Many Voices Working for the Community

Oak Ridge Site Specific Advisory Board

October 14, 2004

Mr. Steve McCracken
Assistant Manager for Environmental Management
DOE-Oak Ridge Operations
P.O. Box 2001, EM-90
Oak Ridge, TN 37831

Dear Mr. McCracken:

Recommendation on the Proposed Plan for Remedial Actions in Zone 2, East Tennessee Technology Park (ETTP)

At our October 13, 2004, meeting, the Oak Ridge Site Specific Advisory Board approved the enclosed recommendations.

In addition to these recommendations, we respectfully ask that you review and address the comments and questions in the enclosed report, *Review and Comments on DOE's Proposed Plan for Contaminated Soil, Buried Waste, and Subsurface Structures in Zone 2, ETTP*, which was presented to the Environmental Management Committee on Aug. 18, 2004.

We appreciate your consideration of these recommendations and look forward to receiving your written response.

Sincerely,

Kerry Trammell, Chair

Enclosures
cc/enc: Dave Adler, DOE-ORO
Pat Halsey, DOE-ORO
Connie Jones, EPA Region 4
Jim Kopotic, DOE-ORO
John Owsley, TDEC
Julie Pfeffer, BJC
Sandra Waisley, DOE-HQ

Oak Ridge Site Specific Advisory Board Recommendation on the Proposed Plan for Remedial Actions in Zone 2, East Tennessee Technology Park (ETTP)

BACKGROUND

East Tennessee Technology Park (ETTP) has numerous buildings, buried infrastructure, burial grounds and soil areas contaminated with organic chemicals, metals and radionuclides. Because of the release and threat of release of hazardous substances that could pose unacceptable risk to human health and the environment, the entire ETTP site is subject to investigation and cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Remediation decisions for contaminated soil, buried waste and subsurface structures have been grouped into two geographic areas: (1) Zone 1 consists of ETTP areas outside the main industrial site, and (2) Zone 2 consists of the main industrial area. A CERCLA decision for Zone 1 was made in 2002.

Risk assessment work at ETTP showed shallow soil contamination, primarily radionuclides, in several locations throughout Zone 2 that could pose a future risk to industrial workers. Additionally, deeper soil in a few locations in Zone 2 could either pose a future industrial risk or could be a future source of continuing groundwater contamination. There are also three burial grounds located in Zone 2. The largest burial ground (K-1070-C/D) is most likely both a future industrial worker risk and a future threat to groundwater. Burial ground K-1070-B is expected to only be a future industrial risk. Previous work has shown that portions of subsurface structures (including slabs, tanks, basements, vaults, pits and pipelines) may cause a future risk to industrial users.

The *Proposed Plan for Contaminated Soil, Buried Waste, and Subsurface Structures in Zone 2, East Tennessee Technology Park, Oak Ridge, TN*, (DOE/OR/01-2110&D2) is under review by the public and is the subject of this recommendation. The Plan discusses five alternatives and presents DOE's preferred alternative. The five alternatives developed and evaluated are:

Alternative 1 - No Action. No remediation of existing contamination; existing monitoring, land use controls, and maintenance programs discontinued

Alternative 2 - Removal of contaminated soil to a depth of 10 feet, and full removal of the K-1070-C/D and K-1070-B burial grounds

Alternative 3 - Removal of contaminated soil to a depth of 10 feet, excavation of K-1070-B burial ground and containment (capping) of the K-1070-C/D burial ground

Alternative 4 - Removal of contaminated soil to a depth of 2 feet, no excavation of K-1070-B burial ground and containment of the K-1070-C/D burial ground

Alternative 5 - Removal of contaminated soil to a depth of 10 feet, buried waste removal from K-1070-B regardless of depth and partial removal of the K-1070-C/D burial ground

DISCUSSION
The preferred alternative (Alternative 5) in the Plan establishes remediation levels based on the reasonably anticipated future land use for Zone 2 (i.e., industrial use to 10 feet) and on protecting the groundwater to drinking water standards. The SSAB and other community members have expressed various concerns about the Plan and the degree of reliance of some of the alternatives on long-term institutional controls because of uncertainties about the effectiveness of the controls over long periods of time.

Of special concern are the operation and maintenance of land-use controls after remediation in cases where sale and transfer or lease of the property to non-DOE parties is possible. Such property transfers or leasing is most likely under Alternatives 2 and 3. Before DOE may authorize such transfers of property, there must be a reasonable expectation that all necessary institutional controls can be maintained after the transfer and that the new owner understands and is capable of meeting institutional control responsibilities.

An issue related to Alternative 5 is the potential effect on economic investment in reindustrialization of the ETTP site. In this alternative, only contaminated soils and wastes from the K-1070-C/D burial ground are removed, and classified wastes and materials are left in place. The specter of a 30-acre area surrounded by fencing, warning signs, and armed patrols in the midst of a site otherwise zoned for reindustrialization may discourage investment by potential clients and tenants.

A concern related to all the alternatives (except the no-action alternative) is the rubble resulting from demolition of "clean" buildings in Zone 2. The possibility exists that the rubble would be left in piles around the site, thereby creating a landscape looking more like a battlefield than a site attractive to potential clients, and thus discouraging economic investment in reindustrialization of the site.

In the event of future failure on the part of any client/tenant to continue all institutional controls necessary for the protection of human health and the environment, responsibility for enforcement of or continued implementation of such controls should return to DOE or its successor agencies.

Other issues not adequately addressed for any alternative in the Plan include a more detailed non-traffic accident analysis and the fate of underground utility infrastructure.

RECOMMENDATION
The Board agrees with DOE that the reasonably anticipated future land use for Zone 2 is industrial development. To that end, any Plan alternative selected for implementation that does not result in cleanup consistent with and conducive to that future land use is unsatisfactory.

We recommend the Record of Decision (ROD) commit to and define a program of cleanup and restoration that the public and prospective clients/tenants will find both aesthetically acceptable and compatible with construction of future industrial facilities including excavation, grading, contouring and revegetation where appropriate. This cleanup would address the fate of demolition materials and underground site infrastructure remaining from other remediation and removal action projects. Further, the Board recommends that the cleanup be performed in a manner that will preserve as much as possible of the existing site infrastructure for support of reindustrialization to minimize the burden of local government to reconstruct.

