



ENERGY AND ENVIRONMENT CABINET

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Leonard K. Peters
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October 23, 2013

Ms. Rachel Blumenfeld
US Department of Energy
Portsmouth/Paducah Project Site Office
PO Box 1410
Paducah, Kentucky 42002

RE: Conditional Concurrence for the Remedial Investigation / Feasibility Study Report for CERCLA Waste Disposal Alternatives Evaluation (DOE/LX/07-0244&D2)
Paducah Gaseous Diffusion Plant
Paducah, McCracken County, Kentucky
KY8-890-008-982

Ms. Blumenfeld:

The Kentucky Division of Waste Management (Division) and the Cabinet for Health and Family Services Radiation Control Branch have collectively reviewed the above-listed document received on July 25, 2013. While many comments were addressed relative to the D1 draft of the document, several issues remain unresolved. These are noted in the attached conditions which the Division would expect to be met before concurring on the Feasibility Study Report.

If you have any questions or require additional information, please contact Todd Mullins at (502) 564-6716, ext. 4690 or e-mail at todd.mullins@ky.gov.

Sincerely,

April J. Webb, P.E., Manager
Hazardous Waste Branch

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DWM File: #1040; Graybar: AIN20120007 (CERCLA WDAE RI/FS Report)

Attachments: Kentucky Conditions

**Kentucky Division of Waste Management Conditions Pertaining to the
Remedial Investigation/Feasibility Study Report for CERCLA Waste Disposal Alternatives
Evaluation**

Paducah Gaseous Diffusion Plant, Paducah, Kentucky

DOE/LX/07-0244&D2

October 23, 2013

General Condition Related to Previous Comments:

Section 6.4.3.3 Long-term environmental effects, Pg. 6-24, 6th Paragraph:

In response to EPA General Comment #15, DOE modified the text in this paragraph to read as follows:

“There may be impacts to the terrestrial biotic resources resulting from the eventual loss of integrity of the landfill cover and/or liner. This could result in leachate reaching surface water. The long-term commitment to engineering controls, SM&M, and institutional controls results in the viability of the No Failure scenario for PWAC development and, consequently, the WAC.”

It is not entirely clear what the last sentence means. However, it is incorrect to assume that the No Failure scenario is viable. At some point in time this landfill’s containment system will eventually fail. Controls can be put in place to mitigate the consequences of such a failure; however, these controls will not prevent the landfill from failing. It is the Division’s position that only the Instantaneous Failure and Gradual Failure scenarios should be considered viable and that the more likely of these two scenarios is the Gradual Failure scenario. Delete the last sentence or modify it so that it no longer implies that the No Failure scenario is viable.

Specific Conditions Related to Previous Comments:

Specific Comment #10: Section 5.1, Pg. 5-1, 5th Paragraph, 1st Bullet.

To remain consistent with the Feasibility Study Work Plan (FSWP, page C-18) and the fact that there can be only one point of compliance, this RAO should read as follows:

“Prevent releases of CERCLA waste from a disposal cell that result in contaminant concentrations that exceed a maximum contaminant level (MCL)/background concentration or 10⁻⁶ risk or HI=1 for residential use at the point of compliance (i.e., Edge of Waste);”

These are the criteria used to set the initial PWAC as specified in the FSWP. Per the work plan, concentrations at other potential points of exposure were used to adjust this initial PWAC value downward if certain cumulative risk/hazard levels are exceeded at those points of exposure. Otherwise, the initial PWAC becomes the final PWAC. Although the FSWP does not specify

the Edge of Waste as the point of compliance, this requirement is mandated per 401 KAR 34:60 (40 CFR 264:095). Please modify the RAO accordingly.

Specific Response to Comment #10:

During the modeling subgroup meeting held July 27, 2011, the term edge of waste (EOW) was discussed in terms of one of the points of assessment for the PWAC. The group agreed that the EOW essentially is the edge of the waste management area or the edge of the cover (so as to not compromise the remedy), and that it is not possible to know this location as the design has not yet been performed. Therefore, it was agreed that, for the purposes of the RI/FS, assessing the PWAC at the EOW set at 0 m (which would be interior to the cover system toe, but is conservative) allows for completion of the RI/FS evaluation. The group also agreed that the final WAC will differ from the PWAC if a different POC is selected. EPA further discussed that under CERCLA DOE would select the point of compliance.

Given that the design has not been performed and that the point of compliance has not been defined yet, the RAO included as Section 5.1, Page 5-1, 5th Paragraph, 1st Bullet, has been revised as follows:

Prevent releases of CERCLA waste from a disposal cell that result in a contaminant concentrations in groundwater that exceeds the higher of the background concentration or the maximum contaminant level (MCL)²/background concentrations or, if neither an MCL nor background concentration is available, the residential risk-based no action level (NAL) (DOE 2011b), at the edge of waste (EOW).

Condition #1:

It is acknowledged that the July 17, 2011 meeting notes refer to the edge of waste (EOW) as a “point of assessment”; however, per the *Work Plan for CERCLA Waste Disposal Alternatives Evaluation Remedial Investigation/Feasibility Study*, the EOW is a point of exposure, not a point of assessment. In order to remain consistent with the approved work plan text and to avoid confusion, the correct terminology should be used whenever referring to this location within the text of this feasibility study.

During the meeting in question, Kentucky is quoted as assuming that the point that will determine the final WAC for an onsite landfill, if constructed, is the EOW as this term is defined in the work plan. This remains Kentucky’s position. This point may vary with design but only to the extent that the design affects the dimensions of the landfill (i.e., the distance from the center of the landfill to the toe of the containment berm). It is also Kentucky’s position that this point, being at the hydraulically downgradient limit of the waste management area, would constitute the point of compliance for any newly constructed onsite landfill. Kentucky strongly disagrees that DOE would unilaterally select this point of compliance. As stated in Kentucky’s original comment, the point of compliance is dictated by 401 KAR 34:60 (40 CFR 264:095), which is ARAR.

The Division accepts the revision to the RAO in question under the condition that the footnote (²) adjacent to “(MCL)” be deleted. This footnote refers the reader to Section 5.4.6.8 of the document which in turn addresses uncertainties that could affect the development of the final WAC. The only reference to MCLs in this section pertains to the 900 pCi/L EPA published MCL for Tc-99 and to an alternative 4 mrem/year dose-based value of 3910 pCi/L contained within a now outdated version of the Risk Methods Document. The Division contends that this value is irrelevant since it was not used to develop the PWAC and, barring a change in EPA policy, will not be used to back calculate the final Tc-99 WAC for an onsite cell.

Specific Comment #11: Section 5.1, Pg. 5-1, 5th Paragraph, 2nd Bullet.

The RAO seems to imply that any cumulative human health risk falling with the EPA risk range of 10⁻⁴ to 10⁻⁶ can be considered *de minimis*. This is incorrect. A cumulative human health risk in excess of 10⁻⁶ is by definition not *de minimis*. Per the FSWP, a rural groundwater user located at the property boundary is not to receive a cumulative ELCR or hazard in excess of 10⁻⁶ or HI=1, respectively. Please modify the RAO as follows:

“Prevent exposure by a human receptor to contaminants migrating from CERCLA waste that results in a cumulative human health risk in excess of risk or hazard-based target levels after management [i.e., cumulative excess lifetime cancer risk (ELCR) greater than 1 x 10⁻⁴ at the WDF boundary, cumulative ELCR greater than 1 x 10⁻⁶ at the property boundary or hazard index (HI) greater than 1 at either point of exposure (within 0 to 1,600 years)].”

In addition, add a third RAO intended to protect the inadvertent intruder that reads as follows:

“Prevent exposure to or direct contact with buried waste or its progeny for as long as the waste remains hazardous/presents unacceptable risk (i.e., cumulative risk in excess of the EPA risk range of 10⁻⁴ to 10⁻⁶ or HI=1).”

Specific Response to Comment #11:

A third RAO has been added to the D2 RI/FS Report: Prevent exposure to or direct contact with buried waste or its progeny for as long as the waste presents unacceptable risk (i.e., cumulative risk after management in excess of the EPA risk range of 1E-04 to 1E-06 or HI=1).

