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July 28, 1998

James Shafer, Remedial Project Manager
U.S. Department of the Navy
Naval Facilities Engineering Command
Northern Division
10 Industrial Highway
Code 1823, Mail Stop 82
Lester, PA 19113-2090

Re: Human Exposure to contaminated soil at the Old Fire Fighter Training Area

Dear Mr. Shafer:

Thank you for your letter dated July 21, 1998 where you presented the Navy's analysis of predicted child blood lead levels when exposed to soils at the Old Fire Fighter Training Area (*OFFTA*). As discussed with you on several occasions, EPA respectfully disagrees.

I raised the issue about children's exposure to contaminated soils at the OFFTA to you in April 1998. EPA was also involved when the Day Care Center was closed in 1994. On August 6, 1993, the Agency for Toxic Substances and Disease Registry issued a health assessment for NETC that evaluated all Installation restoration sites, including the OFFTA. Their report indicated that exposure to soils at the OFFTA could result in cancer-related and adverse non-cancer health effects. Page 72 of the health assessment states that the *population most at risk from exposure at the Old Fire Fighter Training Area is children.* Lead, cadmium, arsenic, PAHs, and PCBs were identified as contaminants of concern. Since no cleanup actions have been completed since 1994, site conditions are virtually the same. The Remedial Investigation is not yet complete. It is therefore unclear why activities substantially similar to the existence of a Day Care Center have resumed.

Given that the area is polluted with several contaminants, it is disappointing that the Navy's recent analysis focused solely on lead. EPA's concern regarding use of the site for childhood recreational activities is not based solely on lead contamination. In fact, we note that concentrations of other inorganics, PCBs, and semivolatile organic compounds in the surface soils are elevated in several surface locations across the OFFTA. Subsurface soil and groundwater contamination is also present at the site.

If the public discovers there is contamination at the play area and perceives a health risk, difficulties could be encountered. The Navy should be prepared to defend its assessment of health risks and be able to answer questions about the decision to locate the youth center at OFFTA, contamination levels, and health risks.

EPA reviewed the 1994 human health risk assessment (*HHRA*) and does not believe that the evaluation was conservative enough for the following

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reasons: 1) current EPA guidance recommends that 400 mg/day be used for the reasonable maximum exposure for incidental ingestion of soil for children (see EPA's 1997 Exposure Factor Handbook) (the 1994 HHRA used 100 mg/day; 2) the number of days of exposure was quite low; 3) mixing of surface and subsurface that could occur during construction was not assessed; 4) inhalation routes were not assessed (Note: beryllium is a potent carcinogen when inhaled and was detected in the surface soils); 5) dermal exposure contributions were underestimated because only a limited number of contaminants were quantified; and 6) potential risks of fire from underground waste oils were not assessed. → pig- risk

As you know, the Navy's relative risk ranking evaluation submitted to EPA on December 2, 1997, ranked the site as *High.* In fact, the worksheet for this site states that *...known pathways include groundwater, surface water, sediment, and soil...* and *...receptors include both human and ecological...* The groundwater, sediment ecological marine, and soil categories were all ranked as *high* and therefore contributed to an overall site ranking of *high.*

The Source Removal Evaluation Report dated January 1998 indicated that the Navy would not pursue a removal action because field inspections revealed site-wide subsurface contamination instead of a discrete source area. Soil and groundwater contamination was determined to be ubiquitous in the subsurface and near water table, but surface soils - where human health exposure is likely to occur - were not adequately characterized in the source removal evaluation. Petroleum, semivolatile organic carbons, and metals were all detected in relatively high concentrations in the subsurface soils. Semivolatile organic carbons were also very high at one sediment sample (SS-1). Test pit 4 revealed the presence of what appeared to be asbestos containing material. PCBs (Aroclor 1254), at a concentration of 120 µg/kg, were also detected in the surface soils at this location, and at 540 µg/kg in the surface soils at MW-10. In EPA's letter dated February 6, 1998, EPA requested additional characterization of the surface soils. Such information has not yet been provided and has been deferred to the RI (see letter from Donald Conan dated July 2, 1998).