The Board also recommends that DOE make special provision for the operation and maintenance of land-use controls after remediation in cases where sale and transfer or lease of the property to non-DOE parties is possible. DOE must ensure that all necessary institutional controls can be maintained after the transfer and that the new owner understands and is capable of meeting these responsibilities. If this implementation responsibility cannot be reliably assured, then DOE must retain necessary responsibility and authority for the institutional controls, including ownership of the property if necessary. In addition, the respective responsibilities of DOE and the new owner for any required institutional controls must be documented and communicated to all directly involved parties at the time of transfer, including within property conveyance documents, such as purchase agreements and deeds.

Review and Comments
on

DOE's Proposed Plan for Contaminated Soil, Buried Waste, and Subsurface Structures in Zone 2, ETTP

prepared for

The Oak Ridge Site-Specific Advisory Board

Aug. 15, 2004

G. K. Eddlemon

865-693-8508
eddlemo@bellsouth.net

This report is based on a review of three documents prepared for the U.S. Department of Energy for the development and evaluation of five alternatives for remediating contaminated soil, buried waste, and subsurface structures in Zone 2 at the ETTP located on the Oak Ridge Reservation:

DOE. 2004 (a). Focused Feasibility Study for Zone 2 Soils and Buried Waste, East Tennessee Technology Park, Oak Ridge, TN.

DOE. 2004 (b). Addendum to the Focused Feasibility Study for Zone 2 Soils and Buried Waste, East Tennessee Technology Park, Oak Ridge, TN.

DOE. 2004 (c). Proposed Plan for Contaminated Soil, Buried Waste, and Subsurface Structures in Zone 2, East Tennessee Technology Park, Oak Ridge, TN.

This report summarizes important aspects of the above documents including especially the evaluation and comparison of each alternative with CERCLA-required criteria and with each other. Certain specific issues/concerns raised by members of the SSAB are also addressed.

The proposed plan discusses the alternatives and evaluations provided in the two earlier documents and presents the DOE's preferred alternative. The five alternatives developed and evaluated in these documents are:

- Alternative 1 – No Action. No remediation of existing contamination; existing monitoring, land use controls, and maintenance programs discontinued. Not protective of human health or the environment.
- Alternative 2 – Removal of contaminated soil to a depth of 10 ft, and full removal of the K-1070-C/D and K-1070-B burial grounds
- Alternative 3 – Removal of contaminated soil to a depth of 10 ft, excavation of K-1070-B burial ground, and containment (capping) of the K-1070-C/D burial ground
- Alternative 4 – Removal of contaminated soil to a depth of 2 ft, no excavation of K-1070-B burial ground, and containment of the K-1070-C/D burial ground
- Alternative 5 – Removal of contaminated soil to a depth of 10 ft, buried waste removal from K-1070-B regardless of depth, and partial removal of the K-1070-C/D burial ground

This last, and DOE's preferred, Alternative 5 was developed in response to perceived difficulties with the first three "action" alternatives including problems in cost, short-term effectiveness, and implementation of Alternative 2 and the long-term need for institutional controls associated in particular with Alternatives 3 and 4.

DOE sees the reasonably anticipated future land use for the ETTP Zone 2 as industrial development. The key clean-up issues as described in the Plan are (1) future land use, and (2) groundwater resources. To achieve this, requirements of the NCP for protective remediation goals must be satisfied. To that end, DOE has developed a single Remedial Action Objective consisting of two protection goals:

- Protection of future land use: Protect human health under an industrial land use to excess cancer

- risk levels at or below 10-4 and non-cancer risk levels at or below a Hazard Index of 3.
- Protection of groundwater resources: Protect groundwater to levels at or below maximum contaminant levels.

While each of the four "action" alternatives was developed for the purpose of meeting these goals, and, after DOE's own evaluations, found to satisfy the goals, the SSAB has expressed concern about the degree of reliance of some of these alternatives on long-term institutional controls because of uncertainties about their effectiveness over long periods of time.

Institutional Controls and Monitoring

Institutional Controls and Monitoring are key features of all four action alternatives. They are used in conjunction with remediation measures to reduce the risk of worker and public exposure to contaminants, and in the case of Alternative 5, to control access to classified material as well. By themselves, these controls have little effect on the prevention of contaminant migration.

Monitoring consists of physical surveillance (e.g., physical inspection of engineered controls and barriers) and long-term monitoring of media of concern (e.g., soils and groundwater). Monitoring is used to measure the continued effectiveness of remedial actions including engineered controls and barriers. It can show where further measures may be needed to ensure performance objectives of remedial actions are met. It is readily implemented and of relatively low cost. All action alternatives rely to varying degrees on monitoring and physical surveillance.

Institutional controls primarily involve restrictions on access and use to reduce exposure to contaminants, control disturbance and development at the site, and to protect engineered controls from damage. Such restrictions are presently in place at ETTP and according to DOE, can be easily implemented in any future actions at relatively low cost. Access and use restrictions can be implemented through the following measures:

- Administrative controls including controlled site entry, access controls for specific areas or facilities, surveillance and security patrols, and required use of personal protective equipment (PPE).
- Deed Restrictions including land use restrictions through issuance of codes, deeds, or zoning requirements. "Restrictive covenants would prohibit certain activities on the site such as drilling drinking water wells; excavating building foundations; and using land for residential, recreational, or agricultural purposes." (FFS 2004 a) The FFS states that deed restrictions would be legally enforceable even after property is transferred from DOE control.
- Physical barriers include fences, signs, and other access barriers erected around waste areas or site boundaries to restrict access to unauthorized personnel.

Table 1 lists the major land use controls (LUCs), most or all of which would likely be used in each of the five remediation alternatives. Note that the Plan's stated duration for all but one of these LUCs is "Indefinitely." The exception is the Excavation/Penetration Permit Program, which would remain in place only as long as property remains under DOE control, raising the question of what could happen after DOE no longer retains control. See Tables 6.8 and 6.9 of the FFS (from which this Table 1 has

been adapted).