The term “*de minimis*” has been deleted from the RAO and the RAO has been revised as follows:

Prevent exposure by a human receptor to contaminants migrating from CERCLA waste that results in a cumulative human health risk after management in excess of risk-based and hazard-based target levels [i.e., when contaminant levels are greater than background, a cumulative risk in excess of the EPA risk range of 1E-04 to 1E-06 or hazard index (HI)=1 to 3]. When groundwater modeling predicts that a single contaminant will be present in groundwater at a point of exposure at the waste facility boundary or DOE property boundary, the MCL for the chemical will be used as a

protective value consistent with EPA guidance (EPA 1991). In making this determination, a “single contaminant” will be considered to be predicted and present when concentrations of all other contaminants within the same time interval are predicted to be below their residential NAL (derived using a target HI of 0.1 and/or a target ELCR of 1E-06) or background concentration in groundwater.

Condition #2:

The addition of the third RAO is acceptable and requires no modification. The language intended to replace the second RAO is unacceptable in that it would permit exposures that would result in measurable toxic effects to human receptors. The Division cannot allow a hazard index greater than HI=1 to be used for the purpose of developing a final WAC for an onsite landfill. Modify the RAO as follows:

Prevent exposure by a human receptor to contaminants migrating from CERCLA waste that results in a cumulative human health risk after management in excess of risk-based or hazard-based target levels [i.e., when contaminant levels are greater than background, a cumulative risk in excess of the EPA risk range of 1E-04 to 1E-06 or hazard index (HI)=1]. When groundwater modeling predicts that a single contaminant will be present in groundwater at a point of exposure at the waste facility boundary or DOE property boundary, the MCL for the chemical will be used as a protective value consistent with EPA guidance (EPA 1991). In making this determination, a “single contaminant” will be considered to be predicted and present when concentrations of all other contaminants within the same time interval are predicted to be below their residential NAL (derived using a target HI of 0.1 and/or a target ELCR of 1E-06) or background concentration in groundwater.

Specific Comment #27: Appendix C, Section C6.1.1, Pg. C6-3, 5th Paragraph.

DOE is suggesting here that the excavation scenario should be considered infeasible given the assumption that access to the site will be controlled during the 200 to 1,600 year period. It is unlikely that Land Use Controls could be relied upon for these extended timeframes and DOE has not committed to maintaining control of the site in perpetuity. Therefore, it is feasible, although perhaps unlikely, that an excavation worker could be exposed to waste buried in an onsite cell. Modify the text to account for this possibility.

Specific Response to Comment #27:

Section 5.4.4.3 of the D1 RI/FS Report states: “The land use controls and necessary surveillance, maintenance, and monitoring (SM&M) activities will continue for as long as the waste disposed of in the facility poses an unacceptable risk to human health and environment.”

The above quoted sentence will be revised as follows:

...however, DOE will provide engineering controls, surveillance, maintenance, and monitoring (SM&M), and institutional controls for as long as the waste disposed of in the

facility could pose an unacceptable risk to human health or the environment, as assessed during the CERCLA five-year reviews.

Additionally, long-term SM&M may be used to address the uncertainties with regard to facility design and longevity.

Institutional controls are further discussed in sections 5.4.4.3 and 6.4.1 of the RI/FS Report.

Based on this commitment, the potential for an excavation worker to be exposed to waste buried in an on-site cell is not considered feasible. No change has been made to Appendix C, Section C6.1.1 of the RI/FS Report.

Condition #3:

While the intent of the modified language appears to have been to provide a greater level of assurance with regards to DOE's stewardship commitment for the onsite alternative, the change had the opposite effect. It is agreed that for a typical CERCLA remedial action the five-year review process is used to assess in part whether RAOs have been achieved. If this is found to be the case then monitoring can cease. However, this is not a typical remedial action. The text as now written implies that the CERCLA five-year review process could be used to determine that waste deposited in an onsite cell no longer presents an unacceptable risk to human health and the environment. Due to the nature of the waste that would be managed in an onsite landfill, the timeframes over which the waste could pose an unacceptable risk are enormous. In the context of this remedial action, the CERCLA five-year review will be used to assess whether the remedy is functioning as designed, to suggest modifications as required, and to insure that the remedy remains protective; however, it cannot be used to determine that the waste no longer poses an unacceptable risk to human health and the environment. By suggesting that this could be the case, DOE's response fails to capture the intent of the five-year review as it would relate to this action. While it is not being suggested that this was the intent of the language modification, nonetheless the Division must request that DOE restore the original text to modified Section 5.4.4.3.

The Division still contends that it is feasible, although perhaps highly unlikely, that an excavation worker could be exposed to waste buried in an onsite cell. Please modify the text to remove any reference to this exposure scenario being infeasible.

Specific Comment #28: Appendix C, Section C6.1.3, Pg. C6-6, 1st Paragraph, 1st Sentence.

The statement made here that the PWAC is to be based upon a residential groundwater user located at the disposal cell boundary (i.e., the WDF boundary) appears inconsistent with the iterative approach for PWAC derivation detailed in Section C.3.3 of the FSWP. Please see Comment #16. Modify the text or provide clarification so that it is consistent with this approach.

Specific Response to Comment #28:

The sentence has been revised to be consistent with the approach outlined in the Work Plan (DOE 2011) and other portions of the RI/FS Report:

The receptor selected for PWAC development is the residential groundwater user drawing water from a well located at one of three points of assessment (i.e., edge of waste, WDF boundary, property boundary, or surface water outcrop) from Year 200 to 1,600. As discussed in Section C6.1.1, the point of exposure considered is the WDF boundary, which is located 100 m from the edge of the waste to account for the size of the cap/liner and berm, as the closest plausible (although unlikely) location for a well.

Condition #4:

DOE refers to “one of three points of assessment.” This is inconsistent with text found in the Feasibility Study Work Plan. The work plan refers to different points of “exposure”, not assessment. Modify the suggested language so that it remains consistent with the Work Plan by replacing the word “assessment” found in the first sentence with the word “exposure.” As to the last sentence in the modified paragraph, it is acknowledged that Section C6.1.1 of the D1 document refers to the Waste Disposal Facility (WDF) Boundary as the point of exposure for a residential receptor considered in support of PWAC development. The Division acknowledges that this was one such point of exposure; however, it was not the sole point of exposure used to develop the PWAC. As with the text in Section C6.1.3 (see original comment) the text in Section C6.1.1 also appears inconsistent with iterative approach for PWAC derivation detailed in Section C.3.3 of the Work Plan. It also appears inconsistent with the following RAO:

Prevent releases of CERCLA waste from a disposal cell that result in a contaminant concentration in groundwater that exceeds the higher of the background concentration or the maximum contaminant level (MCL)²/background concentrations or, if neither an MCL nor background concentration is available, the residential risk-based no action level (NAL) (DOE 2011b), at the edge of waste (EOW).

Given that multiple points of exposure were used to generate the PWAC, the last sentence in the modified paragraph has little relevance. Please delete the sentence.

Specific Comment #33: Table G.2.

Kentucky is identifying the following state requirements as potential ARARs. Please integrate this list with Table G.2 and ensure that summaries are consistent with the regulation.

Action	Prerequisite	Summary of Requirements	Citation
Construction of a Solid Waste Contained Landfill	Landfill Subgrade Reqs – relevant and appropriate	Subgrade material construction, compaction, density & moisture content requirements.	401 KAR 48:080 § 3
Construction of a Solid Waste Contained Landfill	Specific Soil Component Reqs. of Landfill Liner Systems – relevant and appropriate	Liner system construction, compaction, slope, density, lift thickness, moisture content & QA requirements.	401 KAR 48:080 § 4
Construction of a Solid Waste Contained Landfill	Primary Liner System (Leachate Collection System). – relevant and appropriate	Minimum construction/design requirements NOTE: Only §6(4)(h) was cited.	401 KAR 48:080 § 6
Construction of a Solid Waste Contained Landfill	Final Cap System Specifications – relevant and appropriate	Minimum final cap requirements NOTE: Only vegetative cover and vegetation requirements were cited.	401 KAR 48:080 § 9
Construction of a Solid Waste Contained Landfill	Alternative specifications – relevant and appropriate	Allowance for alternative specification (equal to or better than) 401 KAR 48:080 requirements – relevant and appropriate	401 KAR 48:080 § 11
Closure of a RCRA Subtitle C Landfill	Survey Plat – applicable	Submit survey plat to local zoning authority	401 KAR 34:070 § 7 40 CFR 264.116
Land Disposal of TSCA Waste	Disposal Requirements applicable	Requirements for type and concentration of TSCA waste permitted for land disposal	40 CFR §761.60

Response to Specific Comment #33:

Kentucky clarified, via e-mail on April 24, 2013, that the specific citations from 401 KAR 48:080 they would like added as ARAR are as follows:

- 401 KAR 48:080 § 3 (1), 3(2)(b)-(d)
- 401 KAR 48:080 § 4 (1), 4(2)(a-c), 4(3)(a)(1-5), 4(3)(b)(1-3)
- 401 KAR 48:080 § 6 (1-3), 6 (4)(a-f), 6(4)(h-i)
- 401 KAR 48:080 § 11

A crosswalk was provided to Kentucky and EPA comparing RCRA/TSCA requirements to the Kentucky solid waste regulations. Each of the above citations has either a parallel or similar

federal citation that will be included in Appendix G of the D2 RI/FS Report; therefore, the Kentucky citations are not included.

