TECHNICAL EVALUATION REPORT
FOR
U.S. NAVY DRAFT TECHNICAL MEMORANDUM:
REQUEST FOR UNRESTRICTED RADIOLOGICAL RELEASE OF
SELECT OPEN SPACES INSTALLATION RESTORATION SITE 12,
FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

December 13, 2019

1.0 INTRODUCTION

1.1 U.S. Navy Submittal and Request

By letter dated September 20, 2018 (U.S. Nuclear Regulatory Commission's [NRC] Agency Documents Access and Management System [ADAMS] Accession No. ML18277A072), the U.S. Navy (Navy) submitted its *Draft Technical Memorandum: Request for Unrestricted Radiological Release of Select Open Spaces Installation Restoration Site 12, Former Naval Station Treasure Island, San Francisco, California* (hereafter, the Draft Technical Memorandum) to the California Department of Toxic Substances Control. The stated purpose of the Navy's Draft Technical Memorandum is to demonstrate that select open areas of Installation Restoration Site 12 (Site 12) on Former Naval Station Treasure Island (hereafter, Treasure Island), located in San Francisco, California, meet unrestricted radiological release. The Draft Technical Memorandum describes the lines of evidence and surveys that the Navy and other entities previously completed within the select open areas of Site 12.

The NRC received a copy of this Draft Technical Memorandum to review per the NRC's Memorandum of Understanding (MOU) with the U.S. Department of Defense (DoD) (hereafter the NRC/DoD MOU; ADAMS ML16092A294). The NRC staff sent a Request for Additional Information (RAI) to the Navy on November 19, 2018 (ADAMS ML18309A060), which the Navy responded to on April 12, 2019 (ADAMS ML19116A220). On July 22, 2019, the Navy supplemented its response with additional information on radiological surveys conducted within housing units located on Site 12 (ADAMS ML19249B410).

1.2 Background

On April 28, 2016, the NRC and the DoD entered a MOU that documents the roles, responsibilities, and relationship between the DoD and NRC regarding environmental response actions on DoD sites containing radioactive materials. As articulated in the NRC/DoD MOU, the MOU serves to avoid duplication of regulatory requirements and effort imposed by obligations that are established by the Atomic Energy Act of 1954, as amended (AEA), and associated NRC regulations, and by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Defense Environmental Restoration Program (DERP). This agreement was based on an NRC staff recommendation to the Commission in SECY-14-0082, "Jurisdiction for Military Radium and U.S. Nuclear Regulatory Commission Oversight of U.S. Department of Defense (DoD) Remediation of Radioactive Material" (ADAMS ML14097A005), which recommended an MOU with the DoD to further reinforce the NRC's reliance on CERCLA and the U.S. Environmental Protection Agency's (EPA) oversight at the Alameda Naval Air Station, Hunters Point Shipyard (HPS), and McClellan Air Force Base, and to further clarify the

NRC's monitoring role at other DoD facilities. The NRC staff's recommendation was subsequently approved by the Commission in SRM-SECY-14-0082 (ADAMS ML14356A070).

Because Treasure Island is not under direct EPA oversight, NRC staff, consistent with the NRC/DoD MOU, has been monitoring DoD's activities, primarily by performing document and data reviews and providing DoD with written comments to ensure that NRC's dose criterion of 25 millirem per year (mrem/yr) (0.25 millisievert per year [mSv/yr]) is not exceeded.

1.3 Summary of Proposed Action

In the Draft Technical Memorandum, the Navy requests unrestricted radiological release from the State of California of select open spaces within Site 12 at Treasure Island. The Navy defined Site 12 as radiologically impacted due to the presence of low-level radiological waste in the solid waste disposal areas (SWDAs). The radiological waste consisted of discrete, radium bearing low-level radiological objects (LLROs).

Historical site grading, performed during construction of Treasure Island housing, resulted in the comingling of SWDA debris with clean fill and other site soils cut from high areas of the site. At that time, the comingled material was used as construction fill and site contouring for Site 12. Per the Navy's construction documentation, portions of the Site 12 footprint received fill material up to 4-feet (1.2-meters) deep, with most of the area requiring 2 feet (0.6 meter) or less of fill.

