APPENDIX N
Response to Comments

From: Cordero, Daniel@DTSC <Daniel.Cordero@dtsc.ca.gov>
Sent: Wednesday, March 6, 2024 3:48 PM
To: Dressler, Donald L III CIV USN NAVBASE SAN DIEGO CA (USA) <donald.l.dressler2.civ@us.navy.mil>
Cc: Guzman, Tinina L CIV USN NAVFAC SW SAN CA (USA) <tinina.l.guzman.civ@us.navy.mil>; Komeylyan, Chehreh@Waterboards <Chehreh.Komeylyan@waterboards.ca.gov>; Peng, Ted@DTSC <Ted.Peng@dtsc.ca.gov>; Chenoweth, Valerie@DTSC <Valerie.Chenoweth@dtsc.ca.gov>; Fendick, Edward@DTSC <Edward.Fendick@dtsc.ca.gov>
Subject: [Non-DoD Source] Naval Air Station, North Island, Site 10 Draft Removal Action Completion Report

Dear Mr. Dressler, the Department of Toxic Substances Control (DTSC) has completed its review of the subject line document. DTSC does not have any comments and requests that the document be finalized. Please forward a finalized copy within 30 days of receipt of this email. If you have any questions, please contact me at the phone numbers or email below. Thank You.

Daniel Cordero Jr
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San Diego Regional Water Quality Control Board

November 22, 2023

Tinina Guzman
Naval Facilities Engineering Command Southwest
Coastal Integrated Products Team
750 Pacific Highway
San Diego, CA 92132-5190
Sent via email: tinina.l.guzman.civ@us.navy.mil

In reply refer to/attn:
DOD100343300:CKomeylyan

Subject: Response to Draft Removal Action Completion Report, Installation Restoration Site 10 Shoreline Slag Area, Naval Air Station North Island, Coronado, California

Tinina Guzman,

The California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) reviewed the U.S. Department of the Navy (Navy) *Draft Removal Action Completion report, Installation Restoration Site 10 Shoreline Slag Area, Naval Air Station North Island, Coronado, California* (Draft RACR), submitted on September 25, 2023. The Navy completed a non-time critical removal action (NTCRA) to address point source low-level radioactive materials (LLRMs) in the intertidal zone associated with smelter slag wastes disposed at Installation Restoration (IR) Site 10 Shoreline Slag Area at Naval Air Station North Island, Coronado, California. The Navy's Draft RACR provides a summary of activities associated with the NTCRA (including excavation of slag and sediment from the intertidal zone, waste management, confirmation sampling, backfill placement, final land survey, decontamination and demobilization, results of post removal action sampling, risk assessment summary, and any deviations from the approved removal action work plan.

The Navy's NTCRA addressed the findings of the radiological surveys conducted as part of the long-term monitoring and maintenance at the IR Site 10 Shoreline Slag Area and implements removal of point source LLRMs in the intertidal zone. The removal action enhances the current long-term monitoring, maintenance, and inspection being conducted as part of the remedy selected in the Record of Decision[1] to include removal and disposal of low LLRMs in the waste consolidation area, dune restoration area, and intertidal zone. If LLRMs are identified during future radiological monitoring (every 3 years), then the Navy will remove LLRMs as part of the maintenance activities of IR Site 10.

[1] 2015. *Final Record of Decision for Operable Units 2, 4, 5, and 10,* Naval Air Station North Island, Coronado, California, January.

Based on the results of the NTCRA, the Draft RACR recommends: 1) Expansion of the area requiring land use controls at IR Site 10 to include the intertidal zone of the shoreline slag area, 2) Conducting radiological monitoring of the shoreline slag aera intertidal zone for source LLRMs at a minimum frequency of every 3 years, 3) Performance of five-year reviews to evaluate remedy effectiveness to ensure protection of human health and environment, and 4) Establishing a Radioactive Materials Area and implementing tiered radiological controls based on the level of invasive work conducted at the shoreline slag area.

The San Diego Water Board finds the Draft RACR acceptable and concurs that the NTCRA reduced the potential risk to human health and ecological receptors associated with point source LLRMs in shoreline sediment. The NTCRA also reduced the potential transport of LLRMs in the shoreline slag area to other areas in San Diego Bay. The San Diego Water Board defers to the Department of Toxic Substance Control for evaluation of the conclusions drawn on the Human Health and Ecological Risk Assessments.

The San Diego Water Board appreciates the Navy's time and efforts addressing contaminated sites within the Naval Air Station North Island boundaries and looks forward to assisting with these efforts. In the subject line of any response, please include the reference code – **DOD100343300:CKomeylyan**.

For questions or comments, please contact Sherrie Komeylyan at (619) 521-3366, or Chehreh.Komeylyan@waterboards.ca.gov.

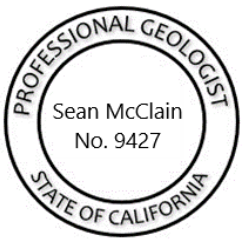
Respectfully,

Sherrie Komeylyan

Sherrie Komeylyan
Project Manager
Water Resource Control Engineer

Sean McClain

Sean McClain, P.G.
Program Manager
Senior Engineering Geologist



CK:sm:ck

cc: (via email): Daniel Cordero, Project Manager, Department of Toxic Substances Control, daniel.cordero@dtsc.ca.gov

Michael Rafanan, Environmental Business Line Team Leader, Naval Facilities Engineering Systems Command Southwest, michaelfrancis.p.rafanan.civ@us.navy.mil

Donald Dressler, Naval facilities engineering Systems Command Southwest, Donald.l.dressler2.civ@us.navy.mil

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 11, 2023

Tinina Guzman, Environmental Engineer
Naval Facilities Engineering Command
Southwest
750 Pacific Highway, 11th Floor
San Diego, CA 92132-0058

SUBJECT: FOLLOW-UP ON COMMENTS REGARDING U.S. NAVY DRAFT REMOVAL ACTION COMPLETION REPORT FOR INSTILLATION RESTORATION SITE 10 SHORELINE SLAG AREA AT NAVAL AIR STATION NORTH ISLAND, CORONADO, CALIFORNIA

Dear Ms. Guzman:

The purpose of this letter is to provide you the results of the U.S. Nuclear Regulatory Commission (NRC) staff's review of additional information provided by the Navy to address prior agency comments regarding the U.S. Navy's *Draft Removal Action Completion Report for Instillation Restoration (IR) Site 10 Shoreline Slag Area at Naval Air Station North Island (NASNI), Coronado, California* (hereafter, the draft Removal Action Completion Report [RACR]. The report is non-publicly available in NRC's Agencywide Documents Access and Management System [ADAMS] at Accession No. ML23298A011.

The NRC's role at IR Site 10 is consistent with the Memorandum of Understanding (MOU) between the NRC and the U.S. Department of Defense (DoD), entered into on April 28, 2016 (hereafter the NRC/DoD MOU; ADAMS Accession No. (ML16092A294). Under this MOU agreement, the NRC conducts monitoring of DoD facilitates consistent with the agency's responsibilities under the Atomic Energy Act of 1959, as amended to protect the public health and safety from the hazards associated with radioactive materials. Specifically, this responsibility includes overseeing the decommissioning and remediation of DoD facilities or sites to levels that are protective of the public health and safety and the environment as set forth in NRC's regulations. As such, the purpose of the NRC's monitoring is to ensure that DoD's site remediation efforts provide reasonable assurance that residual radioactivity remaining at the site will conform to the NRC dose criterion for restricted use, 25 millirem per year (mrem/yr) (0.25 millisieverts per year [mSv/yr]) with legally enforceable institutional controls, set forth in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 20, Section 1403(b). The U.S. Navy's responsibility for meeting any other relevant Federal and/or State regulatory requirements is independent of this NRC review.

The NRC staff and its contractor, Oak Ridge Associated Universities, reviewed the draft RACR and developed the enclosed comments. The purpose of these comments is to assist the U.S. Navy in demonstrating that there is reasonable assurance that the legally enforceable institutional controls will limit exposures to residual radioactivity at the IR Site 10 to NRC's 0.25-mSv/yr dose criterion. The comments are provided as part of NRC's monitoring role to assist in finalizing the document and planning future phases toward that purpose. The NRC staff intends to prepare a technical evaluation report on the final RACR.

If you have questions regarding these comments, please contact Mr. Christopher Grossman of my staff at (301) 415-0140 by telephone or at Christopher.Grossman@nrc.gov by email.