40 *CFR* § 264.116 (401 *KAR* 34:070 § 7)

This citation will be added to Appendix G in the D2 RI/FS Report with the following note:

NOTE: This requirement will be met by filing a survey plat with the McCracken County Clerk's Office.

40 *CFR* § 761.60

Kentucky clarified, via e-mail on April 24, 2013, that the specific citations from 40 *CFR* § 761.60 would be added as ARAR and are as follows:

- 40 *CFR* § 761.60(a)(3)(ii)
- 40 *CFR* § 761.60(b)(1)(i)(B)
- 40 *CFR* § 761.60(b)(3)(ii)
- 40 *CFR* § 761.60(c)(1)(ii)
- 40 *CFR* § 761.60(c)(2)

During a conference call on May 20, 2013, Kentucky and EPA agreed that these citations are not necessary because similar federal citations were included as ARAR in the D1 RI/FS Report.

Condition #5:

The Division agrees with DOE that several of the solid waste regulations originally identified as ARAR by the Division are appropriately addressed by cited RCRA Subtitle C regulations/guidance and/or TSCA regulations. These regulations are as follows:

- 401 *KAR* 48:080 § 3(3)(d)
- 401 *KAR* 48:080 § 4(2)(a)-(b)
- 401 *KAR* 48:080 § 6(2)
- 401 *KAR* 48:080 § 6(3)
- 401 *KAR* 48:080 § 6(4)
- 401 *KAR* 48:080 § 6(4)(a)-(f)
- 401 *KAR* 48:080 § 6(4)(h)-(i)

The Division maintains that the following regulations be listed in Appendix G as Relevant and Appropriate for construction of an onsite CERCLA landfill as justified below. Further, the Division finds no merit in DOE's argument that the availability of alternate specifications renders specific regulations inappropriate. The prescriptive requirements serve as the yardstick for an approvable alternate specification.

Regulation	Reason Required
401 KAR 48:080 § 3(1)	Contains substantive requirements not found in RCRA C or TSCA regulations (i.e., safety factor, subgrade free of organic material).
401 KAR 48:080 § 3(2)	Contains substantive requirements not found in RCRA C or TSCA regulations. Requirement to insure subgrade is “sufficiently dry” is not addressed by the TSCA Liquid Limit requirement.
401 KAR 48:080 § 3(3)(b)	Loader prescribed in regulation functions to eliminate “pancaking” of 6” clay lifts.
401 KAR 48:080 § 3(3)(c)	Specifies a minimum level of QA/QC and compaction required by Kentucky to insure that requirement 40 CFR § 264.301(a)(1)(ii) is being attained.
401 KAR 48:080 § 4(1)	Contains substantive requirements not found in RCRA C or TSCA regulations (i.e., standard compaction requirements, subgrade free of organic material or large rock).
401 KAR 48:080 § 4(2)(c)	Contains substantive requirements not found in RCRA C or TSCA regulations. Requirement to maintain optimal moisture content serves as a vehicle to achieve the required permeability.
401 KAR 48:080 § 4(3)(a)(1)-(5) 401 KAR 48:080 § 4(3)(b)(1)-(3)	Contains substantive testing requirements not found in RCRA C or TSCA regulations. Specifies a minimum level of QA/QC deemed by Kentucky to be appropriate.
401 KAR 48:080 § 6(1)	Specifies a standard compaction requirement deemed by Kentucky to be appropriate

**Radiation Health Branch Comments Pertaining to the
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Paducah Gaseous Diffusion Plant, Paducah, Kentucky

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Specific Conditions Related to Previous Comments:

Specific Comment #5: Pg. ES-6, Comparative Analysis of the Alternatives, Long-term Effectiveness and Permanence, final paragraph.

Based on this paragraph, the reader may infer that the Off-Site and On-Site alternatives are very similar. This is clearly not accurate. To further clarify the differences, a comparison should be presented using similar metrics and format. Consider revising to include the text already presented in Section 5.3.1.1 describing the Off-Site alternative:

“The facility is located in a remote Utah desert with low precipitation and non-potable groundwater, within a 100 square mile hazardous waste zone established by the state of Utah. The nearest population center is approximately 40 miles away. The *EnergySolutions* disposal facility is an above grade, engineered disposal facility with four lined disposal cells to segregate waste types.”

Also consider adding the following text revised to describe the On-site alternative using the same metrics:

“The On-site facility will be located at the PGDP, within 2 miles of the Ohio River, in a county with an average population density of 261/mile², with moderate-high precipitation and a shallow potable groundwater aquifer, with no hundred square mile hazardous waste zone established by the state of Kentucky or DOE. The nearest population center is <1 mile away. The On-site disposal facility is an above-grade engineered disposal facility that will not segregate waste types, which potentially increases the chance of future accelerated transport from co-mingled wastes.”

Specific Response to Comment #5:

The text in the Executive Summary on page ES-6 has been revised to include the following discussion:

For the No Action and Off-Site Alternatives, the *EnergySolutions* and NNSS facilities are located in an arid climate at considerable distances from population centers. Low long-term risk to human health results from the remote location, very low precipitation, and the absence of a potable aquifer below the sites. The license for the federal waste portion of the Waste Control Specialists (WCS) facility in Andrews County, Texas, was issued

on September 18, 2012. As of the December 20, 2012 meeting to discuss comments to this report, the DOE approval process had not been completed. This facility may be considered and evaluated for future waste shipments after the facility is approved by DOE for waste disposal, as long as the transportation and disposal costs in the RI/FS are representative of WCS cost

An on-site waste disposal facility located at the PGDP also would be designed to isolate waste from the environment, but would be located in a more humid climate and is generally closer to human receptors. The greater amount of rainfall and proximity to human receptors create an environmental setting more conducive to contaminant mobilization and subsequent exposure than at western sites. However, long-term risk at the on-site waste disposal facility is low because of the operational, engineered, and institutional controls at the facility during waste placement and following closure.

Condition #1:

The proposed added text does not adequately inform the reader about the difference between segregated waste types at the commercial facility (as required by regulation) and DOE's intent to not segregate waste types at an on-site facility, increasing the risk of accelerated transport. It is not appropriate to discuss long-term risk at the on-site facility while disregarding the relative risk when compared to the off-site facility. Please revise. To be clear, the text added to the document needs to state that there is lower risk at the off-site facility due to the similar controls in place, the environment, and the segregation of waste. It should also explain that the relative risk to the citizens of Kentucky will be far lower if an off-site low level waste disposal facility is utilized, regardless of design or location.

Specific Comment #8: Pg. 1-5, Section 1.2.2, 2nd paragraph, last 2 sentences.

It is incorrect to claim that this is consistent with the work plan, as the words "mobile" and "non-mobile" do not appear in the work plan. Kentucky is certain that there was no ambiguity in the position of not considering subtraction of curies from the waste volume compared to the WAC based on form. Revise the document to remove any portions that state that "non-mobile" waste forms will not be subject to the contaminant inventory limits defined by the PWAC.

Specific Response to Comment #8:

The PWAC development considers the total estimated volume of the WDF. As the PWAC involves only contaminant transport via leaching of contaminants from the proposed landfill and subsequent groundwater fate and transport through the underlying aquifer, the PWAC only considers mobile forms of contaminants. The contaminant inventory limits defined by the PWAC apply only to mobile forms of a contaminant (e.g., nickel as a component of soil that is capable of dissolving into percolating water, etc.). Wastes placed in a non-mobile form, such as nickel ingots, etc., will not be subject to the contaminant inventory limits defined by the PWAC.

