



Jeb Bush  
Governor

## Department of Environmental Protection

Twin Towers Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

David B. Struhs  
Secretary

June 9, 2000

Mr. Bill Hill  
Code 1851  
Southern Division  
Naval Facilities Engineering Command  
2155 Eagle Drive  
P.O. Box 190010  
North Charleston, South Carolina 29419-9010

RE: Final Record of Decision, Operable Unit 6 (Sites 9 and 29), NAS Pensacola

Dear Mr. Hill:

I have completed the technical review of the above referenced Record of Decision (ROD) dated September 7, 1999 (received September 14, 1999). I have the following comments that should be addressed before the State can concur with the ROD.

Groundwater at the sites exceeds the Secondary Drinking Water Standard for manganese; therefore, further monitoring and/or institutional controls to restrict groundwater usage may be required. Prior to implementation of groundwater restrictions, additional groundwater data should be presented to define the area of the manganese exceedence and/or establish that the elevated manganese concentrations are not site related.

It is probable that the area of manganese exceedence extends beyond the site boundary and encompasses a portion of the former Chevalier Field area. The occurrence of manganese is also suspected to the nature of the fill brought in to this area, and therefore, may not be attributable to the site.

Existing groundwater data (manganese concentrations and turbidity) collected for CERCLA sites in the Chevalier Field area may be utilized to evaluate the occurrence of manganese

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Mr. Bill Hill  
Page Two  
June 9, 2000

and demonstrate if manganese is endemic to this area of the facility and attributed to turbidity.

Attached to this letter is groundwater statistical information retrieved from the ambient groundwater monitoring network for Escambia County. This data indicate that several groundwater monitoring wells in the groundwater monitoring network exhibited elevated manganese concentrations attributed to suspended particulates in the groundwater samples.

I recommend that the Navy consider expanding the facility groundwater background data in order to establish more representative reference data for the facility.

The ROD states that the hazard indices (HIs) were found to be 9 and 4 for the future child resident and 4 and 2 for the adult at Sites 9 and 29 (Page 41). The ROD also states that the primary contributor to hazard at the sites is manganese. The basis of these HIs and the hazard based RGOS (tables 6-6 and 6-7) should be reevaluated.

Attached is a memorandum from the University of Florida dated November 30, 1999 that develops health-based groundwater cleanup target levels for many contaminants having organoleptic criteria or secondary standards. The health-based criteria for manganese is stated to be 980 ug/L in this memorandum. Groundwater samples collected at OU6 exhibited manganese concentrations below the health-based criteria,

If I can be of any further assistance with this matter, please contact me at (850) 921-9989.

Sincerely,

*Joseph F. Fugitt*

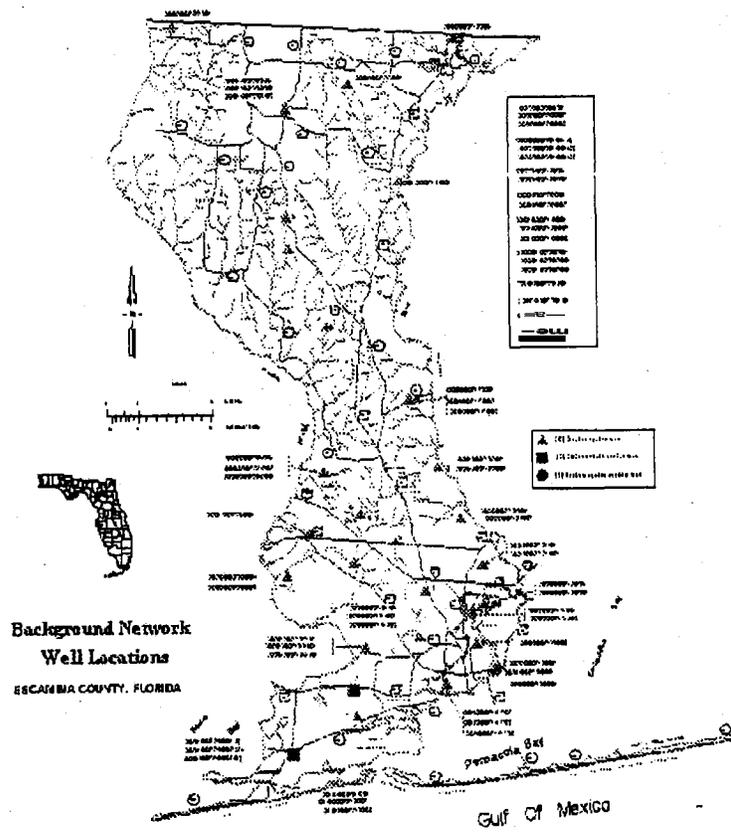
Joseph F. Fugitt, P.G.  
Remedial Project Manager

