

APPENDIX A. VARIANCE ANALYSIS

Table A-1 summarizes proposed variances between the current life-cycle baseline plan for the DOE-ORO Environmental Management program for the Oak Ridge Reservation (ORR) and the risk-based end state (RBES) vision for the ORR. Table A-1 provides a brief description of each proposed variance, potential impacts of the variance, barriers to implementation, and recommendations for action. Maps depicting end state conditions for the ORR under the current baseline and with the variances summarized in Table A-1 are presented in Figures A-1 and A-2, respectively.

Table A-1. Variance Report for DOE Oak Ridge Reservation Risk-Based End State Vision

Variance Report				
ID No.	Description of Variance	Impacts (in Terms of Scope, Cost, Schedule and Risk)	Barriers to Achieving RBES	
V-1	ETTP Closure Project, K-1070-B/C/D Burial Grounds – While a final decision will not be made until the ETTP Zone 2 ROD is completed, the current baseline plan calls for the K-1070-B and K-1070-C/D burial grounds to be excavated for disposal at ORR or offsite disposal facilities. This remedy is assumed to be most consistent with the desired end use of the ETTP site as an unrestricted commercial industrial park. However, it may be possible to achieve an equally protective remedy, potentially at lower cost, for the K-1070-C/D burial grounds through excavation of wastes and contaminated soil above risk-based remediation criteria for industrial use to a depth of 10 ft and leaving deeper wastes in place beneath a clean soil cover. Containment alternatives for K-1070-B would be considered more difficult, as buried waste materials are thought to sit in the saturated zone. Since the K-1070-C/D burial grounds contain classified materials, consideration of security requirements required for implementation of all alternatives must be included in the comparative analysis of alternatives.	CERCLA decision documents for ETTP Zone 2 are currently under development. All remedial actions at ETTP are scheduled for completion by FY2008. The implementation time for the current baseline alternative is estimated at 2.5 yr. while that for the RBES alternative is approximately 1 yr. Final cost estimates will be developed in the Zone 2 FS currently under development. Preliminary cost estimates are \$41M for the baseline alternative and \$4M for the RBES alternative. No unacceptable risk to workers is expected under either alternative, although the partial excavation alternative would require long-term institutional controls to ensure protectiveness to future workers.	The partial excavation alternative would require long-term institutional controls for the K-1070-C/D area, both to ensure protectiveness of the remedy and to prevent unauthorized access to classified materials. However, these controls would be the same as those to be required throughout the ETTP site, i.e., to prevent disturbance of soils below 10 ft and limit future land use to industrial activities.	
V-2	ETTP Closure Project, Dose-Based Criteria for Building Surface Contamination – The great majority of buildings currently standing at ETTP will be demolished during the site closure process. Only those buildings which have a specific identified future use by private industry will remain, with titles transferred to CROET. These remaining buildings may contain residual radiological contamination on building surfaces (walls, floors, structural beams, etc) that may require decontamination to levels sufficiently protective for future occupants. Current cleanup operations at ETTP are based on surface radioactivity limits specified in DOE Order 5400.5, Table IV-1. Under the RBES, dose-based criteria will be derived specifically for the radionuclides of concern at each building and the designated future use scenarios for that building. These criteria will be derived to limit the potential radiation dose and health risk to future building occupants to levels that are determined to be protective and	Use of dose-based criteria, derived for the specific radionuclides of concern and site conditions, would be expected to support more rapid completion of building decontamination and decommissioning (D&D) operations; the time required for development and approval of these dose-based criteria may partially reduce these gains, but the overall schedule impact is expected to be positive. As noted in V-1, all actions at ETTP will be completed by FY2008 in either case. Cost estimates for the use of dose-based surface criteria have yet to be fully developed, but are expected to be lower than costs for use of 5400.5 criteria. No unacceptable risks to future building	Dose-based limits must be derived and approved consistent with DOE directives and guidance (DOE 5400.5 and associated guidance, and draft DOE G 441.1-XX), and the remedy must be approved by EPA and TDEC under the CERCLA process. Use of dose-based surface activity limits is entirely consistent with current EPA, NRC, and DOE guidance, so this barrier is anticipated to be primarily administrative and easily resolvable.	