Because the SWDA debris that was comingled with other grading materials contained LLROs, the Navy performed multiple radiological surveys of Site 12. These surveys consisted of gamma radiation scans and/or measurements of Site 12 roadways, land areas, and housing units; subsurface investigations (i.e., trenching, boreholes, etc.), including gamma radiation scans of excavated soil and sidewalls/bottoms from exploratory trenches and rubbish areas; and gamma radiation anomaly investigations. LLROs were subsequently identified within the Site 12 fill. When identified, the Navy recovered the LLROs. Soil samples were collected from locations where site gamma radiation investigation levels were exceeded (and no LLROs were identified) to quantify diffuse radium-226 (Ra-226) concentrations in soil. The Navy also sampled some site areas at random locations. The Navy compared the analytical results from these biased and random samples to the 1.69-picocurie-per-gram (pCi/g) (0.063-becquerel-per-gram [Bq/g]) release criterion (including background) for the project.

The extensive gamma radiation scans, together with the evaluation of the detection sensitivity of the field instrumentation as a function of depth; LLRO discovery and recovery; and the historical grading records form the basis for the Navy's request for unrestricted radiological release of select Site 12 areas graded with fill of 36 inches (0.9 meter) or less. As a result, Site 12 areas with fill greater than 36 inches (0.9 meter) in depth are not included in the Draft Technical Memorandum release request. Because of this depth exclusion, the Navy clarified that its release request excludes the SWDAs (i.e., Bayside, North Point, and Westside) and other areas considered for future investigation (i.e., Building 1229; areas adjacent to Building 1131 outside of SWDA Westside; areas adjacent to buildings 1204, 1306, and 1301).

2.0 REGULATORY BASIS

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 20, Subpart E, "Radiological Criteria for License Termination," and specifically 10 CFR 20.1402, "Radiological Criteria for Unrestricted Use," establish the NRC's requirements for the release of a site for unrestricted

use. Consistent with the NRC/DoD MOU, NRC staff is performing monitoring activities to ensure that hypothetical future occupants at Treasure Island do not exceed the 25-mrem/yr (0.25-mSv/yr) unrestricted-use dose criterion within 10 CFR 20.1402. It is important to note that this site will be released under the CERCLA/DERP process, not under NRC's regulatory authority.[1]

3.0 EVALUATION

This technical evaluation report describes the NRC staff's evaluation of the Navy's Draft Technical Memorandum for purposes of ensuring conformity with the radiological dose criterion for license termination of 25 mrem/yr (0.25 mSv/yr) for unrestricted use provided in 10 CFR 20.1402.

3.1 Radionuclides of Concern

The Navy identified Site 12 as being possibly contaminated from previous operations involving radium-226 (Ra-226). Upon investigation, the presence of discrete Ra-226 contamination in the form of LLROs was confirmed within Site 12 and outside of the SWDAs. Because the LLROs were produced decades ago, Ra-226 should be in secular equilibrium due to its short-lived progeny. This means that radon-222 (radon) and other short-lived progeny of Ra-226 are also present to the extent that the radon, which is a noble gas, does not diffuse out of the media in which it originates. Remediation of the Ra-226 to acceptable levels (i.e., removal of the LLROs) means that any remaining short-lived radon progeny would naturally decay to negligible levels within a few days of the removal.

3.2 Demonstrating Conformity with Criteria for Unrestricted Use

NRC's consolidated decommissioning guidance in NUREG-1757, Vol. 1 and Vol. 2 (available in ADAMS at Accession No. ML063000243 and ML063000252, respectively), discuss acceptable methods for demonstrating compliance with the radiological dose criterion. In addition to the acceptable methods in NUREG-1757, the NRC staff also used the guidance on survey methods in NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM),* (available in ADAMS at Accession No. ML003761445).

