

**Cabinet Response to Comments**  
**Corrective Action Plan for the Blue Ridge Landfill**  
**Estill County, Kentucky dated November 17, 2017**  
**May 9, 2018**

As required by the agreed order filed January 3, 2017, Advanced Disposal Services (ADS) submitted the *Corrective Action Plan (CAP) for the Blue Ridge Landfill, Estill County, Kentucky* on May 4, 2017. Following review and subsequent comments by the Energy and Environment Cabinet (Cabinet), ADS made revisions to the CAP and re-submitted the document on November 17, 2017. The Cabinet found the CAP to meet preliminary approval, and pursuant to Agreed Order # DWM-160048, Agency Interest No. 998, Permit # 033-00004, it was posted for a 30-day public comment period, which expired February 12, 2018.

In proposing the CAP, Blue Ridge conducted a preliminary screening and evaluation of a number of remedial technologies to address the BES waste. The CAP for the Blue Ridge Landfill then did a detailed analysis and comparative risk assessment for two remedial alternatives:

- Alternative 1 Closure-in-Place and Monitoring
- Alternative 2 Excavate and Redispose BES Waste
- Based on the comparative analysis and risk assessment and on the criteria established in the agreed order the preferred alternative proffered by ADS in the CAP based on the criteria is Alternative 1. According to the CAP, it provides the highest degree of overall protectiveness, poses the lowest short-term physical and radiological exposure-related risks to the community, in particular to workers, landowners, school students/faculty/staff, and residents in the immediate vicinity of the facility. Alternative 1 also, provides long-term effectiveness and protectiveness while also being implementable.

Paragraph 19(a) of the Agreed Order established factors Blue Ridge was required to consider for a proposed remedy. Paragraph 19(b) of the Agreed Order further requires the Cabinet to consider cost and community acceptance of the remedy as part of its evaluation. Overall protection of human health and the environment and compliance with law are the threshold criteria any proposed remedy must meet. The other factors are considered modifying or balancing factors.

The CAP indicates the preferred option is to leave waste in place under the conditions outlined in the CAP, which will become enforceable through permit modifications. The Cabinet preliminarily accepted Blue Ridge's preferred option, determining that leaving the TENORM in place is protective of human health and the environment because it limits potential public and worker exposure to the waste and other adverse impacts associated with excavating at the site, in addition to ensuring long-term protections at the site. The Cabinet then solicited public comment to consider community acceptance. The Cabinet allowed comments to be submitted on the CAP for thirty-two (32) days, and a total of 43 comments were received. After considering the comments, the Cabinet concluded that the CAP and its preferred option meets the regulatory standards for approval pursuant to KRS 224.1-400 and 401 KAR 100:030.

The comments were grouped according to the general nature of the comments and the technical issue or point raised in the comment. With this Response to Comments (RTC) document, the Cabinet intends to provide responses to each group of comments.

### **Specific Comments**

- **Remedial Preferences/Suggestions Comments: Several commenters expressed their preferences or suggestions for remedial alternatives evaluated in the CAP.**

**Response:** Blue Ridge's CAP discussed two remedial alternatives. Alternative 1 (Closure-In-Place) is disposing the material in place subject to conditions stated in the CAP which would eventually be included in the operation/closure permits. Alternative 2 (Excavate and Redispose) is excavating the material from the landfill, then transporting it for disposal in another municipal solid waste landfill located in Pennsylvania. The CAP indicated that alternative 1 was the preferred remedial alternative.

The Cabinet evaluated the CAP and both of the alternatives pursuant to the Agreed Order's paragraph 19(a) factors and Kentucky law. The Cabinet determined both alternatives could meet the KRS Chapter 224 standards of protectiveness established by KRS 224.1-400 and 401 KAR 100:030. Although the Cabinet review determined both alternatives could meet the Cabinet's standards of protectiveness, the Cabinet preliminarily approved the CAP's expressed preference for the remedial alternative 1 (Closure-In-Place).

