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STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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September 24, 2018

18-NWP-150

Mr. William F. Hamel Jr., Assistant Manager for River and Plateau  
Richland Operations Office  
United States Department of Energy  
PO Box 550, MSIN: H5-20  
Richland, Washington 99352

Re: Proposal to Re-Designate Seven Low-Level Burial Grounds Waste Containers from Mixed  
Waste to Radioactive, Non-Dangerous Waste, Letter 16-AMRP-0078, dated January 20,  
2016

1235546

Proposal to Address Mixed Waste Containers in the Low-Level Burial Grounds Operating  
Group, Letter 17-AMRP-0062, dated December 28, 2016

1242104

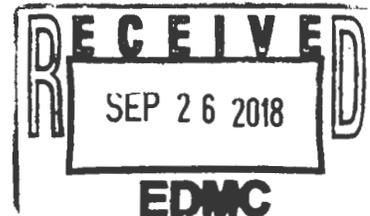
References: See page 2

Dear Mr. Hamel:

The Department of Ecology (Ecology) does not concur with the United States Department of Energy, Richland Operations Office (USDOE-RL) proposed re-designation of 12 of the 24 Green Islands in the Low-Level Burial Grounds from mixed waste to radioactive, non-dangerous waste (16-AMRP-0078, 17-AMRP-0062).

Ecology reviewed burial records, uniform hazardous waste manifests, and environmental calculations from DOE/RL-2014-43, Rev. 1 and 2, which were provided as the basis for the proposal (References 1 and 2). Ecology's final review was performed on Rev. 3, the most current report revision (Reference 3). Please see the enclosure, *Ecology Review of DOE/RL-2014-43, Rev. 3, Mixed Waste Disposed of in the Low-Level Burial Grounds*, for specific comments and concerns related to each Green Island.

In Letter 17-AMRP-0062, USDOE-RL also requested the remaining Green Islands be addressed by applying the alternative closure requirements of WAC 173-303-610(1)(e), using the Resource Conservation and Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) past-practice unit process.



25

10081  
Mr. Hamel  
September 24, 2018  
Page 2 of 3

18-NWP-150

Ecology does not concur at this time with the application of alternative closure requirements for any of the Green Islands, as USDOE-RL has not provided information demonstrating a release has occurred according to WAC 173-303-610(1)(e)(i). If USDOE-RL can demonstrate a release has occurred and chooses to apply for alternative closure requirements in the future, Ecology will consider the proposal.

If you have any questions, please contact me, or your staff may contact Kelly Elsethagen, Waste Management Project Manager, at [kelly.elsethagen@ecv.wa.gov](mailto:kelly.elsethagen@ecv.wa.gov) or (509) 372-7923.

Sincerely,



Suzanne Dahl  
Dangerous Waste Permit Manager  
Nuclear Waste Program

ke/am  
Enclosure

References:

1. Mixed Waste Disposed of in the Low-Level Burial Grounds, DOE/RL-2014-43, Revision 1.
2. Mixed Waste Disposed of in the Low-Level Burial Grounds, DOE/RL-2014-43, Revision 2.
3. Mixed Waste Disposed of in the Low-Level Burial Grounds, DOE/RL-2014-43, Revision 3.

cc: See page 3

Mr. Hamel  
September 24, 2018  
Page 3 of 3

18-NWP-150

cc electronic:

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Hanford Facility Operating Record  
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# Ecology review of DOE/RL-2014-43, Rev 3, Mixed Waste Disposed of in the Low-Level Burial Grounds

## Purpose and Background

The United States Department of Energy (DOE) provided to the Department of Ecology (Ecology) the document DOE/RL-2014-43, Rev. 3, *Mixed Waste Disposed of in the Low-Level Burial Grounds*, proposing to remove the dangerous waste designation for 12 Low-Level Burial Grounds (LLBG) Green Islands (GI). The report evaluates all 24 currently identified GIs and includes, when available, Uniform Hazardous Waste Manifests (UHWMs) and Solid Waste Burial Records (SWBR). The document includes Environmental Calculation Forms (ECFs) that discuss assumptions, methods, calculations, and results. These ECFs provide the basis for DOE's proposal.

Ecology's review, summarized on Table 1, concludes that dangerous waste designations will be retained for all 24 GIs evaluated. Ecology's comments address specific ECFs and the conclusions based on these ECFs. No comments are provided on the body of the report because all the currently identified GIs will remain subject to requirements of WAC 173-303.

The waste codes for each GI are included in most cases on the UHWMs, and were presumably assigned at the point of generation. DOE proposes to revise or remove many of these waste codes in DOE/RL-2014-43, Rev. 3, based on new calculation results that appear to reflect inappropriate application of the designation process described in EPA publication number 540-R-94-005A (RCRA Online document 13647). The use of this designation process is contingent on testing data obtained from a total waste analysis using an appropriate SW-846 method (RCRA Online document 13563). No documentation of total waste analysis testing data was provided for any of the GI's. In addition, the analysis in DOE/RL-2014-43, Rev. 3 assumes that the waste in each container is composed of a single waste stream. In the case of the various GI's, this assumption is at odds with available documentation of the subject wastes, and is not an acceptable basis for re-designation. There are various wastes in each container, which were identified and assigned waste codes at the point of generation. These wastes were then placed in containers along with other radioactive-only and non-regulated solid wastes. Using a total waste analysis process that takes into account the weight of other solid waste streams in the container to change or remove waste codes is impermissible dilution. Each waste stream must be designated at its point of generation, not after co-mingling with other wastes.

In addition to including the weight of other waste streams in the calculations, in most cases, the weight of the container and liners were also included, which is not allowed when designating waste as this also results in impermissible dilution.

For Washington State-only designations, the toxicity category is required to calculate equivalent concentrations for the toxicity criteria evaluation required by WAC 173-303-100(5). The toxicity category and their database source are provided in Table 2.

In regards to lead serving the purpose of shielding, Ecology considers lead shielding that has been discarded within the meaning of WAC 173-303-016(3)-(4) to be a solid waste because it has been disposed. For those GIs where lead has been identified as shielding, consistent with the United States Environmental Protection Agency (EPA) policy on lead shielding, Ecology agrees to remove the D008 waste code. However, the WT01 waste code will be applied because the lead is subject to regulation as a state-only, dangerous or extremely hazardous waste when it exceeds the threshold criteria under WAC 173-303-100. This determination is consistent with Ecology's Director's Determination for LLBG Trench 94, Ecology letter 18-NWP-062, dated April 20, 2018.

The comments are organized in order of the Landfills, then by applicable ECF(s) within the Landfill, and then by individual GIs addressed by the ECFs.

## Landfill 218-E-10

ECF-200SW2-16-0063 (Green Islands 1, 2, 3, 4, and 5)

### ***Green Island 1 Summary: Retain waste codes D008 and WT01.***

GI-1 contains 240 pounds of lead discarded as waste, and carries waste codes D008 and WT01 (UHW # WH-A-87-306, Pg. A-3). DOE proposes to retain D008 and remove WT01.

Basis (ECF-200SW2-16-0063, Pgs. G-18 through G-19):

1. Federal Hazardous Waste Determination: DOE concluded the regulatory level of 5 mg/L was exceeded, and the D008 waste code should be retained. Ecology agrees the D008 waste code should be retained as originally designated at the point of generation. Note: The calculation erroneously contained both the weight of the container and other waste streams. Also, documentation showing data used in the calculation was obtained through testing using an appropriate SW-846 method was not provided.
2. State-only Dangerous Waste Determination: No calculation was provided for removing the WT01 waste code. However, assuming the waste stream is 240 pounds of lead (i.e., leaving out container and other waste stream weight) results in an equivalent concentration of at least 1.0%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)). As a result, the waste continues to designate as WT01 as originally designated at the point of generation.

