



16710

From: J. W. MAUGER, CAPT
COMDT (CG-ENG)

To: Distribution

Subj: PROPOSED POLICY LETTER: CARRIAGE OF CONDITIONALLY PERMITTED
SHALE GAS EXTRACTION WASTE WATER IN BULK

1. PURPOSE. The purpose of this policy letter is: (a) to specify the conditions under which a barge owner may request and be granted a Certificate of Inspection endorsement or letter, under 46 CFR 153.900(d), allowing the barge to transport shale gas extraction waste water (SGEWW) in bulk as Conditionally Permitted SGEWW; (b) to define the information the Coast Guard may require the barge owner to provide pursuant to 46 CFR 153.900(d)(1)(ii); and (c) to specify the additional requirements the Coast Guard imposes on such barges pursuant to 46 CFR 153.900(d)(2)(iii). A barge owner who has not been granted an endorsement or letter under 46 CFR 153.900(d), or who has not provided the information defined by this policy letter, or who has not complied with the additional requirements this policy letter describes, is prohibited from transporting SGEWW in bulk on that barge.

2. LEGAL BASIS. The legal basis for this policy letter is supplied by Coast Guard regulations in 46 CFR part 153 (Ships Carrying Bulk Liquid, Liquefied Gas, or Compressed Gas Hazardous Material) which apply to tank vessels¹ to which 46 U.S.C. chapter 37 (Carriage of Liquid Bulk Dangerous Cargoes) applies. Those regulations are authorized by 46 U.S.C. 3306, which requires the Secretary to prescribe necessary regulations for the operation, etc., of vessels (including tank vessels) subject to 46 U.S.C. chapter 33 (Inspection Generally); and by 46 U.S.C. 3703, which requires the Secretary to prescribe regulations for the operation, etc., of tank vessels carrying liquid bulk dangerous cargoes and subject to the provisions of 46 U.S.C. chapter 37, if those regulations are “necessary for increased protection against hazards to life and property, for navigation and vessel safety, and for enhanced protection of the marine environment.” The Secretary’s authority under these statutes has been delegated to the Coast Guard, DHS Delegation No. 0170.1(92)(b).

3. ACTION. District and Sector Commanders shall use the guidance in this policy letter to ensure compliance with 46 CFR part 153.

4. DIRECTIVES AFFECTED. This policy letter complements but does not otherwise affect Navigation and Vessel Inspection Circular (NVIC) 2-87 (Domestic Barge Transportation of

¹ Per 46 U.S.C. 2101(39) a tank vessel is a “vessel that is constructed or adapted to carry, or that carries, oil or hazardous material in bulk as cargo or cargo residue, and that—(A) is a vessel of the United States; (B) operates on the navigable waters of the United States; or (C) transfers oil or hazardous material in a port or place subject to the jurisdiction of the United States.”

Radioactive Materials/Nuclear Waste) and NVIC 7-87 (Guidance on Waterborne Transport of Oil Field Wastes), neither of which addresses waterborne transport of SGEWW.

5. DEFINITIONS.

Conditionally Permitted SGEWW means a cargo of SGEWW that meets the criteria specified in Enclosure (1) to this policy.

Consignment activity limit means a limiting upper value of radioactivity per consignment load in becquerels (Bq) or picocuries (pCi).

Consignment load means the total amount of cargo in one barge.

Contamination means the presence of a radioactive substance on a surface, as defined in 49 CFR 173.403.

Radiation monitor means a registered radiation protection technologist or other person with the appropriate education, training and skills required by Department of Energy regulations, 10 CFR 835.103, for measuring and monitoring radiation hazards for personnel or objects, or a team of such persons including at least one registered radiation protection technologist.

Radioactivity concentration limit means a limiting upper value of radioactivity per unit mass (Bq/g or pCi/g where g is the mass in grams).

Total radioactivity limit means the maximum amount of radioactivity due to a particular isotope allowed to be in a single barge for a specific shipment and is the quotient of the transport limit divided by the actual concentration of the isotope in the shipment (Bq or pCi).

Transport limit (Z) means the product of the radioactivity concentration limit (Bq/g or pCi/g) and the consignment activity limit (Bq or pCi) for each radioactive isotope present in a consignment load ($Bq \cdot Bq/g = Bq^2/g$ or $pCi \cdot pCi/g = pCi^2/g$).

6. DISCLAIMER. This policy letter supplies guidance to the Coast Guard and the regulated public on one approved means of determining if SGEWW meets the criteria to be Conditionally Permitted SGEWW. This policy letter is not a regulation and is not binding on the regulated public. A barge owner may request, and the Coast Guard may grant, written 46 CFR 153.900(d) permission for a specific barge to carry loads of SGEWW if the barge owner either follows the procedures and stays within the limits set forth in Enclosure (1) of this policy letter, or through other means can show to the satisfaction of the Coast Guard Commandant (CG-ENG-5) that it meets a level of safety equivalent to the criteria contained in Enclosure (1).

7. BACKGROUND.

a. SGEWW, also known as “frack water,” is a by-product of drilling for natural gas using unconventional hydraulic fracturing (or “fracking”) technology, which involves the injection of water, sand, and chemical additives. The sand remains in the well but a substantial portion of the

injected fluid re-surfaces after the drilling and must be handled as SGEWW. At present, this SGEWW is either stored at the drilling site or transported by rail or truck to remote storage or reprocessing centers. There is commercial interest in transporting SGEWW from northern Appalachia via inland waterways to storage or reprocessing centers and final disposal sites in Ohio, Texas, and Louisiana.

b. Pursuant to 46 CFR 153.900(a) and (c), under certain circumstances a bulk liquid hazardous material may be transported by a tank vessel if it is a “listed cargo” (listed in any of several specified tables in Coast Guard regulations). For the reasons detailed in paragraph 7.c, SGEWW is not a “listed cargo” and therefore may not be transported by a tank vessel, 46 CFR 153.900(c), unless its Certificate of Inspection has been endorsed or the vessel has been issued a letter pursuant to 46 CFR 153.900(d).

c. SGEWW cannot be treated as a “listed cargo” because the specific chemical composition of SGEWW varies from one consignment load to another and may contain one or more hazardous materials as defined in 46 CFR 153.2, including radioactive isotopes such as radium-226 and radium-228 (Ra-226, Ra-228), which are known to be elevated in the Marcellus shale (United States Geological Survey Scientific Investigations Report 2011-5135).¹ Variables affecting the chemical composition of SGEWW include the chemicals present in the initial drilling fluid, the geological properties of the specific site being drilled, and the age of the well. In addition, each load can be a mixture of SGEWW from different wells.

