of the drainage ditch, then presumably the trans-chlordane migrated there from an upgradient location. Accordingly, trans-chlordane appears to have the potential to migrate beyond the northeast end of the drainage ditch. The Navy's RTC does not address the original comment. Please revise the RTC and/or provide data indicating that trans-chlordane has not already migrated beyond the northeast end of the drainage ditch.</u>

Navy Response – The response is revised as follows:

Section 5 will be updated to reflect the trans-chlordane concentrations in the ditch relative to the sampling limits. The following text will be included:

"The concentrations of trans-chlordane are high in this area. However, trans-chlordane has the tendency to persist due to its tendency to sorb to soil and sediments. Migration from these soils to off-site locations is not expected, but has not been confirmed."

As indicated in response to Comment 52, over-excavation of this area will be conducted as necessary to connect the wetland and drainage feature to Allen Harbor. Please note that the presence of chlordane in the wetland and drainage features could be due to documented historic use. Also note that a second drainage feature is present north of location QFSO-22. This is visible in Figure 1-2, trending approximately south to north.

60. Section 6.1 and 6.2. Revise the interpretation and conclusions in these sections to be consistent with comments provided on both risk assessments.

Navy Response – The text will be revised to be consistent with comments/responses on the risk assessments.

EPA Comment- Response is acceptable if proposed text changes are made.

Navy Response – Comment noted.

64. Toxicity Factors Used for Aroclor 1260: The HHRA did use Toxicity Factors for Aroclor 1254 to assess risk from exposure to Aroclor 1260 for both cancer risk and chronic non-cancer risk. However, the value used for the subchronic RfD cannot be validated. Table 5.1 lists the subchronic RfD as 6E-05 mg/kg•day. The source is listed as IRIS. This value cannot be located in IRIS unless it was back-calculated based on the uncertainty factor used to estimate the chronic RfD from a less than chronic study. The method used to estimate the subchronic RfD should be addressed in the HHRA. A subchronic RfD surrogate of 3E-05 is cited in the Risk Assessment Information System with the source listed as ATSDR.

Navy Response – As described in the text (Section 4.4.1), "Subchronic toxicity values are not found in IRIS. Instead, subchronic toxicity values have been developed from chronic toxicity values. According to USEPA guidance (USEPA, 1989), if a chronic toxicity value has been developed based on subchronic data, a subchronic toxicity value may be developed by removal of the uncertainty factor used to extrapolate from subchronic to chronic exposures (typically a factor of 10)." Based on the studies performed for Aroclor 1254, a factor of 3 was applied, resulting in the subchronic RfD presented. The table notes will include this factor for clarification.

EPA Comment- The response clarifies how the subchronic RfD for Aroclor 1260 was derived for the HHRA. The initial comment noted that the source in Table 5.1 was listed as IRIS. As noted by the Navy in its response, IRIS does NOT provide subchronic toxicity values. As noted in the Navy's response, the use of the IRIS value without the subchronic to chronic uncertainty value is appropriate but a note must be included in the table to indicate that the subchronic RfD was extrapolated from the chronic RfD in IRIS and not that the "source" is IRIS.

Navy Response – Table 5.1 has been revised to clarify that the subchronic RfD was extrapolated from the chronic RfD in IRIS as requested. The revised Table 5.1 is attached to this Response to Comments (Attachment C).

