

APPENDIX F  
Correspondence

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OCT 10 1994

DIV. OF RADIATION PROTECTION

October 7, 1994

Mr. Gary Robertson  
Waste Management Section  
Washington Department of Health  
P. O. Box 47827  
Olympia, Washington 98504-7827

Dear Gary:

This is a formal submittal as discussed in our meeting on October 5, 1994 setting forth the basis of demonstrating compliance with the requirements of WAC 246-221-060 for the US Ecology Richland Low-Level Radioactive Waste (LLRW) disposal facility. As we had agreed to earlier in the year and as had been included in our proposed revision to the Richland Facility Standards Manual submitted to you April 5, 1994, integrated dose measurements of 400 mrem per year or less along the facility fence line would be considered as demonstrating compliance with the total effective dose equivalent limit of 100 mrem per year for individual members of the public from the licensed operation.

This is based upon utilization of an occupancy factor of 0.25 determined from the following:

- The US Ecology facility is essentially centrally located on the Hanford reservation;
- Activities conducted on the Hanford Reservation are research or industrial in nature;
- There are no residential areas located on the Hanford Reservation;
- Access to the region of the Hanford Reservation that the US Ecology facility is located on is restricted from members of the public; and,
- A standard workweek consists of 40 hours while the total number of hours in a calendar week is 168.

Mr. Gary Robertson  
October 7, 1994  
Page 2

Dividing the standard 40-hour work week by the 168 hours in a calendar week results in a factor of less than 0.24. Consequently, it is appropriate to assume an occupancy factor of 0.25. It should be noted that this analysis is very conservative in that it does not consider that there are no near neighbors to the US Ecology LLRW disposal facility with the exception of the WDOH site inspector's trailers.

Please contact me at 1-800-999-7160 if I can be of any further assistance with this item.

Sincerely,



Arthur J. Palmer, CHP  
Chief Radiological Control and  
Safety Officer

**Mike Ault**


---

**From:** Elsen, Mike (DOH) [Mike.Elsen@DOH.WA.GOV]  
**Sent:** Tuesday, November 29, 2011 14:58  
**To:** Mike Ault  
**Subject:** RE:

There was not a separate approval letter. The approval was the inclusion in the license. Hope this helps. Let me know if you have follow-up questions.

Mike

---

**From:** Mike Ault [mailto:MAULT@usecology.com]  
**Sent:** Tuesday, November 29, 2011 1:54 PM  
**To:** Elsen, Mike (DOH)  
**Subject:** RE:

Mike,

Did WDOH respond or was this letter just used as a follow up to the verbal agreement. If there is a response and you have it would you please forward?

Working with Krist'n has made me very wary of loose ends.

**Michael R. Ault** |General Manager

## **USEcologyWashington**

1777 Terminal Dr.  
 Richland, WA 99354  
 Tel: 509.377.2411 | Fax: 509.377.2244  
 Cell: 509.521.5409  
[mault@usecology.com](mailto:mault@usecology.com)

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**From:** Elsen, Mike (DOH) [mailto:Mike.Elsen@DOH.WA.GOV]  
**Sent:** Wednesday, November 23, 2011 11:49  
**To:** Mike Ault  
**Cc:** Joe Weismann; Schwab, Kristen (DOH)  
**Subject:**

Mike- Attached is the justification letter that Art Palmer used back in 1994 regarding the 400 mrem dose that we discussed yesterday. Please let me know if you have any questions.

Mike

Mikel Elsen, Supervisor  
 Waste Management Section

11/29/2011

Office of Radiation Protection  
Department of Health  
PO Box 47827  
Olympia, WA 98504-7827  
Phone: (360) 236-3241  
Fax: (360) 236-2255

*Public Health -- Always working for a safer and healthier Washington.*

February 8, 2016

Sean Murphy  
US Ecology Washington  
1777 Terminal Drive  
Richland, Washington 99354

**License No. WN-I019-2**

Subject: WN-I019-2, Annual Environmental Monitoring Report

Dear Mr. Murphy:

Thank you for submitting the revised Annual Environmental Monitoring Report, for Calendar year 2014. The department has reviewed this report and requests that the report be amended to address the department's comments. The department had requested that the report be given a QA reviewed before reissuing; even still there were graphs and data missing from the report. The department expects the report to be amended by March 31st, 2016. Below are the comments from the department:

Comments for revised 2014 Annual Environmental Monitoring Report:

Comment No.	Page/Section No.	Comments
1	General	Throughout the main body of this annual report; tables reflect analytical results for the sample media being discussed, these tables do NOT show the investigation or reporting levels in the context of the specific tables. The reader needs to continually refer to the Investigation, Reporting Levels and notes that affect these values annotated in Table 6.3 Environmental Monitoring Requirement (pages 11 – 15). Incorporating a column for Investigation/Reporting Levels in the tables would assist the reader in evaluating the reported data.
2	General	The Figures (graphs) in the main report do not show where the Investigation Level is on the graph. However, the graphics in Appendix J do indicate the Investigation Level. Incorporation of the Investigation Level into the figures in the main body of this annual report would increase the ease by which the reader can evaluate the data produced by the USE Environmental Monitoring program.
		Continued on next page.

