General

Single-Shell Tanks at the Hanford Site (68 FR 1052) will analyze other tank waste activities.

Comments

L-0044/102

In the same EIS, Ecology noted that Alternative B proposes trans-shipments of TRU and HLW waste from West Valley to Hanford for storage prior to disposal at WIPP and the geologic repository respectively. Ecology could not determine if the RHSW EIS included those wastes or what impacts storage of the wastes might have on storage of Hanford wastes. Ecology requests that the USDOE add the volumes to those already in the RHSW EIS and analyze the impacts of storage of those wastes.

Response

Volume I Section 1.5 and Volume II Appendix C have been revised to clarify this.

DOE plans to dispose of HLW and spent nuclear fuel from commercial nuclear power and DOE facilities at the Yucca Mountain National Repository being developed under the Nuclear Waste Policy Act. Storage of HLW or spent nuclear fuel is not within the scope of this EIS.

Comments

E-0026/006

The EIS fails to assess and disclose the impacts to groundwater under the waste site.

F-0019/004

I call for an EIS study [that] assess and discloses the short and long-term impacts to groundwater directly under the waste site.

Response

The groundwater beneath the 200 East and 200 West Areas has been contaminated with radionuclides and non-radioactive chemicals because of waste management activities during past Hanford Site operations. Existing groundwater contamination is largely the result of past liquid disposal practices, leakage from liquid waste storage tanks, and other liquid spills. An estimated 80 square miles of plumes that exceed the benchmark MCLs now exists underneath the Hanford Site. These plumes resulted from the release of an estimated 450 billion gallons of liquid effluent since 1944, 346 billion gallons of which were released in the 200 East and 200 West areas. DOE has ended the types of untreated waste discharges and management activities that caused the contamination, and is taking actions to prevent additional releases from Hanford facilities.

Existing groundwater monitoring data do not indicate that releases from LLBGs have occurred. Groundwater impacts from Low-Level Waste Management Areas 1, 2, 3, and 4 are discussed in Sections 2.8 and 2.9 of the Hanford Site-Groundwater Monitoring for Fiscal Year 2001 document (Hartman et al. 2002), which characterizes the eight LLBGs in question. Based on results of fence line monitoring of the WMAs, the current interpretation is that there is no evidence the specific WMAs in question have contributed to contaminants found in groundwater underlying these areas. Volume I Section 5.3, Volume II Appendix G, and Volume II Appendix L evaluate the potential for contaminants from the LLBGs to reach the groundwater in the future.

The maximum point of impact from multiple and widely dispersed sources may not necessarily be directly underneath the Low Level Burial Grounds or at the Low Level Burial Ground boundary. To model the groundwater impacts from multiple and widely dispersed disposal units over long periods of time, a 1-km point of analysis location was deemed to be more appropriate and representative than a regulatory point of compliance well location, for purposes of NEPA analysis. The point of analysis approach is considered technically appropriate for a NEPA evaluation of groundwater impacts over the long-term (10,000 years) time period analyzed. The 1-km point of analysis is not intended to represent the proposed locations for actual monitoring wells that would be used during the operational and closure time period. Groundwater impacts at the facility boundary (about 100 meters) have been added to the impacts identified for the preferred alternative and are discussed qualitatively for the other alternatives. A discussion of the differences between the 1-km point of analysis and the disposal facility boundary is provided in Volume I Section 5.3 and Volume II Appendix G.

Comments

E-0043/044, EM-0217/044, EM-0218/044, L-0056/044, LM-0017/044, LM-0018/044

Hanford already struggles to deal with the mountains and oceans of high-level nuclear waste in the weapons complex. It has the largest volume of contaminated soils. It has the largest volume of contaminated groundwater. Over the past 50 years, some 440 billion gallons of contaminated liquids were directly disposed in the ground - enough to create a poisonous lake the size of Manhattan 120 feet deep. This alone makes Hanford the most contaminated zone in the Western Hemisphere. Hanford has the largest volume of buried transuranic wastes - long-lived deadly wastes including plutonium, a speck of which is considered lethal if inhaled.

Response

The groundwater beneath the 200 East and 200 West Areas has been contaminated with radionuclides and non-radioactive chemicals because of waste management activities during past Hanford Site operations. Existing groundwater contamination is largely the result of past liquid disposal practices, leakage from liquid waste storage tanks, and other liquid spills. An estimated 80 square miles of plumes that exceed the benchmark MCLs now exists underneath the Hanford Site. These plumes resulted from the release of an estimated 450 billion gallons of liquid effluent since 1944, 346 billion gallons of which were released in the 200 East and 200 West areas. DOE has ended the types of untreated waste discharges and management activities that caused the contamination, and is taking actions to prevent additional releases from Hanford facilities.

DOE is committed to cleaning up the Hanford Site in accordance with the Tri-Party Agreement (TPA) and applicable environmental requirements under federal and state laws and regulations. As of February 1, 2003, DOE had met 99% of its TPA milestones on or ahead of schedule. A lot in the way of cleanup has happened at Hanford over the last decade. Portions of the site have already been cleaned up, removed from the National Priority List (NPL), and released for other uses (e.g., the 1100 Operable Unit). As part of the river corridor cleanup, DOE is remediating contaminated soil sites, decommissioning the plutonium production reactors and associated facilities, removing production reactor fuel from the K Basins to interim storage in the 200 Area, and treating groundwater contaminated by past operations. Groundwater contamination beneath the Hanford Site is being studied and remediated by the ongoing CERCLA program in accordance with the Tri-Party Agreement. See Volume II Appendix N, Section N.2.4. See Volume III Section 2.0, Item 6 of the CRD for more examples of cleanup at Hanford.