ATTACHMENT A

PROPOSED BACKGROUND SEDIMENT DATA FOR QUALITATIVE USE

Data from Background Sediment Samples

		Field ID	SD-01		SD-05		SD-06		SDAHW07 01SA01	
Analyte	**Type**	**units**								
1,2-DICHLOROBENZENE	BNA	UG/KG	960	U	2200	U	1100	U		
1,3-DICHLOROBENZENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
1,4-DICHLOROBENZENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2,2'-0XYBIS(l-CHLOROPROPANE)	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2,4,5-TRICHLOROPHENOL	BNA	UG/KG	2300	UJ	5300	U	2500	U	0.0011	U
2,4,6-TRICHLOROPHENOL	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2,4-DICHLOROPHENOL	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2,4-DIMETHYLPHENOL	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2,4-DINITROPHENOL	BNA	UG/KG	2300	U	5300	U	2500	U	0.0011	U
2,4-DINITROTOLUENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2,6-DINITROTOLUENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2-CHLORONAPHTHALENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2-CHLOROPHENOL	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2-METHYLNAPHTHALENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2-METHYLPHENOL	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
2-NITROANILINE	BNA	UG/KG	2300	U	5300	U	2500	U	0.0011	U
2-NITROPHENOL	BNA	UG/KG	2300	U	5300	U	2500	U	0.00044	U
3,3'-DICHLOROBENZIDINE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
3-NITROANILINE	BNA	UG/KG	2300	U	5300	U	2500	U	0.0011	U
4,6-DINITR0-2-METHYLPHENOL	BNA	UG/KG	2300	U	5300	U	2500	U	0.0011	U
4-BROMOPHENYL-PHENYLETHER	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
4-CHLOR0-3-METHYLPHENOL	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
4-CHLOROANILINE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
4-CHLOROPHENYL-PHENYLETHER	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
4-METHYLPHENOL	BNA	UG/KG	960	U	1300	J	1100	U	0.00044	U
4-NITROANILINE	BNA	UG/KG	2300	U	5300	U	2500	U	0.0011	U
4-NITROPHENOL	BNA	UG/KG	2300	U	5300	U	2500	U	0.0011	U
BUTYLBENZYLPHTHALATE	BNA	UG/KG	280	U	2200	U	1100	U	0.00044	U
Bis(2-CHLOROETHOXY) METHANE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
Bis(2-CHLOROETHYL)ETHER	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
Bis(2-ETHYLHEXYL)PHTHALATE	BNA	UG/KG	960	U	300	J	140	J	0.00044	U
CARBAZOLE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
DI-N-BUTYLPHTHALATE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
DI-N-OCTYLPHTHALATE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
DIBENZOFURAN	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
DIETHYLPHTHALATE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
DIMETHYLPHTHALATE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
ETHYLBENZENE	BNA	UG/KG	29	U	67	U	36	U	0.000015	U
HEXACHLOROBENZENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
HEXACHLOROBUTADIENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
HEXACHLOROCYCLOPENTADIENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
HEXACHLOROETHANE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
ISOPHORONE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
N-NITROSO-DI-N-PROPYLAMINE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
N-NITROSODIPHENYLAMINE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
NITROBENZENE	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
PENTACLOROPHENOL	BNA	UG/KG	2300	U	5300	U	2500	U	0.0011	U
PHENOL	BNA	UG/KG	960	U	2200	U	1100	U	0.00044	U
STYRENE	BNA	UG/KG	29	U	67	U	36	U	0.000015	
ALUMINUM	METAL	UG/KG	4160	J	11900		14400	J	2.24	
ANTIMONY	METAL	UG/KG	20.7	U	53	UJ	33.3	UJ	0.0109	U
ARSENIC	METAL	UG/KG	52.1	J	22.1	J	8.5	J	0.0041	J
BARIUM	METAL	UG/KG	21.8		125		73.4	J	0.0062	U
BERYLLIUM	METAL	UG/KG	0.86	U	2.7	U	1.4	UJ	0.00027	J