### ***Green Island 2 Summary: Retain waste codes D008 and WT01.***

GI-2 contains 5 pounds of lead discarded as waste and carries waste codes D008 and WT01 (SWBR # 221B-WHC-87-2, Pg. A-4). DOE proposes to remove D008 and WT01.

Basis (ECF-200SW2-16-0063, Pgs. G-19 through G-20):

1. Federal Hazardous Waste Determination: DOE concluded the regulatory level of 5 mg/L was not exceeded, and the D008 waste code should be removed. Ecology disagrees. DOE's conclusion appears to reflect inappropriate application of the designation process described in EPA publication number 540-R-94-005A (RCRA Online document 13647). The use of this designation process is contingent on testing data obtained from a total waste analysis using an appropriate SW-846 method (RCRA Online document 13563). No documentation of total waste analysis testing data was provided. Without direct testing of an extract of the waste to demonstrate that it does not exhibit the toxicity characteristic for lead, the waste code assigned at the point of generation cannot be removed. Note: The calculation erroneously contained both the weight of the container and other waste streams.
2. State-only Dangerous Waste Determination: The re-designation calculation for the WT01 waste code also included both the weight of the container and weight of the other waste streams, which is not allowed. Assuming the waste stream is 5 pounds of lead (i.e., leaving out container and other waste stream weight) results in an equivalent concentration of at least 1.0%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)). As a result, the waste continues to designate as WT01 as originally designated at the point of generation.

### ***Green Island 3 Summary: Retain waste codes D008 and WT01.***

GI-3 contains 270 pounds of lead discarded as waste and currently carries waste codes D008 and WT01 (SWBR # illegible, Pg. A-5). DOE proposes to retain D008 and remove WT01.

Basis (ECF-200SW2-16-0063, Pg. G-21):

1. Federal Hazardous Waste Determination: DOE concluded the regulatory level of 5 mg/L was exceeded, and the D008 waste code should be retained. Ecology agrees the D008 waste code should be retained as originally designated at the point of generation. Note: The calculation erroneously contained both the weight of the container and other waste streams. Also, documentation showing data used in the calculation was obtained through testing using an appropriate SW-846 method was not provided.

2. State-only Dangerous Waste Determination: No calculation was provided for removing the WT01 waste code. However, assuming the waste stream is 270 pounds of lead (i.e., leaving out container and other waste stream weight) results in an equivalent concentration of at least 1.0%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)). As a result, the waste continues to designate as WT01 as originally designated at the point of generation.

***Green Island 4 Summary: Retain waste codes D008 and WT01.***

GI-4 contains 2.2 pounds of lead discarded as waste and carries waste codes D008 and WT01 (SWBR # 221B-WHC-87-3, Pg. A-9; UHWM # 271B-87-3, Pg. A-10). DOE proposes to remove D008 and WT01.

Basis (ECF-200SW2-16-0063, Pgs. G-22 through G-23):

1. Federal Hazardous Waste Determination: DOE concluded the regulatory level of 5 mg/L was not exceeded, and the D008 waste code should be removed. Ecology disagrees. DOE's conclusion appears to reflect inappropriate application of the designation process described in EPA publication number 540-R-94-005A (RCRA Online document 13647). The use of this designation process is contingent on testing data obtained from a total waste analysis using an appropriate SW-846 method (RCRA Online document 13563). No documentation of total waste analysis testing data was provided. Without direct testing of an extract of the waste to demonstrate that it does not exhibit the toxicity characteristic for lead, the waste code which was assigned at the point of generation cannot be removed. Note: The calculation erroneously contained both the weight of the container and other waste streams.
2. State-only Dangerous Waste Determination: The re-designation calculation for the WT01 waste code also included both the weight of the container and weight of the other waste, which is not allowed. Assuming the waste stream is 2.2 pounds of lead (i.e., leaving out container and other waste stream weight) results in an equivalent concentration of at least 1.0%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)). As a result, the waste continues to designate as WT01 as originally designated at the point of generation.

***Green Island 5 Summary: Retain waste codes D008 and WT01.***

GI-5 contains 40 pounds of lead discarded as waste and carries waste codes D008 and WT01 (SWBR # 221B-WHC-87-4, Pg. A-12; UHWM # 271B-87-4, Pg. A-13). DOE proposes to retain D008 and remove WT01.

Basis (ECF-200SW2-16-0063, Pgs. G-23 through G-24):

1. Federal Hazardous Waste Determination: DOE concluded the regulatory level of 5 mg/L was exceeded, and the D008 waste code should be retained. Ecology agrees the D008 waste code should be retained as originally designated at the point of generation. Note: The calculation erroneously contained both the weight of the container and other waste streams. Also, documentation showing data used in the calculation was obtained through testing using an appropriate SW-846 method was not provided.
2. State-only Dangerous Waste Determination: No calculation was provided for removing the WT01 waste code. However, assuming the waste stream is 40 pounds of lead (i.e., leaving out container and other waste stream weight) results in an equivalent concentration of at least 1.0%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)). As a result, the waste continues to designate as WT01 as originally designated at the point of generation.

ECF-200SW2-16-0062 (Green Islands 6 and 7)

**Green Island 6 and 7 Summary: Remove waste code WC02, add waste code WT02.**

GI-6 and GI-7 each contain 14.3 pounds of di-n-octyl phthalate and carry waste code WC02, Washington State Carcinogen (Low-Level Waste Storage/Disposal Record PIN #'s 271B-91-000289 and 271B-91-000290, Pgs. A-15 through A-20). DOE proposes to remove WC02, and proposes that the waste does not exceed the toxicity criteria in WAC 173-303-100(5), and is unregulated.

Basis (ECF-200SW2-16-0062, Pgs. G-12 through G-14):

1. State-only Dangerous Waste Determination – WC02: Through an October 19, 1995, rule-making, the carcinogenic dangerous waste criterion, WC02, was removed from WAC 173-303-100. As a result, waste code WC02 no longer applies to GI-6 and GI-7.
2. State-only Dangerous Waste Determination – WT02: Di-n-octyl phthalate is a Category B toxic under the toxicity criteria of WAC 173-303-100(5). The calculation for determining toxicity included the weight of other waste streams, and weight of the grout that was presumably added for treatment or disposal purposes at the burial trench, for an additional 147,791.5 pounds in the calculation. The weight of other waste streams placed in the container and weight of grout added at the trench cannot be included when determining waste designations, as this is impermissible dilution. The calculation was redone using only the weight of the 12 HEPA filters (494.3 pounds) and weight of the di-n-octyl phthalate (14.3 pounds) for each waste stream. This approach is based on the waste description in the burial records which state: “Di-Octyl Phthalate is a clear liquid oil in its original state. In use it is vaporized and blown through HEPA filters. A significant amount remains in the filter media.” (Pgs. A-16 and A-19). The re-calculation resulted in an equivalent concentration of 0.0281% for both GI-6 and GI-7, exceeding the 0.001% toxicity criteria in WAC 173-303-100(5)(b)(iii)(B)). As a result, the waste designates as a WT02, Dangerous Waste.

## Landfill 218-W-3A

ECF-200SW2-16-0064 (Green Islands 8 through 16)

### ***Green Island 8 Summary: Remove waste code D008, retain waste code WT01.***

GI-8 contains 730 pounds of elemental lead shielding designated with waste codes D008 and WT01 (SWBR and UHWM # BETTS-MIN-87-1, Pgs. B-3 through B-4). DOE proposes to remove D008 and WT01.

DOE's basis for removal of the waste codes is that the lead is shielding, is still serving its intended purpose, and is therefore not a solid waste. Shipping records indicate the lead is shielding (Pg. B-5). DOE provides an EPA policy letter, and other documentation supporting this basis. Ecology is aware of EPA's policy on lead used as shielding, and agrees to remove the D008 waste code.