cc: Ron Joyner, NAS Pensacola  
Gena Townsend, USEPA Region 4  
Brian Caldwell, EnSafe, Knoxville  
Allison Harris, EnSafe, Memphis  
Terry Hansen, Tetra Tech NUS, Inc., Tallahassee  
Charlie Goddard, FDEP Northwest District

TJB B

JJC JJC

ESN ESN



GWIS: RETRIEVAL STATISTICS  
05/30/2000

SAND AND GRAVEL AQUIFER

Parameter Description	Meas. Units	No. Station	No. Sample	No. BDLS	Minimum Value	Lower Quartile	Median Value	Upper Quartile	Maximum Value
Manganese, Dissolved	ug/L	43	122	12	1.1500	4.7000	8.6000	15.6667	75.5000
Manganese, Suspended	ug/L	12	13	4	0.5000	0.5000	11.5000	31.5000	295.0000
Manganese, Total	ug/L	62	201	32	3.1667	20.0000	33.4167	67.2500	320.0000

NOTE: Data from different water bodies were analyzed separately.

NOTE: Values below detection limit were treated as 1/2 detection limit.

NOTE: Multiple values at a single station were averaged.

NOTE: Upper and lower quartiles estimated from upper and lower fourths (Hoaglin, Mosteller, Tukey 1983)

NOTE: NSD indicates insufficient data for calculation



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November 30, 1999

Ms. Ligia Mora-Applegate  
Bureau of Waste Cleanup  
Florida Department of Environmental Protection  
Room 471 A, Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

Dear Ms. Mora-Applegate:

At your request, we have developed health-based groundwater cleanup target levels (GCTLs) for those contaminants which currently have GCTLs that are set by secondary standards or are based on organoleptic criteria. Attachment 1 shows the equation used by FDEP to calculate health-based GCTLs for non-carcinogens. Attachment 2 provides the list of contaminants, their current GCTL and basis, and the health-based GCTL. Attachment 3 provides the reference doses (RfDs) and their sources, used in the calculation of the health-based GCTLs.

We hope that this information is helpful. If you have any questions regarding the derivation of these values, please do not hesitate to contact us.

Sincerely,

Christopher J. Stranko, Ph.D.

Stephen M. Roberts, Ph. D.

cc: Tim Bahr  
attachments

**Attachment 1**

**Equation for Deriving Site-Specific Cleanup Target Levels  
For Non-Carcinogens in Groundwater**

$$\text{GCTL } (\mu\text{g/L}) = \frac{\text{RfD}_{\text{oral}} \times \text{BW} \times \text{RSC} \times \text{CF}}{\text{Wconsp.}}$$

<b>Parameter</b>	<b>Definition (units)</b>	<b>Default Value</b>
GCTL	groundwater cleanup target level (μg/L)	n/a
RfD <sub>oral</sub>	chronic oral reference dose (mg/kg/day)	Chemical-specific <sup>b</sup>
BW	average body weight (kg)	70 <sup>a</sup>
RSC	relative source contribution (%)	20%
CF	conversion factor (μg/mg)	1000
Wconsp.	average water consumption (L/day)	2

Equations and default parameters from FDEP 'Ground Water Guidance Concentration Manual', Bureau of Drinking Water and Ground Water Resources, June 1994.

<sup>b</sup>Toxicity values from IRIS, HEAST, or other sources as provided in Tables 5b of the Technical Report for Chapter 62-777, F.A.C.

Note: For those parameters where the derived GCTL is lower than what can reasonably be measured in a laboratory, the PQL will be designated as the groundwater cleanup target level.