3	Page 1 Section 3	In the Executive Summary the "...MEI is not defined..." An air emission license has been issued for this facility (RAEL-009) the definition of the MEI used to generate the required COMPLY run should be incorporated into this section of the annual report.
4	Page 1 Section 3.0 5 <sup>th</sup> Paragraph	You state that "there are no liquid or airborne releases", then two sentences later you indicate that the dose from all effluent sources is less than 0.25 mrem per year. Please clarify this inconsistency.
5	Page 1 Section 3.0 5 <sup>th</sup> Paragraph	You state that "The annual calculated dose from all sources is 96 mrem, compared to our limit of 400 mrem." <b>The dose limit for the general public is 100 mrem from all sources.</b> The department has accepted your request to use a 25% occupancy factor for external gamma exposures and this change should be reflected in the reported gamma exposure results.
6	Page 3 Figure 4.1	There are unlabeled trenches please identify: <ul style="list-style-type: none"> <li>- The trench directly west of trench 14W.</li> <li>- The trench directly west of trench 13 and north of trench 14.</li> </ul>
7	Page 6 Section 5.3	This report refers to a DOH document, authored by "Ledoux" and dated 1995. Has this document been reviewed by licensee for continued applicability as the document is now 21 years old?
8	Page 6 Section 5.3	Tritium sample analyses for trench cap vegetation were seen to be higher than normal. Please explain the cause for the high results.
9	Page 7 Section 5.5	You state that the "penetrating gamma radiation monitoring is discussed in section 8." Section 8 is ground water.
10	Page 8 Table 6.1	Table 6.1 Contract Laboratories: Suggest adding a column to show the City and State that these facilities are located in. Their location is described in the text later in the report. But it would not be too difficult or time consuming to add a location column in this table.
11	Page 8 Table 6.1	Table 6.1 indicates that Environmental Inc. Midwest analyzes radiological samples for US Ecology. In the "Certifications" column a standard certification is not mentioned; however; there is a statement that an inter-lab comparison is conducted with Environmental Resources Associates. Is Environmental Resources Associates a certified radiological laboratory? Reading this, one could think that the radiological analyses are conducted by non-certified facilities.
12	Page 17 Section 7.1	This is a good description of an on-site industrial and environmental air monitoring program. The offsite air sample station is sited in accordance with NUREG 1388. There is no mention of WAC 246-247 and whether this air sampling system meets the requirements of the state radiological air emissions regulations.
13	Page 18 Table 7.1	Table 7.1 Station 1 (Background) Air Average and Maximum. Suggest adding a column to show Investigation and Reporting Levels of Gross Alpha, Gross Beta, and Tritium. This would allow the reader to evaluate the data without having to refer back to page 11 to find the information.
		Continued on next page.

14	Page 18 Table 7.2	Table 7.2 Fence Line Air Average and Maximum (uncorrected). Suggest adding a column to show Investigation and Reporting levels of Gross Alpha, Gross Beta and Tritium. This would allow the reader to evaluate the data without having to refer back to page 11 to find the information.
15	Page 20 Section 7.3	US Ecology Washington reports that Cesium-137 was detected via gamma spectroscopy, and mentions that elevated activities were detected at the site corners and boundaries. US Ecology should provide a reason for increased levels of Cesium-137 in this section of the Annual Report.
16	Page 20 Section 7.3	You have stated "At this time, tritium monitoring of vegetation is experimental..." How does US Ecology Washington use the tritium sample data?
17	Page 20 Section 7.3	You stated "tritium in the plants is not a concern." While this maybe so, US Ecology Washington identifies increases in tritium at trenches 14 and 5. Please provide an explanation as to why the elevated tritium in plants is not a concern. This will provide the reader with a better understanding about how US Ecology operates this site.
18	Page 21 Table 7.3	Table 7.3 Tritium in Trench 14 Grab Sample: It is recommended that a column indicating the Investigation and Reporting levels for tritium be added.
19	Page 21 Table 7.4	Table 7.4 Tritium in Trench 5 Bursage: Please add a column indicating the Investigation and Reporting levels for tritium.
20	Page 21 Section 7.3	You state that "in 1997, old Hanford town site fruit tree leaves ranged from 12-620 pCi/g of Tritium". Please cite the source document for this statement.
21	Page 22 Section 7.4	Licensee states "In 2013 Hanford 200 East area had a mean Cs-137 value of 2.5 +/- 5.6 pCi/g and a maximum value of 8.4+/- 1.1 pCi/g." It is recommended that the licensee cite the source document for this statement.
22	Page 22 Table 7.5	Table 7.5 Soil Sample Results at The Site Boundary. Please add a column indicating Investigation and Reporting levels for the analyses shown on this table.
23	Page 22 Section 7.5	This is a discussion of how direct gamma dose is derived by US Ecology Washington. While it makes sense, there are no license conditions cited in the body of this report that detail this practice. Suggest licensee cite specific license conditions, or provide citations that pertain to written correspondence between the licensee and the Department.
24	Page 24 Figure 7.1	Figure 7.1 Direct Gamma Results at the Site Boundary. Please identify the X and Y axes on this graph. Additionally it is recommended that you change the color scheme of this graph in order to show the corrected dose at each dosimeter station. Initially it appears the Stations 3,8,9,10,11,12,13,14,15,16,17, and 18 all exceed the 90 mrem Investigation Level.
		Continued on next page.

25	Page 26 Section 7.8	In section 7.8 you indicate that you will use the highest average gross alpha air sample and the highest gross beta air sample to calculate the CEDE from facility operations. Why the difference between the highest average gross alpha and the highest gross beta?
26	Page 26 Section 7.8	The formula that you include does not appear to be what you used for your calculations. What formula did you use for your calculations?
27	Page 26 Section 7.8	All references to WAC 246-221-190 are incorrect. The reference you want is WAC 246-221-290.
28	Page 26 Table 7.7 and 7.8	You indicate that the effluent concentration from table II for natural uranium ( $U_3O_8$ ) is 6 E-14 uCi/ml. If you look at natural uranium the most restrictive is 9 E-14 uCi/ml. It also says to see U-230. If you look up U-230 and ( $U_3O_8$ ); it is 4 E-13 uCi/ml. Where did you get the number of 6 E-14 uCi/ml from?
29	Page 27 Section 8.1	Regarding your Investigation and Reporting Levels for gross Alpha in groundwater; this suggestion is made with the reviewer understanding that groundwater and drinking water on the Hanford Site do NOT mean the same thing. Your Investigation Level for gross Alpha in groundwater is currently 12 pCi/l and the Reporting Level for gross Alpha in ground water is 15 pCi/l (the maximum allowable gross Alpha concentration for DRINKING WATER). It is suggested that you revise these levels to 10 and 12 pCi/l respectively. Such a revision would provide the licensee more time to evaluate any increases in groundwater gross Alpha concentrations in a timely manner.
30	Page 28 Figure 8.1	Please label the X and Y axes of this graph, as well as inserting a “line” on this graph that shows the Investigation level for gross Alpha.
31	Page 29 Section 8.1	You state “There were several gross beta results above our investigation level, but all were attributed to DOE activity.” Please provide sources (laboratory reports, correspondence between DOE and USE, Hanford Site annual reports) that provide supporting data.
32	Figure 8.2, 8.3 8.4, 8.5, 8.6 and 8.7	Please label the X and Y axes of this graph, as well as inserting a “line” on this graph that shows the Investigation level for gross Alpha.
33	Page 36 Table 8.1	Suggest licensee C-14 Historical Mean, ...show the years or timeframe for these results in the table.
34	Table 9.2, 9.3, 9.4, and 9.5	Suggest you include US Ecology Washington’s Investigation Levels in order to provide the reader a context with which to compare the US Ecology and DOH analytical results.
35	Appendix A Table A-1	Please provide a note of explanation that defines “BATES#”.
		Continue on next page.