Table 1. Potential Land Use Controls applicable to proposed remediation alternatives.

Land Use Control	Purpose	Remediation Alternatives
Property Record Restrictions	Restrict use of property by imposing limitations	2, 3, 4, 5
Property Record Notices	Provide notice to anyone searching records about existence and location of contaminated areas	2, 3, 4, 5
Zoning Notices	Provide notice to city about existence and location of waste disposal and residual contamination areas for zoning/planning purposes	2, 3, 4, 5
Excavation/Penetration Permit Program	Provide notice to worker/ developer on extent of contamination and prohibit or limit excavation/penetration	2, 3, 4, 5
Access Controls (e.g., fences, gates, portals)	Control and restrict access by workers and public to prevent unauthorized access	3, 4, 5
Signs	Provide notice or warning to prevent unauthorized access	3, 4, 5
Security guards/ surveillance patrols	Control and monitor access by workers and public	3, 4, 5

A Memorandum of Understanding with EPA and TDEC directs DOE to comply with the Oak Ridge Reservation Land Use Control Assurance Plan (LUCAP) "whenever land use controls (LUCs), including institutional controls, are selected as part of a remedial action." (FFS 2004). The LUCAP requires each LUC to be "implemented and properly maintained for as long as the LUC is needed to protect public health and the environment." (FFS 2004). The Oak Ridge Operations Office manager must certify annually that each LUC continues to be effectively implemented.

DOE must prepare a Land Use Control Implementation Plan (LUCIP) to be submitted for approval by EPA and TDEC. Responsibility for implementing, monitoring, maintaining, reporting on, and enforcing the LUCs selected in the ROD in accordance with the Zone 2 LUCIP ultimately lies with DOE. Record-keeping is also clearly important, for example, the extent of contamination remaining after remediation (for excavation or penetration permit requesters). These and use restrictions.must be recorded by DOE as required by CERCLA Sect. 120(h) and 40 CFR 373, along with the original ORR acquisition records.

Of special concern is the operation and maintenance of LUCs after remediation in cases where sale and transfer or lease of the property to non-DOE parties is possible. Such property transfers or leasing are most likely under Alternatives 2 and 3. Before DOE may authorize such transfers of property, "there must be a reasonable expectation that all necessary institutional controls can be maintained after the transfer, and the new owner understands and is capable of meeting its institutional control responsibilities . . . If this implementation responsibility cannot be reliably assured, then DOE must retain necessary responsibility and authority for the institutional controls, including ownership of the property if necessary. The respective responsibilities of DOE and the new owner for any required institutional controls must be documented and communicated to all directly involved parties at the time of transfer," including within property conveyance documents such as purchase agreements and deeds. In any event, the LUCAP places on DOE the financial responsibility for maintaining the LUCs for as long as contamination above levels for unrestricted use remains on the site [which would be indefinitely for any of the action alternatives].

Expected Institutional Controls and Monitoring Requirements for Each Alternative
Alternative 1 -- No Action

- All contamination left as is; existing media monitoring, land use controls, and maintenance programs discontinued. Risks to human health and the environment unmitigated.
- Not a real option; evaluated to provide a baseline for comparison with the other four "action" alternatives.

Alternative 2 – Removal of Soil to 10 ft and Full K-1070-C/D Removal

- Minimizes but does not eliminate restrictions
- Long-term LUCs used to prevent access to residual contamination with depth, and to prevent inappropriate future use of site by residents
  1. property record notices
  2. property record restrictions (if property were to be transferred - possible under Alternative 2)
  3. zoning notices

- Maintain existing excavation permit program (less "intensive" version for excavations below 10 ft; administered by DOE)
- Groundwater monitoring to assess effectiveness of source removal actions to protect groundwater (until a final groundwater decision implemented at ETTP)

Alternative 3 – Removal of Soil to 10 ft and Containment of K-1070-C/D

- Additional, and aggressive, long-term maintenance and institutional controls (due to capping of burial ground)
- Long-term LUCs used to prevent access to residual contamination with depth, and to prevent inappropriate future use of site by residents
  1. property record notices
  2. property record restrictions (if property were to be transferred - *possible under Alternative 3 ??*)
  3. zoning notices
- Cap mowing, repair, possible future replacement
- Fences, security guards, patrols to control (Short-term? The plan uses this term) access to capped burial ground

Alternative 4 – Removal of Soil to 2 ft and Containment of K-1070-C/D

- Additional, and more aggressive (compared to Alternatives 2, 3, and 5), long-term maintenance and institutional controls (due to capping of burial ground and soil remediation to depth of only 2 ft)
- Long-term LUCs used to prevent access to residual contamination with depth, and to prevent inappropriate future use of site by residents
  1. property record notices
  2. property record restrictions (if property were to be transferred - possible, but much more difficult under Alternative 4)
  3. zoning notices
- Maintain excavation permit program for all excavation/penetration activities including shallow activities
- More aggressive maintenance than under Alternatives 2 and 3 (cap for K-1070-C/D and soil cover for K-1070-B burial grounds would require mowing, repair, possible future replacement)
- Postings, fences, security guards, surveillance patrols to control access to capped burial ground and prevent future users from excavating other areas without proper health and safety support.
- Land transfers much more difficult (particularly with respect to ensuring effectiveness of institutional controls)

Alternative 5 – Removal of Soil to 10 ft and Partial K-1070-C/D Removal

- Minimize (compared to Alternatives 3 and 4) but not eliminate long-term institutional controls/restrictions to protect against exposure to contamination (similar to Alternative 2)
- Long-term LUCs (written into a LUCIP, enforceable under CERCLA and the FFA) used to prevent access to residual contamination with depth, and to prevent inappropriate future use

of site by residents
1. property record notices
2. property record restrictions (if property were to be transferred - possible under Alternative 2
3. maps of residual contamination filed with local authorities
4. zoning notices

