



May 15, 2019

Betsy Ullrich, Senior Health Physicist
USNRC Region I
2100 Renaissance Boulevard, Suite 100
King of Prussia, PA 19406

SUBJECT: RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION DOCKET
NUMBER 03039153

Ms Ullrich;

The following is Tidewater's response to the RAIs sent in your letter of April 19, 2019.

If you have any questions regarding the application please contact James Reese at james.reese@tideh2o.net or 916-717-0529.

Sincerely,

Bruce Reynolds

Bruce Reynolds
Chief Operating Officer

1. *The letter was signed by James Reese, your proposed Radiation Safety Officer; the application was signed by you. When submitting future license amendments, please have the document signed by a management representative rather than the Radiation Safety Officer. The NRC views a letter signed by a management representative as indication that management has reviewed the application and concurs in the statements and representations contained therein.*

Response: Tidewater will ensure that all future correspondence regarding license amendments is signed by a senior management representative.

2. *You requested a Type B broad scope license. As we discussed in a telephone conversation, the types and quantities of material you requested do not meet the Type B materials and quantities specified in 10 CFR 33.100, Schedule A. In addition, a broad scope license adds an additional fee category to your licensed activities. Based on your application, we believe that you can carry out your program as described in the application, without having the Type B license. Confirm if you withdraw the request for a Type B broad scope license.*

If you still wish to request a Type B broad scope license, please review the regulations in 10 CFR Part 33 for Type B broad scope licenses. Note that the possession limit for a Type B broad scope license, if only one radionuclide is possessed, is the quantity specified for that radionuclide in 10 CFR 33.100, Schedule A, Column I. If two or more radionuclides are possessed, the possession limit is determined as follows. For each radionuclide, determine the ratio of the quantity to be possessed to the applicable quantity specified in 10 CFR 33.100, Schedule A, Column I, for that radionuclide. The sum of the ratios for all radionuclides possessed under the license may not exceed unity. Therefore, Applicants for a Type B broad scope license should request any chemical or physical form of byproduct material specified in 10 CFR 33.100, Schedule A. Type B applicants should request the quantity of material specified in 10 CFR 33.11(b). Your request does not appear to require this authorization. In addition, you should submit the information requested in the applicable sections of NUREG 1556, Volume 11, Revision 1, "Consolidated Guidance about Materials Licenses, Program-Specific Guidance about License of Broad Scope."

Response: Tidewater withdraws our request for a Type B broad scope license and requests a Service Provider license.

3. *Please provide a copy of your licenses in Agreement States so that we may determine if a pre-licensing visit should be performed prior to issuance of a new license by the NRC.*

Response: Copies of both Tidewater's State of Maryland Radioactive Material License and State of California's Radioactive Material License are located at Appendix A.

4. *In your letter, you stated that that you do not wish to request source material (pursuant to 10 CFR Part 40) or special nuclear material (SNM) (pursuant to 10 CFR Part 70) at this time. You further stated that, should your encounter those materials, you will manage those items under one of the Agreement State Material License. It is not clear how this would be managed; if the temporary job site is in NRC jurisdiction, the source or SNM materials should be managed under this license. Please either confirm that you will not possess, use, or store these materials at temporary job sites in NRC jurisdiction; or request materials authorized by 10 CFR Part 40 and 10 CFR Part 70.*

Response: Section 150.20 of 10 CFR 150 establishes a general license authorizing any person who holds a specific license from an "Agreement State" (a State with which the U.S. Nuclear Regulatory Commission has entered into an effective agreement under subsection 274b of the Atomic Energy Act of 1954) where the licensee maintains an office for directing the licensed activity and at which radiation safety records are normally maintained, to conduct the same activity in Non-Agreement States, areas of exclusive Federal jurisdiction, or in offshore waters if the specific license issued by the Agreement State does not limit the authorized activity to specified locations or installations. This regulation sets the basis for use of our Agreement State licenses. For sites where we anticipate implementing the Service Provider License, we will know the radionuclides of concern prior actual fieldwork commencement. In the event that source material or SNM is identified as a potential radionuclide of concern during the planning phase, Tidewater will request reciprocity from the NRC if the site is exclusive federal jurisdiction for use of one of our Agreement State licenses. If the site is not exclusive federal jurisdiction, we will inform the NRC in our implementation notification that we plan to use our Agreement State license for SNM and source material control and accountability.

Additionally, project sites are typically controlled via a site-specific radiation work plan which ties back to the license based Radiation Safety Plan (RSP). Since the RSPs for our Agreement State Licenses are the same as that we have proposed for our Service Provider license, and because the radiological controls established for the site via the project work plan ensure control of radioactive material and exposures regardless of which license is implemented, onsite actions to account and control of SMN or source material would not change. The license RSO for the applicable Agreement State license will perform an accounting of the quantity of SNM or source material to ensure compliance with license possession limits.

5. *As a result of a review of all licenses and program codes over the past 2 years, the NRC identified that decommissioning service provider activities under program code 03219, as well as waste service provider activities under program codes 03233, 03234 and 03236 may require that an environmental assessment be performed. Confirm if you ever were requested to provide information to support an environmental assessment for your decommissioning service activities by the NRC or an Agreement State, or if an environmental assessment was performed for your licensed activities as described in this application. Confirm that you understand that the issuance of your new license may be delayed until a determination is made regarding the need for an environmental assessment for these activities.*

Response: Based upon your phone conversation of April 17, 2019 with Mr. Reese, Tidewater understands that the requirement for an environmental assessment is new to the NRC and guidance is forthcoming and that this new requirement may delay the issuance of our license. Tidewater has not been asked or provided information for an environmental assessment. As Mr. Reese mentioned during the phone conversation, Tidewater anticipates having a need for the license within the next 3 months. As such if there is anything Tidewater can do to assist in shortening the impact of the decision regarding the environmental assessment and expediting issuance of the license please let us know.

6. *Please provide a copy of your licenses in Agreement States so that we may determine if a pre-licensing visit should be performed prior to issuance of a new license by the NRC.*

Response: Copies of both Tidewater's State of Maryland Radioactive Material License and State of California's Radioactive Material License are located at Appendix A.

7. Section 2 of your license requests radium-226 (Ra-226) in “any” form, with a limit of 0.001 curie of Ra-226 per item.
- Confirm if you are requesting “any” form, which encompasses both sealed and unsealed. If so, specify the maximum Ra-226 limit you wish to possess.
 - Confirm if you wish a separate line item for Ra-226 in the form of sealed sources or items. If so, the 100 items at 0.001 curie each would be a total limit of 0.1 curie in the form of sealed sources and devices or “items”

Response: Tidewater has removed the request for radium-226 items from the license. Tidewater expects to encounter radium-226 in the form of deck markers or dials/gauges at closed military installations. The guidance contained in 10 CFR 30.12(a)(4) provides sufficient authorization for the expected quantities to be encountered. Tidewater’s revised material to be possessed table is shown below.

3.a. Nuclide	3.b. Chemical Form	3.c. Quantity
Any Byproduct material with atomic numbers 1 through 83	Any	0.5 curies total

8. Section 2 of your application does not provide any information related to radioactive materials in the form of sealed sources, as requested in NUREG-1556, Volume 18, Rev 1, “Consolidated Guidance About Materials Licenses - Program-Specific Guidance About Service Provider Licenses.” (NUREG 1556, Vol. 18, Rev. 1) Sections 3, 6, 9 and 10 of your application discuss the use of calibration and check sources, but only once on page 12 are exempt check sources stated. Section 8.5.1 of NUREG 1556, Vol. 18, Rev. 1 states that you should:
- identify each radionuclide that will be possessed in each sealed source or device, and specify the maximum activity per source;
 - specify the maximum number of sources or the total activity for each radionuclide;
 - identify the manufacturer or distributor and model number of each type of sealed source and device requested, or provide the Sealed Source and Device (SSD) registration certificate number;
 - confirm that each sealed source, device, and source and device combination is registered as an approved sealed source or device by the NRC or an Agreement State;
 - confirm that the activity per source and maximum activity per device will not exceed the maximum activity listed on the approved certificate of registration issued by the NRC or by an Agreement State; and
 - identify the special circumstances under which sealed sources and devices that are not registered by the NRC or an Agreement State may be possessed, used, or serviced.

Please provide this information for any sources you wish authorization for under this specific license. Alternately, you may provide information as described in 10 CFR 30.32(g)(4), or commit to possession and use only of sources that are exempt from the requirements of a specific license, or are possessed under a general license.

Response: Tidewater commits to possession and use only of sources that are exempt from the requirements of a specific license, or are possessed under a general license.

9. *In addition to the information provided in Section 3, “Purpose of Use of Licensed Material” of your application, please provide more specific information regarding the types of activities you expect to perform related to site characterization, decontamination and decommissioning of facilities. Based on the application, it appears you intend only to remediate equipment and tools removed from radiologically controlled areas. In particular,*
- specify if procedures will be limited to surveys of tools and equipment. Confirm if you also intend to survey and perform routine cleaning activities of indoor facilities and/or equipment, or if you expect to use aggressive methods that could include grinding, cutting, scabbling or other activities that could generate airborne radioactivity; chemical methods that could result in generation of mixed wastes; or other methods that could require use of specialized protective clothing or equipment such as respirators.*
 - specify if you intend to perform remediation of outdoor areas. If so, specify if the procedures you expect to perform in outdoor areas will be limited to surveys and to soil sampling in the top 15 centimeters, or if you expect to perform activities such as core sampling, soil removal, sampling and remediation below 15 centimeters, ground water and surface water sampling, or other similar activities that may require additional radiation or other safety precautions.*

Response: Tidewater’s intent is to utilize the license for providing full decommissioning support to potential clients and that includes building surfaces or outside structures and land. In doing so, Tidewater expects to utilize aggressive decontamination techniques such as grinding, cutting, and scabbling. We do not at this time expect to require the use of chemical cleaning. While it is not common, it is possible that the decontamination will generate airborne areas and workers will be in full protective clothing including the appropriate respiratory protection. Tidewater’s Safety program has a full respiratory program to include the medical and proper fit testing prior to use.

