UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Base Realignment and Closure Program Management Office West
33000 Nixie Way, Building 50
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Subject: EPA Review of Navy Draft Evaluation of Radiological Remediation Goals for Onsite Buildings
Hunters Point Naval Shipyard Superfund Site

Dear Mr. Robinson:

In July 2019, the Navy completed its fourth Five-Year Review Report for the Hunters Point Naval Shipyard Site in San Francisco, CA ("HPNS" or "Site"). The Navy prepared the Five-Year Review Report pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which requires the Navy to periodically determine whether Site remedies, including remediation goals (RGs), continue to be protective of human health and the environment. EPA's role in the Five-Year Review process is to review and either concur with the Navy's protectiveness determinations or make independent determinations.

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 but additional actions are needed to ensure that Site remedies are or will be protective of human health and the environment in the long-term. In the short-term, based on current site conditions and current use, contamination at the Site does not present a short-term risk to Site occupants or the greater community.

To reflect the most recent science on radiological risk assessment, the Five-Year Review Report includes a recommendation that the Navy prepare two addenda evaluating whether the radiological RGs for soil and buildings at the Site remain protective of human health. If the RGs are no longer protective for future residents or workers, they may need to be modified or other changes made to Site remedies.

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EPA described its review of the Navy's draft addendum evaluating the radiological soil RGs in a letter dated November 15, 2019; the Navy finalized this addendum in June 2020 and will complete its evaluation after the radiological retesting soil data are available. This letter responds to the Navy's evaluation of building RGs. The Navy issued both draft addenda for public comment in 2019.

Methodologies to Assess Cancer Risk from Radiation

RESRAD BUILD (RRB) is a publicly available computer program developed and maintained by the Argonne National Laboratory. The Building Preliminary Remediation Goal (BPRG) calculator is a publicly available computer program developed and maintained by EPA.

Both RRB and the BPRG calculator assess cancer risks to human health from exposure to radiation. As we described in EPA's March 27 and April 11, 2019 letters to the Navy, EPA typically uses its PRG calculators to assess risk, but we can consider other tools after consultation with our headquarters office. This requirement is intended to ensure compliance with Section 120(a)(2) of CERCLA, which prohibits the use of guidelines or criteria at federal facility cleanups inconsistent with EPA guidelines or criteria.

Navy Draft Evaluation of Radiological Building RGs

The Navy's evaluation of the radiological building RGs is described in a September 30, 2019 report titled *Draft Estimated Excess Cancer Risks and Dose Equivalent Rates from Exposures to Radiological Contamination on Building Surfaces Report* ("draft building addendum"). The draft building addendum, prepared by Battelle for the Department of the Navy, provides human health cancer risk estimates developed using RRB. The Navy separately provided EPA with additional files presenting human health cancer risk estimates developed using EPA's BPRG calculator. The BPRG risk estimates are substantially higher than the corresponding RRB risk estimates.

Using both RRB and the BPRG calculator, the Navy evaluates the RGs for the 11 "Radionuclides of Concern" that may be present in Site buildings. The radiological building RGs were adopted in multiple Records of Decision (RODs) at the Site between about 2009 and 2013. The RGs assume that some or all of the current buildings at the Site may be occupied as residences in the future. Site RODs generally require remediation at locations where the radioactivity on an interior building surface exceeds an RG. The draft building addendum assumes that the removable fraction of the radioactivity (i.e., dust) is less than 20% of an RG.

Based on RRB, the Navy concludes that the radiological building RGs are protective of human health for both future residents and indoor workers. The Navy does not appear to have used the BPRG results in support of its conclusion that the RGs are protective.

EPA Response

We completed our review of the Navy evaluation of radiological building RGs in consultation with EPA Headquarters and with assistance from the U. S. Army Corps of Engineers Radiation Safety Support Team and the Department of Energy's Oak Ridge National Laboratory (ORNL). In addition to determining whether we agree with the Navy's conclusion that the RGs remain protective of human health, we examined whether EPA could support the use of RRB as part of the evaluation for HPNS. In our review, EPA considered the November 2019 comments on the draft building addendum submitted to the Navy by a non-profit organization called the Committee to Bridge the Gap.