Data from Background Sediment Samples

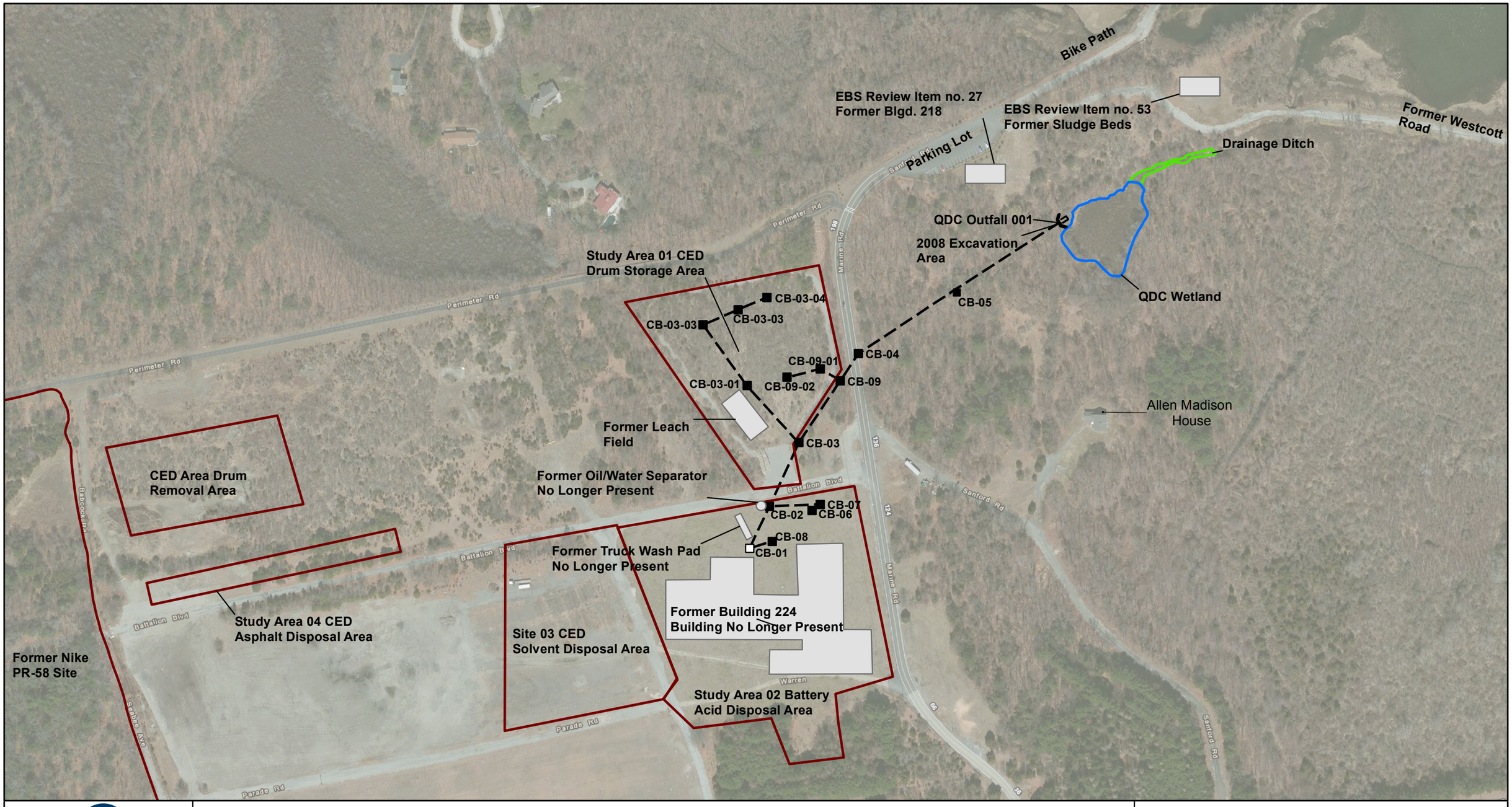
		Field ID	SD-01		SD-05		SD-06		SDAHW07 01SA01	
Analyte	**Type**	**units**								
CADMIUM	METAL	UG/KG	0.14	J	3.9		2	J	0.00065	UJ
CALCIUM	METAL	UG/KG	1400		4640		2570	J	0.268	J
CHROMIUM	METAL	UG/KG	7		19.1	J	40.2	J	0.0026	J
COBALT	METAL	UG/KG	48.3		83.3		30.1	J	0.0037	J
COPPER	METAL	UG/KG	10.2	U	44.6	J	50.4	J	0.0015	J
CYANIDE	METAL	UG/KG	1.5	U	3.4	UJ	1.8	UJ	0.0013	U
IRON	METAL	UG/KG	29100		70200		38100	J	19.3	J
LEAD	METAL	UG/KG	8.8		91.3		49.1	J	0.0043	J
MAGNESIUM	METAL	UG/KG	1030		2200		4690	J	0.634	J
MANGANESE	METAL	UG/KG	152		730	J	314	J	0.095	
MERCURY	METAL	UG/KG	0.3	U	0.68	U	0.38	UJ	0.00006	U
NICKEL	METAL	UG/KG	58.2	J	121		53.2	J	0.0045	J
POTASSIUM	METAL	UG/KG	814	U	3060	U	1620	UJ	0.123	J
SELENIUM	METAL	UG/KG	1.8	U	4.1	UJ	2.2	UJ	0.00087	U
SILVER	METAL	UG/KG	0.12	UJ	0.39	J	1.1	J	0.0011	UJ
SODIUM	METAL	UG/KG	313	U	562		505	J	0.0391	U
THALLIUM	METAL	UG/KG	1.8	U	5.5	UJ	2.9	J	0.0011	U
VANADIUM	METAL	UG/KG	10.4		24.5		27.4	J	0.0052	J
ZINC	METAL	UG/KG	157	J	591	J	274	J	0.0218	
ACID VOLATILE SULFIDE	OTHER	UMOL/G	90	u	5900		2100		0.11	
SEM/AVS	OTHER								3.7	
SIMU. EXTRACTED METAL	OTHER	UMOL/G							0.41	
Total Organic Carbon	OTHER	UG/KG	2.05		1.32		1.35		12	
ACENAPHTHENE	PAH	UG/KG	960	U	2200	U	1100	U	0.00022	U
ACENAPHTHYLENE	PAH	UG/KG	960	U	2200	U	1100	U	0.00044	U
ANTHRACENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000011	
BENZO(A)ANTHRACENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000022	U