- Near-term access controls (postings, fences, security guards, surveillance patrols) for security of classified (but not hazardous) wastes that is not removed [Note: no indication in Plan of how long "near-term" might be – DOE arbitrarily assumes 30 years]
- Maintain existing excavation permit program (less intensive version for excavations below 10 ft; administered by DOE [Note: the Plan does not explicitly call out this alternative]
- Groundwater monitoring to assess effectiveness of source removal actions to protect groundwater (until a final groundwater decision would be implemented at ETTP)

Institutional controls and related measures such as monitoring, inspection/surveillance, and maintenance are all important measures for continuing protection of workers, the public, and the environment over the long term. Under the proposed plan, these measures are generally to be continued for the long term following completion of remediation activities, and are shared to a lesser or greater degree by all four action alternatives. If one limits the term "institutional controls" to include primarily land use controls (LUCs) and the legal instruments (e.g., deed restrictions) to guarantee their continuance, one sees from Table 2 that the differences in costs and degree of reliance among action alternatives are comparatively slight (< 3% between the least costly Alternative 2 and the most costly Alternatives 3 and 4). The greatest cost difference involving strictly institutional controls is in fact the difference in initial costs of implementing the LUCs (deed restrictions including legal fees, administrative controls, and documentation): $666,000 for Alternative 4 vs. only $333,000 for the other three action alternatives.

All action alternatives would require (see FFS Table 6.9):

- Preparation of a LUCIP
- Legal fees for preparation and filing of property record (deed) restrictions notices, including covenant not to sue
- Legal fees for preparation and filing of property record notices
- Preparation of survey plat for zoning notice
- Update/administration of excavation/penetration permit program
- Posting of signs within Zone 2 advising of use restrictions
- Annual validation/certification of LUCIP implementation
- Legal fees for preparation of filing of property transfer notice for sale or lease (if necessary)
- Surveillance patrols and security guards (O&M activities).

Major differences in cost, however, are seen in the expected costs of inspection, maintenance, and security measures among the alternatives because capping (Alternatives 3 and 4) or only partial removal of the K-1070-C/D burial ground (Alternative 5) involve significantly more aggressive use of these measures than does Alternative 2. Combining the costs of these measures with the costs of institutional controls and monitoring, Alternatives 3 and 4 are seen to require a total of about 2.5 times

or more the total investment for Alternative 2, while Alternative 5 would require about 1.5 times as much as Alternative 2 (lower because primarily security measures are less expensive than the additional maintenance and inspection activities required for the cap in Alternatives 3 and 4).

Table 2 provides a qualitative ranking of the alternatives in terms of their comparative costs and degree of reliance on institutional controls and related measures to achieve protection of human health and groundwater. Based on the information presented in the FFS, FFSA, and Plan, it is probably that most potential investors in industrial development of the site would prefer Alternative 2 (if total cost of implementation and long-term control is no object) because there would be less contaminated material left behind than under Alternatives 3 and 4, fewer "reminders" of what lies beneath (compared to Alternatives 3, 4, and 5), and about 30 additional acres of land available for development.

Table. 2. Comparative Degrees of Reliance on and Escalated Costs ($) of Institutional Controls (including Land Use Controls, LUCs), Groundwater Monitoring, and Cap Inspection, Maintenance, and/or Security Among Alternatives.

Alternative[a]	Degree of Reliance	LUCs Initial Cost[b]	LUCs Cost (27 yrs)	Groundwater Monitoring Cost [c]	Cap Inspection, Maintenance, or Security [d]	Total Costs LUCs, Monitoring, Cap Insp., Maint., Security	Cost Factor [e]
Alternative 1	0	0	0	0	0	0	N/A
Alternative 2	Lowest	333,000	2,745,000	428,000	0	3,506,000	1.0
Alternative 3	High	333,000	2,824,000	440,000	5,149,000	8,746,000	2.5
Alternative 4	Highest	666,000	2,824,000	440,000	5,149,000	9,079,000	2.6
Alternative 5	Medium	333,000	2,785,000	434,000	1,583,000	5,135,000	1.5

[a] Description of alternatives:
Alternative 1 – No Action
Alternative 2 – Remove contaminated soil to 10 ft, and full removal of the K-1070-C/D and K-1070-B burial grounds
Alternative 3 – Remove contaminated soil to 10 ft, excavate K-1070-B burial ground, cap K-1070-C/D burial ground
Alternative 4 – Remove contaminated soil to 2 ft, no excavation of K-1070-B burial ground, cap K-1070-C/D burial ground
Alternative 5 – Remove contaminated soil to 10 ft, remove buried waste from K-1070-B regardless of depth, partial removal of K-1070-C/D burial ground
[b] Deed Restrictions including legal fees, administrative controls, and documentation
[c] Monitoring for a maximum of three years
[d] Alternatives 2 and 3: cap inspection, maintenance, and security; Alternative 5: security of buried classified materials
[e] Ratio of each alternative's cost to assumed cost value of unity for Alternative 2

Distribution of Contaminants of Concern by Exposure Unit

Only 14 of the 44 EUs in Zone 2 were determined to have COCs in their soils (Table 3); however, it should be noted that no soil data were available for five other EUs. With a total of 11 COCs, EU Z2-25 is seen to have almost twice as many COCs as the next highest count (7) for Z2-31 immediately to the east of Z2-25 (see Fig. 8 of the Plan).

Table 3. ETTP Zone 2 Exposure Units (EUs) determined to have COCs[a]

EU	Metals	PCBs	Radionuclide	Total COCs
Z2-13	0	0	5	**5**
Z2-16	0	0	6	**6**
Z2-17	4	0	0	**4**
Z2-18	0	0	5	**5**
Z2-19	0	0	6	**6**
Z2-22	0	0	3	**3**
Z2-25	5	0	6	**11**
Z2-27	1	1	0	**2**
Z2-28	0	0	6	**6**
Z2-30	0	0	5	**5**
Z2-31	3	0	4	**7**
Z2-33	0	0	6	**6**
Z2-39	0	0	6	**6**
Z2-41	0	0	5	**5**

[a] COCs determined from risk calculations. No soil data for EUs Z2-04, Z2-05, Z2-07, Z2-34, and Z2-43.

