Pennsylvania Department of Environmental Protection

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Mr. Orlando J. Monaco
Naval Facilities Engineering Command (NAVFACENGCOM)
Northern Division
Environmental Contracts Branch, Mail Stop No. 82
10 Industrial Highway
Lester, PA 19113

RE: Naval Air Warfare Center NPL Site
Technical Evaluation
Phase III RI Report (November 1996)
Area D RI Report (April 1997)
Site 6 Summary Report (January 1998)

Dear Mr. Monaco,

On behalf of the Department, I have completed review of the above noted documents, which were submitted by Brown and Root Environmental. The issues remaining to be addressed are as follows.

A. Technical comments on Phase III remedial Investigation Report (Media Other Than Groundwater), November 1996

1. Table 2-24, entitled " Soil Criteria Detected For All Chemicals Detected In Soil at NAWC Warminster", contains erroneous direct contact values identified as "PADER MSC RESIDENTIAL SOIL". The correct residential direct contact numeric values, and soil to groundwater numeric values are as follows. (Reference: 25 Pa. Code Chapter 250)

Substance	Direct Contact Value (mg/Kg) Res. (0-15')	Nres. (0-2')	Nres. (2'-15')	Soil to Groundwater Res. (0' to bedrock)	Nres.
4,4' DDD	53	230	190,000	6.8	29
4,4' DDE	53	230	190,000	28	28
4,4' DDT	53	230	190,000	100	100
Aldrin	1.1	4.7	190,000	0.1	0.44
Alpha-Chlordane	13	61	190,000	49	49
Aroclor 1242	36	160	10,000	16	62
Aroclor 1248	9.9	44	10,000	18	67
Aroclor 1254	4.4	44	10,000	75	280
Aroclor 1260	30	130	190,000	110	500
Beta-BHC	9.9	44	190,000	5.4	15
Delta-BHC	66	840	190,000	5.4	15
Di ldrin	1.1	5.0	10,000	0.11	0.44
Endosulfan 1	1300	17,000	190,000	110	280
Endosulfan 2	1300	17,000	190,000	130	170
Endosulfan Sulfate	1300	17,000	190,000	72	72
Endrin	66	840	190,000	5.4	5.4
Endrin Aldehyde	66	840	190,000	5.4	5.4
Endrin Ketone	66	840	190,000	5.4	5.4
Gamma-BHC	16	72	190,000	0.071	0.071
Gamma-Chlordane	13	61	190,000	49	49
Heptachlor	4	18	190,000	0.68	0.68
Heptachlor Epox	2	8.7	190,000	1	1
Methoxyclor	1100	14,000	190,000	630	630
1,4 dichlorobenzene	5900	10,000	10,000	61	61
2-methylnaphthalene	8800	10,000	10,000	6000	6000
2-nitrophenol	14,000	170,000	190,000	230	630
3-3' dichlorobenxid.	40	180	190,000	8.4	33
4-methyl 2-pentanone	1500	4300	4900	22	47
acenaphthene	13,000	170,000	190,000	2700	4300
acenaphthylene	13,000	170,000	190,000	2500	4400
anthracene	66,000	190,000	190,000	230	230
benzo(a)anthracene	25	110	190,000	80	320
benzo(a)pyrene	2.5	11	190,000	46	46
benzo(b)flouranthene	25	110	190,000	120	160
benzo(g,h,i)perylene	13,000	170,000	190,000	180	180
benzo(k)flouranthene	250	1100	190,000	600	600
BEHP	1300	5700	10,000	130	130
butyl benzyl phthalate	10,000	10,000	10,000	10,000	10,000