However, under the state's Hazardous Waste Management Act (Ch. 70.105 RCW and implementing dangerous waste regulations under Ch. 173-303 WAC) Ecology considers the lead shielding that has been discarded within the meaning of WAC 173-303-016(3)-(4) to be a solid waste because it has been disposed. Consistent with the designation of elemental lead shielding used in naval reactor compartments disposed in LLBG Trench 94, the lead shielding continues to designate as WT01 as originally designated at the point of generation.

### ***Green Island 9 Summary: Retain waste codes D001, F005, and WT01.***

The five containers in GI-9 designated with waste codes D001, F005, and WT01 due to containing spent toluene that was used in scintillation cocktails (SWBR # 340-PNL-87-3, Pg. B-19; UHWM # 28-7015, Pg. B-20). DOE proposes to remove D001, F005, and WT01.

Basis (ECF-200SW2-16-0064, Pgs. G-31 through G-33):

1. Federal Hazardous Waste Determination – F005: DOE proposes to remove waste code F005, with the basis that the toluene was not used for its solvent properties (Pg. G-32, Section D). The EPA has explained the regulation of scintillation fluids containing xylene and toluene when spent. Resource Conservation and Recovery Act (RCRA) Online document 11639 states, "...scintillation fluids containing xylene and toluene, when spent, would be classified as hazardous spent solvents when they satisfy the specific listings (i.e., F003 for xylene or F005 for toluene) because they are used for their "solvent" properties by mobilizing other constituents in solution and acting as a reaction medium." Also, in RCRA Online document 13258, EPA explains that xylene used in scintillation cocktails for measuring radioactivity in a wastewater would designate as a F003 listed waste when spent. As a result, the waste continues to designate as F005 as originally designated at the point of generation.
2. Federal Hazardous Waste Determination – D001: DOE proposes to remove D001, with the basis that the waste does not exhibit a dangerous waste characteristic under WAC 173-303-090. DOE states as background information, "The burial record indicated that the drums contained 5% paper products, 50% absorbent pads, and 45% other metals. It also indicated that these were dry solids. The manifest indicated that the drum had scintillation vials containing toluene and water. The manifest listed the proper shipping name as a flammable liquid." (Pg. G-31, Section A). DOE also states as an assumption, "The scintillation vials were packaged for disposal by placing them in galvanized open-head DOT specification 17C drum, lined with a rigid poly-ethylene liner. The scintillation vials were not opened. Sufficient absorbent was added to the drum to absorb at least twice the volume of liquid it contained (SD-WM-TI-093)." (Pg. G-39, Section B). The background stating the waste is dry solids, and assumptions stating scintillation vials were not opened do not correlate. If it is assumed the scintillation vials were not opened (Ecology notes this is standard practice when preparing a waste package containing used scintillation vials), it can only be assumed the waste is still in a liquid state inside the vials. Toluene has a flashpoint of 40 degrees Fahrenheit, thus exhibiting the characteristic criteria of ignitability (a liquid with a flashpoint less than 140 degrees Fahrenheit). As a result, the waste continues to designate as D001 as originally designated at the point of generation prior to treatment or commingling with other wastes.

3. State-only Dangerous Waste Determination: DOE proposes to remove WT01, with the following basis: "Toluene, CAS No. 108-88-3, in its pure form is toxic Category D (for all species) according to available data. This chemical is toxic Category D under the toxicity criteria of WAC 173-303-100(5). WAC 173-303-100(5) provides for state-only toxicity designations by following the instructions for book designation. WAC 173-303-100(5)(a) clarifies that if only some of the toxic constituents in a waste or only some of the constituent concentrations are known, and if the waste is undesignated for the known constituents or concentrations, then the waste is not designated under WAC 173-303-100. Because the toluene concentration in these wastes is unknown and the wastes are otherwise undesignated, they are undesignated under WAC 173-303-100." (Pgs. G-32 through G-33, Section E). As toluene used in scintillation cocktails designates as an F005 waste when spent, the waste is not "undesignated for the known constituents". As a result, the waste continues to designate as WT01 as originally designated at the point of generation, as there is no basis for removal.

***Green Island 10 Summary: Retain waste codes D005, D006, D007, D008, D009, and D011, and WT01.***

The fifteen containers of sludge in GI-10 designated as mixed waste with waste codes D005, D006, D007, D008, D009, D011, and WT01 due to the assumption that lead phosphate, among other wastes, was present, and that it is designated as an extremely hazardous waste (SWBR # 1608D-WHC-87-1, Pg. B-22; UHWM # 3-1R-7KM-X, Pg. B-23). DOE proposes to remove all of the waste codes.

Basis (ECF-200SW2-16-0064, Pgs. G-33 through G-34):

1. Federal Hazardous Waste Determination: DOE provides the following background which states: "The facility decommissioning Report indicated that the sludge was characterized and was not designated due to EP toxicity. It was designated however based on the equivalent concentration of various cations in the waste (Pb as PbP04, etc.). The final concentration of lead phosphate (7,300 ppm) resulted in designating the sludge as Extremely Hazardous Waste according to Washington State Regulations, WAC 173-303 (SD-DD-TI-024)." (Pg. G-33, Section A). The basis for removing D005, D006, D007, D008, D009, and D011 states: "The waste does not exhibit a dangerous waste characteristic under WAC 173-303-090. Specifically, the waste was sampled using EP Toxicity testing (the approved method at the time) and did not exceed the regulatory threshold values." (Pg. G-34, Section D). The background and basis do not explain why the waste codes appear on the UHWM, since the EP Toxicity testing results concluded the waste did not designate. In addition, the facility decommissioning report and EP Toxicity testing data to support these claims was not provided. As a result, the waste continues to designate for all waste codes pending resolution of the contradictions noted above.
2. State-only Dangerous Waste Determination: The basis for removing WT01 states: "The final concentration of lead phosphate (7,300 ppm) resulted in designating the sludge as Extremely Hazardous Waste according to Washington State Regulations, WAC 173-303 (SD-DD-TI-024)." (Pg. G-33, Section A); and "Lead phosphate, CAS No. 7446-27-7, is nontoxic according to available data." (Pg. G-34, Section E). Lead phosphate is regulated as a category B toxic when it exceeds the equivalent concentration criteria in WAC 173-303-100(5). No calculations were provided to show the lead phosphate does not exceed the equivalent concentration criteria. In addition, the SWBR identifies specific quantities in the sludge for barium, cadmium, chromium, lead, mercury, and silver. All of these constituents are toxic when they exceed the equivalent concentration criteria in WAC 173-303-100(5), yet they were not evaluated. Without supporting documentation and calculations, there is no basis for removal, and the waste continues to designate as WT01 pending resolution of the contradictions noted above.

***Green Island 11 Summary: Retain waste codes D001, F005, and WT01.***

Three containers in GI-11 designated as mixed waste with waste codes D001, F005, and WT01, due to the presence of dioxane and naphthalene (SWBR # 340-87-0222S, Pg. B-25; UHWM # PNL-287022, Pg. B-26), toluene (SWBR # 340-87-0223S, Pg. B-27; UHWM # 287020, Pg. B-28), and hydraulic oil (SWBR # 340-87-0224S, Pg. B-29; UHWM # PNL-287021, Pg. B-33). DOE proposes to remove all of the waste codes. Each container is evaluated separately below.

