

**TECHNICAL EVALUATION REPORT
FOR
DRAFT FINAL STATUS SURVEY REPORT FOR
SELECT AREAS WITHIN THE EXCAVATION BOUNDARY
NON-TIME CRITICAL REMOVAL ACTION FOR
SOLID WASTE DISPOSAL AREAS
WESTSIDE DRIVE, BAYSIDE DRIVE, AND NORTH POINT DRIVE
INSTALLATION RESTORATION SITE 12 (PHASE III)
NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA**

April 17, 2020

1.0 INTRODUCTION

1.1 Navy Submittal and Request

In December 2018, the U.S. Navy (Navy) submitted its *Draft Final Status Survey Report for Select Areas within the Excavation Boundary Non-Time Critical Removal Action for Solid Waste Disposal Areas Westside Drive, Bayside Drive, and North Point Drive Installation Restoration Site 12, Former Naval Station Treasure Island, San Francisco, California* (hereafter, the Draft FSS Report; available in the U.S. Nuclear Regulatory Commission's [NRC] Agencywide Documents Access and Management System [ADAMS] at Accession No. ML19031B261) to the California Department of Toxic Substances Control. The stated purpose of the Draft FSS Report is to describe the results and findings for surveys completed by the Navy within the solid waste disposal areas (SWDAs) Bayside and North Point of Installation Restoration Site 12 (Site 12) on Treasure Island to support a radiological unrestricted release request for remediated and debris-free areas within SWDA excavation boundaries.

The NRC received a copy of this Draft FSS Report to review per the NRC and U.S. Department of Defense (DoD) Memorandum of Understanding (MOU) (hereafter, the NRC/DoD MOU; ADAMS Accession No. ML16092A294). The NRC staff sent a Request for Additional Information (RAI) to the Navy on March 7, 2019 (ADAMS Accession No. ML19053A696), which the Navy responded to on July 10, 2019 (ADAMS Accession No. ML19198A007).

1.2 Background

On April 28, 2016, the NRC and the DoD executed 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 efforts imposed by obligations that are established by the Atomic Energy Act of 1954, as amended (AEA); associated NRC regulations; 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 Accession No. ML14097A005), which recommended an MOU with the DoD to further reinforce the NRC's reliance on CERCLA

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and the U.S. Environmental Protection Agency's (EPA) oversight at the Alameda Naval Air Station, Hunters Point Shipyard, 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 Accession No. ML14356A070).

Because Treasure Island is not under direct EPA oversight, NRC staff, consistent with the NRC/DoD MOU, has been performing monitoring 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 FSS Report, the Navy requests unrestricted radiological release from the State of California of remediated and debris-free areas within the excavation boundary (consisting of survey unit bottoms and sidewalls to a depth of approximately 4 feet [1.2 meters] below grade) at SWDAs Bayside and North Point within Site 12 at Treasure Island. The Navy did not present project data for SWDA Westside in the Draft FSS Report. The Navy defined the SWDAs as radiologically impacted due to the presence of radium-226 (Ra-226) contained within low-level radiological waste in the SWDAs. The radiological waste consisted of discrete, radium-bearing low-level radiological objects (LLROs) and localized radium-contaminated soil.

Historically, disposal and burning of debris occurred in the portion of Site 12 associated with the SWDAs. Beginning in the 1960s, areas of Site 12 were incrementally developed into housing for Navy personnel and their dependents, which resulted in disposed waste and debris from the SWDAs being re-distributed within Site 12 soils during site grading. The Navy has since completed several phased (Phases I – III) removal actions within the SWDAs. Phase I actions included the excavation of soil to a depth of 4 feet (1.2 meters) and then backfilling in both SWDAs Bayside and North Point with clean fill. Phase II involved the demolition of several buildings to gain access to the contaminated soil beneath that was then removed as part of Phase III. Additionally, Phase III included the re-excavation of the backfilled Phase I areas and conducting the FSS on excavation boundary surfaces.

The Navy subdivided the SWDAs into survey units and performed a radiological FSS of the final excavation surfaces of each survey unit. Because of the presence of extensive embedded solid debris in the sidewalls facing Perimeter Road and a section along North Point Drive (see Figures 7 and 8 of the Draft FSS Report) and contractual limitations on excavation, the sidewall survey units for both SDWAs Bayside and North Point were limited to visibly debris-free sections. All survey units of accessible excavation floors were visibly debris-free.