Source: FFS, Appendix A, Table A.10.

The "War Zone" Issue

Some SSAB members and others have expressed concern about what might be Bechtel Jacobs' plans for the rubble resulting from demolition of "clean" buildings in Zone 2 of ETTP. More specifically, they foresee the possibility that the rubble would be left in piles around the site, thereby creating a landscape looking more

like a WWI battlefield than a site attractive to potential clients, and thus discouraging economic investment in reindustrialization of the site. BJC has submitted an ETTP Waste Handling Plan, Part 2 (WHP2) for "predominantly uncontaminated facilities" to regulators and the public for review. Under Sect. 3.1 of this plan, wastes satisfying Y-12 WAC would be sent to Y-12 land fills V and VII for construction debris, however, the WHP2 later appears to contradict itself in Sect. 4.1 by stating that ". . . placement of crushed, non-hazardous building debris meeting DOE Order 5400.5 requirements. . . *will occur in ETTP fill areas*" [emphasis added]. Wastes not meeting WAC would be disposed of at the EMWMF or at an off-site disposal facility.

While indicating that excavated soils would, depending on levels of contamination, either be removed from the site, or used as fill followed by contouring (or "grading") of the fill areas, the FFS, FFS Addendum, or Plan similarly state that slabs and other subsurface structures would be either removed or used as fill. The demolished concrete could be used as fill, however, only if remediation levels required for soil could be met. This would probably entail crushing of much of the concrete before using as fill. [It should be noted that demolition of aboveground standing structures is apparently *not* within the scope of the FFS and Plan.]

Here is what the Plan says about excavation and fill under Alternative 2:

> After excavation, confirmatory sampling in the open hole would occur before it is backfilled, graded, and stabilized. Concrete meeting the remediation levels from either subsurface structure removal or from building demolition would be used in larger excavations as fill material to save on soil fill and its transportation requirements, and to limit the transport of clean debris off of ETTP to landfills.

However, the Plan goes on to say that "The methodology for management and placement of concrete on-site will be developed in a post-ROD document."

The SSAB may want to consider a comment to the effect that the Plan and the ROD should commit to a program of topographic restoration (grading/contouring/revegetation where appropriate) of excavated areas and demolished building rubble piles (including all excavated material not removed from ETTP) that the public and prospective clients/tenants would find both aesthetically acceptable and representative of natural topography in the area. [Note that the demolition of clean buildings would, or in some cases possibly is being done under a separate action.]

Some board members also raised a related issue, the potential effect on economic investment in reindustrialization of the site by the preferred Alternative 5's removal of only contaminated soils and wastes from the K-1070-C/D burial ground, but not classified wastes and materials. There is concern that the specter of an empty, 30-acre mound or field surrounded by fencing, warning signs, and patrols by security personnel in the midst of a site otherwise zoned for reindustrialization may well discourage investment by potential clients and tenants, even though these institutional controls would be for the "near term" or a "short time," and for security reasons, not because environmental contamination would still remain. Key questions appear to be (1) exactly what is meant by the "near term" or "short time" as used in the FFS and Plan, and (2) how to communicate to the targeted business community a realistic assessment of the situation (i.e., that the visible institutional controls on the K-1070-C/D burial ground

are strictly to protect classified material – they are not in place for reasons of environmental contamination). In any event, about 30 acres of the ETTP would remain unavailable for industrial development for a "short time" under the preferred Alternative 5. Interestingly, the FFS Addendum does state that because the "short-term" time frame cannot be estimated, a period of *30 years* is arbitrarily assumed.

Similar concerns for impacts on economic investment (but the institutional controls would be more or less permanently in place) could be expressed for the capping instead of excavation of the K-1070-C/D burial ground as proposed in Alternatives 3 and 4. It appears to be safe to say that from the perspective of an interested investor, that Alternative 2, followed by Alternative 5, would prove the more attractive options.

Incorporation of NEPA Values

Given that all the alternatives involve *remedial* actions that would take place primarily on a site that has already been highly disturbed, the level of incorporation of NEPA values generally appears adequate. Even so, the documents, and the reading public, would benefit from more detailed discussions of socioeconomics and the Poplar Creek ecosystem, and the positive and negative impacts they may incur under the various alternatives. For example, would meeting groundwater MCLs provide adequate protection for fish and other aquatic life of Poplar Creek? How much woodland and wetland would be lost under the various alternatives? Can the impacts on socioeconomics and environmental justice be analyzed and stated in at least a semi-quantitative way, rather than simply stating that "implementation of this alternative [Alternative 5] could assist in achieving stable socioeconomics in the area . . ." (FFS Addendum 2004)?

Reasonably foreseeable accidents do not appear to have been adequately addressed in any of these documents with the possible exception of traffic accidents associated with waste and fill transport. Unlike the case with the predicted incidence of traffic accidents, accidents on site resulting from remediation actions may well be a discriminating factor among the five alternatives. Alternative 2, for example, would probably be expected to have a higher probability of serious on-site accidents involving workers than Alternative 4.

With respect to the NEPA issue of irretrievable and irreversible commitment of resources, the documents note that each of the action alternatives would consume fuel and other nonrenewable energy resources, but then contradictorily claim that *no impacts from these alternatives are irreversible*. They do state, however, that loss of EMWMF capacity under any of the action alternatives is in fact an irreversible commitment of resources.

Loss of EMWMF capacity is an irreversible commitment that does serve as a factor for discriminating among the various alternatives as shown in Table 4 below.

Table 4. Waste Management Facility (EMWMF) capacity required by remedial action alternatives in units of 1000 cubic yards.

Alternative	Expected Required Capacity (1000 cy)	Upper Bound Capacity Estimate, 1000 cy)
Alternative 1	0	0
Alternative 2	150	250
Alternative 3	47	95
Alternative 4	28	95
Alternative 5	52	112

Thus Alternative 2 is seen to require the most EMWMF capacity, and Alternative 4 the least (of the action alternatives). Alternative 5 is estimated to have somewhat more impact on disposal capacity than Alternatives 3 and 4, but much less than Alternative 2 (by more than a factor of two).