36	Graphs	These figures are graphs that show the results of radiological analyses. They are generally easy to interpret, however please ensure that the X and Y axes of each graph are clearly labeled. It is also suggested that you determine a standard graphic symbol to show Investigation Levels on all graphs and charts. In Appendix J the graphic symbol used to show the Investigation Level changes three times and uses two different colors. Indicating the Investigation Level on the analytical results graphs is a sound and good tool. This allows the reader to easily and quickly see where the sample analyses are in relation to the Investigation Level.
37	Graphs	When using log scale you will need to include small tics to indicate the spacing between the log tics. This will not need to be corrected for this year.
38	Graphs	You need to show all data points on the graph. If you cannot make the log scale show the results at zero or below 0.1 then you will not be allowed to use log scale. This will not need to be corrected for this year.
39	Trench 11 Data and Graphs	All results and graphs reported as Trench 11; not the correct notation of Trench 11A or 11B.
40	Air Samples Graphs	You will need to include a larger tic to indicate the relation between the result and dates provided. This will not need to be corrected for this year.
41	Air Samples Data	Air samples are counted quarterly for C0-60 and Cs-137. The data and graphs for these counts were not provided. The minimal requirement, for the graphs, would be to include a discussion that they did not exceed the MDC so no graphs provided.
42	Soil Samples	Soil samples are counted for C0-60 and Cs-137. The data and graphs for these counts were not provided. The minimal requirement, for the graphs, would be to include a discussion that they did not exceed the MDC so no graphs provided.
43	Soil Graphs	There was no graph of Pu-239 and Pu-240 in soil for station 5.
44	Vegetation Graphs	There was no graph of gross Beta in Vegetation for Trench 4A, 4B, 7A, 14W, and 15.
45	Vegetation Data	There was no Data of gross Beta in Vegetation for Trench 1 thru 3, 4A, and 15.
46	Vegetation Data	Why were there two results for U-233/U-234 and U-235 for station 4 and the NE Corner?
47	Vegetation Data	Why were there two results for U-238 for the NE Corner?
48	Vegetation Data	There was no Data of U-233 and U-234 in Vegetation for Trench 1 thru 4, 4A, and 15.
49	Vegetation Data	There was no Data of U-235 in Vegetation for Trench 1 thru 4, 4A, and 15.
		Continued on next page.

50	Vegetation Data	There was no Data of U-238 in Vegetation for Trench 1 thru 3, 4A, and 15.
51	Vegetation Graphs	There was no graph of total Uranium in Vegetation for Trench 4A, 14W, and 15.
52	Vegetation Data	There was no Data of Pu-238 in Vegetation for Trench 1 thru 3, 4A, and 15.
53	Vegetation Graphs	There was no graph of Pu-238 in Vegetation for Trench 4A, 4B, 7A, 12A, 14W, and 15.
54	Vegetation Data	There was no Data of Pu-239 and Pu-240 in Vegetation for Trench 1 thru 3, 4A, and 15.
55	Vegetation Graphs	There was no graph of Pu-239 and Pu-240 in Vegetation for Trench 4A, 4B, 7A, 12A, 14W, and 15..
56	Vegetation Data	There was no data for Co-60 in Vegetation for Trench 1 thru 3, 4A, and 15.
57	Vegetation Graphs	There were no graphs for Co-60 in Vegetation. The minimal requirement would be to include a discussion that they did not exceed the MDC so no graphs provided.
58	Vegetation Data	There was no data for Cs-137 in Vegetation for Trench 1 thru 3, 4A, 15, and 16.
59	Vegetation Data	At station 3 the Cs-137 result was 0.03 pCi/g and the investigation level is 0.02 pCi/g; this was not noted in Table 10.1. Why was this not investigated?
60	Vegetation Graphs	There were no graphs of Cs-137 in Vegetation. The minimal requirement would be to include a discussion that they did not exceed the MDC so no graphs provided.
61	Vegetation Data	There was no data of H-3 in Vegetation for Trench 1 thru 3, 4A, and 15.
62	Vegetation Graphs	There were no graphs of H-3 in Vegetation.
63	Ground Water Graphs	There was no graph of H-3 for well 9A.
64	Ground Water Graphs	There was no graph of C-14 for well 9.
65	Ground Water Graphs	There were no graphs of Pu-238. The minimal requirement would be to include a discussion that they did not exceed the MDC so no graphs provided.
66	Ground Water Graphs	There were no graphs of Pu-239 and Pu-240. The minimal requirement would be to include a discussion that they did not exceed the MDC so no graphs provided.
67	Ground Water Graphs	There were no graphs of Co-60. The minimal requirement would be to include a discussion that they did not exceed the MDC so no graphs provided.
		Continued on next page.

Mr. Sean Murphy  
February 8, 2016  
Page 7 of 7

68	Ground Water Graphs	There were no graphs of Cs-137. The minimal requirement would be to include a discussion that they did not exceed the MDC so no graphs provided.
69	Ground Water Graphs	There were no graphs of Tc-99.
70	Ground Water Data	What are the investigation and reporting levels for Tc-99? These are not listed in the Facility Standards Manual.
71	Ground Water Data	Why were there two 3 <sup>rd</sup> Qtr. well 3 results for Gross Alpha?
72	Ground Water Data	Why were there two 4 <sup>th</sup> Qtr. well 7 results for Co-60?
73	Ground Water Data	Why were there two 3 <sup>rd</sup> Qtr. well 9 results for Co-60?
74	Gamma Dose	There is no trend analysis or graphs for the 18 TLD locations.

If you have any questions or comments, please do not hesitate to contact me at 360-236-3247.

