UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Subject: EPA Review of Draft Addendum to the Fourth Five-Year Review Evaluating Radiological Remediation Goals for Soil
Hunters Point Naval Shipyard Superfund Site

Dear Mr. Robinson:

The United States Environmental Protection Agency (EPA) recently concurred on the protectiveness determinations included in the Navy's Final Fourth Five-Review Report for the Hunters Point Naval Shipyard Site (Site) in San Francisco, CA (Five-Year Review Report). In the Five-Year Review Report, the Navy concludes that chemical and radiological contamination at the Site does not present an unacceptable short-term risk and additional actions are needed to ensure that Site remedies are or will be protective of human health and the environment in the long-term.

EPA has completed its review of an August 2019 draft addendum to the Five-Year Review Report evaluating the radiological remediation goals for soil, titled "Estimated Excess Cancer Risks and Dose Equivalent Rates from Resident Exposures to Radionuclide-Containing Soils Report." This draft addendum is one of two planned addenda prepared to help EPA and the Navy determine whether the Site remedies are or will be protective in the long-term. EPA will comment separately on the second addendum, which evaluates the remediation goals for radionuclides in existing buildings.

In our review, we considered comments on the draft addendum submitted to the Navy by the Committee to Bridge the Gap, Golden Gate Environmental Law and Justice Clinic, Steve Castleman, and Dr. Ahimsa Porter Sumchai.

In the August 2019 draft addendum, the Navy assesses the remediation goals for the 11 "Radionuclides of Concern" in soil included in the 2006 Action Memorandum and multiple Records of Decision (RODs) at the Site. Site RODs generally require excavation and offsite disposal of soil at locations where the radionuclides exceed the remediation goals specified in the RODs. Any radionuclides left in place after remediation is complete should be at concentrations that fall within EPA's cancer risk range of 10^{-6} to 10^{-4}. This is the cancer risk range applied nationally at Superfund cleanups under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

In the draft addendum, the Navy uses two publicly-available computer programs to assess the remediation goals: EPA's Preliminary Remedial Goal (PRG) Calculator and a calculator developed by the U.S. Department of Energy's Argonne National Laboratory called RESRAD-ONSITE. EPA limited its review to the PRG calculations. The PRG Calculator is EPA's preferred approach for developing preliminary remediation goals and assessing remediation goals for contaminated soil, air, and water at Superfund cleanups. In the assessment described in the addendum, the Navy appropriately uses site-specific assumptions for climate, the relative concentrations of radioactive "parents" and "progeny" ("secular equilibrium" for selected radionuclides), and other parameters rather than relying on generic default values. Use of default values in the PRG Calculator may provide inappropriately-high risk estimates.

In the draft addendum, the Navy concludes that the soil radiological remediation goals are protective for all future land uses, including residential. We recognize that the evaluation makes some Site-specific conservative assumptions that may not reflect actual conditions at the Site. **However, at this time, EPA cannot verify that the soil radiological remediation goals are protective of human health for long-term protectiveness**, for several reasons.

First, the draft addendum does not provide sufficient justification for exceeding the 1×10^{-4} cancer risk generally used by EPA to make risk management decisions at CERCLA sites. For 10 of the 11 radionuclides, the estimated risk associated with the remediation goals calculated with EPA's PRG Calculator is within the EPA cancer risk range of 10^{-6} to 10^{-4}. However, the cancer risk estimate for the radionuclide thorium-232 exceeds the upper limit of the cancer risk range that is generally used at CERCLA sites (1×10^{-4}, equivalent to one in ten thousand). The risk estimate for thorium-232 is 1.7×10^{-4}. The cancer risk estimate for a second radionuclide, radium-226, may also exceed 1×10^{-4}, depending on the background concentration (see discussion below).

In accordance with EPA guidance, a cancer risk estimate exceeding 1×10^{-4} may be acceptable only if warranted by site-specific circumstances, such as naturally-occurring or anthropogenic sources of a contaminant not part of the Superfund cleanup.

Second, the draft addendum does not evaluate the additive cancer risk from multiple radionuclides and chemicals. EPA generally requires that cancer risk be summed if multiple contaminants may be present at the same location, as the Navy has done in the past. We do not expect all 11 radionuclides to be present at one location. However, the absence of usable

radiological data across much of the Site makes the extent to which multiple radionuclides and chemical contaminants are present at a single location uncertain. We will not know the extent until the planned radiological retesting occurs.

Third, the draft addendum does not present a total risk estimate for radium-226. Consistent with Site RODs, the radium-226 remediation goal (1.0 picocurie per gram [1.0 pCi/g]) is applied as an incremental concentration above background. For example, if the background radium-226 concentration is 0.5 pCi/g, the allowable level of radium-226 in soil would be 1.5 pCi/g.

