

NRC Technical Informational Request (TIR)
DOE's 2017 Draft GCAP
Rifle Old Processing Site

TIR-1

Comment

An administrative item needs to be corrected in the document that the main text of the GCAP does not reference Appendix B "Alternative Concentration Limit Application."

Basis

Section 108 of UMTRCA requires U.S. Nuclear Regulatory Commission (NRC) concurrence on the remedial actions selected by the U.S. Department of Energy (DOE) for Title I Sites. DOE's method for documenting the remedial action or compliance strategy is the GCAP.

Based on NRC comments on DOE's 2012 GCAP, DOE includes Appendix B "Alternative Concentration Limit Application [ACL]" in the 2017 GCAP. The intent of this appendix is to fulfill NRC's requirements for information for an ACL Application. DOE states that much of the information needed for an ACL has been compiled in the 1999 Site Observational Work Plan (SOWP) and the 2017 GCAP (main text) but Appendix B is organized similar to NRC's format for an ACL application. However, while Appendix B references the revised GCAP (main text) the main text lacks references to Appendix B.

Path Forward

Please include a reference in the main text to Appendix B. Please be aware of two additional administrative/clerical items which DOE may elect to revise. First, the word "Alternative" in the title of Appendix B should be changed to "Alternate". Second, when the GCAP remedy is sufficient for NRC concurrence, NRC will require that DOE remove the term "Draft" from the title.

TIR-2

Comment

During the site surface reclamation, DOE applied supplemental standards to subsurface soils located in various designated areas within the site. Based on Figure 5 of the 2017 GCAP, the designated areas include under and along Highway 6 (along the northern perimeter of the site) and along the railroad right-of-way (along the southern perimeter of the site). Depiction of the areas with supplemental standards on Figure 5 is consistent with information on the land records (see Appendix A of the GCAP). However, the 2017 GCAP also states that "...removal of soils and alluvial sediments generally stopped at the water table due to difficulties in excavating below this level" and "...some soils exceeding the Ra-226 standard were left in place under the supplemental standards provision of UMTRCA."

The 2017 GCAP reports that investigations conducted under its Science Focus Area 2.0 identified continuing impacts to groundwater from soils in the supplemental standards area along Highway 6; however, that data are not reported in the GCAP. In addition, on Figure 7 of the 2017 GCAP, an increasing trend is observed in uranium concentration in groundwater at

Enclosure

well 656 (see TIR-3). As documented below in TIR-3 and TIR-4, the observed increase in uranium concentrations in groundwater at well 656 may be attributed to residual contamination in the subpile soils (see TIR-3) or recent activity associated with the current land use (see TIR-4). Another possible source for the increase in uranium concentrations at well 656 may be remobilization from subsurface soils subject to supplemental standards if those standards were applied to the subsurface soils in this area below the water table.

DOE did not address the potential that the proposed ACL may be exceeded if uranium were to be remobilized from the subsurface soils with supplemental standards if such remobilization were the cause of the increasing trend in uranium concentrations at well 656.

Basis

Section 40 CFR 192.02(c)(3)(ii)(B)(1)(i) states that the physical and chemical characteristics of the constituents in the residual radioactive material at the site, including their potential for migration, shall be considered in assessing potential adverse impacts on groundwater quality to establish an ACL. DOE established the ACL for uranium based largely on the maximum observed uranium level during the recent past.¹

Path Forward

Please provide a rationale that the proposed ACL is sufficient based on the risk that uranium concentrations in the subsurface soils that were subject to supplemental standards may be a continuing source of contamination to future groundwater.

TIR-3

Comment

Figure 6 of the 2017 GCAP depicts increasing uranium concentrations in groundwater at well 656 since 2003. Well 656 is located within the footprint of the former tailings area. In the 1999 SOWP, using a pseudo-Synthetic Precipitation Leaching Procedure, DOE reported that the subpile soils at the location of well 656 leached uranium at an equivalent to a mass concentration of 12.6 milligrams per kilogram (mg/Kg) (i.e., the leachate contained 0.126 milligrams per liter (mg/L) using the formula provided by DOE). The leaching potential for soils at this location exceeded, by two orders of magnitude, the leaching potential for soils located elsewhere on the site. If the increasing trend continues, the concentrations will exceed the proposed ACL for uranium. (Staff notes that data from DOE's Geospatial Environmental Mapping System (GEMS) website indicate that the levels at this well have been decreasing since the data reported in the 2017 GCAP).

In the 2011 DOE evaluation of natural flushing, DOE recommended that a monitoring well east of the ditch should be installed because monitoring at a single well (well 656) was "...insufficient for delineating uranium levels closer to the Colorado River and the east end of the site."