Basis (ECF-200SW2-16-0064, Pgs. G-34 through G-36):

1. Container with scintillation vials of naphthalene and dioxane designated as D001 and WT01 mixed waste.
  - a. Federal Hazardous Waste Determination: DOE's basis for removing D001 is that the waste does not exhibit the ignitable characteristic described in WAC 173-303-090(5) (Pg. G-35, Section D). DOE states as an assumption: "The scintillation vials were packaged for disposal by placing them in galvanized open-head DOT specification 17C drum, lined with a rigid poly-ethylene liner. The scintillation vials were not opened. Sufficient absorbent was added to the drum to absorb at least twice the volume of liquid it contained (SD-WM-TI-093)." (Pg. G-35, Section B). Ecology notes this is standard practice when preparing scintillation fluids for disposal. Because it is assumed the scintillation vials were not opened, it can only be assumed the waste is still in a liquid state inside the vials. Dioxane has a flash point of 55 degrees Fahrenheit, thus exhibiting the characteristic of ignitability (a liquid with a flashpoint less than 140 degrees Fahrenheit). As a result, the waste continues to designate as D001 as originally designated at the point of generation prior to treatment or commingling with other wastes.
  - b. State-only Dangerous Waste Determination: DOE's basis for removing WT01 is the same as was provided for Green Island 9 (Pgs. G-35 and G-36, Section E). As the dioxane in the scintillation cocktails continues to designate as a D001 ignitable waste, the waste is not "undesigned for the known constituents". As a result, the waste continues to designate as WT01 as originally designated at the point of generation, as there is no basis for removal.
2. Container with scintillation vials containing toluene designated as a F005, D001, and WT01 mixed waste. DOE's basis for removing these waste codes (Pgs. G-34 through G-36, Sections A through F), is the same as was provided for Green Island 9. For the reasons Ecology provided under Green Island 9, the waste continues to designate as F005, D001 and WT01 as originally designated at the point of generation.
3. The container with radioactively contaminated hydraulic oil is currently designated as a D001, ignitable mixed waste. DOE's basis for removal is that the waste does not exhibit a dangerous waste characteristic under WAC 173-303-090(5) (Pg. G-35, Section D). The SWBR identifies the waste stream as 5 kg of hydraulic waste oil generated from PNNL's 340 Building, which was absorbed. The UHWM identifies the waste oil as a flammable liquid, with a flashpoint of 358 degrees Fahrenheit that contains cobalt-60, cesium, uranium, and radium. There is no other information as to why the generator applied the D001 waste code to the waste oil at the point of generation, or how the waste oil was generated. Ecology believes there is not enough information to agree or disagree with DOE's conclusion. As a result, the waste oil continues to designate as a D001 waste as originally designated at the point of generation, pending receipt of additional documentation providing an adequate basis for removal.

***Green Island 12 Summary: Retain waste codes WT01, D006, D007, D008, D009, and D011.***

The twelve containers of sludge in GI-12 were designated as mixed waste with codes WT01, D005, D006, D007, D008, D009, and D011 (SWBR # 1608H-WHC-87-1, Pg. B-32; UHWM # 3-1R-7KM-X, Pg. B-33). DOE proposes to remove all of the waste codes.

Basis (ECF-200SW2-16-0064, Pgs. G-36 through G-37): DOE's basis for removing these waste codes is the same as was provided for Green Island 10. For the reasons Ecology provided under Green Island 10, the waste continues to designate for all waste codes as originally designated at the point of generation, pending resolution of noted contradictions.

***Green Island 13 Summary: Retain waste code D009.***

The container in GI-13 designated as mixed waste with waste code D009 due to the presence of mercury (SWBR # 23457-WHC-87-1, Pg. B-35; UHWM # MU1001, Pg. B-36). DOE proposes to remove the D009 code.

Basis (ECF-200SW2-16-0064, Pgs. G-37 through G-38):

1. Federal Hazardous Waste Determination: DOE's basis for removing the D009 waste code is because the mercury was amalgamated, it is unlikely to exceed the regulatory threshold. The waste was generated from cleanup of small quantities of mercury using a spill kit which immobilized the contamination through amalgamation. DOE assumes that amalgamated waste will produce leachate containing mercury at a concentration less than 0.2 mg/L. Ecology asserts that the Land Disposal Restrictions (LDR) performance intent of AMALG at 40 CFR 268.42(a) is to reduce vapor emissions from mercury, not to establish any particular level of leachability as measured by the TCLP. Although AMALG is a method of treatment under LDR, EPA has never stated that application of AMALG is sufficient to de-characterize a waste. DOE will need to perform direct testing of a representative sample of the treated waste in order to support a claim that treatment via AMALG does in fact de-characterize the waste. DOE provides a document reference (DOE/EM-0472) that discusses a technology to treat mercury by amalgamation. The subject matter of that document is amalgamation by combining liquid mercury with a proprietary sulfur mixture in a pug mill. There is a potential disconnect between citation of a treatability study document and use of a specific spill kit. Ecology needs to see specific information about the performance capabilities of the specific spill kit used for the subject wastes, and exactly how the spill kit was used for the wastes. DOE has not demonstrated that the TCLP for mercury is met by citing Document DOE/EM-0472. As a result, waste continues to designate as D009 as originally designated at the point of generation.

***Green Island 14 Summary: Retain waste codes D001, D003, F001, F003, F005, WT01, WT02, and WP01; remove waste code WC01.***

The 12 containers in GI-14 are designated as mixed waste with waste codes D001, D003, F001, F003, F005, WC01, WT01, WT02, and WP01 due to the presence of sorbed organic liquids (SWBR #'s 222S-WHC-87-1 through 12, Pgs. B-39 through B-51; UHWM # 222-S-87-003, Pgs. B-52 through B-3). DOE is proposing to retain all federal hazardous waste codes, and remove all state-only waste codes.

Basis (ECF-200SW2-16-0064, Pgs. G-38 through G-39)

1. Federal Hazardous Waste Determination: Each container or containers with the same wastes are designated, rather than designating all the containers together as a whole. Ecology notes waste code D001 applies to all twelve containers, waste code D003 applies to four containers, waste code F001 applies to one container, F003 applies to 10 containers, and F005 applies to one container. These are all documented on the UHWM. DOE's basis for retaining all of the federal waste codes is that the description of waste provided in the manifest and burial records are consistent with the waste designation codes originally assigned; and further evaluation is unnecessary since most, if not all, designations would still remain. Ecology agrees with this basis, and the waste continues to designate for the assigned codes, as originally designated at the point of generation.
2. State-only Dangerous Waste Determination – WC01: Through an October 19, 1995, rule-making, the carcinogenic dangerous waste criterion, WC01, was removed from WAC 173-303-100. As a result, waste code WC01 no longer applies to any of the waste in GI-14.
3. State-only Dangerous Waste Determination – WT01, WT02, and WP01: DOE did not provide a basis for removal of the remaining state-only waste codes, other than to state they do not apply. As a result, the waste continues to designate for the assigned WT01, WT02, and WP01 codes, as originally designated at the point of generation.

***Green Island 15 Summary: Retain waste code D001, D008 and WT01; change designation for pseudocumene from WT01 to WT02.***

Two containers in GI-15 are designated as mixed waste with waste codes D008 and WT01 due to the presence of lead (SWBR # illegible, Pg. B-55 through B-56; UHWM # PNL-287029, Pg. B-57); and six containers are designated as mixed waste with waste codes D001 and WT01 due to the presence of pseudocumene (1,2,4-trimethylbenzene) (SWBR #'s 340-PNL-87-9 through 340-PNL-87-14, Pgs. B-58 through B-63; UHWM # PNL-287023, Pg. B-64). For the two containers with lead waste, DOE is proposing to retain D008 and remove WT01. For the six containers with pseudocumene waste, DOE is proposing to remove D001, and retain WT01.

