

Failure of Cleanup at Hunters Point Naval Shipyard

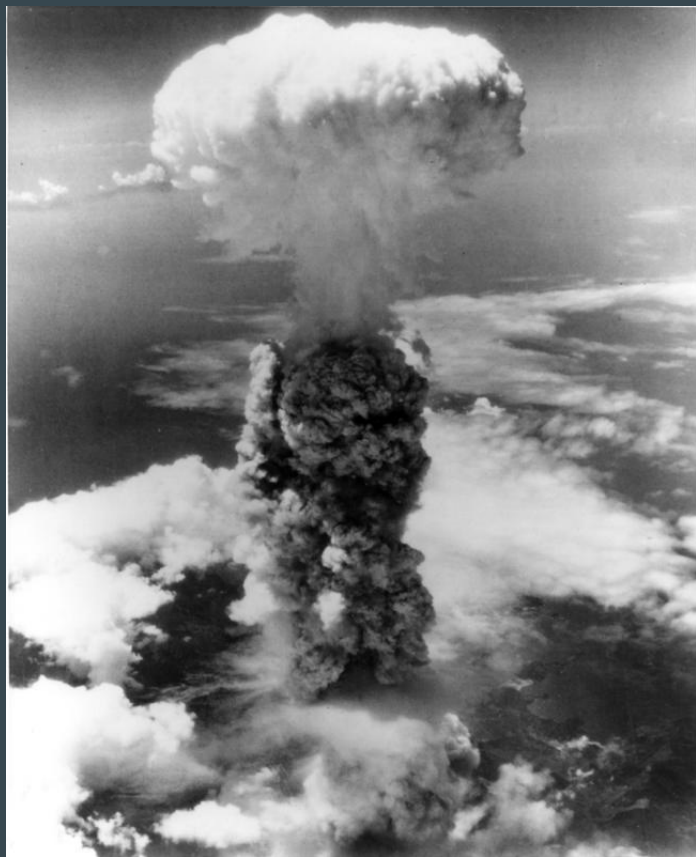
Presented to
Bayview Hunters Point Environmental Justice Task Force

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

July 20, 2022

77 YEARS: Hunters Point & the Dawn of Nuclear Era

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.



Hiroshima

August 6, 1945





One year after
Hiroshima: the
**OPERATION
CROSSROADS**
atomic tests in the
Bikini Atoll

The tests went awry,
& **badly contaminated**
hundreds of ships

Aerial view of Shot Baker, OPERATION CROSSROADS, July 25, 1946, ships in foreground; US Army Photographic Signal Corps





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)



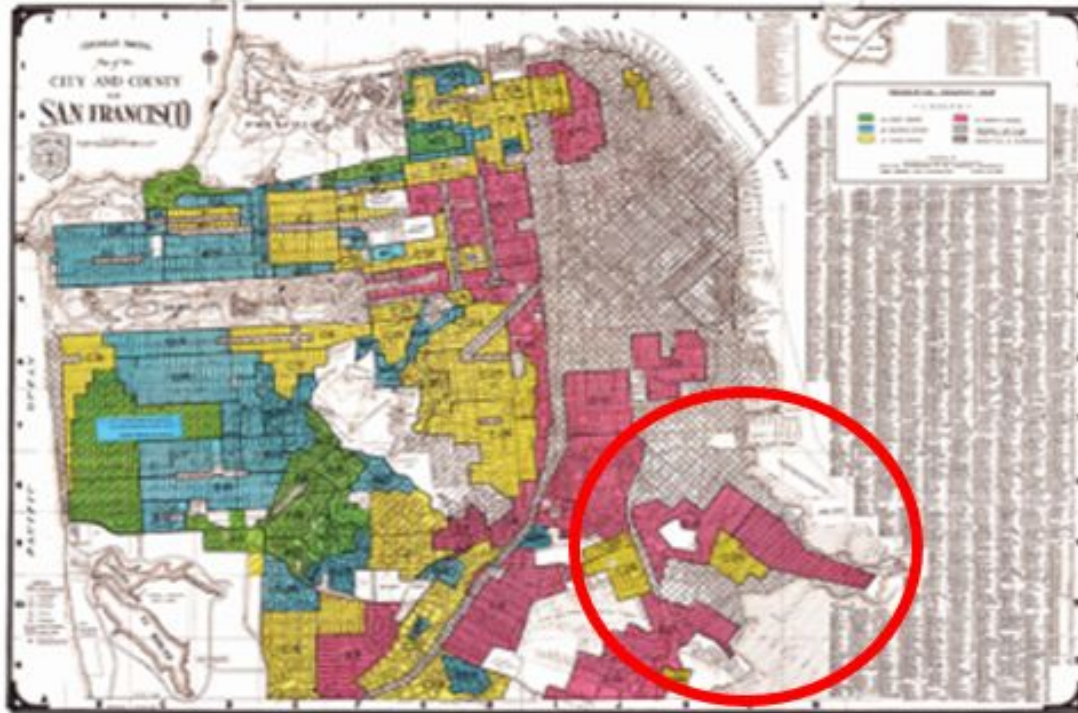
Crude efforts at decontaminating the radioactive fleet at sea proved futile

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)