8. DISCUSSION.

a. Barge Owner. Throughout this policy letter and its enclosures, references to a barge owner may be interpreted as applying equally to a shipper or other party acting on the owner’s behalf, and to any party operating the barge.

b. Endorsement of Certificate of Inspection. Pursuant to 46 CFR 153.900(d)(1)(i), a barge owner may request endorsement of a barge’s Certificate of Inspection, or a letter, allowing the barge to transport Conditionally Permitted SGEWW in bulk. Requests may be made by contacting the U.S. Coast Guard Commandant (CG-ENG-5) at (202) 372-1412 or by emailing HazmatStandards@uscg.mil. The Coast Guard, at its discretion, may provide the endorsement or letter, on condition that the barge owner conduct and document the analyses and surveys, and take the venting measures, described in this paragraph 8. Carriage requirements for SGEWW are given in Enclosure (4), and a sample endorsement is included in Enclosure (5) to this policy letter.

c. Analyses. As an “additional requirement” that the Coast Guard may impose, per 46 CFR 153.900(d)(2)(iii), on the endorsement or letter described in paragraph 8.b, prior to carrying SGEWW on board the barge, the barge owner must have each consignment load of SGEWW chemically analyzed in accordance with Enclosure (1) to this policy letter. The barge owner must keep records showing the results of each analysis for two years and make those records

¹ <http://pubs.usgs.gov/sir/2011/5135/pdf/sir2011-5135.pdf>

available to the Coast Guard upon request. These records are subject to the Freedom of Information Act (FOIA). The identity of proprietary chemicals may be withheld from public release pursuant to the FOIA and applicable Coast Guard policy.

d. Surveys. As an “additional requirement” that the Coast Guard may impose, per 46 CFR 153.900(d)(2)(iii), on the endorsement or letter described in paragraph 8.b, the barge owner must have the barge surveyed in accordance with Enclosure (1) to this policy letter, whenever the barge changes from carrying Conditionally Permitted SGEWW to carrying another cargo, and prior to the entry of any personnel, Coast Guard or otherwise, into the barge. The barge owner must keep records showing the results of each survey for two years and make those records available to the Coast Guard upon request.

e. Venting. Carriage of Conditionally Permitted SGEWW may over time lead to the accumulation of radon, a daughter radionuclide of both Ra-226 and Ra-228, in the tank head space. Daily temperature changes can cause variations in tank pressure, and open venting provides pressure relief, preventing over- or under-pressurization of the tanks. Closed or restricted venting would trap the radon in the head space of the tank. Therefore, as a “design and equipment” requirement under 46 CFR 153.900(d)(2)(ii) and as an “additional requirement” under 46 CFR 153.900(d)(2)(iii), the barge owner must ensure that each barge to which the endorsement or letter described in paragraph 8.b is issued has open venting and must ensure that personnel avoid areas where gas from the tanks may escape, especially during loading and offloading. The owner may meet these requirements by ensuring that operational policy instructs personnel to avoid the tank vents and that personnel comply with that instruction.

9. ENVIRONMENTAL ANALYSIS. The development of this policy letter and the general policies contained within it have been thoroughly reviewed by the originating office in conjunction with the Office of Environmental Management, and are categorically excluded under current USCG Categorical Exclusion # 33 from further environmental analysis, in accordance with Section 2.B.2 and Figure 2-1 of the National Environmental Policy Act Implementing Procedures and Policy for Considering Environmental Impacts, COMDTINST M16475.1 (series). This policy letter will not have any of the following: significant cumulative impacts on the human environment; substantial controversy or substantial change to existing environmental conditions; or inconsistencies with any Federal, State, or local laws or administrative determinations relating to the environment. All future specific actions resulting from the general policies in this letter must be individually evaluated for compliance with the National Environmental Policy Act (NEPA), Department of Homeland Security (DHS) and Coast Guard NEPA policy, and compliance with all other environmental mandates.

10. QUESTIONS. Questions or concerns regarding this policy may be directed to Commandant (CG-ENG-5) at (202) 372-1412 or emailed to HazmatStandards@uscg.mil.

Enclosures: (1) Minimum Acceptable Analysis, Criteria and Safety Requirements to Carry SGEWW
(2) Commonwealth of Pennsylvania Department of Environmental Protection Bureau of Waste Management Form 26R: Chemical Analysis of Residual Waste Annual Report by the Generator

- (3) Sample Calculations for Maximum Allowed Volume
- (4) Interim Minimum Requirements for the Carriage on Unmanned Barges,
46 CFR 153
- (5) Certificate of Inspection Endorsement for Carriage of Shale Gas Extraction
Waste Water (SGEWW)

Enclosure (1) to CG-ENG Policy Letter 13-XX
Minimum Acceptable Analysis, Criteria and Safety Requirements to Carry SGEWW

1. ANALYSIS FOR HAZARDOUS MATERIALS INCLUDING RADIOISOTOPES. Before transporting SGEWW by barge, the barge owner must conduct an analysis described in this paragraph at a state-accredited laboratory.¹ The analysis must include either the analysis procedure outlined in Commonwealth of Pennsylvania Department of Environmental Protection Bureau of Waste Management Form 26R: Chemical Analysis of Residual Waste Annual Report by the Generator (PA Form 26R), see Enclosure (2) to this policy letter, or another procedure that provides as much or more detailed information about the SGEWW composition. PA Form 26R provides a description of the minimum analysis that is required and describes a methodology acceptable to the Coast Guard. The form lists analyses to be completed, including the SGEWW's pH range and physical appearance, a gross chemical analysis, a hazardous waste determination, and a report on the presence of over 50 chemicals or characteristics associated with SGEWW. The use of PA Form 26R is solely to provide an example for the analysis requirements; other parts of the form are not applicable. The report of analysis must include the laboratory name, the date and location the samples were taken, and the date the samples were analyzed, and identify all chemical components listed on PA Form 26R as well as any other components in the SGEWW, specifically including any chemical components that were injected into the well and/or produced by reactions or decompositions of those injected components.² If the analysis indicates the presence of hazardous material as defined in 46 CFR Subchapter D or O, the barge owner must comply with all applicable regulations. If the SGEWW contains hazardous material, as defined in 46 CFR 153.2, other than Ra-226 and Ra-288, that is not listed in 46 CFR 153, it may not be transported in bulk without the prior specific approval of the Commandant pursuant to 46 CFR 153.900. The barge owner must retain the reports of analysis for two years and make them available for Coast Guard inspection on request.