The Cabinet published the CAP and its preliminary determination for comments to evaluate the Agreed Order's paragraph 19(b) factors. A majority of commenters indicated a preference for alternative 2 (Excavate and Redispose) without providing any technical basis for their preference. Other commenters suggested alternative corrective actions not evaluated by the CAP, including removal and disposal at other facilities not specified by Blue Ridge. Some of the commenters wanted additional remedial measures beyond removal, such as indefinite monitoring or school relocation. Another commenter who stated a preference for Alternative 2 (Excavate and Redispose), also suggested acceptance of the Closure-In-Place remedy but commented on length of time proposed for groundwater monitoring. At least three commenters agreed with the CAP's preferred alternative 1 (Closure-In-Place) pursuant to terms to be included in a modified permit and monitoring. Two of those commenters, who estimate they live within one mile from Blue Ridge, highlighted an exposure concern for themselves, their property, the school, and the landfill workers that may result from potentially contaminated dust blowing offsite during removal.

Although the CAP and its supporting appendices, reports, and some of the comments provide sufficient justification for the disposal in place alternative, many of the comments indicate that the commenters may not fully appreciate the public safety and health risks associated with the significant landfill excavation project evaluated in alternative 2. Those generalized safety risks include, but are not limited to, odors, gasses, fugitive dusts, ground

and surface water impacts. Some of those issues are discussed more fully in specific responses below.

After considering comments regarding preference, the Cabinet determined the CAP's preferred remedy alternative 1 (Closure-In-Place) still provides the greatest short-term and long-term protection to human health and the environment. While the Cabinet has determined that both alternatives can meet the standards of protectiveness, none of the comments received altered the Cabinet's preliminary understanding of the remedial alternatives - that alternative 2 (Excavate and Redispose) provides less short-term protectiveness for human health and the environment, without providing any greater long-term protectiveness than alternative 1 (Closure-in-Place). This is especially true considering the greater physical risks and uncertainties associated with alternative 2 that are discussed in the responses that follow. The Cabinet is concerned with the short-term exposure to landfill workers and general public, the general health and safety risks associated with the potential excavation, the potential for offsite impacts from blowing dust as expressed by the commenters who live near the landfill, and with other harmful fugitive emissions generated during landfill excavation. As such, the CAP and its preferred alternative 1 (Closure-In-Place) is approved.

- **Costs Comments: Multiple commenters stated that cost should not be considered, or that differences in the estimated costs were insignificant to a company as large as Blue Ridge.**

**Reponses:** The CAP compares cost estimates for the two specific alternative remedies that were evaluated. Estimated costs associated with alternative 1 (Closure-In-Place) included additional funds for installing an interim cover, upgrading the final cover, and adding parameters to water monitoring. Further, changes that will likely increase closure costs will result in additional bonding through a separate permit action. Alternative 2 (Excavate and Redispose) estimates in the CAP largely reflect costs for equipment, labor, transport, and disposal in a municipal solid waste landfill. Based on Cabinet review, it does not appear that Blue Ridge's removal cost analysis was artificially high. The Cabinet determined that CAP likely does not fully evaluate all of the costs associated with the work. While the CAP mentions some of the externalized costs associated with alternative 2 (Excavate and Redispose) which would be borne by the community, those costs were not fully monetized. Such costs include, but are not limited to, potential traffic impacts on the community, increased disposal costs to the customers, potential emergency response costs (ambulance, police, etc.), wear to local infrastructure, or increased air pollution from landfill gasses (which, in addition to significant odors, likely includes the air release of harmful hydrogen sulfide) and vehicle/equipment exhausts.

While the Agreed Order requires the Cabinet to consider costs, and CAP includes a monetary value for the two options that the Cabinet considered in review, cost considerations did not play a factor in the Cabinet's determination to approve the CAP and

its preferred alternative. The Cabinet tends to agree with commenters that the monetary value associated with labor, excavation, transport, and disposal costs are not cost prohibitive. However, even had the costs for both alternatives been equal, the Cabinet's determination regarding the protectiveness of the alternatives would not have changed.