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**

Map 1: Redlining map of San Francisco

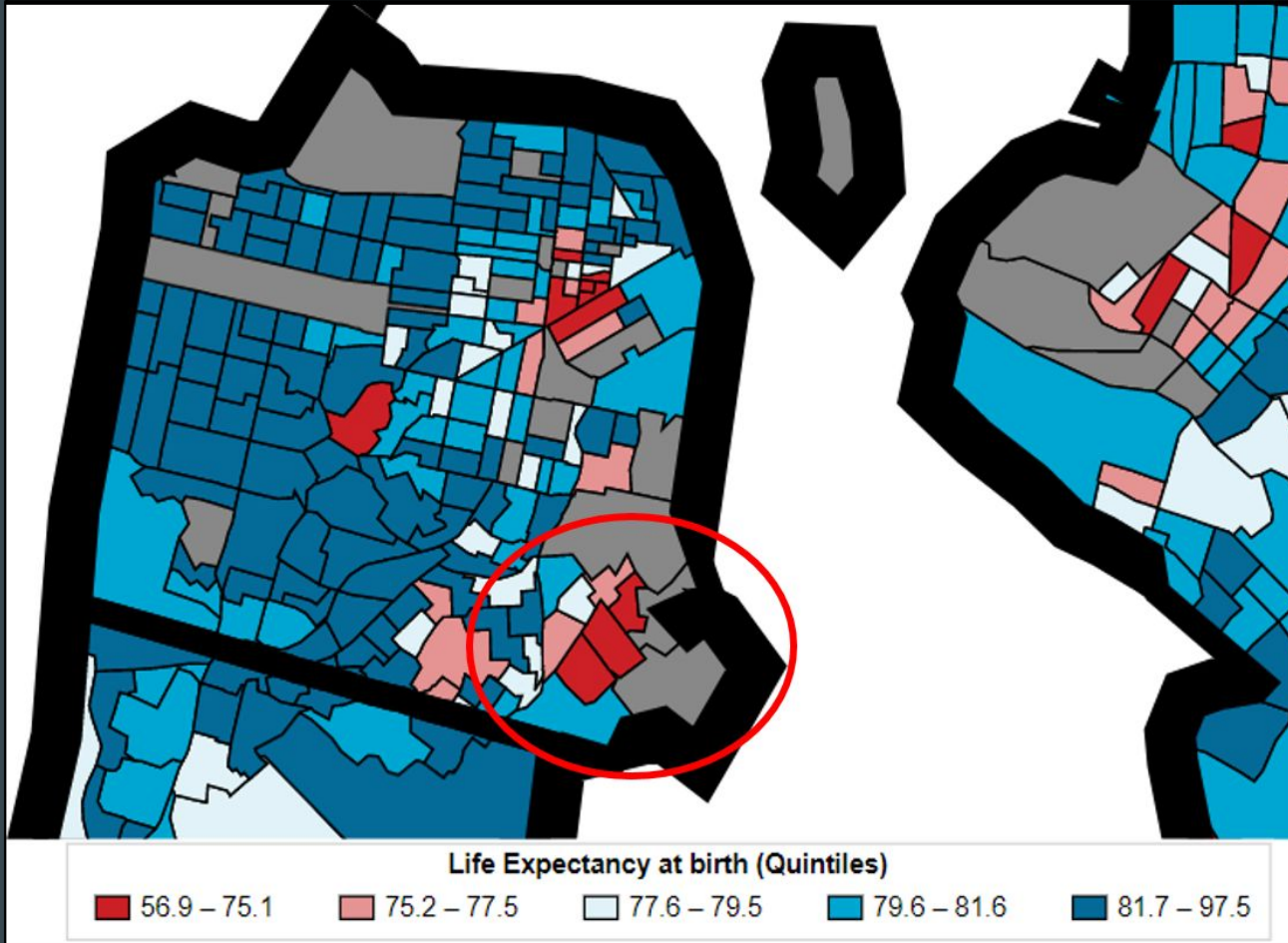


Green= "Best", Blue = "Still Desirable", Yellow= "Definitely Declining",
Red= "Hazardous"

Mapping Inequality: Redlining in New Deal America.

Redlining practices have resulted in BayView Hunters Point (BVHP) concentrating the highest density of Black people in San Francisco

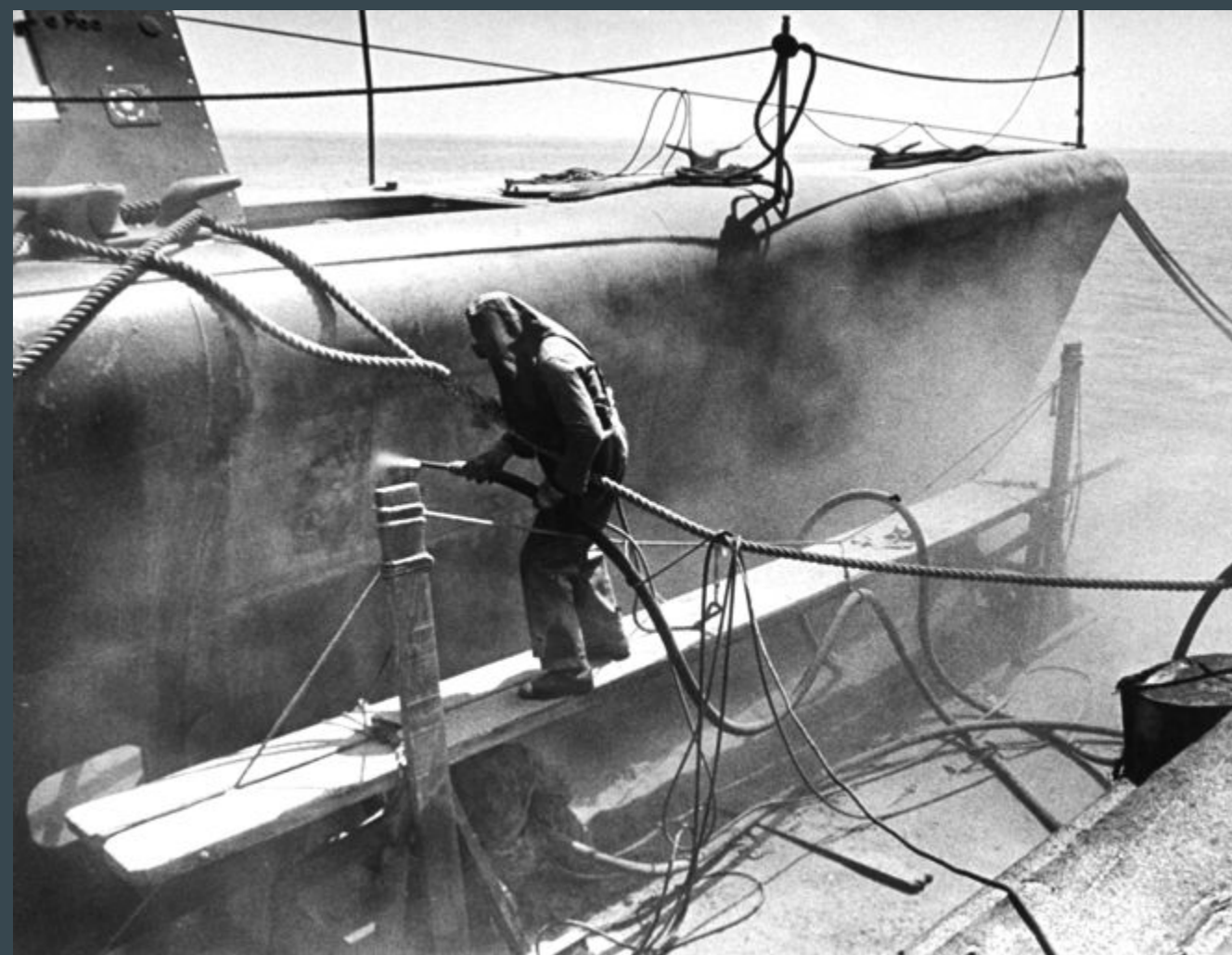
Map 3. Life expectancy at birth by census tract (*San Francisco, 2020*)



Life
expectancy
at birth by
census
tract (San
Francisco
2020)



Drydock 4 at Hunters Point, 1950s (Todd Lappin)



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.