2. CRITERIA TO DETERMINE IF SGEWW CAN BE CARRIED AS CONDITIONALLY PERMITTED SGEWW.

a. As an initial condition to determine if SGEWW can be carried as Conditionally Permitted SGEWW, both the radioactivity concentration limit and the consignment activity limit for each radioactive isotope present in the SGEWW may not exceed the values established below. Furthermore, consignment barge loads of Conditionally Permitted SGEWW may not exceed transport limits established below. The radioactivity concentration limit, consignment activity limit, and transport limit must be determined for every radioactive isotope present in the SGEWW. Limiting values for Ra-226 and Ra-228 are given below. The radioactivity concentration limit and consignment activity limit for other isotopes are found in 49 CFR

¹ Labs accredited by any state are acceptable. For a list of labs accredited by the State of Pennsylvania, see http://www.portal.state.pa.us/portal/server.pt/community/labs/13780/laboratory_accreditation_program/590095.

² Gross alpha and gross beta may be substituted for Ra-226 and Ra-228, respectively. Gross alpha is a measurement of the total alpha particles present in the sample. It is a sum of all alpha-emitting isotopes. Likewise, gross beta is a measurement of the total beta particles present in the sample and is the sum of all beta-emitting isotopes.

173.436 (called “activity concentration for exempt material” and “activity limit for exempt consignment,” respectively), and the transport limit is calculated from these values.

(1) The radioactivity concentration limit for Ra-226 and Ra-228 is 2.7×10^{-10} Ci/g . This is equal to 270 pCi/g which is 2.7×10^5 pCi/l if we assume a density 1 g/ml (the actual density for the SGEWW must be used in the calculations).

(2) The consignment activity limit is 2.7×10^{-7} Ci for Ra-226 and 2.7×10^{-6} Ci for Ra-228. These limits are equal to 2.7×10^5 pCi and 2.7×10^6 pCi, respectively.

(3) The transport limit is the product of the radioactivity concentration limit and the consignment activity limit for each isotope present. For Ra-226, the transport limit is 7.29×10^7 pCi²/g; for Ra-228, it is 7.29×10^8 pCi²/g. Maximum consignment loads of SGEWW allowed for barge transport shall not exceed transport limits for any radioactive isotope.

b. With the above limit values and analytical results obtained per paragraph 1 of this enclosure, the barge owner must calculate the total radioactivity limit for each isotope present in the SGEWW. The total radioactivity limit, as defined in paragraph 5 of the policy letter, is the isotope’s given transport limit divided by the actual concentration of that isotope in the SGEWW.

(1) Single Isotope Present. If only one radioactive isotope is present in the SGEWW, the permissible volume of SGEWW for shipping based on that isotope is the total radioactivity limit for the isotope divided by the concentration of the isotope in the SGEWW.

(2) Multiple Isotopes Present. If more than one radioactive isotope is present in the SGEWW, the total radioactivity in the consignment load is limited and must meet the following:

$$\sum_i \frac{V_B C_i^2}{Z_i} \leq 1$$

Where:

V_B is the volume of the barge,

C_i is the actual concentration of isotope i in the SGEWW

Z_i is the transport limit for isotope i .

If the sum exceeds 1, the volume of SGEWW transported per barge must be decreased, or the SGEWW must be diluted. See Enclosure (3) of this policy letter for sample calculations.

c. Enclosure (4) of this policy letter contains the interim minimum carriage requirements for Conditionally Permitted SGEWW. Enclosure (4) assumes the Conditionally Permitted SGEWW does not contain other non-radioactive hazardous materials. If the report of analysis identifies other non-radioactive hazardous materials, then the barge owner must comply with all applicable regulations.

CHANGES IN BARGE CARGO. Prior to carrying a different cargo in a tank which previously carried Conditionally Permitted SGEWW under this policy letter, the tank must be surveyed as described in paragraph 3.b of this enclosure and meet the contamination limits established in the

Pipeline and Hazardous Materials Safety Administration's (PHMSA) regulations (49 CFR 176.715 and 49 CFR 173.443).

3. SAFETY CONDITIONS AND PROCEDURES TO PROTECT PERSONNEL.

a. The Coast Guard is concerned that, over time, sediment and deposits with radioisotopes may accumulate on the inside of the barge tank surface and may pose a health risk to personnel entering the tank. The Coast Guard's concern with respect to radioisotopes is to ensure that radiation exposure duration and levels are both kept as low as reasonably achievable, within the meaning of Nuclear Regulatory Commission regulations, 10 CFR 20.1003 and 10 CFR 20.1101(b). The procedure described in this paragraph is specifically intended to mitigate the danger of accumulating radioactive substances due to the presence of SGEWW.

b. Prior to any personnel entering a barge tank used to transport Conditionally Permitted SGEWW, the barge owner must verify the barge is safe to enter and that its radioactivity level does not exceed contamination limits established in PHMSA's regulations (49 CFR 176.715 and 49 CFR 173.443) for radioactive contamination (fixed and non-fixed). The barge owner must accomplish this verification by having a radiation monitor survey the barge interior to assess the radioactivity present. The radiation monitor must use properly calibrated instruments that are routinely tested for operability. If the radioactivity level exceeds contamination limits, the barge owner must ensure that the barge is cleaned. Cleaning includes removing any precipitated solids to reduce the radioactivity level. After cleaning, the barge owner will have the radiation monitor conduct a new survey to confirm reduction of radioactivity to within permissible contamination limits established in PHMSA's regulations. The barge owner must ensure that water used during and collected from cleaning the barge, including solids, is treated and disposed of in the same manner as Conditionally Permitted SGEWW. The barge owner must make the survey records available for Coast Guard inspection on request.

c. Barge tanks carrying Conditionally Permitted SGEWW under this policy letter must have open venting to prevent accumulation of radon, a daughter radionuclide of both Ra-226 and Ra-228, in the tank head space. The barge owner must ensure that all personnel avoid areas where gas from the tanks may escape, especially during loading and offloading.

Enclosure (2) to CG-ENG Policy Letter 13-XX

2540-PM-BWM0347 Rev. 7/2010
Instructions



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

FORM 26R CHEMICAL ANALYSIS OF RESIDUAL WASTE ANNUAL REPORT BY THE GENERATOR INSTRUCTIONS

GENERAL INFORMATION

General Instructions. This package is designed to assist an *existing client with DEP* in completing the annual report form. This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. Attach additional sheets as necessary.

General References: 287.54

Date Prepared/Revised. Provide the date the application was prepared and/or revised. When additional sheets are attached to include additional information, identify each attached sheet as Form 26R, reference the item number and identify the date prepared/revised. The "Date Prepared/Revised" on any attached sheets needs to match the "Date Prepared/Revised" on the completed annual report form. Please type or print clearly when completing the form.