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- Deleted:** through capping some or all of these materials in place, particularly
- Deleted:** , but cost for capping alternative expected to be less than that for excavation.
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Variance Report

ID No.	Description of Variance	Impacts (in Terms of Scope, Cost, Schedule and Risk)	Barriers to Achieving RBES	
	consistent with DOE policy to reduce exposures as low as reasonably achievable (ALARA).	occupants (workers) would exist under either alternative, but the use of dose-based surface criteria may significantly reduce the risks to remediation workers performing the D&D operations.		
V-3	<p>Melton Valley Remedial Action Project, Alternative Stabilization Technologies for In-Situ Vitrification - The current baseline plan calls for use of in-situ vitrification (ISV) technology for remediation of buried waste at Trenches 5 and 7 located in the Seepage Pits and Trenches Area of Melton Valley. ISV was selected for use in these areas because these trenches hold a large inventory of radionuclides in a relatively small volume of waste within a small contaminated area. ISV was not proposed for use at other locations within Melton Valley because of the difficulty in using this technology in heterogeneous waste, the potential hazard of using ISV in saturated waste, and the overall high cost of ISV relative to other remediation technologies. Previous demonstration projects using ISV technology at Melton Valley sites near the Trench 5 and 7 area proved unsuccessful. <u>Pre-design activities conducted since the signing of the ROD have identified the presence of standing (perched) water in Trenches 5 and 7, which may further complicate the use of ISV at these sites.</u> Given the extremely aggressive schedule for Melton Valley remedial actions to be completed by FY2006, other remedial alternatives would achieve an equally protective remedy with less schedule risk and potentially lower cost. Selected remediation measures for adjacent areas already include use of in-situ grouting and capping using a multi-layer cover system. Use of <u>in-situ grouting as an alternative treatment technology</u> for the Trench 5 and 7 sites will be protective to human health and the environment under the selected end-state land use for this area (i.e., protection of the worker in this dedicated waste management area).</p>	<p>Construction logic for Melton Valley remedial actions is very difficult due to the highly accelerated schedule for completion of all actions by FY2006. <u>Implementation of in-situ grouting is expected to involve significantly lower schedule risk than ISV, as ISV has not been successfully implemented for conditions of standing water with high activity wastes.</u> <u>Costs for the ISV alternative are estimated at \$55M, based on actual subcontract bids received, approximately double the ROD cost estimate of \$27.3M. The cost estimate for the in-situ grouting alternative is \$14M.</u> No unacceptable <u>long-term</u> risk would be expected under either alternative. <u>Short-term risks would be significantly lower for in-situ grouting versus ISV.</u> Long-term institutional controls will be required under either alternative.</p>	<p>The current CERCLA ROD specifically calls for the use of the ISV technology at Trenches 5 and 7. Deviation from this planned action (i.e., <u>substitution of in-situ grouting for in-situ vitrification as the selected treatment technology</u>) would require additional CERCLA documentation, such as an Explanation of Significant Differences.</p>	