Accounting for additive risk and the contribution from background would better inform the public, EPA, and Navy risk managers and is consistent with EPA risk assessment guidelines.

The draft addendum includes the statement that "The [remediation goals] ... are to be added to site- and radionuclide-specific background." This statement is correct for radium-226 but is not consistent with the RODs for the other radionuclides present at the Site, or with the remediation goals for chemical contaminants at the Site. One of the Site RODs (for Parcel C) clearly states that the radiological remediation goals, other than for radium-226, are inclusive of background. The other Site RODs are silent about radionuclides other than radium-226, but include a statement that the radium-226 remediation goal is "above background." This statement suggests that the remediation goals for the other radionuclides are not to be interpreted as "above background" (i.e., they are inclusive of background).

The decision whether 1×10^{-4} is the appropriate risk level, and how the risk level should apply to radium-226, should be made after data from the recently completed background sampling are available and the background concentration of radium-226 has been established. In the absence of Site-specific circumstances that justify exceeding a 1×10^{-4} cancer risk, we expect that any locations where radiological retesting data demonstrate that the combined radiological and chemical risk exceeds 1×10^{-4} would be remediated.

A decision about the need to modify the remediation goals or make other changes to the remedies described in the RODs would be deferred until retesting is complete and health risks can be assessed using actual Site data. The changes could be in the form of a ROD amendment, ESD, or memo to the file depending on the change. This process would include an appropriate level of public involvement.

In the near term, we recommend that the Navy modify the work plan for the Parcel G retesting to clarify how any risks exceeding 1×10^{-4} and the contribution from background will be addressed. The work plan does not address additive risks and currently states that all remediation goals are to be applied as an increment above background.

Please see the enclosure for additional comments. If you have any questions, please contact Wayne Praskins of my staff at (415) 972-3181 or praskins.wayne@epa.gov.

Sincerely,

John Chesnutt
Manager, Pacific Islands and Federal Facilities Section
Superfund and Emergency Management Division

Enclosure

cc: Nina Bacey, DTSC
Shane Reese, CDPH
Tina Low, RWQCB
Amy Brownell, SFDPH

Enclosure to EPA letter on the Draft Addendum to the Fourth Five-Year Review, Evaluation of Radiological Remedial Goals for Soil, prepared for the Navy by Battelle (Report dated August 7, 2019; transmittal letter dated August 8, 2019; EPA letter dated November 15, 2019)

No.	Location	Comment
#1.	Cover letter, Pg. 3, 1st par	The cover letter includes the statement that "The residential scenario is the most conservative of future land uses ..." We agree that the residential scenario is the appropriate future land use for the evaluation. We note, however, that other land uses, while not expected at the Hunters Point Naval Shipyard Site, may be more conservative (e.g., the "farmer" scenario available in EPA's PRG calculator).
#2.	Report, Pg. 3, 1st par	The report includes the statement that "These actions are conducted to ensure average, radionuclide-specific radioactivity concentrations in residual soil do not exceed the remediation goals (RGs)." Our understanding is that the radiological remediation goals have been and will in the future be applied on a not-to-exceed basis (i.e., any location exceeding a remediation goal has been or will be remediated).
#3.	Report, Pg. 3, 1st par	The report includes the statement that "The RGs ... are to be added to site- and radionuclide-specific background." As noted in the letter, this statement is correct for radium-226 but is not consistent with the Records of Decisions for the other radionuclides present at the Site, or with the remediation goals for chemical contaminants at the Site. In accordance with EPA guidance, any remediation goal below background may be adjusted upward to the background concentration.
#4.	Report, Pgs. 9-11, Section 4	We agree with the Site-specific assumptions used to estimate risks associated with the individual soil remediation goals, using the PRG calculator.
#5.	Report, Pg. 9, Section 4.1	The Navy assumes that future residents of the Site may be exposed to residual levels of radioactivity from ingestion or inhalation of small quantities of soil and from external radiation. The Navy assumes no exposure from consumption of homegrown produce. This assumption is appropriate if institutional controls ("ICs") are implemented and successfully enforced. We will continue to work with the Navy and State agencies to ensure that necessary ICs are included in "Covenants to Restrict Use of Property" ("CRUPs") and other documents restricting future use of the Site. We will also work with the Navy and State agencies to monitor the effectiveness of the restrictions. We expect the CRUPs to limit homegrown produce grown by future residents of the Site to raised beds with impermeable bottoms and sides to prevent contact with and uptake of any residual contaminants in the underlying soil.