Specifically, NUREG-1757, Vol. 1, Section 15.4.3, states that licensees may propose other survey and statistical methodologies to demonstrate compliance, the appropriateness of which are determined based on site-specific conditions and historical information. One such method described in NUREG-1757, Vol. 2, Section 5.0, allows the licensee to evaluate compliance with the dose criterion based on final concentrations rather than radionuclide concentration limits equivalent to the dose limit. Specifically, Appendices I and M of NUREG-1757, Vol. 2, detail technical bases for site-specific dose modeling and processes for developing alternate scenarios from screening levels. The project screening criterion for Ra-226 is 1.69 pCi/g (0.063 Bq/g) when including the site's agreed-upon Ra-226 background contribution.

The NRC staff evaluated the Navy's Draft Technical Memorandum in accordance with NUREG-1757 criteria for characterization and final status survey design and reporting. Areas of review included:

[1] One of the key reasons for the NRC/DoD MOU was to avoid duplicative regulatory requirements and effort given the possible overlap between CERCLA, DERP, and the AEA.

- Designation of Site 12 based on contamination potential
- Type and form of contamination
- Justification for the number of samples, types of samples, and sampling locations
- The type of field measurements performed, sensitivity of field instrumentation, and investigation levels
- Measurement and sample concentration results
- Decision criteria and methods

The NRC staff also evaluated the Navy's Draft Technical Memorandum in accordance with NUREG-1757 dose modeling criteria for future site use to confirm there is reasonable assurance that the average concentrations of residual site contamination would not result in an average member of the critical group receiving a combined dose from all pathways in excess of the 25-mrem/yr (0.25-mSv/yr) limit in 10 CFR 20.1402. Areas of review included the following:

- Source term assumptions
- Description of the critical group
- Exposure scenarios and pathways
- Calculations of radiological impacts on individuals
- Computer models and input parameters

The Navy's project cleanup criterion of 1.69 pCi/g (0.063 Bq/g), which includes the background of Ra-226, was developed based on conservative modeling parameters to ensure compliance with more restrictive carcinogenic risk-based criterion. Per the Navy's April 12, 2019 response to NRC staff's RAI:

> "The action limit of 1.69 pCi/g ^{226}Ra resulted in a dose-based remediation goal of approximately 12.5 millirem per year (mrem/yr) using methodology of that time frame (worst-case year), below the U.S. Nuclear Regulatory Commission's 25 mrem/yr dose criterion shown in Code of Federal Regulations, Title 10, Section 20.1402."

The NRC staff performed an independent analysis of the residual remediation goal, i.e., 1-pCi/g [0.037-Bq/g] above background (0.69-pCi/g [0.026-Bq/g]), using RESRAD-ONSITE, Version 7.2, and an area of contamination of 1,000 m^2. NRC staff utilized default values for the other model parameters. The resulting dose was less than 25 mrem/yr (0.25 mSv/yr), satisfying the NRC's dose criterion in 10 CFR 20.1402. The NRC staff note that the Navy's modeling approach assumes uniform contamination over the entire 1,000 m^2 area. This approach does not accurately depict the distribution of the contamination associated with LLROs located on the site since they are discrete in nature rather than diffuse contamination. However, potential exposure to discrete LLROs is expected to affect only a few individuals as compared to small populations exposed to diffuse contamination in the soil, thus the Navy's approach is considered conservative.

Overall, the staff review concluded that, with additional information from the Navy's response to the NRC staff's RAI, the Draft Technical Memorandum provided the necessary information and discussions regarding investigation methods, instrumentation, and data assessments to provide reasonable assurance that the select open areas of Site 12, less the identified sub-areas being further investigated by the Navy (i.e., SWDAs; Building 1229; areas adjacent to Building 1131 outside of SWDA Westside; areas adjacent to buildings 1204, 1306, and 1301; areas where the fill was greater than 36-inches [0.9-meter] deep), satisfies 10 CFR Part 20, Subpart E,

"Radiological Criteria for License Termination." Details on the NRC staff's review of the Navy's surveys and dose assessments are in the following sections.