SECTION A. CLIENT (GENERATOR OF THE WASTE) INFORMATION

Company Name. Identify the company name. Include the company's mailing address, phone number and email address.

Subsidiary/Parent Company. If the company identified is a subsidiary, identify the name of the parent company and the EPA Generator ID number.

Company Contact. Identify the company's contact and include the contact's phone number and email address.

Waste Generation Location. If the waste generated is not at the company's mailing address, describe the location of the waste generation; and provide the township, county, and state.

SECTION B. WASTE DESCRIPTION

Residual Waste. Enter the code that represents the type of residual waste. The list of Residual Waste Codes (RWC) can be found on the 'Codes Residual Waste' document included with this package. Also include the code's description, the amount of waste; the unit of measurement, and the timeframe for disposal/processing. If the timeframe is 'one time' check the box; if other than 'one time' provide the appropriate timeframe.

1. GENERAL PROPERTIES

- a. **pH Range.** Indicate the pH range based on analyses or knowledge.
- b. **Physical State.** Check appropriate box to indicate physical state.

- c. Physical Appearance.** Describe the color and odor of the waste. Enter the number of solid and/or liquid phases of separation and describe each phase. For example, two phases: one yellow oily liquid and one gray granular solid.

2. CHEMICAL ANALYSIS ATTACHMENTS

Check the appropriate box to indicate if required information is attached to the completed annual report form.

The analytical methodologies used shall be those set forth in the most recent edition of the EPA's Test Methods for Evaluating Solid Waste (SW-846), Methods for Chemical Analysis of Water and Wastes (EPA 600/4-79-020), Standard Methods for the Examination of Water and Wastewater (prepared jointly by the American Public Health Association, American Water Works Association, and Water Environment Federation), or a comparable method subsequently approved by EPA or the Department.

The person taking the samples and the laboratory performing the analysis shall employ the quality assurance/quality control procedures described in the EPA's Test Methods for Evaluating Solid Waste (SW-846) or Handbook for Analytical Quality Control in Water and Wastewater Laboratories (EPA 600/4-79-019).

All analyses submitted must specify the method used and any special preparation, deviation from the method, or pertinent observations. Each analysis sheet must include: *date of sampling, date of analysis, name of laboratory performing test, laboratory accreditation number, laboratory contact person and phone number*. Analytical determinations should be run on the samples, as is, unless otherwise specified in the cited method. Report the analyses in mg/kg on a dry weight basis for solids or in mg/L for liquids, or as otherwise specified in cited method.

No single analytical method is applicable for all waste streams and some modifications may be necessary for unusual waste types. Any modifications, however, must be approved by the Department.

If the sample is of unknown origin or characteristics, contact the appropriate Department regional office prior to analysis.

Chemical analysis of the waste must include the following unless the generator certifies, in writing, either the concentration of the parameter or the absence of the parameter based on his/her knowledge of the manufacturing or pollution control process:

- a. Gross Analysis.** The total concentration of any constituent present at 1% or greater.
- b. Trace Analysis.** The total concentration of any constituent listed in Appendix VIII (40 CFR 261.34(e), as incorporated by reference at 25 Pa. Code 261a.1) which, based upon generator knowledge of the waste and the process generating the waste, are likely to be found in the waste at concentrations exceeding 50 ppm.

c. Hazardous Waste Determination. As required under 40 CFR262.11, and as incorporated by reference at 25 Pa. Code 262a.1.

- 1) pH
- 2) Ignitability
- 3) Reactive Sulfide
- 4) Reactive Cyanide
- 5) Toxicity Characteristic Leaching Procedure (TCLP) - include all parameters found in 40 CFR 261.24, as incorporated by reference at 25 Pa. Code 261a.1, as well as pH of extract. Report all results in mg/L or as otherwise specified in method.

d. Wastewater Produced from the Drilling, Completion and Production of a Marcellus Shale or Other Shale Gas Well. In lieu of the Trace Analysis described in subsection b., the chemical analysis of wastewater produced from the drilling, completion and production of a Marcellus Shale or other shale gas well must include the following:

Acidity	Calcium	Lead	Selenium
Alkalinity (Total as CaCO ₃)	Chemical Oxygen Demand	Lithium	Silver
Aluminum	Chlorides	Magnesium	Sodium
Ammonia Nitrogen	Chromium	Manganese	Specific Conductance
Arsenic	Cobalt	MBAS (Surfactants)	Strontium
Barium	Copper	Mercury	Sulfates
Benzene	Ethylene Glycol	Molybdenum	Thorium
Beryllium	Gross Alpha	Nickel	Toluene
Biochemical Oxygen Demand	Gross Beta	Nitrite-Nitrate Nitrogen	Total Dissolved Solids
Boron	Hardness (Total as CaCO ₃)	Oil & Grease	Total Kjeldahl Nitrogen
Bromide	Iron – Dissolved	pH	Total Suspended Solids
Cadmium	Iron – Total	Phenolics (Total)	Uranium
		Radium 226	Zinc
		Radium 228	

Additional constituents that are expected or known to be present in the wastewater.

*Note - All metals reported as total.

For impoundments and tanks, the chemical analysis must represent the volume of wastewater stored in the impoundment or tank. A representative analysis is based upon the frequency, location and number of samples. Samples of an impoundment should be taken from various locations and wastewater depths as identified on a grid. Grab samples should be used for pH volatile organic compounds, phenolics, and oil and grease. Composite samples should be used for other analytes. If multiple loads of wastewater are removed from the same impoundment or tanks for transfer, processing, treatment or disposal, the same chemical analysis of the wastewater may be used repeatedly without further analysis, provided the analysis remains representative of the impoundment. If large volumes of water, wastewater or other fluids are added to the impoundment, a new chemical analysis must be performed that is representative of the impoundment.

e. Additional Analyses. Any additional parameters as required.

- 1) On Form U (if waste is managed at a Pennsylvania facility)
- 2) By conditions in a permit or approval, for management of the waste.
- 3) By the facility(ies) managing the waste.

3. PROCESS DESCRIPTION & SCHEMATIC ATTACHMENTS

a. Manufacturing and/or Pollution Control Processes. Check the appropriate box to indicate if a detailed description of the manufacturing and/or pollution control processes producing the waste is attached.

