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NAS WHITING FIELD  
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LETTER REGARDING THE CLARIFICATION TO THE U S NAVY RESPONSE TO  
COMMENTS ON THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION ON  
THE REMEDIAL INVESTIGATION REPORT FOR SITES 3, 4, 6, 30, 32 AND 33 NAS WHITING  
FIELD FL  
3/30/2000  
TETRA TECH

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0300-E091

March 30, 2000

Commanding Officer  
Department of the Navy  
SOUTHNAVFACENGCOM  
ATTN: Ms. Linda Martin, Code 1859  
Remedial Project Manager  
2155 Eagle Drive  
North Charleston, SC 29419Subject: Clarifications to the Navy's Responses on  
FDEP's Remedial Investigation Report Comments  
For Surface and Subsurface Soil  
Sites 3, 4, 6, 30, 32, and 33  
NAS Whiting Field, Milton, FloridaReference: CLEAN Contract No. N62467-94-D-0888  
Contract Task Order No. 0028

Dear Ms. Martin:

Tetra Tech NUS, Inc. is pleased to submit clarifications to the original responses to FDEP's comments on the Draft Remedial Investigation Report for Surface and Subsurface Soils at Sites 3, 4, 6, 30, 32, and 33, Naval Air Station Whiting Field in Milton, Florida. The clarifications address the comments included in FDEP's February 2, 2000 letter.

Copies of the response clarifications have been forwarded to the list below on behalf of Southern Division, Naval Facilities Engineering Command for Naval Air Station Whiting Field.

Please call me at (865) 483-9900 if you have any questions or comments regarding this submittal.

Sincerely yours,

Phillip E. Ottinger  
Task Order Manager

PEO:tko

Enclosure

cc: Mr. Rao Angara, Harding Lawson Associates (1 copy)  
Mr. Craig Benedikt, USEPA (1 copy)  
Mr. Jim Cason, FDEP (2 copies)  
Mr. Terry Hansen, Tetra Tech NUS (1 copy)  
Mr. Jim Holland, NAS Whiting Field (1 copy)  
Ms. Amy Twitty, CH2M Hill (1 copy)  
Mr. Gerry Walker, Tetra Tech NUS (1 copy)  
Ms. Debbie Wroblewski, Tetra Tech NUS (w/o enclosure)  
File/Edb

## RESPONSE TO COMMENTS

### Florida Department of Environmental Protection Comments Remedial Investigation Report for Sites 3, 4, 6, 30, 32, & 33 February 2, 2000

#### University of Florida Comments

1. It appears from their responses to a number of our comments related to the validity of assumptions about future exposure to soils that Tetra Tech and the Navy are planning to rely heavily on institutional site controls to limit such exposure. The reliability of proposed institutional controls is an issue that FDEP will have to address.

#### Response:

The actions required to implement and ensure the reliability of proposed institutional controls will be included in the Land Use Control Implementation Plan developed by the Navy in consultation with FDEP and EPA. The above response applies to both the above University of Florida comment and the similar FDEP comment.

2. In our review of the RIR, we commented on the GI absorption values used by Tetra Tech in the route-to-route extrapolation of toxicity values. Apparently, these GI absorption values were provided to Tetra Tech by Dr. Ted Simon of USEPA Region 4. Despite USEPA Region 4's apparent blessing of these values, we are compelled to take exception to the GI absorption value for arsenic. We have seen this value misused on several occasions. The GI absorption value for arsenic of 0.41 comes from a report by Bettley and O'Shea (*British Journal of Dermatology*, 92: 563-568, 1975). In this study 8.52 mg of a soluble arsenite was administered to seven human subjects. The estimated percentage of the administered dose that remained in the bodies of these subjects after ten days ranged from 0.41 to 0.76. From these observations, some have inferred a GI absorption of 41% (corresponding to the lower end of this range). This is not correct. Other studies have shown that urinary excretion of an intravenous arsenic dose in humans is also about 60-70% of the dose, indicating that the oral absorption of arsenic is nearly complete. The ATSDR Toxicant Profile for arsenic lists a bioavailability value of 0.95 for arsenic from the Bettley and O'Shea study. This would be a better value to use.

#### Response:

The Navy conservatively used the lower GI absorption value (0.41) in accordance with informal EPA guidance.

The GI absorption value is used to adjust oral cancer slopes and reference doses (RfD) to obtain dermal cancer slopes and RfDs as shown in the following equations. Also, as seen in the following example calculations the lower the GI absorption value the higher the calculated dermal risk.