Sincerely,

Cardelia H. Maupin Signed by Maupin, Cardelia on 12/11/23

Cardelia Maupin, Branch Chief (Acting)
Low-Level Waste and Projects Branch
Division of Decommissioning, Uranium Recovery and Waste Programs
Office of Nuclear Material Safety and Safeguards

Enclosure:
Comments Regarding the Draft Removal Action Completion Report Installation Restoration Site 10 Shoreline Slag Area, Naval Air Station North Island, Coronado, California

Comment Letter for Draft Removal Action Completion Report for Installation Restoration Site 10 Shoreline Slag Area at Naval Air Station North Island, Coronado, California. DATE December 11, 2023

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DATE	Dec 11, 2023	Dec 11, 2023		

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COMMENTS REGARDING
THE DRAFT REMOVAL ACTION COMPLETION REPORT
INSTALLATION RESTORATION SITE 10 SHORELINE SLAG AREA,
NAVAL AIR STATION NORTH ISLAND,
CORONADO, CALIFORNIA

U.S. Nuclear Regulatory Commission (NRC) staff and its contractor, Oak Ridge Associated Universities, reviewed the draft "Removal Action Completion Report (RACR) Installation Restoration Site 10 Shoreline Slag Area, Naval Air Station North Island, Coronado, California, (hereafter, Draft RACR; non-publicly in NRC's Agencywide Documents Access and Management System (ADAMS)[1] at Accession No. ML23298A011. We have prepared the following comments for consideration by the U.S. Navy for finalizing the Draft RACR. In addition, these comments will assist in planning future phases for Installation Restoration (IR) Site 10 Shoreline Slag Area (SSA) at the Naval Air Station North Island (NASNI) as it pertains to radiological contamination. The Draft RACR documents radiological investigation results, the completion of non-time critical removal actions (NTCRA) to address point source low-level radioactive materials (LLRM) in the intertidal zone, removal of radium-226 in soils, and achievement of removal action objectives (RAO) at IR Site 10 SSA.

The NRC staff's comments were prepared as part of the Memorandum of Understanding (MOU) between the NRC and the U.S. Department of Defense (DoD) regarding confirmed radium contamination at DoD sites (ADAMS ML16092A294). The purpose of NRC's monitoring is to ensure that the U.S. Navy's remedy at NASNI provides reasonable assurance that NRC's dose criterion in Title 10 of the *Code of Federal Regulations* (10 CFR) 20.1403(b), "Criteria for license termination under restricted conditions," (i.e., 25 millirem per year (mrem/yr) [0.25 millisievert per year (mSv/yr)]) is met with legally enforceable institutional controls for sites or portions of the sites that will be released for restricted use. These comments are provided as part of NRC's monitoring to assist in finalizing the Draft RACR and to assist with planning any future phases toward those purposes. Once the U.S. Navy issues a final RACR, the NRC staff intends to document, in a publicly available technical evaluation report, its review of the U.S. Navy's demonstration that removal actions provide reasonable assurance that the remedy will meet the NRC's dose criterion with legally enforceable institutional controls.

COMMENT 1: LEGALLY ENORCMENT INSTITUTIONAL CONTROLS

The U.S. Navy should ensure that legally enforceable institutional controls will be enacted to provide reasonable assurance that exposures to residual radioactivity remaining at the site following completion of removal actions will conform with NRC's dose criterion.

Description: As summarized in Section 1.1 of the Draft RACR, the U.S. Navy manages IR Site 10 as a closed landfill-like facility. Land use in the vicinity of IR Site 10 is primarily industrial and Department of Navy related. The presumptive remedy identified for the waste consolidation area portion of the site in Section 11.4 of the Record of Decision (Navy, 2015) includes groundwater monitoring, inspections, maintenance of the ground cover, and land-use controls, also known as institutional controls. The Navy considers the presumptive remedy appropriate

[1] ADAMS is the NRC's official recordkeeping system, through which the NRC provides access to publicly available documents. ADAMS is available online at https://www.nrc.gov/reading-rm/adams.html.

for use at IR Site 10 based on several factors, including that there will be no changes to the current and planned future use of IR Site 10.

In Section 3.5 of the Draft RACR, the U.S. Navy recommends the following changes to the remedy at IR Site 10 to address LLRM in the intertidal zone portion of the site:

- Expand the area requiring land use controls at IR Site 10 to include the intertidal zone of the SSA. This will require a revision to the decision document and land use control implementation design.
- Conduct radiological monitoring of the IR Site 10 SSA intertidal zone for point source LLRM at a minimum frequency of every 3 years.
- Perform Five-Year reviews to evaluate remedy effectiveness and ensure protection of human health and the environment.
- In addition, due to the nature of the radiologically impacted sand/slag, it is recommended that the U.S. Navy set up a Radioactive Materials Area and implement tiered radiological controls based on the level of invasive work conducted at the IR Site 10 SSA.

Section 13.3.2.1 of NUREG-1757, Vol. 1, Rev. 2, "Consolidated Decommissioning Guidance - Decommissioning Process for Materials Licensees," (ML063000243) provides guidance on acceptable methods to demonstrate the adequacy of institutional controls and the type of information that the U.S. Navy should consider when demonstrating that land use controls would be legally enforceable institutional controls. The guidance in NUREG-1757, Vol. 1, Rev. 2 pertains to NRC licensees undergoing decommissioning. However, the U.S. Navy is not an NRC licensee at NASNI. In accordance with the NRC-DoD MOU, the Navy only needs to demonstrate that the institutional controls relied upon to meet the NRC's 25-mrem/yr [0.25-mSv/yr] dose criterion are legally enforceable. Therefore, only portions of the guidance in Section 13.3.2.1 are applicable at IR Site 10. Specifically, the U.S. Navy should consider documenting the following information related to institutional controls for radiological contamination when finalizing the Draft RACR or in a future Land Use Control Implementation Design document:

- a description of the legally enforceable institutional control(s) and an explanation of how the institutional control is a legally enforceable mechanism;
- a description of the restrictions on present and future landowners;
- a description of the entities enforcing, and their authority to enforce the institutional control(s);
- a discussion of the durability of the institutional control(s) (Note that NRC considers legal agreements and restrictive covenants to be durable institutional controls);
- a description of the activities that the entity with the authority to enforce the institutional control(s) may undertake to do so;
- a description of the manner in which the entity with the authority to enforce the institutional control(s) will be replaced if that entity is no longer willing or able to do so (this may not be needed for Federal or State entities);
- a description of the duration of the institutional control(s), the basis for the duration, the conditions that will end the institutional control(s), and the activities that will be undertaken to end the institutional control(s); and
- a description of the records pertaining to the institutional controls, how and where they will be maintained, and how the public will have access to these records.

Basis: 10 CFR Part 20, Section 1403(b), "Criteria for license termination under restricted conditions," specifies that legally enforceable institutional controls provide reasonable assurance that the Total Effective Dose Equivalent from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem/yr [0.25 mSv/yr]. Additional information is needed to demonstrate that the U.S. Navy will implement legally enforceable institutional controls.

COMMENT 2: INVESTIGATION LEVELS

The Navy should provide additional information to demonstrate the selection of an appropriate removal action objective (RAO) and investigation levels to ensure that exposures to residual radioactivity remaining at the site following completion of removal actions conform with NRC's dose criterion.

Description: The Navy used a z-score approach, originally setting the RAO to 3σ above the average background determined by 2-inch x 2-inch (2x2) sodium iodide detectors and then revising to an investigation level equal to twice the average background. The U.S. Navy should provide additional information to clarify how the determination was made that the high frequency of false positive detections was the result of interference from Naturally Occurring Radioactive Material (NORM). For example, the additional information should include a description of the analytical method used to identify the NORM interference, whether the interference was observed during both soil and sediment sampling, and why the NORM interference was not seen in earlier characterization surveys.

The Navy's z-score approach may be useful for sites where the contamination characteristics are represented by isolated, high activity (and as such, high count rate) anomalies within what is generally an ambient background investigation area. This can be a reasonable approach when the RAO is established based on representative background media, which appears to be the case at IR Site 10 SSA. However, a separate reference area was identified, and the RAO was properly calculated rather than establishing an RAO using data from within the study area, which would include anomalies that artificially increase average and 3σ values and result in an artificial increase to the RAO. However, NRC staff identified several potential issues with the U.S. Navy's approach:

- Section 3.2.6 states that each investigation level was based on background values from the background reference area determined during previous characterization efforts. The U.S. Navy should provide justification and documentation that the radiation detectors used during the NTCRA were responding within the established response controls of the detectors during characterization when the background values were established.
- Appendices F and G outline the U.S. Navy's methods used to plan MARSSIM[2]-based sample distribution and gamma walkover activities. There are some technical issues to consider, such as:
    - The U.S. Navy should clarify which detectors were used to perform the measurements. The Navy mentions both 2x2 and 3x3 detectors in the appendices, though measurement data appear to align with 2x2 detectors.

[2] Multi-Agency Radiation Survey and Site Investigation Manual (NUREG-1575, Rev. 1; ADAMS ML003761445)

- The U.S. Navy should clarify the count rate necessary to meet the following data quality objective (DQO) from Appendix F, Section 1.2 of the Draft RACR: “Scans are conducted at a rate to achieve an minimum detectable concentration for the scan (MDC_{SCAN}) in counter per minute (cpm) of less than 50% of the established RG criteria” given the RAO is 1.2 picocuries per gram (pCi/g) (i.e., MDC_{SCAN} ~ 0.6 pCi/g).
- The U.S. Navy should clarify the methodology used to calculate the MDC_{SCAN} of 1 pCi/g.

Basis: For the U.S. Navy to demonstrate that the site will comply with the NRC's dose limit in 10 CFR 20.1403(b), adequate justification is needed for radiological investigation levels to ensure that significant radiological contamination has been adequately characterized.