- **Groundwater Monitoring Comments: A number of commenters stated that the groundwater monitoring proposed in the CAP is inadequate for radionuclide constituents given the long half-lives of the radioisotopes.**

**Response:** ADS will be developing a Radioactive Sampling/Analysis Plan to sample groundwater and surface water including underdrains beneath the landfill liner. This plan will be handled through a modification to the groundwater monitoring plan in the facility's solid waste permit. In the interim, ADS has proposed to monitor groundwater and the two underdrains (located beneath the bottom liner) for radionuclides beginning in 2018 to establish a baseline. ADS has proposed to add radionuclides Ra-226, Ra-228, and gross alpha and gross beta activity analyses to the routine quarterly sampling of all five groundwater monitoring wells currently in the groundwater monitoring network for a year. After a one year period (four consecutive quarters), radionuclides will be sampled and analyzed from the two down gradient monitoring wells (MW-13 and MW-15R) on a semi-annual basis from 2019-2023. If no elevated levels of Ra-226 or Ra-228 are identified and no elevated radiological activity is found, radionuclides will be monitored every five years (2023, 2028, 2033, etc.) for the operating life of the landfill. Once the facility enters the 30-year post-closure period, unless there are elevated levels or radionuclides or radiological activity found, monitoring will cease.

For many sites contaminated with radionuclides, monitoring is typically more frequent initially, and then the frequency reduced over time if there are no increasing trends of radioactivity levels. Determining an appropriate interval and duration for groundwater monitoring for radionuclides is a question of mobility versus half-life of the radionuclides. The half-lives of the radionuclides and their primary decay products of concern in TENORM wastes are wide-ranging: Radon (Rn-222), in a gaseous state, is only 3.8 days; Radium (Ra-228) is 5.75 years, Lead (Pb-210) is 22.2 years, while the half-life of Ra-226, the primary isotope of concern is 1,600 years.

The main factors affecting potential migration to groundwater are the radionuclide's solubility and mobility. Shale bedrock units like the New Albany Shale, which is the primary geologic formation underlying the landfill, contain clay minerals which tend to sorb radionuclides with positive valence states such as Radium, Uranium and Thorium. According to studies performed on uranium mill and mill tailing sites, radium is moderately soluble in its movement to surface water and groundwater, and its solubility is affected by the presence of sulfate, organic materials, and pH of the solution or leachate. The key factor affecting potential for migration to groundwater is how radium reacts geochemically when

mixed with leachate, and subject to the degree to which acidic conditions may occur in the landfill.

The Sorption Coefficient ( $K_d$ ) is also an important factor in groundwater chemistry which affects a chemical's adsorption and movement in water and its tendency to partition from soil to water in the environment. Most TENORM radionuclides have moderate to high  $K_d$  values and do not partition from soil to the aqueous phase very readily. The risk assessment performed by Risk Assessment Corporation (RAC) utilized the worst-case assumptions (highest potential mobility) for  $K_d$  values based on what has been referenced in the literature. The  $K_d$  for radium is 70, uranium is 35, lead is 100 and thorium is 3200, although uranium is not expected to be a radionuclide of concern with the BES waste. Lower  $K_d$  values, closer to 0, typically result in faster travel times within the aquifer. A good example is tritium, which has a  $K_d$  of 0.04, is very soluble, and moves readily with surface water and groundwater. Tritium is not known to be present in the BES wastes disposed of at Blue Ridge. Future groundwater monitoring at Blue Ridge will focus on observing trends in concentrations of radium for a period of time to determine if it is becoming more soluble due to conditions in the landfill.