3.2.1 Characterization Survey

MARSSIM provides guidance for surveys used to demonstrate compliance with unrestricted use criteria specified at 10 CFR 20.1402. The NRC staff, in conjunction with staff from other Federal agencies, developed MARSSIM methods primarily for the assessment of the dose-based allowable average concentrations of radiological contamination. In addition, because contamination is typically heterogenously distributed, MARSSIM also contains provisions for identifying and evaluating localized, elevated radiation anomalies (i.e., hotspots). However, the MARSSIM methods described are not universally applicable and alternative methods may be necessary for radiological investigation design, implementation, and data assessment. The Site 12 conceptual site model (CSM) supports the use of alternative methods. The Navy developed the CSM based on historical knowledge that potential contamination would be the result of discrete, isolated locations of Ra-226 contamination due to the presence of a LLRO within the depth of fill material, rather than as dispersed contamination over a larger area.

Based on the CSM, the Navy implemented alternative investigative methodologies intended to provide assurance that buried LLROs would be identifed and retrieved. The Navy utilized gamma radiation scans to assess the open land areas for the presence of residual hotspots, rather than extensive random or systematic soil sampling campaigns that are commonly employed to assess both the average contaminant concentrations and to identify larger areas of distributed contamination.

The Navy's reliance on gamma scans, rather than a potentially burdensome systematic soil sampling plan as the primary method to identify suspect LLROs, is an appropriate alternative method, provided the methods and procedures demonstrate the desired LLRO detection sensitivity. The NRC staff's evaluation of Navy processes found that high-density scans of the open land area surfaces were conducted at speeds of 0.25 to 0.5 meters per second using either the RS-700 large volume (256 cubic inches [4.2 liters]) or Ludlum Model 44-20 3-inch (0.8-centimeter) by 3-inch (0.8-centimeter) sodium iodide scintillation detectors. The Navy demonstrated, within Section 3 of their Draft Technical Memorandum, that the sodium iodide detector sensitivity was capable of detecting the gamma radiation from an LLRO with historical average total activity buried 36 inches (0.9 meter) or less from the surface. In addition to LLRO detection, the Navy's system also had a minimum detection concentration capability for identifying near-surface diffuse soil contamination of 1.69 pCi/g (0.063 Bq/g), including background, or greater. The Navy supplemented the extensive gamma radiation surveys at Site 12 with exploratory trenching operations, anomaly investigations, and soil sampling. These additional methods provided validation of the CSM given the characteristics of the contamination (i.e., discrete LLROs vs. diffuse contamination), prior radiological disposals that were limited to the SWDAs, and the accuracy of historical grading records.

In the RAI on survey methodology, coverage, and CSM validation, the NRC staff requested that the Navy provide further discussion of scanning coverage because gamma radiation scanning was the primary method for identifying and investigating suspected LLROs. Reliance on scanning is acceptable under specific conditions, provided the scan sensitivity was adequate and all of the open land areas received high-density scan coverage. These conditions are present at Site 12: Contamination is characterized by discrete, high-activity sources rather than diffuse, low-level contamination.

In response, the Navy demonstrated that high-density scans and conservative investigation levels were established and performed for all open land areas. As stated in the Navy's response to this RAI, "Survey coverage is a combination of several investigations. The compiled survey coverage is shown on Figure 2 [of the Draft Technical Memorandum] and consisted of 100 percent high density scans." The Navy further clarified that all accessible land areas, including common spaces, private fenced backyards, and paved roadways, were surveyed. SWDAs were not surveyed and specifically excluded from the request for unrestricted release. Some select areas of Site 12 are still being investigated and were similarly excluded from the request for unrestricted release.

The Navy's initial RAI responses regarding detection sensitivity addressed open land area scanning measurement systems but not detection sensitivity for systems used in the housing units to detect LLROs buried beneath the foundations. Because of the different instrumentation and measurement conditions, NRC staff requested information on detection capability for various burial depths beneath the housing unit slabs to provide reasonable assurance that LLROs would have been identified for further investigation if present.