Comparative assessment of alternatives against CERCLA evaluation criteria

CERCLA and the NCP requires that all alternative be evaluated against nine major criteria:

1. Overall protection of human health and the environment
2. Compliance with ARARs
3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility, or volume through treatment
5. Short-term effectiveness
6. Implementability
7. Cost
8. State acceptance
9. Community acceptance

The first two criteria must be met for any alternative to be considered for selection in a ROD. The State and Community acceptance criteria would be evaluated after consideration of comments.
The Plan has evaluated each alternative against the first seven of these criteria.
The Plan indicated that there were no substantive differences among the action alternatives for three of the criteria, i.e., Overall protection, Compliance with ARARs, and Reduction of toxicity,

mobility, or volume through treatment (no significant treatment is foreseen), with the exception that Alternatives 3 and 4 rely more on the effectiveness of the cap and institutional controls than do Alternatives 2 and 5.

With respect to Long-term effectiveness, the Plan found that all four action alternatives satisfy this criterion, but again, Alternatives 3 and 4 depend more on (a) institutional controls than do Alternatives 2 and 5, and (b) long-term maintenance of the cap, not a factor with Alternatives 2 and 5, to achieve long-term management of risk.

Alternative 5 was rated highest for short-term effectiveness because the Plan found it to pose the lowest probability of impacts to workers and the community due to less excavation than Alternative 2 and no need for cap fill as required for Alternatives 3 and 4.

Implementability would be easiest under Alternative 4 (unless excavation of the K-1070-B burial ground should unexpectedly be required), most difficult under Alternative 2 (due to magnitude of burial ground excavation, materials handling, disposal scheduling, security patrols, and potential for unexpected waste). Implementability of Alternatives 3 and 5 would be similar to Alternative 4, but on a smaller scale because either there would be no excavation (Alternative 3) or only partial excavation (Alternative 5) of K-1070-C/D.

Finally, capital costs were predicted in the Plan to be considerably less for Alternatives 4 and 5 ($60,000,000 and $62,000,000, respectively) than for Alternatives 2 and 3 ($105,000,000 and $72,500,000, respectively). O&M costs on the other hand, were predicted to be lowest for Alternative 2, about 50% more for Alternative 5, and more than 2.5 times more for Alternatives 3 and 4 (See Table 5 below).

Table 5. Comparative Costs for Implementation of Alternatives.

Alternative	Escalated Capital Cost ($1,000,000)	Annual O&M Cost ($1,000,000)
Alternative 1	0	0
Alternative 2	105	0.118
Alternative 3	72.5	0.311
Alternative 4	60	0.311
Alternative 5	62	0.178

Based on its evaluation of each alternative with respect to the first seven of the CERCLA/NCP

COMMENTS AND RECOMMENDATIONS

STEWARDSHIP

How will effective Stewardship be guaranteed for the indefinite future?
The FFS, FFSA, and Plan do indicate that DOE is committed to maintaining necessary LUCs to protect future users of the site. The SSAB, however, wants to see concrete guarantees, including within the final ROD itself, for long-term funding of continued implementation of such measures as well as any other stewardship measures that may prove necessary in the future to satisfy all remediation goals (i.e., protection of worker health, public health, *and* the environment) in perpetuity, that is, beyond the assumed 25 years of industrial use if necessary. Some type of trust fund may be the most appropriate financial vehicle for this purpose.

INCORPORATION of NEPA VALUES
Adequacy of environmental assessments.
The FFS, FFSA, and Plan, and the reading public, would benefit from more detailed, and where possible, quantitative, analysis and discussions of, for example, socioeconomics, the Poplar Creek ecosystem, terrestrial habitat, wetlands, and the positive and negative impacts they may incur under the various alternatives. For example, would meeting groundwater MCLs provide adequate protection for fish and other aquatic life of Poplar Creek? How much woodland and wetland would be lost under the various alternatives? Can the impacts on socioeconomics and environmental justice be analyzed and stated in at least a semi-quantitative way, rather than simply stating that "implementation of this alternative [Alternative 5] could assist in achieving stable socioeconomics in the area . . ." (FFS Addendum 2004)?

Accident analysis.
Reasonably foreseeable accidents do not appear to have been adequately addressed in any of these documents with the possible exception of traffic accidents associated with waste and fill transport. Unlike the case with the predicted incidence of traffic accidents, accidents on site resulting from remediation actions may well be a discriminating factor among the five alternatives. Alternative 2, for example, would probably be expected to have a higher probability of serious on-site accidents involving workers than Alternative 4. Please provide adequate analyses of reasonably foreseeable non-traffic-related accidents.

Irretrievable and irreversible commitment of resources
With respect to the NEPA issue of irretrievable and irreversible commitment of resources, the documents note that each of the action alternatives would consume fuel and other nonrenewable energy resources, but then contradictorily claim that *no impacts from these alternatives are irreversible*. This statement appears to be incorrect. Please correct or explain. The documents do acknowledge, however, that loss of EMWMF capacity under any of the action alternatives is in fact an irreversible commitment of resources.

Potential for improper segmentation of actions and impacts.
CEQ regulations (40 CFR 1508.25) and DOE recommendations (DOE 1993) call for NEPA reviews (EISs specifically) to assess effects of connected, cumulative, and similar actions. Failure to properly assess connected, cumulative, and similar actions can result in improper segmentation or piecemealing of adverse effects and consequent diminishment of their significance. The SSAB is concerned that the FFS and related documents have not adequately addressed the potential for segmentation of impacts and

their significance. For example, one separate action (separate from the proposed Zone 2 remediation considered here) calls for demolition of "predominantly uncontaminated facilities" at ETTP followed by disposal of the resulting demolition wastes as set forth in the WHP2. Both the Zone 2 remediation proposal and the uncontaminated facilities demolition and disposal action appear to be not only "connected," but "cumulative" and "similar" as well. It is therefore necessary that impacts of the proposed Zone 2 remediation effort be assessed in relation to the demolition and disposal action and any other actions that may be proposed. Special attention should be focused on cumulative impacts of these various actions (see related comment below).

