Failure of Cleanup at Hunters Point Naval Shipyard

Presented to
Bayview Hunters Point Environmental Justice Task Force

by Daniel Hirsch
Nicolas Snyder
Alex Dodd
Committee to Bridge the Gap

July 20, 2022
On July 16, 1945, the USS Indianapolis departed Hunters Point Naval Shipyard carrying components of a bomb code-named “Little Boy,” including half of the highly enriched uranium then in existence in the world. It was headed to Tinian Island in the Pacific. On August 6, the Enola Gay left Tinian and dropped the assembled atomic bomb on Hiroshima.
One year after Hiroshima: the OPERATION CROSSROADS atomic tests in the Bikini Atoll

The tests went awry, & badly contaminated hundreds of ships
USS Independence wreckage after the Able Shot blast, still smoking (NARA)
Radioactively contaminated USS Independence after A-bomb blast damage.

Note: Two sailors at far right. (NARA)
Group of sailors wash down the highly contaminated deck of the captured German battleship USS Prinz Eugene (IX 300). The ship was so radioactive that it was later sunk. (NARA, Still Pictures Unit, Record Group 80-G, box 2228)

Crude efforts at decontaminating the radioactive fleet at sea proved futile
Navy decided to take
79 irradiated Crossroads ships
to Hunters Point for “decontamination”
Bayview Hunters Point, was then, and remains today, a low-income community of color
Redlining practices have resulted in BayView Hunters Point (BVHP) concentrating the highest density of Black people in San Francisco.
Life expectancy at birth by census tract (San Francisco, 2020)
Radioactive ships were brought into drydocks and sandblasted in the open air, with the potential to spread the contamination throughout Hunters Point.
A sign in front of the USS ex-INDEPENDENCE anchored at HPNS, reading "Personnel for Radioactive Ships Only" (NARA)
>600,000 Gallons of Radioactive Fuel Burned at HPNS

610,000 gallons of contaminated fuel oil from Navy ships exposed to nuclear weapons tests were burned in boilers on land at HPNS, where the contamination could be widely dispersed by air releases.
Sailors – and their clothing – contaminated by nuclear work at HPNS were washed at the site, with the contaminated rinse water going down the drains and leaking into the soil through breaks in the lines.
Naval Radiological Defense Laboratory

In addition to the decontamination of ships from the Pacific nuclear tests, the Naval Radiological Defense Laboratory was established at HPNS. It participated in all Pacific nuclear tests from 1950-1958 as well as doing extensive research at HPNS with large quantities of radionuclides, including nuclear weapons debris brought back for analysis.
An array of animals were irradiated and injected with radioactivity at HPNS, potentially contaminating portions of the site by releases from excrement and incineration of carcases.
Goats confined to USS Niagara before the Baker Shot. They were left on board, in the detonation zone, for a number of days following the blast, the effects of which were later observed and documented. (NARA)
In addition, NRDL was allowed to possess extremely high amounts of radionuclides under its licenses:

- 60,000 curies of strontium-90/yttrium-90
- 15,000 curies of cobalt-60
- 3,000 curies of cesium-137
- 2,426 pounds of depleted uranium
- 94 pounds of natural uranium
- 12 pounds of natural thorium
- 2 pounds of U-235
- 2,000 grams of plutonium-239
To put these large amounts into perspective

➢ 60,000 curies of strontium-90/yttrium-90 could contaminate more than ten trillion tons of soil at EPA’s default Superfund preliminary remediation goal (PRG)

➢ 2,426 pounds of depleted uranium could contaminate more than 200 million metric tons of soil above EPA's default Superfund preliminary remediation goal

➢ 2,000 grams of plutonium-239: a millionth of an ounce if inhaled will cause cancer with a virtual 100% statistical certainty
HPNS was declared a Superfund site in 1989

The subsequent botched cleanup has been riddled with scandal and failure of oversight
The present crisis regarding the botched HPNS cleanup
I. EPA found evidence of falsification of radioactivity measurements made by Navy contractor Tetra Tech at 90-97% of HPNS survey units.