Tidewater also expects to utilize the license in remediation activities performed outdoors. Typically, this involves removal of contaminated soil or subsurface structures such as discharge piping. Tidewater’s experience acquired thorough the performance of decommissioning efforts under our State RMLs has shown that the residual radioactivity in outdoor sites is not limited to the first 15 cm of soil. It is our experience that ground water and surface water could be impacted on remediation sites and Tidewater has experience at developing the appropriate wells and collecting water samples if required. We are currently performing water sampling and well development at a project site for the National Park Service at Great Kills Park in State Island, NY as part of the CERCLA response.

10. *In Section 3 of the application, you stated that one of the purposes of use was to “transport in packages or container approved for use under the provisions of 10 CFR Part 71 for transfers to licensees authorized to receive the materials, in accordance with the terms and conditions of licenses issued by the NRC or Agreement States.” Based on the quantities of materials requested, it seems unlikely that you would require use of Type B packages. However, if you plan to use Type B package, please note that you must be registered with NRC as a user of the Type B package, and have an NRC-approved quality assurance (QA) plan.*

Confirm that you do not expect to require use of Type B packages; or provide your procedure for packaging material in a Typo B package.

Response: Tidewater does not expect to require the use Type B packages.

11. *Based on review of the application, we understand that you are not planning to perform activities with radioactive wastes other than those generated by your site remediation activities. If this is correct, please state, "We will limit waste handling activities to those wastes generate by remediation and decommissioning services we provide. We will NOT take possession of waste generated by the customer as would a commercial waste service provider, or handle wastes we did not generate."*

Response: Tidewater will limit waste handling activities to those wastes generate by remediation and decommissioning services we provide. Tidewater will not take possession of waste generated by the customer as would a commercial waste service provider, or handle wastes we did not generate.

12. *Section 4, "Responsible Individuals," of your application does not include all the information requested in NUREG 1556, Volume 18, Revision 1, Section 7, "Individuals Responsible for Radiation Safety Program and Their Training and Experience." In accordance with Section 8.7.1, provide the following:*

- *Demonstrate that the RSO has sufficient independence and direct communication with responsible management officials by providing a copy of an organizational chart by position and demonstrating day-to-day oversight of the radiation safety activities [note: the application states that an organization chart was attached in Appendix A, but appears to be missing]; and*
- *Confirm that the RSO will be available for emergencies and can be on-site at temporary job sites within 24-48 hours, if applicable*

Response: Mr. Reese, Tidewater's RSO, routinely communicates radiological issues to responsible management to include the Chief Operating Officer and the President. An organization chart showing the independence and direct communication with responsible management officials is attached to the document. Tidewater confirms that the license RSO, Mr. Reese, is available and can be on site within 24-48 hours if necessary.

13. *Section 5 of your application, "Training", does not specify when training will be provided. Section 5.6 of your Radiation Safety Plan (RSP) states that employees will have initial training prior to working with licensed materials, and that refresher training would be every 2 years. NUREG-1556, Vol. 18, Rev 1. states that refresher training should be provided every year. Please justify why refresher training is only needed every 2 years for your activities.*

Response: We have revised Section 5 of the RSP to indicate that refresher training will occur annually.

14. *NUREG-1556, Vol. 18, Rev 1., considers decommissioning services to be "high risk" activities. Therefore, in accordance with Section 8.10.1, operating procedures should be submitted with the application. Operating procedures should provide personnel with specific guidance for all operations they will perform, and include topics important to safe operations as applicable to the materials and uses proposed in the application. NUREG-1556, Volume 18 further states that emergency procedures should be submitted with all license applications, and should address all likely scenarios that may be encountered. Some of the items in Section 8.10.1 include, but are not limited to: steps to take and whom to contact when an emergency occurs; methods and occasions for conducting radiation surveys; procedures for personnel monitoring, including bioassays; procedures to be taken in emergency situations to prevent spread of*

contamination; procedures to be followed in the event of an uncontrolled release to the environment. Please provide your operating and emergency procedures for the types of activities you expect to perform under this license. In particular,

- a. *Provide procedures related to surveys and routine cleaning activities of indoor facilities and equipment; and procedures for use of aggressive methods that could include grinding, cutting, scabbling or other activities that could generate airborne radioactivity; chemical methods that could result in generation of mixed wastes; or other methods that could require use of protective clothing such as use of respirators.*
- b. *Provide procedures related to surveys and remediation in outdoor areas, for activities such as soil sampling in the top 15 centimeters; core sampling, soil removal, sampling and remediation below 15 centimeters; ground water and surface water sampling; or other similar activities that may require additional radiation or other safety precautions, and use of other specialized equipment.*
- c. *Provide operating and emergency procedures for other basic radiation safety activities related to the authorized uses under the license, such as procedures for proper use of protective clothing and equipment; respirator use; air sampling and air monitoring; radiation and contamination surveys; scanning surveys and static measurements for total contamination to determine if facilities may be released for unrestricted use; removable contamination (wipe) surveys; handling of samples and chain-of-custody; issuance of radioactive work permits or equivalent procedures, etcetera.*
- d. *Confirm that surveys to determine if licensee facilities are suitable for release for unrestricted use will meet the criteria in 10 CFR Part 20, Subpart E “Radiological Criteria for License Termination” and will implement the current guidance such as the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) and NUREG-1757 “Consolidated Decommissioning Guidance.”*

Response: Copies of our operating procedures have been included in the response package. All surveys performed for the purpose of obtaining unrestricted release of a project site will meet the criteria in 10 CFR Part 20, Subpart E “Radiological Criteria for License Termination” and will implement the current guidance such as the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) and NUREG 1757 “Consolidated Decommissioning Guidance.”

15. *Your application states that inventory of materials at temporary job sites will be performed every 12 months. In accordance with NRC standard license conditions, please confirm that a physical inventory will be conducted at intervals not to exceed 6 months, to account for all sealed sources and devices possessed at temporary job sites under the license; and records of the inventory will be maintained for a period of 3 years and will include the radionuclides, quantities, manufacturer’s name and model numbers, and date of the inventory.*

Response: Tidewater has revised the application to commit to performing physical inventories for all sealed sources and devices possessed at temporary job sites every 6 months and to maintain the records for a period of 3 years. Inventory records will include the radionuclides, quantities, manufacturer’s name and model numbers, and date of the inventory.

16. Pursuant to NUREG 1556, Vol. 18, Rev 1, Section 8.10.2, state “We will develop, implement, and maintain procedures for ensuring accountability of licensed materials at all times.”

Response: Tidewater will develop, implement, and maintain procedures for ensuring accountability of licensed materials at all times.

17. In the section “Contamination Limits” on page 18 of your application, it states that tools and equipment used in radiologically controlled or contaminated areas that meet the Table 2 contamination limits may be used outside of those areas. The same table is shown in Section 9.4, “Contamination Surveys for Material Release” in your RSP. Furthermore, Section 11.0 “Controlling Surface Contamination,” states that surface contamination levels in unrestricted areas must meet these limits. Please note that these limits for alpha emitters and some beta/gamma emitters may not meet the 10 CFR Part 20, Subpart E criteria for release of facilities for unrestricted use. Your Table 2 is similar to Appendix L of NUREG-1556, Volume 11, Rev. 1 for acceptable contamination levels of items but not building surfaces.

- a. Please confirm your understanding that this table is to be used only for individual item release and not for release of facilities (building surfaces).
- b. Confirm that your criteria for release of facilities [buildings and outdoor areas] will meet 10 CFR Part 20, Subpart E, “Radiological Criteria for License Termination”, and that you will use the guidance in NUREG 1757, Volume 1, “Decommissioning Process for Materials Licensees,” and Volume 2, “Characterization, Survey, and Determination of Radiological Criteria,” to develop and implement appropriate release criteria, and site remediation and decommissioning activities.

Response: Table 2 of the RSP has been modified to reflect that the levels specified in the table are for release of material and equipment. Tidewater commits to utilizing the criteria in 10 CFR 20, Subpart E and NUREG 1757 for release of facilities.

18. In accordance with Section 8.10.4, “Surveys” of NUREG-1556, Vol. 18, Rev. 1, state “We will conduct surveys and maintain contamination levels in accordance with the survey frequencies and contamination levels published in Section 8.10.4 of NUREG-1556, Volume 18, Revision 1,” or submit alternate survey methods and frequency for demonstrating how to evaluate a radiological hazard.

Response: Radiological surveys will be performed as stated in procedure RS-010.1, Section 5.1.4 which states, “Routine radiological surveys shall be conducted in accordance with the schedule provided in each project specific plan.” Since the radiological conditions and circumstances for a particular project are unique it is not possible to commit to specific survey frequencies in the RSP or this license application.

19. The section “Leak Testing” on page 20 of your application is not clear if you plan to perform leak tests under your license, or you will have another authorized facility perform leak testing. NUREG-1556, Vol. 18, Rev. 1. Section 8.10.5 states to provide either

- a. “Leak tests sample collection or analysis will be performed by an organization authorized by NRC or an Agreement State to provide leak testing services to other licensees. Leak tests may be collected by the licensee using a leak test kit supplier’s instructions. Such leak test kits will be supplied by an organization authorized by the NRC or an Agreement State to provide leak testing services.” OR

- b. *“Leak testing and analysis will be done by the applicant.” If you will perform both leak testing and sample analysis, provide the information in Appendix G of this NUREG supporting a request to perform leak testing and sample analysis and either (1) state that the applicant will follow the model procedures in Appendix G of NUREG–1556, Volume 18, Revision 1 “Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Service Provider Licenses,” or (2) submit alternative procedures.*

Response: Tidewater does not intend to perform leak testing for other licensees and currently does not possess any sources that require leak testing. However, should we encounter a source that meets the criteria for leak testing Tidewater will collect the samples using a leak test kit from a supplier and send to an organization authorized by NRC or an Agreement State to provide leak testing services to other licensees.

20. *The section “Personnel Dosimetry” on page 17 of your application refers to a requirement that workers wear a TLD. It later refers to film badge, TLD, OSL, etc. It is not necessary to specify the type of dosimetry you will assign to individuals. In accordance with Section 8.10.6 of NUREG 1556, Vol. 18, Rev. 1, state “We will monitor individuals in accordance with the criteria in Section 8.10.6, “Radiation Safety Program – Occupational Dose” of NUREG 1556, Vol. 18, Rev.1. You may also state “We will maintain, for inspection by the NRC, documentation demonstrating that unmonitored individuals are not likely to receive a radiation dose in excess of the limits in 10 CFR 20.1502.”*

Response: Tidewater will maintain, for inspection by the NRC, documentation demonstrating that unmonitored individuals are not likely to receive a radiation dose in excess of the limits in 10 CFR 20.1502.