Describe the manufacturing process that produced the waste and any pollution control methods involved. This must include the raw materials used in the process, any intermediate products formed, final products, and any substances added during treatment. For non-hazardous waste, provide sufficient detail to demonstrate the waste is not a listed hazardous waste. For example:

"Resol Resin Manufacture"

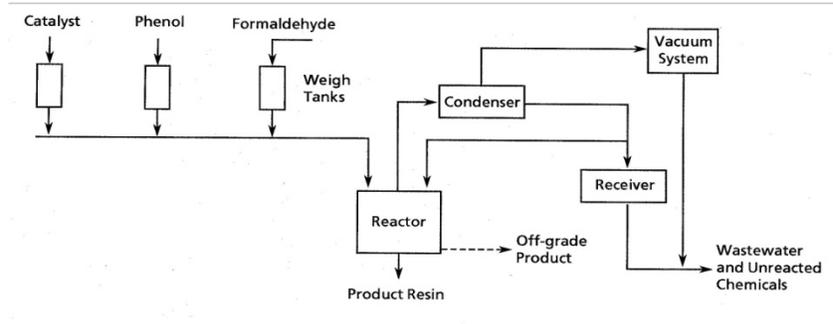
"These resins are formed by reacting phenol, or a substituted phenol with formaldehyde which contains an excess of formaldehyde. An alkali (sodium hydroxide) is used to catalyze the polymerization which takes place at a pH of between 8 and 11 and at a temperature of 60°C."

"When the desired degree of polymerization has occurred, the kettle is cooled to about 35°C to inhibit further reaction. The caustic may be neutralized in the kettle with sulfuric acid at this time. The water from this distillation forms a concentrated waste of unreacted materials and low molecular weight resin."

"The batch is dumped, and depending on the specific resin, the batch may be washed several times and a vacuum may be used during the dehydration cycle. It is important that molten resin be handled quickly to avoid its setting up to an insoluble, infusible mass which would become a waste."

b. Schematic of Manufacturing and/or Pollution Control Processes. Check the appropriate box to indicate if a schematic of the manufacturing and/or pollution control processes producing the waste is attached.

Provide, on 8½ x 11" size paper, flow schematics of the manufacturing and/or pollution control processes generating the waste stream starting with the raw materials and ending with the final products. (See example on next page.)



c. **Confidentiality Claim.** Check the appropriate box to indicate if the substantiation for a confidentiality claim (if portions of the information submitted are confidential) is attached.

Information submitted to the Department in this portion of the form may be claimed as confidential by the applicant. If no claim is made at the time of submission, the Department shall make the information available to the public without further notice.

Claim of confidentiality shall address the following:

- The portions of the information claimed to be confidential.
- The length of time the information is to remain confidential.
- The measures taken to guard undesired disclosure of the information to others.
- The extent to which the information has been disclosed to others and the precautions taken in connection with that disclosure.
- A copy of pertinent confidentiality determinations by EPA or any other federal agency.
- The nature of the substantial harm to the competitive position by disclosure of the information, the reasons it should be viewed as substantial, and the relationship between the disclosure and the harm.

SECTION C. MANAGEMENT OF RESIDUAL WASTE

1. PROCESSING OR DISPOSAL FACILITY(IES)

On the annual report form, Items a through d are repeated twice (to accommodate identification of two facilities). Attach additional sheets if necessary to identify all facilities being utilized.

For each facility identified, include the facility name and address; the municipality and county in which the facility is located; the facility's contact person (name, title, phone, and email address); and the volume of waste shipped to the processing or disposal facility in the previous year.

2. BENEFICIAL USE

Indicate whether the waste has been approved for beneficial use; and include the general permit number or approval number. Also identify the volume of waste beneficially used in the previous year.

SECTION D. CERTIFICATION

In accordance with 25 Pa. Code 287.54(f), information required in "Waste Description", if previously submitted to the Department, may be omitted from the annual report form, provided the generator certifies that this information has not changed from that set forth for the previous year. The generator is to check the appropriate box(es) in this area of the annual report form, identify the form(s) and date(s) of submission on which the information is found, and sign the certification statement.

If none of the "Waste Description" information is omitted, do not check any of the boxes; but do sign the certification statement.

The completed annual report form shall be signed by a responsible official for the facility that generated the waste.

Department of Environmental Protection

Southeast Regional Office
2 East Main Street
Norristown, PA 19401-4915
Phone (484) 250-5960

Northeast Regional Office
2 Public Square
Wilkes-Barre, PA 18711
Phone (570) 826-2516

Southcentral Regional Office
909 Elmerton Avenue
Harrisburg, PA 17110
Phone (717) 705-4706

Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222
Phone (412) 442-4000

Northcentral Regional Office
208 W. 3rd St., Suite 101
Williamsport, PA 17701
Phone (570) 327-3653

Northwest Regional Office
230 Chestnut Street
Meadville, PA 16335
Phone (814) 332-6848

Enclosure (3) to CG-ENG Policy Letter 13-XX
Sample Calculations for Maximum Allowed Volume

Example 1: Single Isotope: Low Radium-226 Concentration

A batch of SGEWW has been tested, and the only isotope identified in the water is Ra-226. The concentration of Ra-226 is $150 \frac{\text{pCi}}{\text{l}}$ in the water, and the density of the water is $1.4 \frac{\text{g}}{\text{ml}}$.

$$\text{Ra-226 concentration} = 150 \frac{\text{pCi}}{\text{l}}$$

$$\text{Density} = 1.4 \frac{\text{g}}{\text{ml}} = 1400 \frac{\text{g}}{\text{l}}$$

The radioactivity concentration limit is found in 49 CFR 173.436 or paragraph 2.a(1) of Enclosure (1) of this policy letter. The value, which is defined as pCi per gram, can be converted to pCi per liter by multiplying by the actual density of the SGEWW as determined from the analysis conducted for paragraph 1 of Enclosure (1).

$$\text{Ra-226 radioactivity concentration limit: } 270 \frac{\text{pCi}}{\text{g}} * 1400 \frac{\text{g}}{\text{l}} = 3.78 \times 10^5 \frac{\text{pCi}}{\text{l}}$$

The consignment activity limit is found in 49 CFR 173.436 or paragraph 2.a(1) of Enclosure (1) of this policy letter.

$$\text{Ra-226 consignment activity limit: } 2.7 \times 10^{-7} \text{ Ci} = 2.7 \times 10^5 \text{ pCi}$$

The concentration of the radioactive isotope in the SGEWW must be less than the radioactivity concentration limit. SGEWW does not exceed radioactivity concentration limit:

$$150 \frac{\text{pCi}}{\text{l}} < 3.78 \times 10^5 \frac{\text{pCi}}{\text{l}}$$

The transport limit, Z, for Ra-226 is calculated by multiplying the radioactivity concentration limit and the consignment activity limit.

