



Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

May 11, 2004

Mr. David Mosby, Chair
Oak Ridge Site Specific Advisory Board
Post Office Box 2001, EM-91
Oak Ridge, Tennessee 37831

Mr. Norman Mulvenon
Chair, Citizen's Advisory Panel
Oak Ridge Reservation Local Oversight Committee
102 Robertsville Rd., Suite B
Oak Ridge, Tennessee 37830

Dear Gentlemen:

COMMENTS ON THE *OAK RIDGE RESERVATION GROUNDWATER STRATEGY (DOE/OR/01-2069&D2)*

Thank you for your interest in the Oak Ridge Reservation groundwater strategy. The strategy document is intended to be a "living" document that will be updated from time to time as additional data and information become available. Please note that there are no plans to update the strategy document at this time so most comments are referred to the next update. Responses to individual comments are provided on the enclosed comment resolution tables. The typographical errors you identified have been corrected and a corrected non-redlined version of the document will be produced.

Again, thank you for your interest.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Adler", written over a horizontal line.

David G. Adler,
Federal Facility Agreement
Project Manager

Enclosure

cc w/enclosure:
J. Kubarewicz, MS-7053, BJC

DOCUMENT TITLE: Oak Ridge Reservation Groundwater Strategy	DATE COMMENTS ARE DUE:
DOCUMENT NUMBER: DOE/OR/01-2069&D2	
NAME OF REVIEWER: David N. Mosby	ORGANIZATION: Oak Ridge Site Specific Advisory Board
DATE COMMENTS TRANSMITTED: January 15, 2004	

COMMENT CODE

D = Deficiency of some type; cite applicable regulation(s)	C = Clarification or additional information needed; response may be in summary of comment responses and/or next version of document	E = Editorial comments will be noted and corrected, but dropped from the summary of comment responses
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COMMENT NO.	SECT/PAGE	COMMENT	RESPONSE	ACCEPT/REJECT
1	General	We recommend that a timeline showing a schedule for completion of all phases of groundwater activities be created and included in this document.	The purpose of the document is to provide a strategy for making future decisions. An approximate timeline for decision making was provided in Figure 4, however project schedules are not intended to be included in this document and are provided within the Oak Ridge Federal Facilities Agreement, Appendix J.	
2	General	We recommend that any reference to alternatives be tempered with a statement that they will be considered only after all avenues for complete restoration of groundwater at the site have been exhausted.	Per EPA guidance, a range of alternatives for remediation is required for comparative evaluation as part of the decision making process during feasibility studies. This document identifies a range of alternatives, including complete restoration, for groundwater feasibility studies.	

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3	General	We recommend that the impact of the cleanup of groundwater on other remediation efforts be clearly stated.	The effectiveness of completed early actions and source-controls actions is evaluated under the Water Resource Restoration Program and reported annually in the Remediation Effectiveness Report.	
4	General	We recommend that the reason for the generation of this groundwater strategy be stated and precisely explained, replacing the existing Introduction in the current version of the <i>Oak Ridge Reservation Groundwater Strategy</i> (DOE/OR/01-2069&D2).	The purpose for the document as stated in the introduction is to provide strategy for making future decisions on groundwater restoration on the Oak Ridge Reservation.	

DOCUMENT TITLE: Oak Ridge Reservation Groundwater Strategy	DATE COMMENTS ARE DUE:
DOCUMENT NUMBER: DOE/OR/01-2069&D2	
NAME OF REVIEWER: Norman A. Mulvenon	ORGANIZATION: Oak Ridge Reservation Local Oversight Committee
DATE COMMENTS TRANSMITTED: December 5, 2003	

COMMENT CODE	
D = Deficiency of some type; cite applicable regulation(s)	C = Clarification or additional information needed; response may be in summary of comment responses and/or next version of document
	E = Editorial comments will be noted and corrected, but dropped from the summary of comment responses

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1	Executive Summary	The estimate of 1500 acres of groundwater contamination seems low.	The estimate is a rough approximation of the surface area with underlying groundwater contamination plumes.	
2	Page 1-1, 3 rd paragraph	That the document provides the "best" strategy is too subjective. The CAP suggests the sentence be rewritten as follows: "Although this document might not provide the only viable strategy for making groundwater remediation decisions, it attempts to integrate the technical complexities of the ORR with the cost and schedule constraints associated with near-term emphasis on implementing source actions."	Comment noted and will be considered at the next document update.	
3	Section 2	The hydrofracture sheets and associated groundwater contamination in the deep subsurface on Melton	Section 2 provides an overview of ORR site conditions and some details may be missing. Revisions to this	