To clarify this, the referred to text has been modified as follows:

As described in the WP, the PWAC development considers the total estimated volume of the Waste Disposal Facility. As the PWAC involves only release of contaminants through migration of water from the proposed landfill and subsequent groundwater fate and transport through the underlying aquifer, the PWAC considers only mobile forms of contaminants; therefore, for the purposes of this RI/FS and as described in the Work Plan, the contaminant inventory limits defined by the PWAC apply only to mobile forms of a contaminant (e.g., nickel as a component of soil that is capable of dissolving into percolating water, etc.). Wastes placed in a non-mobile form, such as nickel ingots, etc., will not be subject to the contaminant inventory limits defined by the PWAC.

Condition #2:

Kentucky still finds this language unacceptable. It is acknowledged that the PWAC was developed by modeling waste forms that were at least partially mobile. It is acknowledged that, through certain processes, some contaminants may be essentially immobilized for the short term. Regardless of these facts, it is unacceptable to state that because the PWAC was developed using mobile forms of contaminants that it will only apply to those same forms (regardless of the intent of that statement). Kentucky has stated unequivocally throughout every step of this process that this sort of language is unacceptable and will not be agreed to.

Please revise the document to state that the PWAC applies to all forms of the listed contaminant, as envisioned during the scoping process. The discussion of non-mobile forms potentially not being held to the requirements of the PWAC/WAC may be included in a discussion of uncertainties.

Specific Comment #13: Pg. 4-9, Section 4.1.3.3, final bullet.

The base case includes approximately 1.0 mcy that will be disposed of at the C-746-U out of the total of 3.6 mcy, leaving a total of 2.6 mcy for disposal at the required waste disposal facility (whether off-site or on-site). The low-end case includes only 0.622 mcy that will be disposed of at the C-746-U, leaving the same total of 2.6 mcy to be disposed of elsewhere (or in this case, recycled). This means that the 10% waste reduction was taken directly from C746-U.

It does not make sense to take the 10% waste volume reduction from only the waste meeting the WAC for C-746-U. Please revise all low-end waste volume estimates to have a proper reduction of waste volumes, and recalculate costs based on the updated volumes.

Specific Response to Comment #13:

The volumes for the low-end and base case scenarios are the same for each component of the on- and off-site alternatives, such that the alternatives are comparable. Both the volumes for the C-746-U Landfill in each the on-site alternative and the off-site alternative are equally reduced. The volume reduction from the base case to the low-end for the on-site WDF or an off-site facility is 2.5 mcy reduced to 1.5 mcy. This is consistent with the Work Plan (DOE 2011).

The waste volumes used to reduce the base case of 2.5 mcy to the low-end volume of 1.5 mcy have been provided to EPA and Kentucky as supporting information.

Condition #3:

While the added text makes it more clear what the actual volumes are, it did little to clarify the proportioning of waste volume savings that recycling gives (which is the root of the previous comment). Please add text to the document describing how the amounts of recycling taken out of both C-746-U and offsite LLW were derived.

Specific Comment #19: Pg. 4-33, Section 4.2.5, last paragraph, last 3 sentences.

Kentucky is certain that there was no ambiguity in the position of not considering subtraction of curies from the waste volume compared to the WAC based on form. Revise the document to remove any portions that state that “non-mobile” waste forms will not be subject to the contaminant inventory limits defined by the PWAC.

Specific Response to Comment #19:

During the conference call on December 20, 2012, Specific Comment 19 was clarified following discussion of the PWAC being based on groundwater fate and transport per the Work Plan (DOE 2011), but that the response should acknowledge that other criteria may be applied to the WAC.

As described in the Work Plan, the PWAC development considers the total estimated volume of the WDF. As the PWAC involves only contaminant transport via leaching of contaminants from the proposed landfill and subsequent groundwater fate and transport through the underlying aquifer, the PWAC considers only mobile forms of contaminants. Therefore, the contaminant inventory limits defined by the PWAC apply only to mobile forms of a contaminant (e.g., nickel as a component of soil that is capable of dissolving into percolating water, etc.). Wastes placed in a non-mobile form, such as nickel ingots, etc., will not be subject to the contaminant inventory limits defined by the PWAC.

It is recognized that some of the calculated PWAC values may be subject to other criteria that may be applied to the WAC. The final WAC, along with any necessary engineering controls, will be protective of human health and the environment. Hence, design considerations that currently are not accounted for, but are feasible, also will be considered and incorporated into the WAC development, as appropriate. These considerations may result in a WAC that differs from the PWAC, which is consistent with the MOA (page 1, Item 3), as discussed during the conference call on August 10, 2012. Ingrowth radionuclides may not be more mobile than the parent. As discussed in *Dose Modeling Evaluations and Technical Support Document for the Authorized Limits Request for the C-746-U Landfill at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DCN 5090-TR-01-5, June 2012, several ingrowth radionuclides are less mobile (i.e., have higher K_d values) than the parent radionuclide.

Condition #4:

See condition related to Specific Comment #8.

Specific Comment #32: Pg. 6-2, Section 6.1.1, Threshold Criteria, Compliance with ARARs, 3rd paragraph.

It is irrelevant to this discussion as to whether Oak Ridge was granted any waiver. Please remove this text to prevent any appearance of significance.

Additionally, there are more requirements from this ARAR that are not discussed here. A portion of 40 CFR § 761.75(b)(3) states: “Floodplains, shorelands, and groundwater recharge areas shall be avoided.”

It is clear to Kentucky that all parts of the PGDP site that overlay the Upper Continental Recharge System are indeed “groundwater recharge areas” in accordance with EPAs’ common usage of that term. As such, it is unclear how this ARAR can ever be met for either of the sites included in the on-site alternative presented in the document.

Another portion of 40 CFR § 761.75(b)(3) states: “There shall be no hydraulic connection between the site and standing or flowing surface water.”

As this is a siting requirement, not a design requirement, and the site clearly has a hydraulic connection to flowing surface water, it is unclear how this ARAR can ever be met for either of the sites included in the on-site any alternative presented in the document.

Please explain how the sites in the document are compliant with the listed portions of that ARAR and update the document accordingly.

Specific Response to Comment #32:

The RI/FS Report has been revised as discussed below.

The reference to Oak Ridge was included to provide a similar basis and was included in the approved Work Plan, Section 7.1.1, page 7-2 (DOE 2011). The reference to the waiver obtained by Oak Ridge in Section 6.1.1 will be deleted from the RI/FS Report.

The ARAR the reviewer is referencing would qualify for waiver under TSCA regulations in accordance with the ARARs [i.e., 40 CFR § 761.75(c)(4)]; therefore, a waiver under 40 CFR § 300.430(f)(1)(ii)(C) is not necessary. To address this comment, this section has been revised to read as follows:

(2) **Compliance with ARARs (Unless a Specific ARAR is Waived).** CERCLA § 121 (d) specifies that remedial actions for cleanup of hazardous substances must comply with the substantive requirements, criteria, standards, or limitations under federal or more stringent state environmental laws that are applicable or relevant and appropriate to the hazardous substances or circumstances at a site [40 CFR § 300.430(e)(9)(iii)(B)] unless a waiver is granted.

Each alternative was assessed against this evaluation criterion to determine whether it met federal and state ARARs. A detailed discussion of ARARs is provided in Appendix G. The detailed analysis of the three alternatives (Sections 6.2 to 6.4) summarizes which requirements are applicable or relevant and appropriate and how these requirements would be met. When an ARAR is not met, a basis may be presented for justifying one of the six waiver categories allowed under CERCLA 40 *CFR* § 300.430(f)(1)(ii)(C). Alternately, a basis may be presented for using other waivers or variances under identified ARARs, such as 40 *CFR* § 761.75(c)(4). As a result, this FS relies upon a waiver under 40 *CFR* § 761.75(c)(4); see Section 6.4.2 for discussion on the use of this waiver for the requirements of 40 *CFR* § 761.75(b)(3):

(3) Hydrologic conditions. The bottom of the landfill shall be above the historical high groundwater table as provided below. Floodplains, shorelands, and groundwater recharge areas shall be avoided. There shall be no hydraulic connection between the site and standing or flowing surface water. The site shall have monitoring wells and leachate collection. The bottom of the landfill liner system or natural in-place soil barrier shall be at least 50 ft from the historical high water table.