The risk assessment conducted as part of the CAP assumes very conservative modeling assumptions for the groundwater pathway (including no cap and no liner) and uses upper bounding (worst case) maximum reasonable exposure estimates for calculating potential risk to groundwater contamination over time. The results show that the maximum risk would be to a future hypothetical resident consuming groundwater from a well located immediately adjacent to the landfill 2,700 years from the present day, which at  $4.9 \times 10^{-5}$  exceeds Kentucky's target risk level of  $1 \times 10^{-6}$ , but falls within the EPA's risk range. Again, this scenario assumes the landfill has no cap and no liner – all of which are required by federal and state law, Blue Ridge's solid waste permit, and the approved CAP for the Closure-In-Place alternative. However, maximum effective doses were well below the 25 mrem/yr dose limit for low-level radioactive disposal sites, and the maximum total radium (Ra-226 + Ra-228) concentration was well below the USEPA drinking water standard.

ADS will also develop an Interim Remedial Measures Plan that will include installation of an interim cap (low-permeability synthetic or geo-synthetic clay liner) over the BES waste. This additional liner should greatly reduce infiltration to groundwater and leachate generation.

Nevertheless, as a precautionary measure in response to these comments, the Cabinet will require ADS to modify their proposed groundwater monitoring plan by continuing groundwater monitoring for radionuclides following landfill closure, during the 30-year post-closure period. Therefore, monitoring for radionuclides will continue beyond the operating life of the landfill, through the 30-year post-closure period, likely through 2066. If elevated levels of radionuclides or elevated radiological activity is found, groundwater

monitoring will continue. This modification will be made to the solid waste landfill permit monitoring requirements.

In accordance with the solid waste landfill regulations, upon landfill closure, ADS is already required to place a deed notice on the property. To ensure the future use of the landfill property is controlled to limit potential exposure, and to protect human health and the environment, once the landfill enters the 30-year post-closure period, the Cabinet will require ADS to place appropriate land use restrictions on the landfill property, pursuant to applicable law at the time the post-closure period begins. The restrictions will run with the land and will include no residential use, no groundwater use for drinking water purposes, and no disturbance of the cap within the permitted waste boundaries.

- **Waste Characterization Comments: A number of commenters stated that there has been inadequate characterization of the TENORM wastes, therefore the true risks posed by the wastes is unknown.**

**Response:** The characterization of the TENORM wastes is representative of the BES waste that was disposed at the landfill. The waste characterization is based on the process knowledge of generation and characteristics of the specific waste material by radiation health professionals, and on the radioactivity data itself. The CAP and risk assessments performed as part of the CAP by RAC utilized the data that was available including the results of previous sampling of similarly processed oil and gas tank bottoms and fracking waste precipitate at the Fairmont Brine facility and from waste profile radio-analytical data provided by the other generators from reputable, accredited laboratories. According to representatives of the Cabinet for Health and Family Services (CHFS) who visited the Fairmont Brine facility and collected samples of a similarly processed oil and gas waste, the waste precipitate from Fairmont Brine which made up the majority of the material disposed at the landfill, was processed, which removed the parent radioactive isotopes, leaving Ra-226 and its decay products as the primary radionuclides of concern. This also means that the Ra-226 levels are at their maximum activity levels and there will be no in-growth.

The risk assessment calculated the potential average weighted concentration for each radionuclide based on the known data and utilized very conservative upper bounding (worst case) estimates in its dose and exposure calculations and scenarios including assumptions made for groundwater flow and modelling. For radionuclides which were not tested for in some of the shipments of BES wastes, conservative estimates of concentrations based on ratios of Ra-226 and Ra-228 levels were developed and used in the risk assessment. Gamma surveys have been conducted of the facility by Chase Environmental Group and CHFS, and EEC and CHFS collected samples of soil, groundwater, surface water and leachate from the facility. All of this data was taken into consideration for the exposure and risk assessment calculations.

The actual risks and estimated doses calculated by the risk assessment under most of the worker/public exposure scenarios for both alternatives is 1 to 2 orders of magnitude less than the target risk, allowing for a large safety factor to account for any uncertainties in the waste characterization as was alleged by one of the commenters. If one considers the activity levels of the waste could be potentially higher, it would still likely meet target risk levels and dose limits for Closure-in-Place.