$$Z = 270 \frac{\text{pCi}}{\text{g}} * 2.7 \times 10^5 \text{ pCi} = 7.29 \times 10^7 \frac{\text{pCi}^2}{\text{g}}$$

This can be converted from gram basis to liter basis by multiplying by the density, as above:

$$7.29 \times 10^7 \frac{\text{pCi}^2}{\text{g}} * 1400 \frac{\text{g}}{\text{l}} = 1.02 \times 10^{11} \frac{\text{pCi}^2}{\text{l}}$$

To find the total radioactivity limit, L, allowed to be transported in one barge, divide the transport limit, Z, by the actual concentration of the isotope as determined by the analysis from paragraph 1 of Enclosure (1).

$$L = \text{transport limit} / \text{actual concentration} = \frac{(1.02 \times 10^{11} \frac{\text{pCi}^2}{\text{l}})}{(150 \frac{\text{pCi}}{\text{l}})} = 6.8 \times 10^8 \text{ pCi}$$

So the total radioactivity in the barge cannot exceed 6.8×10^8 pCi. The maximum volume allowed to be carried in the barge is the total radioactivity limit, L, divided by the actual concentration of the isotope as determined by the analysis from paragraph 1 of Enclosure (1).

$$\text{Maximum volume allowed} = \frac{6.8 \times 10^8 \text{ pCi}}{\text{concentration}} = \frac{6.8 \times 10^8 \text{ pCi}}{150 \frac{\text{pCi}}{\text{l}}} = 4.536 \times 10^6 \text{ l}$$

The volume in liters can be converted to bbl by dividing by the number of liters per gallon and the number of gallons per bbl.

$$4.536 \times 10^6 \text{ l} * \frac{1 \text{ gal}}{3.78 \text{ l}} * \frac{1 \text{ bbl}}{42 \text{ gal}} = 28,571 \text{ bbl}$$

Since the barge can only hold 10,000 bbl which is less than the maximum allowed volume (28,571 bbl), the entire barge may be shipped with water at $150 \frac{\text{pCi}}{\text{l}}$.

Example 2: Single Isotope: High Radium-226 Concentration

A batch of SGEWW has been tested and the only isotope identified in the water is Ra-226. The concentration of Ra-226 is $550 \frac{\text{pCi}}{\text{l}}$ in the water, and the density of the SGEWW is $1.5 \frac{\text{g}}{\text{ml}}$.

$$\text{Ra-226 concentration} = 550 \frac{\text{pCi}}{\text{l}}$$

$$\text{Density} = 1.5 \frac{\text{g}}{\text{ml}} = 1500 \frac{\text{g}}{\text{l}}$$

The radioactivity concentration limit is found in 49 CFR 173.436 or paragraph 2.a(1) of Enclosure (1) of this policy letter. The value, which is defined as pCi per gram, can be converted to pCi per liter by multiplying by the actual density of the SGEWW as determined from the analysis conducted for paragraph 1 of Enclosure (1).

$$\text{Ra-226 radioactivity concentration limit: } 270 \frac{\text{pCi}}{\text{g}} * 1500 \frac{\text{g}}{\text{l}} = 4.05 \times 10^5 \frac{\text{pCi}}{\text{l}}$$

The consignment activity limit is found in 49 CFR 173.436 or paragraph 2.a(1) of Enclosure (1) of this policy letter.

$$\text{Ra-226 consignment activity limit: } 2.7 \times 10^{-7} \text{ Ci} = 2.7 \times 10^5 \text{ pCi}$$

The concentration of the radioactive isotope in the SGEWW must be less than the radioactivity concentration limit. SGEWW does not exceed radioactivity concentration limit:

$$550 \frac{\text{pCi}}{\text{l}} < 4.05 \times 10^5 \frac{\text{pCi}}{\text{l}}$$

The transport limit, Z, for Ra-226 is calculated by multiplying the radioactivity concentration limit and the consignment activity limit.

$$Z = 270 \frac{\text{pCi}}{\text{g}} * 2.7 \times 10^5 \text{ pCi} = 7.29 \times 10^7 \frac{\text{pCi}^2}{\text{g}}$$

This can be converted from gram basis to liter basis by multiplying by the density, as above:

$$7.29 \times 10^7 \frac{\text{pCi}^2}{\text{g}} * 1500 \frac{\text{g}}{\text{l}} = 1.09 \times 10^{11} \frac{\text{pCi}^2}{\text{l}}$$

To find the total radioactivity limit, L, allowed to be transported in one barge, divide the transport limit, Z, by the actual concentration of the isotope as determined by the analysis from paragraph 1 of Enclosure (1).

$$L = \text{transport limit/actual concentration} = \frac{(1.09 \times 10^{11} \frac{\text{pCi}^2}{\text{l}})}{(550 \frac{\text{pCi}}{\text{l}})} = 1.99 \times 10^8 \text{ pCi}$$

So the total radioactivity in the barge cannot exceed 1.99×10^8 pCi. The maximum volume allowed to be carried in the barge is the total radioactivity limit, L, divided by the actual concentration of the isotope as determined by the analysis from paragraph 1 of Enclosure (1).

$$\text{Maximum volume allowed} = \frac{1.99 \times 10^8 \text{ pCi}}{\text{concentration}} = \frac{1.99 \times 10^8 \text{ pCi}}{550 \frac{\text{pCi}}{\text{l}}} = 361,800 \text{ l}$$

The volume in liters can be converted to bbl by dividing by the number of liters per gallon and the number of gallons per bbl.

$$361,800 \text{ l} * \frac{1 \text{ gal}}{3.78 \text{ l}} * \frac{1 \text{ bbl}}{42 \text{ gal}} = 2279 \text{ bbl}$$

The maximum volume of water at $550 \frac{\text{pCi}}{\text{l}}$ that can be shipped in one barge is 2279 bbl.