Condition #5:

Despite statements to the contrary, Section 6.4.2 does not even mention the additional issues described in the previous comment, much less provide adequate justification for ignoring the requirements of the ARAR being discussed. Please revise the document to provide a response summary of the justification for waiving this requirement consistent with the much more robust description to be provided in the decision document. To be clear, for consistency this should address the requirements in addition to the 50 ft minimum distance requirement.

Specific Comment #33: Pg. 6-8, Section 6.3, 3rd paragraph.

This paragraph is confusing. It is clear that there is major cost savings to putting as near to 17% debris as possible in the waste to receive soil disposal rates and it is stated that “for the FS, then, it was assumed that some blending could occur”. Yet the final sentence states that there is not a sufficient soil-to-debris volume ratio to warrant the use of a soil disposal rate. This is unacceptable and has the appearance of being an intentional bias against off- site disposal. Please revise the document to account for a realistically attainable amount of blending such that the maximum volume practicable can be disposed of at the soil rate.

Specific Response to Comment #33:

The paragraph referred to has been revised to clarify that the soil/waste ratio is not sufficient to support disposal of debris waste at the soil price.

Consideration was given to other methods of optimizing off-site disposal cost. The cost to dispose of soil waste is much less than the cost to dispose of debris waste. One possible method to lower off-site disposal cost is to optimize the ratio of soil and debris

waste to receive the lower soil disposal cost. Based on PGDP disposal contracts, soil waste can contain up to 17% debris and still receive the soil disposal rate; however, it was concluded that there is no guarantee that the removal actions generating projects could reliably provide the needed blend of soil/debris to attain the lower soil disposal cost. The overall forecast waste volume has an approximate 50/50 blend of soil/debris, so a majority of the volume would not have the needed blend to attain the lower soil disposal cost. Optimization would require significant coordination of multiple waste generating projects, development and operation of a waste staging area, purchase of additional containers, and double handling of the wastes; therefore, for the FS, it was assumed that blending to the point of altering the disposal cost would not occur. Where different pricing for soil versus debris is available (e.g., low-level waste disposal at EnergySolutions), these different prices were used for the projected waste streams.

Condition #6:

The modified text does not “clarify that the soil/waste ratio is not sufficient to support disposal of debris waste at the soil price”. At the most, it clarifies that not *all* of the waste could be disposed of at the soil price. There is still a lack of justification for not disposing of a realistic amount of the debris waste at the soil price, and an intentional departure from what would be the correct and cost conscious way of handling the different waste forms make this another compounding error that interacts with other cost overestimations and drives the overall cost estimate well outside of the intended error range. Please revise to cost a realistic amount of debris waste at the soil rate.

Specific Comment #35: Pg. 6-21, Section 6.4.3.3, Air Quality.

This section does not adequately address long term emissions of radon from the cap. Please include a discussion of radon emissions after an assumed failure of the engineered barriers and adjust any evaluations of long term effectiveness accordingly.

Specific Response to Comment #35:

The following sentence has been added to the end of Section 6.4.3.3, Air Quality (page 6-21):

The potential for radon emission from the cover system is discussed in Appendix C, Attachment C7, Section C7.1.2.3; this analysis, which quantified radon emissions for the C-746-U Landfill, indicated that no radon would escape the first layer of the C-746-U Landfill cap. The conceptual design cover system is thicker and includes more layers than the C-746-U Landfill cover system design; therefore, the radon modeling results for the C-746-U Landfill may be extended to be the conceptual design for this project.

Condition #7:

Kentucky does not accept DOE’s “zero radon emissions forever” stance for a landfill that will hold hundreds of tons of uranium. Please revise the document to include the discussion and evaluations previously requested.

Specific Comment #38: Pg. 6-33, Section 6.4.6.3.

This section details engineering modifications that may potentially enhance the performance of the facility. While it is indeed a goal that Kentucky supports to make the facility as protective as possible through the use of engineered barriers, these modifications will be assumed to lose effectiveness in the short term and will not be the basis of any revision to the WAC. Please remove all portions of the document that indicate such.

Specific Response to Comment #38:

Section 6.4.6.3 presents potential design items that could affect the WAC calculation. This discussion was included in the D1 RI/FS Report to be consistent with the MOA. Therefore no change was made to the RI/FS Report, consistent with discussion on December 20, 2012.

Condition #8:

Though Section 6.4.6.3 does indeed include methods that *could* affect the WAC calculation, it must be assumed that they will fail along with all other engineered barriers and that the methods would not have a significant impact on the long term performance of the landfill and therefore the WAC. Please modify the text to capture this fact, as a reader of the current text would likely incorrectly gather that these methods will have a significant impact on the final WAC. Kentucky disagrees that the text in question is consistent with Item #3 of the MOA in that it presumes upfront that a chemical barrier will be used to modify the WAC based on *expected* performance.

Specific Comment #40: Pg. 6-35, Section 6.4.7, Last paragraph.

This facility is not a non-hazardous solid waste facility and nonhazardous solid waste will not be buried there, consistent with 902 KAR 100:022 § 24. As this is an initial alternative evaluation and is consistent with the work plan, it may be left as such in the document, but any alternative that allows the burial of solid waste in a low-level waste disposal facility will not meet the threshold criteria, and this fact should be discussed elsewhere in this chapter.

Specific Response to Comment #40:

Waste placed in an on-site OSWDF will be subject to the facility WAC regardless of waste type. Waste meeting the facility WAC will be considered eligible for placement within the OSWDF. The citation 902 KAR 100:022 § 24(14) [10 CFR § 61.52(a)(11)] is not appropriate because the unit is designated to receive CERCLA remediation wastes, which includes non-hazardous solid waste. See also response to Specific Comment #48.

Condition #9:

To reduce the possibility of facilitated transport, reduce the volume of generated hazardous waste, and minimize potential future costs, please commit in this section to segregate non-hazardous waste types and dispose of them at other available site facilities to the extent practicable.

Specific Comment #45: Pg. C1-3, 1st paragraph, 2nd sentence.

Kentucky is certain that there was no ambiguity in the position not to consider subtraction of curies from the waste volume compared to the WAC based on form. Please revise the document to remove any portions that state that “non-mobile” waste forms will not be subject to the contaminant inventory limits defined by the PWAC.

To be clear, contaminants removed from the site through leachate may be subtracted from the total value compared to the WAC, but any contaminants (regardless of form) that are placed back in the landfill will be added back.

Specific Response to Comment #45:

During the conference call on December 20, 2012, Specific Comment #19, similar to Specific Comment #45, was clarified following discussion of the PWAC’s being based on groundwater fate and transport per the Work Plan (DOE 2011), but that the response should acknowledge that other criteria may be applied to the WAC.

No change has been made to the RI/FS Report regarding “non-mobile” waste.

As described in the Work Plan, the PWAC development considers the total estimated volume of the WDF. As the PWAC involves only contaminant transport via leaching of contaminants from the proposed landfill and subsequent groundwater fate and transport through the underlying aquifer, the PWAC considers only mobile forms of contaminants; therefore, the contaminant inventory limits defined by the PWAC apply only to mobile forms of a contaminant (e.g., nickel as a component of soil that is capable of dissolving into percolating water, etc.). Wastes placed in a non-mobile form, such as nickel ingots, etc., will not be subject to the contaminant inventory limits defined by the PWAC.

It is recognized that some of the calculated PWAC values may be subject to other criteria that may be applied to the WAC. The final WAC, along with any necessary engineering controls, will be protective of human health and the environment. Hence, design considerations that currently are not accounted for, but which are feasible, also will be considered and incorporated into the WAC development, as appropriate, and may result in a WAC that differs from the PWAC, which is consistent with the MOA (page 1, Item 3) and as discussed during the conference call on August 10, 2012. Ingrowth radionuclides may not be more mobile than the parent. As discussed in *Dose Modeling Evaluations and Technical Support Document for the Authorized Limits Request for the C-746-U Landfill at the Paducah Gaseous Diffusion Plant*, Paducah, Kentucky, DCN 5090-TR-01-5, June 2012, several ingrowth radionuclides are less mobile (i.e., have higher Kd values) than the parent radionuclide.

Source depletion due to leachate removal was considered in the D1 RI/FS Report as part of the sensitivity or uncertainty modeling for the PWAC (Section 5.4.6.8; Appendix C, Attachment C1; and Appendix C, Attachment C9). The PWAC presented in the D1 RI/FS Report does not account for source depletion through leachate removal.