21. *Section 8.10.1 of NUREG 1556, Vol. 18, Rev. 1, states that you should have a procedure for obtaining an agreement with customers when performing service operations at a customer facility which also holds an NRC license, and describes the information that should be in that agreement. Confirm that you will obtain agreements as described in the following license condition, which is standard for site remediation licenses:*

- *This license does not authorize the use of licensed material at temporary job sites for uses already specifically authorized by a customer's license. If a customer also holds a license issued by the U.S. Nuclear Regulatory Commission or an Agreement State, the licensee shall establish a written agreement between the licensee and the customer specifying which licensee activities shall be performed under the customer's license and supervision, and which licensee activities shall be performed under the licensee's supervision pursuant to this license. The agreement shall include a commitment by the licensee and the customer to ensure safety, and any commitments by the licensee to help the customer clean up the temporary job site if there is an accident. A copy of this agreement shall be included in the notification required by license condition [insert number].*

Response: When working at temporary jobsites with another licensee Tidewater will first establish a memorandum of understanding that reflects the conditions specified in the standard license condition specified above.

22. *Confirm that you will abide by the following license conditions that are standard for site remediation service providers:*

- *The licensee shall notify the U.S. Nuclear Regulatory Commission in accordance with Appendix D of 10 CFR Part 20, in writing at least 14 days before initiating activities under this license at a temporary job site, excluding routine packaging or repackaging for purposes of transporting and not requiring a job or site specific work package, and characterization and/or final surveys where radioactive materials and/or radiation are not likely to be detected. This notification shall include: (1) The estimated type, quantity, and physical/chemical forms of licensed material to be used, (2) The specific site location, (3) A description of planned activities including waste management and disposition, (4) The estimated start date and completion date for the job, and (5) The name and title of a point of contact for the job, including information on how to contact the individual.*
- *Within 30 days of completing activities at each job site location, the licensee shall notify the U.S. Nuclear Regulatory Commission in accordance with Appendix D of 10 CFR Part 20, in writing, of the temporary job site status and the disposition of any licensed material used.*
- *The licensee shall maintain records of information important to decommissioning for each temporary job site pursuant to 10 CFR [30.35(g), 40.36(f), and 70.25(g)]. The records shall be made available to the customer upon request. At the completion of activities at a temporary job site, the licensee shall transfer these records to the customer for retention.*
- *If approved by a Radiation Safety Officer specifically identified in this license, the licensee may take reasonable action in an emergency that departs from conditions in this license when the action is immediately needed to protect public health and safety and no action consistent with all license conditions that can provide adequate or equivalent protection is immediately apparent. The licensee shall notify the U.S. Nuclear Regulatory Commission Headquarters Operations Center at 301-816-5100 and the U.S. Nuclear Regulatory Commission Regional contact before, if practicable, and in any case immediately after taking such emergency action using the reporting procedure specified in Appendix D of 10 CFR Part 20.*

Response: Tidewater confirms that we will abide by the stated conditions at all jobsite where we implement the NRC license.

Appendix A

State Licenses



Maryland

Department of the Environment

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

NOV 8 2017

Wayne Gaul, Ph.D., CHP, CHMM, Radiation Safety Officer
Tidewater, Inc.
6625 Selnick Drive, Suite A
Elkridge, MD 21075

RE: Radioactive Materials License #MD-27-097-01

Dear Dr. Gaul:

Enclosed is your renewed radioactive materials license, which is being issued in accordance with Maryland Radiation Law and Code of Maryland Regulations (COMAR) 26.12.01.01, Regulations for the Control of Ionizing Radiation. This renewal has been prepared based on your application dated June 2, 2017, and supplemental information received as of September 1, 2017. Please review it carefully to ensure it is complete and accurate.

The Maryland Department of the Environment (MDE) web page, which contains information about all MDE areas of interest can be accessed at:
<http://mde.maryland.gov/programs/Air/RadiologicalHealth/Pages/index.aspx>

If you have and questions, please feel free to contact Mr. Alan D. Jacobson at 410-537-3301 or 800-633-6101, extension 3301. You may also contact this office by fax at 410-537-3198.

Sincerely,

Eva S. Nair, Program Manager IV
Radiological Health Program
Air and Radiation Administration

ESN/ADJ/CRC/NAO/cc

Enclosure(s): License amendment renewal (08)
Code (03225)



Department of the Environment

RADIOLOGICAL HEALTH PROGRAM
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Pursuant to the Maryland Radiation Act, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. The license is subject to all applicable rules, regulations and orders of the Maryland State Department of the Environment, now or hereinafter in effect and to any conditions specified below.

1. Name: Tidewater, Inc	3. License No.: MD-27-097-01
2. Address: 6625 Selnick Drive, Suite A Elkridge, Maryland 21075	4. Amendment No.: 08 RENEWAL Code 03225
	5. Expiration Date: September 30, 2024

6. Radioactive material element & mass number:	7. Chemical and/or physical form:	8. Maximum amount of radioactivity which licensee may possess at any one time:
A. Atomic numbers 1-83	A. Any	A. COMAR 26.12.01.01 Part C, Appendix D, Column 1 limits for material with half-life less than 120 days. Material with half-life greater than 120 days will be limited to less than those quantities in COMAR 26.12.01.01 Section C.29, Table 2
B. Atomic numbers 84-96 except Source Material	B. Any	B. 100 millicuries total
C. Source material	C. Any	C. 100 millicuries total; quantities in a readily dispersible form shall be less than 10 millicuries
D. Any radioactive material	D. Sealed Source or Vial	D. No single isotope to exceed 10 microcuries; no combination of isotopes to exceed 50 microcuries per source. Total possession not to exceed 1 millicurie.
E. Any radioactive material	E. Solid or liquid	E. No single isotope to exceed 10 microcuries; no combination of isotopes to exceed 50 microcuries per source. Total possession not to exceed 1 millicurie

9. Authorized Use(s):

- A.-C. Possession and use incident to decontamination, decommissioning or radiation survey work at temporary job sites.
- D-E. Calibration, reference and check sources.



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RADIOACTIVE MATERIAL LICENSE

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License No.: MD-27-097-01

Amendment No.: 08 RENEWAL

CONDITIONS

10. The licensee shall notify the Agency in writing providing the location of temporary jobsites in Maryland, except for areas under exclusive federal jurisdiction. No radioactive material shall be used or stored at the address in Item 2, with the exception of sealed sources authorized in 6D and 6E. The licensee shall notify the Radiological Health Program at least 30 days prior to vacating a permanent use address.
- 11A. The radiation protection program shall be under the supervision of Wayne Gaul, Ph.D. CHP, CHMM, assisted by Jeffrey S. Koncki and James Reese, CHP, Clifton Gray, Emery Grohregin and Shane Reese.
- 11B. Radioactive material shall be used by or under the supervision and in the physical presence of an employee who:
1. has a certificate from a licensed training course on file with the licensee; and
 2. the licensee has authorized to use radioactive material.
12. The licensee shall comply with all appropriate provisions of COMAR 26.12.01.01 "Regulations for the Control of Ionizing Radiation."
- 13A. Each sealed source containing radioactive material, other than Hydrogen-3 with a half-life greater than thirty (30) days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six (6) months. In the absence of a certificate from a transferor indicating that a test has been made within six (6) months prior to the transfer, the sealed source shall not be put into use until tested. If there is reason to suspect that a sealed source might have been damaged, or might be leaking, it shall be tested for leakage before further use.
- 13B. Notwithstanding the periodic test for leakage required, any sealed source is exempt from such tests for leakage when the sealed source contains 3.7 MBq (100 μ Ci) or less of beta or gamma emitting material or 370 KBq (10 μ Ci) or less of alpha emitting material.
- 13C. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of a device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate.
- 13D. Records of leak tests shall be kept in units of microcuries and maintained for inspection by the Department.
- 13E. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Department regulations. A report shall be filed within five (5) days of the test with the Administrator, Radiological Health Program, 1800 Washington Boulevard, Baltimore, Maryland 21230, describing the equipment involved, the test results, and the corrective action taken.
- 13F. Test for leakage and/or contamination shall be performed by the licensee or by other persons specifically authorized by the Department, the U.S. Nuclear Regulatory Commission or another Agreement State to perform such services.



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RADIOACTIVE MATERIAL LICENSE

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Amendment No.: 08 RENEWAL

CONDITIONS

14. The licensee shall conduct a physical inventory every six (6) months to account for all sealed sources received and possessed under the license. The records of the inventories shall be maintained for three (3) years from the date of the inventory for inspection by the Department, and shall include the quantities and kinds of radioactive material, location of sealed sources, and the date of the inventory.
- 15A. The licensee shall not make any false statement, representation, or certification in any application, record, report, plan, or other document regarding radiation levels, tests performed or radiation safety conditions or practices. Additionally, the licensee shall not falsify, tamper with, or render inaccurate any monitoring device or method.
- 15B. Violation of any term, condition, or regulation could subject the licensee to administrative or civil penalty or criminal prosecution, as specified in Title 8, Radiation, of the Article Environment of the Annotated Code of Maryland.
16. The licensee shall not transfer ownership and/or control of this license to any person or entity without providing required information regarding the transfer for the Agency's review and without receiving written authorization for the transfer by the Agency.
17. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material authorized by this license in accordance with statements representations, and procedures contained in:
- Renewal application dated June 2, 2017.
 - Letter with attachments dated September 1, 2017.

COMAR 26.12.01.01 "Regulations for the Control of Ionizing Radiation" shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Eva S. Nair, Program Manager IV
Radiological Health Program
Air and Radiation Administration

September 13, 2017
NAO 10/19/2017
NAO

RADIOACTIVE MATERIAL LICENSE

Pursuant to the California Code of Regulations, Division 1, Title 17, Chapter 5, Subchapter 4, Group 2, Licensing of Radioactive Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, use, possess, transfer, or dispose of radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders of the California Department of Public Health now or hereafter in effect and to any standard or specific condition specified in this license.