COMMENT 3: CONFIRMATION SURVEYS AND SAMPLING

The U.S. Navy should provide additional information to support the adequacy of the post-removal confirmation sampling when demonstrating that NRC’s dose criterion at 10 CFR 20.1403(b) is met.

Description: Section 3.3.2 of the Draft RACR describes the post-removal action confirmatory sampling methodology used to demonstrate that removal goals were met and inform the dose/risk assessment. However, the Draft RACR does not provide the DQO for determining the number of samples needed or the data assessment methods and how the assessment would demonstrate compliance with RAO. Further, it does not appear that the confirmation sampling methodology was appropriate for the contamination, which consists of discrete, isolated sources rather than contamination distributed over larger areas. Collecting a small number, nine samples per decision unit in this case, may provide an estimate of the average concentration in the survey area. However, because there were no DQO, the desired confidence of the results cannot be established; thus, such an approach is not useful for determining probabilistic parameters or whether isolated LLRM remains at the site. Instead, the Navy should consider a presence/absence-based sampling design, which would provide the needed information to estimate the potential for encountering a previously unidentified LLRM.

Additionally, the sample locations identified on the maps provided in the Draft RACR appear random or possibly judgmental. Final sampling in previously contaminated and remediated areas should be performed in a systematic pattern unless other justification is provided. Also, given the U.S. Navy developed no area factors and its removal goal does not appear to be dose-based, it is not clear whether adjusting areas between measurement locations to ensure that these areas can be detected by scanning techniques is appropriate (see Appendix F, Section 1.5). The Navy should provide additional justification to support this approach.

MARSSIM-based final status surveys are specifically designed to statistically demonstrate that average residual radionuclide concentrations in various media do not exceed an action level. Guidance in MARSSIM helps planners ensure that data are collected in a manner that clearly supports site decisions. While the U.S. Navy’s IR Site 10 SSA confirmation plan misaligns with MARSSIM in some respects, as described above, key characteristics (specifically survey instrumentation and gamma radiation walkover survey techniques) do produce a clear picture of site conditions and can support decision-making.

The scanning requirements described in MARSSIM are to ensure small areas of elevated radionuclide concentrations that may go undetected by sampling are detected and accounted for in decision-making. These small, elevated areas, in the form of LLRM, appear to be the principal characteristic of the IR Site 10 SSA contamination. The gamma walkover scans provide an efficient means of identifying LLRM near the surface and provide a much greater probability of detection over some type of random or systematic soil sampling strategy alone. However, because the gamma radiation signal rapidly decreases with increasing depth, additional investigation processes may be required to provide LLRM detection confidence if there is evidence that contamination is not limited to surficial, readily identifiable deposits.

The NRC staff note that high density gamma radiation walkover surveys were performed according to procedure and many anomalies were identified and removed. However, the MDC_{SCAN} method described by the U.S. Navy is not necessarily suited for discrete sources. The survey technique and depth of the LLRM will ultimately determine detection success as these sources (discrete sources of radium) since they emit high gamma radiation that is easy to identify when the source is within a few centimeters of the surface and the detector transect is near the source. Therefore, performing properly implemented, high-density surveys with a 2x2 (or 3x3) detector is critical to identifying LLRM sources. The z-score/twice-background method is useful if a source is at depth or other factors lead to a reduced detector response as the anomaly may be apparent when mapped or proximal data points examined. MARSAME[3], the supplement to MARSSIM for performing radiological surveys for release of materials and equipment, allows for scan-only release surveys. MARSSIM has not yet officially adopted that type of guidance and if it were adopted, it would likely be reserved for rigid allowance conditions. The IR Site 10 SSA, under proper planning and implementation, could be a candidate of such an approach, but only with justification and approvals of the approach.

Unless the U.S. Navy can demonstrate that the removal reached the non-impacted, native interface of the subsurface matrix of the SSA, some LLRM may remain, including in the rip-rap areas discussed in the Draft RACR. In such a case, a desired confidence level—e.g., 95% confidence that 99%, or some other factor, of grid cells are acceptable—can be accomplished through application of a presence/absence sampling design. Such confidence cannot be achieved with a limited number of random or systematic samples associated with a survey design that is intended to estimate a statistical parameter, which in the case of the MARSSIM guidance is the mean/median.

In lieu of such an investigation, the U.S. Navy's commitment to future, routine gamma radiation surveys of the area provide reasonable assurance, although not specifically quantifiable, that if any LLRM remain and are remobilized and reach the surface where they could potentially deliver exposure, they will be identified and removed. Based on the NRC staff's review, application of the essentially scan-only monitoring approach recognized that the soil samples that were collected demonstrate that contamination does not migrate from the isolated LLRM and result in widespread contamination.

Basis: Per guidance in Section 4.5 of NUREG-1757, Volume 2, Revision 2, the information submitted by the U.S. Navy to confirm the levels of residual radioactivity remaining at the site should be sufficient to determine whether the site meets the NRC's dose criterion at 10 CFR

[3] Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (NUREG-1575, Supplement 1; ADAMS ML090260577)

20.1403(b). Additional information supporting the appropriateness of what is essentially a scan-only design could provide reasonable assurance that the NRC's dose limit could not plausibly be exceeded.

COMMENT 4: IDENTIFICATION OF DISCRETE SOURCES OF RADIUM

The Navy should provide additional information on the identification of discrete sources of LLRM at IR Site 10 SSA to support dose analyses for demonstrating that residual radioactivity remaining at the site following completion of removal actions conforms with NRC's dose criterion.

Description: Sample data presented in Table 3-3 of the Draft RACR demonstrate that contamination is likely highly localized (i.e., limited to the actual discrete source and possible contact sediment), based on a combination of systematic and judgmental samples. While Section 3.2.10 describes a study performed by the U.S. Navy to correlate detector readings in cpm to an activity concentration of the LLRM in pCi/g, the correlation study was not expanded upon as to the usefulness of the information. In addition, it is not clear to NRC staff that the limited sample population (three samples) is adequate for developing a useful correlation between detector response and source activity. Further, NRC staff note that the main body of the Draft RACR provides information on the direct exposure rate and soil sample results but does not provide summary information for the discrete radiation sources discovered at the site. The Draft RACR provides some information on direct exposure rate results but, does not provide summary information for the activity of the radiation sources. It only provides soil samples that would likely not be representative of any unidentified sources that may remain in the area. The quantitative results for LLRM identified and listed in Appendix G were only referred to in the report body and never discussed or summarized. As unidentified LLRM are the more likely cause of any future exposures than widespread residual radioactivity, LLRM results presented in Appendix G should be discussed in the main body of Draft RACR like the confirmation sampling quantitative data that are provided in Table 3-3.

Using the broader set of LLRM activity and dose rate data, the U.S. Navy should risk-inform its dose/risk modeling approach to demonstrate that NRC's dose criterion will be met should undiscovered LLRM result in exposures to individuals before being identified by the U.S. Navy during its monitoring interval. These measures are needed because the U.S. Navy intends to perform radiological monitoring for LLRM in the intertidal zone every three years.

Basis: NRC seeks reasonable assurance that residual radioactivity remaining at the site following removal actions demonstrate that NRC's 10 CFR 20.1403(b) dose criterion is met. The absence of distributed, volumetric contamination and the removal of discrete sources provide confidence in the Navy's demonstration. Further, future monitoring and land use controls provide additional assurance to minimize the probability of future public exposures and ensure that potential dose to the public is less than 25 mrem/year. Risk-informing the U.S. Navy's demonstration with potential exposures from unidentified LLRM using the existing data on the range of discovered discrete sources will enhance confidence in the Navy's demonstration that NRC's dose criterion is met.

COMMENT 5: SITE CONCEPTUAL MODEL DESCRIPTION

The U.S. Navy should provide additional information to support the site's conceptual model, including background on the site's radiological history and current conditions.

Description: Section 1 of the Draft RACR describes the location and summarizes the background of the site as well as the site's history of radiological investigations. However, the document does not discuss any operational history related to the use of the smelter, the use of radioactive materials at the site, and ultimately whether the source of radioactive material was associated with slag. Further, the Draft RACR lacks a concise description of the physical form and distribution of the contamination within the environment.

The Navy's description should include, to the extent possible, whether the contamination was directly intermingled with all smelter slag or was intermittently present in only some of the slag loads that were disposed. In addition, the Navy should document whether the contamination was a discrete melted metallic object itself or consisted of small particles that resulted from larger discrete items deteriorating over time. In Section 1.2.6 of the Draft RACR, under the 5th bulleted item, the U.S. Navy describes removal of discrete pieces of radioactive slag as "… large, readily accessible metal fragments…". It is not clear to NRC staff whether these are a different form of the same source material. Additional clarification should also be provided regarding the "hot spots."

Guidance in Appendix D of NUREG-1757 Vol. 1, Rev. 2, recommends that in cases where the historical site assessment does not provide a clear understanding of site conditions, other elements should demonstrate how information gaps will be handled. The integrated result should provide a robust, confirmable understanding of *what is at the site*, how it will be remediated, and how the site cleanup will be verified safely. The Draft RACR does provide other required checklist information, such as geography, hydrology, natural resources, etc., but does not provide the operational history. This information may be included in other referenced documents however, is requested to be included in the Draft RACR.