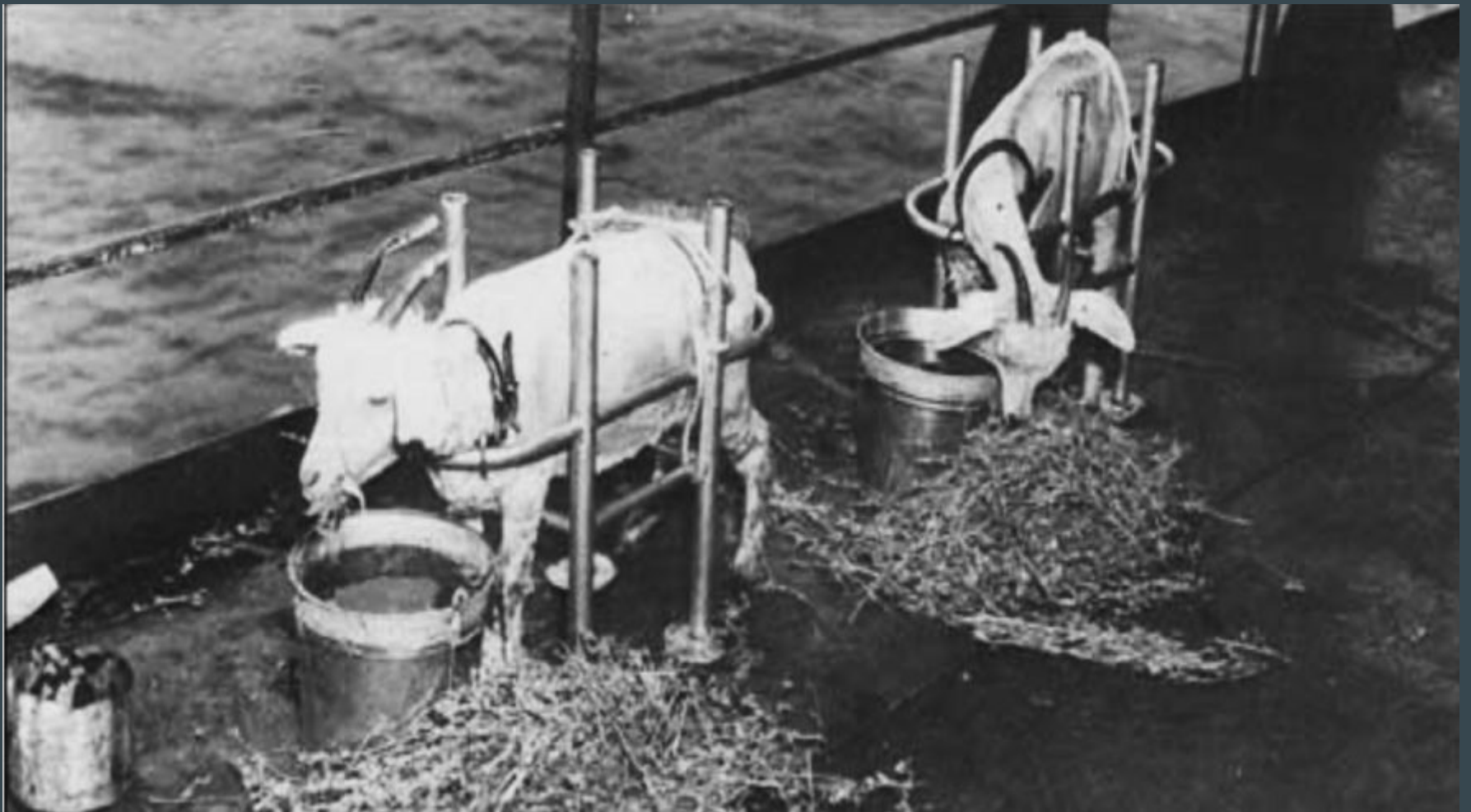
Sailors – and their clothing – contaminated by nuclear work at HPNS were washed at the site, with the contaminated rinse water going down the drains and leaking into the soil through breaks in the lines.

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 carcasses.



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, NRD L 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.

EPA Found Only 3% of Samples to Be Free of Falsification

Summary of EPA, DTSC, CDPH review of Parcel G Radiological Data Evaluation

	Trench	Fill	Building Sites	Total	% of total
Total Survey Units in Parcel G	63	107	32	202	100%
Navy recommended resampling	20	53	25	98	49%
EPA, CDPH, DTSC recommend resampling	39	54	5	98	49%
Total recommended resampling	59	107	30	196	97%
No signs of falsification found in data	4	0	2	6	3%
% of total recommended resampling	94%	100%	94%	97%	

EPA, CDPH, and DTSC review of Parcel B Rad Data Evaluation

	Trench	Fill	Building Sites	Total	% of total
Total Survey Units in Parcel B	70	110	17	197	100%
Navy recommended resampling	2	18	9	29	15%
Navy recommended reanalyzing archived samples	2	1	0	3	2%
EPA, CDPH, DTSC recommend resampling	55	87	7	149	76%
Total recommended resampling	57	105	16	178	90%
No signs of falsification found in data	13	5	1	19	10%
Regulators not yet reviewed	0	0	0	0	0%
% of total recommended resampling	81%	95%	94%	90%	

	Total	% of total	D-2	UC-1	UC-2	UC-3
Total Survey Units in Parcels UC-1,2,3 & D-2	80	100%	5	26	20	29
Navy recommended resampling	55	69%	4	14	13	24
Navy recommended reanalyzing archived samples	0	0%	0	0	0	0
DTSC recommended resampling	23	29%	1	12	6	4
Total recommended resampling	78	98%	5	26	19	28
No signs of falsification found in data	2	3%	0	0	1	1
% of total recommended resampling	98%		100%	100%	95%	97%

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?

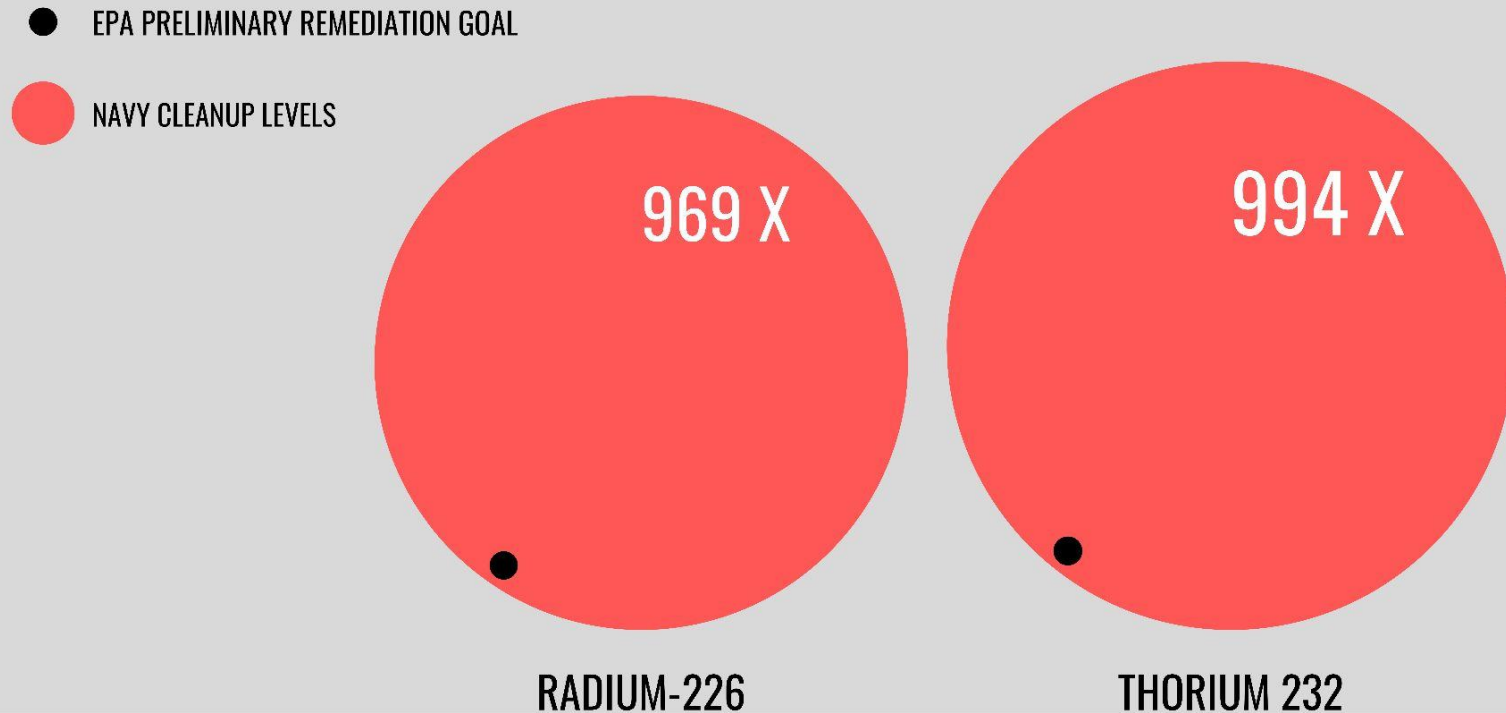
These failures of oversight were not limited to the
Tetra Tech matter, but extend to the whole cleanup.