1. Licensee	Tidewater, Inc.	3. License Number	8000-34	Amendment Number :	
2. Address	1820 Tribute Road, Suite L Sacramento, CA 95815	4. Expiration date	May 27, 2024	(3)	
Attention:	James Reese, CHP Radiation Safety Officer	5. Inspection agency	Radiologic Health Branch North		

6. Nuclide	7. Form	8. Possession limit
A. Any byproduct material with atomic numbers 1 through 83.	A. Any	A. Total not to exceed 500 millicuries.
B. Radium-226	B. Any	B. Total not to exceed 500 millicuries.
C. Any Source Material	C. Any	C. Not to exceed 200 Kg.
D. Any Special Nuclear Material	D. Any	D. Total not to exceed 2 grams, Plutonium-238 not to exceed 0.9 grams.

9. Authorized Use

- A. - D. To be used for site characterization, decontamination, decommissioning, final status survey, and collection of samples from various media as a customer service and to be used for operational testing of radiation detection instrument.

LICENSE CONDITIONS

10. Radioactive material shall be used only at the following locations:

- (a) Temporary job sites of the licensee in areas not under exclusive (see Condition 21) federal jurisdiction throughout the State of California.

11. This license is subject to an annual fee for sources of radioactive material authorized to be possessed at any one time as specified in Items 6, 7, 8 and 9 of this license. The annual fee for this license is required by and computed in accordance with Title 17, California Code of Regulations, Sections 30230-30232 and is also subject to an annual cost-of-living adjustment pursuant to Section 100425 of the California Health and Safety Code.

12. Radioactive material shall be used by, or under the supervision of, the following individuals:

- | | |
|----------------------------|-----------------|
| (a) James Reese, CHP | (e) Shane Reese |
| (b) Claude Wiblin, CHP | (f) Clif Gray |
| (c) Wayne Gau, Ph.D., CHP1 | |
| (d) Angel Reyes | |

RADIOACTIVE MATERIAL LICENSE

License Number: 8000-34

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13. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Items 6, 7, 8 and 9 of this license in accordance with the statements, representations, and procedures contained in the documents listed below. The Department's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - (a) The application dated June 17, 2013, with attachments, and letters dated November 22, 2013, and March 18, 2014, with attachments, all signed by James Reese, Radiation Safety officer and Manager, Radiological Services Division, and attached Delegation of Authority Form, dated November 13, 2013, signed by Bruce Reynolds, Senior Vice President and Operations Manager.
14.
 - (a) The Radiation Safety Officer in this program shall be James Reese, CHP.
 - (b) The Alternate Radiation Safety Officers in this program shall be Claude Wiblin, CHP.
15. Except for calibration sources, reference standards, and radioactively contaminated equipment owned by the licensee, possession of licensed material at each temporary job site shall be limited to material originating from each site. This material must either be transferred to an authorized recipient or remain at the site after licensee activities are completed.
16.
 - (a) At least 14 days before initiating activities at a temporary job site, including military or former military sites where the temporary job site is not under exclusive federal jurisdiction, the licensee shall notify, in writing, the California Department of Public Health, Radiologic Health Branch. The notification shall include the following information:
 - i. Site-specific radiological procedures if they have not been previously approved by the Department of Public Health.
 - ii. Estimated type, quantity, and physical/chemical forms of radioactive material.
 - iii. Specification of the site location.
 - iv. Description of project activities that are planned for the site, including management and disposition of radioactive material.
 - v. Estimated project start date and duration of project.
 - vi. Name, address, title, and phone number of a point of contact for the person managing radiological operations at the temporary job site.
 - (b) Within 30 days of completing activities at each job site, the licensee shall notify, in writing, the California Department of Public Health, Radiologic Health Branch, regarding the radiological status of the temporary job site and the disposition of any licensed radioactive material.
17. This license does not authorize the use of licensed material at temporary job sites for uses already specifically authorized by a customer's license. If a customer also holds a license issued by the NRC or an Agreement State, the licensee shall establish a written agreement between the licensee and the customer specifying which licensee activities shall be performed under the customer's license and supervision, and which licensee activities shall be performed under the licensee's supervision pursuant to this license. The agreement shall include a commitment by the licensee and the customer to ensure safety, and any commitments by the licensee to help the customer clean up the temporary job site if there is an accident. A copy of this agreement shall be included in the notification required by License Condition 16.
18. The licensee shall maintain records of information important to decommissioning each temporary job site at the applicable job site pursuant to Title 17, California Code of Regulations, Section 30256. The records shall be made available to the Department for inspection and to the customer upon request during decommissioning activities, and shall be transferred to the customer for retention at the completion of activities at a temporary job site.

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19. The licensee shall comply with all requirements of Title 17, California Code of Regulations, Section 30373 when transporting or delivering radioactive materials to a carrier for shipment. These requirements include; packaging, marking, labeling, loading, storage, placarding, monitoring, and accident reporting. Shipping papers shall be maintained for inspection pursuant to the U.S. Department of Transportation requirements (Title 49, Code of Federal Regulations, Part 172, Sections 172.200 through 172.204).
20. The total mass of special nuclear material possessed under this license at any one time or at any one authorized location of use shall not exceed that stated in the following formula: The number of grams of Uranium 235 divided by 350, plus the number of grams of Uranium 233 divided by 200, plus the number of grams of Plutonium (all isotopes) divided by 200, shall not exceed one (i.e. unity).
21. Before radioactive materials may be used at a temporary job site at any federal facility, the jurisdictional status of the job site must be determined. If the jurisdictional status is unknown, the federal agency should be contacted to determine if the job site is under exclusive federal jurisdiction. A response shall be obtained in writing or a record made of the name and title of the person at the federal agency who provided the determination and the date that it was provided. Authorization for use of radioactive materials at the job sites under exclusive federal jurisdiction shall be obtained either by:
 - (a) Filing an NRC Form-241 in accordance with the Code of Federal Regulations, Title 10, Part 150.20 (b), "Recognition of Agreement State Licenses", or
 - (b) By applying for a specific NRC license.

Before radioactive material can be used at a temporary job site in another State, authorization shall be obtained from the State if it is an Agreement State, or from the NRC for any non-Agreement State, either by filing for reciprocity or applying for a specific license.

22. In accordance with the California Code of Regulations Title 17, Section 30195.1, the licensee shall maintain an acceptable financial instrument in the amount of \$24,980.00 that satisfies the requirements outlined in the decommissioning funding plan dated March 18, 2014.
23. The licensee will provide the Low Level Radioactive Waste (LLRW) reports specified in the California Health and Safety Code section 115000.1(h) to the California Department of Public Health (CDPH) on an annual basis for both shipped and stored LLRW. Alternatively, LLRW shipment information may be provided on a per shipment basis. LLRW shipment information and annual reports shall be mailed to:

Attn: LLRW Tracking Program
California Department of Public Health
Radiologic Health Branch, MS 7610
P.O. Box 997414
Sacramento, CA 95899-7414

24. At least 30 days prior to vacating any address of use listed in Condition 10 of this license, the licensee shall provide written notification thereof to the California Department of Public Health, in accordance with Title 17, California Code of Regulations, Section 30256 (b).
25. A copy of this license and a copy of all records and documents pertaining to this license shall be maintained available for inspection at 1820 Tribute Road, Suite L., Sacramento, CA.

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26. If approved by the Radiation Safety Officer specifically identified in this license, the licensee may take reasonable action in an emergency that departs from conditions in this license when action is immediately needed to protect public health and safety and no action consistent with all license conditions that can provide adequate or equivalent protection is immediately apparent. The licensee shall notify the CDPH-RHB before, if practicable, and in any case, immediately after taking such emergency action using reporting procedure specified in 10CFR30.50(c).

Issued for the State of California Department of Public HealthDate: May 27, 2014By: 

Ronald Rogus
Senior Health Physicist
Radiologic Health Branch, MS 7610
P.O. Box 997414
Sacramento, CA 95899-7414

Appendix B

Radiation Safety Plan

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RADIATION SAFETY PLAN

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Reviewed by Wayne Gans Date 5/10/19

Approved by [Signature] Date 5/10/19
Radiation Safety Officer



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RADIATION SAFETY PLAN

1.0 PURPOSE AND SCOPE

1.1. Purpose

This document establishes the basis for the radiological controls to be implemented during the performance of work at any client's facility utilizing Tidewater's Nuclear Regulatory Commission (NRC) Radioactive Material License (RML). The requirements and guidelines of this document were developed to ensure workers are afforded a safe work environment, to provide a compliant Radiation Safety Program, and to maintain occupational and environmental exposure to ionizing radiation "As Low As Reasonably Achievable" (ALARA).

The overall Radiological Safety Program is comprised of a hierarchy of documents. The overall approach is described in this Radiation Safety Plan. Separate implementing procedures govern day-to-day program operation at a more detailed level. In addition, project specific plans, operational procedures, task instructions, and permits are developed on an as-needed basis to ensure the completeness and effectiveness of the Radiological Safety Program. **Appendix A** gives Radiological Safety Requirements for the employee and the employer.

The terms "should", "shall", and "may" are used throughout the plan and implementing procedures. The word "shall" denotes a requirement, the word "should" denotes a recommendation, and the word "may" denotes permission.

1.2. Applicability

This document applies to all Tidewater employees, contractors, and visitors at any facility where Tidewater's NRC RML is implemented. All personnel performing work at the worksite shall be informed of this plan and the hazards associated with site operations commensurate with their activities. This document shall not be revised without prior approval of the Radiation Safety Officer.


1.3. Administration

1.3.1. Policy

Tidewater places its highest priority on ensuring the safety and health of its employees and neighbors and protecting the environment. This priority extends to all areas affected by site operations. Managers and Supervisors at all organizational levels commit to implementing a Radiation Safety Program based on the highest standards.

The Radiation Safety Program has adequate resources allocated to provide for and assure that all workers are qualified and competent to perform work safely in a radiological environment. Management actively promotes the involvement of all employees in the Radiation Safety Program by instilling a sense of ownership, cooperation, mutual respect, and commitment toward radiological safety. Personnel at all organizational levels incorporate the philosophy of ALARA into all aspects of work planning and execution.

Management establishes and promotes realistic radiological performance goals to challenge employees to be innovative, creative, and to work together toward improving radiological safety performance. Management encourages the efforts of employees to minimize occupational exposure, environmental impact, and the generation of secondary

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radioactive waste. Tidewater is committed to Radiation Safety Program excellence.