Sincerely,

Kevin Siebert  
Waste Management Section

cc:

Joe Weisman - US Ecology Boise, Id  
John Martell – Washington DOH  
Mike Priddy - Washington DOH  
Phil Rigdon- Yakama Nation  
Rose Ferri- Yakama Nation



STATE OF WASHINGTON  
 DEPARTMENT OF HEALTH  
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US ECOLOGY  
 REC. OCT 15 2015  
 WASHINGTON

October 12, 2015

Mike Ault, Facility Manager  
 US Ecology Washington  
 1777 Terminal Drive  
 Richland, Washington 99354

License No. WN-I019-2

Subject: WN-I019-2, Annual Environmental Monitoring Report

Dear Mr. Ault:

Thank you for submitting the Annual Environmental Monitoring Report, for Calendar year 2014. The department has reviewed this report and is requesting that the report be reissued in its entirety to address the department's comments. The department is disappointed in the quality of this submittal and expects that US Ecology will perform QA on this document before it is resubmitted. The hard copy should be in color or the format should not require color to interpret the document. The department requests you format the graphs similar to the graphs contained in the 2012 report, for individual sampling locations which includes error bars and action levels. If you choose not to produce this type of graph, the department will require all of the individual lab sample results to be included as an attachment to the report. The department expects the report to be reissued by December 31<sup>th</sup>, 2015. Below are the comments from the department:

Comments from 2014 Annual Environmental Monitoring Report:

Comment No.	Page/Section No.	Comments
1	Document	Where is section 1 of the document?
2	Document	The first page indicates 77 pages in the document. All other pages indicate 76 pages in the document.
3	Document	Delete "Table of Contents" from the bottom of all pages that are not a part of the table of contents.
4	Document	The electronic and hard copies should be identical; some of the Figures on the electronic copy are different.
5	Multiple	Too much data cannot read in gray scales for Figure: 4.1, 7.1, 7.2, 7.5, 8.1, 8.2, 8.5, 8.6, 8.7, 8.8, 8.9, 8.11, and 8.14.
6	Multiple	None of the results provided indicate which lab provided them. Please Provide.

7	Multiple	None of the Figures have action levels indicated on them. Please Provide.
8	Multiple	The Figures have no labels on the axis.
9	Figure 4.1 Page 6	This Figure is hard to read and should be on 11" X 17" paper.
10	Section 7.1 Paragraph 4 Page 20	Sampling locations on figure 4.1 are not easily identified. (see Comment #5)
11	Section 7.1	There are no results for the 9 sampling stations or their associated uncertainties. This includes the Goss Alpha, Gross Beta, Co-60 and Cs-137, as well as the quarterly gamma spec analyses. Please provide.
12	Section 7.1	There are no Air results for sampling stations 1, 2 and 5 or their associated uncertainties for H-3. Please Provide.
13	Section 7.1	There is no trend analysis for the 9 sampling stations. Please perform and submit the trend analysis.
14	Figure 7.1 Page 24	The last date is not in recognizable format. Please correct.
16	Section 7.3 Figure 7.1, 7.2	There is no trend analysis for vegetation samples on the electronic version for Gross Alpha and Gross Beta. Please provide. The electronic and hard copies are required to be identical.
16	Section 7.3 Figure 7.1, 7.2	Please explain what the lines represent on the hard copy of the report. They are not identified.
17	Section 7.3	There are no results for Co-60, Cs-137, and gamma Spec with associated uncertainties, for any of the vegetation samples. Please provide.
18	Section 7.3	There are no vegetation results for all capped trenches. Please provide.
19	Section 7.4	There are no results for soil samples with their associated uncertainties. Please provide.
20	Figure 7.4 Page 34	There is a problem with date order or year of last sample. Please correct or explain.
21	Section 7.5	There are no results for TLD readings with their associated uncertainties. Please provide.
22	Section 7.5	The Background location should not be evaluated based on the lowest dose. Station 1 has been designated as the background station and should be used as the background location.
23	Section 7.8 or Table 7.14	You did not indicate what equation was used. Please explain and show your calculation.
24	Section 8.0	There are no results for ground water samples including their associated uncertainties. Please provide.
25	Figure 8.1 Page 40	There are no graphs for wells 6, 9, 9a. Please provide.
26	Figure 8.2 Page 42	There are no graphs for wells 6, 9, 9a. Please provide.
27	Figure 8.4 Page 44	There are no graphs for wells 6, 9, 9a, 3, 4, 5, 7, 8. Please provide.

28	Figure 8.4 Page 44	Please explain in the text, what the relevance of this Figure. (graph of wells 10 and 13) is.
29	Figure 8.5 Page 46	This figure should indicate DOE sampling locations in relationship to the US Ecology facility.
30	Section 8.1	US Ecology indicates that there are studies to show ground water contamination from the DOE are impacting groundwater wells at US Ecology. If there are results for DOE ground water samples with their associated uncertainties, that data would be valuable. If available in <u>“CH2MHILL Plateau Remediation Company, 2014”</u> or <u>“U.S. Department of Energy, September 2013”</u> please provide results or a link to the specific data.
31	Section 8.2	This link is not functional ( <a href="http://www.phoenix.pnnl.gov">www.phoenix.pnnl.gov</a> ). When the address is entered, the page does not exist. Please correct.
32	Section 8.2	This link is not functional (2013 Hanford Site Groundwater Monitoring Report) They have moved the page. When the link is forwarded it arrives at <u>“HANFORD SITE ENVIRONMENTAL REPORT FOR CALENDAR YEAR 2011”</u> . Please correct.
33	Figure 8.6 Page 48	This figure does not indicate the location of US Ecology. Please use a figure which shows the location of the US Ecology facility.
34	Figure 8.6 Page 48	This figure is hard to read. Please provide a figure that is readable.
35	Figure 8.7 Page 49	Please explain why there are no graphs for wells 6, 9, 9a.
36	Figure 8.8 Page 50	The only contaminate that is indicated as being at US Ecology is Chromium 48. There is no indication of H-3, Tc-99, Uranium or Sr-90. Please explain.
37	Section 8.2	There are no results for C-14 in ground water samples with their associated uncertainties. This needs to be included.
38	Table 8.1 Page 51	Why are the new wells 4, 6, 7 not included? The results should be included.
39	Figure 8.9 Page 52	There are no graphs for wells 6, 9, 9a. These wells need to be included.
40	Section 8.2	There are no graphs or results presented for Tc-99 in ground water samples with their associated uncertainties. Please provide.
41	Section 8 Page 53	“10.3 Gamma Emitting Radioisotopes in Groundwater” mis-numbered.
42	Section 8	There are no graphs or results for Gamma emitting radioisotopes in ground water samples with their associated uncertainties. Please provide.
43	Section 8 Page 53	“10.4 Plutonium in Groundwater” mis-numbered.
44	Section 8	There are no graphs or results for Plutonium in ground water samples with their associated uncertainties. These need to be included.
45	Section 8 Page 53	“10.5 Uranium in Groundwater” mis-numbered.
46	Section 8	There are no results for Uranium in ground water samples with their associated uncertainties. Please include.