**For Direct Contact Dermal Cancer Risk**

$$\text{Dermal Cancer Slope Factor} = \frac{\text{Oral Cancer Slope Factor}}{\text{GI Absorption Factor}}$$

**AND**

$$\text{Cancer Risk} = \text{Lifetime Chronic Daily Intake} * \text{Dermal Cancer Slope Factor}$$

**Example Dermal Cancer Risk Calculation Using Site 3 Adult Trespasser Data**

Chemical	GI Absorption Factor	Oral Cancer Slope	Calculated Dermal Cancer Slope	Lifetime Chronic Daily Intake	Lifetime Cancer Risk
Arsenic	0.41	1.5E+00	3.66E+00	5.09E-07	1.86E-06
Arsenic	0.95	1.5E+00	1.58E+00	5.09E-07	8.04E-07

**For Direct Contact Dermal Hazard Index (Noncarcinogenic Risk)**

$$\text{Dermal Reference Dose (RfD)} = \text{Oral RfD} * \text{GI Absorption Factor}$$

**AND**

$$\text{Hazard Index (HI)} = \text{Chronic Daily Intake} / \text{Dermal RfD}$$

**Example Dermal Hazard Index Calculation Using Site 3 Adult Trespasser Data**

Chemical	GI Absorption Factor	Oral RfD	Calculated Dermal RfD	Chronic Daily Intake	Hazard Index
Arsenic	0.41	3.00E-04	1.23E-04	1.78E-06	1.45E-02
Arsenic	0.95	3.00E-04	2.85E-04	1.78E-06	6.25E-03

As shown above, the calculated dermal cancer risk and HIs using UF's GI absorption value (0.95) are approximately 57 percent lower than the values calculated using the EPA Region 4 GI absorption value of 0.41. However, use of UF's GI Absorption value (0.95) will not change the recommendation to perform a feasibility study at each site since the total calculated risk (dermal, ingestion, and inhalation) for each site will still exceed the Florida target cancer risk of  $1 \times 10^{-6}$ . Therefore, at this time the Navy does not plan to recalculate the dermal risk values for each site using UF's arsenic absorption value of 0.95.

The Navy does agree the 0.95 arsenic GI absorption value is listed in Table 4-1 of the 6 November 1998 Peer Consultation Workshop Draft of the *Risk Assessment Guidance for Human Health Evaluation Manual, Supplemental Guidance* and is likely to be the value recommended by the USEPA when this document is finalized and published.

3. Tetra Tech has calculated risk/hazards for a construction worker scenario which they characterize as a reasonable maximum exposure (RME) estimate. The exposure frequency (EF) for this worker is 30 days/year. For the calculation of hazard quotients for non-carcinogenic COPCs, the 30 day/year EF is combined with an exposure duration (ED) and averaging time (AT) of 1 year. We must again object to the characterization of this exposure scenario as representative of a maximally exposed individual. One month is simply not an upper bound estimate of exposure at a construction site. With respect to the issue of ED and AT, Tetra Tech's use of an EF of 30 days/year with an EF (and AT) of 1 year corresponds to the improbable situation in which a construction worker visits a site 2-3 days per month over the course of a year. The problem is that since the exposure is averaged over such a long period, the daily dose of chemicals received by the receptor is lower than it should be if the exposure was assumed to occur on concurrent days. For this scenario the ED and AT should be 42 days (30 days plus weekends).

Response:

The 30 days/year exposure frequency for the construction worker (Scenario 1) was used by the Navy due to the small size of the sites in question and the type of construction (e.g. utility line repair, pavement repair, etc.) likely to be performed at these sites. Using the scenario suggested by UF, the construction worker cancer risk does not change but the HI is 8.6 times higher than the value calculated in Scenario 1. However, as shown in attached Tables F-1 through F-6, the cancer risk and HIs calculated for the construction worker scenario suggested by UF (Scenario 2) as well as for a scenario with double the exposure (Scenario 3) do not result in unacceptable risks to the construction worker at any site. The following parameters were used to calculate the cancer risk and hazard index values shown in Tables F-1 through F-6.

Scenario 1 (Values used by Tetra Tech in the RI Report)

- Exposure frequency (EF) - 30 days
- Exposure duration (ED) - 1 year
- Noncarcinogenic averaging time (AT) - 365 days

Scenario 2 (Values suggested by UF)

- Exposure frequency (EF) - 30 days
- Exposure duration (ED) - 1 year
- Noncarcinogenic averaging time (AT) - 42 days

Scenario 2 (EF twice Scenarios 1 and 2)

- Exposure frequency (EF) - 60 days
- Exposure duration (ED) - 1 year
- Noncarcinogenic averaging time (AT) - 84 days

As seen from Table F-1 through F-6, even doubling the exposure frequency to 60 days does not result in unacceptable risks to the construction worker at any site. The Navy, at this time, does not plan to revise the construction worker risk assessment scenario currently included in the RI Report.