BENZO(A)PYRENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000022	U
BENZO(B)FLUORANTHENE	PAH	UG/KG	960	U	2200	U	1100	U	8.8E-06	U
BENZO(G,H,I)PERYLENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000035	U
BENZO(K)FLUORANTHENE	PAH	UG/KG	960	U	2200	U	1100	U	8.8E-06	U
CHRYSENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000022	U
DIBENZ(A,H)ANTHRACENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000018	U
FLUORANTHENE	PAH	UG/KG	960	U	2200	U	1100	U	0.00004	
FLUORENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000044	U
INDENO(I,2,3-CD)PYRENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000022	U
NAPHTHALENE	PAH	UG/KG	960	U	2200	U	1100	U	0.00022	U
PHENANTHRENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000026	
PYRENE	PAH	UG/KG	960	U	2200	U	1100	U	0.000022	U
4,4'-DDD	PESTPCB	UG/KG	2.1	J	22	U	11	U	2.2E-07	U
4,4'-DDE	PESTPCB	UG/KG	1.9	J	11	J	11	U	2.2E-07	U
4,4'-DDT	PESTPCB	UG/KG	4.2	J	22	U	11	U	2.2E-07	U
ALDRIN	PESTPCB	UG/KG	4.9	U	11	U	5.4	U	1.1E-07	U
ALPHA-BHC	PESTPCB	UG/KG	4.9	U	11	U	5.4	U	1.1E-07	U
ALPHA-CHLORDANE	PESTPCB	UG/KG	0.5	J	11	U	5.4	U	1.1E-07	U
AROCLOR-1016	PESTPCB	UG/KG	96	U	220	U	110	U	4.4E-06	U
AROCLOR-1221	PESTPCB	UG/KG	190	U	4	U	210	U	8.8E-06	U
AROCLOR-1232	PESTPCB	UG/KG	96	U	220	U	110	U	4.4E-06	U
AROCLOR-1242	PESTPCB	UG/KG	96	U	220	U	110	U	4.4E-06	U
AROCLOR-1248	PESTPCB	UG/KG	96	U	220	U	110	U	4.4E-06	U
AROCLOR-1254	PESTPCB	UG/KG	96	U	220	U	110	U	4.4E-06	U
AROCLOR-1260	PESTPCB	UG/KG	69	U	220	U	110	U	4.4E-06	U
BETA-BHC	PESTPCB	UG/KG	1	J	1.7	J	5.4	U	1.1E-07	U
DELTA-BHC	PESTPCB	UG/KG	0.5	J	11	U	0.22	J	1.1E-07	U