47	Figure 8.11 Page 54	There are no graphs for wells 4, 6, 7. These wells need to be included.
48	Figure 8.11 Page 54	There is no data after 2013. Please include 2014 data.
49	Figure 8.11 Page 54	There is no trend analysis on the electronic Figure. Please provide.
50	Figure 8.12 Page 55	Please explain how pCi/l compares to ug/l that is given as the EPA drinking water limit.
51	Figure 8.12 Page 55	There are no graphs for wells 3, 4, 5, 6, 7, 9, 10. These need to be included.
52	Figure 8.12 Page 54	There is no data after 2013. Please include 2014 data.
53	Table 8.2 Page 57	Please explain what the column headers "Case number", "DL", "RI" mean.
54	Section 8.6 Page 57	The second paragraph states in part: "Figure 8.14 from the 2012 Hanford Environmental Report (U.S. Department of Energy, September 2013) and shows the USEW site on top of the estimated plume location, with the center of the plume (and higher concentrations) coming in the future. An update plume map can be found at the phoenix web site (U.S. Department of Energy, 2015)." Please explain what is meant by this statement.
55	Figure 8.15 Page 63	Please show where US Ecology is located in this Figure.
56	Figure 8.16 Page 64	This Figure should show the ground water flow over the entire facility. As shown, this Figure could be misinterpreted since no ground water flow over the North end of the facility is shown.
57	Section 8.9 Page 65	This link is not functional ( <a href="http://www.phoenix.pnnl.gov">www.phoenix.pnnl.gov</a> ). When the address is entered, the page does not exist.
58	Appendix G	This appendix (Electronic Database) was not included.

If you have any questions or comments, please do not hesitate to contact me at 360-236-3247.

Sincerely,



Kevin Siebert  
Waste Management Section

cc: Sean Murphy, RSO - US Ecology  
Joe Weisman - US Ecology Boise, Id  
John Martell - Washington DOH  
Mike Priddy - Washington DOH  
Phil Rigdon- Yakama Nation  
Rose Ferri- Yakama Nation



STATE OF WASHINGTON  
DEPARTMENT OF HEALTH

OFFICE OF RADIATION PROTECTION

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US ECOLOGY  
REC. APR 19 2016  
WASHINGTON

April 13, 2016

Sean Murphy  
US Ecology Washington  
1777 Terminal Drive  
Richland, Washington 99354

License No. WN-I019-2

Subject: WN-I019-2, 2014 Annual Environmental Monitoring Report

Dear Mr. Murphy:

Thank you for submitting the revised Annual Environmental Monitoring Report, for Calendar year 2014, received April 4, 2016. The department has reviewed this report and requests that the report be amended to address the department's comments. The department expects the report to be amended by May 1st, 2016. Below are the comments from the department:

Comments for revised 2014 Annual Environmental Monitoring Report:

Comment No.	Page/Section No.	Comments
Old Comment 5	Page 1 Section 3.0 5 <sup>th</sup> Paragraph	You state that "The annual calculated dose from all sources is 96 mrem, compared to our limit of 400 mrem." The dose limit for the general public is 100 mrem from all sources. The department has accepted your request to use a 25% occupancy factor for external gamma exposures and this change should be reflected in the reported gamma exposure results.
	USEW Response	This question was answered by an email from Mike Elsen to Mike Ault on December 29, 2012. USEW agrees that the limit stated in the Facility Standards Manual (FSM) should be 100 mrem/year, with a 25% occupancy factor. The place to change this is in the FSM, not in this report. FSM Section 6.5 will be changed, as will table 6.1 of the FSM during the next revision of that document.
	DOH Response	US Ecology Washington's public dose limit is 100 mrem/yr as stated in WAC 246-221-060 and WAC 246-250-190.  One of the purposes of an environmental report is to show that operations from facilities are in compliance with applicable regulations as well as

	DOH Response Continued	radioactive materials licenses issued to the facility. Another purpose is to obtain data on critical pathway parameters to more accurately evaluate radiation dose to the public. Since the regulatory limit is 100 mrem/yr and the department had reviewed and approved US Ecology's 1994 justification for using an occupancy factor of 0.25, it is strongly suggested that this report, at a minimum, briefly discuss US Ecology's October 1994 basis to use an occupancy factor. This will aid the reader in understanding the difference between the regulatory limit of 100 mrem/yr and the approved administrative limit of 400 mrem/yr.
Old Comment 17	Page 20 Section 7.3	You stated "tritium in the plants is not a concern." While this maybe so, US Ecology Washington identifies increases in tritium at trenches 14 and 5. Please provide an explanation as to why the elevated tritium in plants is not a concern. This will provide the reader with a better understanding about how US Ecology operates this site.
	USEW Response	There is no consensus opinion on the interpretation of tritium in vegetation results. (See section 7.3). If the department is aware of any consensus documents, or DOE or NRC guidance, please forward that information. USEW can provide a discussion on why it is not a concern from your provided documents.
	DOH Response	Please provide the basis for the statement that tritium in plants is not a concern.  Section 7.3 is now Vendor Audits.
Old Comment 62	Vegetation Graphs	There were no graphs of H-3 in Vegetation.
	USEW Response	There are no trend analysis or investigation levels required for tritium in vegetation. This analysis is experimental.
	DOH Response	Your radioactive materials license condition 72 requires a comprehensive annual report of all samples analyzes with statistical trend analysis. Since tritium in vegetation was analyzed a trend analysis is required.
NEW Comment DOH	Page 2 section 2 paragraph 3	It is suggested that in addition to the 19 closed low-level radioactive waste trenches, there also is a closed chemical trench as well as a closed tank
NEW Comment DOH	Electronic Database	The quarterly backgrounds that are subtracted from the quarterly doses, in the database, are from the year 2011 not 2014.