EPA did not publicly disclose this; PEER had to obtain the EPA findings under FOIA and make them public.
Tetra Tech Falsifications

97% of measurements were found to be suspect

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA

December 27, 2017

George ("Pat") Brooks
US Department of the Navy
33000 Nixie Way, Bldg 50
San Diego, CA 92147

Dear Mr. Brooks:

Thank you for providing for review the Draft Radiological Data Evaluation Findings Report for Parcels B and G Soil ("Report"), Former Hunter’s Point Naval Shipyard (HPNS), September 2017. The U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), and the California Department of Public Health (CDPH) have independently reviewed this report in detail with a technical team including national experts in health physics, geology, and statistics, and EPA’s comments are attached.

In Parcel B, the Navy recommended resampling in 15% of soil survey units in trenches, fill, and building sites. EPA, DTSC, and CDPH found signs of potential falsification, data manipulation, and/or data quality concerns that call into question the reliability of soil data in an additional 76% of survey units, bringing to 90% the total suspect soil survey units in Parcel B. (These do not add exactly due to rounding) In Parcel G, the Navy recommended resampling 49% of survey units, and regulatory agencies recommended 49% more, for a total of 97% of survey units as suspect.
### Summary of EPA, DTSC, CDPH review of Parcel G Radiological Data Evaluation

<table>
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<tr>
<th>Summary of review</th>
<th>Trench</th>
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<th>Total</th>
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<tr>
<td>Total Survey Units in Parcel G</td>
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<td>107</td>
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<td>202</td>
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<td>Navy recommended resampling</td>
<td>20</td>
<td>53</td>
<td>25</td>
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<td>EPA, CDPH, DTSC recommend resampling</td>
<td>39</td>
<td>54</td>
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<tr>
<td>Total recommended resampling</td>
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<td>107</td>
<td>30</td>
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<td><strong>0</strong></td>
<td><strong>2</strong></td>
<td><strong>6</strong></td>
<td><strong>3%</strong></td>
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<tr>
<td>% of total recommended resampling</td>
<td>94%</td>
<td>100%</td>
<td>94%</td>
<td>97%</td>
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### EPA, CDPH, and DTSC review of Parcel B Rad Data Evaluation

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<tr>
<th></th>
<th>Trench</th>
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<th>Building Sites</th>
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<th>% of total</th>
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<td>110</td>
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<td>Navy recommended resampling</td>
<td>2</td>
<td>18</td>
<td>9</td>
<td>29</td>
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<tr>
<td>Navy recommended reanalyzing archived samples</td>
<td>2</td>
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<td>0</td>
<td>3</td>
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<td>EPA, CDPH, DTSC recommend resampling</td>
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<td>87</td>
<td>7</td>
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<td>105</td>
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<td>UC-1</td>
<td>UC-2</td>
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<td>-----</td>
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<td>Total Survey Units in Parcels UC-1,2,3 &amp; D-2</td>
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<td>Navy recommended resampling</td>
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<td>DTSC recommended resampling</td>
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<td>29%</td>
<td>1</td>
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<td>6</td>
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<td>Total recommended resampling</td>
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<td>5</td>
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<td>3%</td>
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<td>0</td>
<td>1</td>
</tr>
<tr>
<td>% of total recommended resampling</td>
<td></td>
<td></td>
<td>100%</td>
<td>100%</td>
<td>95%</td>
</tr>
</tbody>
</table>
Unprecedented Falsification

“The vast scope of the signs of falsification found is unprecedented nationally.”

- EPA Region IX

Navy 5-Year Review: Appendix B1. Regulatory Agency Interview Records, Hunters Point Naval Shipyard, 2019
Tetra Tech Scandal is just the Tip of the Iceberg

How did the Navy and EPA Fail to Catch Such Monumental Falsification for So Many Years?