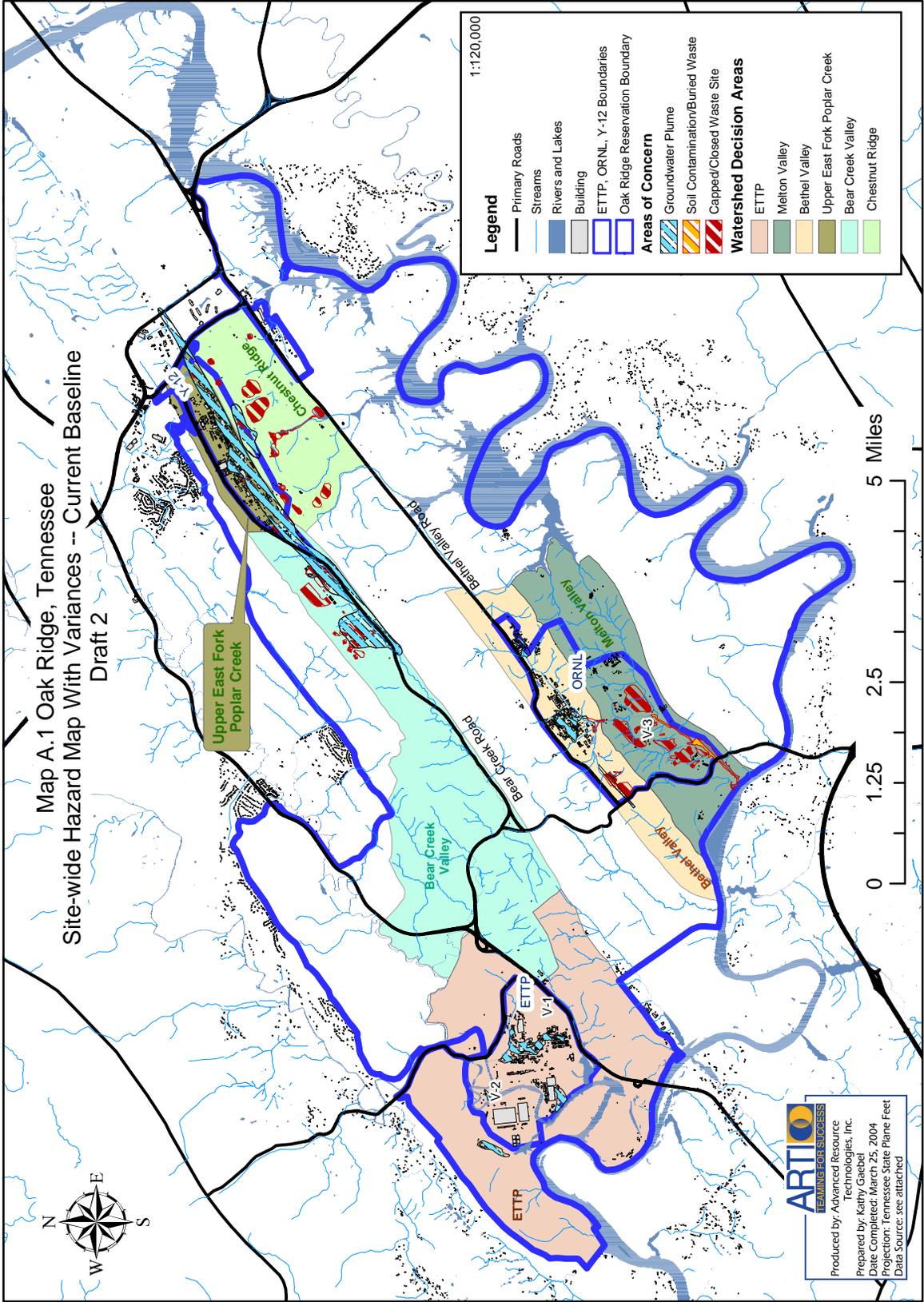
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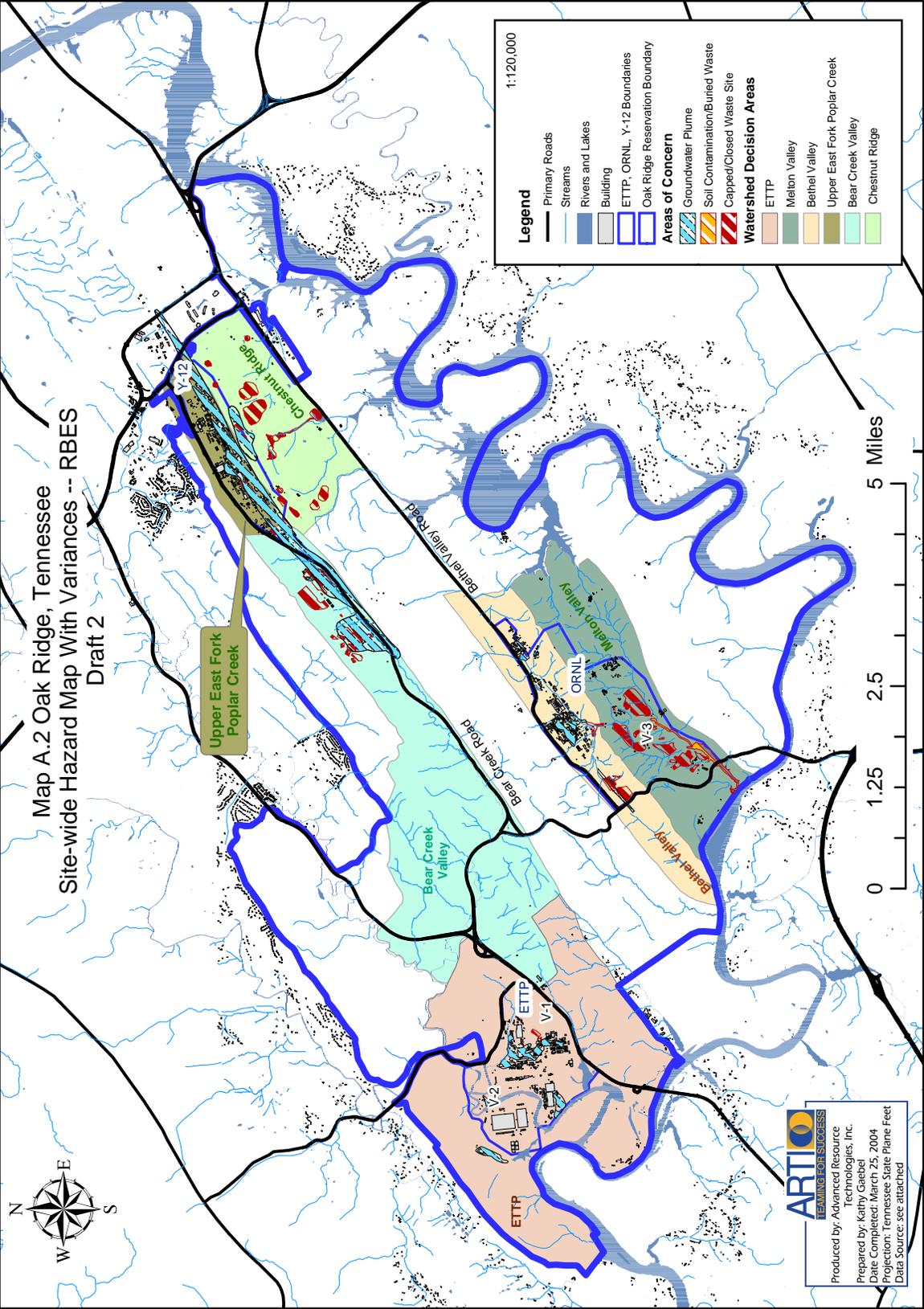
Map A.1 Oak Ridge, Tennessee
 Site-wide Hazard Map With Variances -- Current Baseline
 Draft 2



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Produced by: Advanced Resource Technologies, Inc.
 Prepared by: Kathy Gaebel
 Date Completed: March 25, 2004
 Projection: Tennessee State Plane Feet
 Data Source: see attached

Map A.2 Oak Ridge, Tennessee
 Site-wide Hazard Map With Variances -- RBES
 Draft 2



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Legend

- Primary Roads
- Streams
- Rivers and Lakes
- Building
- ETTP, ORNL, Y-12 Boundaries
- Oak Ridge Reservation Boundary

Areas of Concern

- Groundwater Plume
- Soil Contamination/Buried Waste
- Capped/Closed Waste Site

Watershed Decision Areas

- ETPP
- Melton Valley
- Bethel Valley
- Upper East Fork Poplar Creek
- Bear Creek Valley
- Chestnut Ridge

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