**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

Radionuclide	Navy Remediation Goals for Soil (pCi/g)	2021 EPA Default PRG for soil (pCi/g)	<i>How many times weaker are the Navy's Remediation goals?</i>
Radium-226	1.861	0.00192	969 times weaker
Strontium-90	0.331	0.00477	69 times weaker
Thorium-232	1.690	0.0017	994 times weaker
Uranium-235	0.195	0.00708	28 times weaker

NAVY CLEANUP LEVELS THAT ALLOW HUNDREDS OF TIMES MORE CONTAMINATION IN SOIL THAN EPA CLEANUP GOALS



The cancer risk from the Navy Soil Cleanup Standards is, according to the EPA's PRG Calculator, 2.12×10^{-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.**”

SF Board of Supervisors Adopts Prop P as Official City and County Policy

“WHEREAS, Although the federal government is required by law to clean up the Shipyard, 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

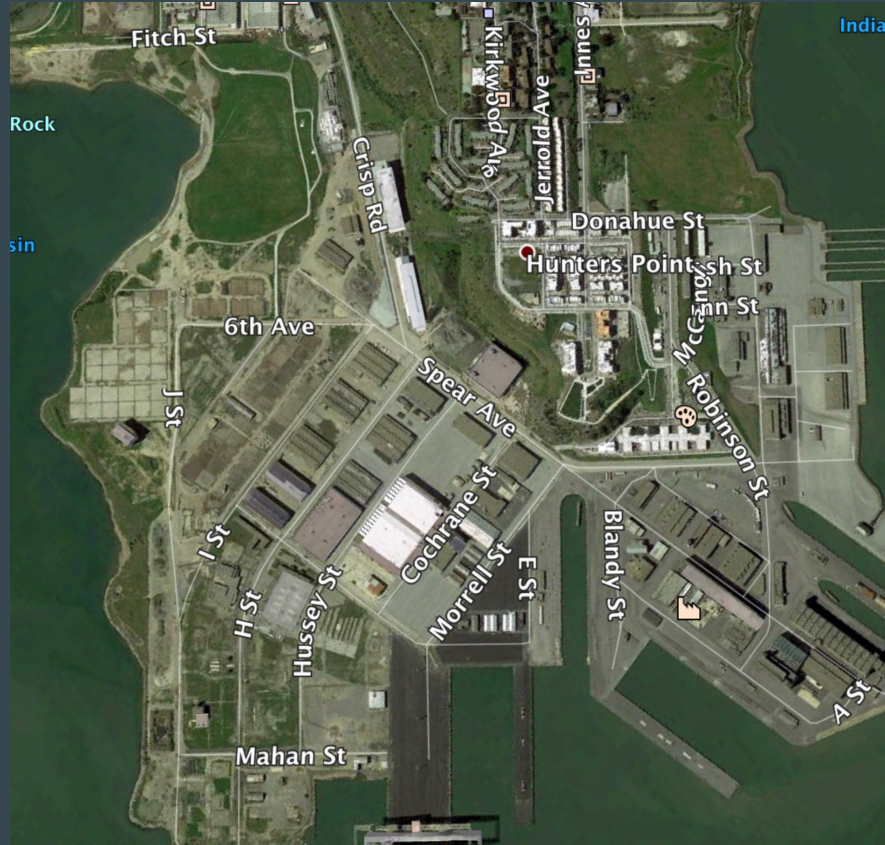
WHEREAS The Hunters Point Bayview community wishes the Hunters Point Shipyard to be cleaned to a level which would enable the unrestricted use of the property - the highest standard for cleanup established by the United States Environmental Protection Agency; and