Basis: 10 CFR Part 20, Section 1403(b), "Criteria for license termination under restricted conditions," specifies that legally enforceable institutional controls provide reasonable assurance that the Total Effective Dose Equivalent from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem/yr [0.25 mSv/yr]. Adequate historical information and description of physio-chemical characteristics of the contamination provides reasonable assurance that the site conceptual model is adequate to demonstrate NRC's dose criterion is met.

COMMENT 6: DOSE MODEL

The U.S. Navy should provide additional information to support its dose modeling exposure scenarios to demonstrate that NRC's dose criterion is met.

Description: Appendix K of the Draft RACR describes the U.S Navy's dose model to demonstrate that residual radioactivity remaining at the site conforms with NRC's restricted release dose criterion at 10 CFR 20.1403(b). The U.S. Navy's model assumes a receptor spends 100-percent of 30 consecutive years occupying a 1,000-m^2 section of the site with uniform contamination from residual radioactivity remaining at the site. The U.S. Navy models

incidental ingestion and external gamma pathways but does not appear to include justification for elimination of the inhalation pathway. The Draft RACR indicates that the U.S. Navy modeled the highest concentration identified during the post-NTCRA survey (i.e., 0.556 pCi/g) uniformly distributed within the assumed area. While the U.S. Navy's modeling approach may be bounding, the approach appears inconsistent with the conceptual model of the site, which involves discrete sources of LLRM. The U.S. Navy should model potential dose received by an individual in proximity to or collecting discrete, isolated, or highly localized LLRM under plausible scenarios. Other U.S. Navy sites (e.g., former Naval Station Treasure Island) with similar discrete LLRM contamination provided direct exposure estimations to various source configurations (i.e., depth, occupancy, etc.) of representative discrete source activity levels found at the site. The U.S. Navy should provide additional information to justify that its dose model is adequate. This additional information could include further dose analyses of discrete sources to risk-inform the U.S. Navy's demonstration that NRC's dose criterion is met.

This scenario has been applied at multiple U.S. Navy sites within California, where the source of contamination, and, hence, exposure potentials are from discrete sources of Ra-226 or other radionuclides. The Navy should consider collectively consolidating lessons learned, dose modeling parameters, and calculations to propose a consistent methodology for assessing potential dose to demonstrate that NRC's dose criteria are met if isolated, localized sources were present as residual radioactivity.

Table 5-1 of NUREG-1757 Volume 2, Revision 3, describes the types of scenarios that should be considered to demonstrate that NRC's dose criterion is met. Further, guidance in Section 5.2 of NUREG-1757, Volume 2, Revision 3, on the general approach for dose modeling recommends that when site information shows significant variability in residual radioactivity concentration, the licensee may conceptualize the site as two or more sources of residual radioactivity (e.g., one or more "hot spot" sources that represent the area(s) of elevated concentration).

Basis: 10 CFR Part 20, Section 1403(b), "Criteria for license termination under restricted conditions," specifies that legally enforceable institutional controls provide reasonable assurance that the Total Effective Dose Equivalent from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem/yr [0.25 mSv/yr]. Adequate justification for the modeling is necessary to provide assurance that NRC's dose criterion is met.

EDITORIAL COMMENTS:

- Nomenclature used throughout the document should be more consistent. The Draft RACR uses multiple terms in describing the specific radioactive material and there are no clear definitions of the various terms provided. For example, Page 22 of Section 1.4.1 uses three terms within two paragraphs. These terms were "elevated radioactive materials and metal debris", "metal fragments", "discrete pieces of radioactive slag", "hot spot" Ra-226 concentrations. Other terms used elsewhere included: "low-level radiation-contaminated slag deposits", "low-level radiological objects", and "radioactive slag waste". The U.S. Navy should use consistent terminology where appropriate to improve the clarity of the Draft RACR.

EXTERNAL REFERENCES:

U.S. Navy, 2015. “Final Record of Decision for Operable Units 1, 2, 4, 5, and 10, Naval Air Station North Island, Coronado, California.” January.

Response to Comments on
Draft Removal Action Completion Report
Installation Restoration Site 10, Shoreline Slag Area
Naval Air Station North Island, Coronado, California
Report Dated September 2023

The following comments were submitted by Ms. Cardelia Maupin, Branch Chief (Active) Low-Level Waste and Projects Branch Division of Decommissioning, Uranium Recovery and Waste Programs Office of Nuclear Material Safety and Safeguards*, in an attachment to a letter dated 11 December 2023:*

General Comment		General Response
	U.S. Nuclear Regulatory Commission (NRC) staff and its contractor, Oak Ridge Associated Universities, reviewed the draft "Removal Action Completion Report (RACR) Installation Restoration Site 10 Shoreline Slag Area, Naval Air Station North Island, Coronado, California, (hereafter, Draft RACR; non-publicly in NRC's Agencywide Documents Access and Management System (ADAMS)1 at Accession No. ML23298A011. We have prepared the following comments for consideration by the U.S. Navy for finalizing the Draft RACR. In addition, these comments will assist in planning future phases for Installation Restoration (IR) Site 10 Shoreline Slag Area (SSA) at the Naval Air Station North Island (NASNI) as it pertains to radiological contamination. The Draft RACR documents radiological investigation results, the completion of non-time critical removal actions (NTCRA) to address point source low-level radioactive materials (LLRM) in the intertidal zone, removal of radium-226 in soils, and achievement of removal action objectives (RAO) at IR Site 10 SSA. The NRC staff's comments were prepared as part of the Memorandum of Understanding (MOU) between the NRC and the U.S. Department of Defense (DoD) regarding confirmed radium contamination at DoD sites (ADAMS ML16092A294). The purpose of NRC's monitoring is to ensure that the U.S. Navy's remedy at	**Comment acknowledged.** Institutional controls for IR Site 10, as documented in the Final ROD (Navy, 2015) will be extended to the portion of the IR Site 10 Shoreline Slag Area (SSA) intertidal zone (IZ) with a Record of Decision Explanation of Significant Differences (ROD ESD), 40 CFR, Section 300.435(c)(2)(i)), and Land Use Control Remedial Design (LUC RD). Please see responses to Specific NRC comments, following the General Response. Below is a summary of the General Response: • The Navy is not requesting "Criteria for license termination under restricted conditions" under 10 CFR 20.1403(b) for IR Site 10 SSA IZ as there will be LUCs implemented following Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements pursuant to CERCLA Section 117(c) and National Oil and Hazardous Substances Pollution Continency Plan (NCP; 40 CFR, Section 300.435(c)(2)(i)) that will include a ROD ESD, LUC RD, and Public notice. The Navy will submit the ROD ESD and LUC RD to the NRC for comment prior to finalization. Please also see response to Specific Comment 1. • Results of the final Gamma Walkover Survey (GWS) post removal action indicate compliance with the 25 millirem per year (mrem/yr) to a depth of 6-inches (the detection limit of the instrumentation in the sand/sediment to ensure the scan surveys met the Data Quality Objectives). However, since the IR Site 10 SSA IZ is a dynamic environment, and there

General Comment		General Response
	NASNI provides reasonable assurance that NRC's dose criterion in Title 10 of the *Code of Federal Regulations* (10 CFR) 20.1403(b), "Criteria for license termination under restricted conditions," (i.e., 25 millirem per year (mrem/yr) [0.25 millisievert per year (mSv/yr)]) is met with legally enforceable institutional controls for sites or portions of the sites that will be released for restricted use. These comments are provided as part of NRC's monitoring to assist in finalizing the Draft RACR and to assist with planning any future phases toward those purposes. Once the U.S. Navy issues a final RACR, the NRC staff intends to document, in a publicly available technical evaluation report, its review of the U.S. Navy's demonstration that removal actions provide reasonable assurance that the remedy will meet the NRC's dose criterion with legally enforceable institutional controls.	is the potential for radioactive material (RAM) from slag coming to the surface, the ROD ESD and LUC RD for the IR Site 10 SSA IZ is recommended to include requirements for additional monitoring and LUCs. See Response to Specific Comment 2 • The IR Site 10 SSA is located on the active military base of Naval Air Station North Island. Hence, the public is not allowed on to the site and military personnel would not be traversing this portion of the base unless they would be conducting specific tasks related to monitoring and operations. Known potential activities would be environmental and biological monitoring, and Navy SEAL exercises. The LUC RD will put in requirements for maintaining control and postings regarding the potential for RAM in this area. Please see Response to Specific Comment 6.