Sampling of the BES waste in the landfill was considered and evaluated, but core sampling through the landfill would create a new risk to workers and the public from exposure to the BES waste and other municipal solid waste. Further, sampling could pose safety issues with methane and other gases and volatile organic compounds. In addition, locating the specific BES waste in the landfill to collect representative samples would be difficult, if not impossible because the BES waste was mixed with other solid wastes and spread throughout the 17 disposal cells. Any data from sampling would likely not improve the characterization of the waste. The results could actually end up indicating lower radioactivity due to dilution and mixing of the BES wastes with municipal solid waste and the daily cover material that consists of pulverized New Albany shale.

- **Short-Term Risk Comments: A number of commenters stated that Alternative 2 (Excavate and Redispose) Can Be Done Safely**

**Response:** The short-term cancer risk posed to a landfill worker and supervisor during the removal is estimated to exceed Kentucky's target risk level and creates the potential for direct exposure during excavation, transport, and re-disposal. If waste quantities and activity levels are assumed to be higher than the characterization data indicates (as one commenter suggested they may be), there would be a higher dose and possibly greater risk of exposure for the workers during excavation and loading of the material under the removal option. In any removal scenario, various work plans, such as health and safety plans, would need to be developed to reduce exposures to protect workers.

Further, under the removal option, the excavation surface would need to be monitored with a radiation detection instrument to mark the boundaries of material that is above the concentration, and the removal would continue until the target concentration of < 5 pCi/g is achieved. At this low level, and because the waste was mixed with other municipal solid waste and spread over 17 disposal cells, it will be difficult, if not impossible, to delineate the unpermitted TENORM waste from the naturally occurring radiological activity associated with the New Albany Shale used as daily cover or the other allowable wastes having radiological activity. Therefore, there would be significant uncertainty with ensuring the removal of all of the BES wastes. All of the time spent in close proximity to the waste would result in worker exposure to direct radiation levels and likely airborne contamination. Use of respiratory protection can reduce or prevent exposure to airborne radioactivity, but wearing such protection will slow the performance of the work and has

its own risks. There would also be general safety hazards associated with use of heavy, earthmoving equipment within the exclusion zone and outside the area from normal landfilling operations.

The removal work also poses additional physical risk to workers, students, and the public due to potential fugitive dusts and particulates from excavation and loading the waste. As this is a landfill, the Cabinet's concerns regarding dusts and particulates are not limited to radiological contamination, but extend to more general health risks. There is also an increased risk of truck accidents in transporting over 1,800 truckloads of contaminated TENORM waste, and will cause increased truck traffic into and out of the landfill and in the vicinity of two schools.

Removal of the TENORM wastes would not be simple and would include other challenges. Although the CAP briefly describes these generalized risks, the Cabinet's determination regarding short-term risks also drew upon its significant experience with landfill excavation, slide remediation, and other issues it has observed at other facilities. Waste cover will have to be removed to enable workers to access the potentially radioactive waste. Uncovering the BES waste that was mixed with and buried under several thousand cubic yards of solid waste would create significant odors due to the bacterial degradation and decomposition. The odors could spread to fairly long distances based on wind and weather patterns, and would likely adversely impact the day to day activities of nearly all of the nearby residents as well as students, faculty, and staff at the two schools during the entire removal operation. Deodorizers and other measures can be used, but Cabinet experience with other landfills suggests that odor control measures sometimes have mixed results. Gases typically associated with the odors and solid waste landfill operations include methane, ammonia, and hydrogen sulfide and other volatile organic compounds. Exposure to these gases and other potential contaminants could pose additional risks to workers and others in the vicinity of the removal area, and would require monitoring to ensure levels of fugitive chemical emissions and odor would not exceed allowable regulatory or health-based levels off-site including the schools and nearby residences.