SF Board of Supervisors Adopts Prop P as Official City and County Policy

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



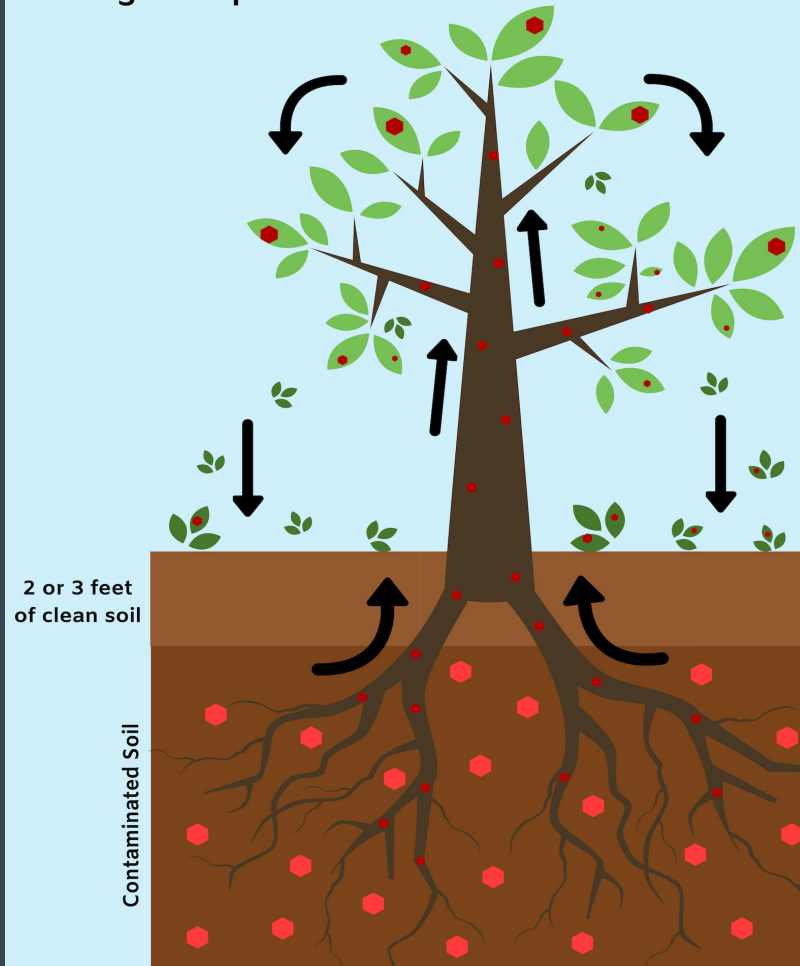
August 2017, Google Earth



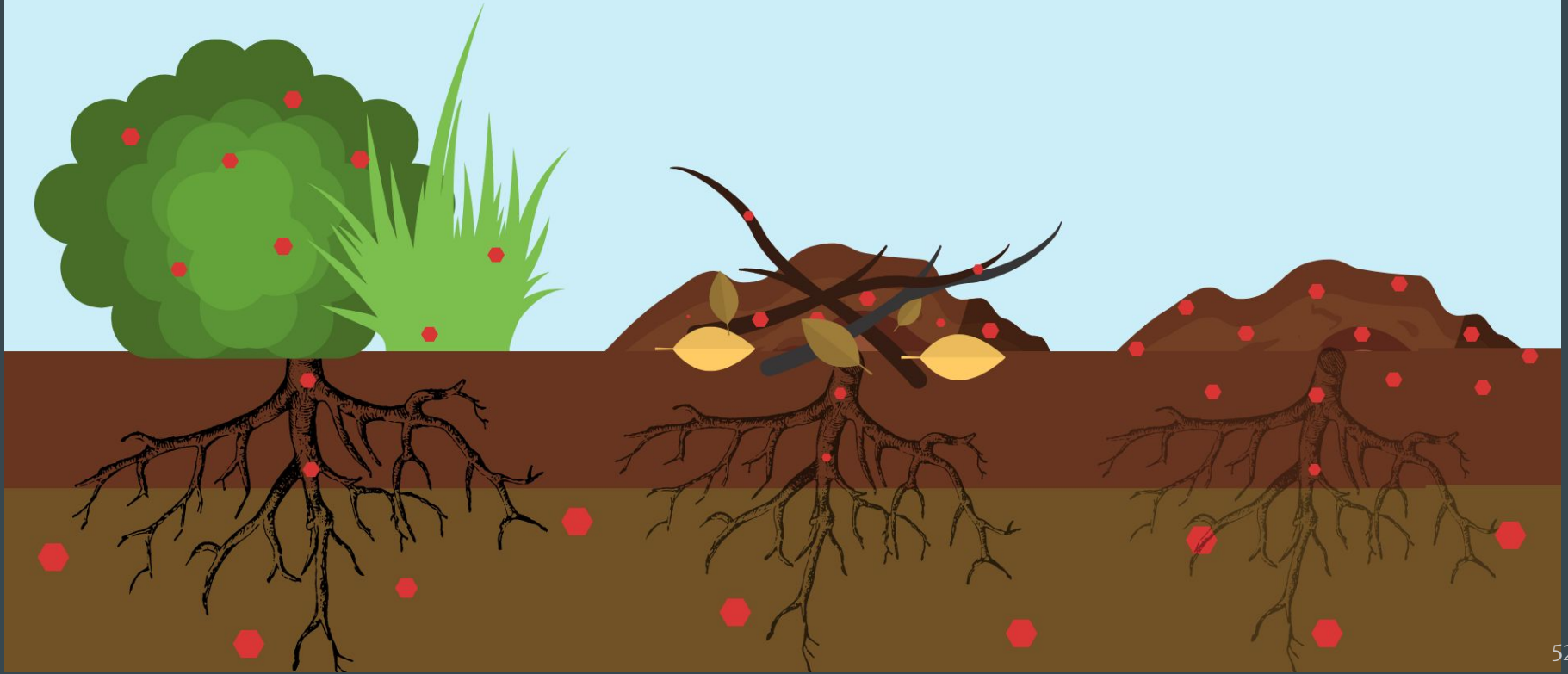
HPNS
Development
Plans have
always included
large areas of
soil with
vegetation, and
that remains true
to this day

**There are numerous mechanisms by which
contaminants can be brought back to the
surface**

Uptake of Contaminants to Soil Surface Through Deep Rooted Plants



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**



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

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

**Growing fruits and vegetables
is common in
the Bayview/Hunters Point area.**



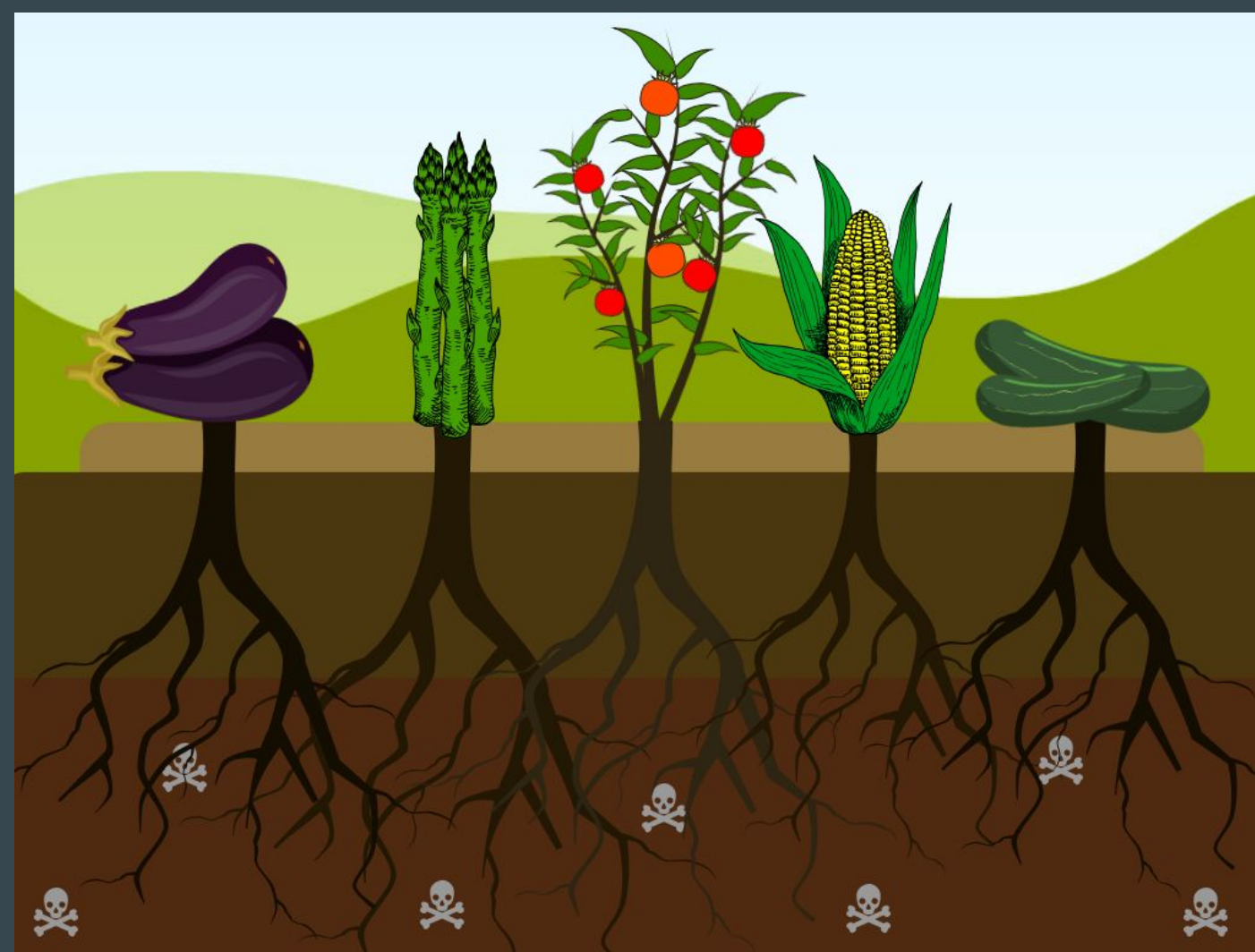
Corn and other
produce grown at
Quesada
Community
Gardens in
Bayview/Hunters
Point
neighborhood



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



Raised bed

2 foot soil
cover

contaminated
soil

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 2×10^{-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 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:

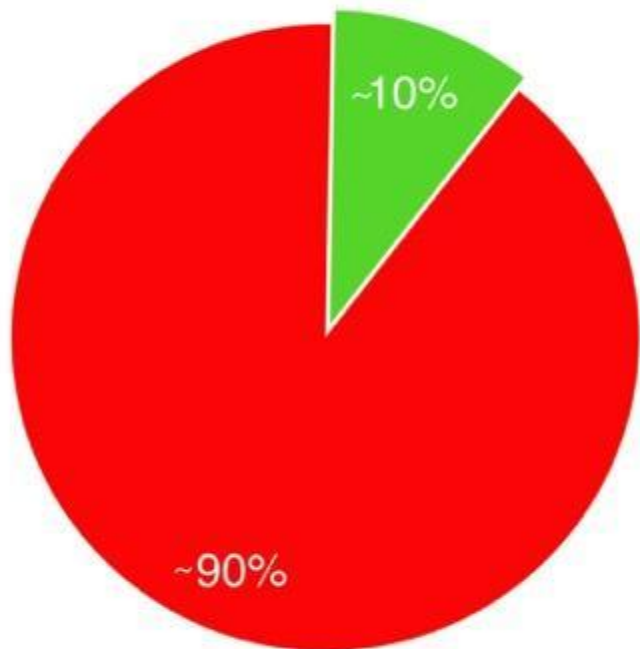
- Sandblasting of radioactive ships
- Burning of contaminated fuel oil in HPNS boilers
- Use of wide array of radionuclides for nuclear research at NRDL
- Extensive earth moving for cleanup and construction activities

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.