The FSS included 100-percent gamma radiation scans of survey unit surfaces, in situ, where accessible, using sodium iodide (NaI) scintillation detectors with electronic data capture capability and a minimum of 20 soil samples per survey unit. Most of the survey units had tidewater/groundwater/stormwater infiltration or collection, making the excavation floor or sidewalls inaccessible for direct survey and sampling. In these cases, the Navy excavated a layer that was an additional 6-inches (in.) (15-centimeters [cm]) thick from the excavation floor, stockpiled the over-excavated soil for dewatering, and transferred it to a radiological screening yard for the direct gamma radiation scanning.

The Navy evaluated the gamma scan data for evidence of elevated direct radiation levels considered distinguishable from the background distribution. Scan data anomalies identified during this evaluation were further investigated via static measurements, which resulted in the identification and remediation of three LLROs, and/or judgmental (i.e., biased) soil sampling if an LLRO was not physically identifiable within the anomaly. Judgmental soil samples were taken in two survey units at SWDA Bayside and three survey units at SWDA North Point. The three LLROs identified were from the bottom of the excavations during in-situ scans. When an LLRO was identified in-situ, the Navy removed the LLRO and surrounding soil within 5 feet (1.5 meters) to a depth of 1 foot (0.3 meter) and collected at least five judgmental soil samples (four at the lateral corners and a fifth from the center of the remediation directly below the LLRO location).

A random soil sample population, generated in accordance with NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual* (hereafter, MARSSIM; ADAMS Accession No. ML003761476), was collected from each survey unit for assessing final radiological status. All samples were analyzed for Ra-226 by gamma spectroscopy. The Navy compared individual soil sample analytical results to the Ra-226 project screening level of 1.69 pCi/g (0.063 Bq/g) including background contributions. The random sample population results for each survey unit were statistically evaluated with the Treasure Island sitewide background concentrations via a two-sample hypothesis test. The test was conducted to establish whether there was statistical confidence that the difference in the median Ra-226 concentration between the survey unit and site reference background was greater than 1 pCi/g (0.037 Bq/g), the derived concentration guideline level (DCGL) for soil established by the Navy. Lastly, the Navy calculated a conservative estimate of the annual dose and associated lifetime cancer risk to a hypothetical resident farmer.

At the completion of survey activities, the SWDAs Bayside and North Point areas were backfilled to grade to promote proper drainage away from the sites. The Navy used clean imported fill that was placed during the restoration phase of previous removal actions as well as screened buffer materials to backfill the excavations and restore the site.

Based on the evidence developed from the historical assessments and investigations, remedial response actions, absence of visible debris in most excavated surfaces, and the FSS data, the Navy believes that SWDAs Bayside and North Point satisfy all regulatory guidelines and dose-based conditions and is requesting the California Department of Public Health concur on the release without radiological restrictions.

2.0 REGULATORY BASIS

10 *Code of Federal Regulations* (CFR) Part 20, Subpart E, "Radiological Criteria for License Termination," and specifically 10 CFR 20.1402, "Radiological criteria for unrestricted use," establish the 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) 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

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.

3.0 EVALUATION

This technical evaluation report describes the NRC staff's evaluation of the Navy's Draft FSS Report 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 the SDWAs at Site 12 as being contaminated from previous operations involving radium-226 (Ra-226). Upon investigation, the Navy confirmed the presence of discrete Ra-226 contamination in the form of LLROs comingled with other waste debris. Because the LLROs were produced decades ago, Ra-226 should be in secular equilibrium with its short-lived progeny. This means that radon-222 (radon) and other short-lived progeny 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 (i.e., removal of the LLROs and associated contaminated soil) to acceptable levels means that any remaining short-lived radon progeny would naturally decay to negligible levels within a few days of the removal. Additionally, the NRC staff's technical review noted that the Navy's dose assessment of the FSS data for each survey unit conservatively assumed that the long-lived progeny, lead-210 (Pb-210), was in equilibrium with the Ra-226 concentration.