DOE is responsible for the cleanup of dozens of sites around the country. DOE's approach is to consolidate and dispose of radioactive waste from all its cleanup efforts in the safest and most cost-effective manner possible. Hanford and other sites would be available for the disposal of low-level waste and mixed low-level waste; WIPP is used for the disposal of TRU waste; Yucca Mountain is expected to be used for the disposal of high-level waste and spent nuclear fuel. Many more curies of waste will be sent offsite from Hanford than will be received from offsite. Analysis indicates that these wastes could be handled without complicating future remediations, or diverting resources or disposal capacity from other Hanford cleanup activities.

The Hanford clean-up effort is expected to be completed in 2035, followed by a long-term stewardship program that ensures waste remaining onsite is appropriately managed.

Comments

P-0068/001

Hanford is still leaking nuclear waste - No more should be allowed to be stored there.

Response

The groundwater beneath the 200 East and 200 West Areas has been contaminated with radionuclides and non-radioactive chemicals because of waste management activities during past Hanford Site operations. Existing groundwater contamination is largely the result of past liquid disposal practices, leakage from liquid waste storage tanks, and other liquid spills. An estimated 80 square miles of plumes that exceed the benchmark MCLs now exists underneath the Hanford Site. These plumes resulted from the release of an estimated 450 billion gallons of liquid effluent since 1944, 346 billion gallons of which were released in the 200 East and 200 West areas. DOE has ended the types of untreated waste discharges and management activities that caused the contamination, and is taking actions to prevent additional releases from Hanford facilities.

The HSW EIS evaluates impacts to the Columbia River and downstream populations for about 10,000 years. For all alternatives analyzed in this HSW EIS, DOE has analyzed the long-term movement of contaminants

through soil and groundwater to the Columbia River. In all cases, it found that the water quality of the Columbia River would be virtually indistinguishable from the current river background levels. The concentrations of all the constituent contaminants were well below benchmark drinking water standards at a hypothetical well located near the Columbia River. The impacts of groundwater reaching the river are discussed in Volume I Sections 5.3 and Volume II Appendix G. See also Volume I Section 5.11 and 5.14 and Volume II Appendixes F and L.

Comments

F-0002/004

Must have ground water monitoring in all Hanford disposal areas[.]

F-0014/002

The lack of attention given to groundwater and the monitoring of groundwater also make this SWEIS inadequate.

L-0019/005, TSE-0002/005

Lack of adequate groundwater monitoring [is a an open issue in the revised draft.]

L-0041/027

The revised EIS indicates two general groundwater flow patterns that may exist in the future once the operational discharges decay and their physical influence no longer affects flow streamlines. To resolve these two divergent views of the future, DOE should establish a three-dimensional aquifer characterization program that adds as many monitoring wells as necessary. This characterization activity should include field scale siting studies combined with a large scale infiltration test to verify that the monitoring wells are functioning properly.

L-0041/060

Monitoring should occur prior to, during and following operation of waste disposal facilities. Long term monitoring should include leachate monitoring, shallow and deep vadose zone monitoring, and groundwater monitoring. Each facility's design should include key monitoring points that incorporate cutting-edge approaches for moisture movement.

L-0044/002

The current groundwater monitoring system does not achieve RCRA regulatory compliance.

L-0044/003

At the Hanford Site, there is a huge deficiency in the number of wells required for the detection, delineation and assessment of releases at a number of LL Waste Management Areas (LLMA's). These issues were described in Ecology's Notices of Deficiency (NOD's) transmitted for the Low Level Burial Grounds permit application.

L-0044/008

As a land-based TSD [treatment, storage, and/or disposal], the entire LLBG [low-level burial ground] unit is currently subject to groundwater monitoring requirements of WAC 173-303-400 (interim status). Upon permit issuance and closure plan approval, the LLBG's will be subject to final groundwater monitoring standards.

L-0044/058

Comment # 89 and Water Quality description for LLBG [low-level burial ground] Vol. Sec. 4.5.3.3 (Re: Comment # 89) The response states: "Current results from the RCRA compliant groundwater monitoring have not identified any groundwater impacts from the LLBGs." Washington State Department of Ecology has not made a determination that the groundwater monitoring at the LLBGs is compliant. Statements that indicate or imply that the LLBG groundwater monitoring program is compliant should be deleted.

Groundwater

THR-0002/007

Current groundwater monitoring around the burial grounds is not adequate to meet regulatory requirements. And this is another statement from the Department of Ecology in Washington. They have concluded that the low-level burial ground monitoring networks and programs are significantly deficient.

THR-0009/005

Let's not reach the groundwater with our measurement devices, let's go downstream far enough because of the large volume of the river the instruments don't pick it up and say it's okay.

TPO-0017/004

We have to have more [groundwater] monitoring.

TRI-0001/015

There is no adequate description and timeline which needs to be included as a commitment in this EIS and for any action to fully and adequately monitor the groundwater around the existing burial grounds.

TSE-0009/004

And of course to implement the legally adequate groundwater monitoring system that has been discussed earlier this evening.

TSE-0010/007

Effective groundwater monitoring also must be put in place now.

TSE-0010/008

The DOE has a lot of power right now. They can stop dumping radioactive waste in unlined trenches. They can do it this year.

TSE-0012/005

Do not ignore or minimize the impacts to the groundwater.

TSE-0017/002

...groundwater monitoring wells are insufficient[.]

TSE-0023/001

Clean water is a scarce resource. It is even scarcer than oil, according to some reports from national agencies. Water, not oil, is what we will be fighting wars over in the future. So this plan to add more uncharacterized waste to inadequately monitored, unlined trenches, and to fix it in maybe five years from now, it is not just immoral and illegal, it is a national security risk

TSE-0030/005

The groundwater monitoring is grossly inadequate, in fact, and in this EIS.

TSE-0034/001

...it seems to me that with all the scientists we have, we ought to be able to figure out a way to keep the groundwater from becoming more contaminated. That doesn't seem to me like that's rocket science.