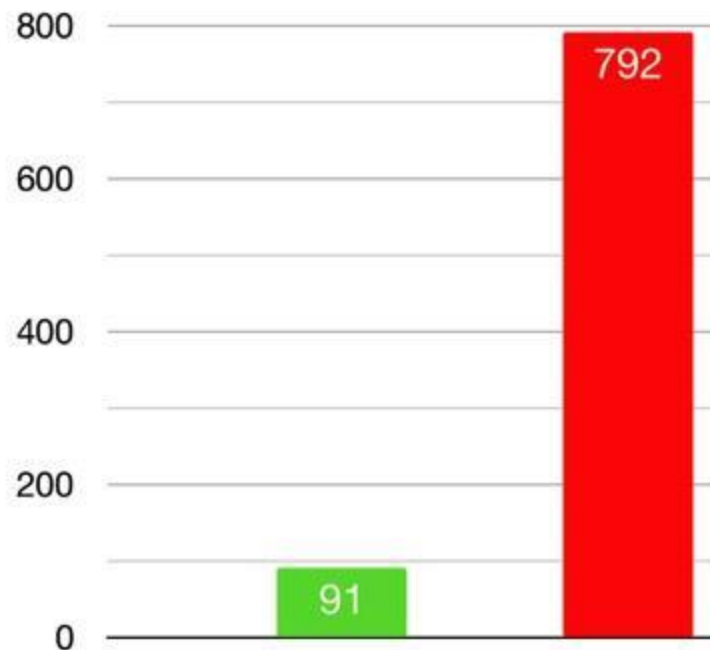
Furthermore, this determination was made through a paper exercise relying on markedly incomplete historical records.

~90% of HPS Sites Were Never Sampled



- 91 Sites Received Some Sampling
- 792 Sites Exempted from Sampling

792 of 883 HPS Sites Were Exempted from Sampling



- 91 Sites Received Some Sampling
- 792 Sites 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

Radionuclide	Half-Life	Radiation
Ac-227 (Actinium)	21.8 Years	Alpha, beta, and gamma
Ag-110 (Silver)	24.6 Seconds	Beta and gamma
Am-241 (Americium)	432.7 Years	Alpha and gamma
Am-243	7,370 Years	Alpha gamma
As-73 (Arsenic)	80.3 Days	Beta and gamma
Au-76	26.3 Hours	Beta and gamma
Au-195 (Gold)	186 Days	Gamma
Au-198	2.7 Days	Beta and gamma
Ba-133 (Barium)	10.5 Years	Beta and gamma
Ba-140	12.8 Days	Beta and gamma
Be-7 (Beryllium)	52.28 Days	Beta and gamma
Bi-207 (Bismuth)	32 Years	Beta and gamma
Bi-210	5.01 Days	Beta and gamma
Br-82 (Bromine)	1.47 Days	Beta and gamma
C-14 (Carbon)	5715 Years	Beta
Ca-45 (Calcium)	162.7 Days	Beta and gamma
Cd-109 (Cadmium)	462 Days	Gamma
Cd-115	2.23 Days	Beta and gamma
Ce-141 (Cerium)	32.5 Days	Beta and gamma
Ce-144	284.6 Days	Beta and gamma
Cf-252 (Californium)	2.65 Years	Alpha, beta, and gamma
Cl-36 (Chlorine)	3.01×10^5 Years	Beta
Cm-242 (Curium)	162.8 Days	Alpha and gamma
Cm-244	18.1 Years	Alpha and gamma
Co-57 (Cobalt)	271 Days	Gamma
Co-58	70.9 Days	Beta and gamma
Co-60*	5.27 Years	Beta and gamma
Cr-51 (Chromium)	27.7 Days	Gamma
Cs-134 (Cesium)	2.07 Years	Beta and gamma
Cs-137*	30.1 Years	Beta and gamma
Eu-152 (Europium)	13.5 Years	Beta and gamma
Eu-154	8.6 Years	Beta and gamma
Eu-155	4.8 Years	Beta and gamma
Eu-156	15.2 Days	Beta and gamma
Fe-55 (Iron)	2.73 Years	Gamma
Fe-59	45.5 Days	Beta and gamma
Gd-152 (Gadolinium)	1.1×10^{14} Years	Alpha
Ge-68 (Germanium)	270.8 Days	Beta and gamma
H-3 (Tritium)	12.3 Years	Beta
Hg-203 (Mercury)	46.6 Days	Beta and gamma

Radionuclide	Half-Life	Radiation
I-125 (Iodine)	59.4 Days	Beta and gamma
I-129	1.57×10^7 Years	Beta and gamma
I-131	8 Days	Beta and gamma
In-115 (Indium)	4.4×10^{14} Years	Beta
Ir-192* (Iridium)	73.8 Days	Beta and gamma
K-40 (Potassium)	1.27×10^9 Years	Beta and gamma
K-42	12.36 Hours	Beta and gamma
Kr-85 (Krypton)	10.76 Years	Beta and gamma
La-140 (Lanthanum)	1.68 Days	Beta and gamma
Lu-177 (Lutetium)	6.71 Days	Beta and gamma
Mn-54 (Manganese)	312.1 Days	Beta and gamma
Mo-99 (Molybdenum)	2.75 Days	Beta and gamma
Na-22 (Sodium)	2.6 Years	Beta and gamma
Na-24	14.95 Hours	Beta and gamma
Nb-94 (Niobium)	2×10^4 Years	Beta and gamma
Nd-147 (Neodymium)	10.98 Days	Beta and gamma
Ni-63 (Nickel)	100 Years	Beta
Np-237 (Neptunium)	2.14×10^6 Years	Alpha and gamma
P-32 (Phosphorus)	14.28 Days	Beta
Pa-234 (Protactinium)	6.7 Hours	Beta and gamma
Pb-210 (Lead)	22.6 Years	Beta and gamma
Pd-109 (Palladium)	13.5 Hours	Beta and gamma
Pm-147 (Promethium)	2.62 Years	Beta and gamma
Po-210 (Polonium)	138.4 Days	Alpha and gamma
Pr-143 (Praseodymium)	13.57 Days	Beta and gamma
Pr-144	17.28 Minutes	Beta and gamma
Pu-237 (Plutonium)	45.2 Days	Alpha and gamma
Pu-238	87.7 Years	Alpha and gamma
Pu-239*	2.41×10^4 Years	Alpha and gamma
Ra-226* (Radium)	1,599 Years	Alpha and gamma
Rn-222 (Radon)	3.82 Days	Alpha and gamma
Rb-86 (Rubidium)	18.65 Days	Beta and gamma
Ru-103 (Ruthenium)	39.27 Days	Beta and gamma
Ru-106	1.02 Years	Beta
S-35 (Sulfur)	87.2 Days	Beta
Sb-125 (Antimony)	2.76 Years	Beta and gamma
Sc-46 (Scandium)	83.8 Days	Beta and gamma
Se-75 (Selenium)	119.8 Days	Gamma
Sm-145 (Samarium)	340 Days	Gamma
Sm-153	1.93 Days	Beta and gamma