EPA continues to be concerned about unrestricted access to contaminated areas at NETC, including the OFFTA. Use of the OFFTA site as a military youth activity center inordinately increases actual or potential exposure to human populations. Further, I note that my question regarding whether potential adverse human health effects have been disclosed to the parents or guardians of the children playing at the OFFTA remains unanswered.

EPA's guidance does not make it mandatory to use the average surface soil lead concentration in the IEUBK model. Given that the site access is unrestricted, it is possible to have exposures to specific areas within the OFFTA. On page 8 of the April 17, 1998 issue of the Newport Naval Log, two 5 year old children are depicted playing at Katy Field, Coasters Harbor Island. The article also reported that youths from ages five to twelve engage in indoor and outdoor activities at the Military Yo

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uth Activities School. On May 13, 1998, EPA reported its results from running the IEUBK model. We noted that exposure to a site-wide average concentration of lead (138.71 $\mu\text{g/g}$) is deemed to be acceptable, but that exposure to soils at the maximum lead concentration (2970 $\mu\text{g/g}$) for all age groups between six months and six years exceeded the 10 $\mu\text{g/dL}$ blood lead level and therefore could cause adverse health effects. Further, we note that the RI Direct Exposure Criteria of 150 mg/kg was exceeded in three areas (2790 mg/kg at FF-M111; 372 mg/kg at FF-M101; 349 mg/kg at FF-SS30).

Preschool-age children and fetuses are usually the most vulnerable segments of the population for exposures to lead (ATSDR, 1988). This increased vulnerability results from a combination of factors including: 1) the developing nervous system of the fetus or neonate has increased susceptibility to the neurotoxic effects of lead; 2) young children are more likely to play in dirt and to place their hands and other objects in their mouths, thereby increasing the opportunity for soil ingestion; 3) the efficiency of lead absorption from the gastrointestinal tract is greater in children than in adults; and 4) nutritional deficiencies of iron and calcium, which are prevalent in children, may facilitate lead absorption and exacerbate the toxic effects of lead.

Studies on the effects of lead in children have demonstrated a relationship between exposure to lead and a variety of adverse health effects.

Several studies have noted observed relationships between environmental lead concentrations and body lead burdens in young children. The change in blood lead per 100 $\mu\text{g/g}$ soil lead ranges from 0.1 to 11.1 (Reagan and Silbergeld, 1989). (Note: 9 of the 40 samples at OFFTA exceed 100 $\mu\text{g/g}$). These effects include impaired mental and physical development, decreased heme biosynthesis, elevated hearing threshold, and decreased serum levels of vitamin D. The neurotoxicity of lead is of particular concern because evidence from prospective longitudinal studies has shown that neurobehavioral effects, such as impaired academic performance and deficits in motor skills may persist even after blood lead levels have returned to normal (Needleman, 1990).

In summary, EPA does not believe that it is appropriate to use contaminated areas as recreational areas for children. EPA believes that uncertainties exist in the current data and assessments for the OFFTA and caution is warranted when selecting uses for the site. We should discuss remedial and site management options for the site. I look forward to working with you and the Rhode Island Department of Environmental Management toward the cleanup of the OFFTA. Please do not hesitate to contact me at (617) 573-5777 should you have any questions or wish to arrange a meeting.

Sincerely,

Kymberlee Keckler, Remedial Project Manager
Federal Facilities Superfund Section

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cc: Paul Kulpa, RIDEM, Providence, RI
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Reagan P. L. and Silbergeld E. K. (1989). Establishing a health based standard for lead in residential soils. In: Hemphill and Cothorn, eds. Trace substances in environmental health, Supplement to Volume 12, (1990) of Environmental Geochemistry and Health.