DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, NORTHEAST
NAVAL FACILITIES ENGINEERING COMMAND
10 INDUSTRIAL HIGHWAY
MAIL STOP, #82
LESTER, PA 19113-2090

IN REPLY REFER TO
5090
Code EV23/CF
January 11, 2005

Ms. Kymberlee Keckler, Remedial Project Manager
Federal Facilities Superfund Section
USEPA Region 1
1 Congress Street, Suite 1100
Boston MA, 02114-2023

Mr. Paul Kulpa, Project Manager
Office of Waste Management
Rhode Island Department Of Environmental Management
235 Promenade St.
Providence Rhode Island, 02908-5767

Dear Ms. Keckler/ Mr. Kulpa:

SUBJECT: RESIDUAL RISK CALCULATIONS ASSOCIATED WITH VARIOUS SOIL REMOVAL OPTIONS, SITE 09, OLD FIRE FIGHTING TRAINING AREA, NAVAL STATION NEWPORT, NEWPORT, RHODE ISLAND

Attached is a summary of residual risk calculated to remain after each of the excavation options described in our response package dated December 23, 2004. We are sending you only a summary for discussion purposes during our phone call the 13th, since the backup is quite voluminous. Based on our conversations on the 13th, we can provide necessary documentation to support these calculations as needed.

If you have any questions, please do not hesitate to contact me at (610) 595-0567 extension 142.

Sincerely,

CURTIS A. FRYE, P.E.
Remedial Project Manager
By direction of the
Commanding Officer

Enclosure: Residual Risk After Soil Removal Actions, Site 09, Old Fire Fighting Training Area, Naval Station Newport, Newport, RI, January 10, 2005

Copy to:
C. Mueller, NSN
S. Parker, TtNUS
J. Stump, Gannett Fleming
C. Tippmann, TtFWI

Residual Risk After Soil Removal Actions
Old Fire Fighting Training Area
Naval Station Newport
Newport Rhode Island

Approach:

Calculations were performed to estimate risk to human receptors after completion of the various soil removal action options. So-called "Residual Risk" was estimated for carcinogenic COCs based on a residential exposure to soil as was conducted in the remedial investigation for the site (Tetra Tech NUS, Inc., 1999). Non cancer COCs were not considered in this risk evaluation as unacceptable non cancer risk was not evident in the Remedial Investigation. The residential scenario is used because it is the most conservative potential future use scenario. This scenario is based on the presumption that soils to a depth of 10 feet below ground surface could be brought to the surface during installation of footings or foundations, and the future resident could be exposed to those soils if they are left on the surface.

In the residential scenario, soils to a depth of 10 feet below ground surface are presumed to be available to human receptors through dermal contact and ingestion. It is also presumed that the final grade after excavation and backfill will be the Base Grade Elevation, as described in the Soil Predesign Investigation Report (Tetra Tech NUS, Inc., 2004). Base Grade Elevation is most simply defined as the original grade of the site without the presence of the mounds.

The data sets used to estimate residual risk were developed from a combined database of chemical data published in the Remedial Investigation Report and the Soil Predesign Investigation Report. From this database, a separate data set was compiled for each of the excavation scenarios described in the Navy submittal dated December 23, 2004. Each of these excavation scenarios provides a different extent of soil removal, with a different combination of targeted contaminants and excavation procedures. Since each excavation scenario would leave some soil remaining in the 0-10 foot depth interval, sample results from those remaining soils above the 10 foot depth were used to estimate residual risk remaining if that excavation scenario was completed.

Residual risk was calculated for each excavation option three different ways: As a worst case scenario, residual risk was calculated using maximum concentrations of COCs remaining after each excavation option. As a reasonable maximum case scenario, residual risk was calculated using average detected concentrations as the dose. This is a reasonable approach because soils are to be removed and replaced with clean fill under each excavation option, reducing the likelihood of encountering the maximum concentration remaining at depth. And finally, because arsenic may be naturally occurring at the concentrations detected, the risk was calculated using average detected concentrations remaining, however without arsenic as a site contaminant. All calculations used the reasonable maximum exposure assumptions and toxicity values that were utilized in the remedial investigation.

Findings:

Residual risks are summarized on Table 1 for each excavation scenario described in the Navy's submittal dated December 23. As this table shows, residual cancer risk remains above 1E-5 using the maximum remaining concentration of each COC under each scenario, mostly due to the presence of arsenic and benzo(a)pyrene. When using average concentrations remaining, residual cancer risk ranges between 2.81E-5 and 1.58E-5, and drops to between 8.23E-6 and 1.97E-6 when arsenic is removed from the dose.

Conclusions:

Based on the risk calculations summarized in Table 1, excavation option C will adequately reduce risk to the future residential receptor at the site under the subsurface soil exposure scenario described above.

As described in the Draft Soil Predesign Investigation report, arsenic is a naturally occurring element and the concentrations of arsenic found are most likely naturally occurring rather than related to site releases. Elimination of arsenic from the estimate of residual risk from site contaminants may be appropriate.

Additionally, it is noted that the maximum concentrations of contaminants are not likely representative of actual exposure under the scenario used. The use of average concentrations remaining in the 0-10 foot interval after excavation is a more appropriate yet still adequately conservative representation of exposure, since a) the removed soil will be replaced with clean fill, reducing the overall exposure if soils from depths to 10 feet below ground surface are indeed turned to the surface, and b) excavation into the water table even for setting footings and foundations is not common practice for residential construction, and would not occur across the entire site in any event.

Calculation of residual cancer risk using average detected concentrations of organic COCs remaining after excavation scenario C is estimated at 8.23E-6, which is below the target risk level for RIDEM, and within an acceptable risk range for the USEPA.

TABLE 1
SUMMARY OF CALCULATED RESIDUAL RISKS
SUBSURFACE SOIL EXCAVATION OPTIONS AT OLD FIRE FIGHTING TRAINING AREA
NAVAL STATION NEWPORT, NEWPORT RHODE ISLAND

Excavation Option Description	Residual Risk Calculated		
	Using Maximum Concentrations	Using Average Concentrations	Using Average Concentrations, No Arsenic
C – Excavate soil exceeding PRGs to Water Table	7.05E-05	2.57E-05	8.23E-06
B1 – In addition to C, excavate soil with petroleum to max depth possible "in the wet"	5.54E-05	2.57E-05	7.93E-06
B2 – In addition to C, excavate soil with petroleum and lead to max possible depth "in the wet"	5.18E-05	2.54E-05	7.61E-06
B3 – In addition to C, excavate soil exceeding all PRGs to max possible depth "in the wet"	5.14E-05	2.81E-05	8.41E-06
A1 – In addition to C, excavate soil with petroleum with sheeting and dewatering	5.19E-05	2.52E-05	6.52E-06
A2 – In addition to C, excavate soil with petroleum and lead with sheeting and dewatering	3.83E-05	1.58E-05	1.97E-06
A3 – in addition to C, excavate soil exceeding PRGs with sheeting and dewatering.	3.83E-05	1.69E-05	2.16E-06

6.89×10^{-6}