TSP-0009/002

Regarding the Columbia River, there needs to be adequate baseline monitoring of groundwater contamination. And currently there is not adequate baseline monitoring. More than just NEPA.

Response

Groundwater monitoring is conducted according to TPA requirements, the Hanford Dangerous Waste Management permit, and DOE Orders. Groundwater monitoring will be expanded as necessary according to agreements between DOE and regulatory agencies to support future waste management operations.

Groundwater

The HSW EIS evaluates impacts to the Columbia River and downstream populations for about 10,000 years. For all alternatives analyzed in this HSW EIS, DOE has analyzed the long-term movement of contaminants through soil and groundwater to the Columbia River. In all cases, it found that the water quality of the Columbia River would be virtually indistinguishable from the current river background levels. The concentrations of all the constituent contaminants were well below benchmark drinking water standards at a hypothetical well located near the Columbia River. The impacts of groundwater reaching the river are discussed in Volume I Sections 5.3 and Volume II Appendix G. See also Volume I Section 5.11 and 5.14 and Volume II Appendixes F and L.

See the revised discussion on Groundwater Monitoring in Volume I Section 4.5.3.3.

In 2001 alone, samples were collected from 735 groundwater monitoring wells to determine the distribution and movement of existing radiological and chemical constituents in Hanford Site groundwater, and to identify and characterize potential and emerging groundwater contamination problems. Samples were analyzed for about 40 different radionuclide constituents and about 290 different chemical constituents. Airborne radionuclide samples were collected at 45 continuously operating samplers: 24 on the Hanford Site, 11 near the site perimeter, 8 in nearby communities, and 2 in distant communities. Nine stations were community-operated environmental surveillance stations managed and operated by local school teachers as part of an ongoing DOE-sponsored program to promote public awareness of Hanford Site environmental monitoring programs.

Groundwater contamination beneath the Hanford Site is being studied and remediated by the ongoing CERCLA program in accordance with the Tri-Party Agreement. The CERCLA process considers legally applicable Federal, State, and local laws or relevant and appropriate requirements (ARARs). Any decisions reached by DOE on the basis of analysis in the HSW EIS would be implemented in accordance with applicable Federal, State, and local laws and regulations. See Volume II Appendix N, Section N.2.4.

Comments

L-0041/045

The analysis of future site risks – as the foundation for decision making – contains significant uncertainty. For example, the revised EIS presents two distinctly different groundwater flow paths. Reliable information about groundwater flow beneath the Hanford site and specifically the 200 area must be obtained before an analysis of impacts can be conducted with confidence. Prior to finalizing this EIS, DOE should install new groundwater monitoring wells. Further, DOE should allow time to collect data to project future groundwater elevations that would indicate future flow paths.

Response

Groundwater monitoring is conducted according to TPA requirements, the Hanford Dangerous Waste Management permit, and DOE Orders. Groundwater monitoring will be expanded as necessary according to agreements between DOE and regulatory agencies to support future waste management operations.

DOE believes this HSW EIS complies with applicable NEPA requirements.

Comments

L-0013/002

Also important is that Hanford area needs ground water detection devices and impervious ground protection covers in critical areas.

Response

Groundwater monitoring is conducted according to TPA requirements, the Hanford Dangerous Waste Management permit, and DOE Orders. Groundwater monitoring will be expanded as necessary according to

agreements between DOE and regulatory agencies to support future waste management operations.

See the revised discussion on Groundwater Monitoring in Volume I Section 4.5.3.3.

Federal RCRA Subtitle C and related state hazardous waste management regulations require that radioactive mixed waste land disposal units meet minimum technical standards to prevent the release of hazardous substances. The standards include a system of multiple liners to prevent leakage into groundwater, a leachate collection system, groundwater monitoring wells, a multi-layer cap to prevent infiltration of rain and snow, stringent waste treatment standards, and a program of monitoring, inspection, and reporting during the period of operation and after closure. These standards will apply to all new mixed waste disposal units evaluated in the HSW EIS. Volume I Section 2.2.3 discusses disposal facilities and their environmental protection features.

The preferred alternative as described in Volume I Section 3.7 is to dispose of low level waste in newly constructed lined disposal facilities as soon as they are available. For purposes of analysis the HSW EIS assumes this would occur by 2007. MLLW is currently being, and will continue to be, disposed of in lined facilities.

However, the use of unlined trenches for disposal of low level waste is an established, legal, and environmentally protective method of low level waste disposal at both DOE and commercial facilities. As such, it is a reasonable alternative, under CEQ regulations, and must be analyzed. The HSW EIS considers a wide range of alternatives for disposal of low level waste in both lined and unlined facilities. Lined trench alternatives include leak detection and leachate collection capabilities. In addition, groundwater monitoring would be done in compliance with applicable RCRA and State hazardous waste, TPA, and DOE requirements to validate the performance of the disposal facilities.

Comments

THR-0002/009

Some of the monitoring wells right now do not reach groundwater, and this is the analysis that DOE is using in the EIS. They are using this lack of data from groundwater wells that don't reach groundwater to claim that there won't be any impact from the DOE waste at Hanford. And we disagree.

Response

Groundwater monitoring is conducted according to TPA requirements, the Hanford Dangerous Waste Management permit, and DOE Orders. Groundwater monitoring will be expanded as necessary according to agreements between DOE and regulatory agencies to support future waste management operations.

See the revised discussion on Groundwater Monitoring in Volume I Section 4.5.3.3.

The long term groundwater impacts presented in the HSW EIS are not premised on the fact that contaminants from the low level burial grounds have not reached groundwater. In any event, the conclusions in the model do not depend upon data from monitoring wells which are no longer operative. Data from over 1000 operating wells are included in the modeling process.

Comments

F-0020/003

The priority must be to clean up what is there especially the groundwater.