1.3.2. Responsibilities and Authority

The Radiation Safety Officer (RSO) is responsible for ensuring compliance with this plan, associated procedures, and the radioactive material license. He/she has the authority to direct all aspects of the Radiation Safety Program and to ensure compliance with required regulations. The RSO is organizationally independent from operations and has the authority and responsibility to stop any activity which is not conducted in a safe manner or in compliance with the license, applicable regulations, and implementing procedures. The Radiation Safety Officer must have a B.S. or higher degree in Health Physics or a related field and at least five (5) years of practical health physics experience or comprehensive certification by the American Board of Health Physics. Unless certified by the American Board of Health Physics, eight (8) or more years of practical experience is required.

Radiological Protection Technicians (RPTs) are responsible for determining, by sampling and measurement, compliance with this document. An RPT has the authority and responsibility to stop work if he/she suspects the initiation or continuation of the activity will result in either imminent danger to a worker or a violation of program requirements.

All site personnel are responsible for compliance with the requirements of the Radiological Safety Plan and implementing procedures. All personnel have the responsibility and authority to stop work through their supervisor if considered unsafe.

1.3.3. Quality Assurance

Periodic audits (at least annually) of the Radiological Safety Program will be made during the course of operations to ensure compliance with this document. Audits will be conducted under the direction of the Radiation Safety Officer by radiological safety, quality assurance personnel, qualified health physicists, or auditors from outside the company. Audit schedules for individual activities will be identified considering the ALARA, regulatory, and safety reviews in accordance with implementing procedures.

2.0 REFERENCES


2.1. Regulations

- 2.1.1. 10 CFR 20, "Standards for Protection Against Radiation"
- 2.1.2. 10 CFR 19, "Notices, Instructions, and Reports to Workers"
- 2.1.3. 10 CFR 71, "Packaging and Transportation of Radioactive Material"
- 2.1.4. 40 CFR, Selected Parts, "Protection of the Environment"
- 2.1.5. 49 CFR, Selected Parts, "Transportation"

3.0 DEFINITIONS

For purposes of this document, the following terms are defined consistent with the terminology of the NRC regulations (10 CFR 20) and guidance.

Access Control: A location, or locations, at the perimeter of controlled areas, through which all normal personnel entries and exits are made, where action is taken to control the spread of radioactive contamination to adjacent uncontaminated areas, and to control personnel exposure to radiation, radioactive materials, airborne radioactivity and

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contamination, as well as the act of controlling access to the work area.

Accessible Area (for personnel control): Denotes a space, zones or surface capable of being reached by personnel that would not require tools, machinery, unusual force or agility for access.

Action Level (or investigation level): A level established for the quantities used in the course of implementing the safety and environmental programs, whether or not there are limits for these quantities. An action level is not a limit, but rather is a guideline used to determine a course of action when the value of a quantity exceeds or is predicted to exceed the selected value. The action initiated might range from simply recording the information, through investigating causes and consequences, to intervening measures.

Adult: An individual 18 or more years of age.

Airborne Radioactivity: Any radioactive material dispersed in the air in the form of dust, fumes, particulates, mist, vapor, or gas.

Airborne Radioactivity Area: An area in which airborne radioactivity, composed wholly or partly of licensed material, exists in concentrations in excess of the amounts specified in 10 CFR § 20.1003; or to such a degree that an individual present in the area without respiratory protection equipment could exceed, during the hours an individual is present in any week, an intake exceeding 0.6% of the amounts specified in 10CFR20); or 12 DAC hours; or in excess of more restrictive criteria as established in the Radiation Safety Program.

Air Sample: The collection of a representative portion of an atmosphere of interest to measure its radioactivity or to detect the presence of radioactive substances. Grab samples are of short duration (usually less than 15 minutes) and are obtained to determine real-time airborne concentrations. Continuous samples are longer period air samples (e.g., for the entire period of an activity) for determination of average or integrated airborne concentrations.

As Low As is Reasonably Achievable (ALARA): Making every effort to maintain exposure to radiation and radioactive materials as far below the limits specified in 10 CFR 20 as is reasonably consistent with the purpose for which the licensed activity is undertaken, and taking into account the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other socioeconomic considerations.

Annual Limit on Intake (ALI): The derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of 5 rems (0.05 Sv) or a committed dose equivalent of 50 rems (0.5 Sv) to any individual organ or tissue. (ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table 1, Columns 1 and 2, of appendix B to 10 CFR §§ 20.10001-20.2401).

Background Radiation: Radiation from cosmic sources, naturally-occurring radioactive materials, including radon (except as a decay product of source or Special Nuclear Material) and global fallout as it exists in the environment from the testing of nuclear explosive devices. Background radiation does not include radiation from source, by-product, or Special Nuclear Material.

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Bioassay: The identification and determination of concentration of radioactive material in the human body, whether by direct measurement (in vivo) or by analysis and evaluation of materials excreted or removed from the body (in vitro).

Check Source: A radioactive source, not necessarily certified, which is used to confirm the continuing satisfactory operation of an instrument.

Derived Air Concentration (DAC): That concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work (inhalation rate 1.2 cubic meters of air per hour), would result in an intake of one ALI. DAC values are given Table 1, column 3, of appendix B to 10 CFR §§ 20.1001-20.2401.

Derived Air Concentration-Hour (DAC-Hour): The product of the concentration of radioactive material in air (expressed as a fraction or multiple of the derived air concentration DAC for each radionuclide) and the time of exposure to that radionuclide, in hours. 2,000 DAC-hours is equivalent to one ALI and is equivalent to a committed effective dose equivalent of 5 rems (0.05 Sv).

Designee: Denotes an individual who is, in all respects, determined to be qualified to act on behalf of the responsible individual. Circumstances whereby the designee may assume such responsibility shall be defined in writing.

Engineering Controls: Physical controls involving the use of physical barriers, special equipment, or special materials to reduce actual or potential exposure to radiation or radioactive materials.

Extremity: The hand, elbow, arm below the elbow, foot, knee, or leg below the knee.


High Radiation Area: An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 100 millirem in 1 hour at 30 cm from the radiation source or from any surface that the radiation penetrates.

Incident: An off-normal occurrence with the potential for significant adverse safety effects to individuals or the general public, or which could result in violation of regulations or provisions of the license.

Lost or Missing Licensed Material: Licensed material whose location is unknown. It includes material that has been shipped but has not reached its destination and whose location cannot be readily traced in the transportation system.

Minor: An individual less than 18 years of age.

Occupational Dose: The dose received by an individual in a radiological area or in the course of employment in which the individual's assigned duties involve exposure to radiation and to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or another person. Occupational dose does not include dose received from background radiation, as a patient from medical practices, from voluntary participation in medical research programs, or as a member of the general public.

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Radiation Area: An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 millirem in 1 hour at 30 cm from the radiation source or from any surface that the radiation penetrates.

Radiation Worker: An individual receiving or expected to receive an occupational exposure in the course of accomplishing his/her work assignment.

Radioactive Material: Any material, solid, liquid or gas, which emits radiation spontaneously.

Radioactive Waste: Material which is radioactive, or which is contaminated with radioactive material such that the decontamination for unrestricted use is not economically practical, and which no longer has economic value such that the material must be disposed under prescribed conditions.

Radiation Safety Officer (RSO): The qualified individual directly responsible for the safety of all persons at the facility utilizing sources of radiation from the hazards associated with such sources. The RSO has the authority to stop operations whenever he/she believes that persons are being endangered.

Radiation Work Permit (RWP): A document which authorizes personnel to perform identified tasks based on radiological considerations in areas containing or suspected to contain radiation and/or radioactive material. The document describes work to be done, known or suspected area radiological conditions, and prescribes limits and precautions to be taken while work is in progress.

Radiologically Controlled Area (RCA): An area established with controlled access to provide for occupational radiation exposure and contamination control.

Respiratory Protection Device: An apparatus, such as a respirator, used to reduce an individual's intake of airborne radioactive materials.

Sealed Source: Any radioactive material that is encased in a capsule designed to prevent leakage or escape of the material.

Whole Body: For purposes of external exposure means the head, trunk (including male gonads), arms above the elbow, or legs above the knee.

4.0 REQUIREMENTS

- 4.1. Radioactive material inventory at any facility will be maintained within the possession limits of the RML possession limits.
- 4.2. Permanent and temporary personnel and contractors shall be trained and qualified in accordance with radiological safety training requirements prior to beginning work.
- 4.3. All work in the RCA will be performed in accordance with approved procedures, task instructions, and permits.
- 4.4. Engineered controls shall be used where practical to maintain exposure ALARA.
- 4.5. Radioactive materials shall be handled and stored in such a manner as to facilitate exposure and contamination control.

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- 4.6. All operations shall be conducted in such a manner as to minimize the generation of radioactive waste materials.
- 4.7. Instrumentation, equipment and supplies in sufficient quantities to safely perform the work shall be available on the job site prior to beginning the activity.
- 4.8. Personnel dosimetry shall be provided, worn, and reported as specified upon entry into an RCA.
- 4.9. Bioassay to include in-vivo measurement, and urine and fecal analysis as appropriate shall be performed in accordance with Radiation Safety procedures for all personnel with an occupational intake potential.
- 4.10. Personnel protective equipment/clothing shall be inspected, worn, and disposed in accordance with applicable work permits and procedures.
- 4.11. Radiological instrumentation shall be set up, checked, and used by qualified personnel as specified in Radiation Safety procedures.

5.0 Training

5.1. Radiological Safety Training Requirements


Periodic radiological safety training is necessary to ensure that all individuals understand the general and specific radiological hazards, their responsibility to Tidewater and the public for safe handling of radioactive materials, and to maintain their individual radiation exposure ALARA.

The appropriate degree of training for each individual will be established based on the nature of the job assignment (i.e. the location where the work will be performed, the hazards associated with that particular area, and the methods used to perform the work). Workers will be categorized as General Workers (those who do not frequent the RCA and typically do not work with radiation or radioactive materials), or Radiation Workers (those who do). Visitors may be exempted from training requirements provided that he/she is escorted, has received a safety briefing, and has written authorization from the RSO or designee.