As part of our review we wanted to understand the assumptions and methodology used to develop the RRB risk estimates, determine the reasons why the BPRG risk estimates are substantially higher than the corresponding RRB risk estimates, and identify ways in which RRB may be more representative of conditions at the Site than the BPRG calculator.

In its submittal, the Navy did not attempt to explain the differences between the RRB and BPRG risk estimates. Even after a lengthy and in-depth review, we were unable to fully understand the methodology used by RRB or identify site-specific conditions that would justify the use of RRB to evaluate the HPNS building RGs. Therefore, at this time we cannot concur with the Navy's conclusion that the radiological building RGs remain protective of human health or support the use of RRB as part of the evaluation of HPNS building RGs.

There are three primary reasons why we are unable to concur with the Navy's long-term protectiveness determination for the radiological building RGs or support the use of RRB for HPNS.

First, we were unable to gain confidence in a key parameter used by RRB to estimate cancer risk. Like the BPRG calculator, RRB uses slope factors to estimate risk from a contaminated source. We understand the basis for the slope factors used in RRB to estimate risk from a source with finite thickness (i.e., a contaminated volume), but we do not fully understand how RRB estimates risk from a contaminated surface (i.e., an area source). This is important because the HPNS RGs are in units applicable to a contaminated surface.

When we searched the June 2003 RRB User's Manual, we could not find a description of how RRB estimates risk from an area source. We requested information about how RRB estimates risk from an area source from the Navy and directly from Argonne National Laboratory but received limited information in response.

Second, we were unable to conclude that the methodology used by RRB to estimate cancer risk from contaminated dust (i.e., the removable fraction of the contamination) is consistent with EPA guidelines or justified by site-specific circumstances. The EPA methodology (i.e., the BPRG calculator) multiplies the concentration of a radionuclide on an interior building surface by three factors: [hand-to-mouth frequency] x [fingertip surface area] x [saliva extraction factor].

The parameter values in the BPRG calculator are based on an assessment of risks in buildings contaminated by the collapse of the World Trade Center. The RRB methodology makes use of a user-defined removable fraction rate, air release fraction, source lifetime, deposition rate, and ingestion rate. The assumed ingestion rate in RRB appears to be much lower than in the BPRG which produces substantially lower risk estimates than the corresponding BPRG risk estimates. The Navy did not provide a comparison of the BPRG calculator and RRB approaches. Based on our review we were unable to conclude that RRB better represents conditions at HPNS.

Third, we are unable to verify that the Navy's RRB simulations appropriately estimate cancer risk because those simulations assume that radiological contamination is present only on the building floor. This assumption may result in an underestimate of the risk from external exposure to gamma radiation at HPNS buildings. We address this concern below, in our possible path forward.

Possible Path Forward

Although we are unable to support the use of RRB for HPNS, we have developed a possible path forward using the BPRG calculator.

Our proposal uses a modified version of the BPRG calculator. We determined that one of the assumptions built into the BPRG calculator may be overly conservative and inappropriate at HPNS. That is the assumption that fixed contamination is present on all six interior building surfaces (four walls, ceiling, and the floor). To better represent conditions at HPNS, we worked with EPA's National Superfund Radiation Expert and ORNL to make use of a modified version of the BPRG calculator that assumes that any fixed contamination remaining in the buildings is limited to the floor and lower six feet of the interior walls. Our preliminary calculations using the modified version of the BPRG calculator indicate that the majority of the radiological building RGs remain protective for fixed contamination.

We propose that BPRGs be used as limits on the removable fraction of the radioactivity (i.e., dust). Our preliminary calculations using default exposure assumptions result in BPRGs substantially lower than 20% of the RGs.

The Navy evaluation, and EPA's review, assume that some or all of the buildings at the Site may be occupied as residences in the future. We encourage the Navy to discuss plans for future use of the current, onsite buildings with the City/County of San Francisco. The appropriate building RGs would change if the buildings are not used as residences or if they are demolished. If changes in the RGs are appropriate, the Navy would need to comply with the post-ROD change process outlined in EPA Superfund guidance.

We are prepared to work with the Navy to finalize the radiological building RG evaluation, ensure the radiological survey methods used during retesting adequately protect human health, and provide EPA approval to allow the building radiological retesting to proceed.

If you would like to discuss our possible path forward, or have any questions, please contact me at (415) 972-3181 or praskins.wayne@epa.gov.

Sincerely,

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Superfund Project Manager

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