If the contaminants in the leachate are modified or treated not to leach, as determined by ANSI 16.1 or a similar procedure, and the contaminants are placed back in the WDF in a non-leaching form, the Kd values for this volume of waste should be increased accordingly for incorporation into the analysis for the migration of material disposed of within the OSDC; such analyses will be completed when the final WAC is derived.

Condition #10:

Regardless of the method through which the PWAC was calculated, it is not acceptable to unilaterally declare a waste form “non-mobile” and expect it to not be subject to the PWAC limits. See condition related to Specific Comment #8.

Specific Comment #46:

Page C9-3, Section C9.1.1: During the scoping process, Kentucky was promised a modeling run that captured peak radon emanation rate. Please run that model and discuss the results in the text and compare to the current 40 CFR § 192.02 (b) limits. As the current federal rulemaking process concerning the burial of depleted uranium is still very much in flux (and in fact leaning away from permitting shallow or above ground disposal of significant quantities of depleted uranium, especially in non-arid environments) and there are no promulgated regulations that address this specific issue, it is absolutely essential to Kentucky’s acceptance of this project that this analysis is completed.

From NRC SECY2008-0147:

“The staff also considered whether requirements for uranium mill tailings impoundments in 10 CFR Part 40, Appendix A, could be applied to disposal of large quantities of DU in a Part 61 LLW disposal facility. For example, Part 40 requires that the disposal design control radiological hazard from radon for 1,000 years. However, uranium mill tailings are a significantly different source term than the large quantities of DU from enrichment facilities, because the concentration of radium and radon in mill tailings is generally at its maximum concentration when disposed of and slowly decreases over time, in comparison to DU, where these daughter products increase over time and exceed the mill tailings concentration about the 1,000 year time frame. For similar disposal conditions, the peak risk (at 2 million years) from radon from DU is orders of magnitude larger than from uranium mill tailings. However, even after 1,000 years, if the radon barrier is lost (meaning that the institutional controls had failed); radon hazards at uranium mill tailings impoundments would likely produce doses to intruders that exceed 500 millirem/yr, the intruder dose objective used in the development of the Part 61 waste classification system (NUREG-0706, Final Generic EIS on Uranium Milling, September 1980). Therefore, the staff concluded that specific and unique guidance was needed for disposal of large quantities of DU in LLW facilities to mitigate the potential impacts to the intruder.”

“Shallow disposal (< 3m deep) is likely to not be appropriate for large quantities of DU, regardless of site conditions. Shallow disposal may be possible if robust intruder

barriers, excluding the possible excavation of DU, and a robust radon barrier that can effectively limit radon fluxes over the period of performance are installed, and their performance is justified. Small quantities (1 – 10 metric tons) could be disposed of at shallow depths.”

Specific Response to Comment #46:

Per the Work Plan (DOE 2011), the PWAC involves only contaminant transport via leaching of contaminants from the proposed landfill and subsequent groundwater fate and transport through the underlying aquifer to a groundwater user; the PWAC does not consider other pathways, such as vapor transport. It is recognized that other potential pathways and receptors will be assessed as part of the WAC development for an on-site facility if that alternative is selected. The approved Work Plan does not include a requirement for radon modeling through the cover system.

As discussed in response to Specific Comment 35, the potential for radon emission through the cover system is discussed in the D1 RI/FS Report, and the following sentence has been added to the end of Section 6.4.3.3, Air Quality (page 6-21):

The potential for radon emission from the cover system is discussed in Appendix C, Attachment C7, Section C7.1.2.3; this analysis, which quantified radon emissions for the C-746-U Landfill, indicated that no radon would escape the first layer of the C-746-U Landfill cap. The conceptual design cover system is thicker and includes more layers than the C-746-U Landfill cover system design; therefore, the radon modeling results for the C-746-U Landfill may be extended to be the conceptual design for this project.

Correspondence including issued versions of the Work Plan, comments to the Work Plan versions, the dispute letters, the MOA to the dispute, and the modeling subgroup minutes were reviewed for discussions or agreements regarding radon:

- Radon modeling was not identified in D2 Work Plan dated January 14, 2010.
- Radon modeling was not identified in comments to the January 14, 2010 D2 Work Plan from the Kentucky Department for Environmental Protection dated June 28, 2010.
- Radon modeling was not required in D2 Work Plan dated September 28, 2010.
- Radon modeling was not required in the dispute to D2/R1 Work Plan dated October 28, 2010.
- Radon modeling not identified as an action item in the MOA dated January 20, 2011.
- The potential for radon generation and migration was discussed during the April 21–22, 2011, modeling subgroup meeting in Nashville, Tennessee, where KYDEP/RHB expressed an interest in DOE providing discussion of radon generation and pathways in the report (see minutes to the meeting issued July 25, 2011). This discussion was included in the D1 RI/FS Report, Appendix C, Attachment C7, Section C7.1.2.3: “Radon specific modeling was not performed for this effort; however, radon modeling was

performed as part of the 2011 C-746-U Landfill authorized limits request (DOE 2011). Because of similarities in cap design, and siting, these results are extended to this effort. During the evaluation of radon migration at the C-746-U Landfill, Th-230, U234, and U-238 isotopes were evaluated for radon emissions using an updated version of the RAECOM program found at <http://www.wise-uranium.org/ctc.html?unit=c>. This analysis indicated that no radon would escape the first layer of the cap.” It should be noted that the similarities in cap design as they are relevant to the modeling refer to the cap soil components; the conceptual design for the WDF incorporates additional layers which would further reduce the potential for radon emissions.

Condition #11:

See condition related to Specific Comment #35.

The response completely ignored the quoted material, which is unacceptable. The response does note that, well over two years ago, Kentucky communicated the need for an assessment of radon emissions at the proposed landfill (which was agreed to by DOE) yet fails to provide the requested information, which is again unacceptable. Please revise the document to address the quoted material and provide the agreed to assessment of radon emissions.

Comment #47: Pg. G-13, Table G.1.

The following table contains a list of potential ARARs of concern to Kentucky, based on the information supplied in the document. The location column is consistent with Table G.1 (i.e., an already listed location). Please integrate this list with Table G.1 and ensure that any summaries are consistent with the regulation.

Location

Citation

Disposal Site Suitability Requirements

Siting of a LLW disposal facility

902 KAR 100:022 § 17-19, 21-23

Response to Comment #47:

The ARARs in the table above were evaluated for relevant and appropriate; these siting requirements generally are not relevant and appropriate as cited in DOE G 435.1, Appendix A, based upon the differences between DOE and commercial LLW disposal facilities. DOE previously evaluated the requested ARARs and included several in the D1 RI/FS Report, specifically 902 KAR 100:022 § 17 (only relevant and appropriate with respect to the stability performance objective in 902 KAR 100:022 § 21), § 21, and § 22(4-11). 902 KAR 100:022 § 23 (*Disposal Site Design for Land Disposal. Disposal site design for near-surface disposal*) is more appropriately included with the design requirements and 902 KAR 100:022 § 23 was included as an ARAR in the Design/Construction of a Landfill section of Table G.2 in the D1 RI/FS Report. The remaining ARARs requested for addition in this comment are discussed below.

Siting of a LLW disposal facility—902 KAR 100:022 § 18

The citation 902 KAR 100:022 § 18 is not a siting requirement, but rather a dose limit requirement to the public as a result of operations that is maintained through ALARA. Based upon Attachment B to EPA guidance, OSWER No. 9200.4-18, dose limit requirements are not appropriate for actions under CERCLA: “EPA has carefully reviewed the basis for the NRC dose levels and does not believe they are generally protective within the framework of CERCLA and the NCP. Simply put, NRC has provided, and EPA is aware of, no technical, policy, or legal rationale for treating radiation risks differently from other risks addressed under CERCLA and for allowing radiation risks so far beyond the bounds of the CERCLA risk range.” The WAC will be based on dose limits as required by DOE Orders and the CERCLA risk range. The WAC will be submitted to Kentucky and EPA for their review.

Siting of a LLW disposal facility—902 KAR 100:022 § 19

The general performance objective for the protection of individuals from inadvertent intrusion (902 KAR 100:022 § 19) is relevant but not appropriate for DOE wastes remaining on-site under DOE’s custodial care. 902 KAR 100:022 § 19 specifies that protection of the inadvertent intruder shall be ensured after active institutional controls are removed. DOE will be required to continue institutional controls until the facility can be released pursuant to DOE 458.1; therefore, 902 KAR 100:022 § 19 is relevant but not appropriate.