Mr. Sean Murphy  
April 13, 2016  
Page 3 of 3

NEW Comment DOH	Page 3 Figure 2.1	The Environmental monitoring Stations map that you provided is different than the map supplied in your September 2013 Facility Standards Manual (FSM) that was submitted in support of license renewal. Please use the map that is included in the approved FSM.
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If you have any questions or comments, please do not hesitate to contact me at 360-236-3247.

Sincerely,



Kevin Siebert  
Waste Management Section

cc:

Joe Weisman - US Ecology Boise, Id  
John Martell - Washington DOH  
Mike Priddy - Washington DOH  
Phil Rigdon- Yakama Nation  
Rose Ferri- Yakama Nation

**From:** [Siebert, Kevin H \(DOH\)](#)  
**To:** [Sean Murphy](#)  
**Subject:** RE: Attachment J.docx  
**Date:** Thursday, December 10, 2015 3:32:37 PM  
**Attachments:** [Example.xlsx](#)

---

If you select the x axis and chose axis label low it will look like attached.

---

**From:** Sean Murphy [<mailto:sean.murphy@usecology.com>]  
**Sent:** Thursday, December 10, 2015 3:26 PM  
**To:** Siebert, Kevin H (DOH)  
**Subject:** RE: Attachment J.docx

This is excel.

Even excel can't display zero on a log scale. Mathematically impossible.  $\log(0)$  is undefined.

I have it set to choose automatically.

---

**From:** Siebert, Kevin H (DOH) [<mailto:kevin.siebert@doh.wa.gov>]  
**Sent:** Thursday, December 10, 2015 3:22 PM  
**To:** Sean Murphy  
**Subject:** RE: Attachment J.docx

Would doing the graphs in excel work better and give you more options? In excel you can chose to display the units low which take it off the graph.

---

**From:** Sean Murphy [<mailto:sean.murphy@usecology.com>]  
**Sent:** Thursday, December 10, 2015 3:10 PM  
**To:** Siebert, Kevin H (DOH)  
**Subject:** RE: Attachment J.docx

It's a log scale axis, zero does not exist, nor do negative numbers appear.

---

**From:** Siebert, Kevin H (DOH) [<mailto:kevin.siebert@doh.wa.gov>]  
**Sent:** Thursday, December 10, 2015 3:08 PM  
**To:** Sean Murphy  
**Subject:** RE: Attachment J.docx

Is there a reason for the x axis display to be at 1 instead of 0?

---

**From:** Sean Murphy [<mailto:sean.murphy@usecology.com>]  
**Sent:** Thursday, December 10, 2015 3:03 PM  
**To:** Siebert, Kevin H (DOH)  
**Subject:** Attachment J.docx

So this is what we are going to create for the report. There will be several hundred of them. I will not do the analytes that are always zero (like Co, Cs). I'll include Pu, due to the hypersensitivity in your office, even though it zero.

Do they look OK?



STATE OF WASHINGTON  
DEPARTMENT OF HEALTH

OFFICE OF RADIATION PROTECTION

111 Israel Road SE • P.O. Box 47827 • Olympia, Washington 98504-7827

TDD Relay Service: 1-800-833-6388

October 6, 2016

Sean Murphy, RSO  
US Ecology Washington  
1777 Terminal Drive  
Richland, Washington 99354

**License No. WN-I019-2**

Subject: WN-I019-2, Annual Environmental Monitoring Report 2015

Dear Mr. Murphy:

Thank you for submitting the Annual Environmental Monitoring Report, for Calendar year 2015. The department has reviewed this report and is requesting that the report be reissued in its entirety to address the department's comments. The department expects that US Ecology will perform QA on this document and have the radiation safety committee review it before it is resubmitted. The department expects the report to be reissued by November 30<sup>th</sup>, 2016. Below are the comments from the department:

Comments from 2015 Annual Environmental Monitoring Report:

Comment No.	Section No. / ¶ / Page	Comments
1	General	All graphs and figures of graphs should have minor ticks to help evaluate the results.
2	General	All graphs and figures of graphs should be in color to help trace the individual lines.
3	General	The Environmental Report Format revision 8 dated October 21, 2013, requires a glossary. This is missing from the report.
4	General	The Environmental Report Format revision 8 dated October 21, 2013, requires an appendix for internal audits. This is missing from the report.



5	General	<p>Most sections and information requested in the report format are included, but do not necessarily follow the outline given by the report format. This is most notable with data tables and maps.</p> <p>Missing from report:</p> <ul style="list-style-type: none"> <li>-Location and a map showing location of MEI, plus dose calculation in the executive report section</li> <li>-Statement on why environmental monitoring is a sound business practice in Description of Environmental Monitoring Program section</li> <li>-Met Data should at least be referenced to in the Environmental Monitoring Program section</li> <li>-Statistical methods used to analyze and validate data and MDL/MDA in QA program section</li> <li>-Sample recount data and a column indicating how many times action or investigation levels are exceeded in the data table in Samples Exceeding Investigation or Action Levels, as well as a statement regarding remediation activities</li> </ul>
6	General	<p>Data tables are not in a consistent format. Some show standard deviation while others do not; some compare past to current averages without the deviation to show whether the current data is statistically similar; many tables are not discussed or referenced in the text.</p>
7	Section 1 Paragraph 5 Page 1	<p>USEW dose limit to the general public is 100 mrem not 400 mrem.</p>
8	Figure 2.1 Page 3	<p>The map has sections of the facility cut off on the south side. The size of the map legend makes it unreadable. This map should be on a 11 x 17 sheet of paper.</p>
9	Table 4.1 Page 8	<p>Did USEW change labs in 2015?</p>
10	Section 5.6 Page 25	<p>USEW reported a value of 102 mrem for the general public. This value is above the dose limit for the general public. Please confirm if this number is correct.</p>
11	Section 6.0 Page 27	<p>USEW makes the statement "Groundwater sample results show very little variation from sample to sample." What does USEW mean by this statement?</p>
12	Table 6.1 Page 32	<p>USEW has an error in this table for well 9. USEW reported 28 pCi/l as the mean with the max reading of 7.7 pCi/l.</p>