5.2. Basic Radiological Safety Training

Each worker who is categorized as a Radiation Worker will receive a minimum of 8 hours classroom training prior to initial assignment if they have no prior experience in equivalent radiological work. The purpose of the training is to teach proper methods for working with radiation and handling radioactive materials, to discuss the effects of radiation, to explain the risks of occupational exposure, and to identify the specific hazards associated with the operations to be conducted. The following topics will be covered:

- Radioactive materials and radiation;
- Biological effects of radiation;
- Risks of occupational exposure;
- Exposure limits;
- ALARA, minimizing exposure (time, distance and shielding);
- Personnel dosimetry;
- Protective clothing and equipment (PPE);
- Radiation detection – operation, calibration, and use;

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- Contamination control;
- Decontamination;
- Responsibilities of radiation workers;
- Federal and State Regulations and License provisions for the protection of personnel from radiation and radioactive material;
- Emergency response;
- Radiation exposure reports available to workers;
- Respiratory protection program;
- Radiation work permits (RWPs).

Workers with documented prior radiological work experience need receive only as much training as is necessary to ensure a level of competence comparable with trained workers.

Qualifications of the trainer shall be a minimum of five (5) years operational radiation protection experience plus 40 hours of formal training in radiation protection. The training session is followed by a written test which must be passed (80% pass rate) before unescorted access is allowed to the RCA. Records of required training are maintained in each worker's file. The RSO may authorize individuals to challenge any training requirement and demonstrate the requisite level of knowledge in radiation safety by successfully completing a written exam and demonstration of practical factors.

5.3. Radiological Protection Technician (RPT) Training

Qualified RPTs shall demonstrate an appropriate level of knowledge, understanding, and practical ability in radiation protection, and the ability to apply this knowledge to situations they might encounter during normal and abnormal conditions. Tidewater's RPT training standards include classroom lecture, work experience, and demonstration of proficiency in certain minimum technical areas or tasks.

5.4. General Workers/Visitors

Management, technical, delivery, and other personnel who require occasional access to the RCA, and who only enter these areas for observation or similar purposes, or to perform work not involving radioactive materials shall have training commensurate with the radiological conditions expected to be encountered or shall be escorted by appropriately qualified personnel at all times.


5.5. Records

Personnel training records shall be maintained by the RSO throughout the duration of the operations at each particular site in accordance with Section 17.0.

5.6. Re-qualification of Training

Re-qualification of radiological safety training for all personnel shall be accomplished annually to re-qualify as a Radiation Worker, or a RPT in accordance with applicable procedures.

Personnel shall also demonstrate that they retain the practical abilities needed to perform their specific job. Performance of practical abilities during radiological work in the six months prior to qualification expiration is considered satisfactory demonstration of these practical abilities.

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The RSO or designee shall review the duties of personnel who fail to re-qualify and, based on this review, either disqualify these personnel or limit the duties of these personnel until they satisfactorily re-qualify.

5.7. Implementation

The RSO shall ensure that the training requirements of this section are implemented. Personnel designated to verify practical abilities, conduct classroom and practical training, shall be designated by the RSO.

5.8. Instruction on Radiation Exposure to the Unborn Child

The requirements of this section apply whenever female personnel of child-bearing age may receive occupational radiation exposure. Prior to being issued dosimetry, all female employees authorized to receive radiation exposure, their supervisors, and all females authorized to receive radiation as visitors shall be given specific instruction about prenatal exposure risks to the developing embryo and fetus. This instruction shall include applicable information from the appendix to NRC Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure". The instruction shall be given during initial and re-qualification training. All personnel receiving instruction in accordance with this section shall sign a statement indicating an understanding of the hazards prior to being permitted entry to the RCA. The signed statements shall be kept with the training records. Statements signed by visitors shall be maintained indefinitely.

6.0 RADIATION EXPOSURE LIMITS

Exposure limits are established to control personnel exposure to ionizing radiation. Federal and State Regulations outline the maximum permissible exposures that an individual may receive. These radiation protection regulations stress maintaining personnel exposures to ionizing radiation ALARA.

6.1. Radiation Exposure Limits and Administrative Control Levels

Standard exposure control methods found in this document and implementing Radiological Safety Procedures are designed to maintain radiation exposure below the limits set forth in 10CFR20.

Through the use of engineered and administrative controls, it is Tidewater's intent to keep radiation exposure to occupational workers, members of the general public, and an embryo/fetus ALARA.

Notifications and reports of over exposures and excessive levels and concentrations shall be made per Subpart M-Reports of 10CFR20.

6.1.1. Occupational Dose Limits

The occupation dose limits for radiation workers are listed in Table 1.

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Table 1, Occupational Exposure Limits

Category	10 CFR 20	Tidewater, Inc.
Total Effective Dose Equivalent (TEDE)	5.0 Rem/yr	5.0 Rem/yr
Total Organ Dose Equivalent (TODE)	50 Rem/yr	50 Rem/yr
Lens of Eye	15 Rem/yr	15 Rem/yr
Shallow Dose	50 Rem/yr	50 Rem/yr
Embryo/Fetus*	0.5 Rem/gestation	0.5 Rem/gestation
Minors	10% of Adult limits	10% of Adult limits
Members of Public	0.1 Rem/yr (TEDE)	0.1 Rem/yr (TEDE)

6.1.2. Limits to Members of the Public

Members of the general public (non-occupational dose) are limited as specified in **Table 1**.

6.1.3. Prenatal Exposure

A special situation exists when the radiation worker is an expectant mother. Since developing tissue is very sensitive to radiation, the dose equivalent to the embryo/fetus shall not exceed 0.5 rem during the entire period of pregnancy from occupational exposure of the mother who declares her pregnancy in writing and the estimated date of conception (month and year). The dose equivalent rate to the embryo fetus of a declared pregnant worker should not exceed 0.05 rem per month. If/when the mother declares her pregnancy and the dose to the embryo/fetus is found to be 0.45 rem or greater, the additional dose received during the remainder of the pregnancy shall not exceed 0.05 rem.


6.1.4. Visitors

Visitors are considered members of the general public. Visitor exposure shall be limited to less than 0.1 rem per calendar year.

7.0 PERSONNEL MONITORING FOR RADIATION EXPOSURE

7.1. External Dosimetry Program

For purposes of monitoring exposure to radiation, personnel dosimetry shall be provided to an individual likely to exceed 10% of the limits in **Table 1**. The specific monitoring requirements for personnel radiation exposure for all Tidewater licensed activities is determined and approved by the RSO. Radiation Safety procedures provide instructions for the issue and processing of dosimetry, and the recording of personnel radiation exposure for all personnel working at the site.

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All individuals shall wear appropriate personnel dosimetry for RCA entry when required. The RSO may allow access by Visitors to an RCA provided continually monitored by a Radiation Worker with appropriate monitoring and/or dosimetry.

7.2. Thermoluminescent Dosimetry (TLD) or Optically Stimulated Luminescent (OSL) Dosimetry

7.2.1. TLDs or OSLs shall be the dosimetry of record and shall be worn on the frontal area of the torso between the neck and the waist. TLD's will be processed and evaluated by a dosimetry processor who holds current accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) for the radiation(s) most closely approximating the type of radiation(s) to which individuals are exposed. Normal issue TLDs or OSLs will be worn to assess whole body deep and shallow dose. If dose to the extremities, or the lens of the eye is anticipated to exceed 10% of the limits in **Table 1** special TLDs or OSLs will be issued.

7.2.2. Lost or damaged dosimetry shall be reported to the RSO.

7.2.3. Personnel dosimetry records for an individual shall be made available to an authorized requestor and to the individual upon written request. This information will be readily available to enable an individual to keep track of their own exposure.

7.2.4. Letters indicating annual dose will be sent to each radiation worker monitored in the previous year per the appropriate dosimetry procedure.

7.3. Internal Dosimetry Program


The site internal dosimetry requirements for specific activities will be determined and approved by the RSO. Radiation Safety procedures provide the instructions for the internal radiation monitoring of individuals, submittal of bioassay samples, and the types and applications of various measurements.

7.3.1. Requirements

Internal radiation monitoring shall be performed when an individual is likely to receive an intake of radioactive material in excess of 10% of the Annual Limits on Intake (ALI) as defined in 10CFR20.1003.

7.4. Exposure Records

The RSO or designee shall maintain records of personnel exposure and shall forward those records and data as required by 10CFR20. Occupational exposure records are recorded on NRC Form 5 or equivalent. Any recorded eye dose, skin dose, or planned special exposure dose will be maintained separately. Dose evaluation reports are prepared, maintained, and submitted per 10CFR20 and provided to workers per 10CFR19.13.

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8.0 CONTROLLING RADIATION EXPOSURE

8.1. Minimizing Radiation Exposure

Tidewater shall maintain personnel radiation exposure ALARA. A continuing effort is required to meet this goal by developing and implementing improvements to work procedures and work performance. The following are requirements to assist in meeting this goal:

- 8.1.1. All work shall be performed in the RCA under the direction of an approved procedure, approved work instruction, or RWP.
- 8.1.2. Individual work procedures shall specify applicable actions to be used to minimize radiation exposure while working.

8.2. Plans, Procedures and Work Instructions

- 8.2.1. Major work shall be performed under the guidance of a task specific plan, procedure, work instruction, or RWP. Determination of the need for specific approved plans, procedures, work instructions, or permits shall be made by the Project Manager, and the RSO.
- 8.2.2. Plans, procedures or work instructions may describe the task, radiological conditions, or radiological controls, and shall be approved by the RSO or designee. A RWP will supplement the above with specific contamination or exposure control measures, monitoring requirements, and work instructions.

8.3. Radiological Work Permit (RWP)

The RWP is an administrative mechanism to inform personnel of area radiological conditions, entry/exit requirements and specific work requirements that may apply to the task being performed. The RWP shall be used to maintain occupational radiation exposure ALARA, to minimize the spread of contamination, and to provide for augmented monitoring and surveillance where required. A description of the task to be performed and the radiological conditions associated with the work shall be recorded on the RWP. Also specified are the protective measures, dosimetry, and training required by personnel entering the designated area.

8.4. Access Control

8.4.1. General Access

The RCA may include Radiation, High Radiation, Very High Radiation, Contamination, Airborne Radioactivity, and approved Radioactive Material Storage Areas as appropriate. Access control to the RCA shall be provided via the RWP. The RCA boundary may be delineated via barriers or other administrative controls which prevent access by unauthorized personnel, and ensure that authorized personnel have received appropriate training and qualification. The access control requirements are applicable to all employees, contractors, and visitors who may have need to enter this area.

8.4.2. Radiological Areas and Postings

Radiological areas are maintained at various locations inside the RCA, as required. These areas may be posted with the requirements for entry or other restrictions.