FFSA, Socioeconomics and Land Use, p. 23.
Please expand the presently limited assessment of socioeconomics and land use. For example, the potential for and effects of a boom or bust effect on local employment and the local economy as the proposed remediation effort begins, peaks, and terminates should be addressed.

Cumulative Impact Analysis should be expanded.
The assessment of cumulative impacts in the FFS and related documents appears to be limited to a brief discussion of cumulative transportation impacts from the proposed Zone 2 remediation effort and the building demolition and disposal also planned at ETTP. There are, however, other possible kinds of cumulative impacts (e.g., socioeconomic, ecological, wetland, air pollution, human health, and impacts on future value for industrial development) and other past, present, and future actions (whether federal, non-federal, or private), including numerous past, present, and future removal actions that may contribute to cumulative impacts. These also should be addressed in the FFS and related documents to satisfy DOE's requirement to incorporate NEPA values such as cumulative impact assessment in CERCLA-related review documents. For example, this remediation proposal is directed at soils, buried wastes, and subsurface structures; other media that may contribute to human exposure such as groundwater and surface waters will be addressed in later CERCLA decisions. As far as practicable, the cumulative impacts from all of these potential sources of exposure should be assessed in these documents.

OTHER COMMENTS/RECOMMENDATIONS

What will Zone 2 look like: Industrial Park, or War Zone?
Some SSAB members have expressed concern about what might be Bechtel Jacobs' plans for the rubble resulting from demolition of "clean" buildings in Zone 2 of ETTP. More specifically, they foresee the possibility that the rubble would be left in piles around the site, thereby creating a landscape looking more like a WWI battlefield than a site attractive to potential clients, and thus discouraging economic investment in reindustrialization of the site. If the rubble (whether demolition wastes from clean buildings, or from underground structures) is used as fill, will the resulting grounds be appropriately restored and contoured for compatibility with industrial uses, and where appropriate, ecological values?

BJC has submitted an ETTP Waste Handling Plan, Part 2 (WHP2) for "predominantly uncontaminated facilities" to regulators and the public for review. Under Sect. 3.1 of this plan, demolition wastes satisfying Y-12 WAC would be sent to Y-12 land fills V and VII for construction debris. Wastes not meeting WAC would be disposed of at the EMWMF or at an off-site disposal facility. Later however,

the WHP2 states in Sect. 4., with little explanation, that ". . . placement of crushed, non-hazardous building debris meeting DOE Order 5400.5 requirements. . . *will occur in ETTP fill areas*" [emphasis added]. Table 2 adds to the confusion by indicating that 13090 cy or 94% of construction debris will be sent to the Y-12 landfills and only 5% (4914 cy) will be "free-releasable concrete," destination to be determined. There is no direct indication in the text or the table that this free-releasable concrete will likely be used as fill at ETTP. Moreover, 4914 cy of concrete is more like 27% by volume of the total waste stream – not 5% as indicated in the WHP2, Table 2.

Both the WHP2 and the FFS (and related documents) should explicitly, and where possible, quantitatively set forth the precise disposition of the demolition wastes, and indicate the visual, environmental, and engineering impacts (i.e., engineering integrity of fill areas in terms of siting new industrial facilities) on Zone 2. The Plan, ROD, and WHP2 should clearly demonstrate DOE's commitment to a program of topographic restoration (grading/contouring/revegetation where appropriate) of excavated areas and demolished building rubble piles (including all excavated material not removed from ETTP) that the public and prospective clients/tenants would find both aesthetically acceptable, representative of natural topography in the area, and compatible with construction of future industrial facilities. [Note that the demolition of clean buildings would, or in some cases possibly is being done under a separate action.]

Investing public's preferred alternative?
Based on the information presented in the FFS, FFSA, and Plan, it is probably that most potential investors in industrial development of the site would prefer Alternative 2 (if total cost of implementation and long-term control is no object) because there would be less contaminated material left behind than under Alternatives 3 and 4, fewer "reminders" of what lies beneath (compared to Alternatives 3, 4, and 5), and about 30 additional acres of land available for development.

Potential effect of Alternative 5 on economic investment in reindustrialization.
Related to the previous comment are concerns for the potential effect on economic investment in reindustrialization of the site by the preferred Alternative 5's removal of only contaminated soils and wastes from the K-1070-C/D burial ground, but not classified wastes and materials. There is concern that the specter of an empty, 30-acre mound or field surrounded by fencing, warning signs, and patrols by security personnel in the midst of a site otherwise zoned for reindustrialization may well discourage investment by potential clients and tenants, even though these institutional controls would be for the "near term" or a "short time," and for security reasons, not because environmental contamination would still remain. Key questions appear to be (1) exactly what is meant by the "near term" or "short time" as used in the FFS and Plan, and (2) how to communicate to the targeted business community a realistic assessment of the situation (i.e., that the visible institutional controls on the K-1070-C/D burial ground are strictly to protect classified material – they are not in place for reasons of environmental contamination or other hazards to potential tenants). In any event, about 30 acres of the ETTP would remain unavailable for industrial development for a "short time" under the preferred Alternative 5. Interestingly, the FFS Addendum does state that because the "short-term" time frame cannot be estimated, a period of *30 years* is arbitrarily assumed. Please define or explain such terms as "near term" and "short time" (as used for example, in the Plan, pp. 32, 37, 38).

Similar concerns for impacts on economic investment (but the institutional controls would be more or less permanently in place) could be expressed for the capping instead of excavation of the K-1070-C/D burial ground as proposed in Alternatives 3 and 4.

Revision of protection goal for future land use.
The non-cancer protection goal for human health under an industrial land use has been revised from an HI of less than 3, as expressed on p. 17 in Draft 2 of the Plan, to a more conservative threshold of less than 1 in Draft 3 of the Plan. The Plan should summarize the areas or sources where an HI of 1 is exceeded.

Also, Table 1 of the Plan ("Maximum carcinogenic risk and hazard index values . . .") and the associated discussion on p. 16 should clarify that the risk and HI values presented here are for current conditions, not post-remediation conditions (if that is in fact the case).