END OF GENERAL COMMENTS AND RESPONSES

Response to Comments on
Draft Removal Action Completion Report
Installation Restoration Site 10, Shoreline Slag Area
Naval Air Station North Island, Coronado, California
Report Dated September 2023

	SPECIFIC DRAFT RACR COMMENTS	SPECIFIC RESPONSE
1	**COMMENT 1: LEGALLY ENFORCMENT INSTITUTIONAL CONTROLS** The U.S. Navy should ensure that legally enforceable institutional controls will be enacted to provide reasonable assurance that exposures to residual radioactivity remaining at the site following completion of removal actions will conform with NRC's dose criterion. **Description:** As summarized in Section 1.1 of the Draft RACR, the U.S. Navy manages IR Site 10 as a closed landfill-like facility. Land use in the vicinity of IR Site 10 is primarily industrial and Department of Navy related. The presumptive remedy identified for the waste consolidation area portion of the site in Section 11.4 of the Record of Decision (Navy, 2015) includes groundwater monitoring, inspections, maintenance of the ground cover, and land-use controls, also known as institutional controls. The Navy considers the presumptive remedy appropriate for use at IR Site 10 based on several factors, including that there will be no changes to the current and planned future use of IR Site 10. In Section 3.5 of the Draft RACR, the U.S. Navy recommends the following changes to the remedy at IR Site 10 to address LLRM in the intertidal zone portion of the site: • Expand the area requiring land use controls at IR Site 10 to include the intertidal zone of the SSA. This will require a revision to the decision document and land use control	**Comment acknowledged**. The Navy will be preparing a ROD ESD and LUC RD document to detail the LUCs for the IR Site 10 SSA in accordance with CERCLA requirements, 40 CFR, Section 300.435(c)(2)(i)), EPA OSWER Directive 9355.0-89 (EPA 2012), and Department of Defense (DoD) Guidance on LUCs with Environmental Regulatory Agencies (DoD 2001). The Navy is not planning on decommissioning this site or terminating a radioactive materials license per NUREG-1757 or 10 CFR 20.1403b requirements as this site is located on an active military base of Naval Air Station North Island. To further clarify the recommendations, the last bullets of Section 3.6 were modified as follows: • "Prepare a ROD Explanation of Significant Differences (ESD) and LUC Remedial Design (RD) in accordance with CERCLA requirements, 40 CFR, Section 300.435(c)(2)(i)), and EPA OSWER Directive 9355.0-89 (EPA 2012) and DoD Guidance on LUCs with Environmental Regulatory Agencies (DoD 2001) to include expansion of the area requiring LUCs at IR Site 10 to include the IR 10 SSA IZ. Based on the RAM located in the bluffs (sample LAYDOWN1-SITE10-SSA-001), further radiological investigation and removal in the bluffs may be needed and should be included in the ROD ESD The LUCs may include a tiered level of radiological controls and signage based on the level of invasive work conducted at the IR Site 10 SSA. • The ROD ESD and LUC RD should include details of the restrictions, and enforcement activities, documentation, and include radiological monitoring of the IR Site 10 SSA IZ for point source LLRMs at a minimum frequency of every 3

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	implementation design. • Conduct radiological monitoring of the IR Site 10 SSA intertidal zone for point source LLRM at a minimum frequency of every 3 years. • Perform Five-Year reviews to evaluate remedy effectiveness and ensure protection of human health and the environment. • In addition, due to the nature of the radiologically impacted sand/slag, it is recommended that the U.S. Navy set up a Radioactive Materials Area and implement tiered radiological controls based on the level of invasive work conducted at the IR Site 10 SSA. Section 13.3.2.1 of NUREG-1757, Vol. 1, Rev. 2, "Consolidated Decommissioning Guidance - Decommissioning Process for Materials Licensees," (ML063000243) provides guidance on acceptable methods to demonstrate the adequacy of institutional controls and the type of information that the U.S. Navy should consider when demonstrating that land use controls would be legally enforceable institutional controls. The guidance in NUREG-1757, Vol. 1, Rev. 2 pertains to NRC licensees undergoing decommissioning. However, the U.S. Navy is not an NRC licensee at NASNI. In accordance with the NRC-DoD MOU, the Navy only needs to demonstrate that the institutional controls relied upon to meet the NRC's 25-mrem/yr [0.25-mSv/yr] dose criterion are legally enforceable. Therefore,	years per the Action Memorandum (DoN 2022). The LUC RD will be completed in accordance with the requirements of EPA OSWER Directive 9355.0-89 (EPA 2012) and DoD Guidance on LUCs with Environmental Regulatory Agencies (DoD 2001). • Perform Five-Year reviews in accordance with CERCLA Section 121 to evaluate remedy effectiveness and ensure protection of human health and the environment. Public participation will be included with the ROD ESD and LUC RD in accordance CERCLA §117(c); and 40 CFR §§300.435(c)(2)(i) and 300.825(a)(2)."

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	only portions of the guidance in Section 13.3.2.1 are applicable at IR Site 10. Specifically, the U.S. Navy should consider documenting the following information related to institutional controls for radiological contamination when finalizing the Draft RACR or in a future Land Use Control Implementation Design document: • a description of the legally enforceable institutional control(s) and an explanation of how the institutional control is a legally enforceable mechanism; • a description of the restrictions on present and future landowners; • a description of the entities enforcing, and their authority to enforce the institutional control(s); • a discussion of the durability of the institutional control(s) (Note that NRC considers legal agreements and restrictive covenants to be durable institutional controls); • a description of the activities that the entity with the authority to enforce the institutional control(s) may undertake to do so; • a description of the manner in which the entity with the authority to enforce the institutional control(s) will be replaced if that entity is no longer willing or able to do so (this may not be needed for Federal or State entities);	

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	• a description of the duration of the institutional control(s), the basis for the duration, the conditions that will end the institutional control(s), and the activities that will be undertaken to end the institutional control(s); and • a description of the records pertaining to the institutional controls, how and where they will be maintained, and how the public will have access to these records. **Basis:** 10 CFR Part 20, Section 1403(b), "Criteria for license termination under restricted conditions," specifies that legally enforceable institutional controls provide reasonable assurance that the Total Effective Dose Equivalent from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem/yr [0.25 mSv/yr]. Additional information is needed to demonstrate that the U.S. Navy will implement legally enforceable institutional controls.	
2	**COMMENT 2: INVESTIGATION LEVELS** The Navy should provide additional information to demonstrate the selection of an appropriate removal action objective (RAO) and investigation levels to ensure that exposures to residual radioactivity remaining at the site following completion of removal actions conform with NRC's dose criterion. **Description:** The Navy used a z-score approach, originally setting the RAO to 3σ above the average background determined by 2-inch x 2-inch (2x2) sodium iodide detectors and then revising to an investigation level equal to twice the average background. The U.S.	Please note that the referenced Basis of Section 13.3.2.1 "Control Adequacy" of NUREG-1757, Vol. 1, Rev. 2, "Consolidated Decommissioning Guidance - Decommissioning Process for Materials Licensees," is guidance and recommendations for decommissioning of facilities or sites meant to be utilized on the front-end, during planning and review phases of the Decommissioning Plan (DP) for a Nuclear Regulatory Commission (NRC) Group 6 decommissioning to assure an understanding of actions to be taken to **initiate** and **complete** the **license termination process**. Both contain NRC Dose criterion of a Total Effective Dose Equivalent (TEDE) of 25 mrem (0.25 mSv) per year provided in 10

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	Navy should provide additional information to clarify how the determination was made that the high frequency of false positive detections was the result of interference from Naturally Occurring Radioactive Material (NORM). For example, the additional information should include a description of the analytical method used to identify the NORM interference, whether the interference was observed during both soil and sediment sampling, and why the NORM interference was not seen in earlier characterization surveys. The Navy's z-score approach may be useful for sites where the contamination characteristics are represented by isolated, high activity (and as such, high count rate) anomalies within what is generally an ambient background investigation area. This can be a reasonable approach when the RAO is established based on representative background media, which appears to be the case at IR Site 10 SSA. However, a separate reference area was identified, and the RAO was properly calculated rather than establishing an RAO using data from within the study area, which would include anomalies that artificially increase average and 3σ values and result in an artificial increase to the RAO. However, NRC staff identified several potential issues with the U.S. Navy's approach: • Section 3.2.6 states that each investigation level was based on background values from the background reference area determined during previous characterization efforts. The U.S. Navy should provide	CFR Part 20, Section 1402, "Radiological criteria for unrestricted use" and 10 CFR Part 20, Section 1403(b), "Criteria for license termination under restricted conditions," The RACR describes the Non-Time-Critical Removal Action (NTCRA) activities completed in accordance with the NTCRA Work Plan (EIP 2022) to remove contamination that posed an immediate threat to human health and the environment as a final cost-effective measure to mitigate the potential effects to human health and the environment from Low Level Radiological Material ((LLRM) (Radium-226 contaminated slag waste)) deposited within the IR 10 SSA IZ. The guidance, recommendations, and regulation cited are specific to decommissioning and license termination. The **removal action** was **neither** a decommissioning **nor** license termination action. While the Navy did use an investigation level for Gamma Walkover Survey (GWS) scans set at the mean of the Background Reference Area (BRA) plus three standard deviations, or equivalent to natural background accounting for natural variations in background, it did not use a z-score. Z-score is the number of standard deviations from the mean value of the reference population, tested against the population of the measurements generally within an ambient background investigation area of concern to identify anomalies, where a z-score of 3 or greater is considered indicative of likely contamination. This was not the case for this removal action. For this removal action the Navy established a separate BRA. The BRA measurement results were acquired in a previously approved non-impacted area with similar physical, chemical,