Because housing units had been constructed over portions of the Site 12 land areas, the Navy investigated the housing units for LLROs that could be present beneath the units. The units were constructed of concrete slab on grade. The survey methods and instrumentation that the Navy used for detecting LLROs beneath existing housing unit slabs varied from those used for land areas. The floor of each unit, including garage slabs, etc., were subdivided into one-meter by one-meter grids. Each grid was scanned with a Ludlum Model 193-6 plastic scintillator exposure rate meter and a static measurement was made at the location with the highest observed exposure rate or at the center of the grid. While supplemental Navy correspondence (available in ADAMS at Accession No. ML19249B410) stated that the detector sensitivity was adequate to discern changes in exposure rate as small at 0.1 microroentgen per hour (μR/hr) (0.3 nanocoulomb per kilogram per hour [nC/kg-hr]), per the Draft Technical Memorandum, only static locations exceeding 2 μR/hr (0.5 nC/kg-hr) above background were further investigated for potential LLROs buried beneath the slab.

Further, the Navy responded in a July 22, 2019 e-mail (available in ADAMS at Accession No. ML19249B410) that Microshield® modeling was used to estimate the Model 193-6 detector's response to a 3 μCi (0.1-MBq) LLRO beneath three feet (0.9 meter) of soil. The Navy's modeled dose rate result of 6 μR/hr (1.5 nC/kg-hr) did not consider a concrete slab thickness of 2 to 4 inches (5 to 10 centimeters) because the slab was considered to provide negligible shielding. The Navy stated the LLRO would have been detectable at that depth beneath the slab during the housing unit surveys.

The NRC staff performed independent modeling using Microshield® and the Monte Carlo N-Particle (MCNP) transport code to estimate the dose rate from both a 3-μCi (0.1-MBq) LLRO and a worst case 2.1-mCi (78-MBq) LLRO. The NRC's evaluation considered a 3-inch (8-centimeter) thick concrete slab overlying the soil to estimate the depth at which the Navy's investigation level (i.e., 2 μR/hr [5.2 nC/kg-hr]) could identify buried LLROs for further investigation. The NRC staff's results indicate that the Navy's investigation level would adequately identify LLROs up to a depth of approximately 0.85 foot (0.26 meter) or 2.8 feet (0.85 meter) below the slab base for a 3 μCi (0.1-MBq) or 2.1-mCi (78-MBq) LLRO, respectively. In summary, NRC staff expects that the housing unit surveys were adequate to investigate higher-activity LLROs, but that it is not likely that lower-activity LLROs would have been detected within the full 3-foot (0.9-meter) depth being requested to be released.

Because the Navy's investigation level isn't adequate to identify LLROs for further investigation beneath the housing slabs, the NRC staff recommends that any site areas associated with the review that are disturbed in the future or following housing slab removal be scanned for gamma rays. A discovery of radiological contamination near a housing unit in September 2019 supports the staff's recommendation. These gamma ray scans will provide confidence that potentially unidentified LLROs beneath a slab, roadway pavement, or at significant depth in soil will be identified and appropriately investigated in the future to assure public health and safety are protected.

3.2.2 Dose Assessments

The Navy's Draft Technical Memorandum did not provide a quantified confidence level that all LLROs, or a specific proportion of LLROs, remaining within a given area had been identified. In the RAI related to dose assessments, the NRC staff asked the Navy to demonstrate that under plausible future use scenarios the 25-mrem/yr (0.25-mSv/yr) dose criterion for Treasure Island would not be exceeded in the event that an LLRO was encountered. This exercise is the equivalent of the license termination requirement for evaluating average and hotspot concentrations.

In response, the Navy's confirmation that Site 12 survey coverage consisted of 100-percent high-density gamma radiation scans, in combination with demonstrated detector sensitivity and anomaly investigation requirements, provides assurance that there is minimal probability that an undiscovered LLRO remains buried within site fill material. The Navy has stated (and demonstrated through the identification of LLROs at depth) that their detectors could detect a 3-microcurie (µCi) (0.1 megabecquerel [MBq]) source at 36 inches (0.9 meter) of soil depth, the maximum depth for the areas that they are seeking to free release and where the historic grading plans have identified the use of SWDA fill.