These failures of oversight were not limited to the Tetra Tech matter, but extend to the whole cleanup.
II. EPA Repeatedly Approved Navy HPNS Cleanup Goals That Were Even at the Time Extremely Outdated, Non-protective & Inconsistent with EPA CERCLA Guidance, and Thus Violated CERCLA 120(a)(2)
Soil Cleanup Goals Are Extremely Outdated

<table>
<thead>
<tr>
<th>Radionuclide</th>
<th>Navy Remediation Goals for Soil (pCi/g)</th>
<th>2021 EPA Default PRG for soil (pCi/g)</th>
<th>How many times weaker are the Navy’s Remediation goals?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radium-226</td>
<td>1.861</td>
<td>0.00192</td>
<td>969 times weaker</td>
</tr>
<tr>
<td>Strontium-90</td>
<td>0.331</td>
<td>0.00477</td>
<td>69 times weaker</td>
</tr>
<tr>
<td>Thorium-232</td>
<td>1.690</td>
<td>0.0017</td>
<td>994 times weaker</td>
</tr>
<tr>
<td>Uranium-235</td>
<td>0.195</td>
<td>0.00708</td>
<td>28 times weaker</td>
</tr>
</tbody>
</table>
NAVY CLEANUP LEVELS THAT ALLOW HUNDREDS OF TIMES MORE CONTAMINATION IN SOIL THAN EPA CLEANUP GOALS

- **EPA PRELIMINARY REMEDIATION GOAL**

- **NAVY CLEANUP LEVELS**

  - **Radium-226**: 969 X
  - **Thorium 232**: 994 X
The cancer risk from the Navy Soil Cleanup Standards is, according to the EPA’s PRG Calculator, $2.12 \times 10^{-3}$, meaning 1 in every 473 people would get a cancer from the radioactive contamination.

This is 2,120 times higher than EPA’s risk goal and 21 times higher than the upper end of the risk range.
The Navy’s Soil Cleanup Standards Would Allow 332 millirem per year, the Equivalent of ~166 Chest X-rays Annually, Year After Year

The Navy soil standards, approved by EPA, would allow the public to receive essentially a chest X-ray every other day for decades, with no medical benefit, and no informed consent.

[Note that OLEM guidance declares any ARAR (Applicable or Relevant and Appropriate Requirements) over 12 millirem/year presumptively non-protective.]

(Radiation Q&A Q35)
Adverse National Impacts Were This to Happen

This could not only place people in the Hunters Point area at risk but could impact cleanup of large numbers of other contaminated sites across the country, where Responsible Parties have been pushing to use less protective standards not consistent with EPA’s guidance. This pending action could undermine EPA authority nationally.
EPA Refusal to Admit & Fix the Cleanup Standards Errors

Rather than admit it made an error in approving the Navy’s woefully non-protective cleanup standards for soil and buildings, and committing to fixing them, EPA is instead misusing the 5-Year Review process to allow contamination levels 100 times higher.
III. Navy & EPA Quietly Shifted Remedy from Cleanup to Coverup
Navy shifts from remediating to covering up contamination

The 1997 Record of Decision (ROD) for Parcel B called for excavation and off-site disposal of contaminated soil. (1997 Parcel B ROD, p. 49, 65)

Work at Parcel B found far more contamination than the Navy had anticipated. (Amended Parcel B ROD, p. 1-5)

In the 2009 Amended ROD for Parcel B, the Navy changed its remedy to rely on covering rather than removing contamination:

“...the consideration of parcel-wide covers to address soil contamination instead of excavation represents a fundamental change in the scope of the remedy for soil.” (Amended Parcel B ROD, p. 1-4)
Remedy now relies primarily on “durable covers,” which are defined in the RODs as 2 feet (or in some cases 3) of “clean soil” or 4 inches of asphalt.

This “Durable Cover” Strategy Violates the Cleanup Voted for by the Community from Occurring
Community Acceptance is Included in Remedial Investigation/Feasibility Study Criteria

“Community acceptance. This assessment includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose. This assessment may not be completed until comments on the proposed plan are received.”

40 CFR 300.430(e)(9)(iii)(I)
Proposition P: Public Overwhelmingly Supports Highest Cleanup Standards, Unrestricted Use

Passed in 2000 with 86.4% in favor

“While the federal government is required by law to clean up the Shipyard, the Navy says it will cost too much to do a thorough job. Instead, the Navy plans to leave behind so much contamination that it will increase the risk for cancer resulting from exposure to the property, requiring the construction of barriers and the restriction of future land uses.”