Note: All comments and their responses will be included in an appendix in the Final RI Report.

TABLE F-1

**SUMMARY OF CONSTRUCTION WORKER CANCER RISKS AND HAZARD INDICES FOR VARIOUS EXPOSURE SCENARIOS AT SITE 3  
NAS WHITING FIELD, MILTON, FLORIDA  
PAGE 1 OF 1**

Receptor	Exposure Route	Scenario 1 <sup>a</sup>		Scenario 2 <sup>b</sup>		Scenario 3 <sup>c</sup>	
		Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Construction Worker Surface Soil	Ingestion	7.2E-08	0.03	7.2E-08	0.26	1.4E-07	0.26
	Dermal Contact	6.3E-08	0.02	6.3E-08	0.17	1.3E-07	0.17
	Inhalation	--	--	--	--	--	--
	Total	1.4E-07	0.05	1.4E-07	0.43	2.8E-07	0.43
Construction Worker Subsurface Soil	Ingestion	8.0E-08	0.01	8.0E-08	0.09	1.6E-07	0.09
	Dermal Contact	7.5E-08	0.01	7.5E-08	0.09	1.5E-07	0.09
	Inhalation	--	--	--	--	--	--
	Total	1.5E-07	0.02	1.5E-07	0.17	3.0E-07	0.17

The inhalation pathway was not evaluated because the maximum site concentrations did not exceed the soil to air SSLs.

<sup>a</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 365 days.

<sup>b</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 42 days.

<sup>c</sup> Reasonable maximum exposure for an exposure frequency (EF) of 60 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 84 days.

TABLE F-2

SUMMARY OF CONSTRUCTION WORKER CANCER RISKS AND HAZARD INDICES FOR VARIOUS EXPOSURE SCENARIOS AT SITE 4  
 NAS WHITING FIELD, MILTON, FLORIDA  
 PAGE 1 OF 1

Receptor	Exposure Route	Scenario 1 <sup>a</sup>		Scenario 2 <sup>b</sup>		Scenario 3 <sup>c</sup>	
		Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Construction Worker Surface Soil	Ingestion	5.7E-08	0.02	5.7E-08	0.17	1.1E-07	0.17
	Dermal Contact	4.6E-08	0.01	4.6E-08	0.09	9.2E-08	0.09
	Inhalation	--	--	--	--	--	--
	Total	1.0E-07	0.03	1.0E-07	0.26	2.0E-07	0.26
Construction Worker Subsurface Soil 2-15' (below land surface)	Ingestion	7.7E-08	0.01	7.7E-08	0.09	1.5E-07	0.09
	Dermal Contact	7.2E-08	0.01	7.2E-08	0.09	1.4E-07	0.09
	Inhalation	--	--	--	--	--	--
	Total	1.5E-07	0.02	1.5E-07	0.17	3.0E-07	0.17
Construction Worker Subsurface Soil 2-22' (below land surface)	Ingestion	1.7E-07	0.01	1.7E-07	0.09	3.4E-07	0.09
	Dermal Contact	7.2E-08	0.01	7.2E-08	0.09	1.4E-07	0.09
	Inhalation	--	--	--	--	--	--
	Total	2.5E-07	0.02	2.5E-07	0.17	5.0E-07	0.17

The inhalation pathway was not evaluated because the maximum site concentrations did not exceed the soil to air SSLs.

<sup>a</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 365 days

<sup>b</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 42 days.

<sup>c</sup> Reasonable maximum exposure for an exposure frequency (EF) of 60 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 84 days.

TABLE F-3

**SUMMARY OF CONSTRUCTION WORKER CANCER RISKS AND HAZARD INDICES FOR VARIOUS EXPOSURE SCENARIOS AT SITE 6  
NAS WHITING FIELD, MILTON, FLORIDA  
PAGE 1 OF 1**

Receptor	Exposure Route	Scenario 1 <sup>a</sup>		Scenario 2 <sup>b</sup>		Scenario 3 <sup>c</sup>	
		Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Construction Worker Surface Soil	Ingestion	2.1E-07	0.03	2.1E-07	0.26	4.2E-07	0.26
	Dermal Contact	4.1E-08	0.02	4.1E-08	0.17	8.2E-08	0.17
	Inhalation	--	--	--	--	--	--
	Total	2.5E-07	0.05	2.5E-07	0.43	5.0E-07	0.43
Construction Worker Subsurface Soil <sup>d</sup>	Ingestion	NA	NA	NA	NA	NA	NA
	Dermal Contact	NA	NA	NA	NA	NA	NA
	Inhalation	NA	NA	NA	NA	NA	NA
	Total	NA	NA	NA	NA	NA	NA

The inhalation pathway was not evaluated because the maximum site concentrations did not exceed the soil to air SSLs.