Radionuclide	Half-Life	Radiation
Sn-113 (Tin)	115.1 Days	Beta and gamma
Sr-85 (Strontium)	64.84 Days	Gamma
Sr-89	50.52 Days	Beta and gamma
Sr-90*	28.78 Years	Beta
Ta-182 (Tantalum)	114.4 Days	Beta and gamma
Tb-161 (Terbium)	6.91 Days	Beta and gamma
Tc-97 (Technetium)	2.6×10^6 Years	Beta and gamma
Tc-99	2.1×10^5 Years	Beta and gamma
Te-127 (Tellurium)	9.4 Hours	Beta and gamma
Te-133	12.4 Minutes	Beta and gamma
Te-133m	55.4 Minutes	Beta and gamma
Th-228* (Thorium)	1.91 Years	Alpha and gamma
Th-232	1.4×10^{10} Years	Alpha
Ti-44 (Titanium)	67 Years	Gamma
Tl-204 (Thallium)	3.78 Years	Beta
Tm-170 (Thulium)	128.6 Days	Beta and gamma
Tm-171	1.92 Years	Beta and gamma
U-233 (Uranium)	1.59×10^5 Years	Alpha and gamma
U-235	7.04×10^8 Years	Alpha and gamma
U-236	2.34×10^7 Years	Alpha and gamma
U-238	4.478×10^9 Years	Alpha and gamma
W-185 (Tungsten)	74.8 Days	Beta and gamma
Xe-133 (Xenon)	5.24 Days	Beta and gamma
Y-88 (Yttrium)	106.7 Days	Beta and gamma
Y-90	2.67 Days	Beta and gamma
Y-91	58.5 Days	Beta and gamma
Zn-65 (Zinc)	243.8 Days	Beta and gamma
Zr-95 (Zirconium)	64 Days	Beta and gamma

Over 100 radionuclides
used

**TABLE 4-3
RADIONUCLIDES OF CONCERN AT HPS**

Radionuclide	Half Life	Radiations
Ac-227 (Actinium)	21.8 Years	Alpha, beta, and gamma
Am-241 (Americium)	432.7 Years	Alpha, beta, and gamma
Am-243	7,370 Years	Alpha and gamma
Ba-133 (Barium)	10.5 Years	Beta and gamma
Bi-207 (Bismuth)	32 Years	Beta and gamma
C-14 (Carbon)	5715 Years	Beta
Cl-36 (Chlorine)	3.01×10^5 Years	Beta
Cm-244 (Curium)	18.1 Years	Alpha and gamma
Co-60 (Cobalt)	5.27 Years	Beta and gamma
Cs-137 (Cesium)	30.1 Years	Beta and gamma
Eu-152 (Europium)	13.5 Years	Beta and gamma
Eu-154	8.6 Years	Beta and gamma
Gd-152 (Gadolinium)	1.1×10^{14} Years	Alpha
H-3 (Tritium)	12.3 Years	Beta
In-115 (Indium)	4.4×10^{14} Years	Beta
K-40 (Potassium)	1.27×10^9 Years	Beta and gamma
Nb-94 (Niobium)	2×10^5 Years	Beta and gamma
Ni-63 (Nickel)	100 Years	Beta
Np-237 (Neptunium)	2.14×10^6 Years	Alpha and gamma
Pb-210 (Lead)	22.6 Years	Beta and gamma
Pu-238 (Plutonium)	87.7 Years	Alpha and gamma
PU-239	2.41×10^4 Years	Alpha, beta, and gamma
Ra-226 (Radium)	1,599 Years	Alpha and gamma
Sr-90 (Strontium)	28.78 Years	Beta
Tc-97 (Technetium)	2.6×10^6 Years	Beta and gamma
Tc-99	2.1×10^5 Years	Beta and gamma
Th-232 (Thorium)	1.4×10^{10} Years	Alpha
Ti-44 (Titanium)	67 Years	Gamma
Tl-204 (Thallium)	3.78 Years	Beta
U-233 (Uranium)	1.59×10^5 Years	Alpha and gamma
U-235	7.04×10^8 Years	Alpha and gamma
U-236	2.34×10^7 Years	Alpha and gamma
U-238	4.478×10^9 Years	Alpha and gamma

Source: Historical Radiological Assessment, 2004

Table 3-4. Soil Radionuclides of Concern

Soil Area	Radionuclide of Concern
Former Sanitary Sewer and Storm Drain Lines and Building 351A Crawl Space	^{137}Cs , ^{226}Ra , ^{90}Sr
Former Buildings 317/364/365 Site	^{137}Cs , ^{226}Ra , ^{90}Sr , ^{239}Pu

Table 3-5. Soil Remediation Goals

Radionuclide	Residential Soil Remediation Goal ^a (pCi/g)
^{137}Cs	0.113
^{239}Pu	2.59 ^b
^{226}Ra	1.0
^{90}Sr	0.331

^aAll RGs will be applied as concentrations above background.

^b ^{239}Pu is an ROC only for the Former Buildings 317/364/365 Site.

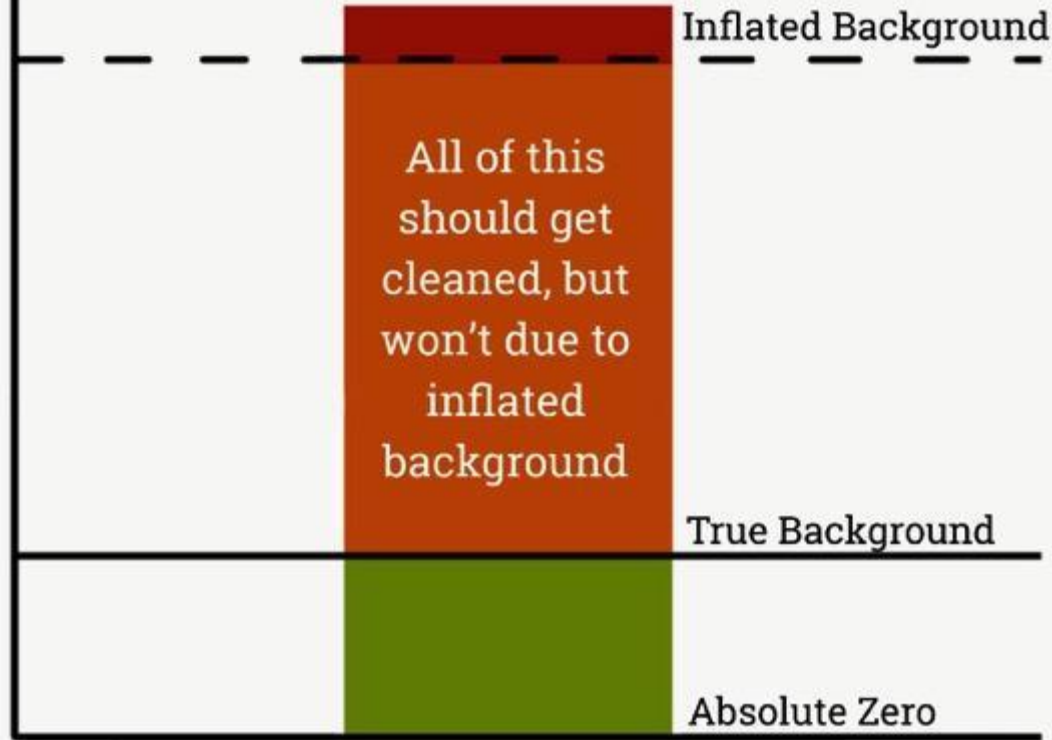
Source: Draft Final Parcel G retesting plan 2018