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	justification and documentation that the radiation detectors used during the NTCRA were responding within the established response controls of the detectors during characterization when the background values were established. • Appendices F and G outline the U.S. Navy's methods used to plan MARSSIM2-based sample distribution and gamma walkover activities. There are some technical issues to consider, such as: o The U.S. Navy should clarify which detectors were used to perform the measurements. The Navy mentions both 2x2 and 3x3 detectors in the appendices, though measurement data appear to align with 2x2 detectors. o The U.S. Navy should clarify the count rate necessary to meet the following data quality objective (DQO) from Appendix F, Section 1.2 of the Draft RACR: "Scans are conducted at a rate to achieve an minimum detectable concentration for the scan (MDCSCAN) in counter per minute (cpm) of less than 50% of the established RG criteria" given the RAO is 1.2 picocuries per gram (pCi/g) (i.e., MDCSCAN ~ 0.6 pCi/g). o The U.S. Navy should clarify the methodology used to calculate the MDCSCAN of 1 pCi/g. **Basis:** For the U.S. Navy to demonstrate that the site will comply with the NRC's dose limit in 10	geological, radiological, and soil composition materials as the impacted area of concern within the IR 10 IZ SSA, with no anomalies or outliers, during a previous GWS characterization scan survey conducted by the same company (Philotechnics, Ltd.) using the same survey technician (Mr. Kevin Banks) who conducted the NTCRA GWS scans using similar Ludlum 44-10 two-inch by two-inch sodium iodide gamma scintillation detectors (2x2 NaI) coupled to Ludlum 2221 or equivalent ratemeter/scaler dataloggers in accordance with Philotechnics. Ltd HPO-230 "Gamma Walkover Scanning Surveys" procedure. A total of 160 background measurement results were acquired, and the mean and standard deviation were calculated. GWS scan surveys for the BRA, characterization (previous and current), and final NTCRA were used to identify areas of elevated gamma readings above the investigation level relative to the mean BRA background measurement result within the SU. These locations were marked and received additional investigations to determine the concentration, area, and extent of the contamination, or if elevated gamma readings due to electronics or Naturally Occurring Radioactive Material (NORM). The methodology and calculations for the GWS scan Minimum Detectable Concentration were added to Appendix F of the RACR.

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	CFR 20.1403(b), adequate justification is needed for radiological investigation levels to ensure that significant radiological contamination has been adequately characterized.	
3	**COMMENT 3: CONFIRMATION SURVEYS AND SAMPLING** The U.S. Navy should provide additional information to support the adequacy of the postremoval confirmation sampling when demonstrating that NRC's dose criterion at 10 CFR20.1403(b) is met. **Description:** Section 3.3.2 of the Draft RACR describes the post-removal action confirmatory sampling methodology used to demonstrate that removal goals were met and inform the dose/risk assessment. However, the Draft RACR does not provide the DQO for determining the number of samples needed or the data assessment methods and how the assessment would demonstrate compliance with RAO. Further, it does not appear that the confirmation sampling methodology was appropriate for the contamination, which consists of discrete, isolated sources rather than contamination distributed over larger areas. Collecting a small number, nine samples per decision unit in this case, may provide an estimate of the average concentration in the survey area. However, because there were no DQO, the desired confidence of the results cannot be established; thus, such an approach is not useful for determining probabilistic parameters or whether isolated LLRM remains at the site. Instead, the Navy should consider a presence/absence-based sampling design, which would	As previously mentioned, the NTCRA activities were to remove contamination that posed an immediate threat to human health and the environment as a final cost-effective measure to mitigate the potential effects to human health and the environment from LLRM deposited within the IR 10 IZ SSA. This was accomplished by 100% gamma scans of the IR 10 IZ SSA impacted areas of concern to identify near surface, within six inches below ground surface (bgs), RAM indicative of radiological slag waste, radiological contamination, or LLRM. Once it was confirmed all areas within the IR 10 IZ SSA impacted areas of concern GWS scan results were less than the investigation levels and all near surface radiological slag waste, radiological contamination, and LLRM was removed, confirmation samples were collected. Confirmation samples were collected in accordance with the NTCRA Work Plan (EIP 2022) and acquired and analyzed to verify concentrations of the Radium-226 met the remediation goals (RGs) and thereby confirm the validity of the GWS scans. Confirmation samples were not utilized to confirm the presence or absence of small discrete sources of radiological contamination or radioactive materials. GWS scans were utilized to confirm the presence or absence of near surface, within six inches bgs, discrete sources of radiological contamination or radioactive materials, as provided in response to Specific Comment 2.

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	provide the needed information to estimate the potential for encountering a previously unidentified LLRM. Additionally, the sample locations identified on the maps provided in the Draft RACR appear random or possibly judgmental. Final sampling in previously contaminated and remediated areas should be performed in a systematic pattern unless other justification is provided. Also, given the U.S. Navy developed no area factors and its removal goal does not appear to be dose-based, it is not clear whether adjusting areas between measurement locations to ensure that these areas can be detected by scanning techniques is appropriate (see Appendix F, Section 1.5). The Navy should provide additional justification to support this approach. MARSSIM-based final status surveys are specifically designed to statistically demonstrate that average residual radionuclide concentrations in various media do not exceed an action level. Guidance in MARSSIM helps planners ensure that data are collected in a manner that clearly supports site decisions. While the U.S. Navy's IR Site 10 SSA confirmation plan misaligns with MARSSIM in some respects, as described above, key characteristics (specifically survey instrumentation and gamma radiation walkover survey techniques) do produce a clear picture of site conditions and can support decision-making. The scanning requirements described in MARSSIM are to ensure small areas of elevated radionuclide	GWS scans were conducted using similar Ludlum 44-10 2x2 NaI gamma scintillation detectors coupled to Ludlum 2221 or equivalent ratemeter/scaler dataloggers in accordance with Philotechnics. Ltd HPO-230 "Gamma Walkover Scanning Surveys" procedure. The mobile gamma ray detection system geo referenced survey data using external high resolution EMLID Reach RS+ Real Time Kinematics (RTK) Global Navigation Satellite System (GNSS). The system allowed for rapidly measuring radiation levels, spatially correlating, and providing for real-time data processing and Geographic Information System mapping of radioactivity. Data from both the gamma detector and Global Position System (GPS) were collected in a data-logger and available for real-time review and downloaded into a field computer, viewed, and stored in an un-corruptible data file for real-time feedback and data validation/post-processing. The scalar/rate-meter used to measure near surface gross gamma count rates (in cpm) was configured to output directly to the GPS unit and system to perform the data logging functions, operated by a qualified technician. As with all instrumentation, for quality purposes, the system was functionally checked daily prior to use. In addition, to the extent possible, a cart system developed to maintain the bottom of the detectors as close as possible, yet within 10 centimeters (cm), of the surface of the material being surveyed with a field of view (FOV) of one square meter, at a set scan speed not-to-exceed 0.5 meters/second, a one second counting interval, and each pass offset (transect) marked and maintained at no more than 0.5 meters from other transects in accordance with Philotechnics. Ltd HPO-230 "Gamma Walkover

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	concentrations that may go undetected by sampling are detected and accounted for in decision-making. These small, elevated areas, in the form of LLRM, appear to be the principal characteristic of the IR Site 10 SSA contamination. The gamma walkover scans provide an efficient means of identifying LLRM near the surface and provide a much greater probability of detection over some type of random or systematic soil sampling strategy alone. However, because the gamma radiation signal rapidly decreases with increasing depth, additional investigation processes may be required to provide LLRM detection confidence if there is evidence that contamination is not limited to surficial, readily identifiable deposits. The NRC staff note that high density gamma radiation walkover surveys were performed according to procedure and many anomalies were identified and removed. However, the MDCSCAN method described by the U.S. Navy is not necessarily suited for discrete sources. The survey technique and depth of the LLRM will ultimately determine detection success as these sources (discrete sources of radium) since they emit high gamma radiation that is easy to identify when the source is within a few centimeters of the surface and the detector transect is near the source. Therefore, performing properly implemented, high-density surveys with a 2x2 (or 3x3) detector is critical to identifying LLRM sources. The z-score/twice-background method is useful if a source is at depth or other factors lead to a reduced detector response as the anomaly may be apparent when	Scanning Surveys" procedure. GWS scans were conducted along uni-directional transects across the defined area and performed in a manner to ensure 100% coverage, including cross-hatching when necessary. Maintaining the bottom of the detector within 10 cm of the surface of the material being surveyed minimized the drop-off of intensity of the gamma particles and increases the chances that gamma rays interacted with the sensor to provide as representative of a result as possible. For areas not accessible to the cart, the technician utilized the system in handheld form, and utilized an "S" pattern, maintaining the detector within 10 cm of the surface of the material being surveyed. For the confirmation samples as provided Section 3.3.2 of the Draft RACR, confirmation samples were collected and sent to an off-site laboratory to establish whether concentrations of Ra-226 in sediment met RGs in accordance with the NTCRA Work Plan and Appendix F of the RACR. Per the NTCRA Work Plan Section 5.7 "Design and Implementation of Final Status Surveys" Subsection 5.7.1 "Background Reference Area for Soil and Open Land Areas" and Appendix F Section 1 "Design and Implementation of Final Status Surveys" Subsection 1.1 "Background Reference Area for Soil and Open Land Areas" of the RACR, the "N" number of samples was calculated consistent with the numbers used with the Wilcoxon Rank Sum (WRS) Test from Section 5.5.2.2 in MARSSIM (NUREG 1575, 2000). The WRS statistical test is recommended in MARSSIM (NUREG 1575, 2000) for demonstrating compliance when the contaminant is present in background, and as described in NTCRA Work Plan Section 5.7.6 and RACR Appendix F Section 1.6 – "Wilcoxon Rank Sum Test" respectively, and NTCRA Work Plan Section 5.7.8 and RACR Appendix F Section 1.8 – "Contaminant in Background