## Attachment 2.

**Comparison of Organoleptic and Secondary Standard GCTLs with Health-Based Values**

Contaminant	CAS #	Current GCTL	Health-Based GCTL
		(µg/L)	(µg/L)
Acenaphthene	83-32-9	20 <i>Organoleptic</i>	420 <i>Systemic Toxicant</i>
Aluminum	7249-90-5	200 <i>Secondary Standard</i>	7000 <i>Systemic Toxicant</i>
Biphenyl, 1,1- [or Diphenyl]	92-52-4	0.5 <i>Organoleptic</i>	350 <i>Systemic Toxicant</i>
Butyl acetate, n-	123-86-4	43 <i>Organoleptic</i>	N/A
Chlorophenol, 3-	108-43-0	10 <i>Organoleptic / PQL</i>	35 <i>Systemic Toxicant</i>
Chlorophenol, 4-	10648-9	5.5 <i>Organoleptic / PQL</i>	35 <i>Systemic Toxicant</i>
Chloropicrin	76-06-2	7.3 <i>Organoleptic</i>	N/A
Copper	7440-50-8	1000 <i>Secondary Standard</i>	280 <sup>a</sup> <i>Systemic Toxicant</i>
Cumene [or Isopropyl benzene]	98-82-8	0.8 <i>Organoleptic</i>	700 <i>Systemic Toxicant</i>
Dichlorobenzene, 1	541-73-1	10 <i>Organoleptic / PQL</i>	210 <i>Systemic Toxicant</i>
Dichlorophenol, 2,3-	576-24-9	10 <i>Organoleptic / PQL</i>	21 <i>Systemic Toxicant</i>
Dichlorophenol, 2,4-	120-83-2	0.5 <i>Organoleptic / PQL</i>	21 <i>Systemic Toxicant</i>
Dichlorophenol, 2,5-	583-78-8	10 <i>Organoleptic / PQL</i>	21 <i>Systemic Toxicant</i>
Dichlorophenol, 2,6-	87-65-0	4 <i>Organoleptic / PQL</i>	21 <i>Systemic Toxicant</i>
Dichlorophenol, 3,4-	95-77-2	0.5 <i>Organoleptic / PQL</i>	21 <i>Systemic Toxicant</i>
Ethyl ether	60-29-7	750 <i>Organoleptic</i>	1400 <i>Systemic Toxicant</i>
Ethylbenzene	100-41-4	30 <i>Secondary Standard</i>	700 <sup>b</sup> <i>Primary Standard</i>
Fluoride	7782414	2000 <i>Secondary Standard</i>	4000 <sup>c</sup> <i>Primary Standard</i>
Formaldehyde	50-00-0	600 <i>Organoleptic</i>	1400 <i>Systemic Toxicant</i>
Hexane, n-	110-54-3	10 <i>Organoleptic / PQL</i>	420 <i>Systemic Toxicant</i>
Iron	7439-89-6	300 <i>Secondary Standard</i>	2100 <i>Systemic Toxicant</i>
Manganese	7439-96-5	50 <i>Secondary Standard</i>	980 <sup>d</sup> <i>Systemic Toxicant</i>
Methyl acetate	79-20-9	5000 <i>Organoleptic / PQL</i>	7000 <i>Systemic Toxicant</i>