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**

Inflating Background



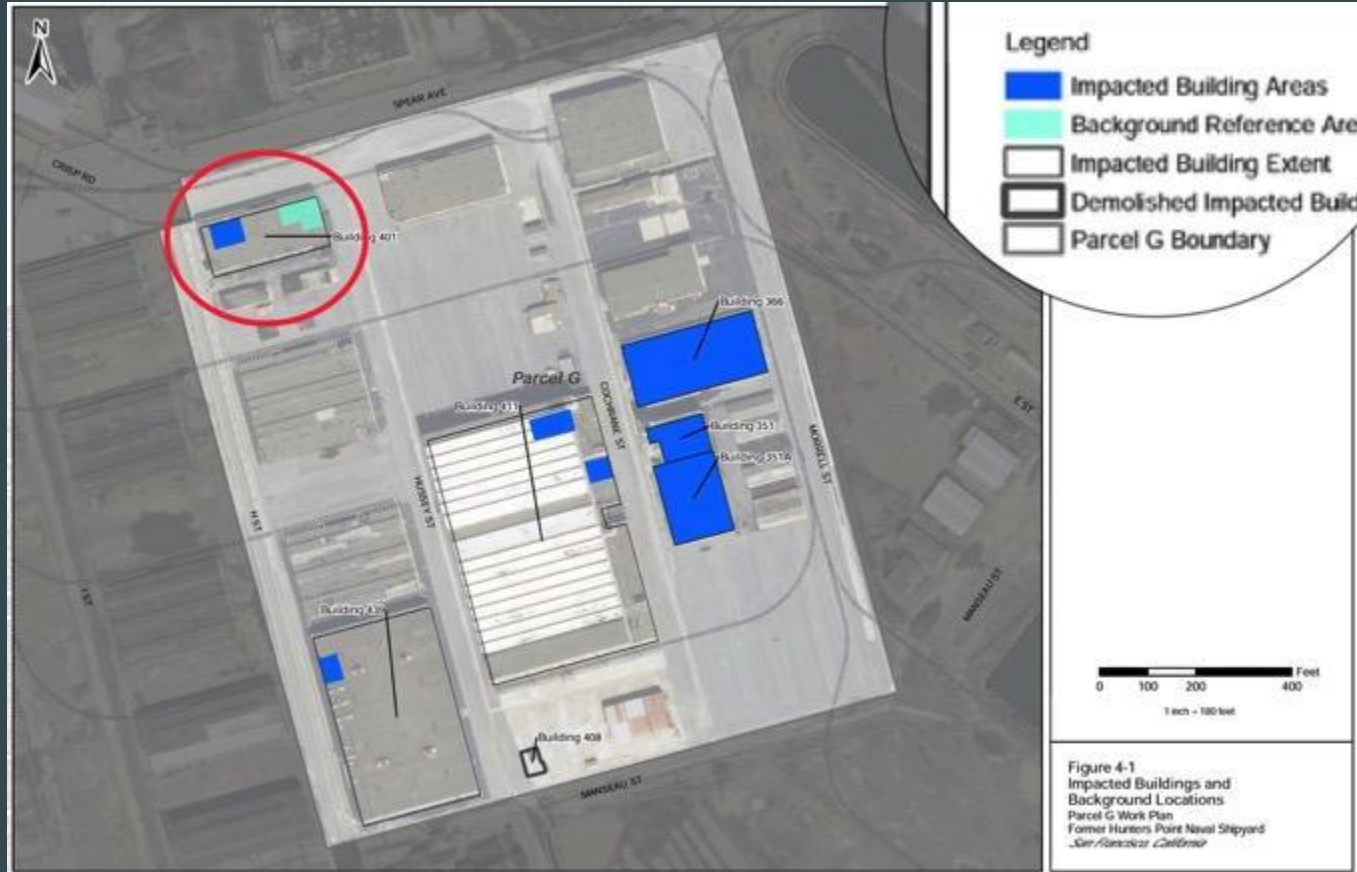
At HPNS,
background
measurements are
taken in
potentially
contaminated
areas

EPA Guidance Forbids Background Locations in Potentially Contaminated Areas

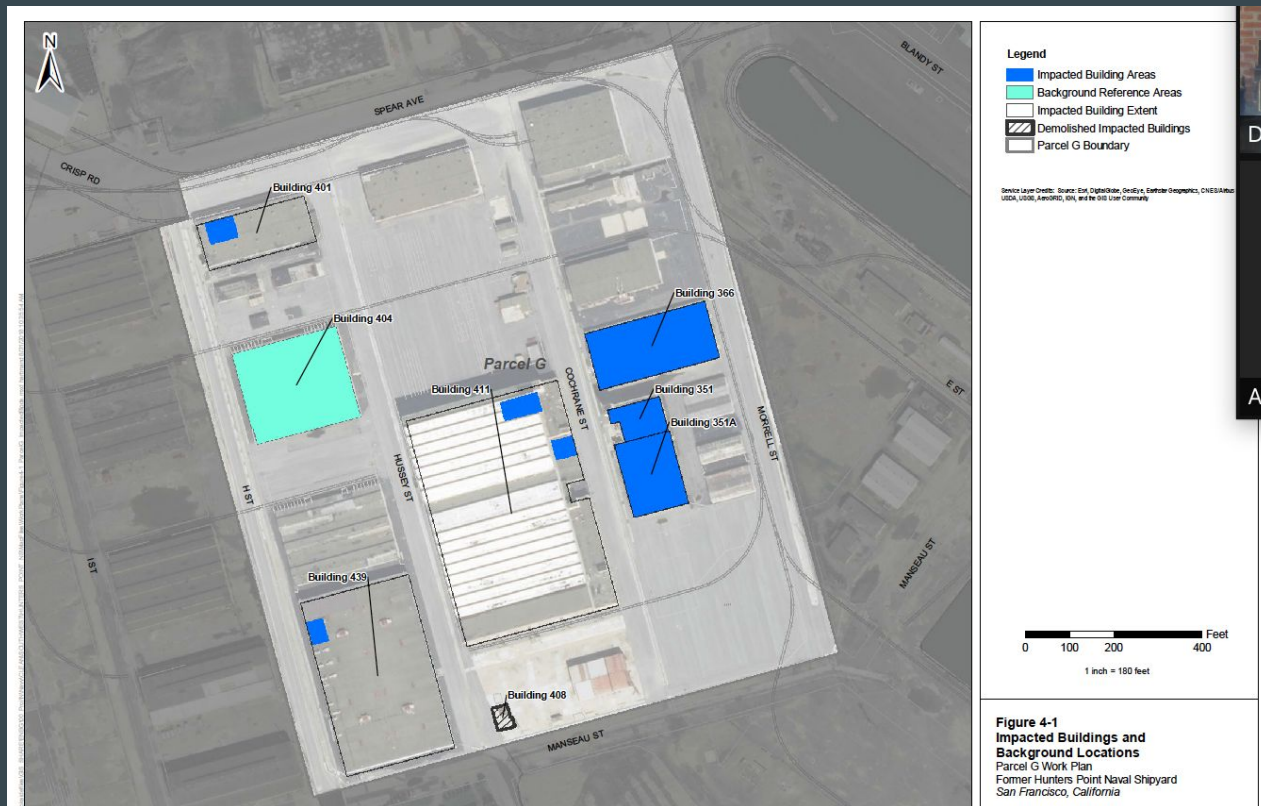
Background Reference Areas should be “selected from non-impacted areas” and “cannot be potentially contaminated by site activities.”

Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), EPA 42-R-97-016

Misuse of Background Continues Beyond TetraTech Scandal



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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