Contaminant	Direct Contact Value (mg/Kg)			Soil to Groundwater (mg/Kg)	
carbazole	—	—	—	—	—
chrysene	2500	10,000	190,000	220	220
di-n-butyl phthalate	10,000	10,000	10,000	1500	4100
dibenz(a,h)anthracene	2.5	11	190,000	41	160
dibenzofuran	—	—	—	—	—
diethylphthalate	10,000	10,000	10,000	500	500
flouranthene	8800	110,000	190,000	3300	3300
flourene	8800	110,000	190,000	380	380
hexachloroethane	220	2800	190,000	0.56	0.56
indeno(1,2,3-cd)pyre	25	110	190,000	7000	28,000
naphthalene	8800	110,000	190,000	5	5
pentachlorophenol	150	660	190,000	5	5
pyrene	6600	84,000	190,000	220	220
1,1,2,2 TCEA	5.5	28	33	0.074	0.32
1,1 dichloroethane	200	1000	1200	2.7	11
1,2 dichloroethene					
cis-	670	1900	2100	7	7
trans-	1300	3700	4300	10	10
trans-1,3 dcpe	—	—	—	—	—
2-butanone	10,000	10,000	10,000	280	580
acetone	10,000	10,000	10,000	370	1000
bromomethane	95	270	300	1	1
carbon disulfide	10,000	10,000	10,000	190	410
chloromethane	—	—	—	—	—
chloroform	14	72	82	10	10
ethylbenzene	10,000	10,000	10,000	70	70
methylene chloride	—	—	—	—	—
tetrachloroethene	340	1500	3300	0.5	0.5
toluene	7600	10,000	10,000	100	100
trichloroethene	190	970	1100	0.5	0.5
total xylenes	10,000	10,000	10,000	1000	1000
2,3,7,8 TCDD	1.2 E-4	5.3 E-4	190,000	3.2 E-5	3.2 E -5
Aluminum	190,000	190,000	190,000	NA	NA
Antimony	88	1100	190,000	27	27
Arsenic	12	53	190,000	150	150
Barium	15,000	190,000	190,000	8200	8200
Beryllium	4.2	18	190,000	320	320
Cadmium	110	1400	190,000	38	38

Chromium 3-	190,000	190,000	190,000	190,000	190,000
Chromium 6-	1100	14,000	190,000	340	970
Lead	500	1000	190,000	450	450
Mercury	19	240	190,000	10	10
Nickel	4400	56,000	190,000	650	650
Selenium	1100	14,000	190,000	26	26
Silver	1100	14,000	190,000	84	84
Thallium	18	220	190,000	14	14
Vanadium	13	160	190,000	210	580
Zinc	66,000	190,000	190,000	12,000	12,000

There are three approaches to attaining a remediation standard for affected soil that are authorized under Act 2 of 1995, the Land Recycling and Environmental Remediation Standards Act. The above numeric values for soils are defined as direct contact and soil-to-groundwater numeric values. In any exposure setting, the direct contact numeric value is compared to the soil-to-groundwater numeric value throughout the first fifteen feet of the soil column. The lower numeric value for the regulated substance would be the medium specific concentration (MSC). Regulated substances which are detected in soil below a depth of 15 feet below the ground surface would be compared to the soil-to-groundwater numeric value. The resulting medium specific concentration(s) would be the statewide health standard for that particular regulated substance.

A rough estimate of the volume of soil exceeding the statewide health standard is determined. A removal action is often taken on the volume of soil exceeding the standard. A statistical demonstration is necessary to demonstrate attainment with the statewide health standard. This is accomplished through confirmation sampling.

A background determination is allowed under Act 2. The remediator identifies an area that was not affected by a release of regulated substances, and collects ten (10) soil samples to determine the background concentration of the regulated substance. The highest concentration detected can be used as the background concentration. The volume of soil affected by a release of the regulated substance is determined, and remediation is conducted to the background concentration. If the background concentration is higher than the concentration attributable from the release, the remediator can take the no action alternative.

A site-specific standard can be sought for the same volume of contaminated media. If attainment of the statewide health standard is not desired, the remediator can determine the concentration of the regulated substance that can remain on site without posing a risk to human health and the environment. If risk is forseeable, the remediator can close the pathway of exposure through engineering controls. The demonstration of attainment would be the ability of that engineering control to perform its intended function. Institutional controls such as fencing and deed notices can be used to maintain the site-specific standard.