L-0055/045

DOE's Initiative 6 in the Performance Management Plan is for ground water cleanup and protection. Unfortunately, this initiative will leave contamination in the ground water and in the vadose zone which will be available to continue to contaminate the ground water under the DOE site.

Groundwater

L-0055/062

To store this waste without preplanning contingency to retrieve and retreat stored in the future when new technologies do arise seems short sighted and too focused on a small savings to a problem that will have a much costlier impact later in time. To have made a commitment to address groundwater in the Performance Management Plan without giving that decision an opportunity to develop a more detailed strategy for ground water remediation in the 200 Areas to influence sitting of this solid waste facility also seems a premature decision.

P-0085/002

I understand you don't plan to clean-up this groundwater for 150 years?

THR-0001/001

There's no plans to clean it [groundwater contamination] up. In their analysis they never assumed that it would ever be cleaned up. And they just say to you in the future and everybody else in the future generations, you can't drink it, you can't use it.

Response

Groundwater contamination beneath the Hanford Site is being studied and remediated by the ongoing CERCLA program in accordance with the Tri-Party Agreement. The CERCLA process considers legally applicable Federal, State, and local laws or relevant and appropriate requirements (ARARs). Any decisions reached by DOE on the basis of analysis in the HSW EIS would be implemented in accordance with applicable Federal, State, and local laws and regulations. See Volume II Appendix N, Section N.2.4.

TPA Milestone M-15-00C requires all 200 Area, non-tank farm, pre-record of decision site investigation activities to be completed by December 31, 2008. Site characterization information generated from TPA remedial investigation and LLBG RCRA permitting activities has been used in development of the HSW EIS.

Comments

E-0026/004

No analysis of long term impacts to groundwater, the ecosystem, public health or the Columbia River [is in the EIS]

Response

The HSW EIS evaluates impacts to the Columbia River and downstream populations for about 10,000 years. For all alternatives analyzed in this HSW EIS, DOE has analyzed the long-term movement of contaminants through soil and groundwater to the Columbia River. In all cases, it found that the water quality of the Columbia River would be virtually indistinguishable from the current river background levels. The concentrations of all the constituent contaminants were well below benchmark drinking water standards at a hypothetical well located near the Columbia River. The impacts of groundwater reaching the river are discussed in Volume I Sections 5.3 and Volume II Appendix G. See also Volume I Section 5.11 and 5.14 and Volume II Appendixes F and L.

Volume II Appendix G describes the analysis used to calculate concentrations of key contaminants that could potentially reach the groundwater from LLBG disposal units. The analysis also assesses the impacts to accessible surface water resources (the Columbia River) from contaminated groundwater. Concentrations of key contaminants are compared to drinking water standards as a benchmark against which water quality may be assessed. The calculations also provide the basis for estimates of potential human health risk and ecological risk for comparison among the alternative groups. Volume II Appendix G also discusses waste forms, release models, and how they were applied in modeling groundwater transport.

Volume II Appendix I provides information about potential impacts to terrestrial and aquatic ecological resources that may result from implementation of HSW EIS alternatives. Potential impacts to terrestrial

resources were evaluated in the near term (i.e., during waste management operations and under current conditions). Potential impacts would result primarily from surface disturbances associated with excavation and disposal activities. Potential impacts to Columbia River riparian and aquatic resources could occur in the long term, i.e., up to 10,000 years following the conclusion of waste management operations. These would be primarily the result of the eventual migration of radionuclides and other hazardous chemicals through the vadose zone to groundwater and on to the Columbia River.

Volume II Appendix F describes the methods used to evaluate health impacts of the HSW EIS alternative groups. Volume II Appendix F describes normal impact assessment methods, accident assessment impact methods, intruder impact assessment methods, and long-term impacts from waterborne pathways.

Comments

L-0044/121

The HSW EIS must include various plume maps based on the USDOE's predictive studies and corresponding risk/impact maps (in two dimensions) for easier understanding on a site wide basis.

Response

The HSW EIS includes graphic figures showing groundwater contaminant concentrations over a 10,000-year time period in Volume I, Section 5.3 and Section 5.14 and Volume II, Appendix G and Appendix L.

Comments

L-0044/011

The EIS does not display the data related to risk adequately; risk analysis and discussion are not tied directly to specific alternatives. In addition to discussing the mrem groundwater dose impact of each alternative, the ground water concentrations should be displayed for each alternative and the risk as displayed by incidental latent cancer risk (ILCR) should be discussed for each alternative. This sort of analysis and discussion should include ILCR contour maps generated for each alternative for various times in the next 10,000 years. The reader should be able to a get a sense of how much of the land area will have an impact near, at or above health standards for how long. These data should be provided in groundwater concentration plume maps and ILCR contour maps (see the TWRS EIS). Additionally, a table should be developed that discusses the alterative and the ILCR peak levels and the number of related fatalities.

L-0044/015

Groundwater concentration plume maps should be provided for each of the alternative[s] for the peak impacts. ILCR [incidential cancer risk] contour maps showing concentrations for each alternative and the peak concentration times should also be included. ILCF should be calculated for each alternatives. Data should be displayed in the same style as the TWRS EIS.

Response

The HSW EIS includes graphic figures showing groundwater contaminant concentrations over a 10,000-year time period in Volume I, Section 5.3 and Section 5.14 and Volume II, Appendix G and Appendix L.

The HSW EIS comparison of human health and safety impacts among the alternatives is expressed in terms of worker dose, dose to the public from atmospheric releases, accidents during the operational period, and long-term impacts via the groundwater pathway in the post-closure period. The risks are expressed in many ways, including probability of latent cancer fatalities. Details of the analyses are provided in Volume I Section 5.11 and Volume II Appendix F.

DOE believes this HSW EIS complies with applicable NEPA requirements.