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4	Page 3-2, 3 rd paragraph	<p>Valley are discussed in Appendix A, but not here. This document should discuss how DOE's strategy will ensure that it discharges its long-term obligations with respect to the hydrofracture waste material.</p> <p>The text states that groundwater outside the identified plume areas would be evaluated as part of future National Priority List footprint reduction efforts. How would this evaluation be accomplished? Does DOE expect to discontinue its practice of placing deed restrictions against use of groundwater in property deeds for released property? Will restrictions in existing deeds be reviewed and removed, as appropriate? Note that elimination of unneeded deed restrictions would be beneficial to property owners, would increase community confidence that Oak Ridge is a safe place to live, and would increase that credibility of those deed restrictions that remain in force (by making it clear that there is a reason for the restrictions that DOE imposes).</p>	<p>section to add a sentence on the mentioned hydrofracture sheets will be considered in the next update. However, this strategy document only provides a framework for decision making. Decisions on long term management of residual risks will be addressed in the appropriate decision document.</p> <p>In the case of Oak Ridge National Lab a Boundary Sites ROD will be issued to address areas outside of the main plant. Groundwater elsewhere on the ORR which is not addressed in other RODs will be addressed under the Oak Ridge Reservation Footprint Reduction project following the CERCLA process for preliminary assessments. The assessment will identify areas that require additional investigation under CERCLA. If contamination exists at unacceptable levels, or to protect against causing unacceptable movement of contaminated groundwater, decisions on deed restrictions or other land use controls will be made in the appropriate decision and/or land transfer documents.</p>	
5	Page 4-1, 2 nd paragraph	<p>This paragraph attempts to draw a distinction between characterization data and implementation data. Timing of data collection seems to be the only actual distinction, as the same monitoring wells, sumps, and other discharges remain as sampling points. There is no question that being able to see the actual effects of source controls helps to reduce uncertainty. However, there is also reasonably good data defining the history of much of the groundwater contamination, with constraints on the timing of contamination and the extent of the resulting plume. Even a conceptual model should be able to integrate both the characterization data and changes over time due to interim interventions.</p>	<p>The intent of the paragraph is to explain the rationale of the EPA recommended phased decision approach. A phased approach allows the use of data collected after implementation of an interim action such as source control to determine the effectiveness of that action and use it as a basis for planning the next phase of remediation. This approach is intended to reduce the uncertainty associated with complex site and contamination issues and is intended to increase the effectiveness and reduce the cost of remediation.</p>	
6	Page 4-2, 2 nd	<p>The discussion implies that source removal actions may not have accomplished anything. That source</p>	<p>The intent of the discussion is to state that due to uncertainties in source terms the effectiveness of</p>	

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7	paragraph Page 4-2, 3 rd paragraph	removal actions produced a level of soil cleanup could be indicated as another objective if these actions. A "monitoring period" is referenced, but it is not clear how long this might last within each watershed. The document should give an estimate of the time needed post-source control actions for monitoring before the Federal Facility Agreement parties can reasonably agree on a final groundwater decision. This paragraph should also mention passive groundwater restoration technologies that can be implemented either near the source or near the discharge, such as treatment trenches.	source term actions is difficult to predict in advance. This is the rationale for a phased approach so that the effectiveness of source term action can be measured before the next action is initiated. The monitoring period will be dependent upon the site and action and will typically be identified in the Record of Decision. For example the Melton Valley Interim ROD identifies a 10 year monitoring period to evaluate the effectiveness of the hydrologic isolation source control actions. Passive remediation is mentioned elsewhere in the document.	
8	Page 4-2	Section 4.2.1 would be better titled "Potential Goals for ORR" as no goals are actually proposed.	A range of potential goals is proposed per the first sentence of the second paragraph.	
9	Page 4-7, 3 rd paragraph	Indicate whether Tennessee has an EPA-approved state groundwater classification system and what classification has been applied to ORR groundwater.	At the time this draft was prepared the State of Tennessee did not have an EPA approved classification system, however, by agreement with the regulators this was not added to the document as it is likely to change prior to the next document update. Time-sensitive material in general has not been included in the document to avoid having it out of date at any particular time.	
10	Page 4-8, Figure 4	Timeframe is uncertain, and public presentations modifying strategy to one groundwater ROD for East Tennessee Technology Park (ETTP) needs to be incorporated.	Only the logic sequence of the timeframe is presented. The figure will be revised to incorporate changes in ETTP strategy at the next document update.	
11	Page 4-12, 4 th paragraph	This paragraph is at odds with what the public has been told about the timing of decisions at ETTP. The final groundwater ROD is reportedly within the scope of the accelerated cleanup and is expected to be issued in 2008, in combination with the interim ROD. No doubt there will not be sufficient time to monitor the effects of Phase 1 and 2 actions. The report doesn't speak to the degree that contaminated groundwater at ETTP is leaving the reservation via	Per the response to Comment #10, the change in ETTP strategy will be included in the next update. The decision on groundwater remediation will be made in the ETTP Site-wide ROD. The LOC recommendation is noted and the public will participate in the CERCLA decision process at ETTP.	