13	Section 6.2 Paragraph 2 Page 32	USEW states that “Technitium-99 is the largest contributor to gross beta in up-gradient wells.” How can USEW support this statement? Figure 6.2 indicates that the Tritium concentration is well above 2,000 pCi/l while Figure 6.1 indicates that the Technitium-99 concentration is only 20 pCi/l.
14	Section 6.2 Paragraph 2 Page 32	USEW stated “Our contract laboratory has investigated the possibility that Technitium-99 is driven off during the drying portion of the gross beta analysis, and concluded that there is no appreciable loss during their procedure.” What support did USEW’s lab provide to support this statement?
15	Pages 19 & 26	Station 1 average concentrations in Table 5.1 and 5.8 do not match. Please reconcile the difference.
16	Page 19	Tables 5.1 and 5.2 are not discussed in text
17	Pages 22 & 2	Data for previous years at Trench 13 are discussed, but not 2015.
18	Pages 23 & 2	“Uranium in Soil” subsection does not have any statement regarding the results or trends. Include a summary of findings.
19	Page 24	Table 5.6 shows 4-year averages and the current year’s average at the TLD locations. Standard deviations or min & max are not included; nor a discussion on whether the current year’s averages are statistically similar to past years. Include an analysis of how the current’s year’s data fits into the trend shown in the previous years.
20	Pages 27 & 7	“Since 2002, the slope has decreased, but it is still increasing from year to year” is a bit difficult to understand. Clarify what the statement means. It also seems that, per Fig. 6.1, gross beta has shown an overall slight increase since 2000, not 2002.
21	Page 31	Fig. 6.2 shows that tritium concentration at Well 3 is significantly higher than the other wells; the text should address this increase.
22	Pages 32, 1, & 2	It is stated that wells MW-3, 4, 5 have higher C-14 concentrations than the other wells, but the reason why is not discussed. Address why this might have occurred.
23	Pages 32 & 2	Data and/or graph are not referenced for discussion of Tc-99.
24	Appendix C	This is not the most current amendment of license. The current amendment is not releasable to general public and should not be included.
25	Appendix H	The title page is mislabeled as appendix I.
26	Appendix H	Did you mean to record the volume for station 1 in meters? The rest of the volumes are in feet. Please be consistent.
27	Appendix H	What type of volume are FT2 and FT1? These units are listed in the volume column, for H-3 in environmental air.

28	Appendix H	The Environmental Report Format revision 8 dated October 21, 2013, requires reported values to be accompanied by uncertainty absolute error values of plus/minus 2 sigma. These are missing from the environmental air section.
29	Appendix H	The 3 <sup>rd</sup> quarter groundwater for well 9 is missing U-239 and total U.
30	Appendix J	Missing the Total Uranium in vegetation graph, for the NE corner.
31	Appendix J	Missing all the graphs for Tritium in vegetation.
32	Appendix J	Fence line dose should be graphed in either gross or net mrem for the quarter instead of mrem per day.

If you have any questions, comments, or would like to discuss responses please do not hesitate to contact me at 360-236-3247.

Sincerely,



Kevin Siebert  
Waste Management Section

cc:

Mike Ault, - Facility Manager, US Ecology  
Joe Weisman - US Ecology Boise, Id.  
John Martell - Washington DOH  
Mike Priddy - Washington DOH  
Phil Rigdon- Yakama Nation  
Rose Ferri- Yakama Nation

WASHINGTON STATE DEPARTMENT OF HEALTH

OFFICE OF RADIATION PROTECTION (ORP)

ENVIRONMENTAL REPORT FORMAT

*Notes to Licensees:*

*This format is to be used as a guideline by licensees when preparing their annual environmental report.*

*This report will be used by the ORP regulatory section(s), Environmental Sciences Section and ORP management to ensure compliance with site specific license conditions.*

*This format is not intended to require licensees to change the current title of their annual environmental report, if a title is specified in their current ORP license(s).*

*Tables included in this report are shown as examples.*

1. **Cover Page:** This page should include:
  - Site Name
  - Facility and Facility Address
  - Reporting Period
  - Radioactive Materials/Waste/Air Emissions License Number
  - Authors Name or Site Point of Contact
  
2. **Table of Contents:** This page should list the items below and the pertinent page or section numbers.
  - Sections
  - Figures
  - Maps
  - Tables
  - Radiological Air Emissions (RAE) Data Sheet
  - Appendices/Attachments
  - References

3. **Executive Summary** (Written in a non-technical manner. This section should be able to let the non-technical reader know well the site was operated and provide information regarding major issues the site experienced during the year.)
  - Statement of compliance with the appropriate sections of WAC 246 and other state or federal regulations.
  - Purpose of the environmental report.
  - Statement referring reviewer to the RAE Data Sheet (if required by license).
  - Site-specific diagram or map.
  - Map showing site in relation to the surrounding community.
  - Brief description of land and water use by the site.
  - Very brief list/summary of any radiological releases or major compliance issues.
  - List and description of radionuclides of concern.
  - Brief statement of **location and dose** to the Maximally Exposed Individual (MEI).
  - Map showing the location of the MEI in relation to the site.
  - What was the calendar year dose to the environment?
  
4. **Introduction** (Audience: Non-Technical)
  - Facility location (street address) and diagram showing general layout of the site
  - The purpose of the facility.
  - List facility officers (CEO, Manager, RSO, Health Physics/Technical Services Manager, Regulatory Compliance Officer).
  - Primary activities that occur at the facility.
  - Number of all full-time employees at the facility.
  - Photos and diagrams of the facility, with buildings/work areas labeled.
  - Radioactive material storage areas.
  
5. **License Condition Compliance Summary** (Audience: Technical)
  - Specify maximum quantity or annual possession quantity (specific terminology is dependent on language used in each specific license) or as listed in WAC 246-221/232/233/235.
  - Specify maximum radiological air emissions release limit under WAC 246-247 and basis for this license limit (air treatment system, inventory control, other applicable technologies).
  - At the discretion of the Office of Radiation Protection (ORP) licensing section manager, submit summaries of each Notice of Correction (NOC), Notice of Violation (NOV), and requests for compliance plans. This summary should list the basis for the finding (specify license condition(s) or reason(s) given by the department), status of corrective action (if any), status of compliance plan, or other actions taken by the facility to address the findings.
  - Summarize releases of radioactive material that require notification to an outside regulatory agency (this shall also include notification of non-radioactive material releases that have an impact on the radiological operations of the facility).