Basis (ECF-200SW2-16-0064, Pgs. G-39 through G-41)

1. Two containers with contaminated lead wrapped in plastic designated as D008 and WT01 mixed waste.
  - a. Federal Hazardous Waste Determination: DOE concluded the regulatory level of 5 mg/L was exceeded, and the D008 waste code should be retained. Ecology agrees the D008 waste code should be retained as originally designated at the point of generation. Note: The calculation erroneously contained both the weight of the container and other waste streams. Also, documentation showing data used in the calculation was obtained through testing using an appropriate SW-846 method was not provided.
  - b. State-only Dangerous Waste Determination: No calculation was provided for removing the WT01 waste code. However, assuming the waste stream is 1636 pounds of lead (i.e., leaving out container and other waste stream weight) results in an equivalent concentration of at least 1.0%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)). As a result, the waste continues to designate as WT01, as originally designated at the point of generation.
2. Six containers of scintillation vials containing pseudocumene designated as D001 and WT01 mixed waste.
  - a. Federal Hazardous Waste Determination: DOE's basis for removing D001 is that the waste does not exhibit the ignitable characteristic described in WAC 173-303-090(5) (Pg. G-40, Section D). DOE states as background information, "The burial records indicated that the waste in the six drums containing scintillation vials consisted of 50% glass and 50% absorbent pads. It also indicated that these were dry solids." (Pg. G-39, Section A). DOE also states as an assumption, "The scintillation vials were packaged for disposal by placing them in galvanized open-head DOT specification 17C drum, lined with a rigid poly-ethylene liner. The scintillation vials were not opened. Sufficient absorbent was added to the drum to absorb at least twice the volume of liquid it contained (SD-WM-TI-093)." (Pg. G-39, Section B). The background stating waste is dry solids, and assumptions stating scintillation vials were not opened do not correlate. If it is assumed the scintillation vials were not opened (Ecology notes this is standard practice when preparing a waste package containing used scintillation vials), it can only be assumed the waste is still in a liquid state inside the vials. Pseudocumene has a flash point of 112 degrees Fahrenheit, thus exhibiting the characteristic of ignitability (a liquid with a flashpoint less than 140 degrees Fahrenheit). As a result, the waste continues to designate as D001 as originally designated at the point of generation prior to treatment or commingling with other wastes.
  - b. State-only Dangerous Waste Determination: Pseudocumene is regulated as a category C toxic when it exceeds the equivalent concentration criteria in WAC 173-303-100(5). The re-designation calculation for the WT01 waste code included both the weight of the six containers and weight of the other waste streams within the containers, which accounted for 1,619 pounds. According to DOE's calculation, the equivalent concentration was 0.017%, designating the waste as a WT02, Dangerous Waste (note, DOE states the waste is WT01 in results/conclusions on Pg. G-41, Section F, which appears to be in error). The calculation was redone assuming the waste stream is composed of 331 pounds of pseudocumene (i.e., a worst case calculation leaving out container and other waste stream weight). The worst case calculation resulted in an equivalent concentration of 0.10%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(B)) for a WT02, Dangerous Waste. As a result, the waste designation should change from WT01, Extremely Hazardous Waste to WT02, Dangerous Waste.

***Green Island 16 Summary: Retain waste codes D001, F002, F003, F005, WT02 and WP02; remove waste codes WC01 and WC02.***

The 30 containers in GI-16 are designated as mixed waste with waste codes D001, F002, F003, F005, WC01, WC02, WT02, and WP02. A UHWM did not accompany the waste shipment, which was received October 20, 1989. The disposal records indicate the contents to be a mix of silica gel, tar, asphalt, diatomaceous earth, plastic, glass, and metal (Solid Waste Storage/Disposal Record #'s LBLAB-BER-90-45 through

LBLAB-BER-90-74, Pgs. B-66 through B-95). DOE notified Ecology April 19, 1996, that the waste contained organic solvents, based on a process review by Lawrence Berkeley Laboratory (LBL). DOE is proposing to retain all federal hazardous waste codes, and remove all state-only waste codes.

Basis (ECF-200SW2-16-0064, Pg. G-41)

1. Federal Hazardous Waste Determination: DOE's basis for retaining all of the federal waste codes is that the generator declared the waste to be a listed waste, and that further evaluation is unnecessary since most if not all designations would still remain unless additional information were provided by the generator to reassess the determinations. Ecology agrees with this basis, and the waste continues to designate for all waste codes.
2. State-only Dangerous Waste Determination – WC01 and WC02: Through an October 19, 1995, rule-making, the carcinogenic dangerous waste criterion, WC01 and WC02, were removed from WAC 173-303-100. As a result, these waste codes no longer apply to any of the waste in GI-16.
3. State-only Dangerous Waste Determination – WT02 and WP02: DOE did not provide a basis for removal of the remaining state-only waste codes, other than to state they do not apply. As a result, the waste continues to designate as WT02 and WP02 as originally designated at the point of generation.

## Landfill 218-W-3AE

ECF-200SW2-16-0065 (Green Islands 17 through 20)

### ***Green Island 17 Summary: Retain waste codes D018, D022, D038, F002, F003, and F005.***

The 63 containers in GI-17 are designated as mixed waste with waste codes D018, D022, D038, F002, F003, and F005. A UHWM did not accompany the waste shipment, which was received September 30, 1994. The disposal records indicate the contents to be a mix of 10 mil liners, anticorrosion rad pads, superfine absorbant, silica gel, metal cans, and plastic bags (Low-Level Waste Storage/Disposal Record #'s not provided, Pgs. C-4 through C-66). DOE notified Ecology April 19, 1996, that the waste contained organic solvents, based on a process review by LBL. DOE is proposing to retain all federal hazardous waste codes.

Basis (ECF-200SW2-16-0065, Pg. G-46 through G-47)

1. Federal Hazardous Waste Determination: DOE's basis for retaining all of the federal waste codes is that the generator declared the waste to be a listed waste, and that further evaluation is unnecessary since most if not all designations would still remain unless additional information were provided by the generator to reassess the determinations. Ecology agrees with this basis, and the waste continues to designate for all waste codes.

### ***Green Island 18 Summary: Retain waste code D011 and WT01.***

The 43 containers in GI-18 are designated as mixed waste with waste codes D011 and WT01 due to containing 1.98 pounds of silver (SWBR # TRWS6-TRW-87-1, Pg. C-69; UHWM # 87062663, Pg. C-72). DOE proposes to retain D011 and remove WT01.

Basis (ECF-200SW2-16-0065, Pgs. G-47 through G-48):

1. Federal Hazardous Waste Determination: DOE concluded the regulatory level of 5 mg/L was exceeded, and the D011 waste code should be retained. Ecology agrees the D011 waste code should be retained as originally designated at the point of generation. Note: The calculation erroneously contained both the weight of the container and other waste streams. Also, documentation showing data used in the calculation was obtained through testing using an appropriate SW-846 method was not provided.
2. State-only Dangerous Waste Determination: No calculation was provided for removing the WT01 waste code. Silver is a Category A toxic under the toxicity criteria of WAC 173-303-100(5), and DOE initially designated this as extremely hazardous waste with the waste code WT01. Ecology evaluated the information provided in the SWBR, and was unable to determine which waste stream contained the silver. Because a specific waste stream containing the silver could not be determined, a worst-case assumption is made. The waste stream is assumed to be composed of 1.98 pounds of silver (i.e., leaving out container and other waste stream weight), which results in an equivalent concentration of 10.0%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)). As a result, the waste continues to designate as WT01 as originally designated at the point of generation.

### ***Green Island 19 Summary: Retain waste code D001 and WT02.***

The two containers in GI-19 are designated as mixed waste with D001 and WT02 waste codes due to containing 20 pounds of aluminum nitrate (SWBR # 2345Z-WHC-87-1, Pg. C-77; UHWM # MW002, Pg. C78). DOE proposes to remove D001 and retain WT02.

Basis (ECF-200SW2-16-0065, Pgs. G-48 through G-49):

1. Federal Hazardous Waste Determination: DOE proposes to remove the D001 waste code, with the basis that the aluminum nitrate is mixed with diatomaceous earth (95% of the waste) rendering it insufficient to yield enough oxygen to readily stimulate the combustion of organic matter (Pg. G-49, Section D). The supporting assumptions and calculations showing the waste was neutralized using one of the accepted LDR treatment methods for removing the characteristic of ignitability are not provided. For example, adding a reducing agent to the oxidizer (if properly done) would be a legitimate treatment in that it permanently removes the characteristic by chemical reaction. However,

without this additional information, addition of diatomaceous earth could be viewed as simply diluting the waste vs. being a form of legitimate LDR treatment. As a result, the waste continues to designate as D001 pending resolution of noted contradictions.