3.2 Demonstrating Conformity with Criterion for Unrestricted Use

NRC's consolidated decommissioning guidance in NUREG-1757, Vol. 1 and Vol. 2 (ADAMS 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 MARSSIM.

The MARSSIM default assumption is that survey unit is considered contaminated above the unrestricted-use criterion. Under MARSSIM, the licensee designs and implements a work plan and develops a FSS report to assess the data to determine if the default assumption may be rejected in favor of the conclusion that any residual contamination within the survey unit satisfies the unrestricted-use criterion. The NRC staff reviewed the Draft FSS Report and determined that the Navy's approach was in accordance with MARSSIM guidance.

The NRC staff evaluated the Navy's Draft FSS Report in accordance with NUREG-1757 criteria for characterization and FSS design and reporting. Areas of review included:

- 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 FSS Report 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 conservatively estimated dose using the maximum measured FSS sample Ra-226 concentration of 0.931 pCi/g (0.034 Bq/g) as the survey unit-wide input concentration and assumed the resident farmer scenario in the modeling. The Navy calculated a resulting dose of 5.1 mrem/yr (0.051 mSv/yr).

Overall, the NRC staff's review concluded that, with additional information from the Navy's July 10, 2019 response to the NRC staff's RAI, the Draft FSS Report provided the necessary information and discussions regarding investigations methods, instrumentation, and data assessments to provide reasonable assurance that the remediated and debris-free areas within the excavation boundaries of SWDAs Bayside and North Point satisfy 10 CFR 20, Subpart E, "Radiological Criteria for License Termination." Because the survey results did not exceed the gross Ra-226 project screening level (1.69 pCi/g [0.063 Bq/g] when including the site's agreed-upon Ra-226 background contribution), and there was no sign of debris or evidence of radiological contamination, the NRC staff finds the excavation and FSS data are acceptable for use to support a conclusion that excavated and debris-free surface areas at SWDAs Bayside and North Point meet the project screening levels. Likewise, the NRC staff finds that the survey results meet the project screening levels and therefore also satisfy the NRC's criterion for unrestricted radiological release. Details on the NRC staff's review of the Navy's surveys and dose assessments are in the following sections.

3.2.1 Final Status Survey

MARSSIM contains guidance 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 an 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 that would provide reasonable assurance that LLROs originally disposed of within the SWDAs but later re-distributed within Site 12 soil during historical site grading would be identified and retrieved. Specifically, the Navy's chosen methodologies included gamma scans of excavation boundary surfaces and soil sampling. The NRC staff's review of these investigative methods and data assessment is discussed in more detail in the following sections.

Overall, the NRC staff concludes that, with the additional information, the Navy's Draft FSS Report provides necessary information and discussions regarding investigation methods, instrumentation, and data assessments to demonstrate that the portions of SWDAs Bayside and North Point Drive Installation Restoration Area Site 12 covered under the Draft FSS Report satisfy 10 CFR Part 20, Subpart E – "Radiological Criteria for License Termination".

Because the Navy was not able to scan the excavation floor of survey units with water intrusion, as described in more detail below, the NRC staff recommends that any site areas associated with this review that are disturbed in the future be scanned for elevated gamma ray emissions and investigated, if warranted. These gamma ray scans will provide confidence that potentially unidentified LLROs at significant depth in soil (i.e., greater than approximately 4 feet [1.2 meters] in depth from the ground surface) will be identified and appropriately investigated in the future should those soils be excavated to assure public health and safety are protected.

3.2.1.1 Gamma Scans

In the case of the SWDA's themselves, which were considered Class 1 survey units, the Navy performed gamma scans consisting of 100-percent coverage of the accessible surfaces of each survey unit to identify anomalies above an established investigation level and the data electronically captured. Excavation boundary surfaces that were not accessible due to water infiltration were excavated an additional 6 in. (15 cm) and transported to one of the site radiological survey yards (RSYs) for drying and scanning. Both in-situ and ex-situ scans were performed at a speed of 0.25 to 0.5 meters per second using either an array consisting of two large volume (256 cubic inches [4,195 cubic centimeters]) or hand-held 3-in. by 3-in. (8-cm by 8-cm) NaI scintillation detectors.