Contaminant	CAS #	Current GCTL	Health-Based GCTL
		(µg/L)	(µg/L)
Methyl methacrylate	80-62-6	25 <i>Organoleptic</i>	9800 <i>Systemic Toxicant</i>
Methyl tert-butyl ether [or MTBE]	1634-04-4	50 <i>Organoleptic</i>	210 <i>Systemic Toxicant</i>
Methylnaphthalene, 1-	90-12-0	20 <i>Organoleptic</i>	140 <i>Systemic Toxicant</i>
Methylnaphthalene, 2-	91-57-6	20 <i>Organoleptic</i>	140 <i>Systemic Toxicant</i>
Naphthalene	91-20-3	20 <i>Organoleptic</i>	140 <i>Systemic Toxicant</i>
Phenol	108-95-2	10 <i>Organoleptic</i>	4200 <i>Systemic Toxicant</i>
Silver	7440-22-4	100 <i>Secondary Standard</i>	35 <i>Systemic Toxicant</i>
Sulfate	14808-79-8	250000 <i>Secondary Standard</i>	N/A
Toluene	108-88-3	40 <i>Secondary Standard</i>	1000 <sup>e</sup> <i>Primary Standard</i>
Total dissolved solids [or TDS]	C-010	500000 <i>Secondary Standard</i>	N/A
Trichlorophenol, 2,4,5-	95-95-4	4 <i>Organoleptic</i>	700 <i>Systemic Toxicant</i>
Trimethylbenzene, 1,2,3-	526-73-8	10 <i>Organoleptic</i>	350 <i>Systemic Toxicant</i>
Trimethylbenzene, 1,2,4-	9543-6	10 <i>Organoleptic</i>	350 <i>Systemic Toxicant</i>
Trimethylbenzene, 1,3,5-	108-67-8	10 <i>Organoleptic</i>	350 <i>Systemic Toxicant</i>
TRPH	No CAS#	5000 ##	280' <i>Systemic Toxicant</i>
Vinyl acetate	108-05-4	88 <i>Organoleptic</i>	7000 <i>Systemic Toxicant</i>
Xylenes, total	1330-20-7	20 <i>Secondary Standard</i>	10000 <sup>e</sup> <i>Primary Standard</i>
Zinc	7440-66-6	5000 <i>Secondary Standard</i>	2100 <i>Systemic Toxicant</i>

The National Center for Environmental Assessment (NCEA) recommends a reference dose range of 0.04-0.07 mg/kg-day. The health-based GCTL is based on a RfD of 0.04 mg/kg-day.

<sup>b</sup>The health-based GCTL for ethylbenzene is the basis for the Primary Standard.

<sup>c</sup>The value for fluoride is the Primary Standard. A value based on systemic toxicity would be lower.

<sup>d</sup>When considering risk from non-dietary exposure to manganese, the USEPA recommends modifying the reference dose to account for background exposure. In this case, the unmodified RfD was used because the formula used to calculate the GCTL uses a relative source contribution term to account for background exposure.

<sup>e</sup>The values for Toluene and Xylenes, total are the Primary Standards, Values based on systemic toxicity would be higher.

The health-based GCTL for TRPH is based on the fraction-specific RfD (0.04mg/kg-day) for the C<sub>8</sub>-C<sub>16</sub> hydrocarbon fraction recommended by the Total Petroleum Hydrocarbon Working Group (TPHCWG). If site specific data on the composition of the TRPH is available, it could be used to derive a site-specific GCTL.

N/A = Not available

## = Based on similarity to oil and grease standard as provided in Chapter 62-302, F.A.C.

**Attachment 3**

**Sources of Toxicity Information Used to Calculate Health-Based GCTLs**

Contaminant	CAS #	Oral RfD	Oral RfD Source	Health-Based GWCTL
		(mg/kg-day)		(µg/L)
Acenaphthene	83-32-9	0.06	IRIS	420
Aluminum	7249-90-5	1	NCEA	7000
Butyl acetate, n-	123-86-4	N/A	N/A	N/A
Biphenyl, 1,1- [or Diphenyl]	92-52-4	0.05	IRIS	350
Chlorophenol, 3-	108-43-0	0.005	Surrogate (a)	35
Chlorophenol, 4-	106-48-9	0.005	Surrogate (a)	35
Chloropicrin	75-CE-2	N/A	N/A	N/A
Copper	7440-50-8	0.037	HEAST	259 <sup>a</sup>
Cumene [or Isopropyl benzene]	98-82-8	0.1	IRIS	700
Dichlorobenzene, 1,3-	541-73-1	0.03	IRIS	210
Dichlorophenol, 2,3-	576-24-9	0.003	Surrogate (b)	21
Dichlorophenol, 2,4-	120-83-2	0.003	IRIS	21
Dichlorophenol, 2,5-	583-78-8	0.003	Surrogate (b)	21
Dichlorophenol, 2,6-	87-65-0	0.003	Surrogate (b)	21
Dichlorophenol, 3,4-	95-77-2	0.003	Surrogate (b)	21
Ethyl ether	60-29-7	0.2	IRIS	1400
Ethylbenzene	100-41-4	0.1	IRIS	700 <sup>b</sup>
Fluoride	7782-41-4	0.06	IRIS	4000 <sup>c</sup>
Formaldehyde	50-00-0	0.2	IRIS	1400
Hexane, n-	110-54-3	0.06	HEAST	420
Iron	7439-89-6	0.3	NCEA	2100
Manganese	7439-96-5	0.14	IRIS	980 <sup>d</sup>
Methyl acetate	79-20-9	1	HEAST	7000
Methyl methacrylate	80-62-6	1.4	IRIS	9800
Methyl tert-butyl ether [or MTBE]	1634-04-4	0.03	HAL	210
Methylnaphthalene, 1-	90-12-0	0.02	Surrogate (c)	140
Methylnaphthalene, 2-	91-57-6	0.02	Surrogate (c)	140
Naphthalene	91-20-3	0.02	IRIS	140