Stormwater protection plans would need to be designed and implemented to control and redirect stormwater, to the extent possible, to prevent stormwater from entering the excavation area, which could cause additional infiltration, generate additional volumes of leachate in the landfill, and increase the potential for groundwater impacts. The removal could also disrupt or slow down normal waste disposal operations at the landfill as the removal areas of the landfill would need to be separated from the working face and the areas that receive solid waste on a daily basis.

Based on the Cabinet's experience with other responses that involve excavation, the 93 day estimated timeframe to identify, remove, load and transport impacted waste and re-cover the excavation area would likely end up being much longer. Weather conditions play a significant role in conducting excavations in an area with shale and clay soils. If conditions are too wet for the heavy equipment to operate, work would be postponed - sometimes for

several days at a time - until it is dry enough to continue. The longer the timeframe for the excavation means a longer time period the potential worker safety and public safety issues, including odor problems, increased truck traffic, and stormwater infiltration concerns, will persist.

- **Liner Design/Life Comments: Some commenters stated that the landfill design and liner life is inadequate given the half-lives of the BES waste.**

**Response:** Studies conducted on the service life of high-density polyethylene (HDPE) liners in landfills have indicated an estimated service half-life of up to 446 years, dependent on a number of factors, including temperature inside the landfill. Other studies indicated potentially longer service life for liners in low-level radioactive waste disposal facilities. The Blue Ridge Landfill has an engineered liner system designed and constructed to meet the requirements for permitted solid waste contained landfills in 401 KAR 48:080. The purpose of the liner is to prevent the migration of landfill leachate and contaminants from the landfill into groundwater. The liner system consists of five layers that provide a specific function to protect groundwater. From the bottom to the top, they include:

1. A 2-3 feet thick compacted clay layer that has low permeability;
2. A 60 ml HDPE designed to prevent migration of leachate while resisting material degradation from municipal solid wastes, and other solid or special wastes;
3. A geotextile cushion or geo-composite drainage layer on top of the HDPE geomembrane;
4. A 12-inch thick granular low-permeability layer that protects the liner and collects leachate; and
5. A geotextile layer on top of the granular layer to protect the leachate system.

ADS will be developing an Interim Remedial Measures Plan, which will include placing - either a synthetic liner or low-permeability soil layer interim cover over the BES waste as an additional barrier to further reduce the infiltration of water into the landfill and reduce leachate generation. The interim cover will be addressed as part of the landfill permit modification. ADS has agreed to comply with the updated TENORM regulation in 401 KAR 48:090 when the landfill is closed, estimated to be approximately 2034. The regulation requires both a synthetic liner and low-permeability soil layer be constructed as a final cap.

It is important to note that the risk assessment dose and risk calculations for the most likely future exposure scenario of a resident drinking groundwater from a well immediately adjacent to the landfill 2,700 years from the present, assumes the landfill has no cap, no interim cap, and no engineered liner. As noted in a previous response, the Cabinet will require land use restrictions be placed on the landfill property, pursuant to applicable law at the time the post-closure period begins, that will include no residential use, and no groundwater use for drinking water purposes. Therefore, the worst-case scenario risks calculated in the assessment do not account for protective measures presently in place at

the landfill, measures that will be undertaken as part of the CAP, or measures that will remain in place indefinitely (i.e. the institutional controls). The worst-case scenario calculated risk slightly exceeds the target risk level. However, even in the worst case scenario, the maximum effective radiation doses were well below the 25 mrem/yr dose limit for low-level radioactive disposal sites, and the maximum total radium (Ra-226 + Ra-228) concentration was well below the drinking water standard.