The Navy established an investigation level that was equivalent to the mean plus three standard deviations of the site background reference area gamma radiation count rates. Such an investigation level would readily identify near-surface LLROs that may have remained up to a depth of 3 feet [0.9 meters] below the excavation boundary surface. The Navy had previously provided the detection sensitivities for buried LLROs in the *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; ADAMS Accession No. ML18277A072).

Identified anomalies were investigated, LLROs and surrounding soil within 5 feet (1.5 meters) were removed if present, and judgmental samples were collected from all suspected anomalies, with or without identified LLROs. The Navy did not specifically state how the investigation level corresponded to the project screening level, a requirement in MARSSIM for determining the adequacy of sample density for the detection of localized soil contamination.

In the March 7, 2019 RAI on the adequacy of the investigation level, the NRC staff requested that the Navy provide minimum detectable concentrations (MDCs) for the scans and justify the adequacy of the investigation level. The Navy's response clarified that the investigation level used was based on statistical evaluations of detector response under known background

conditions from a previous study². Essentially, gamma radiation count rates distinguishable from background—defined as greater than the mean of the background count rate plus three standard deviations—required investigation via a static measurement and sampling if the elevated counts were confirmed. In terms of Ra-226 activity concentrations for comparison with the release criterion, the corresponding MDCs provided by the Navy in its response were 1.32 and 0.36 pCi/g (0.049 and 0.013 Bq/g) for the 3-in. × 3-in. (8-cm x 8-cm) NaI detector and the RS-700 gamma radiation measurement systems, respectively. The 3-in. × 3-in. (8-cm x 8-cm) NaI detector MDC (i.e., 1.32 pCi/g) was greater than the 1-pCi/g (0.063-Bq/g) DCGL. In the case of the Site 12 SWDAs, the NRC staff does not consider this exceedance to be problematic because small areas of elevated distributed radioactivity³ are not considered relevant for the Site 12 SWDAs based on the Navy's CSM, which is focused on discrete LLROs and localized associated contaminated soil. Rather, the Navy's emphasis is on the identification of discrete LLROs, and the MDC's exceedance of the DCGL is not a regulatory concern because the Navy previously demonstrated its ability to identify discrete LLRO's in the near-surface (i.e., within the upper 36 in. [0.9 meters]) in its Draft Technical Memorandum (ADAMS Accession No. ML18277A072). NRC staff's evaluation of the Navy's the Draft Technical Memorandum and its ability to detect discrete LLROs was documented in a corresponding NRC technical evaluation report (ADAMS Accession No. ML19277G288).

The discovery of LLROs during in-situ gamma scans of the excavation boundaries in three survey units suggests that LLROs may be present beyond the soils remediated during earlier phases. NRC staff notes that most of the survey units' floors were inaccessible due to water intrusion and identification of LLROs was limited to the depth of over-excavation (i.e., 6-in. [15-cm]). While the Navy's sensitivity is adequate to detect LLROs while scanning the 6-in. (15-cm) layer ex-situ, the Navy would not have been able to detect LLROs buried in-situ beneath this additional excavated layer because scans were not performed of the excavation floor due to water intrusion. Similar to the recommendation in its technical evaluation report on the Draft Technical Memorandum, the NRC staff recommends that any site areas associated with this review that are disturbed in the future be scanned for elevated gamma ray emissions. These supplemental gamma ray scans will provide confidence that potentially unidentified LLROs at significant depth in soil will be identified and appropriately investigated in the future to assure public health and safety are protected.

The Navy also performed gamma scans of the accessible sidewall surfaces where visible debris was present in SWDA Bayside and North Point to verify there were no known LLROs present on the surface. The Navy then covered the sidewalls with poly-sheeting to create a physical barrier to mitigate the potential for cross-contamination should radiological contamination be present in the sidewall areas. The Navy then placed clean backfill material (i.e., rock and soil) on the clean side of the poly-sheeting to create a second physical barrier and entomb the clean survey

² Shaw Environmental, Inc., 2012, *Analysis of Gamma Survey and Radium-226 Soil Concentration Data at the NSTI Sitewide Background Areas and the Area 7 Background Reference Area*.