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12	Section 5.4	<p>Poplar Creek, possibly because this isn't yet well established. The complex industrial hydrogeology of the plant site means that demolition of facilities, removal of foundations and other impermeable surface covers, and discontinuance of "sump-and-treat" activities will likely result in substantial changes in groundwater flow patterns, possibly causing plumes to migrate into previously uncontaminated areas. DOE must be prepared to aggressively react to this, not to count on recommending "monitored natural attenuation" as a default Phase 3 decision.</p> <p>Oak Ridge has long known that new technologies will need to be deployed to adequately deal with groundwater remediation problems. In particular, pump-and-treat systems have limited effect on actually cleaning up a plume, instead being used primarily for controlling the spread of a plume. The technologies in Figure 8 appear to be the ones toward which selection will be driven. How the technologies in Figure 7 will be investigated is vague.</p> <p>Monitored natural attenuation (MNA) is mentioned often in the text, however little discussion is seen about the option of enhancing natural attenuation by addition of oxygen or nutrients to degrade organic plumes or using <i>in situ</i> chemical treatments to bind radionuclides or metals to the soil matrix. MNA by itself is often perceived as the "do nothing" option.</p> <p>This strategy document should briefly indicate how DOE will handle monitoring activities of new potential sources, such as the Spallation Neutron Source. Should new sources of groundwater contamination go undiscovered, this would complicate the effort to finalize watershed remediation.</p>	<p>The CERCLA RI/FS process and EPA guidance prescribe the evaluation of technologies and representative process options including innovative technologies. The guidance also identifies the use of treatability studies to collect information needed for technology evaluation and remedial design.</p> <p>The EM program addresses legacy groundwater contamination. Questions on groundwater monitoring of planned new facilities or those under construction at ORNL should be addressed to the DOE Office of Science.</p>	

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13	Section 5.6	<p>It is good to see that the strategy acknowledges that the planned directions will lead to residual damages subject to Natural Resources Damages Assessment (NRDA). We would also like some assurance that DOE's decisions on ORR groundwater will weigh the long-term costs of NRDA and long-term stewardship obligations.</p>	<p>NRDA and long term stewardship considerations will be evaluated as part of the CERCLA feasibility studies.</p>	
14	Section 6	<p>This section effectively summarizes the technical challenges involved in addressing groundwater contamination on the ORR and the need for additional science and technology to effectively deal with the situation, but it appears that DOE is dropping the ball with respect to defining a strategy for developing the needed science and technology.</p> <p>The principal method planned for addressing the need for research and development seems to be "groundwater workshops"-essentially, talking about the problem. Technical discussions can be helpful, but they are not a substitute for developing new information. Also, if there is no funding for scientific investigations and technology development related to this topic, where will the experts be found to contribute meaningful input in these proposed workshops?</p>	<p>The intent of this section is to present an overview of science and technology needs and an approach for a path forward. The development of a comprehensive science and technology plan is beyond the scope of this document.</p>	
15	Section 6.1	<p>The likelihood of being able to make site-specific advances in modeling for fractured media versus unconsolidated porous media is an important consideration that should be briefly assessed.</p>	<p>Comment noted and will be considered at the next document update.</p>	
16	Sections 6.3 and 6.4	<p>These sections suggest that some needed research results can be obtained by "leveraging" work supported by other DOE programs, the Department of Defense, the state, EPA, and the private sector. Unfortunately, this appears to be mostly wishful thinking. As stated repeatedly elsewhere in the document, the situation on the ORR is unusually complex. This means that finding at other sites have</p>	<p>Funding for needed research is currently limited and the suggested approach is to leverage resources to the extent possible including lessons learned at individual sites within the ORR. The current approach has been to request funding for targeted research using leverage to the extent practicable.</p>	