Example 3: Multiple Isotopes

A batch of SGEWW has been tested and two isotopes were identified in the water, Ra-226 and Ra-228. The concentrations of Ra-226 and Ra-228 are $225 \frac{\text{pCi}}{\text{l}}$ and $400 \frac{\text{pCi}}{\text{l}}$, respectively, and the density of the SGEWW is 1.4 g/ml.

$$\text{Ra-226 concentration} = 225 \frac{\text{pCi}}{\text{l}}$$

$$\text{Ra-228 concentration} = 400 \frac{\text{pCi}}{\text{l}}$$

$$\text{Density} = 1.4 \frac{\text{g}}{\text{ml}} = 1400 \frac{\text{g}}{\text{l}}$$

The radioactivity concentration limits for each isotope are found in 49 CFR 173.436 or paragraph 2.a(1) of Enclosure (1) of this policy letter. The values, which are defined as pCi per gram, can be converted to pCi per liter by multiplying by the actual density of the SGEWW as determined from the analysis conducted for paragraph 1 of Enclosure (1).

$$\text{Ra-226 radioactivity concentration limit: } 270 \frac{\text{pCi}}{\text{g}} * 1400 \frac{\text{g}}{\text{l}} = 3.78 \times 10^5 \frac{\text{pCi}}{\text{l}}$$

$$\text{Ra-228 radioactivity concentration limit: } 270 \frac{\text{pCi}}{\text{g}} * 1400 \frac{\text{g}}{\text{l}} = 3.78 \times 10^5 \frac{\text{pCi}}{\text{l}}$$

The consignment activity limits are found in 49 CFR 173.436 or paragraph 2.a(1) of Enclosure (1) of this policy letter.

$$\text{Ra-226 consignment activity limit: } 2.7 \times 10^{-7} \text{ Ci} = 2.7 \times 10^5 \text{ pCi}$$

$$\text{Ra-228 consignment activity limit: } 2.7 \times 10^{-6} \text{ Ci} = 2.7 \times 10^6 \text{ pCi}$$

The concentration of each radioactive isotope in the SGEWW must be less than its radioactivity concentration limit. SGEWW does not exceed radioactivity concentration limit for either isotope:

$$\text{Ra-226 : } 225 \frac{\text{pCi}}{\text{l}} < 3.78 \times 10^5 \frac{\text{pCi}}{\text{l}}$$

$$\text{Ra-228: } 400 \frac{\text{pCi}}{\text{l}} < 3.78 \times 10^5 \frac{\text{pCi}}{\text{l}}$$

The transport limit, Z, must be determined for each isotope and is calculated by multiplying the radioactivity concentration limit and the consignment activity limit for each isotope. The transport limit for Ra-226 will be represented by Z₁, and the transport limit for Ra-228 will be represented by Z₂.

$$Z_1 = 270 \frac{\text{pCi}}{\text{g}} * 2.7 \times 10^5 \text{ pCi} = 7.29 \times 10^7 \frac{\text{pCi}^2}{\text{g}}$$

$$Z_2 = 270 \frac{\text{pCi}}{\text{g}} * 2.7 \times 10^6 \text{ pCi} = 7.29 \times 10^8 \frac{\text{pCi}^2}{\text{g}}$$

These can be converted from gram basis to liter basis by multiplying by the density, as above:

$$\text{Ra-226: } 7.29 \times 10^7 \frac{\text{pCi}^2}{\text{g}} * 1400 \frac{\text{g}}{\text{l}} = 1.02 \times 10^{11} \frac{\text{pCi}^2}{\text{l}}$$

$$\text{Ra-228: } 7.29 \times 10^8 \frac{\text{pCi}^2}{\text{g}} * 1400 \text{ g/l} = 1.02 \times 10^{12} \frac{\text{pCi}^2}{\text{l}}$$

Since more than one radioactive isotope is present in the SGEWW, the total radioactivity in the consignment load must meet the following summation:

$$\sum_i \frac{V_B C_i^2}{Z_i} \leq 1$$

Where:

V_B is the volume of the barge,

C_i is the actual concentration of isotope i in the SGEWW

Z_i is the transport limit for isotope i.

For two isotopes, the equation can be simplified to

$$\frac{V_B C_1^2}{Z_1} + \frac{V_B C_2^2}{Z_2} \leq 1$$

Where:

V_B is the volume of the barge,

C₁ is the actual concentration of Ra-226 in the SGEWW

C₂ is the actual concentration of Ra-228 in the SGEWW

Z₁ is the transport limit for Ra-226

Z₂ is the transport limit for Ra-228.

The volume of the barge is 10,000 bbl, which can be converted to liters by multiplying by the number of liters per gallon and the number of gallons per bbl.

$$V_B = 10,000 \text{ bbl} * \frac{42 \text{ gal}}{1 \text{ bbl}} * \frac{3.78 \text{ l}}{1 \text{ gal}} = 1,578,600 \text{ l}$$

$$C_1 = 225 \frac{\text{pCi}}{\text{l}}$$

$$C_2 = 400 \frac{\text{pCi}}{\text{l}}$$

$$Z_1 = 1.02 \times 10^{11} \frac{\text{pCi}^2}{\text{l}}$$

$$Z_2 = 1.02 \times 10^{12} \frac{\text{pCi}^2}{\text{l}}$$

Substituting into the above equation:

For Ra-226

$$\frac{V_B C_1^2}{Z_1} = \frac{1,587,600 \text{ l} * (225 \frac{\text{pCi}}{\text{l}})^2}{1.02 \times 10^{11} \frac{\text{pCi}^2}{\text{l}}} = 0.79$$

For Ra-228

$$\frac{V_B C_2^2}{Z_2} = \frac{1,587,600 \text{ l} * (400 \frac{\text{pCi}}{\text{l}})^2}{1.02 \times 10^{12} \frac{\text{pCi}^2}{\text{l}}} = 0.25$$

Therefore,

$$\frac{V_B C_1^2}{Z_1} + \frac{V_B C_2^2}{Z_2} = 0.79 + 0.25 = 1.04 \geq 1$$

So, this SGEWW is not permitted to be transported in a barge unless the SGEWW is diluted or the volume is reduced.

Reduce Barge Volume

If the volume in the barge is reduced to 9500 bbl:

$$V_B = 9500 \text{ bbl} * \frac{42 \text{ gal}}{1 \text{ bbl}} * \frac{3.78 \text{ l}}{1 \text{ gal}} = 1,508,220 \text{ l}$$

$$C_1 = 225 \frac{\text{pCi}}{\text{l}}$$

$$C_2 = 400 \frac{\text{pCi}}{\text{l}}$$

$$Z_1 = 1.02 \times 10^{11} \frac{\text{pCi}^2}{\text{l}}$$

$$Z_2 = 1.02 \times 10^{12} \frac{\text{pCi}^2}{\text{l}}$$

For Ra-226

$$\frac{V_B C_1^2}{Z_1} = \frac{1,508,220 \text{ l} * (225 \frac{\text{pCi}}{\text{l}})^2}{1.02 \times 10^{11} \frac{\text{pCi}^2}{\text{l}}} = 0.75$$

For Ra-228

$$\frac{V_B C_2^2}{Z_2} = \frac{1,508,220 \text{ l} * (400 \frac{\text{pCi}}{\text{l}})^2}{1.02 \times 10^{12} \frac{\text{pCi}^2}{\text{l}}} = 0.24$$

Therefore,

$$\frac{V_B C_1^2}{Z_1} + \frac{V_B C_2^2}{Z_2} = 0.79 + 0.24 = 0.99 \leq 1$$

So, SGEWW with a Ra-226 concentration of $225 \frac{\text{pCi}}{\text{l}}$ and a Ra-228 concentration of $400 \frac{\text{pCi}}{\text{l}}$ can be shipped if the volume in the barge is limited to 9500 bbl.