³ Per MARRSIM guidance, for Class 1 areas, defined as areas that may contain distributed radioactive contamination in excess of the DCGL, FSSs must demonstrate that the actual scan MDC is less than the scan MDC required to demonstrate the DCGL is met. The required scan MDC is based on an elevated measurement comparison (EMC) that corresponds to a $DCGL_{EMC}$, where the $DCGL_{EMC}$ is the average elevated concentration that may be present within a hot spot of a correspondingly-sized area. The EMC in combination with the average activity of the survey unit ensures that the 25-mrem/yr (0.25-mSv/yr) dose criterion is satisfied.

units. The Navy expects the poly-sheeting to also function as a demarcation of the boundary of clean backfill to guide future excavation activities whereby a buffer layer of the backfilled soil on the clean side of the poly-sheeting would be excavated while remediating the sidewall contamination.

In the March 7, 2019 RAI on excavation sidewall surfaces, the NRC staff requested that the Navy provide additional information on whether remaining visible debris in the sidewalls of the excavations would be addressed by future remediation, and, if so, that the Navy should provide a description of the radiological controls for areas adjacent to, or otherwise impacted by, the remediation. The Navy responded that two actions related to the RAI are underway. The first is the current (as of this report) removal of remaining debris as a part of a separate removal action contract. The second is that the Navy is concurrently preparing a Feasibility Study Addendum for Installation Restoration Site 12 which addresses radiological and chemical contamination in the SWDAs. The Navy's plan is to evaluate any future additional actions to address debris beneath Perimeter Road or any other sidewalls at SWDAs Westside, Bayside, and North Point as part of the Feasibility Study Addendum.

3.2.1.2 Soil Samples

In addition to gamma scans, the Navy collected the required systematic soil sample populations from each survey unit, analyzed the samples for Ra-226, and statistically compared the results with the sitewide background soil concentrations in accordance with MARSSIM guidance. All judgmental and systematic sample results were provided within report tables that included the individual sample result together with the survey unit descriptive statistics. There were no individual samples that exceeded the 1.69-pCi/g (0.063-Bq/g) gross Ra-226 project screening level.

3.2.1.3 Data Assessment and Decision Criteria

Because the Navy appeared, but didn't explicitly claim, to assess FSS data in accordance with MARSSIM Scenario B in the Draft FSS Report, the NRC staff, in the March 7, 2019 RAI, requested the Navy provide clarification on whether the Navy intends to use MARSSIM Scenario B and, if so, additional justification for its use. The NRC staff requested this clarification because Scenario B is considered less protective⁴. Because Scenario B relaxes the burden of proof, NRC guidance is that Scenario B should only be applied in circumstance where both the DCGL is low relative to background and the background is highly variable. When Scenario B is adopted, specific justification is to be provided, including evidence that site background is highly variable.

⁴ As described in NUREG-1505, Revision 1, "A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys" (ADAMS Accession No. ML061870462), in Scenario B, the null hypothesis is that the survey unit satisfies release criterion and significant evidence is required to reject the null hypothesis and conclude that the survey unit exceeds background concentrations by more than the DCGL. Therefore, the burden of proof is on the alternative hypothesis (i.e., that the survey unit does not meet the release criterion) and the survey unit will be released unless it is shown to be contaminated above background. Whereas, in Scenario A, the null hypothesis is that the survey unit does *not* satisfy release criterion and significant evidence is required to conclude the survey unit can be released. Therefore, Scenario A is more protective than Scenario B.

In its response to the RAI, the Navy clarified the intent of the Scenario B language by stating that the residual Ra-226 concentrations are comparable to background when LLROs are not present or are identified and removed. The NRC staff performed an independent assessment of the Navy's FSS data and determined that all results were less than the project screening level (1.69-pCi/g [0.063-Bq/g] Ra-226 including background), rendering statistical tests unnecessary as the survey unit will always satisfy the dose limit. Based on this finding by the NRC staff, the Navy could have adopted the default Scenario A, which is more protective as it requires significant evidence to confidently conclude that the survey unit is less than the release criterion. The results from all Site 12 SWDA survey units lead to the NRC staff's conclusion that residual contamination was less than the project screening level, thereby satisfying the dose limit in 10 CFR 20.1402. The NRC staff's conclusion is that the Navy responses and the FSS results are adequate to demonstrate compliance with the NRC's 25-mrem/yr (0.25-mSv/yr) limit in 10 CFR 20.1402.