Risk analysis is used throughout the HSW EIS. See Volume I Section 5 in the EIS and Volume II Appendices

Groundwater

F, G, H, I and L.

Several mitigation measures have been built into the alternatives addressed in the final HSW EIS, including installation of barriers, liners, and leachate collection systems in disposal facilities; treatment of MLLW to meet applicable RCRA and state requirements; and in-trench grouting or use of HICs for Cat 3 LLW and MLLW. Revised analyses in the final HSW EIS indicate that such measures would reduce the estimated releases and levels of groundwater contamination. As set forth in Volume I Section 5.3, for the action alternatives, constituent concentrations in groundwater at 1 km from the disposal facilities are expected to be below the benchmark drinking water standards. Water quality in the Columbia River would be virtually indistinguishable from the current background levels.

Comments

L-0055/066

DOE is considering moving exclusively to burial of LLW and MLLW in lined disposal facilities with leachate collection systems. CTUIR strongly recommends lined disposal facilities with leachate collection systems as well as extensive monitoring wells around and under the trenches or burial grounds. This can help to detect any leaks or degrading of waste containers before the waste has a chance to move into the ground water system. The current EIS analyzed impacts to the ground water from a hypothetical well located 1 km from the burial site. The analysis should be done for a well located at the edge of the burial grounds. If the trenches will have a low-permeability liner and a system for collecting leachate does the design assume that water will be getting into the burial grounds, through the waste to be able to be collected? How is this system to be maintained for as long as the waste remains hazardous?

Response

Federal RCRA Subtitle C and related state hazardous waste management regulations require that radioactive mixed waste land disposal units meet minimum technical standards to prevent the release of hazardous substances. The standards include a system of multiple liners to prevent leakage into groundwater, a leachate collection system, groundwater monitoring wells, a multi-layer cap to prevent infiltration of rain and snow, stringent waste treatment standards, and a program of monitoring, inspection, and reporting during the period of operation and after closure. These standards will apply to all new mixed waste disposal units evaluated in the HSW EIS. Volume I Section 2.2.3 discusses disposal facilities and their environmental protection features.

The preferred alternative as described in Volume I Section 3.7 is to dispose of low level waste in newly constructed lined disposal facilities as soon as they are available. For purposes of analysis the HSW EIS assumes this would occur by 2007. MLLW is currently being, and will continue to be, disposed of in lined facilities.

However, the use of unlined trenches for disposal of low level waste is an established, legal, and environmentally protective method of low level waste disposal at both DOE and commercial facilities. As such, it is a reasonable alternative, under CEQ regulations, and must be analyzed. The HSW EIS considers a wide range of alternatives for disposal of low level waste in both lined and unlined facilities. Lined trench alternatives include leak detection and leachate collection capabilities. In addition, groundwater monitoring would be done in compliance with applicable RCRA and State hazardous waste, TPA, and DOE requirements to validate the performance of the disposal facilities.

The maximum point of impact from multiple and widely dispersed sources may not necessarily be directly underneath the Low Level Burial Grounds or at the Low Level Burial Ground boundary. To model the groundwater impacts from multiple and widely dispersed disposal units over long periods of time, a 1-km point of analysis location was deemed to be more appropriate and representative than a regulatory point of compliance well location, for purposes of NEPA analysis. The point of analysis approach is considered technically appropriate for a NEPA evaluation of groundwater impacts over the long-term (10,000 years) time period analyzed. The 1-km point of analysis is not intended to represent the proposed locations for actual

monitoring wells that would be used during the operational and closure time period. Groundwater impacts at the facility boundary (about 100 meters) have been added to the impacts identified for the preferred alternative and are discussed qualitatively for the other alternatives. A discussion of the differences between the 1-km point of analysis and the disposal facility boundary is provided in Volume I Section 5.3 and Volume II Appendix G.

Groundwater monitoring is conducted according to TPA requirements, the Hanford Dangerous Waste Management permit, and DOE Orders. Groundwater monitoring will be expanded as necessary according to agreements between DOE and regulatory agencies to support future waste management operations.

Comments

E-0041/006

In response to a question about non-renewable resources, only two new non-renewable resources have been added. Others (such as steel, and water), are either dismissed as not being 'major', or are asserted not to be at risk—a dubious argument at best, given the pollution to the groundwater that already exists.

L-0052/006

Groundwater. Water is a sacred resource for the Nez Perce Tribe, and the ERWM can assure you the Tribe is not interested in sacrificing such a resource, as is suggested by Section 5.15, Volume I, Irreversible and Irretrievable Commitment of Resources. That section states, "…after a few hundred years following disposal, the vadose zone surrounding disposal areas and groundwater beneath the Hanford Site to which contaminants travel would be irretrievably committed." Table 5.146, Volume I, does not even indicate the anticipated volume and extent of irreversible and irretrievable (I and II) commitment of groundwater.

Response

As a result of additional mitigation measures incorporated into the action alternatives, the impact of the proposed action on groundwater at the 1-km line of analysis would be below benchmark drinking water standards. The discussion of Irreversible and Irretrievable Commitments of Resources in Volume I Section 5.15 has been revised in this EIS.

Comments

E-0043/018, EM-0217/018, EM-0218/018, L-0056/018, LM-0017/018, LM-0018/018

DOE may not irreversibly and irretrievably commit groundwater. Groundwater is a state resource, not a federal resource. DOE should design a facility to prevent the release of contaminants to the soil and groundwater.

E-0047/019

DOE declares Irreversible and Irretrievable Commitments of Resources violates State, Federal and the Trust Responsibility.

E-0047/021

Groundwater and the vadose zone under the Hanford Site are declared irretrievably and irreversibly committed due to long-lived radionuclides in existing disposal areas at Hanford.

E-0047/023

EIS does not discuss the area or volume of groundwater that will be made unusable by the alternatives proposed, only that it will exceed acceptable risk values in the future.