“Hunters Point Shipyard [must] be cleaned to a level which would enable the unrestricted use of the property - the highest standard for cleanup established by the United States Environmental Protection Agency.”
“WHEREAS, Although the federal government is required by law to clean up the Shipyards, the Navy says it will cost too much money to do a thorough job. Instead, the Navy plans to leave behind so much contamination that the property may expose occupants and visitors to an unacceptable risk of cancer unless the Navy imposes legal restrictions on land use and constructs physical barriers; and

WHEREAS, The United States government should be held to the highest standards of accountability for its actions; and
WHEREAS, The United States Navy has demonstrated that it is not committed to responsible site management or cleanup and *many in the Bayview Hunters Point community believe the department's disdain for its duties in this neighborhood stems from the racial make-up of its residents*; and

WHEREAS The Hunters Point Bayview community wishes the Hunters Point Shipyard to be cleaned to a level which would enable the unrestricted use of the property - *the highest standard for cleanup established by the United States Environmental Protection Agency*; and
RESOLVED, That the Board hereby declares that Proposition P ... shall be the official policy of the City regarding the remediation of the Shipyard and sets forth a standard of remediation acceptable to the community;
Thin Covers Are Ineffective at Preventing Exposure to Contaminants
Large Portions of HPNS are Soil With Vegetation

March 2017, Google Earth

August 2017, Google Earth
HPNS Development Plans have always included large areas of soil with vegetation, and that remains true to this day.
There are numerous mechanisms by which contaminants can be brought back to the surface
Uptake of Contaminants to Soil Surface Through Deep Rooted Plants

2 or 3 feet of clean soil

Contaminated Soil
Shrubs, Bushes, and Other Landscaping Vegetation Can Draw Contaminants from Beneath the Soil Cover, and Decay of the Plant Matter Can Result in Contamination of Top Soil
There Are Numerous Other Mechanisms Which Render Soil Covers Useless
In the short time since soil covers have been installed at IR 07/18 (2011), instances of barrier breach by burrowing animals have already occurred.

Photos taken on March 1st, 2013

Photograph 15. Large, collapsed burrow near revetment crest in central portion. Second burrow entry at lower left corner of photograph. Burrow scheduled for repair.

Source: Navy Third Five-Year Review, HPNS
Growing fruits and vegetables is common in the Bayview/Hunters Point area.
Corn and other produce grown at Quesada Community Gardens in Bayview/Hunters Point neighborhood
Children growing produce in the soil of a Bayview/Hunters Point street median

Source: Quesada Gardens
Roots of Vegetables Penetrate Depths Beyond 2 Feet, and Thus Can Absorb Contaminants
EPA Tries to Get Around This by Claiming That All Gardens Will Be Raised Beds With Impermeable Bottoms

Completely unenforceable; nothing can grow under such circumstances; a regulatory fiction designed to allow vastly higher concentrations of contaminants than permitted for unrestricted residential use.
Even With the Garden Pathway Turned Off in the PRG Calculator, the Cancer Risks from the Navy Soil Cleanup Levels Exceed the CERCLA Risk Goal by 350 Times and Also Exceed the Normal EPA Upper Limit of the Risk Range.
With the Garden Pathway Included, the Risk Associated with the Navy Remediation Goals is Far, Far Outside the Acceptable Risk Range

When the garden pathway is included, as it should be, the PRG-based risk is $2 \times 10^{-3}$, far, far above the upper end of acceptable risk levels.

When chemicals are included, as they must be, the risk is even further into the the $10^{-3}$ range, vastly exceeding acceptable risk.
Coverup, not Cleanup of Contamination

Original cleanup promise: removal of contaminated soil

Contamination was found to be ubiquitous and cleanup costs higher than anticipated, so Navy modified cleanup plan to rely on covering contamination with 2 feet of “clean” soil or 4 inches of asphalt