3.2.2 Dose Assessment

The Navy calculated the potential excess dose to a residential farmer using the soil concentration data for each survey unit using RESRAD-ONSITE, Version 7.2. Section 7.6 and Appendix E of the Draft FSS Report summarize the Navy's dose modeling. NRC staff performed an independent sensitivity analysis of selected input parameters that have been found to be significant for estimating the dose from Ra-226 and Pb-210 (i.e., transfer factors, sorption coefficients, and depth of plant roots) using RESRAD-ONSITE, Version 7.2, and found that the Navy's use of the default parameters, rather than site-specific input values, remains protective of public health and safety. Therefore, the NRC staff finds the Navy's source term assumptions, description of the critical group and corresponding exposure pathways, and input parameter values provide reasonable assurance that doses from residual radioactivity will not exceed NRC's 25-mrem/yr (0.25-mSv/yr) limit in 10 CFR 20.1402.

The NRC staff also previously evaluated plausible future scenarios for an unidentified LLRO remaining in the subsurface in its technical evaluation report (ADAMS Accession No. ML19277G288) for the Navy's Draft Technical Memorandum (ADAMS Accession No. ML18277A072). The NRC staff's previous analysis determined that an unidentified LLRO remaining in the subsurface would not result in the 25-mrem/yr (0.25-mSv/yr) unrestricted-release dose criterion being exceeded. In that analysis, the NRC assumed the unidentified LLRO would remain immediately beneath a receptor at a depth of 2.8 feet (0.85 meter). The resultant annual dose for a 2.1-mCi (78-MBq) LLRO was approximately 9 mrem (0.09 mSv). However, the SWDAs covered in the Draft FSS Report will have approximately 4 feet (1.2 meters) of remediated or clean soil or more overlying a potential unidentified LLRO at the bottom of the excavation rather than the 2.8 feet (0.85 meter) assumed in the NRC staff's previous analysis. Therefore, NRC staff has reasonable assurance that the dose resulting from an unidentified LLRO remaining at the lower excavation boundary would not exceed the 25-mrem/yr (0.25-mSv/yr) unrestricted-release dose criterion.

3.8 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 domestic licensing and related regulatory functions. Treasure Island is not an NRC-licensed site and there is no application for an NRC license nor any other NRC regulatory action. In contrast, NRC is reviewing DoD

reports and providing written comments to DoD, per the NRC/DoD MOU, and NRC is not overseeing the site remediation. 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. For these reasons, NRC is not taking a Federal action. 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 Accession No. ML15090A588), the NRC does not need to prepare an Environmental Assessment regarding these remediation activities.

3.9 State Consultations

NRC staff discussed this Draft FSS Report with the State of California.

3.10 Evaluation of EPA/NRC Memorandum of Understanding 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 Accession No. ML022830208) is not necessary for this specific review.

4.0 CONCLUSIONS

As discussed in detail above, the NRC staff, consistent with the NRC/DoD MOU, has reasonable assurance that all near-surface soil sample results from the remediated and debris-free excavation boundaries in SWDAs Bayside and North Point are less than the 1.69-pCi/g (0.063-Bq/g) gross Ra-226 project screening level. Thus, doses from residual radioactivity at Treasure Island Site 12 SWDAs Bayside and North Point would conform to the 25-mrem/yr dose criterion for unrestricted use in 10 CFR 20.1402. This conclusion is based on:

- the Navy's demonstration in the Draft Technical Memorandum that the sensitivity of the high-density radiation surveys can identify LLROs at depths within the fill of up to 3 feet (0.9 meter) below ground surface;
- the Navy's bounding dose assessment resulting in a maximum plausible dose due to the maximum observed Ra-226 concentration of 5.1 mrem/yr (0.051 mSv/yr); and
- NRC's confirmatory modeling of plausible exposure scenarios and maximum doses of less than 9 mrem/yr (0.09 mSv/yr) for potential LLROs that may not have been investigated and remain below excavation boundaries.

However, NRC staff recommends, due to the isolated occurrence of LLROs that have been found to date, that the Navy perform additional scans of disturbed areas after significant soil disturbance occurs due to development (e.g., excavation activities) 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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