- **Risk Comparison Comments: Some commenters stated that the short-term risk posed to landfill workers as part of the Alternative 2 (Excavate and Redispose BES waste) is not great enough to justify long-term risk posed by leaving the wastes there.**

**Response:** The Excavate and Redispose option would pose an increased short-term radiological lifetime cancer morbidity risk for the landfill worker of  $1.8 \times 10^{-5}$  and the landfill supervisor at  $2.2 \times 10^{-6}$  compared with Kentucky's target risk level of  $1 \times 10^{-6}$ . This is due to the potential direct exposure to a worker and a supervisor from inhalation of particulates, soil ingestion, and external exposure from the excavation and loading of waste. If waste quantities and activity levels are assumed to be higher than the characterization data indicates, there could be a higher potential dose and an even greater risk of exposure for the workers in the excavation and during loading of the material under the removal option. In addition, as stated previously this option poses a higher physical risk to workers, students, and the public due to possible truck accidents in hauling the waste, disrupts normal landfill operations, will create odors from uncovering buried waste, will create challenges with handling stormwater run-on and runoff during the removal period, and will cause increased truck traffic into and out of the landfill and in the vicinity of two schools.

In order to ensure the future use of the landfill property is controlled in order to limit potential exposure, and protect human health and the environment, once the landfill enters the 30-year post-closure period, the Cabinet will require ADS to place appropriate land use restrictions through institutional controls on the landfill property, pursuant to applicable law at the time the post-closure period begins. The land use restrictions will run with the land and will include no residential use, no drinking water use and no disturbance of the cap. For calculating the potential long-term risk, the risk assessment conducted as part of the CAP assumes very conservative modeling assumptions for the groundwater pathway (including no final cap, no interim cap, and no engineered liner) and uses upper bounding (worst case) maximum reasonable exposure estimates for calculating potential risk to groundwater contamination over time. The results show that the maximum risk would be to a future hypothetical resident consuming groundwater from a well located immediately adjacent to the landfill 2,700 years from the present day, which at  $4.9 \times 10^{-5}$  exceeds the target risk level of  $1 \times 10^{-6}$ . However, maximum effective doses were well below the 25 mrem/yr dose limit for low-level radioactive disposal sites, and the maximum total radium (Ra-226 + Ra-228) concentration was well below the USEPA drinking water standard.

Estimated human health radiological risk from the TENORM waste is based on scientifically accepted approaches and is directly proportional to the quantity of radioactive materials in the waste. The risk assessment is from the overall risk of exposure and makes recommendations based on the lesser of the total risk, given the information available. Factored into the recommendation from the assessment is that certain exposures and risks have already been received (to account for the initial disposal), and that adding additional exposures and risks by unnecessarily excavating, relocating, and reburying the same wastes elsewhere with no additional long-term benefit is not warranted. Alternative 1: Closure-in-Place and Monitoring would be safe for the workers and the public and pose very little long-term future risk to residents with adequate institutional controls in place including placement of land-use restrictions stating no disturbance of the cap, no residential use, and no drinking water use.

- **Contingency Plan Comments: Some commenters stated the CAP is deficient since it does not include a Contingency Plan.**

**Response:** The Blue Ridge Landfill is operating under a contained solid waste landfill permit, and radionuclides will be added to their groundwater monitoring program as a permit modification. Between the landfill permit and 401 KAR 48:300/310, provisions which require groundwater and surface water assessment and corrective action, and additional financial assurance to insure corrective action is completed are already in place. If there are exceedances of any constituents in groundwater, radionuclides or others, the facility will be required to conduct an assessment and perform corrective action if necessary, including conducting additional remedial action. As noted above, in accordance with comments received, the Cabinet will require ADS to modify their proposed groundwater monitoring plan by continuing groundwater monitoring for radionuclides following landfill closure, during the 30-year post-closure period. Therefore, monitoring for radionuclides will continue beyond the operating life of the landfill, through the 30-year post-closure period, likely through 2066. If detection monitoring indicates elevated levels of radionuclides or elevated radiological activity exist, groundwater monitoring will continue and, if necessary, ADS will be required to conduct a groundwater assessment and potential corrective actions.