2. State-only Dangerous Waste Determination: DOE concluded the aluminum nitrate equivalent concentration exceeded the regulatory threshold of 0.001% in WAC 173-303-100(5)(b)(iii)(A), and the WT02 waste code should be retained. Ecology agrees the WT02 waste code should be retained as originally designated at the point of generation. Note: The calculation erroneously contained both the weight of the container and the diatomaceous earth that was mixed with the aluminum nitrate. To verify the waste stream should continue to designate as WT02 vs. WT01, the calculation was redone using only the 20 pounds of aluminum nitrate as the waste stream. The resulting equivalent concentration is less than 1.0%. As a result, Ecology agrees the waste continues to designate as WT02 as originally designated at the point of generation.

***Green Island 20 Summary: Retain waste code D008, WT01, and WT02.***

DOE designated two containers within GI-20 separately. The first drum contains 169 pounds of contaminated lead wrapped in plastic, and is designated with waste codes D008 and WT01 (SWBR #340-PNL-87-1, Pg. C-80; UHWM # PNL 287031, Pg. C-81). The second drum contains 12.5 pounds of beryllium, and is designated with waste code WT02 (SWBR # 340-PNL-87-2, Pg. C-82; UHWM #PNL-287032, Pg. C-83). DOE is proposing to retain D008 and remove WT01 and WT02.

Basis (ECF-200SW2-16-0065, Pgs. G-49 through G-50)

1. Container with contaminated lead wrapped in plastic designated as D008 and WT01 mixed waste.
  - a. Federal Hazardous Waste Determination: DOE concluded the regulatory level of 5 mg/L was exceeded, and the D008 waste code should be retained. Ecology agrees the D008 waste code should be retained as originally designated at the point of generation. Note: The calculation erroneously contained both the weight of the container and other waste streams. Also, documentation showing data used in the calculation was obtained through testing using an appropriate SW-846 method was not provided.
  - b. State-only Dangerous Waste Determination: No calculation was provided for removing the WT01 waste code. Lead is a Category B toxic under the toxicity criteria of WAC 173-303-100(5). Taking into account only the weight of the contaminated lead results in an equivalent concentration of at least 1.0%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)). As a result, the waste continues to designate as WT01 as originally designated at the point of generation.
2. Container with beryllium designated as WT02 mixed waste.
  - a. State-only Dangerous Waste Determination: DOE states, "Beryllium, CAS No. 7440-41-7 is nontoxic according to available data." (Pg. G-50, Section E). Beryllium is regulated as a Category B toxic when it exceeds the equivalent concentration criteria in WAC 173-303-100(5). Taking into account only the weight of the beryllium (i.e., leaving out container and other waste stream weight), the equivalent concentration of beryllium is at least 1.0%. This concentration meets the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)) for a WT01, Extremely Hazardous Waste. However, given that the WT02 waste code was assigned at the point of generation, and the information contained in the SWBR and UHWM as to how waste codes were assigned is absent, the WT02 waste code for the beryllium waste will be retained as originally designated. [Review note: ECF-200SW2-16-0065, Section A, page G-50, identifies waste designation codes that were applied to GI-20 as D008 and WT01. Waste code WT02 which was applied to the container of beryllium waste is missing from the list (see page C-83, UHWM 340-87-02475)].

## Landfill 218-W-4C

ECF-200SW2-16-0063 (Green Islands 21, 22, and 23)

### ***Green Island 21 Summary: Retain the waste codes D008 and WT01.***

The Shippingport Reactor Pressure Vessel disposed of in GI-21 originally designated as mixed waste with codes D008 and WT01 due to containing 8,000 pounds of lead (Solid Waste Storage/Disposal Record # SPAP-SPA-89-01, Pg. D-4; UHWM # 89002, Pg. D-5 through D-8). DOE proposes to remove D008 and WT01.

Basis (ECF-200SW2-16-0063, Pgs. G-24 through G-25)

1. Federal Hazardous Waste Determination: DOE's basis for removing D008 is that the lead is shielding, is still serving its intended purpose, and is therefore not a solid waste. A review of the burial record and UHWM does not indicate the lead is shielding. In the basis background summary, DOE describes the lead as shielding and further describes the package preparation process for transport, which included filling the reactor pressure vessel and neutron shield tank with light-weight concrete (Pg. G-24, Section A). A citation for this information is included (Witte and Chou, 1989), however this documentation was not provided. Further, the Dangerous Waste Part A Permit Application, Form 3, Revision 5, for the Low-Level Burial Grounds identified the Shippingport Reactor Pressure Vessel as D008 because it is considered to be waste and not lead shielding (Letter number 8904423, from R.D. Izatt, Department of Energy to Roger F. Stanley, Ecology October 24, 1989, "Revisions to the Hanford Site Dangerous Waste Part A Permit Application (WA7890008967) (D-2-9).") As a result, the waste continues to designate as D008 as originally designated at the point of generation.
2. State-only Dangerous Waste Determination: DOE's basis for removing WT01 is that the reactor pressure vessel/neutron shield tank does not meet dangerous waste state-only toxicity criteria of WAC 173-303-100(5) since there are no known toxic constituents in them. Lead is regulated as a Category B toxic when it exceeds the equivalent concentration criteria in WAC 173-303-100(5). Taking into account only the weight of the lead waste (i.e., 8,000 pounds), the equivalent concentration is at least 1.0%, meeting the toxicity criteria in WAC 173-303-100(5)(b)(iii)(D)). As removal result, the waste continues to designate as WT01 as originally designated at the point of generation.

### ***Green Island 22 Summary: Remove waste code D008, retain waste code WT01.***

The metal waste container in GI-22 is composed of steel and 15,800 pounds of lead shielding, and is designated as mixed waste with codes D008 and WT01 (SWBR # 324-PNL-88-1, Pg. D-10). DOE proposes to remove D008 and WT01.

Basis (ECF-200SW2-16-0063, Pg. G-25): The SWBR identifies the lead as shielding. Ecology is aware of EPA's policy on lead used as shielding, and as a result will agree to remove the D008 waste code.

However, under the state's Hazardous Waste Management Act (Ch. 70.105 RCW and implementing dangerous regulations under Ch. 173-303 WAC) Ecology considers lead shielding that has been discarded within the meaning of WAC 173-303-016(3)-(4) to be a solid waste because it has been disposed. Consistent with the designation of elemental lead shielding used in naval reactor compartments disposed in LLBG Trench 94, the lead shielding continues to designate as WT01 as originally designated at the point of generation.

### ***Green Island 23 Summary: Retain waste codes D001, D018, D022, D038, F002, F003, F005, WT02, WP01 and WP02; remove waste code WC02.***

GI-23 contains 32 containers of waste from LBL, designated with waste codes D001, D018, D022, D038, F002, F003, F005, WC02, WT02, WP01 and WP02 (Low-Level Waste Storage/Disposal Records, Pg. D-15 through D-70). The shipment, received January 6, 1995, did not have a UHWM. The Low-Level Waste Storage/Disposal Record documents identify various waste contents including metal (plates, tubing, etc.), plastic, 10 mil liner, absorbent, anticorrosion radpad, pyrofoam, silica gel, and tar. DOE notified Ecology

April 19, 1996, that process reviews by LBL revealed the waste contained organic solvents. DOE proposes to retain all federal waste codes and remove all state-only waste codes.

Basis (ECF-200SW2-16-0063, Pg. G-25 through G-26)

1. Federal Hazardous Waste Determination: DOE's basis for retaining all of the federal waste codes is that the generator declared the waste to be a listed waste, and that further evaluation is unnecessary since most if not all designations would still remain unless additional information were provided by the generator to reassess the determinations. Ecology agrees with this basis, and the waste continues to designate for all waste codes.
2. State-only Dangerous Waste Determination – WC02: Through an October 19, 1995, rule-making, the carcinogenic dangerous waste criterion, WC01 and WC02, were removed from WAC 173-303-100. As a result, the WC02 waste code no longer applies to GI-23.
3. State-only Dangerous Waste Determination – WT02, WP01 and WP02: DOE did not provide a basis for removal of the remaining state-only waste codes, other than to state they do not apply. As a result, the waste continues to designate as WT02, WP01 and WP02 as originally designated at the point of generation.