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	mapped or proximal data points examined. MARSAME3, the supplement to MARSSIM for performing radiological surveys for release of materials and equipment, allows for scan-only release surveys. MARSSIM has not yet officially adopted that type of guidance and if it were adopted, it would likely be reserved for rigid allowance conditions. The IR Site 10 SSA, under proper planning and implementation, could be a candidate of such an approach, but only with justification and approvals of the approach. Unless the U.S. Navy can demonstrate that the removal reached the non-impacted, native interface of the subsurface matrix of the SSA, some LLRM may remain, including in the rip-rap areas discussed in the Draft RACR. In such a case, a desired confidence level—e.g., 95% confidence that 99%, or some other factor, of grid cells are acceptable—can be accomplished through application of a presence/absence sampling design. Such confidence cannot be achieved with a limited number of random or systematic samples associated with a survey design that is intended to estimate a statistical parameter, which in the case of the MARSSIM guidance is the mean/median. In lieu of such an investigation, the U.S. Navy's commitment to future, routine gamma radiation surveys of the area provide reasonable assurance, although not specifically quantifiable, that if any LLRM remain and are remobilized and reach the surface where they could potentially deliver exposure, they will be identified and	Determining the Minimum Number of Samples" respectively. In addition, the DQOs for determining the minimum number of samples are included in NTCRA Work Plan Section 5.7.2 – "Data Quality Objectives" and RACR Appendix F Section 1.2 – "Radiological Survey Data Quality Objectives "to include decision error probability rates, and the null hypothesis and alternate null hypothesis from NUREG-1505 scenario A for use in determination of number of samples. This process resulted in the collection of a minimum of **nine systematic samples in each survey unit**. **In addition, five additional judgmental samples were collected based on locations of the highest gamma scan results identified within the Survey Unit (SU). SUs were plotted using the Visual Sample Plan, version 6.0** The IR 10 IZ SSA were separated into SUs based on the recommended maximum size limit for open land areas provided in MARSSIM. For the confirmation, each SU was limited in size to 2,000 square meters or less. This resulted in a total of seven SUs. Data Assessment methods were provided in NTCRA Work Plan Section 5.10.1 "Data Quality Assessment and Interpretation of Results". A copy of the NTCRA Work Plan (EIP 2022), along with three other relevant site documents, describing the need and intent of the NTCRA were provided to Mr. Christopher Grossman on October 4, 2021, and the Work Plan was finalized in March 2022. A copy of the NTCRA Work Plan will be provided for NRC records.

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	removed. Based on the NRC staff's review, application of the essentially scan-only monitoring approach recognized that the soil samples that were collected demonstrate that contamination does not migrate from the isolated LLRM and result in widespread contamination. **Basis:** Per guidance in Section 4.5 of NUREG-1757, Volume 2, Revision 2, the information submitted by the U.S. Navy to confirm the levels of residual radioactivity remaining at the site should be sufficient to determine whether the site meets the NRC's dose criterion at 10 CFR 20.1403(b). Additional information supporting the appropriateness of what is essentially a scan only design could provide reasonable assurance that the NRC's dose limit could not plausibly be exceeded.	
4	**COMMENT 4: IDENTIFICATION OF DISCRETE SOURCES OF RADIUM** The Navy should provide additional information on the identification of discrete sources of LLRM at IR Site 10 SSA to support dose analyses for demonstrating that residual radioactivity remaining at the site following completion of removal actions conforms with NRC's dose criterion. **Description:** Sample data presented in Table 3-3 of the Draft RACR demonstrate that contamination is likely highly localized (i.e., limited to the actual discrete source and possible contact sediment), based on a combination of systematic and judgmental samples. While Section 3.2.10 describes a study performed by the U.S. Navy to correlate detector readings in cpm to an activity	The correlation study was only used as a field guide to segregate waste as the team evaluated the point sources and conducted excavation activities. This correlation was not used to characterize or provide confirmation sample data, Section 3.2.10, Correlation Study, has been deleted from the RACR so as not confuse the main objectives and final data used for the site.

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	concentration of the LLRM in pCi/g, the correlation study was not expanded upon as to the usefulness of the information. In addition, it is not clear to NRC staff that the limited sample population (three samples) is adequate for developing a useful correlation between detector response and source activity. Further, NRC staff note that the main body of the Draft RACR provides information on the direct exposure rate and soil sample results but does not provide summary information for the discrete radiation sources discovered at the site. The Draft RACR provides some information on direct exposure rate results but does not provide summary information for the activity of the radiation sources. It only provides soil samples that would likely not be representative of any unidentified sources that may remain in the area. The quantitative results for LLRM identified and listed in Appendix G were only referred to in the report body and never discussed or summarized. As unidentified LLRM are the more likely cause of any future exposures than widespread residual radioactivity, LLRM results presented in Appendix G should be discussed in the main body of Draft RACR like the confirmation sampling quantitative data that are provided in Table 3-3. Using the broader set of LLRM activity and dose rate data, the U.S. Navy should risk-inform its dose/risk modeling approach to demonstrate that NRC's dose criterion will be met should undiscovered LLRM result in exposures to individuals before being identified by the U.S. Navy during its monitoring interval. These measures	

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	are needed because the U.S. Navy intends to perform radiological monitoring for LLRM in the intertidal zone every three years. **Basis:** NRC seeks reasonable assurance that residual radioactivity remaining at the site following removal actions demonstrate that NRC's 10 CFR 20.1403(b) dose criterion is met. The absence of distributed, volumetric contamination and the removal of discrete sources provide confidence in the Navy's demonstration. Further, future monitoring and land use controls provide additional assurance to minimize the probability of future public exposures and ensure that potential dose to the public is less than 25 mrem/year. Risk-informing the U.S. Navy's demonstration with potential exposures from unidentified LLRM using the existing data on the range of discovered discrete sources will enhance confidence in the Navy's demonstration that NRC's dose criterion is met.	
5	**COMMENT 5: SITE CONCEPTUAL MODEL DESCRIPTION** The U.S. Navy should provide additional information to support the site's conceptual model, including background on the site's radiological history and current conditions. **Description**: Section 1 of the Draft RACR describes the location and summarizes the background of the site as well as the site's history of radiological investigations. However, the document does not discuss any operational history related to the use of the smelter, the use of radioactive	**Comment acknowledged**. Two new sections 3.5 and 3.6 "Updated Conceptual Site Model" and "Summary of NTCRA" were added to the RACR. Section 3.7 was revised to only include the Recommendations for the site. "**3.5 Updated Conceptual Site Model** Based on the previous investigations and NTCRA conducted under this RACR, the following updates to the conceptual site model are identified. The following different kinds of RAM were identified during the NTCRA activities and removed to the extent possible: 1. RAM consisting of metal slag greater than 0.5-inch, fused together in clusters along the intertidal zone northeast and

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	materials at the site, and ultimately whether the source of radioactive material was associated with slag. Further, the Draft RACR lacks a concise description of the physical form and distribution of the contamination within the environment. The Navy's description should include, to the extent possible, whether the contamination was directly intermingled with all smelter slag or was intermittently present in only some of the slag loads that were disposed. In addition, the Navy should document whether the contamination was a discrete melted metallic object itself or consisted of small particles that resulted from larger discrete items deteriorating over time. In Section 1.2.6 of the Draft RACR, under the 5th bulleted item, the U.S. Navy describes removal of discrete pieces of radioactive slag as "… large, readily accessible metal fragments…". It is not clear to NRC staff whether these are a different form of the same source material. Additional clarification should also be provided regarding the "hot spots." Guidance in Appendix D of NUREG-1757 Vol. 1, Rev. 2, recommends that in cases where the historical site assessment does not provide a clear understanding of site conditions, other elements should demonstrate how information gaps will be handled. The integrated result should provide a robust, confirmable understanding of *what is at the site*, how it will be remediated, and how the site cleanup will be verified safely. The Draft RACR does provide other required checklist information, such as	southwest of Pier E (Figure 3-2). This has commonly been called "visible" slag or point source LLRM. Although not all slag is RAM, the majority of the slag contained RAM above the Investigation Levels. In-situ real time gamma scans were utilized during the removal action. The removal action periodically uncovered point source LLRM or RAM, identified as "hot spots" (Figure 3-2). These items were removed upon each removal action event until no RAM in excess of the Investigation Levels were identified during gamma scan surveys and the IR Site 10 SSA intertidal zone was cleared of these "hot spots" (Figure 3-6). 2. RAM consisting of small pieces less than 0.5-inch, that most likely were detached or dislodged, due to erosion and weathering from the large pieces of slag, through years of tidal action. The distribution of these small pieces of RAM was random, and did not point to a different source of material but fragments from bigger pieces of "visible" slag or point source LLRM (Figure 3-2). 3. Specific LLRMs greater than 100,000 cpm were identified and include a radium dial as noted in Section 3.2.9 (Figure 3-2). 4. Black Sand/Ash was identified at depths ranging from 2-5 feet bgs as described in Section 3.3.1.1. 5. RAM may exist under rip-rap at the IR Site 10 SSA (Section 3.3.1.1). 6. One sample (LAYDOWN1-SITE10-SSA-001) was collected on the bluff of IR Site 10 SSA prior to establishing the Stockpile and Laydown areas (Location 5, Figure 3-2). The Ra-226 analytical result for this sample, collected approximately 0.5 feet bgs, was 371 pCi/g (Appendix L). This area was identified and isolated from the stockpile and