Although undiscovered LLROs are unlikely in open areas, the Navy performed bounding case dose modeling using Microshield®, Version 9.07, in order to directly respond to the RAI. Microshield® was used to calculate the exposure rate based on the primary dose pathway being direct, external exposure. Dose calculations were reported for nine worst-case exposure scenarios with the hypothetical receptor standing or sitting on the ground surface directly above a previously undetected LLRO. The scenarios included different average LLRO source strengths and assumed burial depths as follows:

- 3 µCi (0.1 MBq), the geometric average of LLROs discovered at Treasure Island. The dose model assumed the source was buried 3 feet (0.9 meter) below ground surface.
- 90 µCi (3.3 MBq), the arithmetic average of LLROs discovered at Treasure Island, also modeled as buried 3 feet (0.9 meter) below ground surface.

The 3-foot (0.9-meter) depth configurations for these average activity sources represented the most plausible scenario for an LLRO to have not been identified during site investigations. This is reasonable because the gamma radiation scanning capabilities improve with both decreasing soil cover depth (i.e., decreased shielding) and increasing source strength.

The Microshield® output included an exposure rate in milliroentgen per hour (mR/hr). These initial dose runs were converted to a maximum conceivable bounding case annual dose (mrem/yr) by assuming continuous occupancy (i.e., 8,766 hours annually) and conservatively assuming a 1:1 conversion from mR/hr to mrem/hr. The annual bounding case doses for the 3-µCi (0.1-MBq) and 90-µCi (3.3-MBq) buried LLROs scenarios ranged from 0.052 mrem/yr

(5.2×10^{-4} mSv/yr) to 3.4 mrem/yr (0.034 mSv/yr), which are a fraction of the 25-mrem/yr (0.25-mSv/yr) limit.

As the Navy's response to the RAI stated, the worst-case scenario considered a model based on an LLRO of 2.1 millicuries (mCi; 78 MBq), the highest activity LLRO included on the LLRO log, which was discovered outside of the Deep Debris Area (subarea of SWDA Westside that contained a concentrated quantity of LLROs). The dose was modeled with the source on the surface as well as buried at one, two, three, and four feet (0.3, 0.6, 0.9, and 1.2 meters) below ground surface. The Navy did not consider this scenario plausible given the likelihood that this high-level LLRO would be detected in any of the depths modeled. NRC staff agrees with the Navy's view that the estimated gamma fluences that would be present with the LLRO as deep as three feet (0.9 meter) below ground surface would be expected to result in gamma count rates greater than the sensitivities associated with the gamma radiation detection systems and scanning procedures described in the Draft Technical Memorandum. The Draft Technical Memorandum scan sensitivity discussions demonstrated that LLROs in the 3-µCi (0.1-MBq) range can be detected when buried in soil and that excavation and spreading of soil increased detection capability.

The NRC staff also independently evaluated plausible future scenarios for an unidentified LLRO remaining below a housing unit and determined that they would not result in the 25-mrem/yr (0.25-mSv/yr) unrestricted-release dose criterion to be exceeded. A continuous exposure at a single point source location that is characteristic of the CSM is not considered plausible. As such, annual doses were based on a conservative 438-hour annual exposure duration that the Navy postulated. This results in an estimated annual dose of approximately 9 mrem/yr (0.09 mSv/yr) for the worst case 2.1-mCi (78-MBq) LLRO, assuming an individual is in contact with the ground surface (i.e., laying on the surface) and the LLRO is immediately beneath at a depth of 2.8 feet (0.85 meter), which corresponds to the NRC staff's calculated depth at which the source strength would be investigated described in Section 2.3.1. Likewise, NRC staff calculated annual doses of 1 mrem/yr (0.01 mSv/yr) or 3 mrem (0.03 mSv) for the 3-µCi (0.1-MBq) LLRO buried at a 0.85-foot (0.26-meter) depth depending on whether the individual is standing over the LLRO (doses calculated at a point 1 meter above the ground surface) or in contact with the ground surface (i.e., laying on the surface), respectively.