Furthermore, the citation 902 KAR 100:022 § 19 is based upon 10 CFR § 61.42. The NRC requirements included in 10 CFR § 61.42 were developed to demonstrate whether commercial LLW could be appropriately disposed of in a near-surface landfill. The On-Site Alternative for this CERCLA action will be used to dispose of DOE PGDP CERCLA waste only and will not be used to dispose of commercial waste. Further, Nuclear Regulatory Commission (NRC) guidance at <http://pbadupws.nrc.gov/docs/ML1110/ML111040419.pdf> states, “Dose limits for an inadvertent intruder are not provided in Part 61, but the concentrations of radionuclides established in Tables 1 and 2 assumed a (maximum) dose of 5 mSv/yr (500 mrem/yr). The § 61.55 waste classification tables are used to demonstrate compliance with the performance objective in § 61.42, ‘Protection of individuals from inadvertent intrusion.’” The waste classes defined in 10 CFR § 61.55 are not appropriate for DOE waste.

This regulation is not an ARAR, because (1) it is intended to apply to commercial facilities and is not appropriate for DOE wastes remaining on-site under DOE’s control, and (2) it is based on the NRC waste classification system, which is not well-suited for DOE waste.

Siting of a LLW disposal facility—902 KAR 100:022 § 22(1)

The citation 902 KAR 100:022 § 22 (1) states the “...primary emphasis in disposal site suitability is isolation of wastes, and the disposal site features that ensure that the long-term performance objectives are met,” and is not ARAR because it does not provide a standard or level of control.

Siting of a LLW disposal facility—902 KAR 100:022 § 22(2)

The citation 902 KAR 100:022 § 22 (2) will be added to the ARAR Table G.2 with the following note:

Note: Any existing radiological contamination at the site does not prevent the siting of a disposal facility, as long as it would not prevent characterization, modeling, or monitoring.

Siting of a LLW disposal facility—902 KAR 100:022 § 22(3)

The citation 902 KAR 100:022 § 22 (3) states, “within the region where the facility is to be located, a disposal site shall be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet the performance objectives of this administrative regulation,” which is not appropriate for this action. As indicated above, this requirement is designed to prevent a commercial disposal site from being built near a growing city or farm where the siting may impact other local development. Therefore, 902 KAR 100:022 § 22 (3) is not appropriate for the siting of a CERCLA waste disposal facility on DOE property.

Condition #12:

Kentucky cannot accept DOE’s refusal to designate 902 KAR 100:022 § 18&19 as ARAR.

EPA has allowed dose based limits on past CERCLA projects. Unless DOE can provide an alternative promulgated risk based limit and demonstrate that the given risk based limit is as protective site wide, the dose based limit must be included as ARAR. Please revise to include 902 KAR 100:022 § 18 as ARAR.

Kentucky maintains its position that 902 KAR 100:022 § 19 is an appropriate requirement for the on-site disposal alternative. Design, operation and closure of a disposal facility capable of providing an appropriate measure of long term protection and safety for the massive amount of GDP waste should embrace a “defense in depth” approach to be protective of a person who inadvertently intrudes upon the facility at some point in the future. DOE’s recalcitrance in citing and recognizing this requirement as appropriate is troubling to Kentucky. DOE’s reasoning is not consistent with the regulatory viewpoint that all radioactive waste disposal facilities, whether commercial or federally controlled, will have a caretaker into perpetuity (or until the waste is no longer a threat) unless the government fails and can no longer protect the public from the wastes held within the site. Multiple lines of defense, should one or more fail, is indeed an appropriate measure and requirement. Kentucky, in identifying 902 KAR 100:022 § 19 as a relevant and appropriate requirement, recognizes the regulation does not specify or prescribe an intrusion barrier. However, Kentucky believes compliance with 902 KAR 100:022 § 19 should be demonstrated by providing a measure of protection of inadvertent intrusion should bureaucratic controls cease or fail (despite the current presence of DOE Orders), as envisioned in the regulation.

Comment #48: Pg. G-22, Table G.2:

The following table contains a list of potential ARARs of concern to Kentucky, based on the information supplied in the document. The action column is consistent with Table G.2 (i.e., either an already listed action or a new action formatted similarly). Please integrate this list with Table G.2 and ensure that any summaries are consistent with the regulation as written.

Action	Citation
<i>Site Preparation and Excavation Activities</i>	
Activities causing fugitive dust emissions	902 KAR 100:019 § 17
<i>Design/Construction of a Landfill</i>	
Design of a LLW disposal facility	902 KAR 100:022 § 17-19, 21-23 40 CFR § 192.02 (a)-(c)
<i>General Facility Requirements</i>	
Active waste disposal site	902 KAR 100:022 § 24
Environmental Monitoring	902 KAR 100:022 § 25
<i>Waste Generation</i>	
Characterization of LLW associated with landfill operations	Ch 902 KAR 100:021 § 6 (1-8)
<i>Waste Management</i>	
Packaging of LLW	902 KAR 100:021 § 7 (1)
Structural stability of LLW	10 CFR § 61.56(b) Note: Please footnote (or otherwise annotate) this inclusion with “Although the current Kentucky regulation 902 KAR 100:021 Section 7 (2) (c) may be interpreted to be more stringent than the equivalent NRC regulation 10 CFR Section 61.56 (b) (3), it was intended to mirror federal requirements. In order to avoid confusion in the interpretation of this or any other portion of 902 KAR 100:021 Section 7 (2), it is appropriate to cite the equivalent NRC regulations for this project.” as previously discussed.
Treatment of LLW	902 KAR 100:021 § 7 (1)(g)&(i)
<i>Discharge of Wastewater from Treatment System</i>	
Effluent limits for radionuclides in wastewater	902 KAR 100:019 § 44
<i>Operation of a Landfill</i>	
LLW disposal operations	902 KAR 100:022 § 24 (1),(4)-(14)

Response to Comment #48:

Several of the requested ARAR additions already were included in the D1 report, specifically 902 KAR 100:019 § 44, 902 KAR 100:021 § 7(2) [10 CFR § 61.56 (b)(1-2)], 902 KAR 100:022 § 23, 902 KAR 100:022 § 24(7-13), and 902 KAR 100:022 § 25(3). Additionally, 902 KAR 100:022 § 17, § 21, and § 22(2 and 4–11) are identified more appropriately as siting requirements and already have been identified as ARARs under that section. Revisions to the RI/FS Report are discussed below.

Activities causing fugitive dust emissions—902 KAR 100:019 § 17

The citation 902 KAR 100:019 § 17 states, “the licensee or registrant shall use, to the extent practicable, process or other engineering controls (such as containment, decontamination, or ventilation) to control the concentration of radioactive material in air.” As stated by KDWM in an e-mail in regard to BGOU SWMUs 5 and 6 dispute resolution, dated October 19, 2012, this requirement is not appropriate because 902 KAR 100:19 § 17 applies only to occupational exposure. Potential exposure to radiological air emissions by members of the public covered under NESHAP requirements (401 KAR 57:002, 40 CFR § 61.92) already is cited as applicable in the D1 RI/FS Report.

Design of a LLW disposal facility—902 KAR 100:022 § 17-19, 21-23, 40 CFR § 192.02 (a)–(c)

The list of ARARs included in the D1 RI/FS Report includes LLW disposal facility design requirements under 902 KAR 100:022 § 23 and general requirement 902 KAR 100:022 § 17, and disposal site requirements under 902 KAR 100:022 § 21, and § 22(4–11).

The requirements of 40 CFR § 192.02 (a)–(c) are not appropriate for this project because they are based upon the design requirements for closure of uranium mines and mills where the uranium concentration is much higher and in a different form. This CERCLA remedial action contemplates the disposal of LLW/RCRA/TSCA wastes containing isotopes, constituents, and forms different than would be anticipated for uranium mill tailings. Pursuant to the NCP guidance, based on the purpose of the requirement and the substances regulated as well as the actions/activities regulated by the requirements compared to this action, these requirements are not appropriate.