6. **Description of Environmental Monitoring Program** (Audience: Technical)

- Brief description of the reason for the environmental monitoring program, which should be written from the standpoint of the licensee. The licensee should explain not only regulatory requirements, but also why environmental monitoring is a sound business practice.
  - Type of samples collected (soil, air, water, and vegetation) and frequency of collection (daily, weekly, quarterly, annually).
  - Sample-specific analysis information. (For example: type(s) of radiation counted, and/or isotopic analyses by sample type.)
  - Laboratory where sample analysis is conducted; list laboratory certifications and date of latest laboratory visit by facility staff.
  - Listing of the lower limits of detection for each isotope of concern for each laboratory used by the licensee.
  - Listing of investigation levels and criteria used to determine those criteria levels for each sample type and isotope.
  - List the results of facility-initiated self-assessments, environmental monitoring program audits, or other corporate environmental quality assurance efforts.
- 
- Maps, diagrams, or aerial photographs showing the locations where air, soil, vegetation, and water samples were taken, and of dosimeters.
  - Meteorological data (windrows and their sources (FAA, NOAA, other)).
  - Specify method of collection for all sample media. If corporate procedures are referenced, they must be included as an appendix.
  - Reporting units. The following units are those used to report radiological data by the Washington State Public Health Laboratory (WPHL), *if a site specific license requires the use of different units; use the units required per the license:*
    - Air pCi/m<sup>3</sup>
    - Tritium pCi/m<sup>3</sup>
    - Sediment pCi/g
    - Food pCi/g
    - Vegetation pCi/g
    - Milk pCi/l
    - Soil pCi/g
    - Water pCi/l
    - Ambient Gamma (TLD) mrem/year

**NOTE 1:** A reported value should be expressed using an appropriate amount of significant figures which is determined by the magnitude of the total uncertainty associated with the total value.

**NOTE 2:** Reported values should be accompanied by uncertainty absolute error values of plus/minus 2 sigma.

7. **Environmental Radiation Protection Program and Dose Assessment** (Audience: Technical)

- Description of the environmental radiation monitoring program.
- “Outside the Fence” description of environmental radiation monitoring activities.
- Description of the assumptions and models used in performing dose calculations. If there is a specific modeling program(s) mandated by a license condition, refer to the license condition(s) and the applicable Materials, Waste, or Air Emissions license number.
- Definitive statement regarding the specific Air Emissions modeling program used (CAP-88, COMPLY or other Department of Health (DOH) approved model).
- Tabular Reporting of Radiological Dose for the calendar year (**EXAMPLE BELOW**)

<b>Pathway</b>	<b>Dose to Maximally Exposed Individual</b>	<b>Materials/Waste Licensed Limits (NRC)</b>	<b>Air Emissions Licensed Limits (EPA)</b>		
Air					
Water					
Other Pathways					
All Pathways					

8. **Ground Water Protection Program** (if required by license) (Audience: Technical)

- If ground water protection measures and monitoring activities are being taken, the licensee will describe why these activities are necessary, the specific radionuclides of concern, and the non-radiological concerns.

9. **Environmental Quality Assurance (QA) Program** (Audience: Technical)

- Corporate statement regarding use of internal Quality Assurance (QA) program.
- Reference site QA procedures and latest revision(s) (table or appendix).
- Describe basis for development of site QA procedures.
- Synopsis of the results of any internal QA audits, their findings, and any process improvements implemented during the year due to the QA program.
- Synopsis of any external QA activities (visits to laboratories, review of sub-contractor processes, and procedures).
- Description of the statistical method(s) used to analyze and validate sample data.
- What are the minimum detection limit (MDL) and minimum detection activity (MDA)?

10. **List of environmental sample locations where investigation or action levels were exceeded.** (Audience: Technical)

- This should be tabular, showing the date, sample location, type of sample, analysis result with statistical error, any data from sample recounts or follow-up sampling to verify false or true positive, and a column to indicate how many times this specific site has exceeded investigation or action levels during the last 20 calendar quarters.
- Map, diagram, or aerial photograph of the facility showing the specific locations where investigation or action levels were exceeded.
- Include any communications with the pertinent ORP staff as supporting documentation. This includes emails or records of telephonic conversations regarding each specific site where analysis indicates that investigation or action levels have been exceeded.
- Statement regarding any remediation activities planned or currently being undertaken to address sites where investigation or action levels have been exceeded.

**Washington State Department of Health  
Office of Radiation Protection**

**RADIOACTIVE AIR EMISSIONS (RAE) DATA SHEET**

**NOTE:** This Data Sheet is used by RAE Section licensees to provide air emissions-specific technical data. The licensee may use this form to support reporting radioactive air emissions compliance information using the Environmental Report Format.

**REFERENCES:** Most current licensee copy of their specific Radioactive Air Emissions License (RAEL)

WAC 246-247-080

40 CFR 61, Subparts H and I

**DATA SECTION:**

1. Name of DOH approved modeling program used to generate RAE compliance data:  
\_\_\_\_\_
2. Wind rose/joint frequency table (may also be included as an attachment)
3. Annual average ambient temperature: \_\_\_\_\_
4. Annual average emission unit gas temperature (if available): \_\_\_\_\_
5. Annual total rainfall: \_\_\_\_\_
6. Annual average emission unit flow rate and total volume of air released during the calendar year: \_\_\_\_\_

**STATEMENT OF RAE COMPLIANCE:**

This facility is licensed to emit \_\_\_\_\_ mrem/year (RAEL # and License Condition #).

For Calendar Year XXXX, this facility emitted \_\_\_\_\_ mrem/year. This is in compliance with the above-referenced license condition and is supported by the above data and attached documentation (COMPLY or CAP-88 run). Licensees who are required by RAES license to submit additional information should attach that information to this report.

SIGNED: \_\_\_\_\_ DATE: \_\_\_\_\_

Licensee Signatory Title (Example: Chief Executive Officer, Radiation Safety Officer)

11. **Appendices or Attachments** (examples below)
  - Most current license(s) issued by the ORP.
  - Annual Air Emissions report and supporting documentation (COMPLY/CAP-88 run).
  - Procedures used to implement Environmental Monitoring Program.
  - Corporate policies or statements regarding environmental monitoring.
  - Results of internal audits.
  - Laboratory analysis protocols.
12. **Glossary**
13. **List of Acronyms**