Therefore, the NRC staff expects the likelihood of higher-activity LLROs, which could result in significant exposures (i.e., in excess of the 25-mrem (0.25 mSv) annual unrestricted-release criterion), remaining unidentified in the upper 3 feet (0.9 meter) of soil to be negligible and finds that the Navy has provided reasonable assurance that LLROs with significant activity have been adequately identified and remediated in the surface soils at the site. NRC staff expects that exposures from lower-activity LLROs, which could potentially remain unidentified in soil, are not expected to exceed the 25-mrem (0.25-mSv) annual unrestricted-release criterion.

In summary, the NRC staff analyzed scenarios that reasonably bound the possibility that LLROs remain in subsurface soil and determined that doses would remain below 25 mrem/yr (0.25 mSv/yr). Additionally, the NRC staff has recommended that gamma scans be performed on any site area disturbed in the future or following housing slab removal. These scans will provide additional assurance that potentially unidentified LLROs beneath slabs or at significant depth in soil can be identified and appropriately addressed.

3.3 Environmental Considerations

The scope of 10 CFR Part 51, "Environmental Protection Regulations For Domestic Licensing and Related Regulatory Functions," is limited to the NRC's licensing functions, and Treasure Island is not an NRC-licensed site. Since NRC staff is providing comments to DoD within the CERCLA process, and is not formally licensing the site, NRC is not taking a Federal action. Further, NRC staff is not approving the Navy's documents; rather, NRC staff is ensuring that DoD's cleanup will not result in NRC's unrestricted use dose criterion being exceeded. As a result, NRC staff does not need to comply with NEPA for its activities under the MOU. Accordingly, and consistent with the NRC staff's procedures for managing sites under the NRC/DOD MOU (ADAMS ML15090A588), the NRC does not need to prepare an Environmental Assessment regarding these remediation activities.

3.3 State Consultations

NRC staff discussed this technical evaluation with the State of California.

3.5 Evaluation of NRC/EPA MOU Consultation Triggers

Since this site is undergoing release under CERCLA, and the EPA was consulted prior to the finalization of the NRC/DoD MOU, the NRC staff concludes that consultation with the EPA per the NRC/EPA MOU (ADAMS ML022830208) is not necessary for this specific review.

4.0 CONCLUSIONS

The NRC staff reviewed the CSM, results from bounding case exposure scenarios, radiological survey methods, and other supporting documentation related to current and plausible future scenarios associated with the site. Based on the findings in this review , the NRC staff has reasonable assurance that any residual radioactivity remaining on Treasure Island in the Site 12 non-SWDA areas (and excluding other areas considered for future investigation (i.e., SWDA areas; Building 1229; areas adjacent to Building 1131 outside of SWDA Westside; areas adjacent to buildings 1204, 1306, and 1301; areas where the fill was greater than 36 inches deep)) would conform to the 25-mrem/yr (0.25-mSv/yr) dose criterion for unrestricted use in 10 CFR 20.1402. This conclusion is based on:

- the Navy's bounding dose assessments for open land areas resulting in a maximum plausible dose due to any undiscovered, subsurface LLRO of 3.4 mrem/yr (0.034 mSv/yr), and
- demonstrating that the sensitivity of the high-density radiation surveys, using large-volume NaI detectors, can identify LLROs at depths within the fill of up to three feet (0.9 meter) below ground surface in open land areas,
- NRC's confirmatory modeling of plausible exposure scenarios and maximum doses of 9 mrem/yr (0.09 mSv/yr) for potential LLROs that may not have been investigated and remain below housing unit foundations.

Based on these findings, the NRC staff has reasonable assurance that the evidence presented in the Draft Technical Memorandum, as supplemented by the Navy's additional information during this review, indicates that Site 12 meets the NRC's dose criterion of 25 mrem/yr (0.25 mSv/yr) in 10 CFR 20.1402 and is consistent with the NRC/DoD MOU. However, NRC staff recommends, due to the isolated occurrence of LLROs that have been found to date and the lack of investigation sensitivity inside the housing units, that the Navy perform additional

scans of the accessible areas after significant soil disturbance or housing unit slab removal as development (e.g., excavation activities) of the site occur as an as-low-as-reasonably-achievable (ALARA) best practice. This will ensure that any potentially unidentified LLROs that may be brought to the surface during development activities are appropriately addressed even though the possibility of this occurring is considered unlikely.

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