E-0055/023

DOE may not irreversibly and irretrievably commit groundwater
In section 5.15, DOE asserts a broad and unspecific claim to irreversibly and irretrievably commit an unspecified amount of groundwater with unspecified levels of contamination for an unspecific and unlimited

time.

Groundwater is a State resource, not a Federal resource. DOE lacks authority to make such a claim. Further, both State and Federal law for environmental cleanups require the protection of groundwater.

E-0055/024

DOE must to the greatest degree practicable reclaim or remediate groundwater and prevent its contamination. DOE may not use Hanford's groundwater or the Columbia River for waste disposal. Additionally, DOE must mitigate these impacts both to meet NEPA requirements and to avoid or fulfill the Natural Resource Damage provisions under CERCLA. It is inappropriate and unacceptable for DOE to use an EIS as a vehicle to supplant environmental cleanup laws and regulations.

L-0039/016

This draft EIS makes a claim of irreversible and irretrievable commitment of groundwater due to contamination.

· Groundwater is a State resource, not a Federal resource. DOE lacks authority to decide to allow contamination of groundwater to levels that prevent future use – and "irreversible and irretrievable commitment." This claim should be deleted. Moreover, DOE notes in response to Board Advice Number 133 (attached) that the claim is only made due to existing plumes and contamination, which are not within the scope of this EIS.

· Both State and Federal law for environmental cleanup require the protection of groundwater.

L-0041/012

In addition to these specific deficiencies, we strongly disagree with DOE's intent to knowingly re-contaminate groundwater as new burial sites eventually leach radioactive and hazardous contaminants into the vadose zone and groundwater. Future contamination of groundwater is planned and apparently considered acceptable. In effect, groundwater under Hanford is written off in perpetuity. Detrimental impacts on the health of the Columbia River are likely under this scenario. Planned re-contamination of the groundwater is simply unacceptable.

L-0041/013

This Environmental Impact Statement (EIS) makes a broad and unspecified claim of Irreversible and Irretrievable commitment of resources. It states that it commits an unspecified quantity of groundwater over an unspecified area for and unspecified and unlimited time. This is contrary to the intents and requirements of the body of environmental laws that govern Hanford cleanup.

L-0041/028

Groundwater across the Hanford Site exceeds drinking water standards today. Approximately 200 square kilometers is contaminated. Contaminants include radionuclides and hazardous constituents (see list below) in excess of drinking water standards in one or more wells. The modeling presented in the revised draft of the EIS presumes that future releases would be into uncontaminated groundwater, since these contaminates "will have migrated out of the unconfined aquifer by then" (Page 5.244 Line 19). This indicates that the complete mass of radioactive and hazardous contaminants, presently in the vadose zone and in groundwater will have migrated into the Columbia River, been removed through remedial action, or naturally attenuated.

Radioactive Contaminants
Carbon-14
Cesium-137
Cobalt-60
Europium-154
Iodine-129
Plutonium-238/239
Strontium-90
Technetium-99

Tritium
Uranium
Trichloroethene
Xylene

Hazardous Contaminants
Benzene
Carbon Tetrachloride
Chloroform
Hexavalent Chromium
Cyanide
Dichloroethene
Ethylbenzene
Fluoride
Nitrate
Toluene

However, DOE then claims an irreversible and irretrievable commitment of the groundwater based solely on the present impacts from uncontrolled releases to the groundwater from past actions. The irreversible and irretrievable commitment claim for groundwater must be removed from the EIS.

L-0041/029

The EIS does not discuss the area or volume of groundwater that will be made unusable by the alternatives proposed, only that it will exceed acceptable risk values in the future. Without information on the quantity and quality of the groundwater beneath the burial grounds, an assessment of impacts is not possible. This precludes adequate planning of mitigation strategies.

L-0044/016

Ecology does not agree that the USDOE's claim that the presence of long-lived, mobile radionuclides in the groundwater constitutes a continuing commitment of a water resource. Ecology will not allow releases from waste management units to continue or be left after the units cease operations, absent any form of monitoring or mitigation. Ecology will insist that the USDOE remove the waste that are sources of contamination in the groundwater, monitor for the releases, and implement short- and long-term mitigation measures.

E-0049/003, L-0048/003

The revised EIS claims that groundwater beneath the Hanford site may be considered irreversibly and irretrievably contaminated – in effect, written off entirely. Protecting the groundwater underlying the Hanford site is of particular interest to the Board in that this is the best way to protect the Columbia River. Declaring that nothing can or will be done to clean up the groundwater contamination would result in unregulated contamination of the Columbia River. This is totally unacceptable to the Board.

L-0049/009

Section 5.15, page 5.252. The amount of the vadose zone and groundwater that may be irreversibly and irretrievably committed needs to be better identified and quantified.

L-0052/008

The ERWM [Environmental Restoration and Waste Management] believes that the reasonable benchmark for the health of the water resource is the current drinking water standard. Recognizing the enormity of the contamination as it already exists, the ERWM contends that DOE has the responsibility to reclaim or remediate groundwater to the greatest degree technically practicable and prevent its further contamination. In essence, do no further harm to the resource.

P-0013/002

There are better ways to handle the waste so that groundwater contamination is avoided.

Groundwater

P-0129/001

Please do not continue to compound a terribly inadequate waste storage problem at Hanford with even more nuclear waste. I am well aware of the leakage of plutonium -- extremely carcinogenic -- and carbon tet - a known carcinogen -- into the groundwater of the Columbia River.

THR-0001/002

But they fail to analyze in the EIS, what is the cost of the loss of that resource. What is the cost of one acre-foot in today's dollars, in a dry, arid climate with agriculture, what's it going to be worth in 100 years, 200 years, 300 years, or a thousand years? No analysis. None.