2. **Exceedances of the statewide health standard for soil at Area A, Site 1.**

surface soils: SS-01-01 through SS-01-06: Vanadium (V) exceeds residential direct contact numeric vlaue of 13 mg/Kg. (37.4mg/Kg, 30 mg/Kg, 31.2 mg/Kg, 28.2 mg/Kg, 36.5 mg/Kg, and 34.7 mg/Kg, respectively)

subsurface soils: SB-01-01 327 mg/Kg Antimony exceeds 27mg/Kg s-gw
SB-01-05 98.1 mg/Kg Antimony
SB-01-05 48.8 mg/Kg Cadmium exceeds 38 mg/Kg s-gw
SB-01-01 389 mg/Kg Silver exceeds 84 mg/Kg s-gw
SB-01-04 191 mg/Kg Silver
SB-01-05 140 mg/Kg Silver
SB-01-06 66 mg/Kg Vanadium exceeds res. direct contact
SB-01-07 27.3 mg/Kg Vanadium

3. **Exceedances of the statewide health standard for soil at Area A, site 2**

surface soils: SS-02-01 through SS-02-07: exceedances of the residential direct contact numeric vaalue for Vanadium (26.1 mg/Kg, 25.8 mg/Kg, 56.9 mg/Kg, 39.2 mg/Kg, 111 mg/Kg, 65.4 mg/Kg, and 54.5 mg/Kg.

SS-SDA-05 22.8 mg/Kg Arsenic exceeds residential direct contact numeric value of 12 mg/Kg.
SS-SDA-05 80,800 mg/Kg Lead exceeds redidential direct contact, nonresidential direct contact for surface soils, and soil to groundwater numeric value.

subsurface soils, Area A, Site 2
SS-SDA-07 1270 mg/Kg Lead
SS-SDA-01 through -11: Vanadium exceeds residential direct contact numeric value
SS-SDA-07 12,400 mg/Kg Zinc exceeds soil to groundwater numeric value
SS-02-05 2.9 mg/Kg Benzo(a)Pyrene exceeds residential direct vontact numeric value of 2.5 mg/Kg.
SS-02-07 3.4 mg/Kg Benzo(a)Pyrene
SB-02-07 131 mg/Kg Silver exceeds s-gw numeric value of 84 mg/Kg
SB-02-08 5.2 mg/Kg Benzo(a) Pyrene
SB-02-08 5.9 mg/Kg Aroclor 1254
SB-02-11 3810 mg/Kg Chromium (if all Cr6+) exceeds res. direct contact numeric value of 1100 mg/Kg s-gw numeric value of 340 mg/Kg
SB-02-10 4570 mg/Kg Lead
SB-02-11 156 mg/Kg Silver
SB-02-20 3840 mg/Kg Chromium (if all Cr6+)
SB-02-20 168 mg/Kg Silver
SB-02-21 776 mg/Kg Lead

SB-02-21 1820 mg/Kg Lead
SB-02-31 317 (j) mg/Kg Antimony
SB-02-31 14,100 mg/Kg Chromium (if all Cr6+)
SB-02-32 293 mg/Kg Cadmium
SB-02-47 673 mg/Kg Lead
SB-02-48 978 mg/Kg Lead
SB-02-48 586 mg/Kg Vanadium
TP-08-02-05 3.9 mg/Kg Benzo(a)Pyrene
SB-02-61 3.8 mg/Kg Benzo(a)Pyrene

3. Exceedances of the statewide health standard for soil in Area A, Site 3

surface soils

SS-03-01 3.9 mg/Kg Benzo(a)Pyrene
SS-03-04 3.0 mg/Kg Benzo(a)Pyrene
SS-03-05 3.8 mg/Kg Benzo(a)Pyrene

subsurface soils, Area A, Site 3

SB-03-06 466 mg/Kg Lead
SB-03-08 1600 mg/Kg Lead
TP-01-03-01 474 mg/Kg Lead
TP-01-03-02 620 mg/Kg Lead
TP-03-03-06 67.1 mg/Kg Cadmium
TP-03-03-06 1350 mg/Kg Lead
TP-03-03-06 368 mg/Kg Silver
TP-03-01 detection limit 39 mg/Kg (semivolatiles)
SB-03-08 2.7 (j) mg/Kg Benzo(a)Pyrene