Now, majority of contamination will be left in place on site, beneath a thin soil or asphalt cover
Development of the site will require tearing up the thin soil or asphalt covers and the contaminated soil beneath in order to build residences, shops, utility infrastructure, etc.
The years or decades of intense construction, involving tearing up the soil and asphalt covers and existing building foundations and digging deep into the contaminated soil beneath will produce potential for widespread dispersal of contamination and exposures to people.
The planned redevelopment project would be the largest in San Francisco since the 1906 earthquake.
IV. The Navy and EPA have ignored the potential for widespread contamination and the presence of most radionuclides of concern at HPNS
The Entire Site Has Significant Potential for Contamination

Many activities occurred over the decades which likely led to widespread dispersal of contamination:

➔ Sandblasting of radioactive ships
➔ Burning of contaminated fuel oil in HPNS boilers
➔ Use of wide array of radionuclides for nuclear research at NRDL
➔ Extensive earth moving for cleanup and construction activities
BUT Only ~10% of Sites Received Any Sampling

A Navy document (2004 HRA) simply asserted 90% of all HPNS sites were “non-radiologically impacted” and thus should be exempt from sampling based on the assumption that contamination could only occur where there was record of discrete use and spills.

Furthermore, this determination was made through a paper exercise relying on markedly incomplete historical records.
Approximately 90% of HPS sites were never sampled.

792 of 883 HPS sites were exempted from sampling.
The Testing That *Did* Occur Was Deeply Flawed

- Excluding almost all Radionuclides of Concern
- Using extremely outdated cleanup goals
- Inflating background measurements
Almost all Radionuclides Were Excluded from Testing

Over 100 radionuclides used

from US Navy, 2004 Historical Radiological Assessment Volume 2, Table 4-2
### Table 4-3. Radionuclides of Concern at HPS

<table>
<thead>
<tr>
<th>Radionuclide</th>
<th>Half Life</th>
<th>Radiations</th>
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<tbody>
<tr>
<td>Ac-227 (Actinium)</td>
<td>21.8 Years</td>
<td>Alpha, beta, and gamma</td>
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<td>Am-241 (Americium)</td>
<td>432.7 Years</td>
<td>Alpha, beta, and gamma</td>
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<td>Am-243</td>
<td>7.370 Years</td>
<td>Alpha and gamma</td>
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<td>Ba-133 (Barium)</td>
<td>10.5 Years</td>
<td>Beta and gamma</td>
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<td>Bi-207 (Bismuth)</td>
<td>32 Years</td>
<td>Beta and gamma</td>
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<td>C-14 (Carbon)</td>
<td>5715 Years</td>
<td>Beta</td>
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<td>Cl-36 (Chlorine)</td>
<td>3.01 x 10^3 Years</td>
<td>Beta</td>
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<td>Co-58 (Cobalt)</td>
<td>18.1 Years</td>
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<td>Co-60 (Cobalt)</td>
<td>5.27 Years</td>
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<td>Cs-137 (Cesium)</td>
<td>30.1 Years</td>
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<td>Eu-152 (Europium)</td>
<td>13.5 Years</td>
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<td>Eu-154</td>
<td>8.6 Years</td>
<td>Beta</td>
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<td>Gd-152 (Gadolinium)</td>
<td>1.1 x 10^3 Years</td>
<td>Alpha</td>
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<td>H-3 (Protium)</td>
<td>12.3 Years</td>
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<td>In-115 (Indium)</td>
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<td>K-40 (Potassium)</td>
<td>1.27 x 10^3 Years</td>
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<td>Nb-94 (Niobium)</td>
<td>2 x 10^3 Years</td>
<td>Beta and gamma</td>
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<td>Ni-63 (Nickel)</td>
<td>100 Years</td>
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<td>Np-237 (Neptunium)</td>
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<td>Pb-210 (Lead)</td>
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<td>Pu-238 (Plutonium)</td>
<td>87.7 Years</td>
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<td>Pu-239</td>
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<td>Ra-226 (Radioactive)</td>
<td>1.599 Years</td>
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<td>Sr-90 (Strontium)</td>
<td>28.78 Years</td>
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<td>Tc-99</td>
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<td>Beta and gamma</td>
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<td>Tc-99</td>
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<td>Th-232 (Thorium)</td>
<td>1.4 x 10^4 Years</td>
<td>Alpha</td>
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<td>Ti-44 (Titanium)</td>
<td>67 Years</td>
<td>Gamma</td>
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<td>Ti-204 (Thallium)</td>
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<td>Beta</td>
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<td>U-233 (Uranium)</td>
<td>1.59 x 10^4 Years</td>
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<td>U-235</td>
<td>7.04 x 10^5 Years</td>
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<td>U-236</td>
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<tr>
<td>U-238</td>
<td>6.78 x 10^4 Years</td>
<td>Alpha and gamma</td>
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</table>