<sup>a</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 365 days.

<sup>b</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 42 days.

<sup>c</sup> Reasonable maximum exposure for an exposure frequency (EF) of 60 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 84 days.

<sup>d</sup> There are no COPCs for subsurface soil at Site 6.

TABLE F-4

SUMMARY OF CONSTRUCTION WORKER CANCER RISKS AND HAZARD INDICES FOR VARIOUS EXPOSURE SCENARIOS AT SITE 30  
 NAS WHITING FIELD, MILTON, FLORIDA  
 PAGE 1 OF 1

Receptor	Exposure Route	Scenario 1 <sup>a</sup>		Scenario 2 <sup>b</sup>		Scenario 3 <sup>c</sup>	
		Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Construction Worker Surface Soil	Ingestion	5.8E-08	0.04	5.8E-08	0.35	1.2E-07	0.35
	Dermal Contact	5.4E-08	0.02	5.4E-08	0.17	1.1E-07	0.17
	Inhalation	--	--	--	--	--	--
	Total	1.1E-07	0.06	1.1E-07	0.52	2.2E-07	0.52
Construction Worker Subsurface Soil	Ingestion	7.1E-08	0.01	7.1E-08	0.09	1.4E-07	0.09
	Dermal Contact	6.7E-08	0.01	6.7E-08	0.09	1.3E-07	0.09
	Inhalation	--	--	--	--	--	--
	Total	1.4E-07	0.02	1.4E-07	0.17	2.8E-07	0.17

The inhalation pathway was not evaluated because the maximum site concentrations did not exceed the soil to air SSLs.  
 Surface soil exposure was evaluated in the areas covered with grass.

<sup>a</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 365 days.

<sup>b</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 42 days.

<sup>c</sup> Reasonable maximum exposure for an exposure frequency (EF) of 60 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 84 days.

TABLE F-5

SUMMARY OF CONSTRUCTION WORKER CANCER RISKS AND HAZARD INDICES FOR VARIOUS EXPOSURE SCENARIOS AT SITE 32  
 NAS WHITING FIELD, MILTON, FLORIDA  
 PAGE 1 OF 1

Receptor	Exposure Route	Scenario 1 <sup>a</sup>		Scenario 2 <sup>b</sup>		Scenario 3 <sup>c</sup>	
		Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Construction Worker	Ingestion	NA	NA	NA	NA	NA	NA
Surface Soil <sup>d</sup>	Dermal Contact	NA	NA	NA	NA	NA	NA
Subsurface Soil <sup>e</sup>	Inhalation	--	--	--	--	--	--
	Total	NA	NA	NA	NA	NA	NA

The inhalation pathway was not evaluated because the maximum site concentrations did not exceed the soil to air SSLs.

<sup>1</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 365 days.

<sup>1</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 42 days.

<sup>1</sup> Reasonable maximum exposure for an exposure frequency (EF) of 60 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 84 days.

<sup>1</sup> Concrete covers the surface soil. There is no complete exposure pathway.

<sup>1</sup> There are no COPCs for subsurface soil at Site 32.

TABLE F-6

SUMMARY OF CONSTRUCTION WORKER CANCER RISKS AND HAZARD INDICES FOR VARIOUS EXPOSURE SCENARIOS AT SITE 33  
 NAS WHITING FIELD, MILTON, FLORIDA  
 PAGE 1 OF 1

Receptor	Exposure Route	Scenario 1 <sup>a</sup>		Scenario 2 <sup>b</sup>		Scenario 3 <sup>c</sup>	
		Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Construction Worker	Ingestion	8.8E-08	0.01	8.8E-08	0.09	1.8E-07	0.09
Surface Soil <sup>d</sup>	Dermal Contact	8.2E-08	0.01	8.2E-08	0.09	1.6E-07	0.09
Subsurface Soil <sup>e</sup>	Inhalation	--	--	--	--	--	--
	Total	1.7E-07	0.03	1.7E-07	0.26	3.4E-07	0.26

The inhalation pathway was not evaluated because the maximum site concentrations did not exceed the soil to air SSLs.

<sup>a</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 365 days.

<sup>b</sup> Reasonable maximum exposure for an exposure frequency (EF) of 30 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 42 days.

<sup>c</sup> Reasonable maximum exposure for an exposure frequency (EF) of 60 days, exposure duration (ED) of 1 year, and noncarcinogenic averaging time (AT) of 84 days.

<sup>d</sup> Concrete covers the surface soil. There is no complete exposure pathway.

<sup>e</sup> Exposure to chemicals in the subsurface soil was evaluated.