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	geography, hydrology, natural resources, etc., but does not provide the operational history. This information may be included in other referenced documents however, is requested to be included in the Draft RACR. **Basis**: 10 CFR Part 20, Section 1403(b), "Criteria for license termination under restricted conditions," specifies that legally enforceable institutional controls provide reasonable assurance that the Total Effective Dose Equivalent from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem/yr [0.25 mSv/yr]. Adequate historical information and description of physio-chemical characteristics of the contamination provides reasonable assurance that the site conceptual model is adequate to demonstrate NRC's dose criterion is met.	laydown areas. Based on the previous investigations and removal actions, including this NTCRA, RAM remains at the site but is managed as part the current ROD (DoN 2015) LUCs and described as follows: As described in Section 1.2.6, the WCA was built in 2004 (Shaw 2007), as part of the NTCRA conducted between 2003 and 2006, and contains RAM consisting of readily accessible slag and ash wastes and is being monitored as part of the ROD LUC requirements. During the NTCRA between 2003 and 2006, ash waste was left in place under Building 380 concrete pad and covered with 2.5 feet of clean soil and an 8-inch concrete pad (Shaw 2007, IT 2002; DoN 2003; CDM 2007). As noted in Section 1.2, several removal actions have been conducted at the IR Site 10 SSA intertidal zone but various types of RAM has re-occurred. The recurrence is most likely due to the fact that the depth of the burial of the slag/waste varied and was exposed to tidal and San Diego Bay wave action. Transport of the slag/waste to the surface is most likely caused by tidal action in the IR Site 10 SSA intertidal zone that scours the sand and brings the various types of RAM to the surface. Tidal action is increased during storm events and King tides. The NTCRA described in this RACR removed approximately 4,600 cubic yards (6,440 tons) of RAM (see Section 3.6). **3.6 Summary of NTCRA** This NTCRA at IR Site 10 SSA was conducted between April 2022 to April 2023 during low tide to a maximum depth of 6-feet bgs, guided by in-process gamma survey in accordance with the NTCRA Work Plan (EIP 2022a), the EE/CA (EIP 2021), and the Action Memorandum (DoN 2022). A Summary of the NTCRA activities are:

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		• Approximately 4,600 cubic yards (6,440 tons) of RAM was removed as part of this NTCRA and transported and disposed off-site. Waste manifests are included in Appendix M. • Final confirmation samples for Ra-226 were below the RGs of 1.205 pCi/g with the highest final confirmation result of 0.566 pCi/g. The final confirmation samples also met the Metal PSLs (Tables 3-3 and 3-4; Figures 3-4 and 3-5). • The HRRA for RESRAD established the potential maximum risk of $7.14E^{-5}$ considering two pathways for external exposure and soil ingestion. The potential maximum risk is between the USEPA's industrial risk scenario of 10^{-4} to 10^{-6} using the assumptions identified in Section 3.3.3.1 and Appendix K. • The ESV for Ra-226 was calculated to be 10.1 pCi/g for the aquatic animal and 4.08 pCi/g for the riparian animal, resulting in a ratio (hazard quotient) of 0.0095 and 0.0033, below the 1.0 hazard quotient ratio (Section 3.3.3 and Appendix K). The RAOs for the site have been met by: • Reducing the amount of point source LLRMs in shoreline sediment to protect human health and the environment. • Reducing the potential for off-site transport of point source LLRMs to San Diego Bay from IR Site 10 SSA. "

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6.	**COMMENT 6: DOSE MODEL** The U.S. Navy should provide additional information to support its dose modeling exposure scenarios to demonstrate that NRC's dose criterion is met. **Description:** Appendix K of the Draft RACR describes the U.S Navy's dose model to demonstrate that residual radioactivity remaining at the site conforms with NRC's restricted release dose criterion at 10 CFR 20.1403(b). The U.S. Navy's model assumes a receptor spends 100-percent of 30 consecutive years occupying a 1,000-m^2 section of the site with uniform contamination from residual radioactivity remaining at the site. The U.S. Navy models incidental ingestion and external gamma pathways but does not appear to include justification for elimination of the inhalation pathway. The Draft RACR indicates that the U.S. Navy modeled the highest concentration identified during the post-NTCRA survey (i.e., 0.556 pCi/g) uniformly distributed within the assumed area. While the U.S. Navy's modeling approach may be bounding, the approach appears inconsistent with the conceptual model of the site, which involves discrete sources of LLRM. The U.S. Navy should model potential dose received by an individual in proximity to or collecting discrete, isolated, or highly localized LLRM under plausible scenarios. Other U.S. Navy sites (e.g., former Naval Station Treasure Island) with similar discrete LLRM contamination provided direct exposure estimations to various source configurations (i.e., depth, occupancy, etc.) of representative discrete source activity levels found at the site. The U.S. Navy should provide	Please see response to Specific Comment 2. IR Site 10 SSA is located on an active military base of NASNI and Naval Base Coronado and hence is not a BRAC site and not open to the public. Therefore, inherently there are institutional controls in place that restrict public access to this area. However, the Navy will be preparing a ROD ESD and LUC RD to address additional LUCs and monitoring at the IR Site 10 SSA IZ as discussed in response to Specific Comment 1.

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	additional information to justify that its dose model is adequate. This additional information could include further dose analyses of discrete sources to risk-inform the U.S. Navy's demonstration that NRC's dose criterion is met. This scenario has been applied at multiple U.S. Navy sites within California, where the source of contamination, and, hence, exposure potentials are from discrete sources of Ra-226 or other radionuclides. The Navy should consider collectively consolidating lessons learned, dose modeling parameters, and calculations to propose a consistent methodology for assessing potential dose to demonstrate that NRC's dose criteria are met if isolated, localized sources were present as residual radioactivity. Table 5-1 of NUREG-1757 Volume 2, Revision 3, describes the types of scenarios that should be considered to demonstrate that NRC's dose criterion is met. Further, guidance in Section 5.2 of NUREG-1757, Volume 2, Revision 3, on the general approach for dose modeling recommends that when site information shows significant variability in residual radioactivity concentration, the licensee may conceptualize the site as two or more sources of residual radioactivity (e.g., one or more "hot spot" sources that represent the area(s) of elevated concentration). **Basis:** 10 CFR Part 20, Section 1403(b), "Criteria for license termination under restricted conditions," specifies that legally enforceable institutional controls provide	

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	reasonable assurance that the Total Effective Dose Equivalent from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem/yr [0.25 mSv/yr]. Adequate justification for the modeling is necessary to provide assurance that NRC's dose criterion is met.	
1	**EDITORIAL COMMENTS:** • Nomenclature used throughout the document should be more consistent. The Draft RACR uses multiple terms in describing the specific radioactive material and there are no clear definitions of the various terms provided. For example, Page 22 of Section 1.4.1 uses three terms within two paragraphs. These terms were "elevated radioactive materials and metal debris", "metal fragments", "discrete pieces of radioactive slag", "hot spot" Ra-226 concentrations. Other terms used elsewhere included: "low-level radiation-contaminated slag deposits", "low-level radiological objects", and "radioactive slag waste". The U.S. Navy should use consistent terminology where appropriate to improve the clarity of the Draft RACR.	**Comment acknowledged**. The document was reviewed with this suggestion and terms were clarified in the newly added Section 3.5 "Updated Conceptual Site Model and Summary of NTCRA". In addition, the following terms were streamlined: • "Elevated radioactive materials (RAMs)" was changed to RAM. • "Metal debris" and "Metal fragment" was changed to slag where appropriate. • "Discrete pieces of radioactive slag" was changed to radioactive slag. • "Low-level radiation contaminated slag deposits" was replaced with LLRM/slag. • Low-level radiological objects (LLRO) was replaced with RAM. • "Radioactive slag waste" was replaced with LLRM/slag.

END OF SPECIFIC COMMENTS