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9.0 RADIOLOGICAL MONITORING AND SURVEYS

9.1. Instrumentation for Radiological Monitoring

- 9.1.1. Instrumentation for radiological monitoring is selected based on the type of radiation expected, type of measurement required, maintenance and calibration requirements, limits of detection, ruggedness, and versatility.
- 9.1.2. Instruments will be calibrated on an annual basis by an NRC or Agreement State licensed and certified calibration laboratory.
- 9.1.3. Only instruments with a current calibration label shall be used for making measurements. Instruments suspected of damage or exhibiting poor performance shall be removed from service and tagged pending repair or re-calibration. The RSO shall be notified of suspect instruments.
- 9.1.4. Field instruments are battery tested and response checked daily prior to initial use. Operability checks are performed on stationary monitors and laboratory instrumentation in accordance with manufacturer's recommendations.
- 9.1.5. Records of all instrument repair and calibration shall be maintained on file in accordance with Section 17.0.
- 9.1.6. A quality control program for counting instruments, when in use, shall be established and maintained to ensure reliability of counting results. The program shall consist of daily background, source checks, and associated control charts, chi-square tests, confidence level requirements, and optimum background/count time evaluations to meet desired counting sensitivities.

9.2. Radioactive Source Handling

The following safety precautions should be observed by personnel working with check sources while using radiation detection equipment.


- 9.2.1. Damage to or loss of a radioactive source may result in the spreading, inhaling, or ingesting of contamination. If a source is lost or damaged, notify the RSO. Immediate steps should be taken to recover the source and minimize radiation exposure to or contamination of personnel as a result of the lost or damaged source.
- 9.2.2. Except for sources which are permanently attached to instruments (e.g., check sources), radioactive sources which are not in use shall be kept in a locked cabinet or similar device intended to provide limited access.

9.3. Radiation Surveys

Radiation surveys are performed as necessary to ensure personnel do not exceed radiation exposure limits and to meet requirements for posting. These surveys are performed to determine whether abnormal radiation levels exist and to determine the extent and magnitude of radiation levels.

9.4. Contamination Surveys for Material Release

Material that is removed from the RCA will be surveyed for contamination. Only material which meets the free release criteria shown in **Table 2** will be allowed to exit the RCA without restriction. Material not meeting the free release criteria must be decontaminated, transferred

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directly to another RCA and/or packaged and labeled for storage or shipment prior to release from the RCA. Contamination surveys for material release shall be done in accordance with appropriate radiation safety procedures.

Table 2, Acceptable Material and Equipment Release Limits

Nuclides ^a	Average ^{b c}	Maximum ^b	Removable ^{b d}
-235, U-238, transuranics and associated decay products,	100 dpm/100 cm ²	N/A	20 dpm /100 ²
Th-nat	1000 dpm/100 cm ²	N/A	200 dpm/100 cm ²
Beta-gamma emitters	5,000 dpm/100 cm ²	N/A	1,000 dpm/100 cm ²

^a Where surface contamination by both alpha and beta-gamma emitting nuclides exists, the limits established for both alpha and beta-gamma emitting nuclides should apply independently.

^b As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

^c For objects of less surface area, the average should be derived for each such object.

^d The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter paper or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.


10.0 CONTROLLING AIRBORNE RADIOACTIVITY

Periodic air samples are taken as required verifying that air concentrations routinely remain below 10% of the DAC, to maintain the Committed Effective Dose Equivalent (CEDE) ALARA. Air samples are taken using personal lapel (or equivalent) air samplers or grab samplers that provide measurement of concentrations in the workers breathing zone. If the air concentration exceeds 10% of DAC values, the RSO should be notified so appropriate corrective actions can be taken and exposures received by workers evaluated and included in their personal exposure file.

10.1. Use of Respiratory Protection Equipment

Table 1 of Appendix B to 10CFR20 lists the ALIs and DACs for occupational exposure to radioactive materials. TIDEWATER is committed to design of processing facilities and control of work in such a manner as to maintain CEDE ALARA. However, when process or other engineering controls are not practical to control airborne radioactive materials below those contained in the definition of an airborne radioactivity area, intakes may be limited by the use of respiratory protection equipment. Prior to the use of respiratory protection equipment, each individual shall meet the appropriate requirements.

The RSO or designee is responsible to ensure that the qualification requirements are met and documented for personnel using respiratory protection equipment. A copy of this documentation shall be maintained by the RSO or designee in the on-site file.

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11.0 CONTROLLING SURFACE CONTAMINATION

It is Tidewater's intention to maintain generally accessible areas free of contamination. Office areas and other areas outside the RCA will be maintained to keep surface contamination levels as low as possible, but in no case greater than the unrestricted release criteria in **Table 2**.

Radioactive contamination of surfaces (such as floors, equipment, clothing and skin) may result from work operations or gradual precipitation of airborne radioactive contamination onto exposed surfaces. The primary reason for limiting surface contamination is to minimize possible ingestion or inhalation of radioactive materials. In addition, surface contamination is limited to minimize transfer of radioactive materials to the environment. In case of very high levels of surface contamination, control of external radiation exposure from this contamination source may be necessary.


Contamination control procedures should be considered in planning and performance of all jobs. The extent of the contamination control procedures used should be commensurate with the amount of radioactive material being handled, and the nature of the task. The extent of site specific contamination control procedures shall be discussed during the RWP briefing.

11.1. Surface Contamination in Radiologically Controlled Areas

- 11.1.1. The RCA is established, among other things, as a final boundary to prevent the uncontrolled spread of radioactive materials. This boundary serves as the point at which certain precautions are taken, including training, protective clothing, and monitoring to prevent a worker from unknowingly contaminating his/her self, and transferring the contamination to the uncontrolled area. The RCA serves as a buffer between the more contaminated areas and those that are not contaminated. Significant levels of fixed contamination may exist in these areas; however, loose contamination levels are maintained to established limits.
- 11.1.2. Personnel with open wounds shall not enter a RCA without prior approval of the RSO or designee. Open wounds shall be adequately protected from contamination prior to a person working in these conditions.
- 11.1.3. Entrances to contaminated areas shall be posted conspicuously with signs in accordance with approved procedures.
- 11.1.4. Smoking, eating, drinking and chewing shall not be permitted in contaminated areas.
- 11.1.5. Personnel leaving a contaminated area shall (a) remove their outer anti-contamination clothing and (b) monitor or be monitored for surface contamination where background levels of radiation will permit following the guidance provided in approved procedures.

11.2. Records of Contamination

- 11.2.1. Records of surface contamination surveys shall be maintained in the onsite files throughout the duration of the project in accordance with Section 17.0. Any occurrence which results in loose surface contamination greater than the applicable site specific free release limits for uncontrolled areas shall be reported in accordance with Section 17.0. Any spread of contamination in the RCA s which results in work being stopped for more than four hours or takes more than four

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hours to clean up shall be reported in accordance with Section 17.0.

11.2.2. Records of surface contamination surveys shall be retained in the onsite file throughout the duration of the project in accordance with Section 17.0.

12.0 ANTI-CONTAMINATION CLOTHING AND EQUIPMENT

Anti-contamination clothing (Anti-Cs) is used to help prevent personal skin and clothing contamination, and the spread of radioactive materials outside the RCA or contaminated areas. Anti-contamination clothing is required when either surface contamination or airborne radioactivity levels exceed prescribed limits.

The RSO or designee in consultation with other safety disciplines shall determine the appropriate requirements for Anti-Cs and shall so note on the applicable RWP. The recommended type of Anti-Cs for various applications and radiological conditions are provided in radiation safety procedures and the RWP

13.0 RADIOACTIVE DECONTAMINATION

Decontamination may be required for components, tools and equipment, work areas, clothing or personnel. Each of these subjects as well as alternatives to decontamination is discussed in the approved procedures. By the very nature of decontamination process, the generation of secondary waste materials must be considered. Volumes of both solid and liquid wastes shall be minimized. Unauthorized chemicals shall not be used. These may cause difficulties in waste processing. Most radioactive contamination can be removed by normal cleaning.

If large variations in surface contamination levels exist on highly contaminated surfaces, cleaning shall be from less contaminated toward more contaminated areas to prevent radioactivity from being spread to less contaminated areas. Cleaning solutions and cloths used in these decontamination operations shall be disposed of as radioactive waste. During decontamination operations, precautions shall be taken to limit the spread of contamination.


14.0 HANDLING RADIOACTIVE MATERIALS

This section presents methods for controlling radioactive material associated with decommissioning operations. Strict radiological safety procedures are mandatory for such activities to minimize the external and internal radiation exposure received by personnel and to prevent the uncontrolled spread of radioactive materials or release of radiation to areas where the public might be affected.

14.1. Receipt and shipment of Radioactive Material

Radioactive material shall be received in accordance with 10CFR20.1906 and procedures for receiving and opening packages. Radioactive material received requires special control procedures to ensure that adequate radiological safety precautions are observed, both in unpacking and in subsequent use or storage of the material.

Radioactive materials shipped for disposal or to another location shall be appropriately packaged and treated as required by USDOT, applicable federal and state regulations, and applicable disposal site criteria. Shipping shall be performed by the RSO or designee, or a Shipper/Broker in accordance with applicable plans, procedures, and/or instructions.

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Receipt and shipment of radioactive materials shall be accomplished in accordance with radiation safety procedures.

14.2. Radioactive Material Storage

14.2.1. Storage of radioactive materials will be in accordance with all applicable license requirements and should be in accordance with State and Federal Guidance. At a minimum, all radioactive material storage areas will be posted in accordance with radiation safety procedures. Access to these areas will be controlled to prevent unauthorized access, unauthorized removal of radioactive material, and to minimize radiation exposure.

14.2.2. Outdoor Storage

Radioactive materials should be stored where they are protected from adverse weather.

14.2.3. Labeling of Radioactive Material

Each container of radioactive material shall bear a durable clearly visible label which identifies the radioactive contents (for example, radionuclides present, quantity of radioactivity present, material description, date for which the activity was estimated, and radiation levels), and depicts the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL". Exceptions include the following:

- The quantity of radioactive material is less than the amounts listed in appendix C 10CFR20;
- The material is continuously attended by a trained radiation worker;
- The material is in transport and is packaged and labeled in accordance with DOT regulations;
- The material is contained in installed process equipment such as piping, tanks, transfer equipment, and treatment units.


Empty containers which are used or intended to be used for the packaging or handling of radioactive materials will be clearly marked "EMPTY", and any radioactive markings defaced or removed from any container released off-site for unrestricted use.