¹ DOE established the ACL based on the Upper Simultaneous Limit (USL) to the non-parametric distribution of data for one well, well 310, at which the highest uranium levels were typically observed throughout the monitoring program. The USL for a nonparametric distribution with a limited number of datapoints is the highest level observed.

DOE did not address the potential that the proposed ACL may be exceeded if uranium were to be remobilized from the subpile soils with elevated leaching potential.

Basis

Section 40 CFR 192.02(c)(3)(ii)(B)(1)(i) states that the physical and chemical characteristics of the constituents in the residual radioactive material at the site, including their potential for migration, shall be considered in assessing potential adverse impacts on groundwater quality to establish an ACL. DOE established the ACL for uranium based largely on the maximum observed uranium level during the recent past.²

Path Forward

Please provide rationale for establishing the proposed ACL as the observed increasing trend at well 656 indicates it may exceed the ACL in the near future. Please provide a discussion as to why or why not the recommendation in the 2011 evaluation was followed.

TIR-4

Comment

In 2003, the City of Rifle acquired ownership of the property. Based on the 2017 GCAP, DOE reports that the City of Rifle constructed an “operations and maintenance” facility at the east end of the property. As discussed above in TIR-3, uranium concentrations have been increasing in groundwater at well 656, located in the eastern portion of the property since 2003. The uranium concentrations were generally stable at this well though elevated uranium levels were reported during several sampling events prior to 2003.

Because the increase in concentrations coincided with the new ownership/use of the property in 2003, the use of the property as an operations and maintenance facility potentially may have caused, directly or indirectly, the increasing trend observed at well 656 (e.g., washing of vehicles led to increase in infiltration).

Basis

The Quit Claim Deed which transfers ownership of the property from the State of Colorado to the City of Rifle contains covenants that the City’s use of the property shall not adversely impact groundwater quality. The Quit Claim Deed is the primary institutional control upon which DOE basis its groundwater remedy consistent with the Statement of Considerations for the 1995 Amendment to UMTRCA (see 60 FR 2857). If the land use is shown to be adversely impacting the groundwater quality and not corrected or evaluated, then the effectiveness of the institutional control as part of the groundwater remedy may be questioned.

² DOE established the ACL based on the Upper Simultaneous Limit (USL) to the non-parametric distribution of data for one well, well 310, at which the highest uranium levels were typically observed throughout the monitoring program. The USL for a nonparametric distribution with a limited number a datapoints is the highest level observed.

Path Forward

Please determine if the land use is adversely impacting the groundwater quality and, if this is the case, what is the potential for future impacts.

TIR-5

Comment

In Appendix B of the 2017 GCAP, DOE states that its groundwater remedy selection process allows for the application of alternative standards (i.e., ACLs or supplemental standards) before any active remedial measures must be considered. Therefore, the GCAP (Appendix B) provides only a limited corrective action assessment. The assessment is based on: (1) limited success of conventional correction actions at other DOE sites; (2) results of the extensive studies on the site characterization conducted by DOE contractors; and (3), an order-of-magnitude estimates developed in 1999 for the Rifle New Processing Site. DOE's conclusion is that the corrective action cost estimates varied between \$200,000 and \$4,000,000, would provide no tangible benefit and possibly interfere with the current use of the site.

NRC staff does not believe the cost estimates are adequately supported in sufficient detail to be used in a corrective action assessment for this GCAP. While acknowledging that the existing institutional controls will eliminate the potential pathway for ingestion of groundwater, NRC staff has several concerns relying entirely on institutional controls (administrative control) rather than active remediation (engineering control). First, consistent with EPA's regulation at 40 CFR 300.430(a)(iii)(D) for CERCLA sites, NRC staff expects that the use of institutional controls shall not substitute for active remedial actions as the sole remedy unless the active remedial actions are determined not to be practicable. Second, as discussed in TIR-4, limitations specified in an institutional control has the potential to be forgotten in the future. Third, DOE's existing GCAP is based on natural flushing and predicted that all constituent levels would return to those protective of human health and the environment within the 100-year timeframe; in this scenario, the institutional controls can be withdrawn after the remedial activities were completed. The proposed GCAP is based on ACLs with no expectation of the levels ever achieving those protective of human health and the environment; in this scenario, the institutional controls will be, in effect, in perpetuity.

Based on the above concerns, NRC staff believes that DOE will need to re-evaluate the current corrective action assessment on order to provide an adequate evaluation of potential corrective actions alternatives in order to rely solely on the institutional controls. This re-evaluation should include up-to-date information such as the limited areas within the property that would require active remedial actions (i.e., the proposed GCAP reports that the naturally reduced zones were only 3 percent of the total aquifer volume), cost for discharge to the municipal sewer which was constructed in or about 2008 (see New Rifle 2013 Draft GCAP (ML13156A415)) rather than treatment and discharge to the stream, cleanup to the established background (i.e., for uranium, 0.067 mg/L) rather than the Title I MCL (0.044 mg/L), and the potential for re-contamination from the existing soils that were subject to supplemental standards.