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		<p>only limited applicability to the ORR. Past experience indicates that even findings on the ORR may have little relevance for seemingly similar settings elsewhere on the ORR – for example, there are large differences in groundwater hydrology between Melton Valley and the Upper East Fork Poplar Creek Watershed, even though both valleys are underlain by the same geologic units. Furthermore, research sponsors in the DOE Office of Science and other agencies have repeatedly made it clear that they are interested in funding generically applicable research – that investigations specific to a particular site must be undertaken as part of (and funded by) the environmental remediation program for that site. Findings from research at the NABIR Field Research Center in Bear Creek Valley will certainly have direct relevance to ORR groundwater actions, but beyond that it is unlikely that there will be much “leverage” from other sources. Instead of hoping that someone else will solve the ORR’s research and development needs, we would like to see DOE present the case for targeted research and development as part of the local environmental management program.</p>		
17	Section 7	<p>There is no “path forward” described in this section. This section should give an explicit plan for how DOE intends to proceed.</p>	<p>The intent of this section is to summarize the path forward as identified in the strategy document.</p>	
18	Section 8	<p>The list of references should be expanded to include additional citations from which material was drawn to support discussion in the preceding sections, including administrative record documents, the CERCLA law, and technical references.</p>	<p>This section is a reference section not a bibliography. The text will be checked to see if references need to be added to support statements and if so, they will be added to the next version.</p>	
19	General	<p>Small inserts on the various maps showing cross-sections of the underlying strata perpendicular to the plumes at distance intervals and the depth contamination is estimated to reach.</p> <p>A technical discussion of the treatments now being</p>	<p>Comment noted and will be considered during next document update.</p>	

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20		<p>used on contaminated groundwater.</p> <p>Overall, the document is irregular in its understandability. It could be written much more concisely and clearly. It badly needs editorial attention for typographic and grammatical errors.</p> <p>Some of the figures in the document appear to rely on color to communicate information, but are not meaningful when reproduced in black and white. To the extent possible, these should be revised so they can be interpreted in black and white. (Examples: The watershed boundaries for Melton Valley, Bear Creek Valley, and Chestnut Ridge are invisible in a non-color copy of Figure 2. Figure 4 appears to use some sort of color coding; the shading does not make much sense without the color. Figure 5 presumably uses a color - one that is invisible in black and white - to connect the actions to the time periods.)</p>	<p>"extensive" should be used instead of "expensive", correction will be made to the document.</p>	
21	<p>Page ix, 4th paragraph</p> <p>Page 2-1, 3rd paragraph</p>	<p>Is the second sentence supposed to say "expensive investigations" or "extensive investigations"? (Same sentence appears on page 7-1.)</p> <p>The first sentence is confusing and doesn't address the extensive flow known to occur in saprolite. Suggested rewording: "Most groundwater flow on the ORR occurs within fractures in bedrock, particularly in weathered bedrock. Therefore, most geologic units that contain contaminant plumes act as multiporosity systems."</p>	<p>Comment noted and will be considered during next document update.</p>	
22	<p>Page 2-1, 4th paragraph</p>	<p>In the first sentence, correct "groundwater exits" to "groundwater exists".</p>	<p>Agree, will be corrected in the document.</p>	
23	<p>Page 2-3, 2nd paragraph</p>	<p>Suggest the following rewrite: "Groundwater contamination plumes formed beneath the burial grounds tend to be shallow and discharge to nearby streams after short distances. However, DNAPLs or other dense liquids present in the groundwater migrate differently. These contaminants instead</p>	<p>Comment noted and will be considered during next document update.</p>	

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		move downwards through the aquifer, with a plume forming from the dissolved phase only.”		
24	Page 3-1	Define the areas of Bethel Valley considered east, central, and west, or refer the reader to Figure A.3.	Comment noted and will be considered during next document update.	
25	Page 4-1, 3 rd paragraph	The second sentence would be more understandable if it said “...actions that prevent exposure to contamination” instead of “...actions that prevent exposure to groundwater.”	Comment noted and will be considered during next document update.	
26	Page 4-4, 2 nd from last paragraph	“Resources” is misspelled.	Agree, will be corrected in the document.	
27	Page 4-5, 2 nd paragraph	Phrase “growth of plumes” has a typo.	Agree, will be corrected in the document.	
28	Page 4-11, Table 1	The watersheds should be separated from each other by a space or a line.	Comment noted and will be considered during next document update.	
29	Figures 2 and 4	South Campus should be added to these figures. Is this area included in “East” Bethel Valley?	Comment noted and will be considered during next document update. The area is not part of East Bethel Valley.	
30	Page A-22	The map of ETPP should show which buildings have active sumps and Building K-1414 should be labeled, as it is referenced in the text.	Comment noted and will be considered during next document update.	
31	General	The CAP strongly recommends that a committee of interested citizens be formed, and an effort similar to that of the End Use Working Group be mounted for public input on goals for groundwater remediation in the various watersheds. Periodic meetings could be held with the group described in Section 7 to ensure that input from the affected communities is considered throughout the decision-making process.	Public will be invited during the development of specific groundwater decision documents per the CERCLA process and ORR Public Involvement Plan.	