Plan pp. 7, 12; FFS p. 6-1. Possible presence of DNAPLs.
Please discuss the environmental and regulatory implications with respect to the proposed plan should the suspected presence of DNAPLs be confirmed (the reported presence in groundwater of some chlorinated solvents such as trichloroethene at concentrations as high as 5500 ug/L, or 1100 times the MCL, is suggestive of its occurrence as a DNAPL). How would the discovery of DNAPLs affect implementation of the Plan? Please explain why DNAPLs are "not covered in this decision" (FFS, p. 6-1).

Plan, general comment.
Please address the issue of what will be done for wastes and contaminated media below a depth of 10 ft (or 2 ft in the case of Alternative 4), especially should groundwater MCLs or surface water criteria continue to be exceeded after the proposed remediation effort.

Plan, Table 4, p. 21, FFSA, Table 3, p. 5 -- Soil remediation levels Footnote "g" ("h" in FFSA, Table 3) states that "For the Zone 1 decision, the average RL of 600 mg/kg for mercury was selected to achieve an HQ = 1.0. As a result of changes in risk assessment guidance since that time, this concentration is now estimated at HQ = 1.9." The SSAB recommends that the RL for mercury be recalculated based on the new guidance rather than simply staying with a less conservative value based on out-of-date guidance.

Plan, Burial Grounds, Slabs and Subsurface Structures, p. 25.
What is the status of Burial Ground K-1070-G and how will it be remediated if necessary under each action alternative? Is this burial ground the same thing as the G-Pit which was at one time a source of releases to groundwater as discussed in the FFSA, p. 9?

The Plan assumes that no RCRA wastes will be excavated. Does this mean that no RCRA wastes are assumed to reside anywhere in the soils of ETTP? How realistic is such an assumption that no RCRA wastes exist on-site?

Why does development of a methodology for management and placement of concrete on-site have to

wait until after the final ROD?

Plan, Soil Conceptual Site Model, Fig. 3, p. 8.
Please explain why this conceptual model does not include non-rad inorganics such as heavy metals, and non-volatile organics, both types of which appear to be present in some soils at ETTP?

FFSA, Table 7, K-1070-C/D Uncertainty Management, p. 21.
The uncertainty management action for the D-trenches is stated to be excavation up to 8 ft in depth across the trench area. Was 10 ft intended here? If not, please explain the 8-ft figure.

FFS, Table 2.1, Sources of Soil Contamination, p. 2-10.
Why are there no data available on known or potential contaminants from the K-1435 TSCA Incinerator? This would appear to be a significant deficiency that could compromise assessment of existing conditions in Zone 2 in light of the incinerator's potential for contaminant release in the area.

FFS, Table 2.2, Sources of Soil Contamination, p. 2-16.
Are there no data available at all on known or potential contaminants from the K-1239 Decontamination Pit? As in the preceding comment, this would seem to be a significant deficiency compromising the ability to assess existing conditions within Zone 2.

FFS, Data Screening Process, p. 3-4.
Sect. 3.1.3 states that no screening was applied to essential nutrients because none of them have toxicity-based screening levels. Several essential nutrients are in fact listed in the FFS (e.g., Table 3.1 and Appendix A) as COPCs, having exceeded screening PRGs. These include the essential nutrients calcium, chromium, copper, iron, magnesium, manganese, nickle, potassium, sodium, and phosphorus. It seems quite likely that at least some of these nutrients, most of which can be toxic, and some at levels not substantially higher than nutritive levels (e.g., manganese which did exceed PRGs, and selenium, which did not) do have some kind of toxicity-based screening levels established for them. Please confirm or explain the statement that these nutrients have no toxicity-based screening levels when, at the least, PRGs served as screening levels for these nutrients.

FFS, Proposed Cap, Fig. 6.4, p. 6-24.
Please explain the significance of the "yellow" area in the map (perhaps the boundary of the proposed cap?).

FFS, Magnitude of Residual Risks, p. 7-7.
Please explain why "Any area smaller than 50 ft in diameter cannot support an exposure duration of 10 % of a worker's time . . ." Is it possible, for example, that a clerk or a foreman might spend considerably more than 10% of his time in an office located at a "hot spot" smaller than 50 ft in diameter?

Conventions and Acronyms

[text]	Author's notes and comments
ARAR	Applicable or Relevant and Appropriate Requirement
BJC	Bechtel Jacobs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EMWMF	Environmental Management Waste Management Facility
ETTP	East Tennessee Technology Park
FFS	Focused Feasibility Study for Zone 2 Soils and Buried Waste, East Tennessee Technology Park, Oak Ridge, Tennessee. DOE/OR/01-2079&D1/R1. U.S. Dept. of Energy, Office of Environmental Management, Oak Ridge, TN. 2004 (a).
FFSA	Addendum to the Focused Feasibility Study for Zone 2 Soils and Buried Waste, East Tennessee Technology Park, Oak Ridge, Tennessee. DOE/OR/01-2079&D2/R1/A1. U.S. Department of Energy, Office of Environmental Management, Oak Ridge, TN. 2004 (b).
LUC	Land Use Control
LUCAP	Oak Ridge Reservation Land Use Control Assurance Plan
LUCIP	Land Use Control Implementation Plan
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	Operation and Maintenance
NEPA	National Environmental Policy Act
Plan	Proposed Plan for Contaminated Soil, Buried Waste, and Subsurface Structures In Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee. DOE/OR/01-2110&D2. U.S. Department of Energy, Office of Environmental Management, Oak Ridge, TN. 2004 (c).
SSAB	Oak Ridge Reservation Site Specific Advisory Board
TDEC	Tennessee Dept. of Environment and Conservation
WHP2	Waste Handling Plan–Part2 for Predominantly Uncontaminated Facilities of the Remaining Facilities Demolition Project at the East Tennessee Technology Park, Oak Ridge, Tennessee. DOE/OR/01-2174&D1. U.S. Department of Energy, Office of Environmental Management, Oak Ridge, TN. July 2004.