Data from Background Sediment Samples

		Field ID	SD-01		SD-05		SD-06		SDAHW07 01SA01
Analyte	**Type**	**units**							
DIELDRIN	PESTPCB	UG/KG	0.3	J	22	U	11	U	1.7E-07 J
ENDOSULFAN I	PESTPCB	UG/KG	0.4	J	11	U	5.4	U	1.1E-07 U
ENDOSULFAN II	PESTPCB	UG/KG	9.6	U	22	U	11	U	2.2E-07 U
ENDOSULFAN SULFATE	PESTPCB	UG/KG	9.6	U	22	U	11	U	2.2E-07 U
ENDRIN	PESTPCB	UG/KG	9.6	U	22	U	11	U	2.2E-07 U
ENDRIN ALDEHYDE	PESTPCB	UG/KG	0.8	J	0.78	J	11	U	2.2E-07 U
ENDRIN KETONE	PESTPCB	UG/KG	9.6	U	22	U	11	U	2.2E-07 U
GAMMA-BBC (LINDANE)	PESTPCB	UG/KG	4.9	U	11	U	5.4	U	1.1E-07 U
GAMMA-CHLORDANE	PESTPCB	UG/KG	4.9	U	11	U	5.4	U	1.1E-07 U
HEPTACHLOR	PESTPCB	UG/KG	4.9	U	11	U	5.4	U	1.1E-07 U
HEPTACHLOR EPOXIDE	PESTPCB	UG/KG	4.9	U	11	U	5.4	U	1.1E-07 U
METHOXYCHLOR	PESTPCB	UG/KG	4.9	U	110	U	54	U	1.1E-06 U
TOXAPHENE	PESTPCB	UG/KG	490	U	1100	U	5	U	0.000022 U
1,1,1-TRICHLOROETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
1,1,2,2-TETRACHLOROETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
1,1,2-TRICHLOROETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
1,1-DICHLOROETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
1,1-DICHLOROETHENE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
1,2,4-TRICHLOROBENZENE	VOA	UG/KG	960	U	2200	U	1100	U	0.00044 U
1,2-DICHLOROBENZENE	VOA	UG/KG	960	U	2200	U	1100	U	0.00044 U
1,2-DICHLOROETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
1,2-DICHLOROETHENE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
1,2-DICHLOROPROPANE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
2-BUTANONE	VOA	UG/KG	34		160		36	U	0.000015 U
2-HEXANONE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
4-METHYL-2-PENTANONE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
ACETONE	VOA	UG/KG	120	UJ	580	U	200	U	0.000015 U
BENZENE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
BROMODICHLOROMETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
BROMOFORM	VOA	UG/KG	26	U	67	U	36	U	0.000015 U
BROMOMETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000003 BJ
CARBON DISULFIDE	VOA	UG/KG	29	U	67	U	38	U	0.000015 U
CARBON TETRACHLORIDE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
CHLOROBENZENE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
CHLOROETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
CHLOROFORM	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
CHLOROMETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000002 BJ
Cis-1,3-DICHLOROPROPENE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
DIBROMOCHLOROMETHANE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
METHYLENE CHLORIDE	VOA	UG/KG	68	UJ	67	U	39	U	0.000015 U
TETRACHLOROETHENE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
TOLUENE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
TRICHLOROETHENE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
VINYL CHLORIDE	VOA	UG/KG	29	U	67	U	36	U	0.000015 U
XYLENES(TOTAL)	VOA	UG/KG	29	U	67	U	36	U	0.000015 U

ATTACHMENT B

REVISED FIGURE 1-2



RESOLUTION CONSULTANTS

Drawn:	RM	07/30/2015
Approved:	KD	07/30/2015
Project #:	60273164	

Legend

- Catchbasin
- Catchbasin No Longer Present
- QDC Outfall 001
- 2008 Excavation Area
- Former Building 224 Drainline
- QDC Outfall 001 Wetland
- Drainage Ditch

N

0 100 200

Scale in Feet

FIGURE 1-2
SITE LAYOUT
QDC OUTFALL 001 RI, NCBC DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

Path: \\USCHL1FP001\Data\Projects\Govt\Projects\NavyCLEAN AECOM-EnSafe JV\Davisville\GIS\Projects\Wetland_RI_Report\MXD\Figure_1-2_Site_Layout (2).mxd

ATTACHMENT C

REVISED TABLE 5.1

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

DAVISVILLE - OUTFALL 001

Chemical of Potential Concern (3)	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
TRICHLOROETHENE	Chronic	5E-04	mg/kg-day	(4)	5E-04	mg/kg-day	Thyroid, developmental, vascular	1000	IRIS	9/2014
BENZO[A]ANTHRACENE	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BENZO[A]PYRENE	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BENZO[B]FLUORANTHENE	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BENZO[K]FLUORANTHENE	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHRYSENE	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DIBENZ[A,H]ANTHRACENE	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DIBENZOFURAN	Chronic	1E-03	mg/kg-day	(4)	1E-03	mg/kg-day	Kidney	3000	PPRTV	9/2014
INDENO[1,2,3-CD]PYRENE	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NAPHTHALENE	Chronic	2E-02	mg/kg-day	(4)	2E-02	mg/kg-day	Body weight	3000	IRIS	9/2014
BETA-BHC	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AROCLOR-1260	Chronic	2E-05	mg/kg-day	(4)	2E-05	mg/kg-day	Eye, Nails, Immune	300	IRIS	8/2014
ALUMINUM	Chronic	1E+00	mg/kg-day	0.01	1.0E-02	mg/kg-day	Nervous System	100	PPRTV	8/2014
ARSENIC	Chronic	3E-04	mg/kg-day	(4)	3E-04	mg/kg-day	Skin, Vascular	3	IRIS	8/2014
CHROMIUM, TOTAL	Chronic	3E-03	mg/kg-day	0.025	7.5E-05	mg/kg-day	None reported	900	IRIS	8/2014
COBALT	Chronic	3E-04	mg/kg-day	(4)	3E-04	mg/kg-day	Thyroid	3000	PPRTV	8/2014
IRON	Chronic	7E-01	mg/kg-day	(4)	7E-01	mg/kg-day	Gastrointestinal	1.5	PPRTV	8/2014
LEAD	Chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	IRIS	8/2014
MANGANESE	Chronic	2.4E-02	mg/kg-day	0.04	9.6E-04	mg/kg-day	Nervous System	3	IRIS	8/2014