Contaminant	CAS #	Oral RfD	Oral RfD Source	Health-Based GWCTL
		(mg/kg-day)		(µg/L)
Phenol	108-95-2	0.6	IRIS	4200
Silver	7440-224	0.005	IRIS	35
Sulfate	14808-79-8	N/A	NIA	N/A
Toluene	108-88-3	0.2	IRIS	1400 <sup>f</sup>
Total Dissolved Solids (TDS)	C-010	N/A	NIA	N/A
Trichlorophenol, 2,4,5-	95-95-4	0.1	IRIS	700
Trimethylbenzene, 1,2,3-	526-73-8	0.05	Surrogate (d)	350
Trimethylbenzene, 1,2,4-	95-63-6	0.05	NCEA	350
Trimethylbenzene, 1,3,5-	108-67-8	0.05	NCEA	350
TRPH	No CAS#	0.04	TPHWG	280 <sup>f</sup>
Vinyl acetate	108-05-4	1	HEAST	7000
Xylenes, total	1330-20-7	2	IRIS	14000 <sup>g</sup>
Zinc	7440-66-6	0.3	IRIS	2100

<sup>a</sup>The National Center for Environmental Assessment (NCEA) recommends a reference dose range of 0.04 -0.07 mg/kg-day. The health-based GCTL is based on a RfD of 0.04 mg/kg-day.

<sup>b</sup>The health-based GCTL for ethylbenzene is the basis for the Primary Standard.

<sup>c</sup>Fluoride has a Primary Standard of 4,000µg/L.

<sup>d</sup>When considering risk from non-dietary exposure to manganese, the USEPA recommends modifying the reference dose to account for background exposure. In this case, the unmodified RfD was used because the formula used to calculate the GCTL uses a relative source contribution term to account for background exposure.

<sup>e</sup>Toluene and Total Xylenes have Primary Standards of 1,000 µg/L and 10,000 µg/L respectively.

<sup>f</sup>The health-based GCTL for TRPH is based on the fraction-specific RfD (0.04 mg/kg-day) for the C<sub>8</sub>-C<sub>16</sub> hydrocarbon fraction recommended by the Total Petroleum Hydrocarbon Working Group (TPHCWG). If site-specific data on the composition of the TRPM is available, it could be used to derive a site-specific GCTL.

N/A = Not available

##= Based on similarity to oil and grease standard as provided in Chapter 62-302, F.A.C.

#### Reference sources for toxicity data:

IRIS: U.S. EPA's Integrated Risk Information System

HEAST: U.S. EPA's Health Effects Assessment Summary Tables

NCEA: National Center for Environmental Assessment

OPP: U.S. EPA's Office of Pesticide Programs Reference Dose Tracking Report

HAL: Drinking Regulations and Health Advisories (U.S. EPA Office of Water)

TPHCWG: TPH Criteria Working Group Series. Volume 4: Development of Fraction Specific

Reference Doses and Reference Concentrations for Total Petroleum Hydrocarbons, Amherst, MA: Amherst Scientific Publishers, 1997.

Surrogate (a): Surrogate RfD based oral RfD for 2-chlorophenol

Surrogate (b): Surrogate RfD based oral RfD for 2,4-dichlorophenol

Surrogate (c): Surrogate RfD based oral RfD for naphthalene

Surrogate (d): Surrogate RfD based oral RfD for 1,2,4-Trimethylbenzene