TLG-0002/004

We're troubled by assumptions that the Environmental Impact Statement makes that groundwater at Hanford will eventually be allowed to continue to be contaminated to levels that we consider to be unacceptable. And, again, without knowing what this increment is, we can't tell when we might reach the level of how much more waste can be disposed there safely before you reach these unacceptable levels. So we believe that is a shortcoming as well in the document.

Response

As a result of additional mitigation measures incorporated into the action alternatives, the impact of the proposed action on groundwater at the 1-km line of analysis would be below benchmark drinking water standards. The discussion of Irreversible and Irretrievable Commitments of Resources in Volume I Section 5.15 has been revised in this EIS.

Groundwater contamination beneath the Hanford Site is being studied and remediated by the ongoing CERCLA program in accordance with the Tri-Party Agreement. The CERCLA process considers legally applicable Federal, State, and local laws or relevant and appropriate requirements (ARARs). Any decisions reached by DOE on the basis of analysis in the HSW EIS would be implemented in accordance with applicable Federal, State, and local laws and regulations. See Volume II Appendix N, Section N.2.4.

Comments

L-0055/015

Page 5.252 states that "In addition, after a few hundred years following disposal, the vadose zone surrounding disposal areas and groundwater beneath the Hanford Site to which contaminants travel would be irretrievably committed." Yet Table 5.146 does not list an irreversible and irretrievable ground water resource commitment. This is also contradictory to another quote in this EIS from Hanford (page 5.244): "By the time the waste constituents from the action alternatives are predicted to reach groundwater (hundreds of years), the waste constituents would not superimpose on existing plumes, and would not exceed the benchmark dose, because the existing groundwater contaminant plumes will have migrated out of the unconfined aquifer by then." Although this last quote is inaccurate since the source of the current plumes is at least partially from contaminants in the vadose zone, DOE is stating that the ground water would have been in a "clean" state and they are knowingly contributing pollution to the ground water that will leave it in a hazardous condition. This is also unacceptable. DOE can not make such broad statements that will "commit" and leave the whole of the ground water beneath Hanford forever contaminated by their actions, nor can they make a claim for irreversible and irretrievable conditions for existing releases. In addition, since new plumes have recently or will be discovered, DOE can not say with certainty when current plumes would have moved out of the area.

L-0055/016

By the time the waste constituents from the action alternatives are predicted to reach groundwater (hundreds of years), the waste constituents would not superimpose on existing plumes, and would not exceed the benchmark dose, because the existing groundwater contaminant plumes will have migrated out of the unconfined aquifer by then. Is DOE implying that the ground water will have been cleaned up to pristine conditions before more contaminants will have entered the system to recontaminate the ground water. Why is

it predicted to take 100's of years for new contaminants to reach the ground water but current contamination in the vadose zone and ground water would have migrated out of the area by then. There is no discussion of cumulative groundwater issues or of multiple plume issues. It was also predicted that the current contamination would never have reached the ground water in the first place. There are many more types of radionuclides that have contributions to the contamination to the ground water under the Hanford site only a few were analyzed in this EIS to determine their "combined" effects.

Response

DOE is not implying that the groundwater will have been cleaned up to pristine conditions before more contaminants will have entered the groundwater. However, the potential contaminants from actions taken as a result of this EIS will not result in groundwater exceeding benchmark drinking water standards at the 1-km or Columbia River lines of analysis.

The groundwater beneath the 200 East and 200 West Areas has been contaminated with radionuclides and non-radioactive chemicals because of waste management activities during past Hanford Site operations. Existing groundwater contamination is largely the result of past liquid disposal practices, leakage from liquid waste storage tanks, and other liquid spills. An estimated 80 square miles of plumes that exceed the benchmark MCLs now exists underneath the Hanford Site. These plumes resulted from the release of an estimated 450 billion gallons of liquid effluent since 1944, 346 billion gallons of which were released in the 200 East and 200 West areas. DOE has ended the types of untreated waste discharges and management activities that caused the contamination, and is taking actions to prevent additional releases from Hanford facilities.

Contaminants from solid waste are expected to move slower than contaminants from liquid waste disposal. Because the contaminants arrive at different times, contaminants from solid waste disposal actions evaluated in this EIS would not result in exceeding benchmark drinking water standards at the 1-km and Columbia River lines of analysis. Cumulative groundwater impacts are discussed in Volume I Section 5.14.3 and Volume II Appendix L.

Additional text has been added to Volume II Appendix G discussing the application of the U-Code.

Discussion of the synergistic transport effects among organic and inorganic contaminants is provided in Volume I Section 5.3 and Volume II Appendix G. To establish the relative mobility of each contaminant, they were grouped based on their mobility in the vadose zone and underlying unconfined aquifer. Contaminant groupings were used, rather than the individual mobility of each contaminant, primarily because of the uncertainty involved in determining the mobility of individual constituents. The groups were selected based on relatively narrow ranges of mobility, and constituents were placed in the more mobile group when there was uncertainty concerning which group they should be placed in. Some of the constituents, such as iodine and technetium, would move at the rate of water whether in the vadose zone or underlying groundwater. The movement of other constituents in water, such as americium and cesium, would be slowed or retarded by the process of sorption onto soil and rock.

Groundwater contamination beneath the Hanford Site is being studied and remediated by the ongoing CERCLA program in accordance with the Tri-Party Agreement. The CERCLA process considers legally applicable Federal, State, and local laws or relevant and appropriate requirements (ARARs). Any decisions reached by DOE on the basis of analysis in the HSW EIS would be implemented in accordance with applicable Federal, State, and local laws and regulations. See Volume II Appendix N, Section N.2.4.

Comments

E-0026/008

It [the EIS] fails to address "soil caps" and lateral movement of water and waste under the soil caps.