Diluted SGEWW

If the SGEWW is diluted by 5%:

$$V_B = 10,000 \text{ bbl} * \frac{42 \text{ gal}}{1 \text{ bbl}} * \frac{3.78 \text{ l}}{1 \text{ gal}} = 1,578,600 \text{ l}$$

$$\text{Diluted } C_1 = 214 \frac{\text{pCi}}{\text{l}}$$

$$\text{Diluted } C_2 = 381 \frac{\text{pCi}}{\text{l}}$$

$$Z_1 = 1.02 \times 10^{11} \frac{\text{pCi}^2}{\text{l}}$$

$$Z_2 = 1.02 \times 10^{12} \frac{\text{pCi}^2}{\text{l}}$$

For Ra-226

$$\frac{V_B C_1^2}{Z_1} = \frac{1,587,600 \text{ l} * (214 \frac{\text{pCi}}{\text{l}})^2}{1.02 \times 10^{11} \frac{\text{pCi}^2}{\text{l}}} = 0.71$$

For Ra-228

$$\frac{V_B C_2^2}{Z_2} = \frac{1,587,600 \text{ l} * (381 \frac{\text{pCi}}{\text{l}})^2}{1.02 \times 10^{12} \frac{\text{pCi}^2}{\text{l}}} = 0.22$$

Therefore,

$$\frac{V_B C_1^2}{Z_1} + \frac{V_B C_2^2}{Z_2} = 0.71 + 0.22 = 0.93 \leq 1$$

So, SGEWW with a Ra-226 concentration of $225 \frac{\text{pCi}}{\text{l}}$ and a Ra-228 concentration of $400 \frac{\text{pCi}}{\text{l}}$ can be shipped if the SGEWW is diluted by 5% prior to shipment.

Enclosure (4) to CG-ENG Policy Letter 13-XX
Interim Minimum Requirements for the Carriage on Unmanned Barges, 46 CFR 153

This commodity has been assigned to Group 43 (Miscellaneous Water Solutions) as listed in 46 CFR Part 150.

Minimum Requirements Proposed for the Carriage on Unmanned Barges, 46 CFR 153

Cargo Name	Shale Gas Extraction Waste Water
Pressure	Atmosphere
Temp	Ambient
Hull Type	III
Cargo Segregation Tank	1 i 2 i
Tanks	
Tank Type	Integral Gravity
Tank Vent	Open
Gauging Device	Open
Cargo Transfer	
Piping Class	II
Control	G-1
Environmental Control	
Cargo Tanks	Ventilated (natural)
Cargo Handling Space	Vent N
Fire Protection	No
Special Requirements	N/A
Electrical Hazard Class and Group	I-C
Temp Control Install	N/A
Tank Internal Inspection Period	G

Properties Data Sheet

Date of Classification:	XXX xx, 2013
Cargo Name:	Shale Gas Extraction Waste Water
Compatibility Group:	43 (Miscellaneous Water Solutions)
Flash Point:	N/A
Boiling Point:	100°C, approximately that of water
Freezing Point:	0°C, approximately that of water
Specific Gravity:	~1.25@20°C
Solubility:	N/A
Flammability Grade:	N/A
CHRIS Code:	DRS

Enclosure (5) to CG-ENG Policy Letter 13-XX
Certificate of Inspection Endorsement for Carriage of Shale Gas Extraction Waste Water
(SGEWW)

Carriage authority

This barge meets the provisions in CG-ENG Policy Letter 13-XX and the requirements specified in COMDT (CG-ENG-5) Letter dated XX-XXX-XX to carry Shale Gas Extraction Waste Water (SGEWW).

Analyses. The barge owner must have each consignment load of SGEWW chemically analyzed, prior to carrying it on board the barge, in accordance with CG-ENG Policy Letter 13-XX and its Enclosures. SGEWW may contain radioactive isotopes of radium (Ra-226 and Ra-228). The barge owner must document that the transport limits of Ra-226 and Ra-228 in the SGEWW do not exceed 7.29×10^7 pCi²/g for Ra-226 or 7.29×10^8 pCi²/g for Ra-228. The barge owner must keep records for each analysis for two years and make them available to Coast Guard personnel on request.

Surveys – Change in Cargo. The barge owner must, prior to carrying a different cargo in a tank which previously carried Conditionally Permitted SGEWW under this policy letter, have the tank surveyed as described in Enclosure (1) and meet the contamination limits established in Pipeline and Hazardous Materials and Hazardous Materials Safety Administration (PHMSA) regulations (49 CFR 176.715 and 49 CFR 173.443) for radioactive contamination (fixed and non-fixed). The barge owner must keep records for each survey for two years and make them available to Coast Guard personnel on request.

Surveys—Prior to Personnel Entry. Prior to any personnel entering a barge tank used to transport Conditionally Permitted SGEWW, the barge owner must verify the barge is safe to enter and that its radioactivity level does not exceed contamination limits established in PHMSA regulations (49 CFR 176.715 and 49 CFR 173.443) for fixed and non-fixed radioactive contamination. The barge owner must ensure that a radiation monitor surveys the barge interior to assess the radioactivity present and that the radiation monitor uses properly calibrated instruments that are routinely tested for operability. If the radioactivity level exceeds contamination limits, the barge owner must ensure that the barge is cleaned. Cleaning includes removing any precipitated solids to reduce the radioactivity level. After cleaning, the barge owner will have the radiation monitor conduct a new survey to confirm reduction of radioactivity to within permissible contamination limits established in PHMSA's regulations. The barge owner must ensure that water used during and collected from cleaning the barge, including solids, is treated and disposed of in the same manner as SGEWW. The barge owner must keep records for each survey and make them available to Coast Guard personnel on request.

Venting. The barge owner must ensure that the barge provides open venting to prevent accumulation of radon, a daughter radionuclide of both Ra-226 and Ra-228, in the tank head space. The barge owner must ensure that personnel avoid areas where gas from the tanks may escape, especially during loading and offloading.

For questions regarding the carriage requirements of SGEWW, contact COMDT (CG-ENG-5) Hazardous Materials Division at (202) 372-1412 or HazmatStandards@uscg.mil.