4. Exceedances of the statewide health standard for soil, Impoundment Area

subsurface soils

IM101A 91.1 mg/Kg cadmium
IM101 127 mg/Kg Silver
IM705A 82.7 mg/Kg Cadmium
IM705A 373 mg/Kg Silver

4. **Exceedances of the statewide health standard for soil, impoundment area**

subsurface soils

IM307 1.5 mg/Kg detection limit (volatiles)
IM401 1.7 mg/Kg detection limit (volatiles)
IM505 1.5 mg/Kg detection limit (volatiles)
IM705A 2.8 mg/Kg detection limit (volatiles)
IM105A 3.0 (j) mg/Kg Benzo(a)Pyrene

5. **Exceedances of the statewide health standard for soil, Area B, Site 5**

surface soils

SS-05-08 12 mg/Kg Mercury
SS-05-07 24 mg/Kg Aroclor 1254

subsurface soils

SB-05-20 12.9 mg/Kg Arsenic
SB-05-20 726 mg/Kg Lead
SB-05-21 907 mg/Kg Lead
SB-05-20 6510 mg/Kg Vanadium

6. **Exceedances of the statewide health standard for soils, Area C, Site 8**

surface soils

SS-08-12 1000 mg/Kg Lead
SS-08-13 759 mg/Kg Lead

The Department will consider an alternate risk-based concentration at any site. The excess cancer risk or hazard index must not exceed 1 in 10,000, or 1, respectively.

B. **Technical comments on <u>Remedial Investigation Report for Area D Sources, May, 1997</u>**

1. Page 4-57: Tetrachloroehtene (PCE) was detected at a concentration of 2.6 mg/Kg in boring 15/130-SB-85-02, in excess of the soil to groundwater pathway numeric value of 0.5 mg/Kg. Two samples collected at depth at this location were not in excess of 0.5 mg/Kg. If this were confirmation sampling, the attainment demonstration would not pass the75/10X statistical rule for attainment of the statewide health standard for soil media. The remediator can collect a duplicate sample within the interval and at the

location that exceeded the standard, and analyze the duplicate using USEPA Method 1312, the synthetic precipitate leaching procedure. If the leachate does not exceed the statewide health standard for groundwater, the soil is confirmed not to exceed the soil to groundwater pathway, and the numeric value would be moot.

C. **Technical comments on Site 6 Summary Report, January 1998**

1. **Exceedances of the statewide health standard for soils, Site 6**

surface soils

S6-SS-112: 11.0 mg/Kg Benzo(a)Pyrene

subsurface soils

TP-36-09: 368 mg/Kg Silver
TP-29-W3 4.2 mg/Kg Aroclor 1254
TP-29-W3 5.1 mg/Kg Aroclor 1260
SB-4002 2.8 mg/Kg Benzo(a)Pyrene
TP-29-W3 7700 mg/Kg Lead
TP-2907 152 mg/Kg Cadmium
TP-02-01 78.2 mg/Kg Cadmium
SB-21-04 135.0 mg/Kg Cadmium
TP-35-07 145 mg/Kg Cadmium
TP-36-09 68.8 mg/Kg Cadmium
TP-40-03 66.9 mg/Kg Cadmium
TP-02-01 39,300 mg/Kg Lead
TP-38-W1 1030 mg/Kg Lead

Soil to Groundwater pathway exceedances of Lead, Silver, Cadmium are not considered in a baseline risk assessment for soils. However, the soil to groundwater pathway exceedance area must be addressed.

Technical comments on Area A and Area D groundwater are forthcoming. If you have any questions in regard to this matter, please do not hesitate to call me at (610)-832-6151.

Thank You,

James R. Burke

James R. Burke, P.G.
Hydrogeologist 2

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