Response

Lateral water movement, as a phenomenon that might affect contaminant transport, has not been evaluated in the HSW EIS. This is attributable to an absence of field observations of natural recharge events causing lateral movement of water under the solid waste burials. It is possible that liquid discharge waste sites, sewer tile fields, and unplanned releases located immediately adjacent to solid waste burial grounds could create higher moisture contents in and above some strata within the vadose zone profile, and that such water could move laterally. However, such events and effects would be local and short term (operational era), relative to the larger scale and longer term risk assessments (thousands of years).

For the SAC, the solid waste burial grounds have been simulated as aggregated solid wastes with a one-dimensional model that did not assume movement of water laterally under the burial grounds. Multidimensional analyses are conducted as part of the Solid Waste Burial Ground Performance Assessments. These analyses are based on a uniform recharge rate over the disposal region, and may project a buildup of moisture in and above some strata in the geohydrologic profile before drainage occurs. The performance assessment analyses do not indicate lateral migration. (Wood et al. 1995, Wood et al. 1996).

The HSW EIS barrier performance analysis takes into account degradation of the modified RCRA Subtitle C barrier. No guidance is available for specifying barrier performance after the design life. However, it is likely that this specific barrier will perform as designed far beyond its design life. The modified RCRA Subtitle C barrier (see Volume I Section 2.2 for description of this barrier) has a design life of 500 years in the absence of any active institutional controls or maintenance 100 years after closure. The starting infiltration rate used in the release modeling begins at 0.01 cm/yr, after which the assumed rate increases in five steps over 500 years after the start of cover degradation (See Volume II Figure G.3). After 500 years of degradation, the infiltration rate used in the release modeling is assumed to be equivalent to the rate used to represent recharge for the natural surrounding environment (0.5 cm/yr). This rate was used during the remaining 9,000 years of this assessment. Groundwater impacts based on these assumptions are in Volume I Section 5.3 and Volume II Appendix G. A sensitivity analysis was also performed that assumed the cap would be maintained beyond 100 years after closure. Groundwater impacts from this sensitivity analysis are in Volume II Appendix G Section G.4.

Comments

L-0055/017

Although not used as a source of drinking water today, nor expected to be in the foreseeable future, groundwater was analyzed as a source of drinking water. It appears DOE is already trying to write-off the use of the ground water as a drinking water source. The Native American Tribes in the area have consistently expressed their desire to reoccupy the lands of the Hanford Reservation when DOE opens it up. A blanket state that the ground water is unlikely to be used is irresponsible.

Response

The Irreversible and Irretrievable Commitments of Resources discussion in Volume I Section 5.15 has been revised in the final HSW EIS. Consistent with Volume I Section 5.15, DOE intends to maintain appropriate restrictions on groundwater usage for as long as necessary.

Comments

L-0014/005, L-0022/005

While we agree that the existing wastes, which were disposed of in unlined trenches at Hanford should be left as is except where release problems have or will be identified; i.e. carbon tetrachloride release from 200 W Area burial grounds. When problems are found they must be promptly corrected. Any new wastes must be disposed of in lined trenches. Analyses must be provided to verify the acceptability at leaving the wastes in the unlined trenches. The current draft does not adequately address this issue.

Groundwater

L-0033/010

This EIS does not adequately address the problems of mixed waste such as carbon tetrachloride solvent in the waste stream. These volatile carcinogenic compounds represent a serious health risk to future workers. Full disclosure of the future problems of opening these trenches is required in an adequate EIS.

L-0044/009

The EIS does not acknowledge information available about suspected releases from the burial grounds (e.g., LLWMA 4) and deficiencies associated with the existing groundwater monitoring network.

L-0044/064

The short-term impacts of operations and construction activities are described in Section 5.3.1 and appear to be based on an assumption of no current environmental impacts from the LLBGs. This assumption is not supported by monitoring data or technical evaluation. Releases have been detected from LLWMA 4 as shown by environmental monitoring data.

L-0049/005

Section 3.4.3, page 3.25, lines 20-22. This sentence ignores the carbon tetrachloride in the groundwater that apparently came from a burial ground.

THR-0002/006

I wanted to note that one of the chemicals that's leaching into these low-level burial grounds is carbon tetrachloride, a carcinogen. It was measured in air samples from some of these low-level burial trenches at levels reaching 176 times the OSHA standard for worker exposure. So there is also, you know, not only groundwater concerns, but worker health and safety concerns. And these need to be addressed in the EIS, and they are not.

TPO-0011/010

Already it's completely leaked into the groundwater. This is insane putting more things there then there is now.

TRI-0001/010

The permit application filed and on which a Notice of Deficiency was given earlier this year by Ecology, that permit application failed to include dangerous wastes, and the conditions in the Notice of Deficiency noted by Ecology are not addressed in this EIS. … And those conditions that they describe are not described in this EIS. For instance, the notice of deficiency talks about the conceptual model does not adequately explain the groundwater and the vadose zone presence of organics. Nor does this document.

TRI-0001/012

The Department of Ecology noted that considerable evidence shows waste constituent releases from Low-Level Waste Management Area 4 immediately west of the Plutonium Finishing Plant, also not described adequately in this EIS, even though it is a serious and immediate threat to health and the environment.

TRI-0001/013

TRU containers are designed to vent and known inventories are not considered for organics. Now, what are we talking about? Many of you have heard me discuss this before. Levels of carbon tetrachloride in the vapor space of the trenches have been measured at 1,760 parts per million. We have, if you just do a little bit of research, you will find that on the Center for Disease Control and NIOSH [National Institute for Occupational Safety and Health] web sites, you will find medical literature documenting immediate threat to human health as well as fatalities at exposure levels well below 1,760 parts per million, multiples below. But we still have an expectation that workers will be retrieving transuranic waste without personal protective equipment, without supplied air, and we do not have an adequate investigation of the other organics and solvents present. We have only looked at one, and incompletely at that.