- **Host Agreement/Local litigation Comments: Multiple commenters discussed the host agreement and local litigation.**

**Comment:** Multiple commenters stated that because the disposal was a violation of the host agreement, the Cabinet should require a removal.

**Response:** As stated earlier, the Cabinet evaluated the CAP using the factors required by paragraph 19 of the Agreed Order and the laws it enforces. Host agreements are contracts between the local government and landfills, and their terms are enforceable by those parties. KRS Chapter 224 does not require host agreements. The Cabinet does not enforce

host agreements, dictate their terms, mediate disputes arising from them, or otherwise interpret their provisions. Statements in solid waste permits indicating the permit does not relieve the permittee from compliance with all local agreements and laws do not convey authority on the Cabinet to enforce the host agreement as part of the permit. Remedies associated with violations of the host agreement fall squarely within jurisdiction of local court.

**Comment: One commenter stated before the Cabinet approves any CAP it should require Blue Ridge to enter into a new host agreement.**

**Response:** KRS Chapter 224 neither requires landfills to enter into host agreements with counties, nor provides any mechanism for the Cabinet to enforce those agreements' terms. Pursuant to KRS 224.40-315, to obtain a construction permit for a new or significant expansion to a municipal solid waste disposal facility, the applicant must demonstrate that the local government has determined the new landfill or significant expansion will be consistent with the area solid waste management plan required by KRS 224.43-315. The statutes do not specifically set the forms of local contracts or ordinances, which also are necessary for landfill operations, nor do they require host agreements to be part of the local determination. Host agreements are contracts between the local government and the landfill owner/operator, and their terms are negotiable by those parties. The CAP is not the appropriate mechanism to resolve disputes related to host agreements or to leverage negotiations related thereto.

**Comment: Multiple commenters noted that Advanced Disposal had not admitted it accepted TENORM in local litigation regarding the host agreement and local ordinance.**

**Response:** The proposed remedial alternatives in the CAP and its addenda assume concentrations of radium based on all of the available data from the investigation and CAP development process. The assumed concentrations were derived in part from analytical data provided to the Cabinet by generators for some of the waste, including data from Fairmont Brine wastes. Other sources of data included samples of similar waste collected by the Cabinet for Health and Family Services at generators' facilities. Legal positions taken in local litigation do not affect the radioactivity assumptions that Blue Ridge used to develop the CAP or that the Cabinet used to evaluate it.

- **Long-term Economic Impact Comments: Multiple commenters indicated that the Cabinet should consider long-term economic or other financial impacts that might arise based on public perceptions.**

**Response:** As stated earlier, the Cabinet evaluated the CAP using the factors required by paragraph 19 of the Agreed Order and the statutes and regulations it enforces. The CAP and its preferred alternative meet the standards of protectiveness and is approvable

pursuant to Kentucky law. Potential long-term economic impacts based upon future public perception is not a technical factor related to human health or the environment that the Cabinet evaluates.

- **Public notice/participation Comments: At least two commenters asked questions or made comments regarding public participation and/or notice procedures.**

**Response:** Since the Office of Attorney General Criminal Branch concluded its investigation, the Cabinet has maintained a public website for open records associated with the disposal, investigation, and CAP development. In addition, the Cabinet published a near final draft of the Agreed Order through its website and various media outlets, solicited comments, and issued responses to comments on the Agreed Order. Furthermore, the Cabinet participated in two public meetings to discuss the disposal and Agreed Order. Those meetings were hosted and publicized by local officials and a local community group, and were held at the Estill County High School. Lastly, the Cabinet issued a press release and published a public notice announcing the CAP in the local paper, and solicited comments consistent with the solid waste permitting procedures set forth in Kentucky law.

- **Editorial Comments: Some commenters made specific suggestions for edits to CAP language.**

**Response:** Suggestions included things like adding local contact information for Estill County officials and inserting cross-references between CAP sections. The Cabinet reviewed these comments and the specific sections of the CAP they referenced. The Cabinet will request amendments it agreed with in the determination letter.