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NCBC DAVISVILLE
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EMAIL REGARDING CALF PASTURE POINT SHELLFISHING RBCS AND RISK FOR NCBC DAVISVILLE RI
4/16/2010
U S EPA REGION I

Vetere, Stephen

From: williams.christine@epamail.epa.gov
Sent: Tuesday, May 04, 2010 3:58 PM
To: david.a.barney@navy.mil; jeffrey.m.dale@navy.mil; richard.gottlieb@dem.ri.gov
Cc: Vetere, Stephen; Sugatt.Rick@epamail.epa.gov; Brandon.Bill@epamail.epa.gov
Subject: Fw: NCBC Site 07 Shellfishing RBCs-note for Navy
Attachments: Calf Pasture Point shellfishing RBCs and risk for ME13.doc; Shellfishing RBCs.xls

(See attached file: Calf Pasture Point shellfishing RBCs and risk for ME13.doc)(See attached file: Shellfishing RBCs.xls)

In response to your e-mail, Dave, noting the signs were down along the shoreline at Calf Pasture Point solvent disposal area, I asked Rick to use the data we have to check the current risk. Please see his message below also.

While Rick used the current piezometer data from 2-3 ft below ground surface, I believe it is important to note that we're still in discussions to determine if these sampling locations are the optimal locations to sample for the discharge. Risk may be different at the optimal location. As you can see by the attachments, the risk is within our risk range. EPA guidance indicates that a risk within the risk range can be considered to be an actionable risk, with justification.
At this time, however, I believe it is more important to continue our planned investigations into the optimal location for monitoring the discharge, to continue our planned investigations into the feasibility of source area reduction, and continue the LTM of this site.

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"Sometimes leadership is planting trees under whose shade you'll never sit." Gov. Jennifer M. Granholm

----- Forwarded by Christine Williams/R1/USEPA/US on 05/04/2010 03:32 PM -----

From: Rick Sugatt/R1/USEPA/US

To: Christine Williams/R1/USEPA/US@EPA

Date: 05/04/2010 03:06 PM

Subject: NCBC Site 07 Shellfishing RBCs-note for Navy

Please forward this email when you transmit the memo and tables to Navy.
I used the equations from Attachment 5 Sample Calculations of the 2007 technical memorandum. My results for vinyl chloride were nearly identical for the example vinyl chloride concentration of 0.0620 mg/L, although they were not a perfect match. For instance, I got a DADc =
1.05E-06 while they got 1.03E-06. In my experience, small differences like this may be due to differences between Excel algorithms and other programs. It would be useful for Navy's contractor to review my calculations, and theirs, to find the cause for the small discrepancy and to agree upon the results for future application.

MEMORANDUM

To: Christine Williams
From: Richard Sugatt
Date: May 4, 2010
Subject: NCBC Calf Pasture Point-Risk based concentrations for shellfishing

This memorandum documents the derivation of risk-based concentrations for recreational shellfishing and the evaluation of shellfishing risk for the concentrations of volatile organic chemicals detected in shoreline piezometers during Monitoring Event 13.

The risk-based concentrations for contaminants of potential concern (COPCs) in piezometer samples were derived for dermal contact with groundwater by an adult recreational shellfisher using the exposure assumptions and risk equations from the June 2007 "Final Technical Memorandum Human Health Risk Assessment of Shoreline Surface Waters and Sediments, and Groundwater in Shallow Piezometers Site 07, Calf Pasture Point "(the technical memorandum). This scenario evaluates the dermal exposure and risk that may be expected to an adult who digs for shellfish in the shoreline at Calf Pasture Point where COPCs occur in shallow shoreline piezometers. Although evaluated in the technical memorandum, incidental ingestion of sediment and/or surface water during shellfishing was not evaluated because risks from these exposure pathways are insignificant relative to dermal contact.

The COPCs in shallow groundwater (from piezometers along the shoreline) were identified in the technical memorandum as 1,1,2,2-tetrachloroethane; 1,1,2-trichloroethane; 1,1-dichloroethene; 1,2-dichloroethane; benzene; chloroform; cis-1,2-dichloroethene; trans-1,2-dichloroethene; trichloroethene; and vinyl chloride.

The risk-based concentrations for cancer risk are presented in Table 1, in which the risk-based concentrations are set at 1E-05 incremental lifetime cancer risk (ILCR). The risk-based concentrations for non-cancer risk are presented in Table 2, in which the risk-based concentrations are set at Hazard Quotient (HQ) = 1. The risk-based concentrations were calculated by changing the concentration in groundwater (Cw) by trial and error on the attached electronic spreadsheets until the risks reached ILCR=1E-05 (Table 1) or HQ = 1 (Table 2).

These tables were used to calculate the risks associated with the maximum concentration of COPCs in piezometers reported in Table 5 of the latest monitoring event at Site 07 (December 2009 "Monitoring Event 13 September/October 2009 Data Report for Site 07: Calf Pasture Point Naval Construction Battalion Center Davisville North Kingstown, Rhode Island". As shown in Table 3, the cumulative ILCR for the maximum concentration of the five detected COPCs was 2.1E-06, and the hazard quotients for these chemicals were all below HQ=1. The sum of the HQ values was 0.71. It is concluded that the risk associated with dermal contact during shellfishing is lower than EPA risk limits (i.e. ILCR = 1E-04 to 1E-06; HQ = 1). The electronic form of these tables can be

used to calculate risk-based concentrations at other risk levels and to evaluate cumulative risk for future monitoring events.