## Landfill 218-W-5

ECF-200SW2-16-0066 (Green Island 24)

***Green Island 24 Summary: Retain waste codes D001, F002, F003, F005, WT02 and WP01; remove waste codes WC01 and WC02.***

GI-24 contains 24 containers from LBL, designated with waste codes D001, F002, F003, F005, WC01, WC02, WT02, and WP02 (Solid Waste Storage/Disposal Record #'s multiple, Pgs. E-3 through E-27). The shipment, received August 10, 1990, did not have a UHWM. The Low-Level Waste Storage/Disposal Record documents identify various waste contents including tar, diatomite, plastic, steel, silica gel, paper, and uranium 235 and 238. DOE notified Ecology on April 19, 1996, that process reviews by LBL revealed the waste contained organic solvents. DOE proposes to retain all federal waste codes and remove all state-only waste codes.

Basis (ECF-200SW2-16-066, Pg. G-54 through G-55)

1. Federal Hazardous Waste Determination: DOE's basis for retaining all of the federal waste codes is that the generator declared the waste to be a listed waste, and that further evaluation is unnecessary since most if not all designations would still remain unless additional information were provided by the generator to reassess the determinations. Ecology agrees with this basis, and the waste continues to designate for all waste codes.
2. State-only Dangerous Waste Determination – WC01 and WC02: Through an October 19, 1995, rule-making, the carcinogenic dangerous waste criterion, WC01 and WC02, were removed from WAC 173-303-100. As a result, the WC01 and WC02 waste codes no longer apply to GI-24.
3. State-only Dangerous Waste Determination – WT02 and WP02: DOE did not provide a basis for removal of the remaining state-only waste codes, other than to state they do not apply. As a result, the waste continues to designate as WT02 and WP02 as originally designated at the point of generation.

Summary of Ecology LLBG Green Island waste designation review:

Table 1 identifies the Green Island numbers, the LLBG Landfill name, constituents identified in the Green Island, conclusions whether the GI should retain the dangerous waste designations, and applicable waste codes. DOE's proposed designations and waste codes from DOE/RL-2014-43, Rev 3 are provided, as are the results of Ecology's review with the revised designations and waste codes.

Note that every Green Island has been retained as a Dangerous Waste Management Unit based on the results of the review, and they will be subject to WAC 173-303 Dangerous Waste Regulations and the Permit. Brief notes regarding the review are also provided.

Table 1. Summary of Ecology review of DOE/RL-2014-43, Rev 3, Mixed Waste Disposed of in the Low-Level Burial Grounds

Green Island No.	Landfill	Constituents; POG = Point of Generation Designation	DOE Proposal		Ecology Review		Comments
			DW?	Waste Codes	DW?	Waste Codes	
1	281-E-10	Lead POG Designation: D008, WT01	Yes	D008	Yes	D008, WT01	Designation calculation included container & other waste stream weight. Agree with DOE proposal to keep D008 as lead hypothetical leachate concentration exceeds characteristic toxicity level in WAC 173-303-090(8). Keep WT01 as no basis for removal was provided.
2	281-E-10	Lead POG Designation: D008, WT01	No		Yes	D008, WT01	Designation calculations included container & other waste stream weight. Keep D008 as lead hypothetical leachate concentration exceeds characteristic toxicity level in WAC 173-303-090(8), & WT01 as lead equivalent concentration meets toxicity criteria in WAC 173-303-100(5).
3	281-E-10	Lead POG Designation: D008, WT01	Yes	D008	Yes	D008, WT01	Designation calculation included container & other waste stream weight. Agree with DOE proposal to keep D008 as lead hypothetical leachate concentration exceeds characteristic toxicity level in WAC 173-303-090(8). Keep WT01 as no basis for removal was provided.
4	281-E-10	Lead POG Designation: D008, WT01	No		Yes	D008, WT01	Designation calculations included container & other waste stream weight. Keep D008 as lead hypothetical leachate concentration exceeds characteristic toxicity level in WAC 173-303-090(8), & WT01 as lead equivalent concentration meets toxicity criteria in WAC 173-303-100(5).
5	281-E-10	Lead POG Designation: D008, WT01	Yes	D008	Yes	D008, WT01	Designation calculation included container & other waste stream. Agree with DOE proposal to keep D008 as lead hypothetical leachate concentration exceeds characteristic toxicity level in WAC 173-303-090(8). Keep WT01 as no basis for removal was provided.

Green Island No.	Landfill	Constituents; POG = Point of Generation Designation	DOE Proposal		Ecology Review		Comments
			DW?	Waste Codes	DW?	Waste Codes	
6	281-E-10	di-Octyl Phthalate POG Designation: WC02	No		Yes	WT02	Remove WC02 as carcinogenic criterion was removed from WAC 173-303. Designation calculation included weight of other waste streams and grout added at the trench. Add WT02 as Di-Octyl Phthalate equivalent concentration exceeds the toxicity criteria in WAC 173-303-105(5) and is regulated as a Category B toxic, WT02, Dangerous Waste.
7	281-E-10	di-Octyl Phthalate POG Designation: WC02	No		Yes	WT02	Remove WC02 as carcinogenic criterion was removed from WAC 173-303. Designation calculation included weight of other waste streams and grout added at the trench. Add WT02 as Di-Octyl Phthalate equivalent concentration exceeds the toxicity criteria in WAC 173-303-105(5) and is regulated as a Category B toxic, WT02, Dangerous Waste.
8	218-W-3A	Lead POG Designation: D008, WT01	No		Yes	WT01	Remove D008 consistent with EPA policy. Keep WT01, consistent with designation of lead shielding used in naval reactor compartments disposed in LLBG Trench 94.
9	218-W-3A	Toluene POG Designation: D001, F005, and WT01	No		Yes	D001, F005, WT01	Keep F005 as toluene in scintillation vials is considered a listed dangerous waste (RCRA Online 11639 & 13258). Keep D001 as toluene in scintillation vials remains a liquid at disposal, & meets D001 characteristic for flashpoint. Keep WT01 as the basis for removal is not valid.
10	218-W-3A	Lead, chromium, barium, cadmium mercury, silver POG Designation: D005, D006, D007,	No		Yes	D005, D006, D007, D008, D009, D011, WT01	Keep D005, D006, D007, D008, D009, and D011 as no documentation supporting removal is provided. Ecology has not seen facility decommissioning report and EP toxicity tests DOE refers to. Keep WT01 as DOE did not provide a basis for removal that addresses all WAC 173-303-100 toxic constituents.

Green Island No.	Landfill	Constituents; POG = Point of Generation Designation	DOE Proposal		Ecology Review		Comments
			DW?	Waste Codes	DW?	Waste Codes	
		D008, D009, D011, WT01					
11	218-W-3A	Toluene, Dioxane, Naphthalene, radioactively contaminated hydraulic oil  POG Designation: D001, F005, WT01	No		Yes	D001, F005, WT01	Keep F005 as toluene in scintillation vials is considered a listed dangerous waste (RCRA Online 11639 & 13258). Keep D001 as toluene and dioxane in scintillation vials remain a liquid at disposal, & meet D001 characteristic for flashpoint. There is not enough information in the burial records to remove the D001 waste code from the radioactively contaminated hydraulic oil. Keep WT01 as the basis for removal is not valid.
12	218-W-3A	Lead, chromium, barium, cadmium, mercury, silver  POG Designation: D006, D007, D008, D009, D011, WT01	No		Yes	D006, D007, D008, D009, D011, WT01	Keep D005, D006, D007, D008, D009, and D011 as no documentation supporting removal is provided. Ecology has not seen facility decommissioning report, and EP toxicity tests DOE refers to. Keep WT01 as DOE did not provide a basis for removal that addresses all WAC 173-303-100 toxic constituents.
13	218-W-3A	Amalgamated Hg  POG Designation: D009	No		Yes	D009	DOE does not provide an adequate basis or supporting documentation to remove the waste code.
14	218-W-3A	Organics including toluene, acetonitrile, methanol, xylene  POG Designation: D001, D003, F001, F003, F005, WC01, WT01, WT02, and WP01	Yes	D001, D003, F001, F003, F005	Yes	D001, D003, F001, F003, F005, WT01, WT02, WP01	Agree with analysis to keep the federal dangerous waste codes. Remove WC01 as carcinogenic criterion was removed from WAC 173-303. Keep the remaining state-only waste codes as no basis is provided for their removal.