Source: Historical Radiological Assessment, 2004

### Table 3-4. Soil Radionuclides of Concern

<table>
<thead>
<tr>
<th>Soil Area</th>
<th>Radionuclide of Concern</th>
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</thead>
<tbody>
<tr>
<td>Former Sanitary Sewer and Storm Drain Lines and Building 351A Crawl Space</td>
<td>$^{137}$Cs, $^{226}$Ra, $^{90}$Sr</td>
</tr>
<tr>
<td>Former Buildings 317/364/365 Site</td>
<td>$^{137}$Cs, $^{226}$Ra, $^{90}$Sr, $^{239}$Pu</td>
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Source: Draft Final Parcel G retesting plan 2018

### Table 3-5. Soil Remediation Goals

<table>
<thead>
<tr>
<th>Radionuclide</th>
<th>Residential Soil Remediation Goal(^a) (pCi/g)</th>
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<tbody>
<tr>
<td>$^{137}$Cs</td>
<td>0.113</td>
</tr>
<tr>
<td>$^{239}$Pu</td>
<td>2.59(^b)</td>
</tr>
<tr>
<td>$^{226}$Ra</td>
<td>1.0</td>
</tr>
<tr>
<td>$^{90}$Sr</td>
<td>0.331</td>
</tr>
</tbody>
</table>

\(^a\) All RGs will be applied as concentrations above background.
\(^b\) $^{239}$Pu is an ROC only for the Former Buildings 317/364/365 Site.
Testing Couldn’t Even Detect those Few Radionuclides Remaining on Their List

➢ The gamma scans couldn’t detect alpha- or beta-emitting radionuclides at all
➢ They couldn’t detect any gamma radionuclide at the cleanup level, with one possible exception
➢ Soil samples tested for only a small fraction of the radionuclides of concern (~3-4 out of dozens)
➢ Only a small fraction of soil samples were tested for strontium-90 or plutonium-239; most were only tested for radium and cesium
V. Many of the Problems in the Original Tetra Tech Measurements are Being Repeated in the Retesting
At HPNS, background measurements are taken in potentially contaminated areas.
EPA Guidance Forbids Background Locations in Potentially Contaminated Areas

Background Reference Areas should be “selected from non-impacted areas” and “cannot be potentially contaminated by site activities.”

Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), EPA 42-R-97-016
In the Parcel G draft retesting plan, background is taken inside a contaminated building.
In the final retesting plan, they merely moved the “background” location to a building a few feet away, also potentially contaminated.
The Navy proposed--and EPA did not object to--Reference Background Areas for concrete first near contaminated Bldg 810, then from a concrete pad next to Dry Dock 3, then from a concrete pad next to the Finger Piers. All were in the midst of the contaminated Superfund site and potentially contaminated themselves, in violation of EPA’s MARSSIM guidance.
To Summarize:

- The Hunters Point Naval Shipyard has an intense history of sitewide contamination.
- Cleanup has been largely botched due to:
  - Widespread alleged radioactivity measurement falsification
  - Outdated, non-protective, and inconsistent cleanup goals
  - The Navy’s persistent desire to favor covering up contamination instead of removing it
- Many of the problems of initial measurements are being repeated.
● One can’t rely on the Navy and its captured regulators to protect the public.
  ○ It was on their watch that the site was contaminated.
  ○ It was on their watch that the cleanup measurements were allegedly falsified.

● Only through committed community involvement can those responsible for contaminating the site and botching the cleanup be held to account and a genuine and thorough cleanup of the contaminated site be achieved and the health of the people in Bayview-Hunters Point be protected.
Thank you.
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