15.0 WASTE MANAGEMENT

Working with radioactive material can frequently lead to contamination of structures and equipment, protective equipment and clothing, and material used in decontamination. If any of the contaminated material cannot be used further, it becomes radioactive waste. Waste minimization consists of three primary objectives; (1) source reduction, (2) recycling, and (3) volume reduction. Waste minimization must be practiced on levels of the company, from top-level management down to the worker. Training programs, procedures, and work practices will be reviewed annually for waste minimization practices.

15.1. Source Reduction

Source reduction activities are those which reduce or eliminate the production of radioactive waste, or seeks to reduce the volume or amount of clean material that comes in contact with

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radioactive material. Examples include:

- Taking care to not store radioactive materials with non-radioactive materials;
- Removal of packaging from clean material before taking the material into the RCA, or bringing the minimum amount of clean material into the RCA necessary to perform a task;
- Taking care to not bring clean tools, equipment or material into the RCA unless a contaminated tool, equipment or material is not already available;
- Taking care not to touch a contaminated surface or allow clothing, tools, or other equipment to do so;
- Confining radioactive material and contamination to as small an area as practical to minimize the decontamination effort later;
- Minimizing loose surface contamination levels and airborne contamination levels to prevent inadvertent contamination of adjoining areas and equipment;
- Choosing decontamination methods that generate the smallest total waste volume;
- Preventing spills of contaminated materials.

16.0 ENVIRONMENTAL MONITORING

Environmental monitoring consists of measurements, sample collection and analysis, and dose assessment to determine which radionuclides are being released to the environment and, what the extent and effect is on the surrounding population. An environmental monitoring program generally consists of measurements and sample collections at the site boundary and at off-site locations. The types of samples and analyses are dependent on the radionuclides at the site and the possible release and transport mechanisms. The exposure pathways from a site are radioactive effluents released to the air and sewer, and direct radiation exposure from radioactive materials at the site. Due to the limited activity and nature of activities performed under the Tidewater license, the scope of an Environmental Monitoring Program will be determined as part of a site-specific decommissioning plan. Typically, it will be limited to air samples collected at selected location in and around the project site and samples of any liquid effluent from within contaminated areas prior to release to offsite water bodies, such as sanitary or storm water drains. All records of samples collected, analyses performed, results and actions taken shall be maintained in the site files throughout the duration of the operations in accordance with Section 17.0.

17.0 REPORTS AND RECORDS

- 17.1 Any event resulting in any site or regulatory limit being exceeded shall be reported promptly to the RSO and Tidewater management. The RSO shall be responsible for preparing and submitting any formal reports in a timely manner in accordance with applicable regulatory requirements. The following table outlines key reporting requirements with reference to applicable NRC regulations that shall be considered in determining applicable reporting requirements. Requirements of a Customer's license shall also be considered.

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NRC Incident Notifications Requirements

(adapted from NUREG 1556, Vol. 18)

Event	Telephone Notification	Written Report	Regulatory Requirement
Theft or loss of material	immediate	30 days	10 CFR 20.2201(a)(1)(i)
Whole body dose greater than 0.25 Sv (25 rems)	immediate	30 days	10 CFR 20.2202(a)(1)(i)
Extremity dose greater than 2.5 Sv (250 rems)	immediate	30 days	10 CFR 20.2202(a)(1)(iii)
Whole body dose greater than 0.05 Sv (5 rems) in 24 hours	24 hours	30 days	10 CFR 20.2202(b)(1)(i)
Extremity dose greater than 0.5 Sv (50 rems) in 24 hours	24 hours	30 days	10 CFR 20.2202(b)(1)(iii)
Whole body dose greater than 0.05 Sv (5 rems)	None	30 days	10 CFR 20.2203(a)(2)(i)
Dose to individual member of public greater than 1 mSv (100 mrem)	None	30 days	10 CFR 20.2203(a)(2)(iv)
Defect in equipment that could create a substantial safety hazard	2 days	30 days	10 CFR 21.21(d)(3)(i)
Filing petition for bankruptcy under 11 U.S.C.	none	immediately after filing petition	10 CFR 30.34(h)
Expiration of license	none	60 days	10 CFR 30.36(d)
Decision to permanently cease licensed activities at entire site	none	60 days	10 CFR 30.36(d)
Decision to permanently cease licensed activities in any separate building or outdoor area that is unsuitable for release for unrestricted use	none	60 days	10 CFR 30.36(d)
No principal activities conducted for 24 months at the entire site	none	60 days	10 CFR 30.36(d)
No principal activities conducted for 24 months in any separate building or outdoor area that is unsuitable for release for unrestricted use	none	60 days	10 CFR 30.36(d)
Event that prevents immediate protective actions necessary to avoid exposure to radioactive materials that could exceed regulatory limits	immediate	30 days	10 CFR 30.50(a)
Equipment is disabled or fails to function as designed when required to prevent radiation exposure in excess of regulatory limits	24 hours	30 days	10 CFR 30.50(b)(2)
Unplanned fire or explosion that affects the integrity of any licensed material or device, container, or equipment with licensed material	24 hours	30 days	10 CFR 30.50(b)(4)

Note: Telephone notifications shall be made to the NRC Operations Center at (301) 816-5100 or (301) 951-0550.

- 17.2. All records of occupational radiation exposure to workers, and exposure to visitors and members of the general public from licensed activities shall be maintained in a readily retrievable manner and be available for review by the exposed individual and the NRC or Agreement State regulators.
- 17.3. For field projects, radiological records generated shall be maintained in the on-site file. Throughout the duration of the licensed activities at the site, records shall be archived and be readily retrievable. The following records will be included in the facility records retention program at a minimum:

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- Personnel Training Records;
- Personnel Exposure Records;

17.4. The standard forms used in the radiological safety program to document information shall be controlled so to accomplish the following objectives:

- Management review and approval of the forms prior to use;
- A prompting of the user to collect a complete set of data;
- A provision for a documented history of each form's design and usage;
- Adequate documentation of the events required by the NRC or Agreement State and applicable regulations.


18.0 PROCEDURES

- 18.1. Tidewater procedures have been developed for all aspects of the radiation safety program through the use of federal regulatory guidance documents and other applicable guidance documents. These procedures will facilitate the control of radiation exposures, contamination and airborne radioactivity on all Tidewater projects and worksites.
- 18.2. Administrative procedures define specific program functions and the methods to be used when carrying out each program function. All radiological Tidewater job functions will be governed by the rules and regulations set forth in the administrative procedures.
- 18.3. Operational procedures define precise methods used to perform specific radiological job functions properly and safely. These operational procedures are governed by the program functions set forth by the administrative procedures. The methods vary according to each particular procedure but remain consistent in their methodical approach to each objective.

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19.0 REVISION HISTORY

REVISION HISTORY		
Revision Number	Issue Date	Revision Description and Reason for Change

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APPENDIX A

RADIOLOGICAL SAFETY REQUIREMENTS

YOUR RESPONSIBILITY

Each individual must constantly remain aware of potential radiological hazards. Each of your actions could directly affect your exposure to ionizing radiation. The following rules shall be followed by all personnel to maximize radiological control and safety:

1. Obey posted, verbal and written radiological control instructions.
2. Wear TLDs, air sampling devices, and dosimeters as required by signs, RWPs or if so instructed by radiological safety personnel.
3. Submit bioassay samples as requested by radiological safety personnel.
4. Maintain training, in-vivo, medical, and respirator fit testing qualifications current.
5. Keep track of your own radiation exposure status and avoid exceeding hold points.
6. Make every effort to maintain your radiation exposure as far below the administrative limits as is reasonably achievable, consistent with the performance of assigned duties.
7. Do not eat, drink, chew, or smoke in the Radiological Controlled Area.
8. Promptly follow radiological safety direction to prevent contamination spread.
9. Follow all requirements for respiratory protection devices. Wear anti-contamination clothing, including respiratory protection devices, properly whenever required by RWP.
10. Remove anti-contamination clothing and respiratory protection devices properly to minimize spread of radioactive contamination.
11. Perform personnel monitoring or be frisked with proper equipment for the detection of contamination when leaving a Contamination Area or a Radiological Controlled Area.
12. Minimize the possibility of a radioactive material spill by carefully following procedures.
13. For a known or possible radioactive material spill or airborne release, minimize its spread and notify radiological safety personnel promptly.
14. Do not unnecessarily touch a contaminated surface or allow your clothing, tools, or other equipment to do so.
15. As practical, place all contaminated equipment, such as tools and sampling containers, on disposable surfaces (e.g., plastic or paper sheet) when not in use and inside plastic bags when work is finished.
16. Follow "good housekeeping" practices to minimize the amount of material that has to be decontaminated or disposed of as radioactive waste.

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17. Report the presence of open wounds to radiological safety personnel prior to work in areas where radioactive contamination exists. If a wound occurs while in such an area, report immediately to radiological safety personnel.
18. Notify the RSO or the RSO's site designee of exposures to ionizing radiation or administration of radioisotopes for medical diagnostic or therapeutic purposes.

YOUR EMPLOYER IS REQUIRED TO:

1. Provide training, equipment, and necessary measures to maintain exposures ALARA (As Low As Reasonably Achievable).
2. Maintain records of your occupational radiation exposure and, upon your written request, advise you of your recorded occupational radiation exposure.
3. Notify you immediately of any radiation exposure which exceeds applicable limits.
4. Provide you, after termination of employment or upon your written request, and within thirty (30) days after the request, with a written summary of your cumulative recorded occupational radiation exposure received during your period of employment.
5. Notify personnel of the above procedures by posting this notice conspicuously.
6. Post "Notice to Employees" and make known the availability of 10 CFR 19, 10 CFR 20, license(s) and procedures, as applicable.

Notify personnel by posting any Notice of Violation from the NRC or State conspicuously as well as Corrective actions.

INSPECTIONS

Work involving radiological materials may be subject to periodic inspection by the Nuclear Regulatory Commission (NRC), Agreement State, other cognizant Regulatory Agencies (e.g., DOE, EPA, OSHA, etc.) or internal auditor.

INQUIRIES

Inquiries concerning radiological safety should be addressed to your supervisor. Additional inquiries may be addressed to the RSO or any member of the radiological safety organization.

Appendix C Operational Org Chart

ORGANIZATION CHART - REPORTING

Jan, 2019