Basis

Section 40 CFR 192.02(c)(3)(ii)(B)(1)(ix) states that the persistence and permanence of the potential impacts shall be considered in assessing potential adverse impacts on groundwater quality to establish an ACL.

Path Forward

Please provide an up-to-date corrective action analysis.

TIR-6

Comment

The 2017 GCAP reports and bases the proposed ACLs, in part, on a dilution factor of 3×10^5 for the discharge of groundwater to the point of exposure (i.e., Colorado River under average flow conditions). This dilution factor is based on relative flow estimates in the 1999 Site Observational Work Plan (DOE, 1999), specifically, groundwater discharge from the site using an average linear flow rate, saturated thickness and estimated plume width. DOE did not define the method used to calculate the average linear flow rate, but it appears that DOE used the same parameter values and assumptions as the numerical flow model (i.e., a single uniform hydraulic conductivity). The 2017 GCAP reports a revised conceptual model based on dual-domain system with preferential flow pathways that had 4 to 5 orders of magnitude higher hydraulic conductivities compared to the low permeable zones.

The revised GCAP did not include an evaluation of the impact to the dilution factor based on the new conceptual model.

Basis

Section 40 CFR 192.02(c)(3)(ii)(B)(2)(viii) states that the potential for health risks caused by human exposure shall be considered in assessing potential adverse impacts on hydraulically connected surface water.

Path Forward

Please provide a dilution factor based on the new site conceptual model for the 2017 GCAP.

TIR-7

Comment

The 2017 GCAP proposes to monitor groundwater annually for five years after NRC concurrence on the GCAP and once every five years for the next 30 years, and, to evaluate the monitoring strategy after the five- and 30-year periods. In addition, DOE proposes to consider discontinuation of the monitoring when sufficient data have been accumulated to demonstrate that the potential exceedances of an ACL are highly improbable.

DOE did not provide a rationale for the proposed monitoring scheme including that for annual monitoring for five years and the basis that five-year frequency thereafter. Furthermore, DOE did not provide information as to the expected changes if DOE concludes that the monitoring should be discontinued (e.g., NRC concurrence, abandonment of the wells, revising the institutional controls).

Basis

Paragraph 40 CFR 192.03 states that monitoring shall be implemented for a duration that is adequate to demonstrate that future performance conforms to the groundwater protection standards. Section 40 CFR 192.20(b)(4) states that monitoring for compliance will depend upon potential risks to receptors and other factors including characteristics of the subsurface environment (e.g., groundwater velocity). Unlike monitoring for the natural flushing remedy, the monitoring does not have to periodically verify projections of the plume movement and attenuation during an extended period.

Path Forward

Please provide the rationale for the proposed monitoring scheme including the frequency and actions should DOE determine that the monitoring should be discontinued.

Environmental Review

The NRC has determined that its action, concurrence on DOE's revised GCAP, requires an appropriate review under the National Environmental Policy Act (NEPA) by the NRC. Although not specifically stated in the 2017 GCAP, it is NRC's understanding that DOE has determined that its action (i.e., revising the GCAP from natural flushing to ACLs) meets the criteria for a categorical exclusion under the DOE regulations. However, NRC's action (i.e., concurrence on DOE's revised GCAP) does not meet the criteria for one of NRC's categorical exclusions and thus, NRC will be performing an appropriate environmental assessment resulting in an Environmental Assessment or an Environmental Impact Statement. In addition, NRC will be completing the requisite consultations including those satisfying Section 106 of the Nation Historic Preservation Act (NHPA) and Section 7 of the Endangered Species Act (ESA).

In an effort to minimize duplicative efforts that DOE may have performed or has relevant information, NRC staff has the following questions:

Has DOE performed the relevant consultations for Section 106 of the NHPA or Section 7 of the ESA, or other consultations with the various stakeholders include the State of Colorado and the City of Rifle? (In the 2017 GCAP, DOE reports two endangered fish species for the Colorado River adjacent to the site. However, DOE's reference link indicates that three endangered fish exist in the Upper Colorado River. Please verify that the information in the GCAP is up to date.)

Does DOE plan any surface disturbance as part of the revised GCAP?

Has DOE updated the characterization of local land-use including an inventory of nearby groundwater wells and potential future uses of the site?

Has DOE evaluated the cumulative impacts to the groundwater and surface water resources?