Table 1. Cancer Risk-Based Concentrations (mg/L)

Chemical	ILCR	HQ	Cw (mg/L)
Vinyl Chloride	1.0E-05	1.1E-02	0.4
1,1,2,2-Tetrachloroethane	1.0E-05	5.8E-02	2.4
1,1,2-Trichloroethane	1.0E-05	2.1E-01	9.1
1,1-Dichloroethene	NA	1.0E+00	1180.0
1,2-Dichloroethane	1.0E-05	2.6E-02	8.7
Benzene	1.0E-05	2.1E-01	4.0
Chloroform	1.0E-05	1.5E-01	15.7
cis-1,2-Dichloroethene	NA	1.0E+00	92.0
trans-1,2-Dichloroethene	NA	1.0E+00	184.0
Trichloroethene	1.0E-05	2.0E+01	46.7

Table 2. Non-Cancer Risk-Based Concentrations (mg/L)

Chemical	ILCR	HQ	Cw (mg/L)
Vinyl Chloride	9.0E-04	1.0E+00	38.0
1,1,2,2-Tetrachloroethane	1.7E-04	1.0E+00	41.1
1,1,2-Trichloroethane	4.9E-05	1.0E+00	44.3
1,1-Dichloroethene	NA	1.0E+00	1180.0
1,2-Dichloroethane	3.9E-04	1.0E+00	338.0
Benzene	4.7E-05	1.0E+00	18.9
Chloroform	6.7E-05	1.0E+00	104.5
cis-1,2-Dichloroethene	NA	1.0E+00	92.0
trans-1,2-Dichloroethene	NA	1.0E+00	184.0
Trichloroethene	5.1E-07	1.0E+00	2.4

Table 3. Risks for Maximum Groundwater Concentration (mg/L) in Piezometers, Monitoring Event 13, Calf Pasture Point, Site 07 NCBC

Chemical	ILCR	HQ	Cw (mg/L
Vinyl Chloride	5.7E-07	6.3E-04	0.024
1,1,2,2-Tetrachloroethane	1.2E-06	6.8E-03	0.280
1,1,2-Trichloroethane	6.8E-08	1.4E-03	0.062
1,1-Dichloroethene		0.0E+00	0.0
1,2-Dichloroethane	0.0E+00	0.0E+00	0.0
Benzene	0.0E+00	0.0E+00	0.0
Chloroform	0.0E+00	0.0E+00	0.0
cis-1,2-Dichloroethene		2.1E-02	1.97
trans-1,2-Dichloroethene		0.0E+00	0.0
Trichloroethene	3.4E-07	6.8E-01	1.60
Total Risk:	2.1E-06	7.1E-01	

Table 3. Cancer and Non-Cancer Risks for Adult Dermal Contact with Groundwater while Shellfishing for Maximum Piezometer Concentrations-Monitoring Event 13

Chemical	ILCR	HQ	DADc	DADnc	DA_{event}	FA	Kp	Cw	CF	tevent	B	taux	EV	ED	EF	A	BW	AT-c	AT-nc	CSFo	RfDo
					(mg/cm^2/event)	(unitless)	(cm/hr)	(mg/L	(L/cm^3)	(hr/event)	(unitless)	(hr/event)	(event/d)	(yr)	(d/yr)	(cm^2)	(kg)	(d)	(d)	($(mg/kg/d)^{-1}$)	(mg/kg/d)
Vinyl Chloride	5.7E-07	6.3E-04	4.07E-07	1.90E-06	3.37E-07	1	5.60E-03	0.024	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5475	1.4E+00	3.0E-03
1,1,2,2-Tetrachloroethane	1.2E-06	6.8E-03	5.85E-06	2.73E-05	4.84E-06	1	6.90E-03	0.280	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5472	2.0E-01	4.0E-03
1,1,2-Trichloroethane	6.8E-08	1.4E-03	1.20E-06	5.60E-06	9.94E-07	1	6.40E-03	0.062	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5475	5.7E-02	4.0E-03
1,1-Dichloroethene		0.0E+00	0.00E+00	0.00E+00	0.00E+00	1	1.20E-02	0.0	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5474		2.0E-01
1,2-Dichloroethane	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	1	4.20E-03	0.0	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5474	9.1E-02	2.0E-02
Benzene	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	1	1.50E-02	0.0	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5474	5.5E-02	4.0E-03
Chloroform	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	1	6.80E-03	0.0	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5474	3.1E-02	1.0E-02
cis-1,2-Dichloroethene		2.1E-02	4.59E-05	2.14E-04	3.80E-05	1	7.70E-03	1.97	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5474		1.0E-02
trans-1,2-Dichloroethene		0.0E+00	0.00E+00	0.00E+00	0.00E+00	1	7.70E-03	0.0	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5474		2.0E-02
Trichloroethene	3.4E-07	6.8E-01	5.81E-05	2.71E-04	4.81E-05	1	1.20E-02	1.60	0.001	2	0.017	0.24	1	15	80	1800	70	25550	5474	5.9E-03	4.0E-04
Total Risk:	2.1E-06	7.1E-01																			

Dermal exposure calculated according to Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005 July 2004

Kp from Exhibit B-2 Appendix B Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005 July 2004-Updated May 2, 2010 from http://www.epa.gov/oswer/riskassessment/ragse/index.htm.

Oral Reference Dose for trichloroethene is based on evaluation of "External Review Draft Toxicological Review of Trichloroethylene (TCE)" http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=215006

Oral Slope Factor for trichloroethene is based on California EPA, as used in EPA Regional Screening Levels http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

Maximum concentrations in shoreline piezometer groundwater from Table 5 in December 2009 Monitoring Event 13 for Site 07:Calf Pasture Point NCBC, North Kingstown, RI