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

DAVISVILLE - OUTFALL 001

Chemical of Potential Concern (3)	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
TRICHLOROETHENE	Subchronic	5E-04	mg/kg-day	(4)	5E-04	mg/kg-day	Thyroid, developmental, vascular	1000	IRIS	9/2014
BENZO[A]ANTHRACENE	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BENZO[A]PYRENE	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BENZO[B]FLUORANTHENE	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BENZO[K]FLUORANTHENE	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHRYSENE	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DIBENZ[A,H]ANTHRACENE	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DIBENZOFURAN	Subchronic	1E-03	mg/kg-day	(4)	1E-03	mg/kg-day	Kidney	3000	PPRTV	9/2014
INDENO[1,2,3-CD]PYRENE	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NAPHTHALENE	Subchronic	2E-01	mg/kg-day	(4)	2E-01	mg/kg-day	Body weight	3000	IRIS	9/2014
BETA-BHC	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AROCLOR-1260	Subchronic	6E-05	mg/kg-day	(4)	6E-05	mg/kg-day	Eye, Nails, Immune	100	See (3)	8/2014
ALUMINUM	Subchronic	1E+00	mg/kg-day	0.01	1.0E-02	mg/kg-day	Nervous System	100	PPRTV	8/2014
ARSENIC	Subchronic	3E-04	mg/kg-day	(4)	3E-04	mg/kg-day	Skin, Vascular	3	IRIS	8/2014
CHROMIUM, TOTAL	Subchronic	9E-03	mg/kg-day	0.025	2.3E-04	mg/kg-day	None reported	100	IRIS	8/2014
COBALT	Subchronic	3E-03	mg/kg-day	(4)	3E-03	mg/kg-day	Thyroid	300	PPRTV	8/2014
IRON	Subchronic	7E-01	mg/kg-day	(4)	7E-01	mg/kg-day	Gastrointestinal	1.5	PPRTV	8/2014
LEAD	Subchronic	N/A (6)	N/A	N/A	N/A (6)	N/A	N/A	N/A	IRIS	8/2014
MANGANESE	Subchronic	2.4E-02	mg/kg-day	0.04	9.6E-04	mg/kg-day	Nervous System	9	IRIS	8/2014

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

DAVISVILLE - OUTFALL 001

Chemical of Potential Concern (3)	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)

(1) Oral Absorption Efficiencies from Exhibit 4-1, RAGS Part E, USEPA 2004b.
Oral absorption efficiencies for aluminum, cobalt and iron obtained from ATSDR Toxicological Profiles.

(2) Calculated as: (oral RfD) x (oral to dermal adjustment factor).

(3) RfD for Aroclor 1254 used as a surrogate for Aroclor 1260 (High risk and persistence; upper-bound slope factor).
RfD for hexavalent chromium used.
When the chronic RfD is based on a subchronic study, a subchronic RfD has typically been developed by the elimination of the 10-fold uncertainty factor for subchronic to chronic adjustment. If no subchronic data are available, the chronic RfD has been adopted as the subchronic RfD.
Aroclor 1260 (subchronic) - Based on the studies performed for Aroclor 1254, a subchronic to chronic adjustment factor of 3 was applied.

(4) Oral absorption efficiency exceeds 50%. Therefore, no adjustment of the oral reference dose is necessary (USEPA, 2001).

(5) Permeability constants (Kp) used for water absorption calculations: 2E-03 cm/hr for chromium (VI), 4E-04 cm/hr for cobalt, 1E-04 cm/hr for lead, and 1E-03 cm/hr for the remaining inorganics (USEPA, 2004).

(6) See Attachment F for lead model calculations.

IRIS = Integrated Risk Information System
N/A = Not Applicable/Not Available
NOAEL = No Observed Adverse Effects Level
ATSDR = Agency for Toxic Substances and Disease Registry
PPRTV = Provisional Peer Reviewed Toxicity Values