Active waste disposal site—902 KAR 100:022 § 24

The list of ARARs included in the D1 RI/FS Report includes LLW disposal facility operating requirements under 902 KAR 100:022 § 24(7–13). The typographical errors in the citations were corrected [i.e., 902 KAR 100:022 § 24(7) was corrected to 902 KAR 100:022 § 24(7)–(10); 902 KAR 100:022 § 24(8) was corrected to 902 KAR 100:022 § 24(11); 902 KAR 100:022 § 24(9) was corrected to 902 KAR 100:022 § 24(12); and 902 KAR 100:022 § 24(10) was corrected to 902 KAR 100:022 § 24(13)].

The NRC waste classification system under 902 KAR 100:022 § 24(1–3) [10 CFR § 61.52(a)(1–3)] is not well-suited for DOE waste (see DOE G 435.1-1, Appendix A). Regulations 10 CFR Part 61 were developed with several known conditions that are specific to commercial waste and are not necessarily appropriate for DOE LLW. NRC developed a generic waste classification system for application to all facilities and all locations that was based on a well-developed understanding of the characteristics of commercial LLW. Waste streams associated with DOE’s complex were not considered since disposal of those wastes was assumed to be conducted at the DOE-operated sites. Waste generated by DOE nuclear activities are much more variable than commercially generated waste in all respects. Intruder protection, as implemented through a commercial waste classification system, would not be a relevant and appropriate requirement for a DOE disposal facility. Therefore, segregation of certain NRC classes pursuant to 902 KAR 100:022 § 24(1) is not appropriate. Additionally the depth to waste requirement for certain NRC classes pursuant to 902 KAR 100:022 § 24(2) is not appropriate. The citation 902 KAR 100:022 § 24(3) is not appropriate because it is based on NRC classes.

The citation 902 KAR 100:022 § 24(4-5) [10 CFR § 61.52(a)(4-5)] will be added to the ARAR Table G.2 with the prerequisite of “Disposal of LLW waste in containers.”

The citation 902 KAR 100:022 § 24(6) [10 CFR § 61.52(a)(6)] is based on radiation dose rates. Per EPA guidance, this action uses risk assessment; therefore this citation, based on dose, is not well-suited for this project (OSWER No. 9200.4-18).

The citation 902 KAR 100:022 § 24(14) [10 CFR § 61.52(a)(11)] is not appropriate because the unit is designated under several authorities to receive CERCLA remediation wastes that may contain PCBs, asbestos, hazardous constituents, and/or radionuclides. The cited requirement pertains to restrictions on disposal of commercial LLW and is not appropriate for CERCLA waste.

The citation 902 KAR 100:022 § 24(15) [10 CFR § 61.52(b)] is administrative and, as such, is not ARAR.

Environmental monitoring—902 KAR 100:022 § 25

This list of ARARs included in the D1 RI/FS Report includes environment monitoring requirements under 902 KAR 100:022 § 25(3). The following note will be added to the ARARs table:

Note: This requirement would not prevent siting or locating a landfill over an existing radionuclide plume so long as the landfill can be monitored.

The citations 902 KAR 100:022 § 25 (1)(a), 902 KAR 100:022 § 25 (2)(a), and 902 KAR 100:022 § 25 (2)(c) have been added to the monitoring section ARARs in the D2 RI/FS Report. DOE is citing these requirements based on the understanding that it would not prevent DOE from siting or locating a landfill over an existing radionuclide plume as the landfill can be monitored. The following note will be included with each of the citations, 902 KAR 100:022 § 25 (1)(a), 902 KAR 100:022 § 25 (2)(a), and 902 KAR 100:022 § 25 (2)(c):

Note: This requirement would not prevent siting or locating a landfill over an existing radionuclide plume so long as the landfill can be monitored.

Requirements of 902 *KAR* 100:022 § 25(1)(b) and 902 *KAR* 100:022 § 25(1)(c) deal with programs and plans that generally are administrative.

Impacts to health and the environment and evaluation of long-term effects are addressed as part of the CERCLA process; therefore, 902 *KAR* 100:022 § 25(2)(b) is not appropriate. Also, 902 *KAR* 100:022 § 25(4) is not appropriate for this CERCLA action because any corrective measures will be dealt with as part of the CERCLA process.

Characterization of LLW associated with landfill operations—902 *KAR* 100:021 § 6(1–8)

The citation 902 *KAR* 100:021 § 6 (1–8) requirements deal with considerations for the determination of the classification of radioactive waste. The NRC waste classification system is not well-suited for DOE waste and, as such, is not appropriate (see DOE M 435.1-1, Appendix A). Regulations 10 *CFR* Part 61 were developed with several known conditions that are specific to commercial waste and are not necessarily appropriate for DOE LLW. NRC developed a generic waste classification system for application to all facilities and all locations that was based on a well-developed understanding of the characteristics of commercial LLW. Waste streams associated with DOE's complex were not considered because disposal of those wastes was assumed to be conducted at the DOE-operated sites. Remediation waste generated by DOE nuclear activities is much more variable than commercially generated waste in all respects.

Packaging of LLW—902 *KAR* 100:021 § 7(1)

The requirements under 902 *KAR* 100:021 § 7(1) are not ARARs because these requirements are for the protection of health and safety of personnel at the disposal site. Additionally, these requirements are addressed by RCRA requirements that serve to protect the environment and are included as ARARs: 40 *CFR* § 264.314(a), 40 *CFR* § 264.314(c-d), 40 *CFR* § 761.75(b)(8)(ii), 40 *CFR* 264.552(a)(3), and 40 *CFR* § 264.312(a).

Structural stability of LLW—10 *CFR* § 61.56(b)(3)

Requirements at 10 *CFR* § 61.56(b)(3) will be added to the ARAR Table G.2 with the prerequisite of "Disposal of LLW waste in containers."

Treatment of LLW—902 *KAR* 100:021 § 7(1)(g)&(i)

The requirement 902 *KAR* 100:021 § 7(1)(g) will be added as ARAR in the D2 RI/FS Report.

The requirement 902 *KAR* 100:021 § 7(1)(i) is not ARAR because it is for the protection of health and safety of personnel at the disposal site.

Effluent limits for radionuclides in wastewater—902 *KAR* 100:019 § 44

The list of ARARs included in the D1 RI/FS Report includes effluent limits for radionuclides in wastewater requirements under 902 *KAR* 100:019 § 44 [10 *CFR* § 20 Appendix B].

LLW disposal operations—902 KAR 100:022 § 24(1),(4)–(14)

As previously stated, the list of ARARs included in the D1 RI/FS Report includes LLW disposal facility operating requirements under 902 KAR 100:022 § 24(7-13). As discussed above:

- 902 KAR 100:022 § 24(1) is not appropriate for this action.
- The citation 902 KAR 100:022 § 24(4–5) [10 CFR § 61.52(a)(4–5)] will be added to ARARs Table G.2 with the prerequisite of “Disposal of LLW waste in containers.”
- The citation 902 KAR 100:022 § 24(6) [10 CFR § 61.52(a)(6)] is based on radiation dose rates. Based upon Attachment B to EPA guidance OSWER No. 9200.4-18, dose limit requirements are not appropriate for actions under CERCLA: “EPA has carefully reviewed the basis for the NRC dose levels and does not believe they are generally protective within the framework of CERCLA and the NCP. Simply put, NRC has provided, and EPA is aware of, no technical, policy, or legal rationale for treating radiation risks differently from other risks addressed under CERCLA and for allowing radiation risks so far beyond the bounds of the CERCLA risk range.”
- The citation 902 KAR 100:022 § 24(14) [10 CFR § 61.52(a)(11)] is not appropriate because the unit is designated under several authorities to receive CERCLA remediation wastes that may contain PCBs, asbestos, hazardous constituents, and/or radionuclides. The cited requirement pertains to restrictions on disposal of commercial LLW and is not appropriate for CERCLA waste.

Condition #13:

Kentucky cannot accept DOE’s refusal to designate 902 KAR 100:022 § 24(6,) as ARAR.

Please revise concerning 902 KAR 022:24(6) as discussed in the condition related to Specific Comment #47.

Please revise to include 902 KAR 100:022 § 24(6,) as ARAR.

Additionally, the note added for 902 KAR 100:022 § 25 is not specific enough. It must state that the monitoring should be capable of ensuring the protectiveness of the design. Simply stating that “the landfill can be monitored” allows for an unacceptable level of “background” contamination that would prevent differentiating the “background” from a significant leak. Note that this does not preclude the use of a site that contains some level of background contamination. Please revise to appropriately indicate that “background” contamination levels like this are unacceptable and would not meet the intent of the regulation.