Green Island No.	Landfill	Constituents; POG = Point of Generation Designation	DOE Proposal		Ecology Review		Comments
			DW?	Waste Codes	DW?	Waste Codes	
15	218-W-3A	Lead, pseudocumene (1,2,4-trimethylbenzene)  POG Designation: D001, D008, and WT01	Yes	D008, WT01	Yes	D001, D008, WT01, WT02	Lead waste: Designation calculation included container & other waste stream weight. Agree with DOE proposal to keep D008 as lead hypothetical leachate concentration exceeds characteristic toxicity level in WAC 173-303-090(8). Keep WT01 as no basis for removal was provided.  Scintillation vials: Keep D001 as pseudocumene in scintillation vials remain a liquid at disposal, & meet D001 characteristic for flashpoint. Change WT01 to WT02, as worst case calculation shows equivalent concentration meets toxicity criteria in WAC 173-303-100(5)(b)(iii)(B).
16	218-W-3A	Organic solvents based on LBL process review.  POG Designation: D001, F002, F003, F005, WC01, WC02, WT02, and WPO2.	Yes	D001, F002, F003, F005	Yes	D001, F002, F003, F005, WT02, WPO2	Agree with analysis to keep the federal dangerous waste codes. Remove WC01 and WC02 as carcinogenic criterion was removed from WAC 173-303. Keep the remaining state-only waste codes as no basis is provided for their removal.
17	218-W-3AE	Organic solvents based on LBL process review.  POG Designation: D018, D022, D038, F002, F003, and F005.	Yes	D018, D022, D038, F002, F003, F005	Yes	D018, D022, D038, F002, F003, F005	Agree with analysis to keep the dangerous waste codes.
18	218-W-3AE	Silver	Yes	D011	Yes	D011, WT01	Designation calculation included container & other waste stream weight. Agree with DOE proposal to keep

Green Island No.	Landfill	Constituents; POG = Point of Generation Designation	DOE Proposal		Ecology Review		Comments
			DW?	Waste Codes	DW?	Waste Codes	
		POG Designation: D011 and WT01					D011 as silver hypothetical leachate concentration exceeds characteristic toxicity level in WAC 173-303-090(8). Keep WT01 as no basis for removal was provided.
19	218-W-3AE	Al(NO3)3  POG Designation: D001 and WT02	Yes	WT02	Yes	D001, WT02	Keep D001, as supporting assumptions and calculations showing the waste was neutralized using one of the accepted LDR treatment methods for removing the characteristic of ignitability were not provided. Agree with DOE proposal to keep WT02 as equivalent concentration meets toxicity criteria in WAC 173-303-100(5).
20	218-W-3AE	Lead, beryllium  POG Designation: D008, WT01 and WT02	Yes	D008	Yes	D008, WT01, and WT02	Lead waste: Designation calculation included container & other waste stream weight. Agree with DOE proposal to keep D008 as lead hypothetical leachate concentration exceeds characteristic toxicity level in WAC 173-303-090(8). Keep WT01 as no basis for removal was provided.  Beryllium waste: Keep WT02 as the basis for removal is not valid.
21	218-W-4C	Lead  POG Designation: D008 and WT01	No		Yes	D008, WT01	Keep D008 as Shippingport reactor was designated as dangerous waste and not considered shielding according to documentation. Keep WT01 as the basis for removal is not valid.
22	218-W-4C	Lead  POG Designation: D008 and WT01	No		Yes	WT01	Remove D008 consistent with EPA policy. Keep WT01, consistent with designation of lead shielding used in naval reactor compartments disposed in LLBG Trench 94.
23	218-W-4C	Organic solvents based on LBL process review.	Yes	D001, D018, D022, D038, F002, F003, F005	Yes	D001, D018, D022, D038, F002, F003,	Agree with analysis to keep the federal dangerous waste codes. Remove WC02 as carcinogenic criterion was removed from WAC 173-303. Keep the remaining

Green Island No.	Landfill	Constituents; POG = Point of Generation Designation	DOE Proposal		Ecology Review		Comments
			DW?	Waste Codes	DW?	Waste Codes	
		POG Designation: D001, D018, D022, D038, F002, F003, F005, WC02, WT02, WP01 and WP02				F005, WT02, WP01, WP02	state-only waste codes as no basis is provided for their removal.
24	218-W-5	Organic solvents based on LBL process review.  POG Designation: D001, F002, F003, F005, WC01, WC02, WT02, and WP02	Yes	D001, F002, F003, F005	Yes	D001, F002, F003, F005, WT02, WP01	Agree with analysis to keep the federal dangerous waste codes. Remove WC01 and WC02 as carcinogenic criterion was removed from WAC 173-303. Keep the remaining state-only waste codes as no basis is provided for their removal.

**Table 2. Toxic category for constituents evaluated for the toxicity criteria of WAC 173-303-100(5) for Low Level Burial Grounds Green Islands.**

<b>Constituent</b>	<b>Toxic category</b>	<b>Limiting Database<sup>1</sup></b>	<b>Toxicity data</b>
Lead	B	ECOTOX	rainbow trout LC50=0.14 mg/L
Lead(II) phosphate	Unknown (although some toxicity would be expected with lead)	No relevant data in HSDB, RTECS, and ECOTOX	
di-n-octyl phthalate	B	HSDB	catfish LC50=0.69 mg/L
Bis (2-ethylhexyl) phthalate	"Nontoxic" (>D)	ECOTOX	rainbow trout LC50=139 mg/L
Beryllium	B	HSDB	fathead minnow LC50=0.15 mg/L
Toluene	C	ECOTOX	rainbow trout LC50=5.8 mg/L
Dioxane	D	HSDB	dermal rabbit LD50=7600 mg/kg
Naphthalene	B	HSDB	rainbow trout LC50=0.11 mg/L
Methanol	D	HSDB	dermal rabbit LD50=15840 mg/kg
1,2,4-trimethylbenzene	C	HSDB	fathead minnow LC50=7.7 mg/L
Chromium	C	ECOTOX	zebrafish LC50=3.9 mg/L
Aluminum nitrate	C	RTECS	oral rat LD50=204 mg/kg
Barium	"Nontoxic" (>D)	ECOTOX	sheepshead minnow LC50>500 mg/L
Mercury	A	ECOTOX	striped bass LC50=0.09 mg/L
Silver	A	ECOTOX	medaka LC50=0.028 mg/L
Cadmium	X	ECOTOX	rainbow trout LC50=0.002 mg/L
Acetonitrile	C	HSDB	oral rat LD50=175 mg/kg
Xylene	C	ECOTOX	rainbow trout LC50=2.6 mg/L

<sup>1</sup>Three toxicity data bases were searched for relevant toxicity data: HSDB, RTECS, and ECOTOX.

HSDB: Hazardous Substances Data Bank

RTECS: Registry for Toxic Effects of Chemical Substances

ECOTOX: Ecotoxicology database

Metal toxicity depends on the form of the metal, and were evaluated mainly on the basis of elemental metal.